

Thai Breastfeeding Atlas:

English Edition

**Siraporn Sawasdivorn
Kannika Bangsainoi
Kusuma Chusilp
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Siriluck Thavonvattana
Thidarat Wongwisuthi
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Editors Siraporn Sawasdivorn
Kannika Bangsainoi
Kusuma Chusilp
Rachada Kasemsup
Siriluck Thavonvattana
Thidarat Wongwisuthi
Walai Chetawan

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Acknowledgements

Actually, studying how to breastfeed is both science and art, but many obstacles have long obstructed the culture of breastfeeding. Hence, studying it through pictures can make it simple.

I feel really appreciated with this first Thai Atlas of Breastfeeding produced by the cooperative team of editors. Though it took a limited time of preparation, it covers all essence and can be a practical manual.

Associate Professor Khunying Saree Chittinan, M.D.

...Truly appreciated the strong cooperation in writing and editing both content and pictures comprehensively within the limited time for this first preparation.

It is expected that every mother should feed her baby from her warm breast in order that Thai children will grow up with good health and quality.

Clinical Professor Suchitra Nimmannit, M.D.

...Breastfeeding seems to be difficult for the inexperienced, and it might be much more difficult if someone needs to breastfeed continually. However, if mother begins to do so constantly, it will be worthwhile to give away the best to her baby.

I feel very delighted to observe this Atlas with full context, easy understanding, and fruitful photos. It can help both officials and mothers to thoroughly understand how to breastfeed both in theory and practice. It will ease the believed difficulty to simple practicality. All in all, it will provide the greatest benefits to our country.

Professor Emeritus (Pediatrics) Wirapong Chatranon, M.D.

...Breastfeeding provides mother with good benefits in both physical and mental health. In addition, such benefits can expand to the macro level in terms of socio-economic facet since it is economical, energy-saving, and pollution and waste reducing. It will help decrease the global warming indirectly.

When considering this Atlas, I find its value, full context, and easy clarification for the ones who need it. I wish to congratulate and appreciate all participating bodies in helping produce this Atlas. Lastly, it is my great honor to take part in writing this acknowledgement.

Professor Emeritus Urapon Boonprakob, M.D.



... While a baby is sucking breast milk, its brain will be stimulated through 6 channels: eye-contact, mother's soft tone, mother's body scent, taste of breast milk, soft touch from embracing and kissing, and heartfelt caring, producing profound happiness that turns into tight-knit- ted relationship and delicate love.

This “Breastfeeding Atlas: Thai Edition” is important and beneficial to the success of breastfeeding which is essential for Thai children to touch the marvelous chance from nature. I feel really appreciated the powerful cooperation of the edition team in producing this Atlas successfully.

Professor Emeritus Khun Sakorn Thanamitt, M.D.

“The Breastfeeding Atlas: Thai Edition” prepared by the Thai Breastfeeding Center Founda- tion can transfer knowledge of breastfeeding into the complete practicality in a very easy format. It can lead to the success in breastfeeding for the good health of baby. Consequently, the qualified population for the country can be guaranteed in the future.

Professor Usa Tisayakorn, M.D.

“The Breastfeeding Atlas: Thai Edition” is the valued manual of breastfeeding for officials and the pride of people in the breastfeeding arena. Especially, each editor transferred her expertise with the highest intention to prepare the useful atlas for all relevant officials to study by them- selves with ease.

Miss Nongnuch Boonyakiat



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Editorial

It took almost 3 years to organize and prepare this Atlas by starting from the commitment among official teams from various health-concerned networkings both in the private and public sectors. Its main objective is to produce the Atlas to be a pivotal jigsaw in enhancing skills and strengthening confidence among medical and public health officials about how to support breastfeeding to all mothers correctly.

Lots of pictures and knowledge were collected and condensed from the long-term thoughts of highly skillful people working in this field. Some people have gained such a valuable experience for more than 30 years.

This inspiration to collect such knowledge and experience might not be achieved without the active encouragement from various sponsors and all sacrificing authors.

It can be proudly said that this Atlas was not finished by the only one editor but by the strongly cooperative editorial board. Every member took the devoted participation in checking, editing, collecting, and selecting articles including organizing all photos. In some cases, several were taken or drawn again and again in order to ascertain the best outcome.

Our sincerest appreciation goes to every sponsor, the Committee, and the strenuous coordinating team especially for Khun Suthirat Tiwaratkul, Khun Chiraporn Wongsewok, and Khun Suwannee Kaewchantong at the Thai Breastfeeding Center Foundation.

After Thai Edition was published, it took almost 3 years to complete the English edition because of *the challenges of translation*.

Thank you all the professionals who involved in translation, especially Dr. Anuson Quamman and Dr. Suda Yenbamroong.

Siraporn Sawasdivorn
Kannika Bangsainoi
Kusuma Chusilp
Rachada Kasemsup
Siriluck Thavonvattana
Thidarat Wongwisuthi
Walai Chetawan



Alphabetical List of Authors

Kannika Bangsainoi M.D., Ped

M.P.H. (Population and Family Health)
Cert. Lactation Management Education
(WellStart)
Cert. Breastfeeding: Practice and Policy,
Institute of Child Health, UK

Kusuma Chusilp M.D., Ped

Master of Community Health (Nutrition)
Cert. Lactation Management Education
(WellStart)

Meena Sopsamai

Professional Nurse, Lactation Consultant
Bachelor of Science (Nutrition)
Graduate Diploma in Childbirth Education
(Australia)
International Board Certified Lactation
Consultant

Nipunporn Woramongkol M.D., Ped

Cert. Lactation Management Education
(WellStart)

Rachada Kasemsup M.D., Ped

M.S. (Nutrition)
University of

Siraporn Sawasdivorn M.D., Ped

Cert. Hubert H. Humphrey Fellowship
(Emory University)
Cert. Lactation Management Education
(WellStart)
Cert. Breastfeeding: Practice and Policy,
Institute of Child Health, UK

Siriluck Thavornvattana

Registered Nurse
Advanced Practical Nurse; APN (Pediatric
Nursing)
Master of Education (Health Education)

Sirinuch Chomtho M.D. (First-class Honors)

Master of Science (Pediatrics)
Ph.D. in Nutrition, University College
London, UK
Diploma in Pediatric Nutrition, RCPCH, UK

Siripattana Sirithanaratanakul M.D., Ped

Cert. Breastfeeding: Practice and Policy,
Institute of Child Health, UK

Sopapun Ngerchum M.D., Ped

Neonatal & Perinatal Medicine

Su-aree Oantrakarn M.D., Obgyn

Dip. Obstetrics, New Zealand
Cert. Lactation Management Education
(WellStart)

Supa Harikul M.D., Ped

Pediatric Gastroenterology and
Hepatology

Sureelux Sucharitpong M.D., Ped

Developmental-Behavioral Pediatrics
Cert. Developmental Pediatrics, University of
Glessen, Germany



Sutheera Uapairojkij M.D., Ped

Neonatal & Perinatal Medicine

Tawee Chotepitayasunon M.D., Ped

Pediatrics, D.T.M. & H

Sub-division of Pediatric Infectious
Disease

Thidarat Wongwisuthi

Professional Nurse

Cert. Lactation Management Education
(WellStart)

Walai Chetawan

Professional Nurse

Cert. Breastfeeding: Practice and Policy,
Institute of Child Health, UK

Wilairux Busabun

Professional Nurse

Umaporn Sutasworawut M.D., Ped

Pediatric Nutrition

Uraiporn Chitchang

Ph.D. (Nutrition), Mahidol University

Uraivan Chotekiat M.D., Ped

Neonatal & Perinatal Medicine

Cert. Neonatology, Louisiana State
University Medical Center

Borworn Ngarmsiri-udom M.D., Ped

Cert. Statistics and Epidemiology

Kannikar Wichitsukon

Professional Nurse

Cert. Lactation Management Education
(WellStart)

**Piyaporn Borwornkiratikachorn
M.D., Ped**

**Yupayong Hangchaowanich M.D.,
Obgyn**



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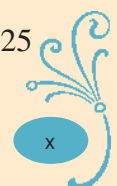
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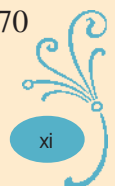
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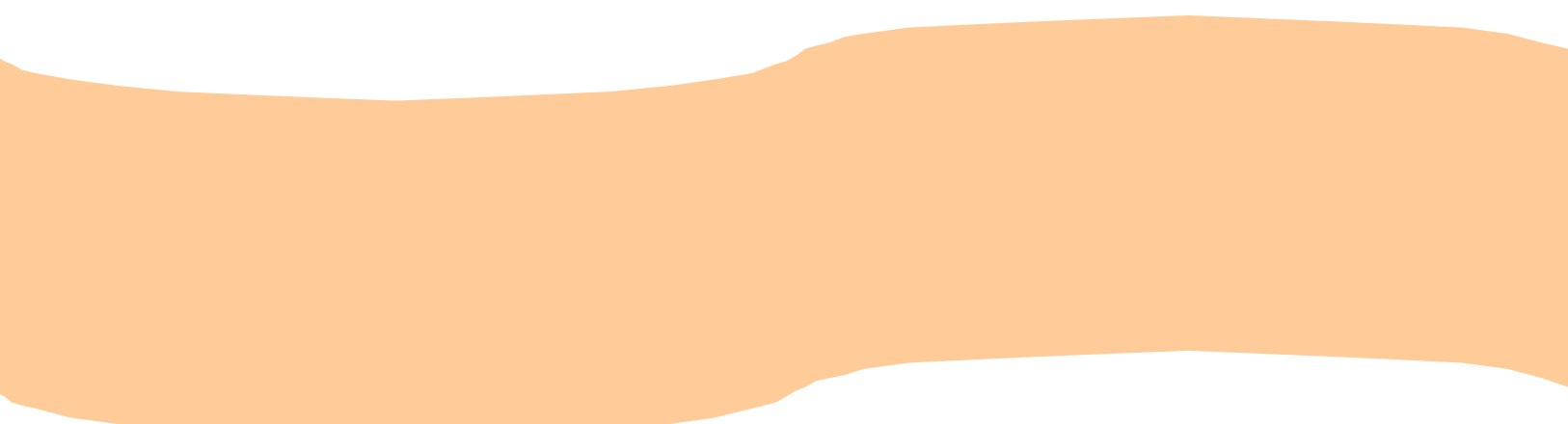


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Unit 1

Introduction to Breastfeeding

1.1 Breastfeeding : Nature's way

- Mother, the vital and essential environment for the newborn
- Newborn instincts and breastfeeding sequence
- Breastfeeding cues
- Postnatal conditions, newborn general care, eye drop, and vaccination
- Duration for breastfeeding

1.2 Learning about the mother's breasts

- Anatomy of the female breast and nipple
- Change in the breasts, areolas and nipples before pregnancy
- Change in the mother's breasts during pregnancy
- Examination and assessment of the breasts and nipples

1.3 Knowledge on breast milk

- Lactation
- Colostrum
- Mature milk

1.4 Correct positioning and proper suckling

- The mother's preparation in breastfeeding
- Breastfeeding position
- Correct positioning
- Assessment of latching on

1.5 Newborn stools after breastfeeding

1.6 Newborn urines after breastfeeding



1.1 Natural way of breastfeeding

● Mother, vital and essential environment for the newborn



Image 1.1.1 Conception in mother's womb



Image 1.1.2 Connection of umbilical cord and placenta in mother's womb



Image 1.1.3 Life signal of newborn - immediate cry after mother's delivery



Image 1.1.4 Calm and warm newborn with close skin contact on mother's bosom



Image 1.1.5 Instinct of newborn inching to suckle



Image 1.1.6 Intermittent suckle of newborn during first hour after birth

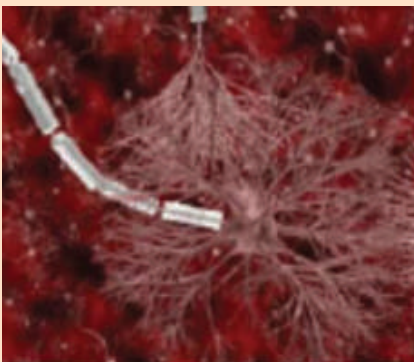


Image 1.1.7 Connection of newborn brain nerve cells during breastfeeding



Image 1.1.8 Hand suckling of newborn during first hour separation after mother's caesarian surgery



Image 1.1.9 Newborn with reduced alertness and slow start to suckle when in close skin contact on mother's bosom, after mother's caesarian surgery and separation from mother for more than an hour



1.1 Breastfeeding : Nature's way

● Mother, vital and essential environment for the newborn

Animals, including mammals, go through birth naturally. Life begins naturally in the mothers's womb, the safest natural environment protecting the unborn. (Image 1.1.1) While in the womb, the embryo is nourished and grow from various nutrients bioactive components and oxygen through. The umbilical cord and placenta. (Image 1.1.2) Right after birth, for the first time, the newborn breathes on his own and cries aloud signaling to the mother that he is alive. (Image 1.1.3) When placed on the mother's abdomen, while the umbilical cord is being cut, the newborn starts to adapt to the extra-uterine life. Lying on the mother's arm, right after birth, with skin to skin contact, is the best place for the baby to be warm and calm before starting to breastfeed. (Image 1.1.4)

The newborn is most alert in the first hour after birth. He will have the natural instinct to reach for food and crawls slowly in search of the nipple to suckle. (Image 1.1.5) The period usually lasts 30-60 minutes after birth. With in the first hour after natural birth, he is able to breastfeed with his lips latching on the mother's nipple and areola, suckling with short bursts. (Image 1.1.6) The baby should start breastfeeding on the delivery bed, before taken away for general newborn care.

As the baby is most alert at this time, and the mother's breast are ready for stimulation, it is the most appropriate time to start breastfeeding. After this period, the newborn will enter into the rest period and sleeps. It will be more difficult to initiate breastfeeding. Even of the suckling stimulation of the nipple and areola is incorrect with in the first hour after birth, there is still strong stimulation to connect the brain nerve cells. (Image 1.1.7) The baby is quick in response to the surroundings.

If the mother receives an analgesic drug or undergoes medically-assisted labor, such as, vacuum extraction, or a caesarian section, the newborn will be less alert than those born through natural birth. All the more, his separation from his mother, or failure to start breastfeeding right after birth, will see him show signs of hunger, such as, sucking his own hand while lying in the incubator in the labor room (Image 1.1.8). The mother-baby separation after childbirth can cause the newborn to enter into the rest period too early, refuse to suckle easily, and miss the opportunity to stimulate lactation at this most suitable period. When the newborn is brought to the mother with abnormal delivery, like surgery, he will start suckling late and suck not as strong as usual (Image 1.1.9), and thus slow down the mother's lactation. For the mother with unnatural delivery, more assistance is needed for her to embrace her baby with skin to skin contact and provide the first breastfeeding. If possible, the medical staff should support from the labor room, or right after her arrival at the postnatal ward.

Skin to skin contact and breastfeeding right after birth is a natural process to stimulate love and bonding between mother and baby. The mother's breasts will secrete milk quicker. The baby with the close skin contact in the mother's arms will have a stable body temperature earlier, safe microbes on his skin, early excretion of gray stools with early suckling, and the chances of jaundice reduced, which is a common health problem found in newborns.



● **Newborn instincts and natural breastfeeding sequence**

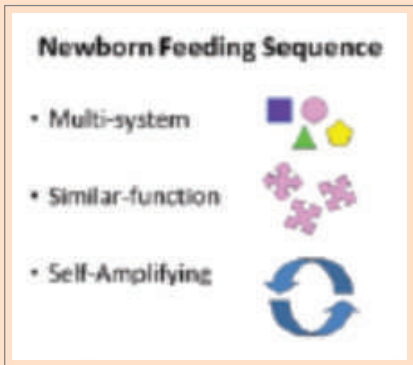


Image 1.1.10 Breastfeeding sequence, in multi-system synchronization*



Image 1.1.11 Staring at the mother's dark nipple



Image 1.1.12 Crawling from mother's abdomen to the breast



Image 1.1.13 Opening the mouth for the nipple instinctively



Image 1.1.14 Touching the nipple with its mouth to start suckling



Image 1.1.15 Tilting its head to suckle breast milk



Image 1.1.16 Sucking breast milk successfully



Image 1.1.17 Start breastfeeding through natural method in the delivery room, the husband's support

* With courtesy of Mari Douma, DO Department of Pediatrics, College of Osteopathic Medicine, Michigan State University, (ABM Meeting in October 2008)



● Newborn instincts and natural breastfeeding sequence

Every animal has survival instincts: knowing how to eat, how to adapt itself to the environment, and so on. Likewise, the human offspring is equipped with the specific suckle instinct in order to survive after birth. The newborn breastfeeding sequence performs in multi-system synchronization, an operation of similar functions and a self-amplifier (Image 1.1.10). In expressing instinctive need for food, several organs operate simultaneously, such as the eyes staring at the mother's dark nipple while sticking out the tongue (Image 1.1.11) to indicate the readiness to suckle. The mother's body scent and the smell of breast milk that the newborn traces from the physical contact with the mother, prompt the baby to crawl toward the mother's breast. This process takes about 50-70 minutes for him to crawl from the mother's abdomen to the breast (Image 1.1.12) until he can suckle on the nipple. In practice, when placing the newborn close to the mother's breast, he will automatically suckle on the nipple (Image 1.1.13). The newborn suckle begins with the operations of the sensory nervous system and the repetitive movement of the lip muscles (Image 1.1.14), which helps to arouse the brain learning cycle of suckling. Consequently, the newborn will learn to suckle on the nipple on his own continually and for longer periods, allowing him to receive breast milk effectively by opening the mouth, turning the face, fiddling, and tilting the head to feed on breast milk (Image 1.1.15). When he can keep the nipple in the mouth properly, the mother's nipple will stimulate the palate until the baby can suck the breast milk (Image 1.1.16).

Such suckling instinct and process are purely natural and have been passed on for generations. Allowing formula milk from the bottle to the newborn will destroy the baby suckling instinct and learning cycle of suckling. The reason is that, when sucking milk from the bottle, the baby uses only the gum ridges to apply pressure on the rubber nipple to release the milk into the mouth for an immediate swallow. The baby does not get to exercise the lips or tongue to stimulate the repeated breastfeeding sequence as in natural breastfeeding. Therefore, the World Health Organization and the UNICEF recommend that the mother embraces the baby with skin to skin contact and nurses within an hour right after birth. In addition, they discourage the newborn to suck from the rubber nipple or the pacifier after birth. The newborn is not supposed to receive formula milk and water from the bottle before the age of six months either, because he needs proper nutrition and stimulation in the brain learning cycle. There are many benefits for exclusive breastfeeding for the baby. For instance, better brain development and stronger skin immunity development. Warmth from the mother also prevents baby hypothermia after birth. Breast milk also acts like a vaccine that helps to boost the immune system and reduce harmful infections, as well as to speed up defecation of the meconium stools, which reduce the likelihood of severe jaundice that will need treatment with phototherapy. Additionally, early breastfeeding will arouse the excretion of the prolactin and oxytocin hormones in the mother, which will help to produce effective and continuous lactation. Moreover, the oxytocin hormones will help the mother feel more relaxed and calm, reduce pain, and prepare her for motherhood in nursing the baby naturally for as long as possible (Image 1.1.17).



● Breastfeeding cues



Image 1.1.18 Flexing arm and clenching fist when hungry



Image 1.1.19 Putting hand into mouth



Image 1.1.20 Suckling hand



Image 1.1.21 Turning cheek, opening mouth and sucking clothes instead of mother's nipple



Image 1.1.22 Intense mouth opening, arm flexing and fist clenching with increasing hunger



Image 1.1.23 Sticking out the tongue, showing agitation, with increasing hunger



Image 1.1.24 Opening mouth and sucking hand repeatedly



Image 1.1.25 Raising hand, clenching fist and sticking out tongue



Image 1.1.26 Crying in hunger



● Breastfeeding cues

Breastfeeding cues express the baby is hungry and need to breastfeed. If the newborn is very hungry, he will suckle for a longer time; and let go once he has enough. Some babies breastfeed a little at a time but do so more frequently while others breastfeed for longer periods but less frequently. The more the baby breastfeeds, the more breast milk is produced accordingly.

The mother can recognize breastfeeding cues from the newborn by observing his actions and movements, for examples, flex his arm and clench his fist. When he starts to get hungry (Image 1.1.18), he will put his hand in the mouth (Image 1.1.19); suck his hand (Image 1.1.20); turn his face and open the mouth using cloth instead of the mother's nipple (Image 1.1.21); open his mouth, flex his arm and make a fist (Image 1.1.22); stick out his tongue, showing agitation with increasing hunger (Image 1.1.23); open his mouth and suck his hand repeatedly (Image 1.1.24); lift his hand, make a fist and stick out the tongue (Image 1.1.25); and cry because he is hungry (Image 1.1.26).

If observed closely, the newborn will display these breastfeeding cues according to these the stages stated above. However, there are many babies who do not follow such pattern. In some cases, the baby may, for example, put the hand into the mouth once or twice, then open the mouth and tilt the head to try to latch on the mother's nipple. If the baby is lulled further, he may repeat these actions a couple of times. However, he will eventually cry out of sheer hunger if not fed. Thus, the mother is advised to observe the newborn and to nurse him before he starts crying.

Crying is the final cue of the hungry newborn. It indicates that the newborn can wait no longer. The newborn emotional development can be affected if he has to cry often before he is eventually breastfed. The nursing mother is at an advantage because she is with the newborn the entire time, and thus able to study the newborn breastfeeding cues thoroughly.

An ideal cycle will see the newborn giving out breastfeeding cues and the mother attending to it, before he fusses and cries. The newborn will then breastfeed happily and peacefully. If the newborn gets hungry on his own, he will normally feed until all of the available breast milk is drained. This ensures that the newborn gets the latter portion of the breast milk, which has the highest portion of fat. Not only does this serve to satisfy the newborn hunger, but it also means that the baby receives the necessary fat for growth and development.

If, however, the newborn is given milk on a set schedule, which is referred as clock feeding, he may not be hungry during breastfeeding. This can result in the newborn receiving only the first portion of breast milk, which is low in fat content. Consequently, the newborn may not receive enough energy and his weight will gain slower than normal. Moreover, setting a breastfeeding schedule is stressful for both the mother and baby. The newborn can cry out in hunger when it is not yet time for the next feeding, and thus not be properly fed. This can affect his emotional development as well as the bond between mother and baby.



● **Postnatal conditions, newborn general care, eye drop and vaccination**



Image 1.1.27 Newborn brought to mother for immediate breastfeeding right after cleaning



Image 1.1.28 Newborn trying to suckle right after birth



Image 1.1.29 Rooming in from labor room to postnatal ward



Image 1.1.30 Newborn eye care



Image 1.1.31 Newborn eye drop for prevention of infection after birth



Image 1.1.32 Newborn vaccination of Vitamin K in labor room



Image 1.1.33 Newborn swaddling for protection from cold air



● Postnatal conditions, newborn care, eye drop and vaccination

The newborn through natural birth, with no post-delivery complications, will have the umbilical cord cut, APGAR score as and towel-dried. He requires no removal of the vernix, a white creamy substance that covers the newborn body. Instead, he should be handed to his mother straight away, as she lies on the labor bed. The newborn is allowed the very first breastfeeding within 30 minutes of being born. Moreover, he is placed on the mother's breasts for that close skin contact intimacy for at least one hour on the delivery bed, with the mother and newborn covered together under the blanket for extra warmth (Image 1.1.27). The newborn will instinctively try to breastfeed (Image 1.1.28). For some mothers, at this stage, breast milk will naturally flow. In addition, rather than being separated, the mother and newborn are kept together the entire time, both in the labor room and later in the postnatal ward (Image 1.1.29).

For the newborn delivered by a Caesarian section (C-section), if the mother is conscious and experiences no complications, he can be brought immediately to the mother for breastfeeding on the labor bed as well. The recovery time after a C-section depends on the anesthetic procedure. For general anaesthesia, mothers are conscious after 2-4 hours and really need someone to help in starting breastfeeding within at least 6 hours after the delivery. For spinal anaesthesia, most mothers are alert with normal blood pressure. In this case, the newborn is brought to the mother for breastfeeding on the labor bed. The mother will need assistance as she will have to remain lying down to prevent the anesthetics from entering the spinal cord and cause complications.

The mother and newborn crucially need to be brought together after birth as soon as possible. They are to remain unseparated for at least one hour or longer, until the newborn has successfully breastfed for the first time. After that, he can be taken away for standard care (Image 1.1.30-1.1.31) and standard inoculation (Image 1.1.32).

Maintaining a constant temperature in the delivery room is essential. In any labor room, air conditioning or cooling appliances of any kind should not blow on to the mother or newborn directly. The mother-baby skin contact with a blanket covering them should sufficiently warm the newborn body (Image 1.1.33).

The use of tools to immediately clear mucus and amniotic fluid from the newborn airway after birth, must be performed with care and caution. Instruments, such as the red bulb syringe or motor-powered suction tube, must be used gently, otherwise may cause trauma to his digestive and respiratory tracts. This will hurt him, and may later affect his breastfeeding negatively.

As for bathing the newborn, it is best to wait for 24 hours after birth.



● Duration of breastfeeding

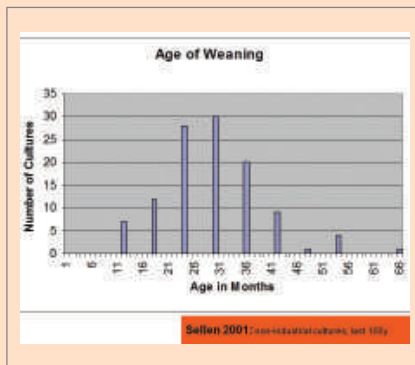


Image 1.1.34 100-year data showing weaning age



Image 1.1.35 Nursing a 6-month-old



Image 1.1.36 Nursing an 8-month-old



Image 1.1.37 Nursing a 1-year-old (mother-baby interaction through eye-hand contact)



Image 1.1.38 Nursing a 2-year-old



Image 1.1.39 Tandem nursing the younger and older (younger from mother's breast and older from bottle with expressed breast milk)



● Duration of breastfeeding

The World Health Organization (WHO) recommends exclusive breastfeeding for six months before age-appropriate food is introduced and fed until the age of two years. Retrospective research conducted amongst agriculture-focused countries for the past 100 years reveals the average age for children to stop breastfeeding to be 30 months. Most children breastfeed until the age of two years, though there are some who breastfeed for as long as four to six years (Image 1.1.34).

In practice, the mother can breastfeed the child for as long as he wants. However, an older child feeling insecure will go to his mother for breastfeeding. This will be breastfeeding for his emotional needs. Thus the recommendation by WHO for breastfeeding is to two years old or older.

Breastfeeding experience and opportunity for weaning at different ages

For the 6-month old infant, the mother is able to continue nursing. Research shows, however, that this is the approximate time when most mothers stop nursing their young because they think the babies are old enough to stop as they receive supplementary food. The mother in Image 1.1.35 continues to nurse. The experienced mother is able to tell when the baby is hungry, and usually nurses him in time.

At eight months, the baby starts to teeth. The mother may choose to stop nursing at this time because he will bite the nipples. Actually, the child cannot bite them because the tongue is over the lower teeth in suckling. However, once the baby has enough, or is close to end the breastfeeding session, he may bite the mother's nipple. This can be one reason for the mother to want to cease breastfeeding altogether (Image 1.1.36).

In fact, children at this age require the nutrients and immunities provided by breast milk. The mother can continue to nurse and prevent the child from biting, by taking notice of the time he begins to breastfeed more slowly and coming close to being full. The mother can, at this point, use the finger to open the baby's mouth to prevent him from biting. However, if he has already bitten the mother, she can simply say no, and put him down calmly. He can learn from this, and not bite again.

As for the 1-year-old, breastfed since birth, he will seek breastfeeding when he is hungry. Continued nursing 3-4 times a day, not only provides feeding but also love, warmth and security. This allows him to know that his mother is always watching over him, and is there to help whenever he needs her. Studies on long-term breastfeeding show the benefits of breast milk, such as intelligence, are directly related to the total amount of time the child is breastfed (Image 1.1.37).

At age two, the child can still breastfeed (Image 1.1.38).

Whether the child can breastfeed after two years of age, depends on the willingness of both the mother and child. Children aged two years old normally start to breastfeed less and less, until they ultimately stop on their own. In most cases, children are completely weaned from ages two to four years, as they start to eat meals like adults and engage in activities other than just breastfeeding. Weaning can fit the child needs and be gradual, beginning with the exemption of mid-day feed. The mother can observe the child to see if he still likes to breastfeed; and if the child is not ready to stop, he should not be forced to wean.

If the mother must nurse both the younger child as well as the older one (tandem nursing), she can let the little one breastfeed while the older feed on expressed milk. In such cases, breast milk is sufficiently produced naturally. The more the baby breastfeeds, the more milk is produced, and the greater the breast milk supply. Tandem nursing also helps the new siblings to get accustomed to each other, but the mother has to make sure to eat well (Image 1.1.39).



1.2 Learning about the mother's breast

● Anatomy of the breast and nipple

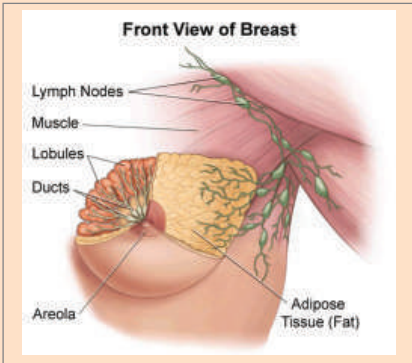


Image 1.2.1 Front view of breast on female chest

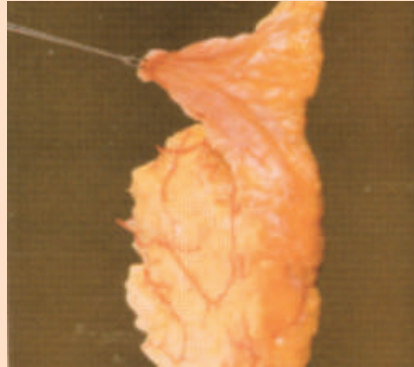


Image 1.2.2 A piece of breast tissue surrounded with fat tissue

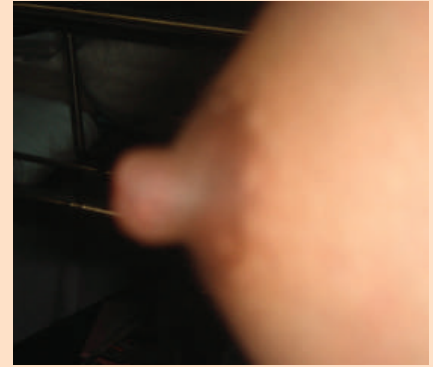


Image 1.2.3 Protruding female nipple from center of breast



Image 1.2.4 Large duct pores on nipple with colostrum drips after milk expression

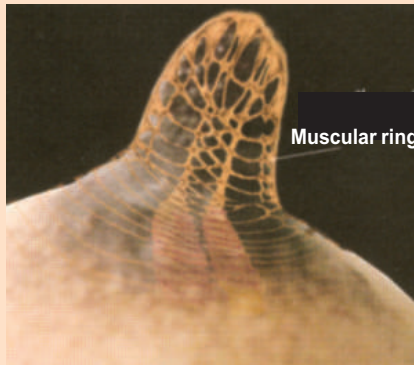


Image 1.2.5 The inner most muscle layer and muscular rings around the milk duct in the nipple

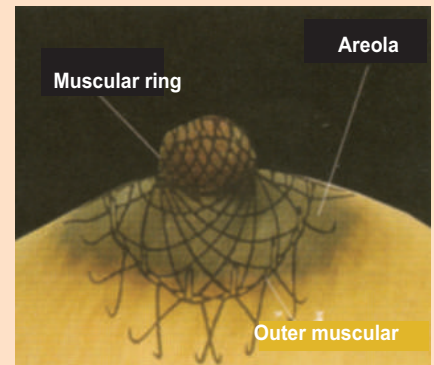


Image 1.2.6 Outermost muscles weaving over middle muscles, covering nipple and areola



Image 1.2.7 Large Montgomery gland bumps on pregnant woman's areola

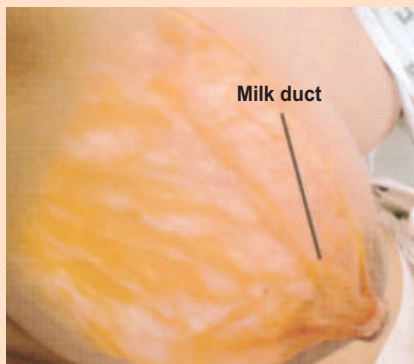


Image 1.2.8 Large branching milk ducts under areola and in nipple

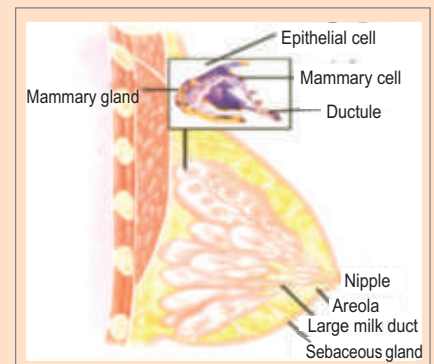


Image 1.2.9 Milk gland secretion to tips of smallest milk ducts



1.2 Learning about the mother's breasts

● Anatomy of the breast and nipple

Medical and public health staffs, who provide breastfeeding assistance, must have the correct understanding of the anatomy of the breast and nipple. With this knowledge, the staff can better help the mother to prepare the breasts and nipples, explain the lactation process, and efficiently assist her as she nurses or expresses her breast milk.

Naturally, the human being has only one pair of breasts. From the front view of the female breast (Image 1.2.1), one can see that it is aligned with the center of the clavicles, and situates between the second and sixth ribs. It has a fibrous tissue bed that attaches to the pectoris muscles, which allows natural breast movement. The breast exterior extends to the armpit and can go to as far as the back muscles. The muscle tissue under the breast contains lymph nodes with the nerve tips emerging between the fourth and sixth ribs, to receive innervation from the breast, areola and nipple or mammary papilla. The breast tissue dissection (Image 1.2.2) reveals glandular lobules and milk ducts that are attached to the nipple and embedded in the fatty tissue (adipose tissue), which is full of capillaries.

The female nipple protrudes from the breast center near the fourth rib (Image 1.2.3) has a diameter of 0.25-0.75 inch, and is approximately 0.4 inch long. Each nipple has about five to seven milk duct openings or pores, which are clearly visible when colostrum begins to flow from milk expression on the first few days after delivery (Image 1.2.4). The areola and nipple have three layers of smooth muscle bundles to bind the larger milk ducts from under the areola into a smaller bundle inside the nipple. The innermost muscle layer runs along the length of the milk ducts inside the nipple. The muscular ring in the middle layer binds the milk ducts (Image 1.2.5) with the outermost muscle layer expanding contours in a net-like weave covering the nipple and areola (Image 1.2.6). In between the three bundles of fibrous tissue are nerve tips that control the stretching and retraction of the muscle, and change the shape of the nipple in response to stimulation.

The areola is a circular area of skin that is thick, coarse, dark and extremely flexible. It has a diameter of 0.25-1.25 inches surrounding the nipple. The areola has 4-28 pores of sebaceous glands (Montgomery tubercles), which become more pronounced during pregnancy and breastfeeding (Image 1.2.7). The sebaceous glands can be deep and have ducts connected to the milk ducts before opening out to the areola. This allows the glands to secrete lubricating fat, a with secretory IgA preventing infection of the nipple and areola. Underneath the areola are large 2.0-4.5 millimeters milk ducts, with no breast milk. Thus, these are no longer referred as lactiferous sinuses. Large milk ducts branch inside the breast tissues (Image 1.2.8), into approximately 2 millimeters smaller milk ducts and smaller than 1.0 millimeters ductules. Large and small milk ducts that gather together are usually found outside the milk lobes (extralobular ducts or ETD). The small ducts that branch into ductules inside the milk lobes (intralobular ducts, ITD) the ductile tips into end mammary glands (Image 1.2.9). These are found along Cooper's ligament, which hold the breast tissue at the base of the breast to the skin, and helps the lobes and breasts to retain their shape.



● **Change in the breasts, areolas and nipples before pregnancy**



Image 1.2.10 Visible inverted baby nipple in areola

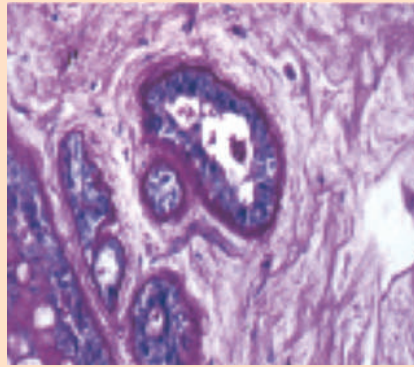


Image 1.2.11 Baby breast tissue with 3-4 hollow milk ducts attached to bottom fibrous breast tissue



Image 1.2.12 Growing pre-pubescent nipples but with same number of ducts

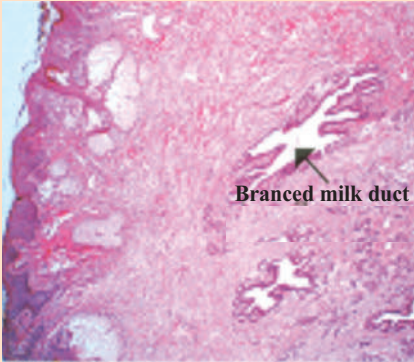


Image 1.2.13 Newly branched ducts in pre-pubescent girl

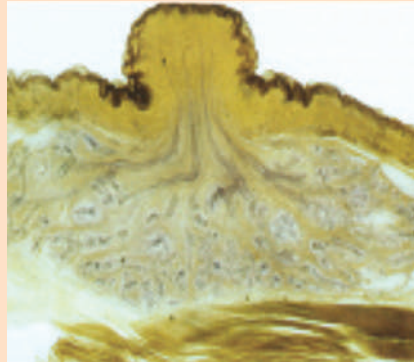


Image 1.2.14 Cross section of bulging teen breast donut-with like increased ducts

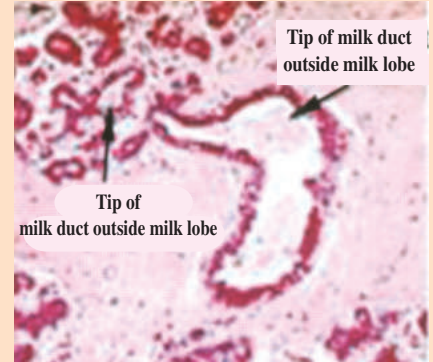


Image 1.2.15 Teen breast tissue with small active milk ducts inside milk



Image 1.2.16 Pre pregnancy Asian teen breasts with less milk producing tissue and fat

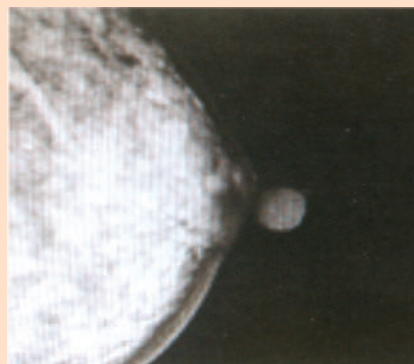


Image 1.2.17 X-ray of non-pregnant female breast with less tissue (gray) than fat (white)



Image 1.2.18 Expanding and enlarging milk ducts under areola and in nipple



● Change in the breasts, areolas and nipples before pregnancy

The development of breast tissue is different according to age, pregnancy, breastfeeding and menopause. This is because the breast has portions of glandular tissues, fatty tissues in lobes, and milk ducts that branch differently.

Baby breasts

At four weeks, the embryo breast begins to appear as epidermal thickening on the front of the embryo, from the armpit to the groin. The nipples of an 18-19 weeks old fetus will start to develop smooth muscles and milk ducts, slightly connected to the fibrous tissue. At 32 weeks, the nipples begin to have the upper milk ducts clogged. Term babies (Image 1.2.10) have nipples that sink deep inside the areolas due to the milk ducts that are attached to the fibrous tissue under the nipples. Underneath the nipples are lobes five to 10 millimeters, depending on the fibrous tissue around the milk ducts. In newborn breast tissue (Image 1.2.11) are 3-4 upper duct tips that have begun to hollow out and can produce milk, due to the influence of the mother's hormones during pregnancy. Therefore, some newborn breasts can release milk droplets which are referred as witch's milk. As the newborn grows, the fibers at the base of the breast will increase and push out the baby nipples. Before teenage, a young girl's breasts are flat just like a boy's (Image 1.2.12). The sizes also correspond to the body growth, since the lobes do not have any additional milk ducts, and the existing ones have only branched a little (Image 1.2.13) in the fibrous tissue fused to the skin near the nipple.

Teen breasts

Once a girl reaches puberty, her female hormones increase, causing the breasts to elevate and shape like donuts (Image 1.2.14) with fatty tissues and milk ducts that branch increasingly. The large upper milk duct tips outside the milk lobes will extend into the lobes and break up into smaller ducts with a ratio of around 1:10, thus causing the lobes to have more small ducts and ductules (Image 1.2.15). The milk duct epitheliums will replicate, and the ductule tips will transform into mammary glands and enable the milk lobes to grow with each menstrual cycle until both breasts have grown to similar sizes.

Non-pregnant female breasts

Fertile female breasts differ in size and shape, due to different ethnicities and heredities. The Asian breasts (Image 1.2.16) have less glandular tissue than those of European. Each breast consists of 15 to 20 separate lobes. The shape of the breasts depends on the amount of fatty tissues interspersed in the lobes. Mammograms of non-pregnant women (Image 1.2.17) show a relatively small number of milk lobes (gray) woven into the surrounding fascia. In large amounts of fatty tissue (white), the increased milk ducts outside the lobes will gather and form bigger ones closer to the nipple (Image 1.2.18).



● **Change in the mother's breasts during pregnancy**



Image 1.2.19 Visibly grown breast during third trimester of pregnancy

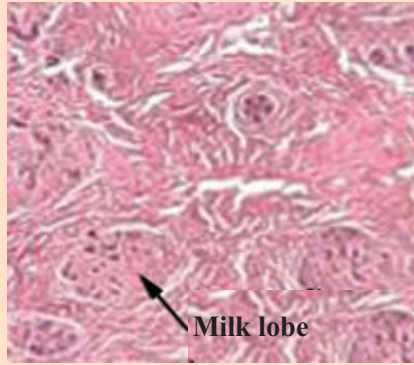


Image 1.2.20 Increasing lobes with simultaneous milk glands developed during pregnancy

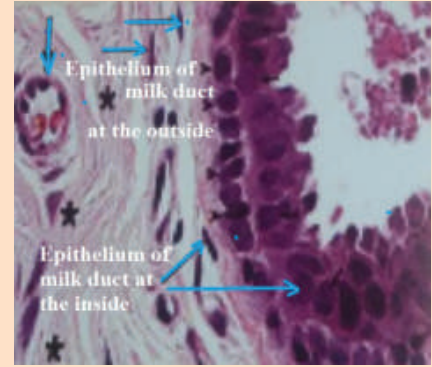


Image 1.2.21 Blood capillaries packed with red and white corpuscles around milk gland

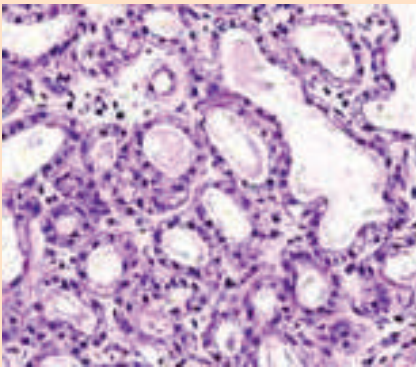


Image 1.2.22 Milk gland tissues and ductules filled with colostrum before delivery



Image 1.2.23 Large, round and taut mature breast 3 days after delivery



Image 1.2.24 Enlarged "Tail of Spence" in armpit from engorgement after delivery



Image 1.2.25 Electron imaging of mature milk cells swollen with milk glands

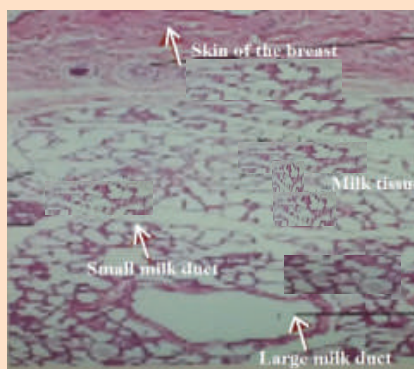


Image 1.2.26 Small mature milk ducts in milk tissue with large empty ducts



Image 1.2.27 Ultrasound image of large milk duct with increased white fat deposits during breastfeeding



● Changes in the mother's breasts during pregnancy

Four weeks after the woman becomes pregnant, the breasts will begin to build breast tissue (mammogenesis), caused by hormones, progesterone, prolactin and placental lactogen. Twenty-two weeks after conception or in the third trimester, the breasts will have increased by 12 to 227 millimeters because of the increased number of hormones from the womb, in the mother's bloodstream. This is why the mother's breasts are visibly enlarged when closer to delivery time (Image 1.2.19). The number of milk lobes inside the breasts increases with the development of the mammary glands, which appear in clusters and in distinctly separate clouds (Image 1.2.20). The fatty tissue in the breasts is pressed and swarmed by the lobes, but the cells of the milk glands are fattier. The glandular tissue has a large number of expanding blood capillaries filled with red and white corpuscles that intersperse the mammary glands and milk ducts (Image 1.2.21). The layer of small milk ducts and ductules forms in the breast tissue. There are mammary stem cells that are adult cells transformed into cells that carry out different functions such as milk cells in the milk glands, and myoepithelial cells that form fibers of the striated muscles packed around the milk ducts. The stem cells can break up inside the milk ducts. About 12 weeks before delivery, the prolactin hormones will stimulate the first stage of milk production (lactogenesis I) with epithelial cells packed tightly in the empty spaces of the milk glands, reshaping from long and tall to cubic forms that are tightly fastened, to produce colostrum. The mammary glands and ductules will grow larger in proportion to the amount of breast milk stored (Image 1.2.22).

Lactating breasts

After delivery, the mother will have breasts weighing 400-500 grams, due to the increased production of breast milk. This is the reason for the breasts to be large and round, and also tauter than during pregnancy (Image 1.2.23). Moreover, the nipples can grow to as large as 16 milliliters. If the breasts are overfilled to the point of engorgement, this can cause the breast tissues to extend into the armpit (Tail of Spence), to form into clusters that are clearly palpable or visible (Image 1.2.24).

Breast tissue in the second stage that is ready to produce milk or lactate, will have lobes containing more milk glands with the number per lobe, ranging from 10 to 100. Electron microscope images show milk glands of about 0.12 millimeters, and milk cells more densely packed to synthesize milk until the glands swell with increasing accumulation of milk (Image 1.2.25). Inside the lobes, both ductules connected to the milk glands and small ducts, proliferate to accommodate the milk produced by the gland. Meanwhile, the large milk ducts in the area under the areola are emptied before lactation (Image 1.2.26). When a baby suckles or squeezes the breast until it triggers the lactation reflexes, and the oxytocin hormones will stimulate the myoepithelial cells, wrapped around the ductules and small ducts, to contract and secrete milk into the large ducts. In an ultrasound image of the breast, large milk ducts appear black and once they receive milk from the small ducts, the ultrasound shows the breast peppered with white dots (Image 1.2.27) where the milk fat is reflected as white deposits in those ducts.



● Examination and assessment of the breasts and nipples



Image 1.2.28 Breast with darkened areola and enlarged blood vessels



Image 1.2.29 Asymmetrical breasts during pregnancy



Image 1.2.30 Breasts like funnels with little upper breast tissues



Image 1.2.31 Extra-ordinary large breasts

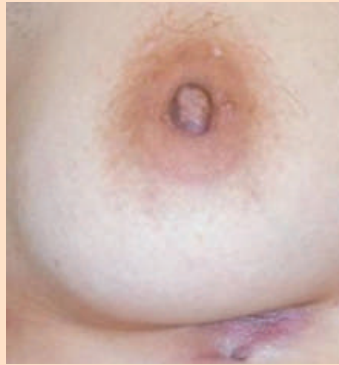


Image 1.2.32 Breast with accessory nipple underneath



Image 1.2.33 Breast with ordinary nipple but tiny areola



Image 1.2.34 Medium areola with inverted nipple



Image 1.2.35 Large areola with relatively short nipple



Image 1.2.36 Extra-large areola with flat nipple



● Examination and assessment of the breasts and nipples

At present, health personnel have guidelines regarding the examination and assessment of the breasts and nipples. Both the examination and assessment can be carried out by the medical staff or even the mother herself, to make decisions concerning problems that may arise during breastfeeding after childbirth. During the examination, the staff attending to the mother should inform the mother of the importance of breastfeeding and breast cancer screening.

The staff should find out the mother's enlarging breast size during pregnancy as well as observe the enlarging darkening areolas and increasingly visible veins on the breasts (Image 1.2.28). Some mothers may have breasts that hurt when pressed. Breasts that have not enlarged during pregnancy, can enlarge and produce milk well within seven days after delivery. Some breasts may have different size (Image 1.2.29), the smaller one may have breast tissue that is not fully developed (hypoplastic breast). Special attention is to be given to breasts that resemble funnels, and nipples that point downwards (Image 1.2.30) as such breasts often do not produce enough milk. Breasts with underdeveloped milk tissues may have clumps of soft tissue, for example, as in the case of the mother with ovarian abnormalities.

Extra large breasts (Image 1.2.31) can cause the mother physical discomfort and concern about the appearance. Pregnancy and breastfeeding will cause the breasts to grow even larger, and more concern for the mother. Large breasts can also block the infant during nursing, and the mother can have trouble positioning the baby. Breastfeeding while lying down enables the mother to better support her breasts with the hands, and have the baby lie on the table while cradling him from the front can help make breastfeeding easier.

Not many mothers have accessory (or extra) breast or nipple. (Image 1.2.32). The accessory breast or nipple is often found in the armpit area, as well as the thigh, groin or labium. This extra breast tissue begins to grow during pregnancy and becomes engorged approximately three days after delivery. Accessory breast tissue can produce milk, and lactate while the baby breastfeeds. It may not include a nipple or breast formation, and it usually appears together with kidney dysfunction.

Observation of the shape and size of both the nipple and areola helps to build confidence in the mother as nipples come in unique sizes and features. It is possible for the areola width to mismatch the nipple size, for instance, the nipple may be ordinary while the areola can be very small (Image 1.2.33) with a 0.25-0.5 inch diameter. The medium areola has a diameter of about 1.0 inch (Image 1.2.34). The large areola with a diameter of approximately 1.0-1.5 inches (Image 1.2.35), or extra-large areola with a diameter over 2.0 inches (Image 1.2.36) normally have very short nipple, making breastfeeding more difficult. In such cases, special assistance is needed to help the baby to pull as much tissue under the areola into the mouth as possible.





Image 1.2.37 Examination on exposed breasts and nipples



Image 1.2.38 Determination of nipple types with pinch test



Image 1.2.39 Gentle hold and press on nipple tip with index finger and thumb



Image 1.2.40 Examination for nipple suppleness with hold-and-stretch method



Image 1.2.41 Short nipple stretched and pulled to almost regular size



Image 1.2.42 Apparent inverted nipple, yet stretchable



Image 1.2.43 Retracted nipple hard for stretching



● Examination and assessment of the breasts and nipples

Determining the type of nipples of the mother should be performed during pregnancy or immediately after delivery, so as to plan for breastfeeding assistance. Precise nipple assessment begins with measuring the diameter and height of the nipple. The average diameter of the normal nipple is 16 millimeters. If the diameter measures less than 12 millimeters, it is considered small. The medium nipple is 12-15 millimeters in diameter while the large nipple has a diameter of 16-23 millimeters. Extra-large nipples are larger than 23 millimeters in diameter.

Breast examination can be carried out by the public health staff or the mother herself, to assess any potential breastfeeding problems. During the examination, the mother should be briefed on the importance of breastfeeding as well as breast cancer screening, and possible nipple problems, such as flat and inverted nipples. These problems can be solved by using a breast shield, or by pulling and massaging the nipple, which is referred as the Hoffman Exercise. The staff should ask the mother about the size change of the breasts during pregnancy, and check on the skin elasticity of both breasts. Moreover, they should be examined for lumps, engorgement, swelling or red bruises; as well as the size and shape of both nipples and areolas. The nipples should also be checked for extension, and the areolas for elasticity. Nipples should be pulled to determine whether they are normal, flat, retracted or inverted. In addition, the mother can be assured that no two nipples are alike, and so are two mothers.

Determination of the elasticity of the nipples and areolas can be done quickly and easily. The brassieres should be removed during examination so as to allow the breasts to move freely. The mother is advised to gently nudge and massage the nipples before examining them on her own (Image 1.2.37). The drawing in Image 1.2.38 shows how to hold and stretch the nipple using the index finger and thumb (Pinch Test). The mother should begin by placing the index finger and thumb on the areola at the bottom of the nipple (Image 1.2.39), and gently compress the nipple. Then gently squeeze it with the index finger and thumb, and press with these squeezing fingers one centimeter into the areola, and to gently pull the nipple upwards (Image 1.2.40). Examiners should take note on how the nipples protrude and also the areola elasticity, to figure how far the nipples can be stretched. Two to three times the normal length is best for insertion into the baby mouth.

Common nipples are the ones that protrude a bit when stationary, and they can also be pulled out easily, and able to extend straight forward (protraction) after stimulation. The baby will have no trouble latching on the normal nipple. As the baby suckles, the tissue under the areola can be pulled deep in with the nipple stretching far in to reach the roof of the baby mouth (Image 1.2.39).

Flat nipples are those that have very short protruding tips, and are difficult for the baby to see and latch on. After being stretched or massaged, they may pop inwards or outwards (Image 1.2.41).

Inverted appearing nipples are nipples that appear inverted but extend straight out after being squeezed and pulled (Image 1.2.42). Babies with stronger suction have no problem breastfeeding with this type of nipple. However, babies with weak suction, especially those who are premature, will have a more difficult time. In this case, steps are needed to be taken to correct the nipples.

Retracted nipples are those with tips that are pulled inwards so much that a dip is visible (Image 1.2.43). Stimulated squeezing or stretching of this kind of nipple can be quite difficult.





Image 1.2.44 Truly inverted nipple attached to fibrous tissue at nipple tip



Image 1.2.45 Abnormal protruded nipple like bean pod



Truly inverted nipples are the ones that are entirely pulled into the areolas to the point where the areolas are seen to roll inwards. These nipples are unresponsive to nipple stretching or cold stimulation, because they are connected to the fibrous tissue inside the base of the breasts (Image 1.2.44).

Long nipples are those that extend out longer than ordinary nipples. They also bend at the base similar to a bean pod (Image 1.2.45). This can lead to breastfeeding problems, especially for first-time mothers or mothers of premature babies. These babies are unable to latch on deeply enough to reach the nipple ducts, and the gum ridges will press on the middle section of the nipple, which can be painful for the mother. Once a baby mouth becomes larger, he will be able to breastfeed better.

28% to 35% of mothers who have undergone their first breast examination are found to have normal nipples. The length of the stationary nipple is not as important as its elasticity, which enables the nipple to extend two to three times its normal length during breastfeeding. The nipple elasticity will improve as pregnancy progresses, or after delivery. For mothers with flat nipples, retracted nipples or inverted appearing nipples, no survey has been done to verify whether preparing the breasts with Hoffman's Exercise will better provide successful breastfeeding. However, wearing a shield, or massaging and pulling on the nipples during pregnancy, can make more flexible nipples. Appropriate breastfeeding assistance after childbirth, such as, ensuring that the baby is feeding correctly, or using a nipple puller, can help to make short nipples protrude longer from the areolas.

Overly large nipples can result in lesser milk production, and the baby will not get enough water. With this kind of nipple, the mother can prevent the baby tongue from raising high enough, and creating negative pressure on the mouth during suckling. Some babies are able to breastfeed from overly large nipples during the first two days after birth, but they will not be able to do so after the third day, because the breasts will have become engorged and make it impossible for the baby to latch on.

There are also mothers whose nipples happen to be short during pregnancy, and completely retract after the mother tries to get the baby to suckle several times. They may experience swelling and pain around the areolas. This means that, the nipples have become inverted due to engorgement. However, this can be solved by squeezing the breasts to drain out milk.



1.3 Knowledge on breast milk

● Lactation



Image 1.3.1 Enlarged breast in last trimester of pregnancy

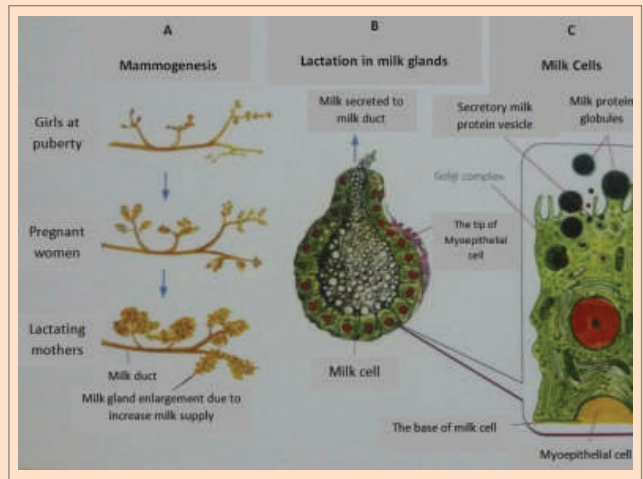


Image 1.3.2 Lactation cycle from A) breast tissue growth during childhood, pregnancy and breastfeeding B) milk secretion by glands and C) cuboid milk cells and myoepithelial tissue growth in milk gland

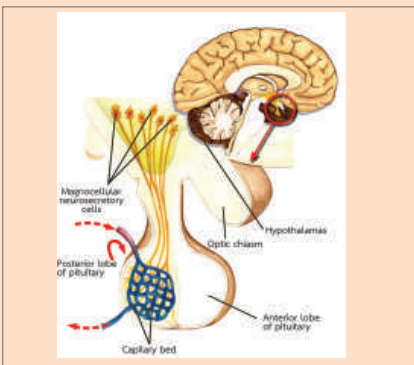


Image 1.3.3 Hypothalamus signal to posterior pituitary gland

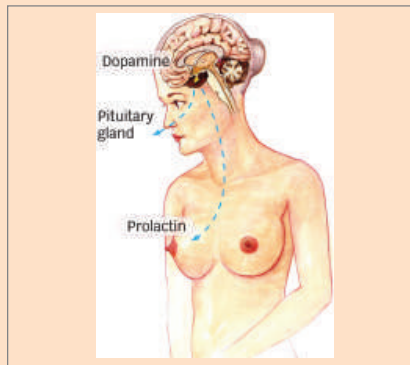


Image 1.3.4 Hypothalamus stimulation of anterior pituitary gland secreting prolactin in breasts

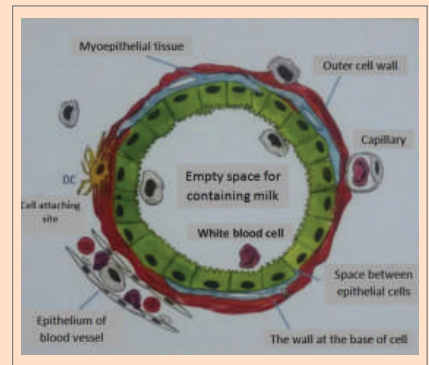


Image 1.3.5 Cuboidal milk cells (innermost green layer) and myoepithelial cells (outer orange layer) and capillaries

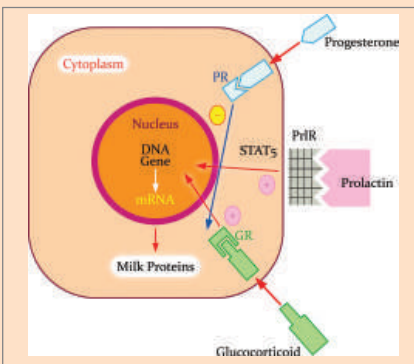


Image 1.3.6 Prolactin hormone stimulation of cuboid milk cell synthesizing nutrients

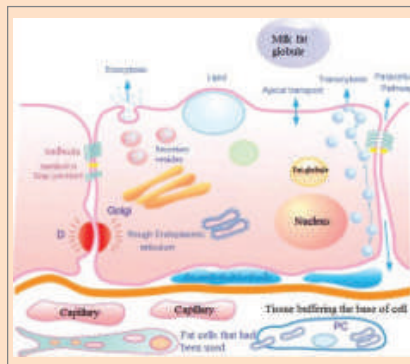


Image 1.3.7 Secretion of various nutrients and biological substances in cuboid milk cells

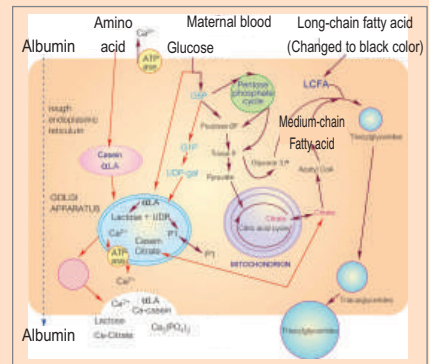


Image 1.3.8 Protein synthesis inside endoplasmic reticulum and lactose in Golgi system producing secretory vesicles



1.3 Knowledge on breast milk

● Lactation

For pregnant women whose breasts increase visibly in size and weight in the last trimester (Image 1.3.1), their breast milk production or lactation cycle (Image 1.3.2) begins from the development of the breast tissues (mammogenesis). The milk ducts that branched out slightly during childhood and puberty, will now branch out into small ducts and ductules, and have a significant increase in the milk glands. During the first 24-28 weeks of pregnancy, estrogens and progesterone will cause the milk glands to produce layers of elongated epithelium cells in the vacuole. Signals (Image 1.3.3) from the hypothalamus to the pituitary glands will stimulate the anterior pituitary glands to secrete prolactin, a single-stranded protein, into the bloodstream and flow to the breasts (Image 1.3.4). Prolactin levels that increase from 10 ng/ml (before pregnancy) to 200 ng/ml at full term, will react with other hormones namely, cortisol, insulin, growth hormones and thyrotropin releasing hormones (TRH), to stimulate the milk glands to produce cuboid milk cells and myoepithelium. The flat and aligned cuboid milk cells are embedded inside the milk glands while the myoepithelium covering the alveoli bed are interspersed with blood capillaries.

Stage 1 Lactation (of colostrum) starts in the final trimester for up to three days after delivery. Within 24 hours after birth, an infant may receive 100 milliliters or less of breast milk. It will take 1-148 hours for the milk volume to gradually increase as the breasts become heavier, dense, bloated, and start to lactate. At four days old, the baby should receive approximately 300 milliliters of breast milk per day.

When insulin and cortisol stimulate the prolactin to stick to the milk cell wall or alveoli (Image 1.3.6), a variety of substances will be secreted and produced inside the alveoli (Image 1.3.7); beginning from protein vesicle synthesis and exocytosis, lipid globule synthesis, transmembrane and transcytosis in the paracellular pathway.

The milk secreting cells produce protein vesicles from the amino acids in the mother's blood within the vacuole of the rough endoplasmic reticulum. From there, casein proteins and alpha lactalbumins are sent to synthesize lactose in the Golgi Apparatus (Image 1.3.8).



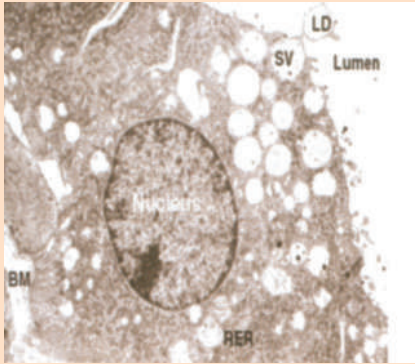


Image 1.3.9 Electron image of secretory vesicle (SV) detached from cell wall

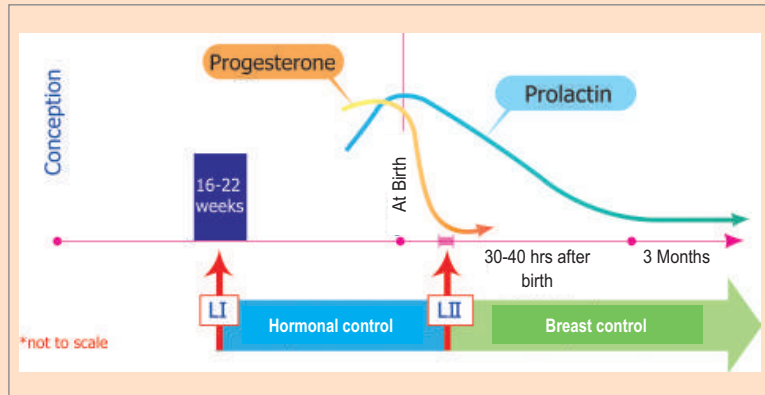


Image 1.3.10 Stage 2 Lactation during 30-40 hours period after delivery with transition from sole hormone control to collaboration of nervous system with hormone and breast control



Image 1.3.11 Initial Stage 2 Lactation with close skin contact and immediate breastfeeding after birth

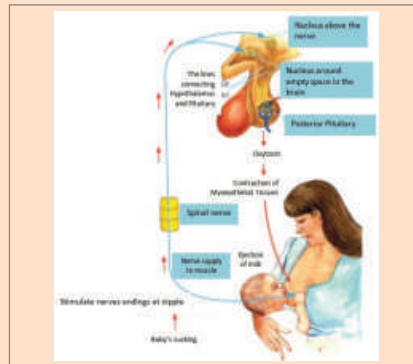


Image 1.3.12 Breastfeeding signals to hypothalamus and posterior pituitary gland for oxytocin secretion

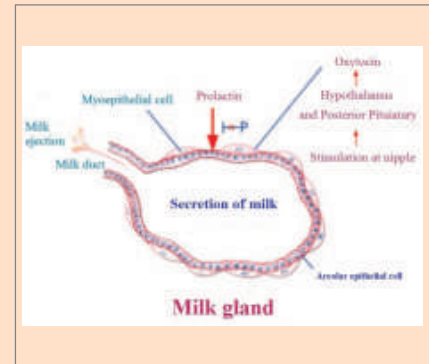


Image 1.3.13 Oxytocin trigger of myoepithelial tissues with milk ejection from milk glands



Image 1.3.14 Little, thick and sticky colostrum on first day of lactation



Image 1.3.15 Clearer and increasing colostrum 3 days after delivery

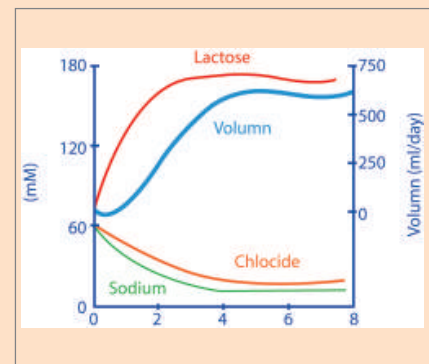


Image 1.3.16 Increased lactose enhancing breast milk increase



Stage 2 Lactation (of transitional milk) occurs during the 32-96 hours period after delivery. The alveoli have a large number of secretory vesicles packed inside the cytoplasm of cells, which appear as clear pockets under electron microscope imaging (Image 1.3.9), that will help increase in milk production. Not only is the production of transitional milk controlled by the hormones due to the drop in the progesterone level after delivery, but it is also controlled by the neuro-hormonal reflex for up to Stage 3 Lactation (Image 1.3.10). Bringing the newborn to his mother for cradling with skin to skin contact, and allowing him to breastfeed for the first time within an hour after birth (Image 1.3.11), will cause the prolactin and oxytocin to surge. The squeezing and suckling on the nipple will send signals to the hypothalamus and posterior pituitary glands. The prolactin flow from the anterior pituitary glands, stimulated by the areola nerve tips, will trigger lactose synthesis in the Golgi system. Lactose synthase attached with lactalbumin on the protein vesicles, help in lactose synthesis; drawing water into the Golgi system and eventually causing the Golgi vesicles to form and build secretory vesicles that contain protein, lactose, minerals and water, before detaching from the cell wall in the lumen, and converting to milk.

The contraction of the milk ducts in the nipple and areola area will cause the posterior pituitary glands to secrete oxytocin (Image 1.3.12). The rapid increase of oxytocin will trigger the contraction of the myoepithelial tissues around the milk glands and ducts. This causes colostrum to discharge from the milk glands (Image 1.3.13) through the ducts, and to eject from the breast.

Colostrum transformation from little, thick and yellowish (Image 1.3.14) to clearer yellow copious milk (Image 1.3.15), is the result of active prolactin that cause an alveolar tight junction (TJ) and increased production in lactose and citrate. The start of early and frequent baby suckling during the first 72 hours will help the alveoli react more intensely to the prolactin. The more lactose there is, the more secretory vesicles will eject from cells, and the more milk is produced.

The increase of various mineral ions such as sodium and potassium is caused by cells movement in the Golgi membrane during Stage 1 Lactation, or during the period of intercellular spacing. This is the cause for the high sodium content in the colostrum on the first few days. In Stage 2 Lactation, both sodium and potassium will be discharged together with the protein and lactose secretory vesicles. The increased milk supply of mature milk is composed of lactose, glucose and citrate; with diminishing protein, nitrogen, sodium, chloride and magnesium (Image 1.3.16). Milk increase during the 36-96 hours period relates to change in breasts, such as engorgement.





Image 1.3.17 1-month old breastfeeding during Stage 3 Lactation



Image 1.3.18 Spontaneous trigger of milk ejection from milk glands and breast

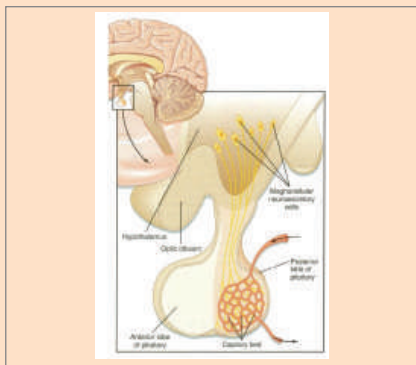


Image 1.3.19 Oxytocin synthesis in hypothalamus stored in posterior pituitary gland before releasing into the bloodstream

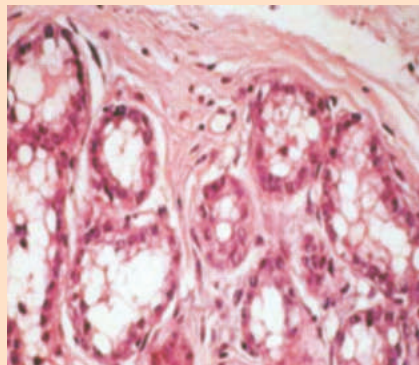


Image 1.3.20 Lactating breast tissue with fatty milk granules in milk glands during breastfeeding



Image 1.3.21 Ultrasound image of empty medium and large milk ducts before milk ejection reflex

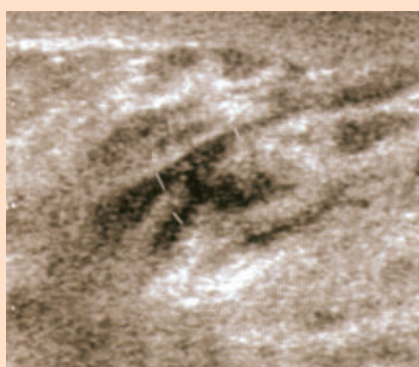


Image 1.3.22 Ultrasound image of breast milk with white fatty granules in medium and large milk ducts after milk ejection reflex



Delay of increased breast milk in the first 96 hours after delivery may be caused by many factors, for example, retained placenta, mother's high testosterone level, reduced milk tissues from surgery, mother's diabetes or obesity, mother's stress, insufficient breast milk due to baby's weak suction, failure to breastfeed immediately after delivery, incorrect breastfeeding, and infrequent breastfeeding.

Stage 3 Lactation occurs after the baby is two weeks old. The breasts control galactopoiesis and the components of mature milk. Babies that are one to two months old or older, can have control over the breastfeeding (Image 1.3.17). Milk production during this stage depends on the milk ejection reflex that occurs throughout each breastfeeding or milk expression (Image 1.3.18).

Oxytocin, a signal peptide consisting of nine amino acids is produced in the hypothalamus around the supra-optic paraventricular nucleus, converts into secretory granules in the magnocellular neurons before releasing and storing in the posterior pituitary glands (Image 1.3.19). When it is time to breastfeed, every milk gland in the breasts will be filled up with milk (Image 1.3.20). An ultrasound study of milk secretion shows that the medium and large milk ducts near the areola and nipple are empty before milk ejection reflex (Image 1.3.21). As soon as the ducts near the areola and nipple are stimulated, oxytocin will be released into the mother's bloodstream and stimulate the myoepithelial cells and the milk ejection reflex. The medium and large milk ducts will each be filled up with milk, which appears as white fatty globules (Image 1.3.21). The baby's tongue will squeeze the large ducts for milk from the breast.

As alveolar cells do not synthesize long chains of fatty acids in the breast milk, the endoplasmic reticulum will produce fatty globules from triacylglycerol that pass through the mother's blood to the cells directly. Thus, the portion of fatty acids in breast milk varies with the mother's diet. The synthesis of fatty globules in the alveoli are produced from fat sedimentation less than 0.5 millilitre to sedimentation larger than 1 millilitre. Fatty globules detached from the endoplasmic reticulum will attach to the cell wall and release from the cells, causing the cells to lose the cell surface which in turn prompt them to produce more Golgi secretory vesicles. The more milk is drained from the milk glands, the more fatty globules discharge into the milk, and the more breast milk is produced.





Image 1.3.23 Engorged breast with inhibitory substance in the milk secreting glands



Image 1.3.24 Engorged breast and unable to express preventing further lactation

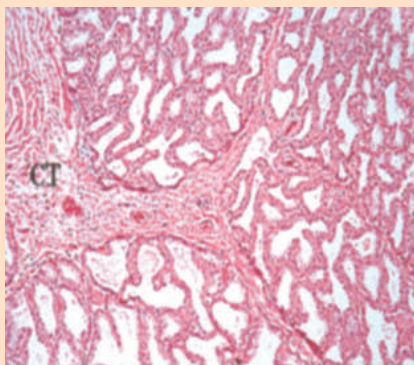


Image 1.3.25 Breast tissue not producing milk breast milk secretory cells involute before the breasts tissues returning to pre pregnancy stage



Ineffective trigger of the milk ejection reflex will cause incomplete milk flow from the milk glands. Mature milk in the breasts (Image 1.3.23) will cause less prolactin to attach to the cuboid milk cells, and less milk will be synthesized. At the same time, greater milk accumulation will have more whey protein, a feedback inhibitor of lactation (FIL), and signal to the respective breast to lower its milk production. The more milk is retained in the breast, the more milk production is reduced in response to chemical reaction. Then, with subsequent breastfeeding or milk pumping, the FIL will reverse and with no effect in the components of the milk.

Direct control of milk production at the breasts (or autocrine) is controlled by several factors, for examples, baby's desire to breastfeed, breast ability to store milk, and FIL buildup. The breast milk content level in the breasts corresponds with the rate of short-term milk synthesis or feeding intervals. The milk production rate will vary with each feeding the milk capacity is 11-58 milliliters per hour for the entire 24-hour period of breastfeeding. The baby can breastfeed up to 76 % milk produced by the mother. Milk production depends on the baby's needs and sucking ability. If the baby needs more milk, he may not require more feedings but need to suck harder and longer with each feeding. The frequency of milk expressed from the breasts may be critical in milk production in the case with no sucking from the breasts and only manual milk expression. Breast size has no effect on milk production. Although large breasts may have more tissues and a greater ability to store milk in between feedings; but mothers with small breasts and yet with more frequent breastfeeding will lactate as much as mothers with large breasts in a 24-hour period.

Factors like the mother's emotional state from pain and medication like magnesium sulphate, or a pre-mature delivery, or long mother-baby separation due to illness, can cause milk ejection reflex reduction. Giving the baby food other than breast milk will only cause the infant to breastfeed less. As a result, the breasts can become engorged and the mother may fail to express breast milk (Image 1.3.24). This may lead to instability of the milk ejection reflex. The stage 3 lactation will gradually decrease and finally stop. Within 40 days, the alveoli will become atrophied (involution) and the breast tissues will return to pre-pregnancy stage (Image 1.3.25).



● **Colostrum**



Image 1.3.26 Concentrated white colostrum (courtesy of Dr. Jack Newman)



Image 1.3.27 Thick light yellow colostrum



Image 1.3.28 Clear colostrum



Image 1.3.29 Golden colostrum

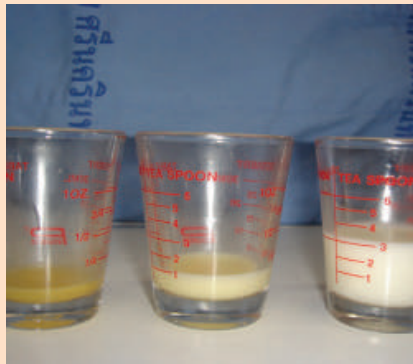


Image 1.3.30-31 Colostrum colors from 3 different mothers: yellow, yellowish white and white

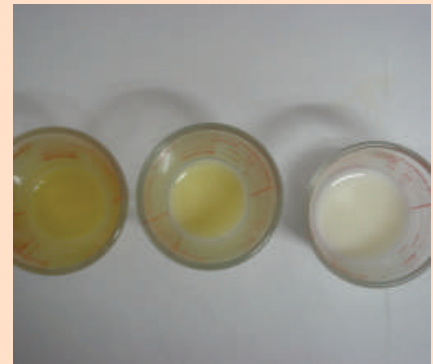


Image 1.3.32-33 Expressed colostrum with use of 2-cc syringe



Image 1.3.34 Extracted amount of approximately 1.5 cc per feeding



● Colostrum

Colostrum drips on a nipple (Image 1.3.26-28)

Breast milk during the first three days after delivery, also known as colostrum, can differ from normal milk color; and though little, it has significant nutritional and immunity benefits. On the first day, the mother can secrete about 3-30 millimeters per day, which is in line with the infant stomach capacity and needs. On the second day, more milk will be lactated at approximately 10-20 milliliters per feeding, or 175 milliliters (six ounces) per day. This amount will increase to 300-500 milliliters (10 to 17 ounces) per day on the third day.

Golden color colostrum (Image 1.3.29)

Dark yellow colostrum normally results from the presence of beta-carotene, which is a key antioxidant. The colostrum phase of breastfeeding has a significant effect on the survival of newborns due to its high immunity level stemming from the high content of white blood cells immunoglobulins - especially Secretory IgA, lysozyme (enzymes that break down bacterial cell walls), T lymphocyte and hormones as well as fats, vitamins, minerals and substances essential to growth. More of these various substances are passed from the mother into the milk than latter milk; for tissue cells lining the milk ducts are still enlarged in 14 days after delivery.

Colostrum colors from three mothers: yellow, yellowish white and white (Image 1.3.30-31)

Colostrum collected from three different mothers on the same day provided these different colors.

Colostrum in yellow mixed with pink or orange (rusty-pipe colostrum) results from the presence of blood; approximately 15% can be found in initial breast milk of mothers in normal condition. The cause for blood-tainted milk is due to damaged capillaries in the areola area during the rapid branching of alveoli during pregnancy. Nonetheless, the infant can still proceed with breastfeeding as normal.

Using a 2-cc syringe (Image 1.3.32-33), about 1.5 cc of colostrum can be extracted per breastfeed (Image 1.3.34). (Details of colostrum use can be found in Section 3.1 and 3.7 of Unit 3.)



● Mature Milk



Image 1.3.35 Comparison of mature and transitional milk

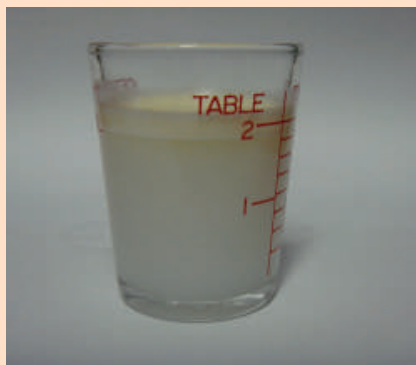


Image 1.3.36 Separation of layers of mature milk left standing



Image 1.3.37 Comparison of fore-milk and hind-milk



● Mature Milk

Comparison of transitional and mature milk (Image 1.3.35)

Transitional milk occurs between the colostrum and mature milk stages, and is produced around the 7-14 days of breastfeeding. The milk will increase to 700-800 milliliters per day (23 to 26 ounces), after which it will stabilize in the range of 440-1,220 milliliters per day, depending on the baby weight and breastfeeding frequency. Despite the drop in protein and immunoglobulin levels in mature milk, there will instead be a boost in the amount of sugar, lactose and fat.

Separation of mature milk into layers left standing (Image 1.3.36)

The mature milk is whiter than colostrum, it will separate into a layer of fat and milk when left standing.

Comparison of fore-milk and hind-milk (Image 1.3.37)

Hind-milk with more fat content than fore-milk will satisfy the baby's hunger and enable him to sleep for longer periods. The increased amount of fat is caused by oxytocin that is secreted in higher amounts as the baby breastfeeds, thus causing the milk glands to contract more and release fat droplets.

There is about a 15% chance for a mix of blood in breast milk during the initial breastfeeding stage, even though the mother's physical condition may be perfectly normal. This may be due to damaged capillaries from rapid cell division in the mammary glands during pregnancy. When blood is found, it should first determine if it is the blood of the mother or baby. Mothers can continue to breastfeed if the blood amount is minimal, and if there is no baby rejection. However, if the baby vomits, the breast milk should be squeezed or pumped out, and it usually takes three to seven days for the blood to clear up.



1.4 Correct positioning and proper suckling



Image 1.4.1 Non-nutritive sucking on hand



Image 1.4.2 Nutritive suckling on mother's breast



Image 1.4.3 Rooting reflexes of face turning and mouth opening in infant palate stimulation



Image 1.4.4 Automatic mouth opening with mother's nipple stimulation of infant lower lip

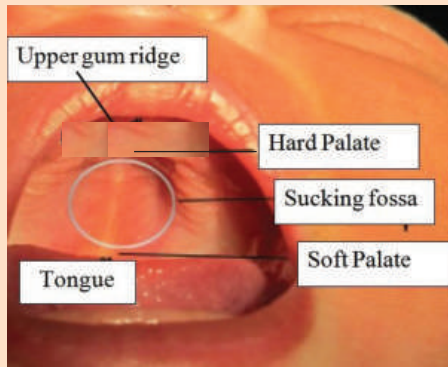


Image 1.4.5 Sucking fossa, U-shaped cavity at joint of soft and hard palates

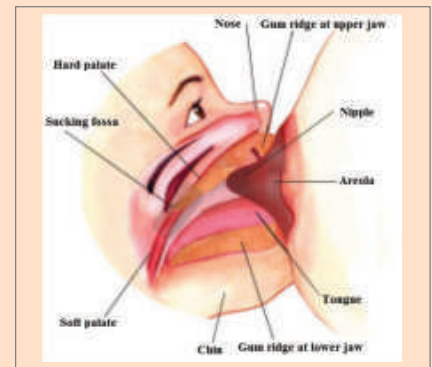


Image 1.4.6 Suckling on nipple and areola with gum ridge pressing areola and palate pressing nipple on tongue

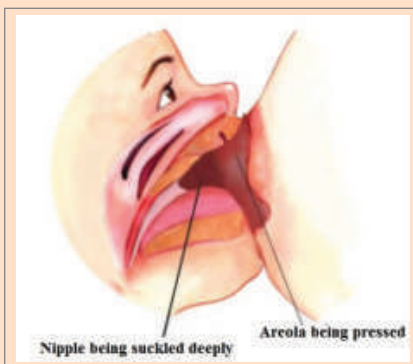


Image 1.4.7 Nipple stretched between palate and tongue as tongue tip rose and waved from front to back

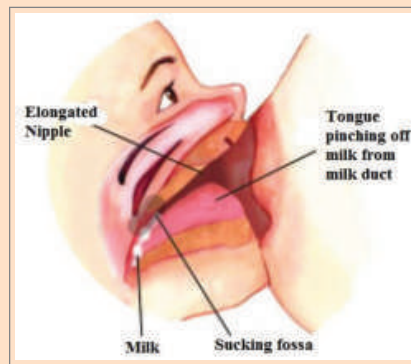


Image 1.4.8 Elongated and flattened nipple in sucking fossa, and tongue pinching off milk from nipple ducts through negative pressure inside mouth

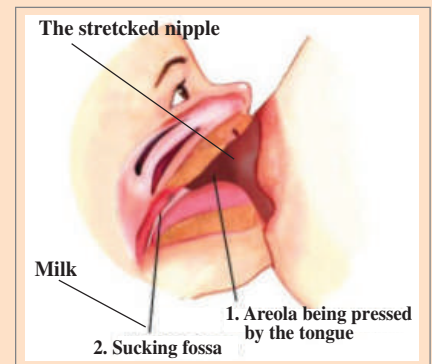


Image 1.4.9 Dripped breast milk from extended nipple tip, at funnel-shaped tongue base before swallow down the throat



1.4 Correct positioning and proper suckling

The suckling action within the newborn mouth can be categorized as either non-nutritive or nutritive. Non-nutritive suckling can occur independently without anything in the mouth, for instance, mere suckling of the mouth while asleep, or suckling upon stimulation by contact with his own hand, the mother's finger or an artificial nipple. Such an example of the infant placing his hand into his mouth and sucking it provides the breastfeeding cue (Image 1.4.1). Breastfeeding is considered nutritive suckling, and it requires the baby to suck in order to draw the nipple and areola tissues into his mouth (suckling). This action of suckling involves the use of the lips and tongue to suck (Image 1.4.2) until the mother's nipple becomes a teat and promotes lactation. Breast milk will flow into the baby's mouth consistently and pause in sync with the baby swallowing.

The baby's ability to suckle depends on the features of the mother's nipples and areolas, the anatomy of the baby's mouth as well as his breastfeeding reflexes. Examples of these reflexes include suckling and swallowing when the gum is touched, spewing when the tongue is touched, and turning the face and opening the mouth (Image 1.4.3) when the finger or nipple is rubbed against the baby mouth.

The sucking mechanics of the baby require rhythmic suction with synchronized actions of the holding of the nipple in the mouth, sucking, swallowing and breathing. In the early stages of breastfeeding, the mother should nudge the infant's lower lip with her nipple until he demonstrates readiness to suckle by opening his mouth (Image 1.4.4). While the baby is holding his mouth open, the mother should quickly bring the baby closer to her nipple so that he can pull in the nipple and areola until they reach his sucking fossa, which is a U-shaped space between the hard and soft palates (Image 1.4.5). When the lips and tongue help place the nipple and areola inside the baby mouth (Image 1.4.6), the gum ridges should press on the areola so that the front tongue tip presses up (Image 1.4.7). The lower jaw is raised to let the tongue contract around the nipple base while the lips close tightly around the nipple base and areola. The buccal (cheek) surface helps retain the shape of the mouth and to close tightly so as to create negative pressure in the oral cavity. As the tongue changes its shape during sucking, it helps elongate, flatten, and widen the nipple and areola in the sucking fossa (Image 1.4.8). The tongue resistance from the palate pressure on the elongated nipple triggers milk secretion from the milk glands and small milk ducts. The milk flows down into the nipple large ducts that dilate. As the lower jaw is lowered, negative pressure is created in the mouth. The tongue's wave like action from the tip of the tongue to its base adds pressure on the large ducts, and in turn causes milk to drip from the nipple onto the middle of the tongue, which sides are rolled up and thus shaping like a funnel. As the amount of milk builds up on the tongue, it presses on the tongue base, lowering the pressure on the tongue base and oral cavity to allow the milk to flow into the throat before being swallowed (Image 1.4.9) in. Pressure on the tongue base raises the tongue tip, causing the soft palate to contract and raise the uvula to seal off the nasal cavity. This prevents milk from flowing back into the nostrils and larynx. Each tongue movement stimulating milk secretion from the large milk ducts in the nipple and areola, takes about 0.7 second. The milk flow rate will be very fast when the baby begins to suck, and gradually slow down towards the end of breastfeeding, when more fat is secreted into breast milk.





Image 1.4.10 Baby asleep without breastfeeding cues or readiness to breastfeed



Image 1.4.11 Alert baby ready to breastfeed after arm-leg and lip stimulation



Image 1.4.12 Incorrect pulling of nipple and areola, or sucking only nipple without latch-on to areola



Image 1.4.13 Appropriate sitting position with supporting devices for mother's back, arms and feet, and raised lap



Image 1.4.14 Correct mother-baby position with make-do items in the ward



Image 1.4.15 Half-sit-recline position for easy and convenient breastfeeding



Image 1.4.16 Half-sit-recline position with football hold position



Image 1.4.17 Half-sit-recline position with arms round baby head and body in cradle hold



Image 1.4.18 The side-lying hold position with mother and baby facing each other, holding the baby's head and back



The Mother's Preparation in Breastfeeding

Babies should be allowed to be breastfeed as often as they want. Each feeding should not be too far apart, for example, two to three hours. The mother should not wait until the baby is hungry to start the next feeding. Mothers are advised to watch for breastfeeding cues and the infant's readiness before starting each feeding. If the infant sleeps for too long or dozes off quickly before proper breastfeeding (Image 1.4.10), the mother should practice getting the baby to stay alert by unraveling the blanket wrapped around him, moving the arms and legs, and stimulating breastfeeding cues through rooting reflexes until the baby awakes and is ready to breastfeed (Image 1.4.11). The mother can manually squeeze out a bit of milk to moisten her nipple before using it to nudge the baby lip and quickly trigger stronger breastfeeding.

During the first weeks after delivery, the mother should be aware of improper latching, for instance, the baby sucking only the nipple with his lips not covering the areola (Image 1.4.12) completely. Paying attention to this will enable the mother to reposition the baby and hold him correctly for breastfeeding. It can also reduce the problem of cracked nipples, breast engorgement and infection, or low milk supply. There are many ways to position and hold the baby so that it can suckle correctly and drain much milk from the breast.

A mother should choose a peaceful and appropriate place to provide comfort and relaxation as she begins to nurse her baby. The chair chosen for breastfeeding should have back support or armrests to aid the mother in sitting as straight as possible. A pillow can be placed at the mother's back or under her arms, and a nursing stool should also be used (Image 1.4.13). In the maternity ward, a pillow can be placed on the mother's lap, or the stool for access to the maternity bed can be used as a footrest (Image 1.4.14) to prevent the mother from leaning forward and prevent her from having a backache while she breastfeeds. Mothers should also think about raising the lap when holding their babies for breastfeeding, to reduce the pressure of supporting the baby weight on the mother's back, shoulders and forearms. If the mother is sitting up in bed, a pillow should be placed under the knees. If the bed headboard can be raised, then the bed should be arranged so that the mother is in a half-sit-recline position (Image 1.4.15). This is the most comfortable breastfeeding position, especially for mothers with C-section, and with the use of the football hold (Image 1.4.16). Mothers with C-section who decides to use the half-sit-recline position, can use the arm to cradle the baby, also known as the cradle hold (Image 1.4.17). If the mother prefers to lie down while breastfeeding, she should lie on the side with a pillow supporting the back and turn herself until the nipple is at the same level as the baby mouth (Image 1.4.18). Mothers should be given advice on how to position themselves to promote comfort and proper holding of the baby to help him latch on to the nipple and areola correctly. Mothers can choose freely on how to position themselves and their babies, so as to match both their preferences and breastfeeding conditions.





Image 1.4.19 Cradle hold: upper arm over baby's head for mouth pressed against breast



Image 1.4.20 Incorrect cradle hold: lower arm over baby's head



Image 1.4.21 Cradle hold: palm support for baby bent hips to turn sideward and pressed against mother's tummy



Image 1.4.22 Incorrect position: elbow push on baby's head with too much upward lift



Image 1.4.23 Over-bent baby's head with nose too close to breast, thus difficulty in breathing during suckling



Image 1.4.24 Cross cradle hold: palm support for baby's head, opposite feeding breast



Image 1.4.25 Palm support for baby's head, chin pressed against breast with baby's body close to mother's



Image 1.4.46 Palm support for baby's head to suckle on nipple on same side of head



Image 1.4.27 Palm support for baby's head to nurse from breast on same of cradling palm



Breastfeeding Positions

There are many different common breastfeeding positions. This does not mean that a mother needs to master every position when she has just started breastfeeding. Each mother should, however, find the opportunity to try out each position and choose one that she feels best for her to breastfeed successfully on her own at home.

Cradle or Madonna Hold

Most mothers prefer the cradle or Madonna hold. This is often chosen as the first breastfeeding position. Mothers who hold their babies in this position, must sit as straight as possible and avoid bending forward. They should expose their breasts as much as they possibly can, so as to support the weight of the breast with their own hand.

The cradle hold begins with placing the baby in a side-recline position on a pillow placed on the mother's lap. The baby's face should be turned completely towards the mother, with her arm on the same side as the breast where the baby is to feed on. The mother has to use her upper arm to support the baby head and neck (Image 1.4.19). She should not use her forearm or her wrist to support the baby head (Image 1.4.20). The baby's head should bend forward a little and tilt slightly to his shoulder. His head and shoulder should be positioned slightly higher than his hips, with the mother's forearm wrapping behind the baby, and her palm supporting his buttocks or thighs, while his hips are slightly arched (Image 1.4.21). The mother should not raise the baby's head as high as her elbow (Image 1.4.22) because the elbow angle can cause the baby head to bend forward too much until his nose presses onto the breast (Image 1.4.23). When a mother first begins to practice holding her baby's head in the fold of her arm, she may find it difficult to control the forward or back arch of the baby neck as well as support her breast with a C-hold. The fold or crook in the mother's arm may move down easily, thus causing the baby to be positioned too far away from the breast, which is especially true for smaller newborns.

Cross-Cradle Hold

The cross-cradle hold places the infant in a side-recline position, facing the mother's bosom just like the cradle hold. However, the opposite palm or hand that cups the breast in the cradle hold is now used to support the baby head and neck instead (Image 1.4.24). This breastfeeding position is the ideal choice for mothers who have difficulty managing the infant head with the arm, or for term babies or premature babies who usually end up bending the head backward when placed in the cradle position. Supporting the baby head with the mother's palm helps ensure that the baby lower jaw is more easily and closely placed against the mother's breast (Image 1.4.25). Furthermore, the mother can cup her breast with a C-hold and see her areola and nipple more clearly.

Clutch or Football Hold

The clutch or football hold is accomplished by placing the infant on a pillow under her armpit. Holding the baby on his side with his bottom facing towards the mother's back, she then uses the palm on the side that is supporting the baby back to support his head (Image 1.4.26). The baby back and neck are placed on the mother's arm on the same side as the pillow. The mother then lifts the infant head so that his mouth levels with the nipple that is on the same side as the hand supporting his head (Image 1.4.27). The infant hand or arm can rest between himself and his mother's body, or touch and feel around his mother's breast.



Image 1.4.28 Rolled blanket or wrap cloth to cushion back of hand supporting baby head



Image 1.4.29 Thumb and index finger behind baby ears to push chin against mother's breast



Image 1.4.30 Modified football hold: baby moved to feed from breast opposite cradling hand



Image 1.4.31 Incorrect baby latch-on to nipple and areola while lying on back with reclining mother on her side



Image 1.4.32 Mother with arm supporting head and lying to nurse her baby lying on his side, back support by rolled cloth



Image 1.4.33 Infant head tilt and rolled back, causing weak suckling



Image 1.4.34 Reclining mother nursing with lower arm pushing baby back and hips nearer her



Image 1.4.35 Reclining mother nursing and hugging baby in sitting position by her side



A cloth diaper, blanket or wrap should be rolled up and used as a cushion for the back of the mother's hand to help prop up the infant head to meet the mother's nipple and areola (Image 1.4.28). The mother places her thumb and index fingers around the back of the baby ears to bring his chin up against the bottom of the areola, and the baby torso on the mother's bosom (Image 1.4.29). Cushioning the mother's hand to support the baby head helps prevent him from rolling away from the mother's breast, and also prevents the mother's hand from aching. If the baby kicks or moves around too much, the mother should straighten the baby legs and clasp them to her side. Moving the infant over to feed from the other breast (Image 1.4.30) is referred as the modified football hold, which resembles the cross-cradle hold. With the infant placed on a pillow in front of her, his mother may find this an easy position. This is also true for mothers with sagging or large breasts, or with flat, inverted or retracted nipples as well as for mothers with C-section, or premature babies, or twins. It is also popular with mothers who prefer the baby head to stay still during nursing.

Lying Down Position

The reclining position enables the mother to rest while breastfeeding during the day or night. Lying down is suitable for mothers with C-section and epidural anesthesia, or wounds in the perineum. However, the reclining position can lead to cracked nipples if the mother experiences difficulty in this position, or is unable to carry it out correctly. This is the case with, for instance, the baby lying on his back and turning only his head to breastfeed (Image 1.4.31), which makes it impossible for the infant to achieve a deep and complete hold on the nipple and areola.

As the mother lies on her side to nurse her baby, she needs one to two additional pillows to cushion the head. Alternatively, she can use the arm on the lower side, while lying down, to support her head so that it is raised high enough for a clear view of the baby breastfeeding. The baby should lie sideways on the bed at the same level as his mother's nipple. The tummy should be touching his mother's with the entire stretch of his back supported by a rolled up blanket or towel. The mother's arm on the higher side of her body supports the breast, and brings the nipple and areola to the baby mouth (Image 1.4.32). For large-breasted mothers or babies who are unable to steady the head while lying on the side (Image 1.4.33), the baby head can roll back and end up having to lift his face to breastfeed. In this case, the mother should use the crook in her elbow crease and forearm to support his head, back, hips and thighs to place his body up against hers (Image 1.4.34).

Specially-designed breastfeeding positions may be needed for mothers who are required to lie facing upwards after delivery, including those with C-section. Infants with muscular or nerve-related abnormalities, and/or trouble in swallowing, such as newborns with Down Syndrome, a cleft lip or a cleft palate, require special breastfeeding positions. An example of a solution is to place the newborn on his stomach between the mother's abdomen and chest with his mouth near the mother's nipple and areola. A newborn with a cleft palate can be placed in a sitting-up position while the mother hugs him on her side, similar to the football hold. Though in this case, the mother lies down on her back (Image 1.4.35). A rolled up cloth can be placed on a pillow to cushion the hips and back of the baby so that his mouth stays still near the nipple and areola while he breastfeeds.





Image 1.4.36 Position of reclining baby on mother's torso, or inner arm



Image 1.4.37 Position of baby with stretched torso and tilted head, sucking only on nipple



Image 1.4.38 Position of cradled baby on mother's torso with head held at 45 degree from body



Image 1.4.39 Position of baby body, ear, shoulder and upper hip in alignment



Image 1.4.40 Position of baby neck and head held up with chin pressed against mother's breast



Image 1.4.41 Relaxed breastfeeding as shown in baby spread out fingers touching mother's breast



Image 1.4.42 V-hold on breast like opened V scissor blades



Image 1.4.43 V-hold on small breast



Image 1.4.44 V-hold on breast with index and middle fingers pinching areola to push baby's chin away from breast



Correct Positioning

A baby usually lies face-up for bottle feeding. However, he must lie sideways with his body facing his mother's and right against it, or with his abdomen touching his mother's while breastfeeding with his mother cradling him in her arm (Image 1.4.36). Although the mother can support his head and torso with various breastfeeding positions, how the baby is positioned to suck on the nipple and areola is all very similar. As the baby is held for breastfeeding, his torso should not be turned away from his mother's. A baby lying with a twisted torso and head at the same level as her chest, and tilting back with his chin far from the breast, is an improper breastfeeding position (Image 1.4.37) since the baby is only sucking on the nipple and not fully triggering the lactation reflexes. To correct the infant position, the mother must do more than just pull down his lower jaw to allow more hold of the areola, or push his head towards the breast. She must readjust his body so that his head is 45 degree above his torso, with his chest pressed against her body (Image 1.4.38). The infant mouth must also be in the nipple-areola area. This position, where the head is held high, helps the milk flow properly to his stomach and intestines so that he can burp well after breastfeeding.

To assess the baby breastfeeding position, check his torso alignment. A correct alignment means that his ear, shoulder and upper hip bone are in a straight line, and his thighs and upper neck are arched on his mother's torso (Image 1.4.39). The baby head should also align with his torso, not turning to the side, tilting up or bent too much. By keeping his neck straight, the baby will be able to press his lower jaw against his mother's breast (Image 1.4.40). The baby breastfeeding position should be relaxed, meaning that his torso muscles are not tensed, and his clenched fists spread out the fingers to feel his mother's breast (Image 1.4.41). The mother should also avoid pushing the baby head to the breast as this can arch his lower neck too much, burying his face into the breast, and pressing his nose against it, causing breathing difficulty for him and prevent his eye contact with his mother.

Breast Support

Holding or supporting the breast as the baby breastfeeds, can help the mother bring her breast to the baby mouth properly. This not only helps to hold the nipple in place after it has been put into the baby mouth, but it also ensures that the infant is able to suckle more effectively.

During the first 1-2 months of initial breastfeeding after delivery, using the hand to support the breast can help the baby to latch and suckle on the nipple and areola properly. In fact, there are many ways to hold the breast, but most mothers only use the first two as described in the following paragraphs.

The scissors or V-Hold support for the breast uses the index and middle fingers placed separately on the upper and lower parts of the breast (Image 1.4.42). Some mothers like this hold and are very good at it because it is much easier to place more of the tissue and areola of small breast into the infant mouth (Image 1.4.43). However, applying the V-hold with the index and middle fingers, pushing and pressing the areola may put too much pressure on some milk ducts, and push the baby chin away from the breast (Image 1.4.44). As a result, the baby may not be getting enough milk, and the mother may develop a cracked nipple. The V-hold can prevent the baby from putting the nipple and areola deep inside his mouth, and it can very easily lose hold of the areola. In addition, some milk ducts may be blocked, causing a breast abscess.





Image 1.4.45 C-hold with four fingers below breast and thumb above



Image 1.4.46 C-hold support for soft breast to express milk



Image 1.4.47 C-hold lift of mother's nipple to touch or rub baby lip more easily



Image 1.4.48 C-hold on large breast with wide areola supported by rolled cloth



Image 1.4.49 U-hold with index finger and thumb on left and right sides of areola exterior



Image 1.4.50 U-hold on baby with weak latching on nipple and areola



Image 1.4.51 U-hold on breast tapering areola like sandwich for baby to latch on



Image 1.4.52 Baby latching on nipple and areola with chin pressed nearer areola base and cheeks puffed up like balloon



The cup or C-hold supports the breast by placing the thumb above the breast and behind the areola, and four fingers beneath the breast (Image 1.4.45). The index finger should be placed deep close to the breast base and with three closely-knit fingers on the chest. New breastfeeding mothers should use the C-hold to prevent the baby lower jaw from bearing too much breast weight. To support soft breasts yet reaching full milk production, all four fingers should be placed directly beneath the breast, away from the areola (Image 1.4.46). This is to lift the breast and use the nipple to rub the baby lips so that they will open wide while placing the nipple and areola in his mouth more easily (Image 1.4.47). The C-hold also helps to steady latching on. The mother can compress the areola by pressing the thumb and index finger together, for the baby to latch on, or stimulate milk flow while the baby breastfeeds. Mothers with extra-large breasts may use rolled-up cloth for support beneath the breast (Image 1.4.48), and four fingers on the cloth to reduce hand-shoulder tension. The palm helps to control the nipple and areola as the baby uses his tongue to squeeze and suck milk from the milk ducts in the nipple.

The Dancer hand or U-hold is a version of the C-hold where the C is turned 90 degree downward, and the thumb and four fingers placed on the left and right of the areola exterior (Image 1.4.49). This hold can be used for infants with weak suction, such as premature ones or those with nervous system disorders, because the mother can use the breast-supporting palm to support the baby cheek and chin. The U-hold can be adapted by extending the index finger to bring the baby chin closer to the breast. It can also support the movement of the baby lower jaw as he latches on the nipple and areola (Image 1.4.50). The U-hold can also help in changing the breast shape and size for the baby to latch on the nipple and areola with greater ease (Image 1.4.51). This is especially true for smaller newborns and newborns with relatively low birth weight. Using the index finger's tip to gently touch the baby's chin can help press the baby's tongue down against the gum ridge.

Latching on

Before latching on the nipple and areola, the mother's skill is important for appropriate positioning. For instance, sitting straight on a chair with a footrest, a pillow on the lap and another supporting the back. Decide on a breastfeeding position, such as the football hold, with the palm supporting the baby's head comfortably. Position the baby's body properly with aligned ears, shoulders and hips, and lie him on the side close to the mother's body. Lift the baby's head higher than the body, and place the lips close to the mother's areola or touching the lower part of the breast gently. The baby head will tilt back a little, with the nose on the same level as the nipple, and the mother's nipple steering straight into the baby palate. When the mother places the nipple on the baby lips and gum ridge gently, the baby lower jaw will open, and the tongue tip will extend to meet the gum ridge and draw the nipple and areola deep into the mouth. The upper and lower lips will close over the areola tightly until the infant cheeks puff up like a balloon (Image 1.4.52).





Image 1.4.53 Latching on nipple and areola with upper and lower lips open at wide angle



Image 1.4.54 Latching on with wide open lips, lower areola in mouth deeper than upper



Image 1.4.55 Baby in alert stage with wide open eyes while the mother stimulate latching on



Image 1.4.56 Unsuccessful latching on with baby's face turn looking for nipple, or crying softly



Image 1.4.57 Latching on and suckling hard and fast with baby fist clenching



Image 1.4.58 Successful latching on with baby relaxed hand spreading out fingers in rhythm with strong milk flow into mouth



Image 1.4.59 Latching on nipple only, with narrow mouth angle but partial lip cover of areola



Image 1.4.60 Latching on nipple with lower lip drawn in and partial areola in mouth



Image 1.4.61 Weak and loose latching on of premature baby to areola



Assessment of latching on

As the mother feels relaxed and comfortable around her nipple and areola, the older baby can latch on instantly and correctly with proper training since birth. For proper latching on (Image 1.4.53), the baby lips should be around the middle of the areola. The mouth should open more than 160 degree, and the upper and lower lips open wide attached close to the areola. In most cases of newborns, those unable to control the head well, are able to open the mouth wide once the nipple rubs the mouth. Nevertheless, the head will tilt back a little as the chin presses close to the lower part of the mother's breast. Latching on the nipple and areola (Image 1.4.54), will see less areola exposure under the baby's lower lip than above (asymmetrical latch). As the baby breastfeeds, the cheeks will puff up like a balloon, and the muscles in the front ears will move in rhythm with sucking and swallowing. The mother will be able to feel the baby's tongue holding the nipple and areola bottom, and also see the baby slow and deep swallowing, or hear the soft sounds of swallowing when there is enough milk.

Parents should be advised to observe the baby's body language for successful breastfeeding. The baby ready for breastfeeding will open the eyes and gaze into the mother's as she encourages him to open the mouth (1.4.55). If the baby is unable to fully latch on, he may turn the head from side to side or start crying in short bursts (Image 1.4.56), but stop when he is able to latch on deeply. Once latching on is deep, the baby will begin to suck hard and fast at intervals, and swallow large amount of milk to the point where the swallowing can be heard. The lower jaw in front of the ears can be clearly seen moving, and the hand will clench and wave as he suckles (Image 1.4.57). When the milk flow is stable, the baby will still be sucking with force but gradually ease down. He will begin to close the eyes, and the face will appear relaxed, let go the hand and spread out the fingers in short rhythms, or hold on to the upper part of the mother's breast (Image 1.4.58). The baby receiving sufficient milk will on his own let go the nipple gently and fall fast asleep.

Improper latching on can be identified with many clues, including the angle of the baby mouth that is less than 160 degree, the baby suckling only on the nipple, and the stretched nipple around the front of the tongue (Image 1.4.59). The baby lips may protrude forward rather than spread out, or the baby mouth closed relatively tight with particularly the lower lip pulled in, and with too much of the areola tissue left outside the lower lip (Image 1.4.60). Other indications of improper latching on, are the baby frequent sucking and swallowing in small amount, and the mother's pain in the nipple, flat nipple tip, and apparent bite marks after breastfeeding. The baby may also often fuss and cry, and refuse to breastfeed because he is not getting enough milk. Babies with weak suction, such as premature babies of 32 weeks or more, will not open the mouth that much, or the open mouth angle may be too narrow, and there may be a large gap between the lips (Image 1.4.61).

The baby should feed from each breast for at least 10 minutes, and until he feels sleepy and dozes off. If the first breast is well drained but the baby is still awake and will not stop breastfeeding, he can be stopped with a finger insert in the mouth, close to the nipple base. The baby will release the nipple immediately. To maintain milk supply in both breasts, the baby should be trained to breastfeed from both breasts equally.



1.5 Newborn stools after breastfeeding



Image 1.5.1 Meconium on first day

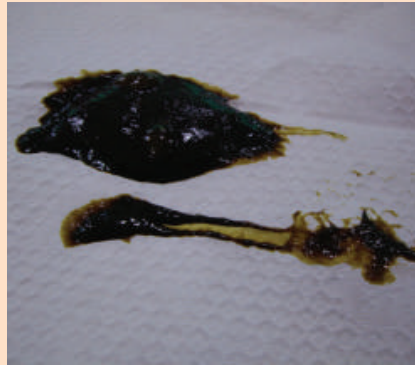


Image 1.5.2 Meconium



Image 1.5.3 Stool on second day



Image 1.5.4 Stool on third day



Image 1.5.5 Stool on fourth day

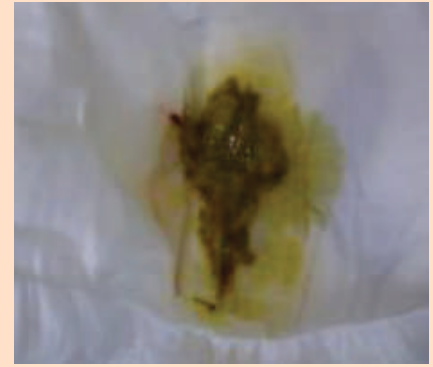


Image 1.5.6 Transitional stool on 4th-5th day



Image 1.5.7 Stool on fifth day



Image 1.5.8 Stool of 1-month-old baby like tiny tomato seeds



Image 1.5.9 Stool of 1-month-old baby constipated for 7 days



1.5 Newborn stools after breastfeeding

The breastfeeding baby stool will have coloring and texture that vary according to age and the mother's diet. Babies who breastfeed exclusively will have stools like liquid, and sometimes watery. Such conditions often cause the mother to worry if the baby has an upset stomach, prompting her to seek medical advice. Medical personnel must therefore familiarize themselves with the normal stool of exclusive breastfeeding babies, so that they can provide proper counselling, and the baby can continue breastfeeding as long as possible.

Exclusive breastfeeding baby stool will change in stages as follow:

During the first 1-2 days, bowel movements may not be often, possibly 1-2 times per day, and the stool will be thick, sticky and green to black in color like mud. This is referred as meconium (Image 1.5.1-2).

On the second day, the stool will become a lighter green with a greater mixture of water. Some babies will have brown pellets in the stool (Image 1.5.3). If a newborn excretes meconium well on the first few days, this will mean that he has received enough energy from breast milk, and the possibility of jaundice will be reduced.

On the 3rd-4th day after delivery and once the baby begins to breastfeed more frequently, the stool color will become lighter from dark green to yellowish green. The stool texture will be less sticky and more watery, referred as transitional stool (Image 1.5.4-6). The stool will also increase in amount with the baby having 3-4 bowel movements per day.

After the fourth day, exclusive breastfeeding babies will have stools that are golden and soft with a thick-liquid-like texture similar to rice congee with pumpkin. In most cases, the stool will have a high water content. Upon examining the baby diaper, the stool should appear in the middle of the diaper surrounded by absorbed water. This is normal, and it is not diarrhea (Image 1.5.7).

On average, for babies that are less than six weeks old, bowel movements will increase to 3-4 times or more per day. However, some babies may frequently have small amounts of stool throughout the day, with the possibility of having a bowel movement after every breastfeeding session. This is a good sign as it indicates that the baby is receiving enough breast milk. Image 1.5.8 shows the golden stool of a 1-month old that resembles tiny tomato-like pellets.

Once the baby is over six weeks old, there will be a change in his bowel movements. More specifically, the stool will become slightly more solid with its texture transforming from congee-like to a sticky toothpaste-like composition. The coloring can range from golden to yellowish green, depending on the mother's diet. Furthermore, the bowel movements will decrease to 1-2 times per day. There is report of a 1-month old infant constipated for seven days, but upon physical examination, was found to be normal with no abdominal bloating. Insertion of the little finger into the rectum stimulated the bowel movement and resulted in a significant amount of yellow stool excretion, with no hard clumps found. This is normal for an exclusive breastfeeding baby from the second month of birth onwards (Image 1.5.9).



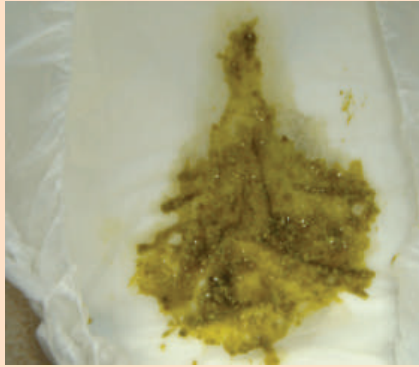


Image 1.5.10 Stool of a 2-month-old, with green seed-like pellets



Image 1.5.11 Minimal baby stool at 2 months

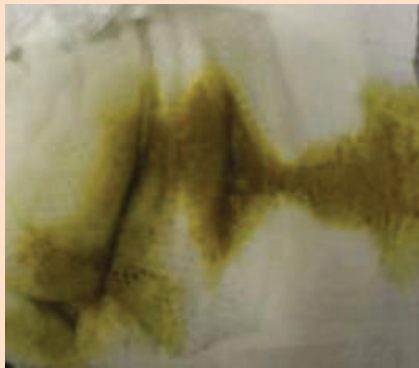


Image 1.5.12 At 2 months of age

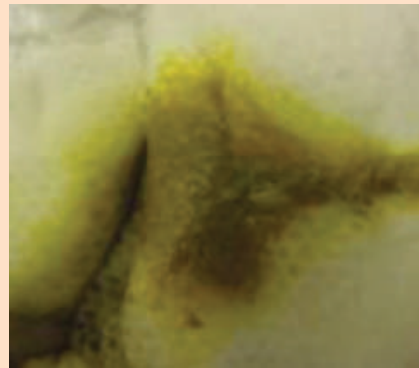


Image 1.5.13 Stool of a 2-month-old, with green mucus



Image 1.5.14 Stool of a 5-month-old, gold in color



Image 1.5.15 Stool of a 5-month-old, with mother's diet of morning glory vegetable



At times, an exclusive breastfeeding baby's stool may be watery, greenish in color with tiny tomato-like seeds (Image 1.5.10), or in small amount of watery yellowish or greenish in color absorbed in the diaper (Image 1.5.11-12). Some babies have greenish mucus mixed in the excrement (Image 1.5.13). Nonetheless, the smell of the stool is faint and sweet; different from the rotten or sour smell of the baby stool with diarrhea caused by a bacterial or viral infection.

Some vegetables, fruit or vitamins in the mother's diet may change the baby's stool color. For example, a 5-month-old baby with regular golden color stool (Image 1.5.14) but excreting green stool on the next day after the mother's diet of a large amount of morning glory (Image 1.5.15).

No red blood should be seen mixed in the stools of an exclusive breastfeeding baby. If there are red strains in the stool, the causes may be

- the influence of the mother's hormones with bloody mucus in her vagina affecting the female newborn on the first few days after birth, a normal condition which will eventually disappear over time
- the reaction to dairy milk or dairy products in the mother's diet, with some of the dairy milk protein slipped into the breast milk
- the wounds in the baby rectum or intestines.



1.6 Newborn urines after breastfeeding



Image 1.6.1 Brick-dust urine



Image 1.6.2 Dark yellow urine



1.6 Newborn urines after breastfeeding

The amount of urine excreted each day helps the baby's caregiver to determine if the baby has enough water or not. The baby receiving sufficient breast milk should urinate 3-5 times per day during the first five days, and at least six times per day afterwards. Babies in diapers may be difficult to assess, as the baby will excrete about three tablespoons of urine per time. The mother can try to pour three tablespoons of water into a disposable diaper, and compare the weight with a dry diaper, to properly estimate how much urine the baby excretes each day.

Urine color

Generally, babies with sufficient breast milk will have clear, colorless urine. However, some babies may have urine that is rusty in color, referred as brick-dust urine (Image 1.6.1). This is found in some babies during the first 2-3 days after birth, due to the uric acid crystals, not blood, in the urine. This condition will disappear once the baby is three days old or older, and thus there is no need for further assessment. However, if the condition persists with the baby still having dark or rusty-color urine (Image 1.6.2), it should be determined whether the baby is receiving enough milk or not. Continue to find the cause(s), and solve the problem of the baby's dehydration. One solution is to provide manually-pumped breast milk in addition to nursing milk, until the baby is able to breastfeed better on his own.

References

1. Auerbach KG, Riordan J. The breastfeeding process: the perinatal and intrapartum period. In: Riordan J, Auerbach KG, editors, *Breastfeeding and human lactation*. Boston: Jones and Bartlett Publisher; 1998: p. 279-309.
2. Black RF, Calhoun D. Preparing to breastfeed. In: Black RF, Jarman L, editors. *The process of breastfeeding*. Boston: Jones and Bartlett Publisher; 1997. P. 3-24.
3. Black RF, Calhoun d. Feeding at breast, In: Black RF, Jarman L. editors. *The process of breastfeeding*. Boston: Jones and Bartlett Publisher; 1997. P. 25-51.
4. Cagla MK, Ozer L, Altugan PS. Risk factors for excessive weight loss and hypernatremia in exclusively breastfed infants. *Brazillan J Med biol Research*. 2006; 39(4):539-544.
5. Clay BW, Hoover K, Positioning and latch on technique. In: Clay, Hoover K, editors. *The breastfeeding atlas*. 4th ed. Texas: Lact New Press; 2008. P. 33-39.
6. Colson S. Maternal breastfeeding position: have we got it right? *Pract Midwife*, 2005; 8(1):92-32.
7. Czank C, Henderson JJ, Kent PC, Lai CT, Hartmann PE. Hormonal control of the lactation cycle. In: Hale TW, Hartmann PE, editors. *The textbook of human lactation*. Amerillo: Hole Publishing 2007. P. 98-111.
8. Czank C, Mitoulas LR, Hartmann PE, Human Milk composition. In; Hale TW, Hartmann PE, editors. *The textatobk of human lactation*. Amerillo: Textas Hole Pubklishing 2007; p. 59-73.
9. Daly SE, Hartmann P. Infant demand and milk supply. Part 1: Infant demand and milk production in lactating women. *J Hum Lact* 1995; 11(1):21-26.
10. Daly Se, Hartmann P. Infant demand and milk supply. Part 2: The short-term control of milk synthesis in lactating women. *J Hum Lack* 1995; 11(1):27-37.
11. De Carvalho et al. Mean feeding frequency during the first 3 days of life and serum billirubin. *Am J Dis Child* 1982; 136:737-738.
12. De Carvalho, et al. Effect of frequent breast-feeding on early milk production and infant weight gain. *Pediatrics* 1983; 72:307-11.
13. De Carvalho M, Robertwson S, Klaus M. fecal billrubin excretion and serum billubin concentrators in breast-fed an d bnottle-fed infants. *J Pediatr* 1985; 107(5):786-90.
14. Gartner L, Morton J, Lawrence R, et al. American Academy of Pediatrics Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics* 2005; 115(2):496-506.
15. Geddes DT. Gross anatomy of the lactating breast, In: Hale TW, Hartmann PE, editors. *The textbook of human lactation*. Amerillo: Texas: Hale Publishing 2007, p. 19-34.
16. Geddes DT, Kent JC, Mitoulas LR. Tongue Movement and intraoral vacuum on breastfeeding infants. *Early Hum Dev*. 2008; 84(7):471-7.
17. Goldman AS. The immune system of human milk antimicrobial. Anti-inflammatory and immunodmodulating properties. *Pediatr Infect Dis J* 1993; 12:664-671.
18. Jacobs LA, Dickenson JE, hart PD. Normal nipple position in term infants: maasured on breastfeeding ultrasound. *J Hum Lact*. 2007-23(2):52-9.
19. Lang G, Caquineau C, Owen RA, Hartmann PE. Regulation of oxytocin secretion. *Vitm Hom* 2005(7);27-58.
20. Lawrence RA, Lawrence RM. *Breastfeeding: a guide for the medical profession* 7th ed. Philadelphia, PA: Elsevier Mobsy(:2011.
21. Lee SJ, Thomas J. Antenatal breast examination for promoting breastfeeding. *Cochrane Database System Rev*. 2008; 16 (3).
22. Marasco L, Barger J. Cue feeding: Wisdom and science. *Breastfeeding Abstracts*: 1999; 18(4): 27-72
23. McCormick FM. Tosh K. McGuire W. Ad libitum or dermand/semi-demand feedign versus scheduled interval feeding for preterm infants. *Cochrane Database Syst Rev*. 2010; 17(2).



24. Meek JY. *New mother's guide to breastfeeding*. AAP New York; Bantam books; 2005.
25. Mercier JC, Gage P. Milk protein synthesis. In: Mephan TB. Editor. *Biochemistry of lactation*. Amsterdam: Elsevier; 1983.
26. Mohrbacher N, Stock J. *The Breastfeeding Answer Book*. 3rd ed. Schaumburg, IL; La Leche League International; 2003.
27. Neifert M. Early assessment of the breastfeeding infant. *Contemporary pediatrics* 1996; 13(10):142-166.
28. Neville MC. Anatomy and physiology of lactation. *Pediatr Clin North Am* 2001; 48(1):13-34.
29. Prime DK, Geddes DT, Hartmann PE. Oxytocin: milk ejection and maternal-infant wellbeing. In: Hale TW, Hartmann PE, editors. *The textbook of human lactation*. Amersillo: Texas: Hale Publishing; 2007. P. 141-155.
30. Ramsay DT, Kent JC, Hartmann PE. Anatomy of the lactating human breast redefined with ultrasound imaging. *J Anatomy* 2005; 206(6):525-534.
31. Ramsay DT, Kent JC, Owen RA, Hartmann PE. Ultrasound imaging of milk ejection in the breast of lactating woman. *Pediatrics* 2004; 113(2):361-67.
32. Rennison ME, Kerr M, Addey CV, Handel SE, Tuner M, Walde CT, et al. Initiation of constitutive protein secretion from lactating mouse mammary epithelial cells by FL (feedback inhibitor of lactation), a secreted milk protein. *J Cell Sci* 1993; 106(pts):641-48.
33. Riordan J. Anatomy and physiology. In: Riordan J, Auerbach KG, editors. *Breastfeeding and human lactation*. Boston: Jones and Bartlett Publisher; 1998; p. 93-119.
34. Sternlicht MD, Kouros-Mehr H, Lu P, Werb Z. Hormonal and local control of mammary branching morphogenesis. *Differentiation* 2006; 74(7):365-81.
35. Unicef. *Breast Crawl: initiation of breastfeeding by breast crawl*. Mumbai, India: Unicef Maharashtra; 2007.
36. Walker M. Influence of the maternal anatomy and physiology on lactation. In: Walker M, editor. *Breastfeeding management for clinician: using the evidence*. Boston: Jones and Bartlett Publisher; 2006 p. 91-135.
37. Walker M. Influence of the infant's anatomy and physiology. In: Walker M, editor. *Breastfeeding management for clinician: using the evidence*. Boston: Jones and Bartlett Publisher; 2006 p. 91-135.
38. Walker M. The first 24-48 hours: common challenges. In: Walker M, editor. *Breastfeeding management for clinician: using the evidence*. Boston: Jones and Bartlett Publisher; 2006 p. 183-248.
39. Wilson-Clay B, Hoover K. *The breastfeeding atlas*. 3rd ed. New York: Lactnews Press; 2005.
40. World Health Organization. *Evidence for the ten steps to successful breastfeeding*. WHO/CHD/98.9 Geneva 1998.
41. Yamauch Y, Yamanouchi I. Breast-feeding frequency during the first 24 Hours after in full term neonates. *Pediatrics* 1990; 85(2): 173-5.





Unit 2

Frequent Problems of Nipple, Areola and Breast

2.1 Nipples and Areolas

- Short Nipple
- Flat Nipple
- Inverted Nipple
- Large Nipple
- Long Nipple
- Sore or Cracked Nipple
- White Spot on Nipple
- Fungal Nipple Infection

2.2 Breasts

- Engorged Breast
- Blocked Duct
- Mastitis
- Breast Abscess
- Sagging Breast
- Hypertrophic Breast



2.1 Nipples and Areolas



Image 2.1.1 Normal nipple



Image 2.1.2 Montgomery tubercles

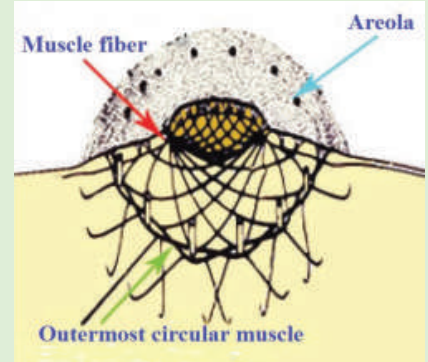


Image 2.1.3 Layer of skin with nipple and areola lined with small, smooth and connecting muscles



Image 2.1.4 Nipple rolling

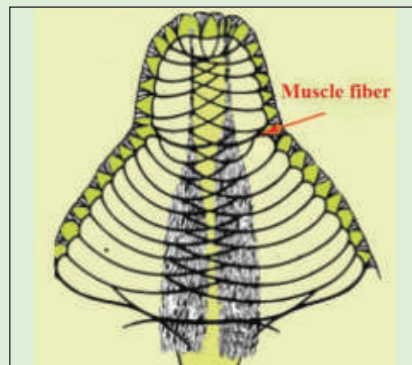


Image 2.1.5 Nipple rolling effect: muscle contract, smaller and raised nipple



2.1 Nipples and Areolas

The normal nipple (Image 2.1.1) resembles a small cone that is 0.7-1 centimeter long, and is tender and elastic.

The normal areola is the dark skin encircling the nipple. It is approximately 2.5 to 3.0 centimeters wide, measuring from the nipple cone to the outer ring of the areola. The essence of breastfeeding lies with the elasticity of the areola; not the size.

When pulled, the nipple and areola should be protractile, so that they can protrude deep into the baby mouth when suckled on.

The skin around the nipple and areola is the most delicate, filled with nourishing nerve ends. If the baby does not suck the nipple and areola deep enough into the mouth, the gum and tongue will press and scrape on the nipple skin. This will cause the mother pain and the nipple crack and wound. Therefore, the mother should have the baby latching deep on the nipple with the baby gum pressing on the areola rather than the nipple. Moreover, humidity will cause the skin to decompose and crack, and thus the mother should allow the nipples to dry after breastfeeding, before putting on the clothes again.

The skin around the areola will have little bumps on it. This is due to the enlarged sebaceous glands and open pores, known as Montgomery tubercles (Image 2.1.2) on the skin, with the function of secreting an oily substance to cover the skin around the nipple and areola, thus preventing them from dehydrating or cracking easily. The mother should therefore refrain from using soap or detergent to clean this area as it will remove this oily protection. It is unnecessary to clean the nipples before nursing. After weaning the baby, these milk glands will be reduced to the original size.

Small smooth muscles are netted together underneath the skin covering the nipple and areola and spreading out in a radius from the nipple. When these muscles are stimulated, for example, by nipple rolling with the index finger and thumb (Image 2.1.4), they will contract, causing the nipple to become smaller and more protractile (Image 2.1.5). Therefore, large, short or flat nipples should be stimulated before nursing, so as to help the baby latch on more easily.



● Short Nipple

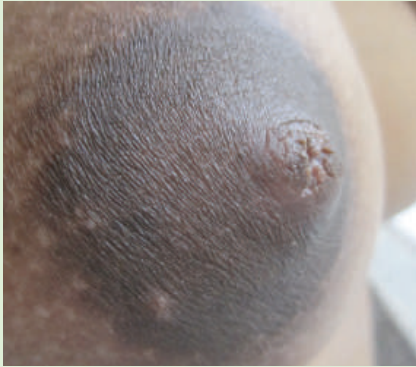


Image 2.1.6 Side view of short nipple



Image 2.1.7 Front view of short nipple, and tender and protractile areola



Image 2.1.8 Flat nipple



Image 2.1.9 Protractile nipple check: hold and stretch

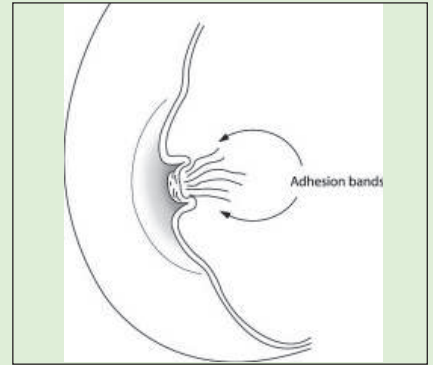


Image 2.1.10 Short or inverted nipple due to binding of adhesion bands

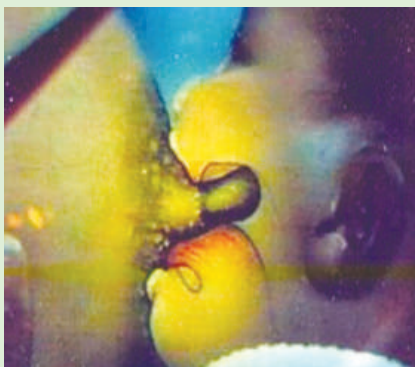


Image 2.1.11 Baby sucking and stretching nipple and areola deep into mouth



Image 2.1.12 Nipple rolling



● Short Nipple

The short nipple refers to the nipple that is shorter than 0.7 centimeters (Image 2.1.6 and 2.1.7).

The flat nipple is a nipple that does not protrude or become erect when stimulated or cold (Image 2.1.8).

Most nipples problems are due to short nipple more than flat or inverted nipples. If the nipples and areola are soft and elastic, it will be much easier for the baby to suck, stretch and pull both the nipple and areola into the mouth, thus more efficient breastfeeding.

This is why assessment of the mother's nipples and areolas is extremely essential. It can help to solve problems before delivery, so that breastfeeding will be more successful.

Assessment of the nipple and areola

Use the index finger and thumb to hold, pull and stretch the nipple (Image 2.1.9) to assess the elasticity of the nipple, if there is fascia pulling the nipple and making it short or inverted (Image 2.1.10), and check if the areola is elastic enough to be pulled into the mouth by the baby (Image 2.1.11). At the same time, nipple rolling (Image 2.1.12) should be done with the index finger and thumb to stimulate and contract the muscles around the nipple and areola making them erect and smaller to classify the nipple type.



Image 2.1.13 Short nipple with small areola, good elasticity



Image 2.1.14 Short nipple with large areola, good elasticity



Image 2.1.15 Short nipple with thick and taut areola and accessory nipple



Image 2.1.16 Short nipple with large areola, good elasticity



Image 2.1.17 Short nipple with narrow yet stretchable areola



Image 2.1.18 Short nipples with small, narrow and taut areolas scars above both areolas



Despite short nipples and different areola size (Images 2.1.13-2.1.14), the baby was able to breastfeed as the nipples and areola have good elasticity. The mother's skill in helping the baby to latch on was also required.

It takes a long time to correct a short and inverted nipple with hard areola (Image 2.1.15). This requires the use of a breast shell to massage the areola. Moreover, it can soften the large and hard nipple base through massage. The short and inverted nipple from the hold-stretch test requires the nipple puller to help make it more elastic.

It is unnecessary to correct the short nipple, wide areola (Image 2.1.16) because the baby can still breastfeed from the nipple and with good elasticity areola, with proper assisting skills after delivery. Even with a large areola, the baby does not need to try to suck the entire nipple. It is important not to let the breast get engorged or other feeding methods, as they will make it more difficult for breastfeeding and more problems will follow.

It is not necessary to correct the short nipple, narrow areola with good elasticity (Image 2.1.17) as the baby can still suck the nipple, and the narrow areola, Some assistance may be required in the beginning.

The short nipple with small, narrow and taut areola, and with scars above both areolas (Image 2.1.18), is different from the short nipple (Image 2.1.17) because the taut areola is causing poor latch on. Correction should first be done to the nipple and areola during antenatal period. This mother sought consultation at the Breastfeeding Clinic two months after delivery. She was unable to nurse her baby and tried hard to express milk scars resulted from improper milk expressing technique.



● Flat Nipple



Image 2.1.19 Front view of flat nipple with good areola elasticity



Image 2.1.20 Side view of flat nipple with good areola elasticity



Image 2.1.21 Infantile nipple with small and taut areola



Image 2.1.22 Small and long nipple



● Flat Nipple

The front and side views of a flat nipple and good elasticity areola (Images 2.1.19-20) the baby can breastfeed, just like the short nipple with large and good elasticity (Image 2.1.16). It is unnecessary to correct making the nipple more protractile. Instructing the mother on nursing skills and good latch-on right after delivery, and help practice the skills until the mother can do it properly and confidently.

The infantile nipple with small and taut areola (Image 2.1.21) can be enlarged and softened with the help of a breast cup. The cup edge will create pressure on the nipple and force it to open through the cup hole, and thus enlarging it; while the part of the cup pressing the areola with the baby movement, will massage it and thus softening it.

The small and long nipple (Image 2.1.22) is found with no known breastfeeding problems. It only requires help for the baby to latch on the areola deeply.

● Inverted Nipple

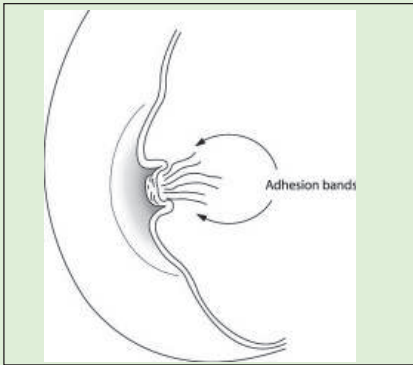


Image 2.1.23 Short or inverted nipple pulled back by adhesive bands

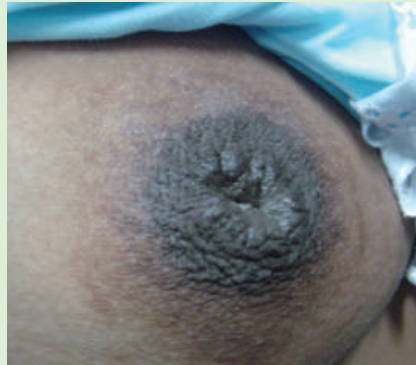


Image 2.1.24 Hard and inverted nipple, cannot be pulled up



Image 2.1.25 Assessment of inverted nipple



Image 2.1.26 Inverted nipple



Image 2.1.27 Inverted nipple pulled upwards by fingers



Image 2.1.28 Nipple not retracting after release



Image 2.1.29 Inverted nipple



Image 2.1.30 Baby breastfeeding from inverted nipple



Image 2.1.31 Nipple not retracting after baby let go



● Inverted Nipple

The inverted nipple cannot protrude above the areola.

The cause for short or inverted nipple results from adhesion bands (Image 2.1.23), disabling the nipple from protruding (Image 2.1.24). This makes it difficult for the baby to latch on completely or to breastfeed altogether.

Assessment of inverted nipple starts with placing the thumb and index finger at the edge of the inverted nipple and pressing down with the fingers to hold and pull up the retracted nipple (Image 2.1.25), so as to check how protractile it is.

The degree of inversion of the nipple can be classified into three levels:

Level 1 or Mild Inversion: use the fingers to hold and pull up the nipple, and it does not retract after release (Image 2.1.26 - 2.1.28), or after nursing (Image 2.1.29 - 2.1.31)

Level 2 or Moderate Inversion: use the fingers to hold and pull up the nipple, and it retracts after release

Level 3 or Severe Inversion: impossible to use the fingers to hold and pull up the nipple





Image 2.1.32 Inverted nipple



Image 2.1.33 Inverted nipple retracting after pull-up and release



Image 2.1.34 Inverted nipple rectified and extending out

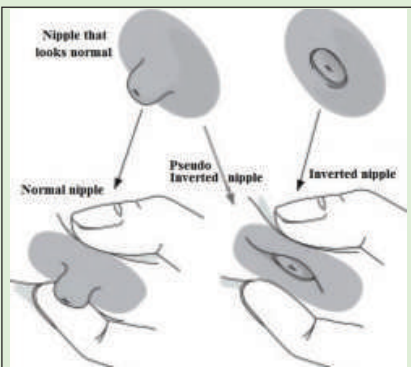


Image 2.1.35 Assessment of inverted nipple or pseudo inverted nipple



Image 2.1.36 Pseudo inverted nipple



Image 2.1.37 Pseudo inverted nipple



Image 2.1.38 Pseudo inverted nipple



Image 2.1.39 Pseudo inverted nipple



The inverted nipple (Image 2.1.32) before correction and after assessment (Image 2.1.33) can be pulled out but retracts a bit after release. This type of nipple is classified as Level 2 or Moderate Inversion.

The inverted nipple (Image 2.1.34) after correction. It was severely ingrown and cannot be pulled up with the fingers. The nipple puller was used to pull up the nipple every day finally with success. This type of nipple is classified as Level 3 or Severe Inversion case.

Proper nipple diagnosis needs actual pull-up and rolling of the nipple as it requires more than mere observation with the naked eye. This is because clothing can sometimes compress the nipple and thus mistaken as short or flat in the assessment. Or, the nipple may appear normal at times but when pressed around the areola, it is wrinkled and retracts inwards, making it difficult or impossible for nursing. It is diagnosed as pseudo inverted nipple (Image 2.1.35).

The pseudo inverted nipple (Image 2.1.36 - 2.1.39) can be repaired with the same method used for the inverted nipple. Use the nipple puller to pull up the nipple as it is caved in. At the same time, use the breast cup to massage the areola. The duration of this correction depends on the response of the nipple and areola. Stop using the breast cup when the areola is already softened. If the nipple is still not protractile, continue to use the nipple puller until the nipple becomes protractile.



Short, Flat and Inverted Nipple Repair



Image 2.1.40 Breast cup with 2 lids

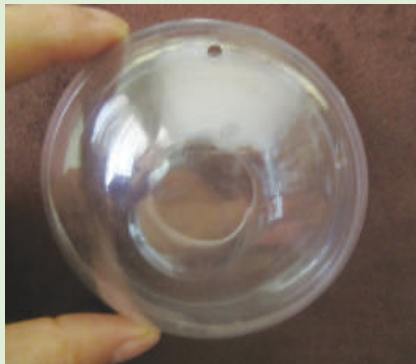


Image 2.1.41 Breast cup with stacked lids

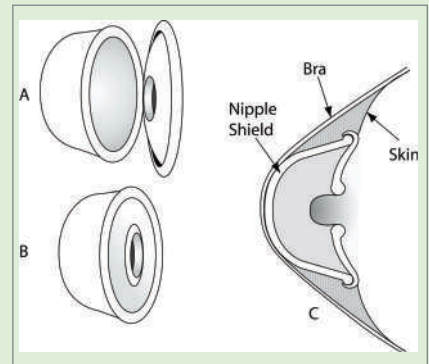


Image 2.1.42 Breast cup operandi



Image 2.1.43 Nipple puller



Image 2.1.44 20-ml syringe

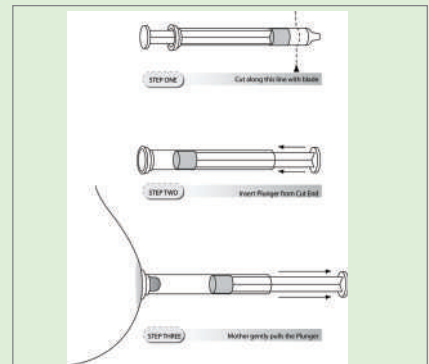


Image 2.1.45 Syringe puller operandi



Image 2.1.46 Syringe puller demonstration



Image 2.1.47 Nipple repair with finger pull-up and roll



Short, Flat and Inverted Nipple Repair

If the nipple and areola are soft and protractile, the baby can suck on them easily, and achieve good and firm suckling. As the baby breastfeeds, the nipple and areola will be stretched and pulled into the mouth. Noticeably, a third portion covers the nipple with the remaining, the areola.

If the areola is very taut or hard by itself, or from breast engorgement, making it impossible for pulling or extension, the baby will have difficulty or total failure in breastfeeding. This is because the baby cannot latch on properly. However, it is possible to soften the areola first by massaging it with breast cup, or by squeezing out milk in the case of engorgement.

Most important is that the medical staff must not demonstrate non-conducive behavior or say anything that can cause the mother to lose self confidence in her ability to nurse. Examples of such non-productive reactions will be to say, “It’s not easy to make the baby breastfeed properly”, or “The baby will have a hard time breastfeeding.” Instead, the staff should offer more encouraging words such as, “I’ve helped many babies breastfeed successfully from such nipple before because the baby is actually sucking milk from the breast, not the nipple.”

To assess retraction of the nipple pulled back by adhesion bands or fascia, the nipple needs to be extended or stretched first. There are normally no problems with nipples that can extend properly. However, if the nipple still retracts, this can cause breastfeeding difficulty for the baby, even if the areola is very protractile. This condition can be improved with a nipple puller.

The protractile nipple and areola are thus significant for breastfeeding as they can affect the baby ability in breastfeeding.

Equipment or tools that can be used to rectify nipple problems, including short, flat, inverted or retracted nipples, comprise of the following:

The breast shell or breast cup consisting of two plastic lids (Image 2.1.40) with the bottom piece that has an approximately 2-centimeter-wide hole in its middle to be placed over the nipple. The mother’s bra is to be fitted over the breast cup with the top piece raised and curved with a ventilation hole. Both plastic pieces are required to be fitted together (Image 2.1.41), and positioned to cover the breast with the bra finally placed over the entire cup (Image 2.1.42).

The nipple puller (Image 2.1.43) as a tool to pull up the nipple that is held back by adhesion bands or fascia.

The syringe puller (Image 2.1.44) as an adapted apparatus to pull up the retracted nipple.

Syringe Puller Operandi

- Use a 20 milliliter syringe and cut off the end part that connects to the needle. Insert the syringe plunger into the syringe barrel through the cut-off end, leaving about 1-2 milliliters at the other end that has not been cut off (Image 2.1.45).

- Place the uncut end of the syringe firmly over the nipple (Image 2.1.46) to ensure a powerful pull as the plunger is pulled back slowly. In the meantime, ask the mother intermittently if she feels any pain. If she does, stop pulling immediately. If she does not, pull up the nipple until it is of a sufficient length. Leave the nipple pulled up for about 5-10 minutes before removing the syringe barrel by pushing back the plunger to prevent the nipple from cracking.

- It is not recommended to use the fingers to pull up and stretch the nipple as when the required nipple length is met, the breast may sag. (Image 2.1.47).



Image 2.1.48 Nipple puller for pulling nipple



Image 2.1.49 Nipple pulled up to longer length



Image 2.1.50 Breast cup operandi



Image 2.1.51 Bra fitting both breast and breast cup



Tool Guidelines for Nipple and Areola Rectification

For the taut or hard areola, the breast cup is best used for massage to make it more protractile.

For the inverted, retracted, non-stretchable or ingrown nipple, the nipple puller or syringe puller should be used.

Procedures during Antenatal Care

If nipple or areola abnormalities are evident, rectifications should be taken from the 14th week of pregnancy onwards. Moreover, the condition should be followed up regularly. Success and follow up depend on the severity of the problem. It is not advisable to take any action during the first trimester of pregnancy as the mother can still be worried about pregnancy and also experience morning sickness at that time.

Nipple Puller Operandi

- Use the nipple puller or syringe puller to gently pull up the nipple (Image 2.1.48), and leave it for about 1-2 minutes. The nipple should lengthen (Image 2.1.49). Squeeze the rubber tube to release the nipple puller, and repeat the procedure several times during the first two days. Later on, when the nipple settles in and does not hurt, the suction pressure can be increased with more squeezing on the tube, and leaving it for 10 minutes longer. Release the nipple puller by first squeezing on the tube, and then removing the nipple puller. Repeat for about 2-3 more times, or until the mother is satisfied. If the nipple puller is not available, use the syringe puller.

- Stop pulling if the mother's abdomen often tightens as a result of womb contraction from the triggered oxytocin reflex. The mother should lie down to rest and relieve the contraction. The next step is to reduce the overall time in pulling the nipple. However, nipple pulling or syringe pulling must stop and the mother should lie down to rest whenever her abdomen tightens and feels pain. If the pain does not subside, seek medical attention immediately. In this case, nipple pulling can be resumed from 36 weeks of pregnancy.

Breast Cup Operandi

- The mother should harness the breast with the cup to ensure that the nipple is in the middle of the cup with the ventilation hole on top (Image 2.1.50). She should also choose a bra that is large enough to cover both the breast and cup (Image 2.1.51).

- The breast cup should be harnessed every day whenever there is movement, so as to allow the cup to massage and soften the areola. The breast cup should not be harnessed during bedtime as it does not add any extra benefit and may end up pressing on the breast and cause a plugged duct. If harnessing the cup causes pain or discomfort, reduce the harness duration and alternate between harness and dismantle, and gradually increase the harness duration.

- Regular appointments should be made to follow up on the use of the breast cup. To ensure accurate assessment of the protractile areola, the mother should not harness the cup on the day of the follow-up appointment.

Remarks

1. It may take one week to months to solve the nipple and/or areola problem, depending on the tautness of the skin.

2. The precautions for breast cup use are the same as those for the nipple puller or syringe puller, though with less severity.



Image 2.1.52 Hoffman's maneuver: push and squeeze from nipple base towards areola outer rim



Image 2.1.53 Hoffman's maneuver: lift areola outer rim and push towards nipple



Precautions

Use of tools to solve nipple problems before the 36th week of pregnancy can cause the womb to contract and lead to preterm labor. The mother is advised to stop using such tools if the abdomen tightens from womb contraction, and must lie down to rest. If the condition persists, the mother must seek medical attention immediately.

Remarks

1. Tools should be used with caution for the mother with previous preterm labor, or signs of threatened preterm labor in her current pregnancy.
2. From experience, Hoffman's maneuver has not been very successful (Image 2.1.52 - 2.1.53) to solve areolar problems.





Image 2.1.54 Nipple puller for nipple pull up: for mother with short nipple and taut areola due to engorging breast



Image 2.1.55 Nipple puller: for baby in breastfeeding from pulled out nipple



Image 2.1.56 Medicine dropper: for baby in breastfeeding with squeezed milk drops



Image 2.1.57 No help: for baby breastfeeding on his own



Image 2.1.58 Baby breastfeeding with father holding and encouraging the mother to be patient; Training the baby to breastfeed takes time. Nonetheless, the baby will gradually learn how to latch on the areola and will eventually breastfeed well.

All the photos on this page provide examples of actual assistance provided by the staff according to the knowledge and experience in the provision of customized care to families with various cases of breastfeeding issues.



Post-Delivery Assistance for Mothers with Short, Flat, Inverted or Retracted Nipple Problems

- Assistance should be provided immediately after delivery before the mother's breasts become tight or engorged as the areola will also become taut, making the nipples even flatter, and thus increasing the difficulty of breastfeeding for the baby. Moreover, this is the most appropriate time to train the baby to breastfeed properly.

- Build up the mother's confidence by explaining how the baby must latch on deep enough to reach the areola in order to receive breast milk; for if only the nipple is sucked on, the baby will not receive breast milk appropriately.

- Help the mother assume a comfortable and relaxed position, whether she is sitting or lying down, with pillows to cushion both the mother and baby as required.

- If the baby cannot latch on and/or does not latch on deep enough, and ends up losing his mouth grip from time to time, use the nipple puller or syringe puller to help lengthen the nipple before breastfeeding the baby. Periods of rest may be needed every now and then until the baby can suckle successfully. Staff providing care for the mother and baby must act with understanding, politeness, tenderness and patience without expressing boredom in any manner. Each breastfeeding period should last no more than 30 minutes, when both the mother and baby should rest. The mother should drink water and nap with the baby lying on the mother's bosom as they usually sleep well while in the mother's embrace.

- If the mother's areola is taut, stimulate lactation manually before breastfeeding, or massage and roll the areola and nipple gently with the index finger and thumb for softening. The muscles will contract, causing the nipple to become erect and elongated, allowing the baby to be able to latch on more easily. In the post-delivery case of the mother with short nipples and engorging breasts, assistance can still be offered. It is best to place the breast cup over the nipple to help massage and soften the areola and nipple, as well as massage and stimulate lactation (Image 2.1.54). This will further soften the areola and the baby will be able to breastfeed more easily. The photo shows the mother at the Breastfeeding Clinic two days after delivery. She arrived late in the afternoon and was advised to wear a breast cup. The next morning, the areolas softened but the nipples were still taut. The nipple puller was used to pull up the nipples to make them more protractile and longer. This procedure was repeated several times until the nipples were well extended, and the baby was brought to the mother's breast for breastfeeding afterwards (Image 2.1.55). However, since the mother did not have adequate breast milk yet, the medicine dropper was used to increase the amount of breast milk fed to the baby (Image 2.1.56). This ensured that the baby receive enough breast milk, and the baby encouraged to continue breastfeeding. At the same time, the baby suckling boosted breast lactation. In such case, these actions should be alternatively performed in repetition until the baby willingly breastfeeds on his own, and does not need to be brought to the breast (Image 2.1.57). Image 2.1.58 shows the father with training on how to position the baby at the breast for breastfeeding, as the mother was unable to do it herself. With this training, the father was able to continue to provide help at home, too. This assistance was provided at each nursing session for four whole days at the Breastfeeding Clinic. Finally, the mother was able to breastfeed by herself.

- If the baby cries a lot and still cannot latch on, the baby should be comforted until he calms down. In addition, breast milk should be manually expressed and cup feed.

- No other kind of nutrition should be provided from the bottle before the baby is brought to the mother for breastfeeding. This is to prevent nipple confusion, or become accustomed to receiving milk from a cup easily. Additionally, the baby may even get used to the taste of formula milk.

● Large Nipple



Image 2.1.59 Large nipple



Image 2.1.60 Mother gently rubbing nipple on baby lower lip to get baby to open mouth wide



Image 2.1.61 Large nipple and sagging breast



Image 2.1.62 Rolled-up cloth to cushion breast, and away from mother's body



Image 2.1.63 Nipple rolling with fingers to shrink nipple



Image 2.1.64 Gently rubbing the nipple on baby lower lip to get baby open mouth wide



Image 2.1.65 Breastfeeding training for mother



Image 2.1.66 Cloth sling for breast hoist



Image 2.1.67 Proper baby latch on with more ease



● Large Nipple

Unfortunately, the mother with large nipples tends to lack confidence in nursing the baby as they usually worry that the baby mouth will be too small. However, the nipple is actually soft and flexible, and will bend and fit into the shape and size of the mouth. A case has been recorded of a mother with nipples three centimeters in diameter (Image 2.1.59), who was provided help to successfully nurse her baby using the following techniques:

- Nipple rolling with the index finger and thumb to help shrink the nipple by 3 millimeters to 2.7 centimeters. Hold baby with the mouth at the mother's nipple, and gently rub the baby lower lip with the nipple to trigger the rooting reflex, and thus encouraging baby to open the mouth as wide as possible (Image 2.1.60). Move the baby head towards the breast as quickly as possible, so as to latch on deep enough to reach the areola. Repeat these steps several times until the baby opens the mouth wide and latches on deep enough.

- The football hold is the best breastfeeding position because the baby face will be right up against the mother's breast and be as close as possible to it.

- Train the mother to nurse the baby on her own until she is confident to do it properly.

Precautions

- If the baby is able to breastfeed, follow-up is required to determine the baby's weight, whether he is receiving sufficient nutrition or not. Additional assistance can be offered in the form of breast compression during nursing.

- If the baby is unable to breastfeed properly, the medicine dropper can be used to provide supplementary milk as the baby breastfeeds. Alternatively, the baby can be cup fed with expressed milk after feeding from the breast, until he is 1-3 months old, and is finally able to breastfeed normally.

With large nipples and sagging breasts (Image 2.1.61), a cloth should be folded and placed under the breast away from the mother's body (Image 2.1.62), so that the baby can latch on more easily. For large nipples, it is advised that the mother use the fingers to roll the nipple first (Image 2.1.63), and then hold onto the nipple base to help place it into the baby mouth (Image 2.1.64). The baby should then be held up so that the mouth is at the mother's nipple, which then rubs against the lower lip. Once the baby opens the mouth as wide as possible, turn in the head immediately towards the nipple. At the same time, with the fingers holding the nipple, push the large nipple into the baby mouth, and then pull out both fingers clearly out of the baby mouth. Then, use the middle finger and thumb to push the nipple deeper into the baby mouth, so that he can get a deeper hold on the areola.

Follow these steps to train the baby until he can latch on and breastfeed well first, and then train the mother on how to position the baby for breastfeeding on her own. The mother was featured in Image 2.1.65, with all these steps actually carried out at the Breastfeeding Clinic. The baby was trained at every feeding during the day for more than one week. Past experience has shown that, for each case, providing assistance until breastfeeding is truly successful requires time, continuous effort, staff abilities and skills, as well as the mother's cooperation, and an appropriate and conducive environment to breastfeed.

With sagging breasts, a sling can be used to hoist the breast and away from the mother's body (Image 2.1.66). In addition, the nipples can be positioned to face downward, so that the baby can latch on correctly and with greater ease (Image 2.1.67).

● Long Nipple



Image 2.1.68



Image 2.1.69



Image 2.1.70



Image 2.1.71



Image 2.1.72



Image 2.1.73

Image 2.1.68 to 2.1.73 Various types of long nipples



● Long Nipple

The long nipple is certainly an obstacle in breastfeeding. It causes difficulty for the baby to latch on deep enough to reach the areola. The nipple that is both long and large is particularly problematic as it will fill the baby mouth, leaving no room for a deeper hold to include the areola. The long nipple (Image 2.1.68) is common in the case where the baby breastfeeds incorrectly, meaning that the baby sucks and pulls simultaneously while breastfeeding. Eventually, the gums will slide down to the nipple and cause the nipple to wound and crack from the early stages of breastfeeding. If this happens often enough, it is also possible for the breast to become long, too. If assistance is not provided (Image 2.1.69 - 2.1.73), the baby will receive little milk and not gain enough weight. Thus, it is important to follow up on the breastfeeding progress to ensure the baby is getting enough breast milk.

Solutions

- Explain the reasons of the problem to the mother and help her understand that the milk supply should be sufficient if the baby is able to latch on properly. Also, demonstrate the use of the index finger to act as the baby's gum to squeeze milk out from the nipple and areola area so that she can see the difference in the amount of milk to be lactated. This will help the mother understand and make her more willing to cooperate in solving the problem.
 - Help train the baby to latch on as deep as possible.
 - Assist the mother in compressing the breast as the baby breastfeeds so as to increase the milk that enters the baby mouth.
 - Actively keep track of whether the baby is getting enough milk from his weight, urine volume and stool 5-6 days after delivery. If the baby weight is still decreasing, supplement the breastfeeding for a certain period of time by feeding the baby with the mother's expressed breast milk from a cup.
 - Try to stimulate sufficient breast milk production to meet the baby needs by expressing milk from time to time, and storing it for the baby.
 - If the baby is unable to breastfeed, provide the milk by expressing or pumping it out, and wait until the baby is big enough to breastfeed on his own. Avoid using the bottle or formula milk as much as possible. and feed the baby milk properly with a cup.

● Sore or Cracked Nipple



Image 2.1.74 Cracked and wounded nipple



Image 2.1.75 Cracked and swollen nipple



Image 2.1.76 Severely-cracked nipple with long wound at base



Image 2.1.77 Nipple with loose skin and tissues



Image 2.1.78 Tied tongue



Image 2.1.79 Baby sucking only nipple



Image 2.1.80 By incorrect cradle of breastfeeding can cause body ache



Image 2.1.81-2.1.82 Mothers with incorrect cradle of babies, causing babies to lie more on back like drinking from bottle



● Sore or Cracked Nipple

The mother's nipple can hurt even though there are no visible wounds, or at times with apparent scratch marks (Image 2.1.74), and even swollen (Image 2.1.75). Severe cases of the nipple skin found with long cracks all the way to the nipple base (Image 2.1.76). It is possible for the nipple skin and tissue to become loosened and peeled off (Image 2.1.77) if the mother allows the baby with a tied tongue to continue breastfeeding (Image 2.1.78).

The most common reasons for cracked nipples are incorrect baby latching on the nipple, or shallow latching on the areola (Image 2.1.79). These conditions can occur from:

- The mother in incorrect breastfeeding position, feeling uncomfortable, not holding the baby close enough, or not having a pillow to cushion the baby (Image 2.1.80). The mother can eventually develop back pain.

- The baby not breastfeeding properly, like lying on the back as if drinking from the bottle. In Image 2.1.81, the baby has to turn the face towards the breast to suckle, disabling him from latching on deeply or swallowing properly.

- The baby having to twist the neck to breastfeed, as another example of the baby lying on his back. This results in the use of mouth corner to suckle, and thus latching on not deep enough to reach the areola (Image 2.1.82).

- The baby sucking only on the nipple because of the mother's slip, or the baby pulling in the lips too much.

- The mother's worry of suffocating the baby and try to move the breast away from the baby nose, causing the baby mouth to slip to the nipple. It is also possible for the mother's hand to ache from baby cradling with no pillow to cushion the hand, causing the mother to lower the hold or drop it entirely. The baby will end up sucking, pulling and pressing the gum on the nipple. As a result, the nipple can be painful and cracked. Sagging breasts may also result.

- The mother's engorged and taut breast may result in hardening the areola that the baby can only suck on the nipple.

- The short nipple with hard and taut areola.

- The baby having a tied tongue, or a fungal infection in the mouth.



Image 2.1.83 Mother in comfortable sitting position with football hold



Image 2.1.84 Rooting reflex trigger with baby head shift towards mother's breast



Image 2.1.85 Baby latching on correctly



Image 2.1.86 Expressed breast milk rub on cracked nipple to hasten wound healing



Help for mother with sore or cracked nipples

- Let the mother practice holding the baby before breastfeeding. The mother should be comfortable and use the recommended football hold.
- Help the baby breastfeed correctly. When the baby opens the mouth wide, shift the head towards the mother's breast quickly (Image 2.1.84) for deep latch on (Image 2.1.85). The medical assistant should not move the hand holding the breast or the hand holding the baby head until the baby has a good latch on. Once the baby is well latched on, the assistant can release the mother's breast.
- When the mother's nipple hurts unbearably, the assistant should encourage the mother with sympathetic words like, "I understand that you are in great pain. Just give it a couple more seconds and you will feel better; but if you really cannot stand it, we can stop the breastfeeding right away." Observe the mother's knitted eyebrows, face and tense body to see if the tension fades. If the pain and tension ease, her eyebrows will become less knitted together. When this happens, ask the mother immediately, "Is the pain easing? If not, I'll help the baby to stop breastfeeding for now." If the mother says that the pain is easing, then continue to provide breastfeeding assistance. The mother should feel the most pain for about 2-3 seconds, after which it will subside or disappear completely.
- After the baby has finished breastfeeding, extract 2-3 drops of breast milk and spread it on the nipple. Allow the breast to air dry before letting the mother put on her clothes. For mothers who allow the breasts to dry in open air, the breast milk spread on the nipple will apparently help the wound heal faster (Image 2.1.86).
- Nursing should be suspended for 1-2 days if the mother cannot bear the pain in the nipples. Milk should be expressed and spread on the nipple before allowing it to dry. Express milk every three hours to prevent the breasts from becoming engorged, and feed the baby with milk from the cup.
- Follow up on the mother and train her to nurse correctly so that she can eventually do it without assistance.
- The baby should be able to breastfeed if he has mild tongue tie, and the mother's areolas are protractile, The baby weight needs to be monitored because he may not be getting enough breast milk. If the mother's areolas are narrow and taut, and the baby has a severe case of tongue tie, the tongue will not be able to stretch out to accommodate the areola and its tip will rub against the nipple, causing it to crack. In this case, the mother should seek immediate help from the pediatrician.
- Treat the baby if he has a fungal infection in the mouth because the infection can spread to the mother's nipples.

● White Spot on Nipple



Image 2.1.87 - 2.1.88 White spot on nipple



Image 2.1.89 Appearance of white spot together with plugged duct



Image 2.1.90 Use of index finger and thumb for areola compression



Image 2.1.91 Areola squeeze to help relieve swollen and tight blister



Image 2.1.92 Use of needle to prick white spot on nipple for the breast milk flow

How to use needle to prick white spot on nipple



● White Spot on Nipple

If white spot appears on the mother's nipple, it is most probably because the milk duct pore is plugged by breast milk or the healed skin tissue bleb or blister (Image 2.1.87 - 2.1.88) dries on the duct pore. This can occur concurrently with the poor flow of breast milk because, for instance, the baby breastfeed insufficiently or inefficiently. A white dot can also appear together with a plugged duct (Image 2.1.89).

Solution

Let the baby breastfeed first with proper latch on, and suck hard on the breast with white spot. When the baby is hungry, there will be hard suction that can burst the blisters or loosen the plugs in the nipple. If the nipple hurts, apply a warm compress to the nipple or cover and soften it with cotton dipped in olive oil. Then, try to remove the tissue around the white dot, or squeeze the white plug to open out the pore.

If this does not work, then prick the blister with a sterilized needle. Squeeze the areola with the index finger and thumb, and the blister will bulge for easier pricking, and avoid pricking the surrounding tissue accidentally. Breast milk will spurt out, and in most cases, pain will also subside immediately. If the blister does not bulge with massage, it is not advisable to prick it with a needle. Most importantly, after removing all white dots successfully, let the baby breastfeed immediately, often and correctly, so as to prevent tissue from growing and covering any more duct pores which will lead to more white spot forming.

Dr. Jack Newman prescribes the use of an all-purpose nipple ointment which contains

- 2% Mupirocin ointment
- 0.1% Betamathazone ointment
- Miconazole powder

This should be applied to the nipple after every breastfeeding session to prevent and treat infection. It helps to relieve pain quickly, and it does not need to be cleaned off before the next breastfeeding as most of the medicine will not be absorbed by the baby.

● Fungal Nipple



Image 2.1.93 Nipple fungus as reddish skin above nipple and areola



Image 2.1.94 Nipple fungus as dry-looking skin around infected area



Image 2.1.95 Nipple fungus evidently as scaly skin



● Fungal Nipple

The most common fungus found on the skin of mothers and babies is caused by *Candida albicans*. The nipple skin affected by this fungus can become paler in color, or come with light pink circles (Image 2.1.93 - 2.1.95). The nipple can appear white and scaly as well as itchy and hurt. The main cause of infection starts from damaged nipple and breast with scratches where the fungus can enter, and with the increased use of antibiotics which promotes fungal growth. The nipple pain can be experienced throughout an entire feeding, or after.

The fungus can spread to the milk ducts (ductal candidiasis), causing inflammation. This will result in an intense stabbing pain that can be felt throughout the inside of the breast. The mother may even feel pain in her back and shoulders, and also experience burning nipple pain. This pain may be felt for only a few moments or can last for hours.

Treating Fungal Infection

Give medicine to both the mother and baby to treat the fungus. Eliminate various risks such as unnecessary antibiotics or immune-suppressants. If thrush (*Candida*) is found in the baby mouth or on the mother's nipple, gentian violet can be an effective medication.

For the baby: Rub 0.25-0.5% gentian violet on the insides of the cheeks, gums and tongue once a day for five days, or continue usage for four more days after pain subsided

For the mother: Apply 0.5% gentian violet on the nipples 1-2 times a day for 4-7 days, or continue usage for four more days after the pain subsided

The only downside to gentian violet application is purple stain on the baby mouth and mother's clothes.

An all-purpose nipple ointment can also be used after every breastfeeding (except for feedings where the mother applies gentian violet) until the pain goes away. The number of times it is applied should be gradually reduced over a period of one week.

If the pain persists, or if ductal candidiasis occurs, the effective treatment will be an immediate dose of 400 mg of fluconazole followed by 100 mg, twice a day until the pain ceases within a week. It is also possible to use ketoconazole instead, though it may not be as effective as fluconazole. If fluconazole does not work, Itraconazole is suggested in the same dosage as fluconazole. If the pain reaches deep inside the breasts and is very intense, 200 to 400 mg of Ibuprofen should be taken every four hours, with the maximum dosage of 1,200 mg per day.

Recommendation

- Advise the mother to wash her hands properly and often, especially after changing the baby diapers and after using the restroom.
- Wash the baby hands frequently if he often sucks his fingers.
- If rubber nipples or pacifiers are used, they should be washed and sterilized in boiling water for around 5-10 minutes to kill germs and fungi.

2.2 Breasts

● Engorged Breast



Image 2.2.1 Full breasts



Image 2.2.2 Severe breast engorgement



Image 2.2.3 Short and swollen nipple due to engorgement

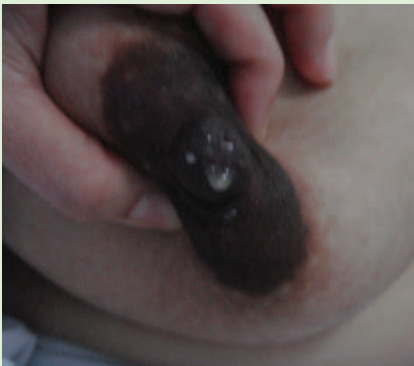


Image 2.2.4 Milk expression to soften areola

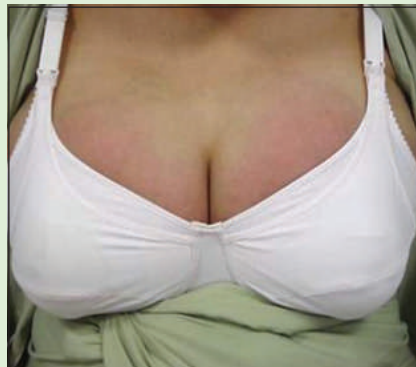


Image 2.2.5 Bra for breasts hoist



Image 2.2.6 Breasts support with cloth tied around the neck



Image 2.2.7 - 2.2.9 Cloth folding method, instead of bra, for breasts support



2.2 Breasts

● Engorged Breast

Full breast results from inadequate breast milk drainage. (Image 2.2.1). As a result, the mother will find the breasts heavy and uncomfortable. If this is not dealt with, the full breasts will get engorged and cause pain for the mother.

Breast engorgement (Image 2.2.2) causes the breast to feel hot and the skin to be red, shiny, heavy, hardened, painful and swollen. The areola will be hard and taut, thus shortening the nipple and in some cases, flattening it (Image 2.2.3), making breastfeeding impossible and causing extreme pain to the breast when squeezed or touched. Breast milk will not flow and the mother can develop a fever that will last no longer than 24 hours.

Causes

Possible causes are abundant milk supply, late start to nurse, incorrect baby breastfeeding, little sucking, insufficient and infrequent nursing, or milk expression by the mother (i.e. with an interval longer than every three hours).

Breast engorgement often affects mothers with C-section without assistance or counselling, and inadequate nursing, babies fed with formula during the time that the mother recovers from delivery, causing nipple confusion. Incorrect cup feeding may cause refusal of breastfeeding. The baby may cry intensely causing stress in the mother, creating more engorgement from inadequate drainage.

Prevention

Nurse the baby early, often, and correctly and effectively.

- “Breastfeeding early” means letting the baby breastfeed immediately after birth, or as soon as possible after delivery. For instance, once the mother recovers from C-section, the baby should be brought to breastfeed in a lie-down position even though the mother is on intravenous drip. The mother should be given assistance and explanations, so as to help her relax and be assured that nursing the baby, despite her small milk supply, is not only to nourish the baby but to also boost milk production, It doesn’t mean the staff are unwilling to take care of the baby.

- “Breastfeeding often” means letting the baby breastfeed whenever he wants to, though no more than three hours should elapse between each feeding. If the mother and baby need to be separated, the mother should manually express milk every three hours.

- “Breastfeeding correctly and effectively” means letting the baby latch on the nipple deep enough to reach the areola, and use the tongue to squeeze out breast milk. It also means, not introducing the rubber nipple first. Moreover, if a cup is used to feed breast milk to the baby, then it has to be done with proper technique refraining from pouring the milk into the baby mouth. The medicine dropper should not be used unnecessarily because it will cause just as many problems as using the rubber nipple.

Assistance to Resolve the Situation

With a full breast, if the areola is very taut, the mother should squeeze out enough breast milk (Image 2.2.4) every 2-3 hours until the areola becomes soft, before proper breastfeeding. The breast will soften quickly as soon as the baby finished that particular breastfeeding period, and return to normal after 1-2 days. The mother is advised to wear a bra for support (Image 2.2.5) and pain relief whenever she moves, as well as prevention of breast sagging. If the mother does not have a bra, she can use a 36 x 36 inch cloth (Image 2.2.6) instead, by folding it as demonstrated (Image 2.2.7 - 2.2.9).



Image 2.2.10 Large towels used as compresses



Image 2.2.11 Homemade cloth compresses



Image 2.2.12 Baby breastfeeding after sufficiently softened areola



Image 2.2.13 Flat and swollen nipple from breast engorgement



Image 2.2.14 Nipple puller used to release breast milk for soft and extended areola



Image 2.2.15 Extended nipple and softer areola after use of nipple puller



Image 2.2.16 Breast cup fitted in to soften areola and fix nipple



Image 2.2.17 Small cloth - inappropriate compress as it is not able to retain heat for long



Image 2.2.18 Use of electric pump



Assistance to Deal with Breast Engorgement

- Express sympathy and treat the mother gently and carefully. The mother needs help because she will be in so much pain that she may be too scared to hold or even touch her own breasts.

- If the baby can nurse help the baby to nurse properly, until the mother's pain is relieved and then manually express the breast milk later.

- Trigger the oxytocin reflex for breast milk flow to the baby who cannot breastfeed from the mother's swollen breasts. Explain the Assistance Plan to assure the mother:

- Place a very warm compress on the breast (Image 2.2.10) for approximately 10 minutes. Use larger towels that can wrap around the breast completely, except the nipple and areola as they are the most painful area. It is also possible to use the cloth to create a homemade compress (Image 2.2.11). Furthermore, the mother can be given paracetamol to relieve pain.

- Reduce the mother's stress by helping her assume the most comfortable sitting position and handle her breasts gently. Show complete willingness to help and sympathy for her pain.

- Assess the mother's breasts and feelings. If the engorgement eases and the areolas become softer, take the baby to the mother to breastfeed, all the while helping the baby to do it correctly (Image 2.2.12).

- Use the nipple puller to release breast milk (Image 2.2.14) if the nipple is flattened due to engorgement (Image 2.2.13). This will help soften the areola as well as enable the nipple to protrude more (Image 2.2.15), so that the baby can latch on with greater ease.

- Manually express milk, or use the breast cup to massage the areola (Image 2.2.16) if the breast is still engorged after the baby finished breastfeeding, or during feedings. By massaging the breast, milk will be released and reduce the engorgement as well as help the nipple extend farther for the baby to breastfeed more easily.

- Advise against the use of small towel as compress for breasts as it will not be able to retain heat for long (Image 2.2.17).

- Use the electric pump if engorgement is severe, and watch for side effects such as nipple pain. It should be used for no more than 30 minutes (Image 2.2.18).

- Teach the mother to hold her baby properly for breastfeeding, both in the sitting and lying down positions.

- Teach the mother to manually express breast milk.

- Teach the mother to prevent breast engorgement.

- The entire procedures above should not take time longer than one hour. The mother should rest every now and then until the next feeding.



Image 2.2.19 Blocked duct



Image 2.2.20 Newborn breastfeeding in an upside down position pointing baby's chin toward the lump on the breast, so he can push the breast milk out of the lump



Image 2.2.21 Newborn in an upside down position for breastfeeding supported by mother's right hand



Image 2.2.22 Mother holding her breast



Image 2.2.23 Pillow put in place to cushion baby head



Image 2.2.24 Mother resting in comfortable position after placing baby properly for breastfeeding



● Blocked duct

Blocked duct is the result of milk congestion and thickening to the extent that it causes blockage (Image 2.2.19) and milk stasis. Symptoms include a lump in the breast that hurts when pressed, skin redness above the lump but without fever, and the mother feeling physically fine but emotionally worried. There may also be white dots on the nipple. At times, it is hard to distinguish blocked duct, mastitis or breast abscess. To better diagnose the breast ailment, check it from the following table:

Blocked Duct	Mastitis	Breast Abscess
<ul style="list-style-type: none"> ● Lump(s) in breast, pain & redness ● No fever 	<ul style="list-style-type: none"> ● Lump(s) in breast, pain & redness ● Fatigue ● Fever ● Mother discouraged about breastfeeding 	<ul style="list-style-type: none"> ● Lump(s) in breast & redness ● Severe condition ● Fever > 38.4C ● Soft tender lump due to fluctuation ● Mother desiring to stop breastfeeding
Causes		
1. Not enough breastfeeding sessions or too short breastfeeding periods due to: <ul style="list-style-type: none"> - the mother being in a hurry or is busy - the baby sleeping for long periods at night within second to third weeks after delivery - changes in daily routines such as travel, stressed out mother 2. Breast milk congestion in some parts or the entire breast due to: <ul style="list-style-type: none"> - the baby breastfeeding incorrectly or not latching on deep enough - pressure on the breasts - large sagging breasts causing lower portion of milk ducts to bend and become blocked 	Same as that of blocked duct, and additional cause of possible trauma to the breast, cracked nipple or infection	Generally caused by lack of, late or improper treatment of breast infection
Treatment		
<ul style="list-style-type: none"> - Breastfeed frequently & correctly - Adjust breastfeeding position in a way that baby's chin is pointing towards the lump in breast (Image 2.2.20-2.2.24) 	<ul style="list-style-type: none"> - Same as that of blocked duct - Give pain killer medication - Take bed rest - If not improved within 24 hours, consider giving antibiotics 	<ul style="list-style-type: none"> - Same as that of mastitis - Drain the pus out through needle aspiration or a surgery - Give pain killer, antibiotics - Take bed rest
Build up the mother's confidence that continuing breastfeeding is the best solution for both the mother and the newborn, no matter if it is a blocked duct, mastitis, or breast abscess.		

● Mastitis



Image 2.2.25 Entire mastitis of the breast



Image 2.2.26 Mastitis affecting only some portions of breast



Image 2.2.27 Mastitis together with white dot on nipple



● Mastitis

Mastitis occurs from plugged duct or untreated breast engorgement that causes breast infection.

The infected area will have a lump and become swollen, red and hot. It will also be painful when touched (Image 2.2.25), and the mother with a fever of 38.50 C or higher. The infection may or may not be the cause for the mother feeling ill and tired. Mastitis can happen any time during the first six months after childbirth, with 20% nursing mothers developing this condition and a higher likelihood during the first six postnatal weeks.

It is often confused with engorgement, which usually affects the entire breast and also occurs in both breasts at once. Under normal circumstances, it occurs in part of the breast and in only one breast (Image 2.2.26). White dot may appear on the nipple together with the plugged duct, which can develop into infection in the milk duct later on (Image 2.2.27).

Causes of Mastitis

- The baby may not be breastfeeding frequently enough or breastfeed for short periods because the mother does not have enough time. Other causes are skipped feeding sessions, change in daily routines such as the mother attending to some business outside the home for a long time, the mother with no time to express breast milk, or the mother under stress. Another possible cause is the baby sleeping for an extended period at night (in the first 2-3 weeks after birth).

- The milk flow can be ineffective in some parts of the breast because the baby does not achieve a latch on deep enough to encompass the areola, creating inefficient breastfeeding. Additional causes include incomplete draining of breast milk from the breast, breast compression from the mother's fingers while holding or pressing down the breast during nursing, and the bra being too tight or staying on top of the breasts for a long time. It is also possible that large, sagging breasts can make it difficult for milk to release from the lower portion of the breasts, thus leading to plugged ducts. Other causes include injured breast and cracked nipple that become infected, especially with *Staphylococcus aureus*.

Assistance

- Drain the milk as soon as possible to prevent mastitis from becoming more severe and alleviating the condition. This can be achieved by helping the baby breastfeed properly, often and consistently. The best way to do this is for the mother to rest at the same time as the baby, so that the mother can be alert and attentive to the baby and nurse him whenever he wishes to breastfeed, and / or express milk every 3-4 hours.

- Start each breastfeeding session with the infected breast first. However, any pain that is felt will affect the oxytocin reflex, causing the milk not to flow. If this is the case, switch to the breast that is not affected first, and once oxytocin reflex is triggered with the milk in the affected breast flowing well, switch back to the infected breast immediately.

- Identify the cause and solution, and explain them to the mother to prevent a recurrence. For instance, the mother can be told to wear a well-fitting bra, use her hand rather than the fingers to cradle her breast, and relax the fingers instead of pressing them down on the breast once the baby is able to latch on deeply.

- Change breastfeeding positions by aligning the baby chin with the mastitis lump, as in the case of the plugged duct.

- Massage the breast gently as the baby breastfeeds, focusing on the area above the plugged duct. Massage the nipple downwards to push out the lump.



Image 2.2.28 Milk draining from breast through expression



Image 2.2.29 Use of breast pump to drain breast milk



Image 2.2.30 Use of electric breast pump to drain milk of mother experiencing severe pain



- After nursing, drain remaining breast milk by squeezing or pumping, which will help cure mastitis faster.

- Once mastitis gets better, nurse the baby in different positions at each feeding session to better drain milk from the various parts of the breast. Make sure that the mother does not nurse in an uncomfortable position.

- Advise the mother to get plenty of rest. She must realize that rest is as important part of the treatment as receiving enough water and nutrition. The best way is for the mother to rest at the same time as the baby, and thus increasing the frequency of breastfeeding. This will help release more milk from the breasts. The mother should take leave from work, and find someone to assist with the housework, so as to dedicate more time for her baby.

- Massage the breasts and place warm compress over them, between breastfeeding sessions, to reduce pain and improve milk flow. After nursing, the cold compress can help relieve pain and swelling.

- At times, the mother is unable to nurse the baby, especially when pain is intense, or the baby refuses to feed from the affected side because the taste of milk may be different. In such case, squeeze or pump out breast milk to avoid the development of breast abscess. Normally the plugged duct or mastitis will get better within the day once milk from the affected area is all drained. Breast milk can be drained possibly through manual expression (Image 2.2.28), or the breast pump (Image 2.2.29). If pain is severe, an electric pump can be used instead (Image 2.2.30).

- Give analgesics such as paracetamol, to improve the oxytocin reflex function. Offer Ibuprofen, an anti-inflammatory agent, to deal with pain and infection, and produce even better results for severe pain. No traces of Ibuprofen have been found in breast milk after being given doses of 1.6 grams per day, which is the appropriate dosage for breastfeeding women.

- The mother may need hospital admission if her condition is severe, and if she has no help at home. Mother and baby should room-in together while in hospital.

- Give additional medical attention to the mother if the condition is severe with cracked nipple and infection not improving 24 hours after drainage of breast milk. Antibiotics including flucloxacillin, comma cloxacillin and cephalexin, which all cover the common causative bacteria, and in this case *Staphylococcus aureus*, should be prescribed.



● Breast Abscess



Image 2.2.31 Breast abscess with fluctuation

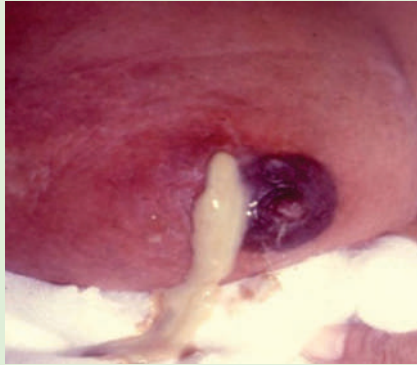


Image 2.2.32 Ruptured breast abscess with pus flowing out



Image 2.2.33 Breast abscess burst by itself on lower part of breast



Image 2.2.34 Burst upper breast abscess



Image 2.2.35 Breast abscess with pus dripping out of milk duct



Image 2.2.36 Breast abscess in left breast with baby breastfeeding from right



● Breast Abscess

Breast abscess is a severe and painful condition that requires immediate medical attention. There will be lumps on the mother's breast, distinctly red with some parts softened due to fluctuation and are extremely painful (Image 2.2.31). Refer the mother to the physician to drain the pus.

Causes

Abscess is developed from untreated engorgement that becomes infected and finally turns into pus.

It is also possible to result from mastitis treated too late or incorrectly.

Treatment

1. Drain the pus in two different ways:

- Needle aspiration
- Surgical drainage

Sometimes the pus cannot be detected through physical examination, and a mammogram is not effective in distinguishing the pus from other lumps. Ultrasound imaging has been found to identify pus for diagnosis, and to detect pus for removal by needle aspiration or surgical drainage. In Haye Hook's conclusion, needle aspiration is ineffective for abscesses larger than 2.4 centimeters and thus requires surgical drainage. An incision must be made radially from the nipple to avoid cutting any lactiferous ducts, and as far from the areola as possible to ensure that the baby can continue to breastfeed.

Some mothers found the abscess already ruptured (Image 2.2.32 - 2.2.34). Pus should be drained through the hole where it was ruptured. Furthermore, the wound should be dressed every morning and evening. As long as the wound is not near the areola, the baby can still breastfeed from the affected side. Be sure to keep the area around the wound extremely clean. If the baby cannot breastfeed, breast milk should be manually expressed from the affected breast often, to prevent engorgement. This will help the wound to heal faster, too.

For the mother with accumulated pus inside of the ducts (Image 2.2.35), let the baby breastfeed from the unaffected side (Image 2.2.36), and squeeze the pus and breast milk from the abscess. Do not allow the breast to become engorged.

2. Let the baby continue breastfeeding after the pus is drained if the wound is distant from the baby mouth.

Assist the baby to breastfeed properly from the unaffected breast first, to trigger the oxytocin reflex. Then, let the baby feed from the breast with abscess.

If the baby cannot breastfeed, breast milk should be expressed correctly every three hours. Correct breast milk expression will not cause the mother any pain, and it will prevent engorgement or the reoccurrence of mastitis. It will also help to sustain milk production for the baby to breastfeed again after the mother has recovered. Once the baby returns to breastfeeding, his suckling will stimulate milk production again.

3. Provide the mother with antibiotics.
4. Ensure that the mother gets plenty of rest, and educate her on its importance.



● **Sagging Breast**

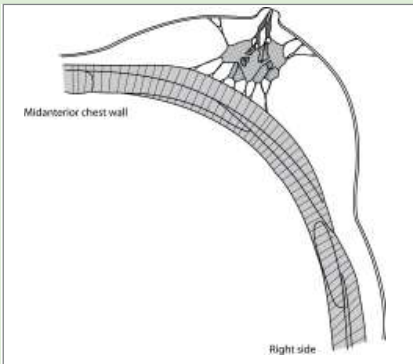


Image 2.2.37 Cooper's ligament



Image 2.2.38 Sagging breasts



Image 2.2.39 Bra with open flaps to expose nipple for breastfeeding



Image 2.2.40 Bra tightening around breast as baby breastfeeds



Image 2.2.41 Sagging breasts



Image 2.2.42 Mother wearing bra incorrectly



Image 2.2.43-2.2.44 Accessory breasts at the armpit after delivery



● Sagging Breast

During pregnancy, the breasts develop and grow. In particular, milk glands and milk ducts will proliferate, causing the breasts to grow in size and increase in weight. Before pregnancy, each breast may be about 200 grams. During pregnancy and close to delivery, the breast will weigh approximately between 400-600 grams. Throughout the breastfeeding stage, the weight can increase to 600-800 grams.

The breast is supported and attached to the chest by Cooper's ligaments, which are suspensory ligaments that tether the lobes to the skin and pectoral fascia. Cooper's ligaments suspend the breasts, attach them to the chest and maintain the breast shape (Image 2.2.37). If these ligaments are pulled too tightly for a long period of time due to increased breast weight, they can become less elastic and thus unable to maintain the original breast shape. This then causes the breasts to sag (Image 2.2.38). It is thus necessary for the mother to wear an appropriate fitting bra all day and night during pregnancy and nursing days. The bra should have flaps that can be opened for breastfeeding (Image 2.2.39). This provides essential support that will help the breasts retain the shape and beauty relatively. If the bra does not have flaps that can be opened, then the mother should unhook the bra during nursing. Moreover, she should not pull her blouse up too tightly as it can press the breast and plug milk flow, leading to a plugged duct (Image 2.2.40).

Sagging breasts (Image 2.2.41) even with the bra worn (Image 2.2.42), can still sag further if the bra cannot support the breast weight properly. The bra straps should be adjusted to support the breasts' weight properly, which will in turn help prevent the breasts from sagging.

Accessory Breasts (Image 2.2.43 - Image 2.2.44)

Accessory breast is breast tissue grown in improper location along the milk line. It is most commonly found in the armpit area. This tissue will grow bigger during pregnancy, and substantially after delivery due to the start of lactation. Accessory breast tissue can cause the mother to experience aching pain from engorgement. The mother can be given paracetamol to relieve the pain. As for the accessory breast tissue, it will eventually subside.



● Hypertrophic Breast



Image 2.2.45 Hypertrophic breasts



Image 2.2.46 Use of cloth to hold up breasts



Image 2.2.47 Use of shoulder sling to hoist breasts



Image 2.2.48 Swollen and hard areola, and short nipple



Image 2.2.49 Use of bulb-style breast pump to pull areola, rising and softening



Image 2.2.50 Use of nipple puller to extend nipple



Image 2.2.51 Help baby breastfeed in football hold with pillow cushioning both baby and breast



Image 2.2.52 To hold breast for baby to breastfeed



Image 2.2.53 Independent hold of mother's breast for baby to breastfeed



● Hypertrophic Breast

The mother, one day after delivery, was visited in the hospital room and found with hypertrophic breasts (Image 2.2.45).

Assistance Procedures

- Offer encouragement to the mother.

- Use the piece of cloth to hold up the breasts to help relieve the pain that the mother experienced from hypertrophic breast condition (Image 2.2.46), as well as enable her to move around more freely and not feel so weighed down by the breasts. However, this method did not prove very effective. The cloth is thus readjusted to make a stronger sling-like support, hanging from the shoulder to hoist the breasts (Image 2.2.47).

- Help the baby to breastfeed successfully.

Because the areolas are large and flat with the skin thick and taut due to swelling (Image 2.2.48), raise the areolas so that the baby can breastfeed properly. Do this with the use of the bulb-style breast pump that has a large and flat opening (Image 2.2.49). The suction pressure from the pump causes the areola to rise. Then, use the nipple puller to pull out the nipple longer (Image 2.2.50). Afterwards, bring the baby to the mother for breastfeeding, with the pillow cushioning both the baby and breast (Image 2.2.51). The football hold proves to be the best breastfeeding position.

The baby is then trained to breastfeed until he is able to do it on his own (Image 2.2.52), and the mother is capable of handling the breastfeeding session all by herself (Image 2.2.53).

References

1. Akkuzu G, Taskin L. Impacts of breast-care techniques on prevention of possible postpartum nipple problems. *Prof Care Mother Child* 2000; 10(2):38-41.
2. Davanzo R. Nutrition with human milk: research and practice. Trieste, Italy: Medela AG; 2010.
3. Hayes R, Michell M, Nunnerley HB. Acute inflammation of the breast-the role of breast ultrasound in diagnosis and management. *Clin Radiol* 1991; 44(4):253-6.
4. Hook G, Ikedo D. Treatment of breast abscesses with US-guided percutaneous needle drainage without indwelling catheter placement. *Radiology* 1999; 213(2):579-82.
5. Lawrence RA, Lawrence RM. Breastfeeding: a guide for the medical profession. 7th ed. Philadelphia: PA: Elsevier Mosby; 2011.
6. Newman J, Pitman T. The ultimate breastfeeding book of answers. Roseville, CA: Prima Publishing; 2000 p. 122-8, 136.
7. Newman J, Pitman T. Dr. Jack Newman's guide to breastfeeding. Toronto; Harper Collins; 2000.
8. Walker M. breastfeeding management for the clinician: using the evidence. Sabbury, Massachusetts: Jones and Bartlett Publishers, Inc; 2006.
9. Wilson-Clay B, Hoover K. The breastfeeding atlas. 4th ed. New York: Lactnews Press; 2008.



3.1 Premature babies



Image 3.1.1 Premature baby born at 36 weeks gestation with low birth weight (2,400 grams),



Image 3.1.2 Premature baby born at 30 weeks gestation with very low birth weight (1,050 grams)



Image 3.1.3 Premature baby born at 24 weeks gestation with extremely low birth weight (720 grams)



Image 3.1.4 Premature with infected abdominal wall due to necrotizing enterocolitis



Image 3.1.5 Plain abdominal X-ray of baby showing abdominal gas from necrotizing enterocolitis



Image 3.1.6 Machine for central vein feeding of very low birth weight premature babies



Image 3.1.7 Machine for dripping control of milk or intestinal nutrients

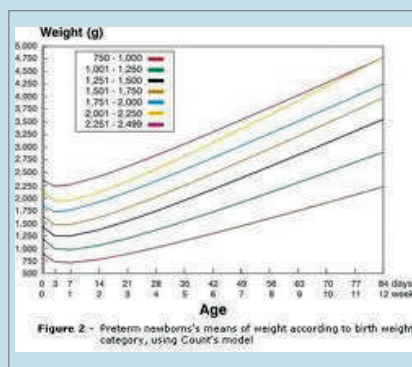


Image 3.1.8 Weight monitoring graph for premature newborns with different birth weights and gestational ages



Image 3.1.9 Premature baby born at 32 weeks gestation with birth weight of 1,595 g that increased to 3,370 g at the age of 42 weeks



3.1 Premature babies

There are still problems of premature babies (less than 37 weeks gestation) and newborns with low birth weight (less than 2,500 grams at birth) in Thailand. The 1999-2010 reports of the Department of Health show high birth rates among low birth weight newborns, between 8.5-8.9% of live births per year. This is higher than the target rate of below 7%. Approximately half of the newborns with low birth weight are born prematurely, which increases the risk of developing illness and mortality if the gestation period is less than 34 weeks. Newborns with low birth weight (Image 3.1.1) and very low birth weight less than 1,500 grams (Image 3.1.2) have 6.6 and 108 times increased risk of mortality respectively, when compared to newborns with normal birth weight. Currently, the Neonatal Intensive Care Units (NICU) have helped to reduce the risk of mortality in newborns with very low birth weight, with exception in the case of newborns who have extremely low birth weight (less than 1000 grams) (Image 3.1.3). These newborns are still at a high risk of death from respiratory problems, imbalanced blood sugar and electrolyte levels, and increased risk of nosocomial infection.

Premature babies have a higher growth rate than full-term babies with less developed respiratory and digestive systems, along with uncoordinated swallowing and breathing movements. This increases the risk of regurgitating breast milk and paused breathing during breastfeeding. The intestinal mucosa cannot fully digest and absorb several types of food with weak peristalsis. Inappropriate intestinal feeding, along with the high risk of infection and lack of oxygen, will further increase the risk of developing necrotizing enterocolitis (NEC). This can result in vomiting, blood and mucous presence in the stool, a flatulence and inflamed abdominal wall (Image 3.1.4) from perforation of the intestines, which can be seen as air in the intestinal wall and abdomen (Image 3.1.5). This is a common cause of death.

In feeding premature babies, the right amount of food and correct method of delivery should be carefully considered. Correct methods of feeding include central vein feeding with specialized machine (Image 3.1.6) for newborns with extremely low birth weight, and very weak peristalsis. Intestinal feeding, by slowly and continuously dripping small amounts of nutrients with the machine that controls the volume per hour can also be given (Image 3.1.7). This helps feed the baby to grow normally at the same rate as during gestation. After feeding, the weight should be monitored with the weight graph and compare it with the weight during gestation period for premature babies (Image 3.1.8). For example, the 32-week old premature baby weighs 1,595 grams at birth while the 42 weeks old weighs 3,370 grams. The increase in weight takes place according to the graph (Image 3.1.9).

Premature babies that have received nutrients correctly, will have a lower risk of developing illnesses and infections, spend less amount of time in hospital, and have good health in the long term with normal brain and mental development. Babies that receive central vein feeding should receive minimal enteral feeding to help with the development of the intestinal mucosa, and reduce the risk of intestinal infection and necrotizing enterocolitis. The colostrum will stimulate peristalsis. Breast milk will flow through the stomach faster than formula milk, helping the baby to receive sufficient breast milk sooner. Breast milk stimulates the release of intestinal hormones and lactase in the intestinal mucosa, reduces intestinal permeability faster than formula milk, helps with the excretion of bilirubin, and reduces bile congestion in the liver and the odds of infection from central vein feeding.





Image 3.1.10 Yellowish colostrum, transitional milk, and white mature breast milk



Image 3.1.11 Expressing & collecting small amounts of colostrum within 24 hours after delivery



Image 3.1.12 Feeding colostrum collected through syringe



Image 3.1.13 Mother pumping the increased amount of breast milk into a cup every 2-3 hours



Image 3.1.14 Mature breast milk with first part transparent (left) and latter part more dense (right)



Image 3.1.15 Latter part of mature breast milk being dripped through machine to control flow rate



Image 3.1.16 Freeze store breast milk in temperature-controlled freezer with no other foods



Image 3.1.17 Transferring freeze-stored breast milk from freezer to refrigerator compartment

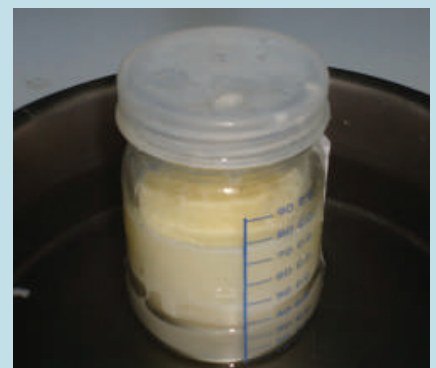


Image 3.1.18 Thawed breast milk should be warmed in water before feeding the baby



Breast milk fulfills the needs of premature babies

Mothers who deliver prematurely also have the same 3-stage breast milk as mothers who deliver full term. The three stages are colostrum, transitional milk, and mature milk (Image 3.1.10). Colostrum, or the *“first drop of vaccine”*, helps to reduce the risk of illness and mortality from infections such as septicemia and meningitis in premature babies. In babies with very low birth weight, the colostrum and mature milk will contain more concentrated amounts of biological substances and nutrients than breast milk from mothers who deliver full term. These include secretory IgA, lysozymes, lactoferrin, phagocytic white blood cells, and easy-to-digest whey protein.

Mature breast milk from mothers who delivered prematurely will have increased amounts of nutrients, such as food energy, proteins, fat, calcium, and zinc. Furthermore, there are increased amounts of growth factors, epidermal growth factors, inflammatory factors, immunomodulators, and concentrated hormones. This is to help the development of the intestines and other organs. Aminopterin and unsaturated long-chain fatty acids (DHA and AA) help in the development of neuronal brain tissue and retina, increase visual acuity, and decrease the severity of retinopathy of prematurity. For premature babies in Neonatal Intensive Care Unit (NICU), each 10 ml of breast milk they received will help elevate their intelligence quotient by 0.53 and reduce their chance for readmission by 6%. Further benefits include reduced risk of developing allergies similar to full term babies, as well as cardiovascular diseases that occur later with a higher risk in low birth weight babies.

Breastfeeding procedures for premature babies

All premature babies can be breastfed. Factors that prevent premature babies from breastfeeding at the hospital includes mother-baby separation where the mother is required to leave hospital early, or is confused and stressed for lack of correct information from the medical staff. Mothers can nurse their baby successfully if the hospital provides an organized system for the mother and family to be involved in the continuous care of the baby until he is discharged from hospital.

Mothers should receive health education or consultation regarding the benefits of breastfeeding, and the method on how to achieve sufficient breast milk supply within 2-4 hours after delivery. During the first day after delivery, mothers should practice the correct method of expressing and collecting small amounts of colostrum with a 1-2 milliliter syringe (Image 3.1.11). Once 0.5-2.0 milliliters of breast milk is collected, it should be immediately dropped into the newborn mouth (Image 3.1.12) for him to receive the same benefits from the colostrum as with nursing within the first hour of birth. Mothers should be encouraged to pump the increased amount of breast milk into a cup every 2-3 hours, and store it correctly (Image 3.1.13). The first and more transparent part of the breast milk containing high protein and lactose should be stored separately from the latter part which is denser from the increased fat content (Image 3.1.14). Put the latter part of the breast milk into the syringe with pressure control (Image 3.1.15). Breast milk that is not given to the newborn should be stored at 18-20 degree Celsius below zero in the freezer (Image 3.1.16). Prior to feeding the newborn, transfer the breast milk from the freezer to the refrigerator for thawing (Image 3.1.17), then take only the required amount and immediately immerse it in warm water (Image 3.1.18). Breast milk should not be left in warm water for longer than 20 minutes. Gently shake the thawed breast milk to mix it properly. Breast milk should not be boiled or warmed in the microwave. Left-over thawed breast milk must be discarded.





Image 3.1.19 Gentle breast massage with palm



Image 3.1.20 Warm breast compression with cloth



Image 3.1.21 Father involved in feeding breast milk to baby with syringe during mother's pumping in nursing room



Image 3.1.22 Mother pumping breast milk during visit to baby in NICU



Image 3.1.23 Kangaroo Mother Care



Image 3.1.24 Breast milk feeding through esophageal-stomach tube



Image 3.1.25 Breast milk feeding through dripping to stimulate tongue and swallowing



Image 3.1.26 Breast milk feeding through tube connected to finger to stimulate sucking and swallowing



Image 3.1.27 Breast milk feeding from cup to stimulate lips, tongue and swallowing



Techniques for mothers to pump sufficient breast milk in premature birth cases

During the period when the baby cannot breastfeed, manual expression of breast milk is a good way to stimulate and stabilize the production of breast milk, and is similar to baby suckling. For some mothers with very low or extremely low birth weight newborns (28-34 weeks gestation period), there may be breast tissue that is not fully developed to produce breast milk in the first 24 hours after delivery. The baby can take some time before he can breastfeed properly. The mother has to manually express her breast milk for the baby for several weeks or months until the baby is able to breastfeed on his own. During the first week, the mother should massage the breasts (Image 3.1.19), or massage with warm compression of towel soaked in warm water and wrung dry (Image 3.1.20) for 4-5 minutes every time before and during the pumping. This is to stimulate the release of the oxytocin hormone and increase blood flow to the breast area and ultimately increase the amount of breast milk produced. In the case where breast milk is insufficient through manual expression, or the mother is worried that the amount does not meet the baby needs, a pumping machine should be considered for the early stages. She should be careful of nipple injury and the compression of milk duct. She should also be in an environment that promotes lactation, such as listening to soft music, looking at baby pictures or sniffing the baby scent from the clothes and expressing next to the cot. The father should be involved in feeding activities, such as helping to feed the mother's breast milk to the baby while she is pumping breast milk (Image 3.1.21). The mother should be involved in feeding at the NICU, such as expressing breast milk besides the baby (Image 3.1.22).

Preparing the premature baby for breastfeeding

The mother should hold the baby next to the chest for skin contact (Kangaroo Mother Care) (Image 3.1.23). Hugging the baby as much as possible or for at least 6-8 hours per day, will help her to stimulate breast milk production faster, and help the baby to receive colostrum, maintain a constant body temperature, reduce the risk of low blood sugar, learn how to breastfeed sooner, receive sufficient breast milk and have better growth development.

Choosing the way to breastfeed the premature baby

Most premature babies with more than 32-34 weeks gestation period are able to breastfeed because their suckling, swallowing and breathing mechanisms are developed properly. Premature babies with less than 30 weeks gestation period usually have problems with breathing and illnesses from the inability to breastfeed; therefore, nutrients must be fed through the central vein along with special methods for breast milk supply such as the infusion pump and esophageal tube insertion (Image 3.1.24). Using the syringe to drip breast milk onto the baby lips and the tongue tip, will help to stimulate the tongue in receiving breast milk and swallowing movements (Image 3.1.25). Using the mother's index finger on the feeding tube (finger feeding) will help to stimulate the lips, tongue and palate movements so that suckling, swallowing and breathing (Image 3.1.26) will be coordinated. Once the baby improves on suckling and swallowing, let him practice suckling breast milk slowly by feeding from the cup (Image 3.1.27).





Image 3.1.28 Premature baby showing signals of hunger with suckling motion of lips



Image 3.1.29 Baby responding to stimulation of lips



Image 3.1.30 Baby with football hold and suckling on same side as mother's hand support on head with father's help



Image 3.1.31 Modified cradle hold with baby on lap and suckling from opposite breast of hand support on head



Image 3.1.32 Premature baby suckling position with head higher than body



Image 3.1.33 Mother holding breast with fingers in U shape



Image 3.1.34 Dancer position: mother holding entire breast and baby chin, to help baby to improve suckling



Image 3.1.35 Baby practicing on suckling as well as receiving additional mother's breast milk through feeding tube due to insufficient milk supply



Image 3.1.36 Parents involved in care for baby while in hospital



Suckling on the mother's breasts

Premature babies that are ready to suckle on the mother's breasts can express the same as full-term newborns when they are hungry. The signals include the suckling of the lips (Image 3.1.28), the sticking out of the tongue, suckling on the feeding tube in the mouth, or looking for the breasts during the mother's close hug. Prior to breastfeeding, the mother should stimulate the baby interest to suckle by hugging and holding him close to the chest, and using the index finger to gently touch the lips and chin to stimulate the rooting reflex (Image 3.1.29).

The mother should choose the most appropriate breastfeeding position that allows a firm hold and support for the baby head such as the football hold (Image 3.1.30). Other methods include holding the baby underneath the mother's armpit and let him suckle from the same side as the hand supporting the head, or the modified cradle hold (Image 3.1.31) where the baby breastfeeds from the opposite side of the hand supporting the head. The premature baby with weak muscle or requires oxygen masks should breastfeed in a position where the head is elevated above the body in a 45-90 degree angle to allow the body to stretch and not press on the neck so as to prevent airway obstruction (Image 3.1.32). The mother should hold the breast with the index finger and thumb on the areola in a U shape (Image 3.1.33) and squeeze on the areola so that the baby who cannot open the mouth wide enough can suckle more easily. She can also use the index finger on the areola to also help hold up the baby chin (Dancer position) (Image 3.1.34). The lifted chin will result in better movement and more suckling pressure. Once the baby starts to suckle, let the mother start squeezing to increase milk flow for him to receive more milk and shorten the suckling time. If she is not producing enough breast milk when he starts breastfeeding, a supplemental nursing system can be used. This means, filling the feeding tube with her milk and attach it to the nipple (Image 3.1.35). This way, he can receive more milk through the feeding tube while suckling from the breast, and stimulating her breasts to produce more milk. Once he is able to suckle well and she is producing sufficient breast milk, she should practice nursing him on her own for 2-3 days. If the baby suckles well, he should gain weight every day and she should prepare for hospital discharge with a follow-up schedule within 24-48 hours.

Breastfeeding the premature baby takes time and patience, especially in NICU cases. Special methods for providing breast milk are needed. Eventually, the baby in every case can suckle from the mother's breasts, if she is provided with proper training in expressing and storing breast milk, and the correct breastfeeding technique. The medical team of caregivers are there to provide help, care and support with the policy to encourage parents on newborn care with close and bedside breastfeeding so that the baby will receive breast milk properly and continuously. It is important to involve the parents of the premature baby to care for him as a team (Image 3.1.36), and to provide them the correct training and information on how to give appropriate care. This will help them to be aware of their abilities, become confident and proud in their capability in taking care of their own baby, providing the best start in life through the mother's breast milk.



3.2 Kangaroo Mother Care



Image 3.2.1 Remove all clothing



Image 3.2.2 Place baby vertically between mother's breasts, tilt his head to one side, and raise it slightly below her chin



Image 3.2.3 Use cloth to tie the baby to mother with cloth upper part below baby ears, and adjust arms, legs and hips in frog position



Image 3.2.4 Baby on mother's chest like baby kangaroo



Image 3.2.5 Use cloth to cover mother preventing her from revealing her body and keep baby warm



3.2 Kangaroo Mother Care

Kangaroo Mother Care is used to care for newborns, especially premature or low birth weight babies, with the mother holding the baby skin to skin on the chest. This is done in the early stage after birth, instead of using the incubator. With this method, the mother's body warmth will pass to the baby and receive nutrients from her breast milk. This method helps the baby to suckle from the breast sooner. His skin will receive direct stimulation while she takes care of him closely. This promotes love and bonding between mother and baby, child development, and reduces the risk of infection, illness and death in this group of babies.

There are three components in Kangaroo Mother Care:

1. Continuous, undisturbed, skin-to-skin contact
2. Exclusive breastfeeding
3. Support, care and help with emotional and technical medical ways for both mother and baby

The important considerations for Kangaroo Mother Care in premature babies are: babies without other illnesses, just born prematurely, and adapted to the environment outside the womb to survive. The most appropriate place to be after birth for premature babies is in the mother's bosom because he can receive warmth from the close skin contact, intimacy with the mother and breastfeeding care. This is the way for him to slowly adjust to the outside world. Separating the mother and baby in premature cases can lead to a higher chance of illness in the baby due to stress and lack of breastfeeding.

The Kangaroo Mother Care can be implemented immediately after birth once the newborn is able to breathe on his own and has no severe illness, or is not handicapped without having to wait for the baby to suckle from the breasts as breast milk can be provided through other means.

Procedures

- Take off all baby clothes except for the diaper and hat (Image 3.2.1).
- Place baby vertically between the mother's breasts, tilt his head to one side, raise the head slightly below the mother's chin to prevent airway obstruction and help promote mother-baby eye contact (Image 3.2.2).
- Tie cloth around the mother and baby with the top part of the cloth under her ears. Adjust arms, legs and hips like the frog (Image 3.2.3).
- Place the baby on the mother's chest like the baby kangaroo (Image 3.2.4).
- Let the mother wear her own clothes preventing her from revealing her body, and it will also help keep the baby warm (Image 3.2.5).



- Kangaroo Mother Care should be implemented for as long as possible in each day.
- The baby should leave the mother's chest only during clinical examination, umbilical cord care, clean up and diaper change.
- If the mother needs to shower and the room temperature is not too low, wrap up the baby in warm cloth on the bed safely within the 10-20 minute shower period.
- Let the baby breastfeed every 2-3 hours. The mother should take notice of his condition. If he appears restless, experiences abnormal breathing, has a change in skin color, or appears darker, the mother should let him rest.
- Provide the baby with exclusive breastfeeding from mothers's breast together with other feeding methods, such as dripping tube, until there is a good increase in weight of 25 grams per kilogram of body weight per day or the total weight reaches 1,800 grams, then let him breastfeed normally both day and night.

Benefits of Kangaroo Mother Care

Baby Benefits

- Provide warmth for the baby.
- Regulate breathing and heartbeat, and lower chances to stop breathing.
- Promote breastfeeding, allow breastfeeding to begin sooner and longer, and the baby to receive breast milk whenever needed.
- Help the baby to adjust better to the environment outside of the womb.
- Help the baby to sleep better and longer.
- Help the baby with less movement and therefore lose less energy and have better weight gain.
- Reduce the risk of infection, allergies, and breastfeeding problems during the first year.

Parents' Benefits

- Boost the mother's confidence in taking care of her baby.
- Provide opportunities for the father to get involved in the same care for the baby.
- Enhance the love and relationship between the mother and baby, and family too.

Hospital Benefits

- Reduce the need for incubators.
- Reduce the number of staff required for baby care.
- Reduce the time in hospital where mother and baby can be discharged sooner.
- Reduce hospital expenses.
- Increase survival rate among premature babies.
- Develop quality care for premature babies and quality psychological development of hospital staff.



Summary of breastfeeding stages in premature babies

1. Begin with the Kangaroo Mother Care.
2. Advise the mother to express and store breast milk every 2-3 hours for the baby after delivery.
3. Use the tube, spoon, drip or cup for cases where the baby is unable to breastfeed.
4. Let the baby practice suckling from the mother's breasts while in her bosom, and combine with other methods until he is able to fully breastfeed at age 32-34 weeks.
5. Let the baby breastfeed on demand, both day and night until weight gain improves to 25 grams per kilogram of body weight per day, or the total weight reaches 1,800 grams.

3.3 Twins



Image 3.3.1 Woman pregnant with twins



Image 3.3.2 Full term newborn twins without problems at birth



Image 3.3.3 Mother lying down and breastfeeding both twins simultaneously



3.3 Twins

Twin delivery has seen a steady increase. Studies in the United States have shown that twin delivery accounts for more than 3% of all deliveries. Twins are at a higher risk of experiencing lower birth weight for both full term and premature babies. Twins are still able to exclusively breastfeed but for triplets and quintuplets, because they are usually born with low birth weight, a mix of formula milk may have to be provided together with breast milk.

Breast milk is definitely beneficial for babies of all ages. An example from the author's experience several families who had an oldest child with allergies, often developed flu and sinusitis, the child had to stay home from school and took lots of medication. This was all because the child had rarely or never been breastfed. It was only until the mother gave birth to the second child, receiving recommendations on breastfeeding and realized the association between dairy milk and allergy development, that she was encouraged to express breast milk for the oldest child too. Some mothers were able to produce enough breast milk to feed all three children. Once the oldest child started receiving breast milk and ceased consumption of dairy milk, there was apparent improvement in his health and he had noticeably less allergic symptoms.

Woman pregnant with twins (Image 3.3.1)

As twin pregnancies are at risk for premature delivery or low birth weight, during the pregnancy, mothers should take in sufficient nutrient, vitamin and mineral. This has to be emphasized to reduce the chances of low birth weight in the newborn.

Full-term twin newborns with no birth complications (Image 3.3.2)

In this case, the mother and twins are encouraged to stay together. The babies should experience close skin contact with their mother, and breastfeeding should be encouraged as much as possible. Initially, both twins may not be able to breastfeed effectively. In this stage, each twin should be allowed to breastfeed one at a time, and proper attention should be given to their weight because both breastfeed from the same mother at the same time. For example, weigh the baby every day during the first week and once a week later on (full term newborn that is able to breastfeed effectively with normal bowel movements does not need to be weighed every day).

Mother breastfeeding both twins simultaneously (Image 3.3.3)

In this case, the mother has twins and is breastfeeding the elder twin with the left breast and the younger, the right. Naturally, the baby is attached to the breast side where he usually feeds from, but it is not necessary to stick to the same breast all the time. The principle is that the baby should feed from whichever breast side is full first, and switch for every meal so that the stronger baby can help to suckle and stimulate breast milk production equally in both breasts.





Image 3.3.4 Breastfeeding twins in football hold and cradle hold



Image 3.3.5 Breastfeeding twins in football hold



Image 3.3.6 Mother breastfeeding one twin at a time in cradle hold



Image 3.3.7 Mother breastfeeding older and younger twins simultaneously



Image 3.3.8 Mother lie-on-back to breastfeed twins



Image 3.3.9 Twins breastfeeding with cloth over stomach



Mother with triplets

The common practice for the mother with triplets is to feed breast milk together with formula milk. This is because there may be insufficient breast milk, and she can be very tired. However, it is up to her if she trusts that her breast milk production can increase with stimulation from suckling or pumping. Mothers who are healthy and well rested are able to produce sufficient breast milk for the babies each day. From experience, in the case of triplets weighing 2,200 g., 1,800 g. and 1,500 g. respectively, the mother was determined to breastfeed, and the doctor was able to stimulate her to express breast milk for her babies within 2 hours after birth. Within 24 hours, the newborns were able to receive breast milk and formula milk together. The first two, once they were healthy enough, were able to return to their mother within the first 2 weeks. The last of the triplets was in intensive care. The mother was worried that breast milk would be insufficient for this baby, so he was given formula milk. It was found later on that he was allergic to the protein in dairy milk, and so formula milk was discontinued. She then purposely expressed breast milk for him and found out that she was able to produce sufficient breast milk for all the triplets. Presently, they are six months old and the mother has a nanny to help take care of them.

Some mothers with help finds that they are able to exclusively breastfeed triplets by letting them feed alternatively and express breast milk while the babies are asleep.

Breastfeeding twins with the football hold (Image 3.3.4-3.3.5)

This is a popular hold for mothers with twins. Its advantages are: babies are able to breastfeed simultaneously, and in some cases, they become full and sleep at the same time, and the mother will feel less tired. With this breastfeeding position, if the mother sits up straight or is not relaxed, it may cause stress. Thus, she should sit in a backward leaning position to relax, which will also help her to increase breast milk production.

Cradle hold and football hold (Image 3.3.6-3.3.7)

Mothers with triplets can breastfeed in a comfortable and relaxed position. She can breastfeed one by one or simultaneously. For simultaneous breastfeeding, the mother can use the football hold or cradle with football hold.

The mother's lie-on-back position for breastfeeding twins (Image 3.3.8-3.3.9)

The mother can breastfeed in several different positions, even when lying on her back. The mother should use a pillow to support the shoulders to lift the breasts higher so that the twins can feed more comfortably. The pillow can come as two normal ones or a horse-shoe shaped pillow that can support both arms.

Whichever the case, the important principle is comfort for the mother, the holding positions and suckling are correct.



3.4 Tongue-tie



Image 3.4.1 Screening for tongue tie in newborns



Image 3.4.2 Full-term newborn crying during breastfeeding



Image 3.4.3 Tongue tie with thick membrane



Image 3.4.4-3.4.5 Tongue tie with thin membrane



Image 3.4.6 Examination of tongue-tie area with thick membrane

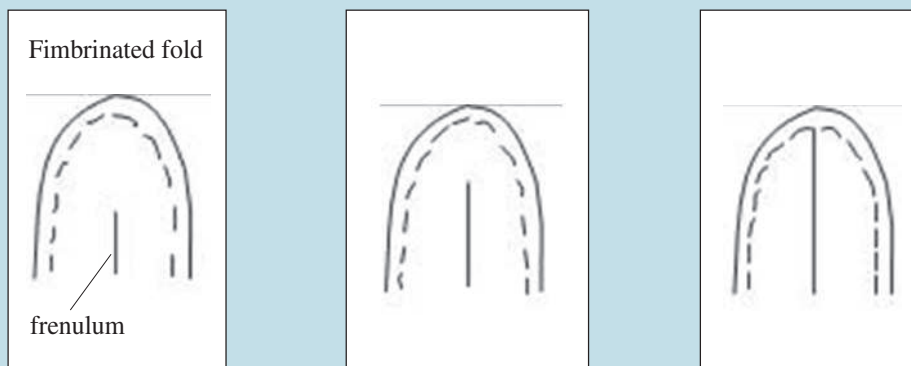


Image 3.4.7 Classification of tongue-tie severity at Siriraj Hospital divides this to minimal tongue-tie (normal), moderate tongue-tie, and severe tongue-tie



3.4 Ankyloglossia (Tongue-tie)

Ankyloglossia or tongue tie affects breastfeeding from the very beginning and it can affect speech and oral health later on. Research from international studies show a variance in the prevalence of tongue tie in newborns from 1.7% to 10.7%. This high variance occurs for lack of a standard classification. In Thailand, the Siriraj Hospital report found that the prevalence of moderate to severe tongue tie associated with breastfeeding problems was 8.7%. Tongue tie is a condition occurring at birth, with mostly standalone cases, but it can also be found with other conditions like Opitz Syndrome, Orodigitofacial Syndrome and X-linked cleft palate.

Baby with a tongue tie (Image 3.4.1)

The membrane under the tongue is short, and attaches itself near the tip of the tongue. The baby is unable to stick the tongue out beyond the gums, or when it does stick out, the tip of the tongue will form a heart-shape.

Full-term newborn crying during breastfeeding (Image 3.4.2)

The mother consulted with the doctor about her child always crying during breastfeeding. Examination showed tongue-tie which disrupts latching on. In this case the tongue was unable to reach out to the areola, therefore the baby was only sucking around the nipples, causing pain and cracks in the nipples and the baby received inadequate breast milk.

Tongue tie with a thick membrane (Image 3.4.3)

The two-month old baby is crying during breastfeeding, and screening shows a thick membrane under the tongue.

Tongue tie with a thin membrane (Image 3.4.4-3.4.5)

The baby visits the breastfeeding clinic with jaundice. Examination indicates that he has a mild tongue tie, and he can still breastfeed efficiently without surgery. Surgery is unnecessary at birth even in some cases where the membrane is thick but the mother's nipple is normal and the areola is flexible enough, as well as many other cases.

Screening for tongue tie in the newborn (Image 3.4.6)

Screening should be done since birth, while the newborn is crying or pushing down on the chin to open the mouth, with a cotton bud to examine underneath the tongue and its membrane by pushing up the tongue. The severity classification of tongue tie from Siriraj Hospital is shown in Image 3.4.7.

Generally, check if the tongue-tie requires surgery. First, help to adjust the holding and breastfeeding positions, and see if the newborn still has problem breastfeeding, cries every time he suckles, weighs the same; or if the mother has problems such as nipple pain when the baby suckles, or wounds in the nipples; then surgery is recommended. In conclusion, surgery is not mandatory for all cases of tongue tie at birth.



3.5 Cleft lip and cleft palate



Image 3.5.1 Unilateral cleft lip, indentation only around pink lips



Image 3.5.2 Unilateral cleft lip, indentation up to columella



Image 3.5.3 Unilateral cleft lip, indentation deep into nose



Image 3.5.4 Bilateral cleft lip, deep into the nostrils



Image 3.5.5 Soft cleft palate



Image 3.5.6 Hard cleft palate, but not to gum



Image 3.5.7 Complete cleft palate, to gum of front teeth



Image 3.5.8 Complete unilateral cleft lip and cleft palate



Image 3.5.9 Complete bilateral cleft lip and cleft palate



3.5 Cleft lip and cleft palate

1 in 700 newborns are at risk of developing cleft lip and cleft palate due to genetics and environmental factors. Families with genetic variations have a higher rate of occurrence. Ethnic difference also accounts for the disparity in cleft lip and cleft palate occurrence. 50% of newborns have both cleft lip and cleft palate, 42% only develop cleft palate, and only 7% develop just cleft lip. Treatment of the cleft lip and cleft palate depends on the physical severity of the condition. Therefore, classification of the severity of the cleft lip and cleft palate is essential from the beginning of the treatment, its follow-up and result report.

The baby with only the cleft lip problem usually develops the unilateral type. Classification of the cleft lip depends on the size of the indentation. Type 1 cleft lip (Image 3.5.1) is unilateral with indentation only in the pink area of the lip. Type 2 cleft lip (Image 3.5.2) is unilateral, up to the nose; Type 3 cleft lip (Image 3.5.3) is unilateral, up to the base of the nose or deep into the nostrils; and Type 4 cleft lip is bilateral, into the area of the nose or deep into the nostrils (Image 3.5.4).

Breastfeeding difficulty depends on the size and area of the cleft, which is widely variable. Babies with just the cleft palate can appear physically normal and produce unusual loud noises or often choke during breastfeeding. The newborn should open his mouth widely, exposing the palate and tonsils, during examination of the cleft palate. It may be a cleft palate in the middle area, unilateral (unilateral cleft palate), or bilateral (bilateral cleft palate). The baby with just the cleft palate is often unilateral and incomplete (incomplete cleft palate). Type 1 cleft palate (Image 3.5.5) is confined to the soft palate. Type 2 cleft palate (Image 3.5.6) involves the soft and hard palate but not the gums or the teeth area. Type 3 cleft palate (Image 3.5.7) is complete cleft palate with the involvement of soft as well as hard palate and also the gums and the front teeth. Type 4 cleft palate is bilateral and involves both soft and hard palate, deep into gum ridge and the range of front teeth. In some cases, the baby cleft palate involves the membrane of the oral cavity, the uvula can be seen as split and therefore, during examination for cleft palate, the doctor must always use the fingers to palpate the palate.

The baby with both the cleft lip and cleft palate often has Types 3 and 4 cleft palate and cleft lip with indentations into the nostrils. He may have unilateral complete cleft lip and cleft palate (Image 3.5.8) or bilateral complete cleft lip and cleft palate (Image 3.5.9), which is classified as the most severe form of cleft lip and cleft palate because 35.7% of such babies have below average weight and 38.9% have below average height. Among the baby with just the cleft lip, only 23.8% and 19.3% has below average weight and height, respectively.



Breastfeeding problem in the baby with cleft lip and cleft palate

The baby with just the cleft palate, or both cleft lip and cleft palate, will experience the following problems during breastfeeding:

1. Increased feeding time

The baby with the cleft palate cannot produce enough suction in the oral cavity while breastfeeding. Tongue movement to suck milk to the back of the mouth for swallowing is difficult, and is often not coordinated with suckling. He requires more suction for suckling milk from the bottle than the breasts, and longer periods to swallow each time. He is often tired and hungry from not receiving enough milk. Breastfeeding may require the specialized pressure-providing equipment.

2. Swallowing air during suckling and food intake

The baby with the cleft lip and cleft palate is unable to fully close the mouth around the rubber nipple during feeding. Too much air can enter through the space between the teat and the baby lips and into the stomach, resulting in flatulence and choking or regurgitation.

3. Milk and food entering the nasal cavity

Swallowing quickly and consuming large quantities of food or milk may cause them to enter into the nasal cavity through the cleft palate. The baby will become fussy often, and reject sucking milk.

4. Coughing and choking while swallowing

Using high pressure from the bottle or syringe to squirt milk or liquid food in large amounts into the throat quickly, will result in the liquid hitting the throat and causing the baby to choke.

5. Slow weight gain

Due to insufficient intake of food and milk, the baby may not receive the required food he needs. He may not develop properly due to insufficient energy, proteins, and nutrients.

6. Middle ear infection

Middle ear infection is a high risk for hearing problem or deafness. This is due to the abnormalities in the Eustachian tube that connects the ears and mouth. Sucking, especially formula milk from the bottle, increases the risk and reoccurrence of irritation of the middle ear membrane, collection of fluid (ear effusion), and infection of the middle ear with collection of fluid (secretory otitis media). Only 2.7% of babies that receive formula milk have no collection of fluid in the middle ear, as compared to 31% of the babies who are breastfed.



7. Slow speech development

The baby with dysfunctional palate muscles may face problems due to tube-feeding because they do not have the chance to use those muscles for suction and swallowing. Lack of muscle exercise leads to problems such as slow speech development or speech impairment. This is because they cannot pronounce nasal vowels or certain consonants. Furthermore, some babies have late teeth eruption or misaligned teeth that require braces.

Benefits of breastfeeding the baby with cleft lip and cleft palate

Breast milk contains nutrients and biological substances that are unique to humans, and is important for growth development, brain development and reduces the risk of illnesses. Apart from receiving more nutrients that are easier to digest than formula milk, the baby with cleft lip and cleft palate also receives immunity and other benefits from exclusive breastfeeding during the first six months after birth, which is the same as the normal newborn baby. Those that are unable to suckle from the mother's breasts should receive expressed breast milk of the mother. Suckling from the mother's breasts reduces the risk of middle ear effusion, middle ear infections, and deafness. Babies who receive breast milk have lower risk of illnesses or respiratory infections, and middle ear infections.

The mother should hold the baby with close skin contact and start nursing within the first hour of birth as with normal newborns. This is to develop love and bonding between mother and baby. Involving the father and family in helping the baby to suckle from the mother's breasts will encourage the acceptance of his disability. Touching and breastfeeding him frequently on demand, can help with synaptic connections of neurons in the brain, increasing the brain response and stimulating development. Using the mouth to suckle milk from the mother's breasts and tongue movement that coordinates with swallowing, can help stimulate facial and oral muscles to function, fully and also help change the appearance of the palate and oral cavity. This way, the baby can have better speech development, and pronounce words more clearly. While suckling on the mother's breasts, he will be able to learn the coordination between the use of hands and mouth in order to learn how to eat and swallow food by himself when he grows up.





Image 3.5.10 Post-surgery on cleft lip



Image 3.5.11 Post-surgery on cleft palate



Image 3.5.12 Baby with cleft lip breastfeeding like normal babies



Image 3.5.13 Feeding tube reducing milk suckling and swallowing



Practice for breastfeeding the baby with cleft lip and cleft palate

Babies with cleft lip and cleft palate, even in the most severe form, are able to exclusively breastfeed from the mother's breasts successfully, or feed on additional breast milk that the mother has expressed, in the first six months after birth. After that, the baby should receive supplementary nutrients along with breast milk according to age, until two years or older. Supplementary food should provide sufficient nutrients according to the baby needs to help in weight gain, and reduce the risk of illness as much as possible, before the surgery to fix the deformity. Following The 10 Steps for Successful Breastfeeding should help the baby with cleft lip and cleft palate breastfeed properly like normal babies. The baby with only the cleft lip or slightly cleft soft palate, should be able to breastfeed normally without any problems, unlike those with severe cleft lip and cleft palate who are unable to use the lip and palate to fully suckle on the nipple. Preparing the nipple, areola and breast to be soft, tender and accommodating to the baby lips can help him to latch on the breasts faster, accommodate the disability of lip and palate, or help close the gap between the lip and breast during suckling. The mother should start expressing breast milk along with breastfeeding so as to increase the amount of breast milk production. Breastfeeding can therefore be a real challenge to the mother and she may need extra help from professionals with special techniques and additional equipment to help her breastfeed effectively.

Techniques to assist breastfeeding babies with cleft lip and cleft palate

Correct and sufficient breastfeeding helps to prepare the baby for surgery according to schedule. Surgery to fix the cleft lip should be performed once the baby is three months old (Image 3.5.10), the cleft soft palate around the age of 6-8 months, and the cleft hard palate around 12-18 months (Image 3.5.11). Surgery and proper care of the oral cavity will help reduce complications in the baby facial structure, and problems associated with teeth eruption, as well as prepare the baby for language and speech before they start going to school.

The baby with cleft lip all the way to the nose (Type 1 and 2) has the least problem with breastfeeding. He can start breastfeeding immediately (Image 3.5.12) while those with severe cleft lip deep into the nose (Type 3 and 4) has the problem to fully close the mouth around the nipple and areola. The problem with breast milk entering the nasal cavity can be found in the baby with soft cleft lip and soft cleft palate. The baby with Pierre-Robin Sequence has cleft palate that forms a U along the entire soft and hard palate, and often has a smaller chin or chin that is dented to the back. As a result, the tongue is pulled back to the throat and blocks the respiratory tract. Such baby has problem breathing and suckling milk on his own, and so the feeding tube must be used to provide food from the mouth to the stomach (Image 3.5.13). The feeding tube should not be retained for longer than 4-12 weeks because it may result in long term problem with suckling and swallowing food.





Image 3.5.14 Hold baby head with same side of hand holding breast



Image 3.5.15 Sitting up and holding baby head above body and tilt at 40-60 degree



Image 3.5.16 Baby suckling properly after adjustment of holding position



Image 3.5.17 Hold breasts in dancer hand position



Image 3.5.18 Breastfeeding and using index finger to push baby chin



Image 3.5.19 Expressing breast milk before letting baby suckle



Image 3.5.20 Holding breast like sandwich for nipple to enter into mouth



Image 3.5.21 Touching breast tissue like holding tea cup



Image 3.5.22 Severe cleft lip and incomplete suckling of nipple



Techniques for holding the baby during breastfeeding

The football hold is recommended to facilitate breastfeeding in the baby with unilateral cleft lip that cannot fully close the lips around the mother's nipple. She should use the palm that is on the same side as the feeding breast to hold the baby's head (Image 3.5.14). This enables the mother to insert the nipple into the mouth on the side with the indentation for the nipple to reach the side with the existing palate, and for the baby to use the palate to put pressure on the nipple and areola. If the baby has a bilateral cleft lip, hold him in the sitting position (Image 3.5.15) with the head and neck above the body at a 40-60 degree angle. The tip of the chin should be slightly above the lower part of areola to prevent milk from flowing from the mouth to the nose. The mother should be able to switch the baby to feed on the opposite breast without having to change positions. This is called the modified football hold. Both positions help the baby to use the lips and gums to fully close around the nipple with the nipple and areola pushing against the palate during milk flow. The baby can use the tongue to receive the milk before swallowing (Image 3.5.16).

Techniques to hold the breasts and express milk

During breastfeeding, the mother should use one hand to hold the baby's head and the other to hold the feeding breast. The mother should use four fingers to hold the breast base and place the thumb on top in a C shape (C-hold). In the case where the breast tissue does not fully occupy the indentation of the palate, or where the nipple move away from the baby lip, the mother should spread out her hand that is holding the breast, as if dancing (dancer hand technique) (Image 3.5.17). This allows the index finger to gently push the baby's chin while breastfeeding (Image 3.5.18). The mother should help to squeeze the breast by pressing it towards her body and squeezing each finger rhythmically to increase the amount of breast milk, and to lessen the amount of pressure for the baby to suckle. The amount of time required for breastfeeding can be reduced as well. The squeezing rhythm should synchronize with the baby suckling so as to prevent choking, and should stop when the baby pauses so as to allow him to breathe.

Techniques for nutritive suckling

Mothers should express some breast milk to start lactation before letting the baby suckle (Image 3.5.19). For correct expression of breast milk, the mother should hold the breast and squeeze with the fingers towards one another like eating a sandwich (sandwich technique). This is to reduce the areola area so that the baby can easily close his lips around the nipple (Image 3.5.20). The mother should lift the nipple to gently touch his lower lip so as to let him tilt his head towards the breast and open his mouth wide, and then move him towards the breast for him to latch on quickly and smoothly until the lips fully encompass the areola and the bottom lip is not folded. During suckling, the nipple should be around the palate area that is not, or the least cleft. The baby cheeks will bloat and move in a wave-like manner while suckling. His chin should be in contact with the lower part of areola. If possible, the neck that is adjacent to the chin should be slightly above the areola. If the lip is cleft all the way into the palate, and the baby is unable to fully close his lips around the nipple so as to suckle, the mother should hold the breast tissue that is soft and flexible like holding the tea cup (tea cup hold) as shown in Image 3.5.21. This allows the breast tissue to fill up the cleft lip area. She can also place the thumb on the breast top to push the skin into contact with the baby lips. This ensures that the lips are in full contact with the breast, and also increases suckling pressure (Image 3.5.22-3.5.23).





Image 3.5.23 Pressing and closing the gap between the cleft lip and areola membrane



Image 3.5.24 Baby with cleft palate wearing feeding obturator



Image 3.5.25 Baby with orthodontic plate



Image 3.5.26 Baby with orthodontic plate fed from cup



Image 3.5.27 Baby with orthodontic plate breastfeeding



Image 3.5.28 Manual breast milk expression into cup for baby

Prosthetic feeding or feeding obturator are made from denture acrylic that is specific for the baby mouth. Each baby must have the mouth printed for the feeding obturators to fit perfectly over the baby palate into the gum line. Then end of the palatal obturator has a string running through the gum line to attach to the ridge of the nose. Babies with wide or horseshoe-shaped cleft palate or those with tongues that roll backwards from the Pierre Robin sequence, should wear the obturator within 2-3 days after birth (Image 3.5.24) to help the baby breastfeed more efficiently.

Babies with severe cleft palate and problem with the gum line affecting the shape of the nose, should consider wearing the orthodontic plate that have wiring attached to the gum line above the lip (Image 3.5.25). The palatal obturator should be removed prior to surgery to fix the cleft lip and cleft palate. Babies with cleft palate who can feed from the breast are not required to wear the palatal obturator because the breast and areola should be able to seal off the cleft gap. After wearing the palatal obturator, the baby should practice suckling. It is not necessary to let the baby feed from the bottle while wearing the prosthetic feeding or orthodontic plate. If the baby is unable to suckle, temporarily let him feed from the cup (Image 3.5.26) and slowly try to get him to suckle from the mother's breast. This is done by placing and gently pressing the mother's nipples onto the middle of the baby tongue while slowly squeezing breast milk onto the tongue. Wait for the baby to swallow before letting the nipple touch the palatal obturator. This will help to reduce the pain for the baby and allow him to accept breastfeeding better, and eventually he is able to suckle on the mother's breasts (Image 3.5.27) completely. Wearing a palatal obturator or orthodontic plate increases suction and reduces backflow of the milk through the palate and up the nose.

Effective storing of expressed breast milk

Expressing breast milk is a method for the mother to ensure the production of her milk. When the baby cannot suckle from the breast, or the mother has long term plans to store breast milk, start expressing milk within the first 4-6 weeks after delivery manually with the hand. The mother should place the index finger and thumb at the outer areas of areola, and press them down towards the mother's breast. Squeeze and relax the index finger and thumb in a slow manner, creating a rhythm until the milk is expressed. Continue to express milk until it flows as drops, then move the index finger and thumb to press throughout different areas around the areola (Image 3.5.28). Express milk from one breast first until the lactation subsides before moving to the next breast, and alternate between each side. Such expression helps to increase lactation. The breasts will become soft and the nipples not easily cracked when the baby suckles, and the mother will be able to help the baby to suckle better. The intervals between each expression should not be longer than three hours. A clean and disinfected 30-milliliter cup or medicine cup, should be used to contain the expressed breast milk. The mother should be allowed to practice expressing milk efficiently, and as often like normal baby breastfeeding sessions, starting from two hours after delivery so as to ensure that the mother has sufficient breast milk as soon as possible. This should reduce the worry of the mother and the family, and the expressed breast milk can be supplemented in normal breastfeeding sessions with the use of other breastfeeding equipment.





Image 3.5.29 Feeding from cup to stimulate the baby to open mouth wide



Image 3.5.30 Feeding through tube from syringe attached to areola (lactation aid)



Image 3.5.31 Baby suckling from breast and feeding tube attached to areola



Feeding from the cup

Use the cup to feed breast milk allows the baby to practice suckling from the cup according to his own needs. Babies with cleft lip and cleft palate who do not have enough suction strength or has difficulty suckling while wearing the palatal obturator or orthodontic plate, should use the cup for feeding breast milk instead of the rubber nipple. This is because suckling from the cup requires the use of the lips and tongue, which is similar to suckling from the breast. The breast milk provided should be freshly expressed for the baby to receive the needed antibodies against infections. The cup should not be more than 30 milliliters in volume, or should be the same size as the medicine cup. Feeding from the cup should begin with small amounts, or about a third of the cup, and the baby should be held to sit on the lap or seated during feeding. He should slightly slant backwards with the cup lifted at about 30-45 degree. Let the breast milk flow to the rim of the cup and touch the baby lower lip until he opens the mouth wide. Wait for him to use the lips to suckle milk, and the tongue to lap the milk into the mouth (Image 3.5.29). Synchronize the slanting the cup for the milk to fall to the rim with the baby suckling. Do not pour the milk into the mouth as he will not be able to practice suckling on his own, and milk may flow back up the nose, or he may simply choke.

Supplementary equipment

Prior to feeding the baby with cleft lip and cleft palate baby, with equipment such as the cup or different types of bottles, one should consider using the supplementary equipment to aid suckling from the breasts (supplemental nursing systems or lactation aid nursing), that are used for babies with severe cleft lip and cleft palate, babies who suckle for more than 30-45 minutes in each breastfeeding period, or babies that gain less than usual weight. Supplementary equipment is often used in babies with a developed palate that can help put pressure on the tube end that is attached to the nipple.

The set of supplementary equipment consists of a feeding tube for newborn babies, and a 5-10 milliliter syringe or a milk bottle that is hung long term during breastfeeding. Breastfeeding with expressed breast milk should begin with the attachment of one end of the small feeding tube (size 5) to the mother's nipple, and the other end with attachment to the equipment containing the milk, such as a syringe in the case where breast milk has been expressed occasionally (Image 3.5.30). Lifting the syringe will help to increase the flow of the expressed breast milk. This way, the baby will be receiving milk from both the breast and syringe. During nursing, the mother should hold the baby with the head above the body. This helps the baby to fully receive breast milk, and ensures steady baby position throughout the entire nursing session (Image 3.5.31). In the case where the mother is separated from the baby, the feeding tube may be attached to the index finger of the person feeding him, and letting him suckle from the tip of the finger. Release breast milk slowly from the syringe to prevent choking. This supplementary method can help to reduce feeding time, make the baby content during breastfeeding, stimulate the mother to produce more milk, and ultimately ensure the baby receives breast milk as needed. The syringe may be placed, without pushing the milk when the baby has enough suction strength to suck milk from the syringe.



Image 3.5.32 Container holding expressed breast milk with feeding tube attached to nipple on one end



Image 3.5.33 Holding baby to breastfeed from breasts and container



Image 3.5.34 Feeding baby with Haberman-Feeder



Image 3.5.35 Use of dripping bottle, instead of Haberman-Feeder



Image 3.5.36 Feeding bottle with squeezable X-shaped rubber teats



In the case where there is a lot of breast milk and it is needed for the baby over a long period of time, it should be stored in the sterilized plastic bag or special bottle that can safely and efficiently store milk (Image 3.5.32). Holding the baby in an embrace similar to the football hold (Image 3.5.33) is should supervised by an expert, and be used for a short time before the baby can start feeding from the breast only.

Haberman-Feeder

The Haberman feeder is a hard, plastic bottle with the wide teat like the long bulb, made of soft silicon, for squeezing pressure at the nipple instead of letting the baby suckle by himself. This is appropriate for the baby with cleft lip and cleft palate, and little suction strength, or where suckling is not desired, such as after surgery to fix the cleft lip and feeding on liquid food after surgery to fix the cleft palate. The bottle can hold 90-150 milliliters of milk or liquid foods while the silicon teat can hold 30 millimeters. The milk or liquid food flows in one direction from the bottle to the silicon teat that is attached to each other by a special equipment. The use of the Haberman feeder gives control over the milk flow to be similar to breastfeeding by adjusting the depth of the teat according to the three lines on it. During feeding, the baby should close the mouth around the teat so that the bottom line aligns with the nose to let the silicon teat to touch the palate area that is not cleft. Let the milk flow into the mouth slowly (Image 3.5.34). Slowly twist the silicon teat deeper until the top line aligns with the nose to increase the milk flow. If the milk flow is too fast, twist the teat back until the bottom line aligns with the nose again. The Haberman feeder allows control of the time required for breastfeeding and the amount of milk. However, the equipment used with the Haberman feeder is expensive and difficult to clean. Therefore, it should only be used when absolutely required. The mother or person using the Haberman feeder should practice cleaning, assembling and learn the feeding techniques before actually using it on the baby.

The distilled water container that is squeezable (from the laboratory), clear plastic container similar to the short syringe but with its end attached to the rubber teat or plastic straw that is dimensioned close to the regular drinking straw and is long enough to reach the palate, can be substituted when the Haberman feeder is unavailable (Image 3.5.35). The feeding technique is the same, but the control of milk flow can be done by squeezing the bottle or plastic container. This is often used when feeding with a spoon is very difficult, or there are still stitches from the surgery. Where the mother has little milk or post-surgery, the baby may be allowed to suckle the mother's milk dropped from the dropper, syringe or spoon to supplement breastfeeding.

Feeding from the bottle and rubber teat

For the baby with cleft lip and cleft palate that is unable to suckle on the mother's breast after wearing the palatal obturator, or the mother is required to give expressed breast or formula milk, the special squeezable plastic feeding bottle (Image 3.5.36) is used to support suckling so that the baby is not so tired. The teat must be bulb-shaped and made from silicon to help the baby suckle more easily and stimulate both the oral and facial muscles. The teat must have an X-shaped gap for the milk to flow in droplets only when the baby is suckling or squeezing. There should be a valve between the bottle and the teat to control the amount of

milk flow so that the baby is not feeding too much or too fast, and to prevent choking or backflow of the milk to the nose. While the baby is feeding, he should be in the lie-on-back position with the head lifted up in a semi-sitting position. This helps milk to flow to the stomach according to the weight of the milk, and reduce the milk flow to the palate, the backflow of milk up the nose and the risk of choking and regurgitating milk. The teat should be inserted into the mouth at the lip indentation area so as to let it touch the part of the palate that is still intact. This allows the palate and gum to suck a stream of milk and increase the suction amount. Slow squeezes of the bottle prevents choking, reduces feeding time, and helps the baby to be less tired during suckling. Too hard squeezes of the bottle will make the milk squirt into the back of the throat, causing backflow of the milk. The baby should be burped often by holding him in a sitting position, then bend the head forward and slowly pat or stroke the back to burp out the air from the stomach that is swallowed during feeding.

Feeding formula milk to the baby bottle will increase the risk of middle ear effusion or middle ear infections, which can cause deafness or hearing loss. Therefore, regular ear check-ups are recommended.





3.6 Down syndrome



Images 3.6.1 - 3.6.2 Characteristics of Down Syndrome



Images 3.6.3 - 3.6.5 Face and tongue massage to strengthen muscles



Images 3.6.6 - 3.6.8 Dancer hand position



3.6 Down Syndrome

Down syndrome is a congenital disorder resulting from a chromosome defect that occurs in 1 out of every 1,000 live births. One of the most common causes is a full or partial extra copy of chromosome 21. Characteristics of the Down Syndrome babies (Images 3.6.1 - 3.6.2) are: small head, flat face, flat nasal bridge, ears at a lower level, upper rims of ear lobes lower than eye level, slanted eyes, small mouth, large tongue that often protrudes, slightly short body (height), short hands, and other abnormalities such as congenital heart defects, congenital intestinal obstruction, congenital hypothyroidism, slow development, and high risk in infection, especially in the middle ears and respiratory system.

Breastfeeding reduces the risk of infection for babies with Down syndrome. It also improve the co-ordination of the facial, oral cavity and tongue muscles. (decrease the tongue protrusion and speech problems) (Images 3.6.1-3.6.2). Breastfeeding stimulates brain development, and strengthens the mother-baby relationship. Breast milk is easier to digest and less water is needed. Down Syndrome babies with congenital heart disease uses less energy with breastfeeding, thus less tired and less flatulence.

The most common problem during suckling is weak muscles, especially in the face, mouth, tongue and neck. Due to this fact, the baby cannot suckle or swallow fully, or close the mouth around nipple long enough; but has a flat and weak tongue that is not strong enough to create suction, and suckling and swallowing are not coordinated, and thus the baby can only take in a small amount of milk over a short period of time, often pauses and fall asleep. The mother with the Down Syndrome baby must be patient, and seek help and guidance for breastfeeding from the first day of birth. Breastfeeding Down Syndrome should be started at birth similar to any other newborn. The baby muscles that are involved in suckling and swallowing are assessed and stimulated by massaging the baby face, mouth and tongue during breastfeeding so as to strengthen the muscles (Images 3.6.3 - 3.6.5). The pillow can be used to assist the baby to position at the same level as the nipple, so that he does not have to lift up the face to suckle. In the beginning, when the mother is still producing small amounts of breast milk, she may also manually express breast milk during the day. If the baby sleeps longer than 2-3 hours, the mother should wake him up for breastfeeding 8-12 times per day, and stimulate him to be awake throughout every feeding session.

The dancer hand position helps the baby with weak muscles and mouth that does not close around the nipples completely (Images 3.6.6 - 3.6.8). In this position, the mother should clasp the hands around the breast and hold the baby jaw and chin to ensure the nipple remains in the baby mouth when he stops suckling. Softly press the baby cheek to reduce the empty space inside the mouth so that the baby requires less energy during suckling. Use the other hand to support the baby head and neck. This particular group of babies may not be good at suckling and thus ends up weak and easily tired. If the baby weight increases too slowly, the mother should store her breast milk for feeding with the cup or spoon, after the suckling session. This will increase milk production from the mother. (Details of expressing and storing milk to feed babies with the cup, can be found in Section 3.5: Cleft lip and cleft palate).



3.7 Storing breast milk for the case of mother-baby separation



Image 3.7.1 Wash hands with soap and water before breast milk expression



Image 3.7.2 Warm compression of breasts with warm towel



Image 3.7.3 Massage breast in circular motion from outer area to around nipple for 3-5 minutes



Image 3.7.4 Express breast milk with thumb on areola and other fingers on opposite side, and press towards body



3.7 Storing breast milk for the case of mother-baby separation

It is widely accepted that ill, premature babies or those with anomalies should especially receive breastfeeding and that the mothers should stay with them all the time. However, there are certain cases where the baby cannot be with the mother all the time, such as, premature birth with extreme low weight and the need to stay inside a ventilator, severe infection, breastfeed inability, and congenital anomalies such as cleft lip and cleft palate, or Down Syndrome.

Methods for storing sufficient breast milk for the case of mother-baby separation

1. Let the mother learn the breastfeeding process, and how breast milk is produced and expressed.
2. And the methods of sustaining sufficient breast milk with the principle of expressing early, frequently, correctly and emptying the breasts.
3. Let healthcare professionals provide her with help and guidance until she can independently do it herself. She may be worried about the baby's condition. Explain to her, and emphasize that breastfeeding is like medicine that can heal the baby. This is factual and can serve as an encouragement as well as make her proud that she is part of saving the baby life.
4. The hospital should arrange an area for the mother to be close by and see the baby even though they are separated. Having a group of mothers with babies of similar conditions to stay and discuss with each other would facilitate a good exchange of knowledge.
5. Assist the mother to express breast milk as soon as possible after delivery in a quiet and relaxing area, which will help with hormone secretion and lactation increase.
6. During the first two days, let her express breast milk to stimulate milk production by pumping for 30 minutes every 2-3 hours:
 - 6.1. Wash the hands with soap and water before milk expression (Image 3.7.1)
 - 6.2. Apply warm compression on the breast with the towel for about 3-5 minutes on each side (Image 3.7.2).
 - 6.3. Massage the breast in a circular motion from the outer area into around the nipple for 3-5 minutes (Image 3.7.3).
 - 6.4. Pump each breast alternately, 15 minutes for each side (Image 3.7.4).
 - 6.5. Apply warm compression again 3-5 minutes for each side.
 - 6.6. Pump both breasts again.
 - 6.7. Repeat doing these 3-4 rounds, which should take about 30 minutes altogether.



Image 3.7.5 Sterilized syringe for breast milk storage



Image 3.7.6 Storing expressed breast milk in syringe



Image 3.7.7 Storing milk in larger syringe



Image 3.7.8 Storing larger volume of milk in container



Image 3.7.9 Organizing expressed breast milk according to date (for first-in, first-out dispensing system)



The reason for warming compression and pumping in circles is to stimulate milk production, as normally the baby is the best stimulator. But if the baby cannot suckle, both mother and attendants must be patient. Milk will be expressed from the breast one drop at a time. Use a sterilized 1-ml Insulin syringe to store the milk (Image 3.7.5). During the 30 minutes of the first expression, a very little amount of maybe 0.5-1 milliliters can be collected and stored in the syringe (Image 3.7.6). Do not transfer the milk to a different container as it is in a very small amount, which can dry out and stick to the container or spill.

Subsequent milk expression sessions should produce more milk. Once more milk is produced, change to a 3 or 5-milliliter syringe (Image 3.7.7).

When the volume of milk produced continues to increase, use a larger container such as a bottle or a bag to store the milk (Image 3.7.8).

Label the date, time, and volume when storing (Image 3.7.9).

After much practice, the third day of expression should provide a steady production of breast milk. It is recommended to keep storing it and apply warm compressions on the breasts for better milk flow.

Massaging the breast with the hand imitates natural lactation. If milk production is still low, a mechanical pump should be considered.

Case Study:

The baby girl weighing 1,460 grams, is born prematurely at 32 weeks with respiratory distress syndrome (RDS), and separated from the mother into an incubator. The mother expresses milk frequently and stores it as indicated in the table below. Initially, the baby is fed through a tube but after 2 weeks, the baby weight increases to 1,600 grams and she is able to breastfeed. Supplementary milk is also given through the feeding tube, dropper and then the cup eventually, until the baby can breastfeed exclusively on her own at 37 weeks. The baby weight increased to 1,920 grams, and was discharged from hospital.

After the discharge, the baby weight increases to 2,100 grams and is perfectly healthy in the follow-up during the first week.

Example: Milk production tracking during mother-baby separation in the case study of the premature baby with low birth weight in the NICU, Health Promoting Hospital, Health Care Center 10, Chiang Mai.

Mother's name KASORN MANEEKAN Baby's name _____
 Baby's date of birth: 16 / 11 / 2009 (Age: _____ months _____ days) Birth weight: 1,460 grams
 Current weight: _____ grams

Time	16.11.09 Day 1	17.11.09 Day 2	18.11.09 Day 3	19.11.09 Day 4	20.11.09 Day 5	21.11.09 Day 6	22.11.09 Day 7	23.11.09 Day 8	24.11.09 Day 9
1:00 AM	CC	2.5 CC	CC	CC	CC	CC	CC	125 CC	CC
2:00 AM	CC	4.5 CC	CC	CC	CC	CC	CC	CC	CC
3:00 AM	CC	CC	25 CC	80 CC	100 CC	CC	CC	CC	120 CC
4:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
5:00 AM	CC	CC	CC	CC	CC	125 CC	135 CC	125 CC	CC
6:00 AM	CC	5.0 CC	CC	55 CC	CC	CC	CC	CC	105 CC
7:00 AM	CC	CC	50 CC	CC	90 CC	CC	CC	CC	CC
8:00 AM	CC	CC	CC	CC	CC	120 CC	100 CC	90 CC	CC
9:00 AM	CC	5.5 CC	25 CC	80 CC	CC	CC	70 CC	CC	120 CC
10:00 AM	CC	5.0 CC	CC	CC	130 CC	CC	90 CC	90 CC	CC
11:00 AM	0.15 CC	CC	30 CC	CC	CC	90 CC	CC	CC	CC
12:00 PM	CC	CC	CC	95 CC	CC	90 CC	CC	120 CC	120 CC
1:00 PM	CC	5.0 CC	30 CC	CC	CC	CC	CC	CC	CC
2:00 PM	0.1 CC	10 CC	CC	CC	80 CC	CC	120 CC	CC	CC
3:00 PM	CC	CC	30 CC	70 CC	35 CC	15 CC	60 CC	90 CC	155 CC
4:00 PM	CC	10 CC	CC	CC	CC	CC	CC	CC	CC
5:00 PM	0.1 CC	12 CC	CC	CC	CC	65 CC	80 CC	CC	CC
6:00 PM	CC	CC	55 CC	CC	80 CC	CC	CC	135 CC	105 CC
7:00 PM	0.5 CC	23 CC	CC	100 CC	CC	95 CC	90 CC	CC	CC
8:00 PM	1.0 CC	CC	70 CC	CC	CC	CC	CC	CC	CC
9:00 PM	CC	CC	CC	CC	130 CC	90 CC	CC	105 CC	125 CC
10:00 PM	2.5 CC	20 CC	CC	CC	CC	CC	100 CC	CC	CC
11:00 PM	CC	15 CC	CC	90 CC	CC	CC	CC	CC	CC
12:00 AM	CC	10 CC	80 CC	35 CC	90 CC	120 CC	CC	100 CC	125 CC
Total	4.35 CC	127.5 CC	395 CC	605 CC	715 CC	860 CC	785 CC	980 CC	975 CC

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Example: Milk production tracking during mother-baby separation (continued from page 128) indicates that, if the mother begins milk expression early and continuously, 750-1,000 milliliters of breast milk can be sufficiently produced from the second week after delivery.

Mother's name KASORN MANEEKAN Baby's name _____
 Baby's date of birth 16 / 11 / 2009 (Age _____ months _____ days) Birth weight 1,460 grams
 Current weight _____ grams

Time	25/11/09 Day 10	26/11/09 Day 11	27/11/09 Day 12	28/11/09 Day 13	29/11/09 Day 14	30/11/09 Day 15	1/12/09 Day 16	2/12/09 Day 17	3/12/09 Day 18
1:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
2:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
3:00 AM	160 CC	125 CC	125 CC	160 CC	140 CC	150 CC	150 CC	160 CC	160 CC
4:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
5:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
6:00 AM	125 CC	125 CC	125 CC	160 CC	140 CC	160 CC	105 CC	125 CC	105 CC
7:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
8:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
9:00 AM	125 CC	130 CC	150 CC	120 CC	150 CC	120 CC	135 CC	170 CC	50 CC
10:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
11:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
12:00 PM	125 CC	140 CC	155 CC	115 CC	150 CC	160 CC	140 CC	145 CC	210 CC
1:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
2:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
3:00 PM	150 CC	135 CC	150 CC	135 CC	150 CC	170 CC	140 CC	200 CC	250 CC
4:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
5:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
6:00 PM	135 CC	160 CC	140 CC	150 CC	150 CC	155 CC	135 CC	100 CC	210 CC
7:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
8:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
9:00 PM	125 CC	105 CC	150 CC	125 CC	170 CC	70 CC	125 CC	140 CC	180 CC
10:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
11:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
12:00 AM	125 CC	105 CC	160 CC	150 CC	150 CC	170 CC	125 CC	125 CC	90 CC
Total	4,070 CC	3,025 CC	3,185 CC	3,145 CC	3,065 CC	3,155 CC	3,115 CC	3,205 CC	3,255 CC

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Example: Milk production tracking during mother-baby separation (continued from page 129).

Mother's name KASORN MANEEKAN Baby's name _____
 Baby's date of birth 16, 11, 2009 (Age _____ months _____ days) Birth weight 1,460 grams
 Current weight _____ grams

Time	4,12,09 Day 19	5,12,09 Day 20	6,12,09 Day 21	7,12,09 Day 22	8,12,09 Day 23	9,12,09 Day 24	10,12,09 Day 25	11,12,09 Day 26	12,12,09 Day 27
1:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
2:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
3:00 AM	160 CC	180 CC	160 CC	150 CC	160 CC	190 CC	190 CC	90 CC	160 CC
4:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
5:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
6:00 AM	135 CC	160 CC	140 CC	110 CC	105 CC	155 CC	120 CC	190 CC	110 CC
7:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
8:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
9:00 AM	180 CC	180 CC	180 CC	125 CC	205 CC	220 CC	130 CC	150 CC	100 CC
10:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	CC
11:00 AM	CC	CC	CC	CC	CC	CC	CC	CC	80 CC
12:00 PM	180 CC	180 CC	175 CC	115 CC	180 CC	140 CC	245 CC	120 CC	160 CC
1:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
2:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
3:00 PM	170 CC	170 CC	140 CC	170 CC	160 CC	100 CC	140 CC	120 CC	80 CC
4:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
5:00 PM	CC	CC	CC	CC	CC	20 CC	CC	CC	CC
6:00 PM	180 CC	180 CC	170 CC	170 CC	150 CC	130 CC	170 CC	130 CC	160 CC
7:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
8:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
9:00 PM	170 CC	160 CC	175 CC	170 CC	150 CC	110 CC	170 CC	190 CC	140 CC
10:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
11:00 PM	CC	CC	CC	CC	CC	CC	CC	CC	CC
12:00 AM	120 CC	180 CC	140 CC	170 CC	175 CC	150 CC	180 CC	140 CC	190 CC
Total	6295 CC	6390 CC	6280 CC	6230 CC	6285 CC	6215 CC	6345 CC	6130 CC	6130 CC

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Milk production (Lactogenesis) and maintenance of milk production (Galactopoiesis) during mother-child separation

Lactogenesis or milk production occurs after the delivery of placenta. Levels of the estrogen and progesterone hormones that suppress milk production will decrease. When the newborn suckles on the mother's nipple, the nerves in the nipple and areola will be stimulated and send signals to the spinal cord and brain. The hypothalamus is activated, stimulating the anterior lobe of the pituitary gland to secrete prolactin into the bloodstream. Prolactin then flows to the breasts to stimulate the alveolar cells to produce milk. During breastfeeding, the prolactin levels will increase to its highest level 30 minutes after breastfeeding is stopped. Prolactin in the bloodstream will continuously decline back to the base line level in three hours. Its secretion depends on the effectiveness of suckling. The mother should also nurse during the night because more prolactin is produced then. Meanwhile, the posterior lobe of the pituitary gland secretes oxytocin into the bloodstream to stimulate contraction of the myoepithelial cells, pumping milk from all alveoli to flow in the ducts. Oxytocin release is dependent on stimulation and suppression of the five senses. When the mother hears the baby cry or sees him, oxytocin will be secreted. In contrast, if the mother is in pain, stressed and worried, it will suppress the hormone. Prolactin secretion is not dependent on the five senses. The mother should stimulate milk production by letting the baby suckle within 30 minutes to one hour after delivery. Continuous breastfeeding will increase and regulate lactation. A factor affecting milk production directly within the breast is the protein Feedback Inhibitor of Lactation (FIL) which suppresses milk production. If milk is overproduced and is not expressed, FIL in the milk will suppress the alveolar cells from producing milk avoiding the harms to the breast from holding too much milk. Breast milk must be expressed by having the baby suckle or manually pumping it, where FIL will be discharged along as well. The breast will then continue to produce more milk. Therefore, it is crucial for the mother to let the baby breastfeed or manually express the breast milk, if she wishes to maintain continuous production of breast milk.

The process of constant breast milk production relies on the baby breastfeeding. Frequent expression through suckling prevents the buildup of FIL, which will in turn cease the milk ducts from producing milk.

The knowledge of continuous lactation in ample amounts for the baby suggests that the production and lactation of milk; the suction of the baby and FIL suppression through rapid, frequent, correct and thorough suckling, can be applied to the baby who is unable to breastfeed and has to be separated from the mother. The rapid, frequent, correct and thorough suction can be used in breast milk expression for the newborn and the sufficient and constant milk production for the baby, too.

The principle of early, frequent and correct breastfeeding can be adapted to early, fre-

quent and correct breast milk express to increase and maintain adequate breast milk to be ward in cases when mother's and babies are separated and unable to nurse in NICU. The express milk can be given to the baby in different methods from birth.

References

1. Bangsainoi K. Feeding at the breast & breastfeeding assessment. cited in: Bureau of Health Promotion, Department of Health, Ministry of Public Health. Training Manual for Breastfeeding Experts. 1st edition. Bangkok: The Agricultural Cooperation of Thailand Limited Press; 2007, pp. 92-115.
2. Jirapaet K, Jirapaet V. Health assessment of the newborns. 2nd edition, Bangkok: Dansutha Printing Co., Ltd.; 2551.
3. Jitinan S, Chatranon W, Savasdivorn S, Editors. Breastfeeding: From knowledge to practice. 2nd edition. Bangkok Medical Publisher Ltd, Part.; 2003.
4. Amstalden-Mendes LG. Neonatal care of infants with cleft lip and/or palate; feeding orientation and evolution of weight gain in a non-specialized brazilian hospital. *Cleft Palate Craniofac J* 2007; 44(3):329-34.
5. Ancieta LM, Xarier CC, Colosimo EA. Growth of preterm newborns during the first 12 weeks of life. *J Pediatr (Rio J)*. 2004; 80(4):67-76.
6. Ballard JL, Auer CE, Khoury JC, Ankyloglossia: assessment, incidence, and effect of frenuloplasty on the breastfeeding dyad. *Pediatrics* 2002;110:e63.
7. Black RF, Jarman L, Simpson JB. The management of breastfeeding (Lactation specialist self-study series, module 4). 1st ed. Sudbury, MA: Jones and Bartlett Learning; 1998.
8. Bergman NJ, Linley LL, Fawcus SR. Randomized controlled trial of skin-to-skin contact from birth versus conventional incubator for physiological stabilization in 1200- to 2199-gram newborns. *Acta Paediatr* 2004; 93(6):779-785.
9. Bessell A, Hooper L, Shaw WC, Reilly S, Reid J, Glenny AM. Feeding interventions for growth and development in infants with cleft lip, cleft palate or cleft lip and palate. *Cochrane Database Syst Rev*. 2011 Feb 16:2-CD003315.
10. Cattaneo A, Davanzp R, Worku B, et al. Kangaroo mother care for low birthweight infants: a randomized controlled trial in different settings. *Acta Paediatr* 1998; 87:976-985.
11. Cole A, Tomlinson J, Slator R, Reading J. Understanding cleft lip and palate. 3: feeding the body. *J Farm Health Care*. 2009; 19(5):157-8.
12. Costello BJ. Prenatal diagnosis and treatment of craniomaxillofacial anomalies. *Oral Maxillofac Surg Clin North Am* 2010; 22(1):5-15.
13. de Leeuw R, Colin EM, Donnebier EA, Mirmiran M. Physiological effects of kangaroo care in very small preterm infants. *Biol Neonate* (1991; 59(3):149-155.
14. Evidence for the use of human milk in preterm infants. In: Weight NE, Morton JA, Kim JH. Best medicine: human milk in the NICU. Amarillo. TX: Hale Publishing, L.P. 2008; p. 43-60.
15. Fenton TR. A new growth chart for preterm babies: babson and Benda's chart updated with recent data and a new format. *BMC Pediatr*; 2003; 3:13.
16. Geddes DT, Langton DB, Gollow I, Jacobs LA, Hartmann PE, Simmer K. Frenulotomy for breastfeeding infants with ankyloglossia; effect on milk removal and sucking mechanism as imaged by ultrasound. *Pediatrics* 2008; 122:e-188-94.
17. Glenny Am, Hooper L, Shaw BC, Reilly S, Kasem S, Reid J. Feeding interventions for growth and development in infants with cleft lip, cleft palate or cleft lip and palate. *Conchrane Database Syst Rew* 2004(3):CD003315.



18. Hogan M, Westcott C, Graiffiths M. Randomized, controlled trial of division of tongue-tie in infants with feeding problems. *J Paediatr Child Health* 2005; 41:246-50,
19. Jorgenson RJ, Shapiro SD, Sailnas CF, Levin LS. Intraoral findings and anomalies in neonates. *Pediatrics* 1982; 69:577-82.
20. Karisoon H. Skin-to-skin care: heat balance. *Arch Dis Child* 1996; 75:F130-F132.
21. Lalakea ML, Messner AH. Ankyloglossia: does it matter? *Pediatr Clin North Am* 2003; 50:381-97.
22. Lamb ME. Early mother-neonate contact and the mother-child relationship. *J Child Psychol Psychiatry* 1983; 24(3):487-494.
23. Lang S. Breastfeeding special care babies. 2nd ed. London: Bailliere Tindall; 2002.
24. Lawrence RA, Lawrence RM. Breastfeeding: a guide for the medical profession. 7th ed. Philadelphia, PA: Elsevier Mosby; 2011.
25. Lawrence RA. Breastfeeding in the premature infant. *J Arab Neonatal Forum* 2005; 2:43-49.
26. Lucas A, Morley R, Cole TJ, Lister G, Leeson-Payne C. Breast milk and subsequent intelligence quotient in children born preterm *Lancet* 1992; 339(8788):261-4.
27. Ludington-Hoe SM, Thomson C, Swith J, Hadeed AJ Anderson GC. Kangaroo care: research results, and practice implications and guidelines. *Neonatal Netw* 1994; 13(1):19-27
28. Messner AH, Lalakea ML. Ankyloglossia: controversies in management. *Int J Pediatr Otorhinolaryngol* 2000; 54:123-31.
29. Messner AH, Lalakea ML, Aby J, Macmahon J, Bair E. Ankyloglossia; incidence and associated feeding difficulties. *Arch Otolaryngol Head Neck Surg* 2000; 126:36-9.
30. Ngercham S, Laohapensong M, Wongvisutdhi T, et al. Lingual frenulum and effect on breastfeeding in Thai newborn infants. Unpublished data.
31. Nyqvist KH, Sjoden PO, Ewald U. The development of preterm infants' breastfeeding behaviour. *Early Hum Dev* 1999; 55:247-64.
32. Paradise JL, Elster BA, Ton LK. Evidence in infants with cleft palate that breast milk protects against otitis media. *Pediatrics* 1994; 95(6 Pt 1): 853-60.
33. Pathumwiwatana P, Tongasukho S, Naratippakorn T, Pradubwong S, Chuslip K. The promotion of exclusive breastfeeding in infants with complete cleft lip and palate during the first 6 months after childbirth at Srinagarind Hospital, Khon Kaen Province, Thailand. *J Med Assoc Thai* 2010; 93(Suppl 4):S71-7.
34. Ricke LA, Baker NJ, Madion-Kay DJ, DeFor TA. Newborn tongue-tie: prevalence and effect on breastfeeding. *J Am Board Fam pract* 2005; 18:1-7.
35. Schanier RJ. Suitability of human milk for the low birthweight infant. *Clin Perinatol.* 1995; 22(1):207-22.
36. Schanier RJ, Oh W. Composition of breast milk obtained from mothers of premature infants as compared to breast milk obtained from donors. *J Pediatr.* 1980; 96(4):679-81.
37. Segal LM, Stephenson R, Dowes M, Feldman P. Prevalence, diagnosis, and treatment of ankyloglossia: methodologic review. *Can Fam Physician* 2007; 53:1-27-33.
38. Singh D, Devi N, Raman R. Exclusive Breast Feeding in Low Birth Weight Babies. *MJAFI* 2009; 65:208-212.
39. Wight NE, Morton JA, Kim JH. Breast medicine; human milk in the NICU. 1st ed. Amarillo, TX Hole Publishing. LP. 2008.
40. Wilson-Clay B, Hoover K. The breastfeeding atlas. 4th ed. New York: Lactnews Press: 2008.





Unit 4:

Case Study

- 4.1 Newborn with jaundice
- 4.2 Slow weight gain
- 4.3 Nipple confusion
- 4.4 Difficulty in breastfeeding with high palate
- 4.5 Milk protein allergy
- 4.6 Mother with chicken pox or shingles
- 4.7 Mother with excessive breast milk
- 4.8 Plugged duct
- 4.9 Relactation

4.1 Newborn with Jaundice

Case Study 1: ABO incompatibility



Image 4.1.1-4.1.2 Dermal test to measure degree of yet visible jaundice on skin



Image 4.1.3 One-day old infant with jaundice



Image 4.1.4 Bilirubin level of 9.1 mg/dl



4.1 Newborn with Jaundice

The data from The Academy of Breastfeeding Medicine (ABM) in 2010 showed that all newborns had unconjugated bilirubin higher than the normal level in normal adults (1.5 mg/dl). This is because bilirubin is produced at a faster rate than is metabolized and excreted. Excess bilirubin deposits in the skin and epithelium in the eye, resulting in yellow coloration of the skin and sclera. Normal neonatal jaundice, or physiologic hyper-bilirubinemia, can be found in 40-60% of newborns, depending on the race. Jaundice becomes visible when the bilirubin level is higher than 5 mg/dl in one-day-old newborns and 7 mg/dl 24-36 hours after birth. Dermal tests are used to measure the degree of jaundice in the case where yellowing of the skin is not clearly visible (Image 4.1.1-4.1.2).

Jaundice in newborns can also be the result of other pathologies. Pathological jaundice can be the result of blood group incompatibility or hormonal dysfunction.

ABM stated that, 2-3 days after birth, 10-18% of exclusively breastfeeding newborns receive insufficient breast milk, resulting in a 10% reduction in weight at birth. Insufficient nutrients results in increased absorption of bilirubin through enterohepatic circulation. This problem occurs more with breastfeeding newborns than those feeding on formula milk. This was originally known as breastfeeding jaundice. The true meaning of this is breast non-feeding jaundice or starvation jaundice. In order to prevent this condition, increase the intake rate of breast milk and ensure that it is sufficient.

Breast milk jaundice occurs in newborns who develop jaundice 1-2 weeks after birth. It is commonly found in newborns with sufficient breast milk, good weight increase, and good health. Differential diagnosis must be made when this phenomenon occurs.

To date, studies have shown that 60% of breastfeeding newborns have continuously high levels of bilirubin until 2-3 weeks old or up to 8-12 weeks. In 50% of these newborns, jaundice is visible at two weeks but not in the first week. Breastfeeding jaundice is also found in breastfed newborns with the persistence of physical jaundice. The mechanism is unknown, with the hypothesis that breast milk increases the absorption of bilirubin in the intestines. It will subside eventually with continued breastfeeding, but it is important to ensure that it does not increase. Normal bilirubin level is 12 mg/dl and medical advice must be sought if it becomes higher than 20 mg/dl.

Case studies

Case Study 1: ABO incompatibility

The full-term newborn, weighing at 2,880 grams, is found with jaundice at six hours after birth (Image 4.1.3-4.1.4). Lab analysis shows the mother's O blood group and the newborn, A with positive indirect Coombs' test and diagnosis of ABO incompatibility.

Supposition

If jaundice is found on the very first day, there must be a neonatal cause for that; therefore, the starvation jaundice would be unlikely

Intervention guidelines

Find the cause and treat as soon as possible.



Case Study 2: Starvation Jaundice



Image 4.1.5 3-day-old newborn with visible facial jaundice



Image 4.1.6 Same newborn with jaundice on body

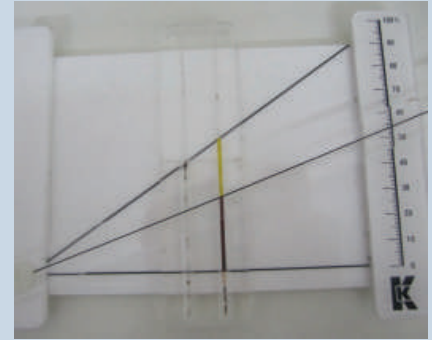


Image 4.1.7 Microbilirubin level of 18 mg/dl

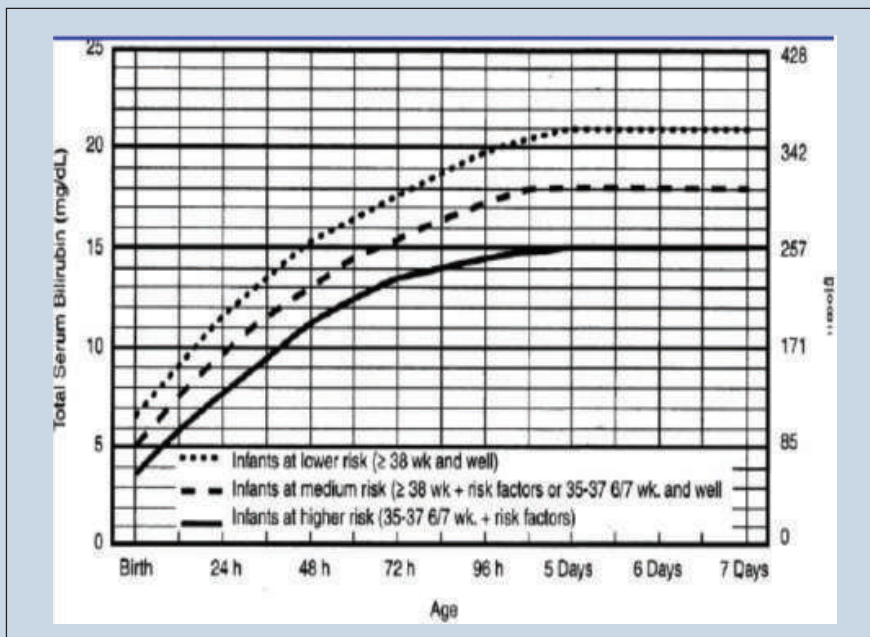


Image 4.1.8 Phototherapy given according to bilirubin levels and age (AAP 2009)



Image 4.1.9 Phototherapy



Image 4.1.10 Jaundice subsided after phototherapy for 3 days, along with exclusive breastfeeding



Image 4.1.11 Bilirubin level of 8.2 mg/dl at 6 days of age



Case Study 2: Starvation jaundice

History and Symptom

The 3-day-old full-term infant, weighing 3,200 grams at birth but reduced to 3,000 grams, with exclusive breastfeeding. Jaundice, as observed on the face and body (Image 4.1.5-4.1.6), shows the Bilirubin level of 18 mg/dl at the microbilirubin meter (Image 4.1.7) but with no abnormalities from the additional blood test.

Theory

Starvation jaundice occurs 2-5 days after birth with no other abnormalities and is mostly developed due to insufficient breastfeeding. In most cases, the level of bilirubin is 12-15 mg/dl. If not treated properly, the bilirubin level may increase to 25 mg/dl. The correct feeding procedure during hospitalization (i.e. breastfeeding within one hour after birth on the delivery bed and giving breastfeeding 10-12 times per day during the first three days of life) can prevent starvation jaundice.

Intervention guidelines

The 3-day-old healthy newborn is found with the bilirubin level of 18 mg/dl, which is considered as low risk. According to the American Academy of Pediatrics (AAP) guidelines in 2009, phototherapy is recommended. When the mother stays with the newborn and nurses continuously, jaundice will subside after three days of phototherapy (Image 4.1.9-4.1.10), and bilirubin level down to 8.2 mg/dl (Image 4.1.11).

Newborns usually leave hospital early. Advice for mothers should emphasize the importance of sufficient breastfeeding to prevent this condition from occurring in the future. Other prevention methods include follow-up at home after birth, telephone calls, and health check-up 2-3 days after hospital discharge, for jaundice observation.

(Phototherapy should be given according to the 2009 AAP standards as in Image 4.1.8)



Case Study 3: Breast milk jaundice



Image 4.1.12 Infant with jaundice from head to groin and 20.5 mg/dl bilirubin level



Image 4.1.13 Four hours after phototherapy with 15 mg/dl bilirubin level



Image 4.1.14 Eight hours after phototherapy with 12 mg/dl bilirubin level



Case Study 3: Breast milk jaundice

History and Symptom

The 17-day-old breastfeeding newborn, weighing 2,700 grams at birth, is found with jaundice and current weight of 3,300 grams, bilirubin level of 20.5 mg/dl (Image 4.1.12) (direct bilirubin is 0.5 mg%), 48% Hct, normal G6PD activity, and negative direct Coomb's test. Medical treatment includes phototherapy and formula milk feeding for the time being. The bilirubin level reads at 15 mg/dl after four hours of phototherapy (Image 4.1.13) and down to 12 mg/dl after eight hours of phototherapy (Image 4.1.14). The newborn is able to go home after three days and continues breastfeeding.

Theory

Diagnosis of breast milk jaundice is usually made when the newborn is two weeks old or more. The mechanism of breast milk jaundice can be the continuation from physiologic jaundice that occurred 2-3 days after birth, or can be developed from an unknown cause. Bilirubin levels of 20-25mg/dl can be found in less than 1%. It is important to note that diagnosis of breast milk jaundice must be made in healthy newborns with normal weight gain. Differential diagnosis is to be made through other clinical symptoms and laboratory analysis.

Intervention guidelines

For this healthy newborn with normal weight gain (approximately 20-30 grams per day), the examination could not reveal the causes of jaundice. Medical treatment includes phototherapy and temporary formula milk diet, and resumed breastfeeding at home.

Treatment guidelines for breast milk jaundice:

- No treatment is required if the newborn is full-term, healthy, and with the bilirubin level below 20mg/dl, and breastfeeding can be continue. If the bilirubin level reads at 20-25 mg/dl, it is an indication for phototherapy, breastfeeding can still continue or stop for no longer than 24 hours, and be switched to formula milk feeding during the interim (in the case of an absent mother).
- The bilirubin level should not increase exponentially.
- Jaundice from other causes must be ruled out.



4.2 Slow weight gain

Case Study 1: Breastfeeding 3-week-old newborn with slow weight gain



Image 4.2.1 3-week-old newborn



Image 4.2.2 Incorrect suckling



Image 4.2.3 Incorrect cradling of baby for breastfeeding



4.2 Slow weight gain

Full-term newborns usually weigh 2,500-3,500 grams. With proper breastfeeding, they should gain 400-600 grams within the first month, and the weight for 1-year-old should be three times the birth weight, which is approximately 9-10 kg.

Case Study 1: Breastfeeding 3-week-old newborn with slow weight gain

History and Symptom

The first case is a 3-week-old newborn, weighing 2,900 grams (Image 4.2.1), has a small body size as observed by the mother's peer. Weighing 2,800 grams at birth, the baby was exclusively breast fed and demand feeding, but cries during breastfeeding.

Theory

Normal newborns should have a 20-30 grams increase in weight during the first month. The weight at the end of the week is usually the same as that at birth. The reasons for no weight gain are incorrect cradling and nursing of the newborn (Image 4.2.2-4.2.3).

Intervention guidelines

Baby cradling and breastfeeding positions should be evaluated and corrected if there is slow weight gain during the first months (refer to Section 1.4 Correct breastfeeding and holding positions). It is important to allow the baby to breastfeed until the breasts are empty, in order to get to the hind-milk, which has a high fat content. The mother should take in enough water and food (with an increase of 500 kilocalories and 12-15 grams of proteins per day) in order to receive sufficient nutrients for breast milk production.



Case Study 2: 5-month-old baby with fast weight gain



Image 4.2.4 Five months old baby with fast weight gain

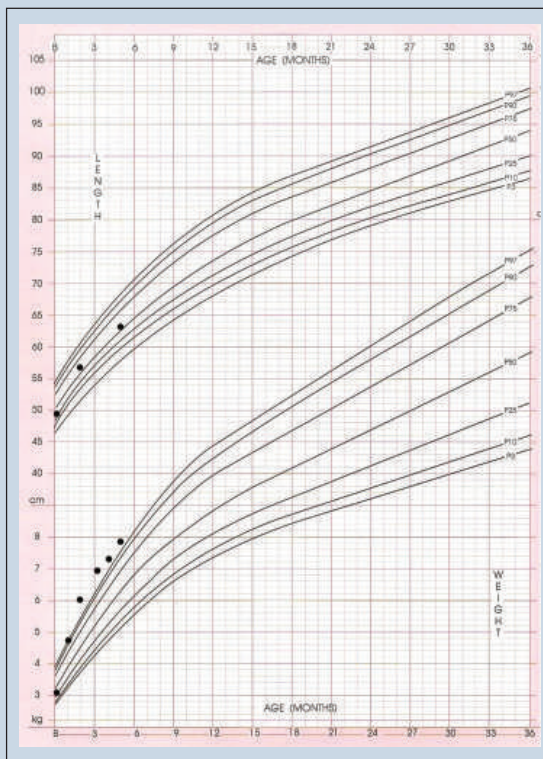


Image 4.2.5 Original growth chart of 5 months old baby

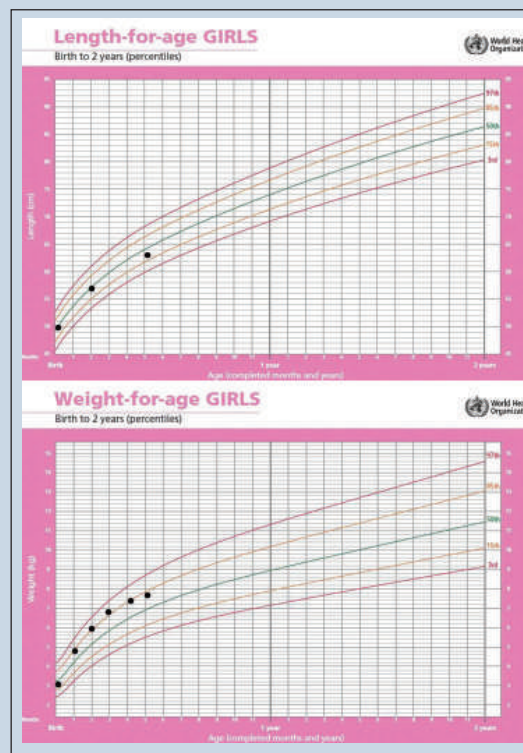


Image 4.2.6 New growth chart of 5 months old baby



Case Study 2: 5-month-old baby with fast weight gain

History and Symptom

The 5-month-old healthy baby girl (Image 4.2.4), weighing 3,090 grams at birth and breastfeeding exclusively since birth, is found with weight above average from the growth chart in the vaccination record book (Image 4.2.5-4.2.6).

Theory

There is a difference in weight gain between babies who breastfeed and those who feed on formula milk. Breastfeeding babies have similar or slightly more weight during the first 2-3 months, according to the standard growth chart which is based on formula-fed babies. After that, breastfeeding babies weigh less than average. Studies show that the growth chart of breastfeeding babies can be used as the standard without any disadvantages, while fast weight gain in formula-fed babies (as shown in their growth chart) may be too high. The exclusively breast-fed babies have lower body energy requirement and lower metabolism rate than the formula-fed babies. In 2006, World Health Organization (WHO) released a growth chart based on breastfeeding babies (<http://www.who.int/childgrowth>). More information can be found in Section 6.3 as well.

Intervention guidelines

Exclusive breastfeeding babies have faster weight gain during the first six months. There is no need to lower the amount of breast milk. However, if the baby feeds on formula milk and supplementary food as well, the intake of supplementary food other than breast milk should be lowered as the amount taken may not be as well controlled as breastfeeding.



Case Study 3: 11-month-old baby with slow weight gain



Image 4.2.7 11-month-old baby with slow weight gain

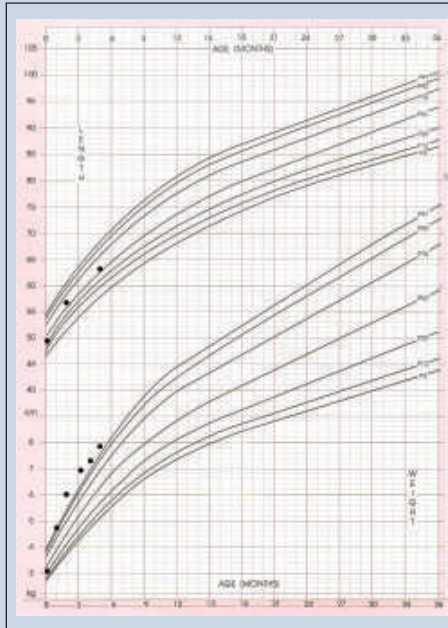


Image 4.2.8 Original growth chart of the same baby

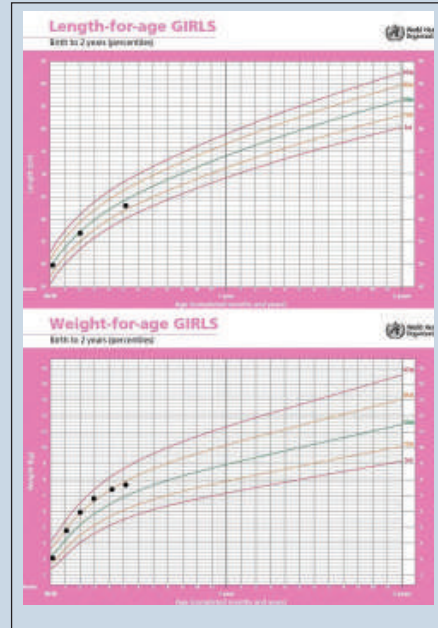


Image 4.2.9 New growth chart of the same baby

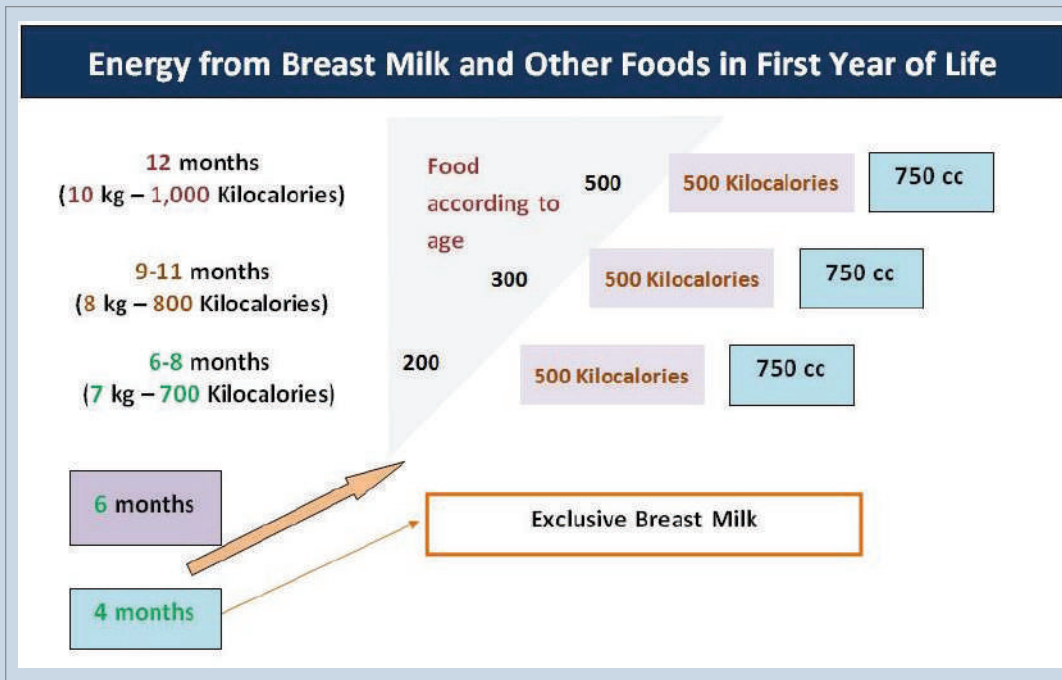


Image 4.2.10 Energy from breast milk and other foods in first year



Case Study 3: 11-month-old baby with slow weight gain

History and Symptom

The 11-month-old baby girl with slow weight gain (Image 4.2.7) is a healthy first-born weighing 3,280 grams at birth. Breastfeeding up to five and a half months and feeding on solid food, such as mashed rice with chicken, or fish with vegetables twice a day, fruits once a day, and an egg yolk daily, the baby now weighs 7.5 Kilograms (Image 4.2.8-4.2.9).

Theory

Babies with slow weight gain should be differentially diagnosed from those with failure to thrive, as shown in the index (adapted from Lawrence 2005). The cause of failure to thrive should be identified and correctly solved.

Baby with slow weight gain

- Healthy and alert
- Good muscle tone
- Good skin turgor
- At least, six times of pale urine per day
- Frequent bowel movement, or infrequent but with large amount of soft stool.
- Breastfeeding eight times or more in each day and each session lasts 15-20 minutes.
- Mother has good let-down reflex
- Slow but steady weight gain

Baby with failure to thrive

- Apathetic or crying a lot
- Slack muscle tone
- Poor skin turgor
- Infrequent dark colored urine with smell
- Infrequent bowel movement
- Breastfeeding less than eight times a day, and short session each time
- Mother has no good let-down reflex
- Variable weight gain or weight reduction

Intervention guidelines

For infants with slow weight gain after six months, food should be adapted to supplement energy and nutrition. A one-year-old baby should receive an average of 500 kilocalories, in addition to milk (Image 4.2.10). Babies are recommended to have three meals per day. Each meal should consist of 5-6 spoons of rice, 2-3 spoons of meat, 3-4 spoons of vegetables (more details in Section 6.4 Food for babies).

Mother should be assured that slow weight gain is normal for a breastfed infant. However, weight and height should not be less than the third percentile. If the baby weight is below standard, assess him for any possibility of failure to thrive, similarly to those who do not feed on breast milk.



4.3 Nipple confusion

Case Study 1



Image 4.3.1 Bottle-feeding baby with tongue curled up



Image 4.3.2 Baby crying when mother holding him towards her breast to latch on



4.3 Nipple confusion

Case Study 1

History and Symptom

The baby girl age one month and five days, natural birth and bottle-feeding with formula milk since hospitalization, is found crying during the mother's nursing at home. The mother goes to hospital for help on how to breastfeed the baby properly.

Theory

In order to feed from the breast, the baby must use the tongue and jaw movement in a wave-like motion. After baby latching on the breast, the mouth will open wide and pull the nipple and areolar tissue as far back into the mouth. The tongue holds the extended areola against the roof of the mouth. When the tongue and jaw move in a wave-like motion, the milk will be squeezed out rhythmically according to the movement of the jaw.

To feed from the bottle, the baby must contract the tongue muscle and lift it (Image 4.3.1), to press on the teat to let the milk flow into the mouth. It is unnecessary to open the mouth wide. When milk flows too fast, the baby will thrust forward and upward, to stop the milk flow from the teat.

Intervention guidelines

- Nurse the baby with exclusive breastfeeding for 45 days after birth. If bottle-feeding is required, correct alternative feeding is recommended. The mother should cradle the baby sideways often, in order to get him used to feeding from the breast, and keep practicing on cradling him for breastfeeding (Image 4.3.2).
- Nurse every 2-3 hours while the baby is in a good mood. Do not let him get too hungry.
- Ideal breastfeeding positioning and baby suckling follow as below:

Correct Positioning

- Lie the baby sideward, facing the mother's breast
- Align the head and body straight; avoid twisting
- Place the stomachs of the mother and infant close to each other
- Let the mother cradle the baby back and body

Proper Suckling

- Let the baby open the mouth widely before latching on the mother's breast and covering the areola
- Ensure the baby upper lips cover the mother's breast firmly
- Let the lower lip open outwardly and everted
- Let the baby's chin stay close to the mother's breast and nose slightly upwards



Image 4.3.3 Use of lactation aid with nipple shield



Image 4.3.4 Baby breastfeeding with lactation aid and nipple shield



Image 4.3.5 Lactation aid preparation



Image 4.3.6 Baby suckling practice on mother's breast



- Let the mother pump milk every 2-3 hours to stimulate lactation and secretion of milk. If the baby prefers fast milk flow, the good secretion of breast milk will help the baby latch on the mother's breast and breastfeed more easily.

- Use the dropper or syringe to spread milk on the breast close to the baby lips, but if the baby turns away, use the nipple shield. If the baby prefers fast milk flow but rejects the milk from the mother's breast, use the lactation aid (Image 4.3.3).

- The QSNICH innovated the nipple shield with two cut edges, to help the baby pull the areola, widen the upper lip, and the lower lip can be everted more (Image 4.3.4).

- Remove the nipple shield when the baby is ready to feed directly from the breast, except the lactation aid for the baby that prefers fast milk flow (Image 4.3.5).

- Lie the baby on the side by the mother's breast to create a familiar environment. Train the baby to rub the mother's breast with the tongue, enabling the tongue muscle to latch on easily (Image 4.3.6), and let the mother rest while nursing.



4.4 Difficulty in breastfeeding with high palate



Image 4.4.1 Wide, flat normal palate with whole mouth visibly seen



Image 4.4.2 High, arched palate with deep-shadow look in mouth



Image 4.4.3 High, arched palate with long-deep-canal look



Image 4.4.4 Uncomfortable breastfeeding for baby with high, arched palate

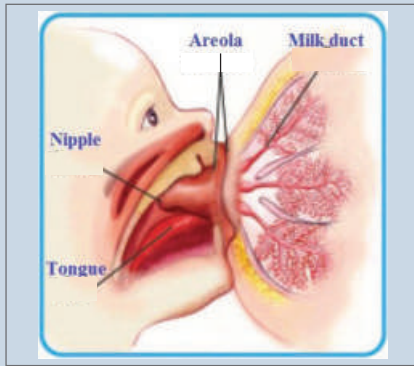


Image 4.4.5 Mother's nipple between baby tongue and palate during feeding



Image 4.4.6 Swollen nipple and areola with bleeding nipple



Image 4.4.7 Nipple scarred, broken and dried up after nursing



Image 4.4.8 Scarred nipple with milk drops



Image 4.4.9 Red, swelling and inflamed breast due to blocked milk duct, after the nipple has been cracked



4.4 Difficult breastfeeding with high palate

Normal newborns have smooth flat and clearly visible palate (Image 4.4.1). High and arched palate is seen as a long deep canal, with the baby mouth open wide (Image 4.4.2), making it difficult to breastfeed, and painful to nurse.

Case Study 1

The 19-year-old mother seeks medical consultation for her 8-day-old firstborn refusal to breastfeed, and nipple pain from the start of nursing. The symptom disappears with correct cradling position and proper baby suckling on the nipple and areola. Due to inadequate milk supply formula milk was supplemented 1-2 times per day, together with breastfeeding 5-6 times a day, until hospital discharge at four days old. Pain starts in the mother's nipple at every attempt in breastfeeding, and so she stops nursing. The mother pumps milk into the bottles, and feeds the baby together with formula milk for two days. The mother tries to nurse again, but the baby refuses to breastfeed. When taken to hospital, arched palate with long deep canal in the healthy infant mouth can be seen visibly (Image 4.4.3). The doctor pokes the finger on the palate to stimulate sucking, but the tongue lifts to the back and pushes hard on the finger until it hurts.

Theory

Underdeveloped upper palate creates an arch that the baby is unable to latch on the mother's breast firmly. This normally occurs in the premature baby requiring intubation, creating a curved palate and narrow mouth. If the baby does not latch on the nipple and areola properly (Image 4.4.4), the tissue around the area will not be fully pressed between the palate and tongue (Image 4.4.5). The tongue pushes the nipple up to the curved palate, causing nipple pain during breastfeeding. The tongue cannot receive milk fully, and thus needs to suck frequently before swallowing each time. The contact of the nipple and areola with the unusually curved palate causes the nipple and areola to swell (Image 4.4.6) and the nipple will be cracked and bleed (Image 4.4.7). The scar remains even after breastfeeding. The stretched but full breast (Image 4.4.8) will reduce pressure on the curved palate rub against the nipple, and help the baby to suckle on the nipple and areola better. If the mother alternates with breastfeeding and bottle-feeding, it will cause nipple confusion for the baby. If milk is not pumped out of such breast, it will cause blockage and pain when touched, leading to a swollen and inflamed breast (Image 4.4.9).





Image 4.4.10 Craniofacial anomalies



Image 4.4.11 Incomplete closed mouth, leaving mouth open extending into cheeks



Image 4.4.12 Curved palate close to arched gum



Image 4.4.13 Incomplete closed mouth during breastfeeding, with milk dripping to the sides



Image 4.4.14 Correct milk pumping before breastfeeding stimulation



Image 4.4.15 Infant with curved palate breastfeeding in sitting position



Image 4.4.16 Areola stretched to close baby mouth not fully shut



Image 4.4.17 U-hold of breast with hand during pumping



Image 4.4.18 Hand-held breast to help breastfeeding baby in sitting position



Case Study 2

The 2-week-old baby, with craniofacial anomalies (Image 4.4.10) and refusing to breastfeed, is brought to the clinic. With normal weight at birth, slight jaundice, other body parts normal, and normal breathing after birth but having difficult bottle-feeding, With in the first few days after birth, the baby was given milk through nasogastric tube due to inadequate sucking. The baby has lateral cleft lip (Image 4.4.11), (Image 4.4.12). The mouth cannot close completely during breastfeeding, and milk drips down on the side while the mother squeezes out milk to stimulate suckling (Image 4.4.13).

Theory

The baby with craniofacial anomalies, such as curved palate, has similar breastfeeding difficulty as the baby with cleft lip and cleft palate. Curved or high palate usually occurs in more than 100 syndromes, such as Turner's Syndrome (45 chromosomes), with a short body, a webbed neck, swollen hands and feet from a blocked lymphatic system, a small chin, a narrow mouth, a high palate, and weak oral muscles that contributed to more sucking problems.

Intervention guidelines for infants with high palate

Educate the mother about the high arch palate causing for nipple pain, and correct feeding position for the baby. Let the baby suckle on the areola, or extend the nipple to stimulate the part between the hard and soft palate, without causing pain. Let the mother practice pumping milk (Image 4.4.14) and feeding the baby with alternative equipment such as the cup. Good milk flow from breast pumping during breastfeeding can reduce rubbing tension between the nipple and palate. Arrange a comfortable and pain-free position for the mother during breastfeeding, such as carrying the baby sideward to breastfeed from one breast. In the beginning, the mother may place the baby in a sitting position with the chin close to the areola (Image 4.4.15). If the baby cannot latch on the breast completely, the mother has to stretch the areola in the position of holding a teacup (Image 4.4.16). Hold the breast in a U shape (Image 4.4.17) so as to squeeze the areola to narrow down. In the sitting position, use the index finger of the U-shape hand to help the baby chin to stimulate feeding. Place the warm towel on the breast for 3-5 minutes before breastfeeding. Pump out 2-3 drops of milk and spread it on the nipple after breastfeeding, and then let it dry to reduce inflammation and infection.





4.5 Milk protein allergy

Milk protein allergy is a crucial food allergy in babies. The most common cause is feeding dairy milk to babies from birth to six months old. Babies below six months old do not have well established gastrointestinal tract, digestive system, and immunity, especially in babies with the risk factor of family history of food allergies from both maternal and paternal sides. The intestinal mucosa is hypersensitive towards allergens. When the baby receives dairy milk, this condition makes it difficult to digest foreign milk proteins into smaller molecules like adults. The protein will remain foreign and go through the weak the intestinal mucosa, inducing food allergies. Food allergies can come in the form of food intolerance (non-allergic reaction) or immunologic reaction, starting from allergic sensitization. We call this condition “primary dairy milk protein enteropathy”.

Contaminated formula milk and the weak immunity system of the baby will lead to infection. Infection then leads to destruction of the intestinal mucosa. This allows for even more foreign protein into the body system to stimulate the allergy mechanism mentioned above. This condition is called “secondary dairy milk protein enteropathy”.

Allergic sensitization is the body IgE-mediated and non-IgE mediated response towards different substance that enters the body, whether through oral intake or inhalation. This can lead to the development of allergies. Intake of formula milk allows allergens to enter into the baby body. Studies using skin test or serum IgE measurements have shown that 1-year-old children with this condition have a ten and three times higher risk for developing asthma and respiratory allergies, respectively.

Genetics plays an important role in the development of several allergies including asthma, skin, and respiratory problems. Studies have shown that 50% of children with allergies have both parents who have allergies. If either parent has allergies, then the percentage is 30%. If neither parents have allergies, then the chances for the baby to develop allergies is 12%. Breastfed babies have a lower chance of developing allergies. It is important to note that breastfeeding during the first six months will lower the chance of developing allergic sensitization, in babies with or without family history of allergies. It also reduces the risk of dairy milk protein allergies during the early years.

Dairy milk protein allergy is found in 2-7% of babies. The condition can be divided into three systems: 1. Gastrointestinal - mucous diarrhea, blood in stool, and chronic diarrhea; 2. Respiratory - nasal congestion and cough; and 3. Dermatology - rashes. This is often found in babies fed with dairy milk. This can also be found in exclusive breastfed babies and is usually the case when the mother receives dairy milk or dairy milk products, such as high intake in dairy milk during pregnancy and breastfeeding (intake of dairy milk for mothers should not exceed two cups per day).

Case Study 1

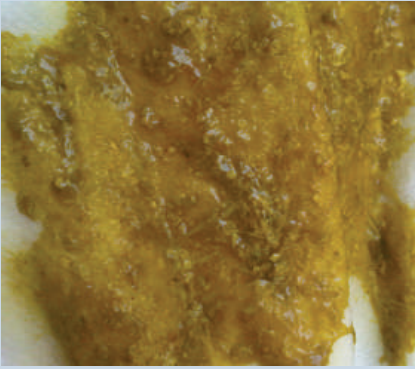


Image 4.5.1 Liquid stool with mucus

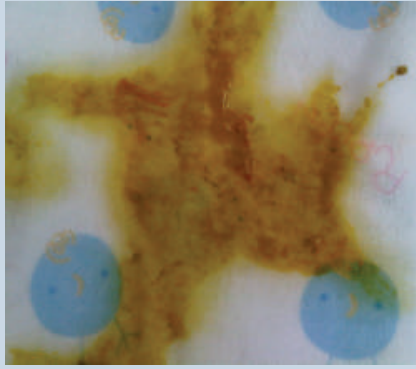


Image 4.5.2 Liquid stool with mucus and blood

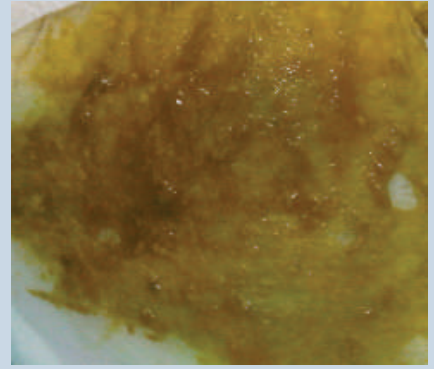


Image 4.5.3 Stool with undigested milk clumps

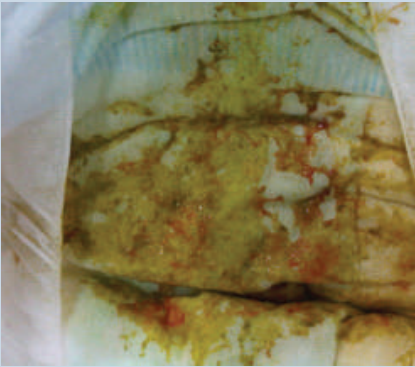


Image 4.5.4 Liquid stool with mucus and blood

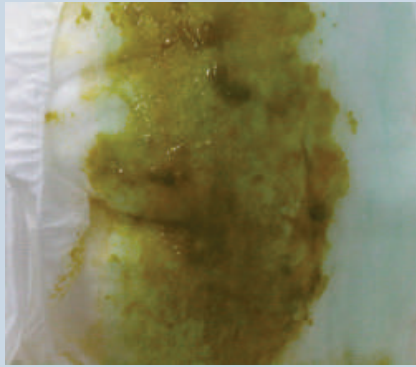


Image 4.5.5 - 4.5.6 Stool with mucus, green bile from gallbladder, and undigested milk clumps

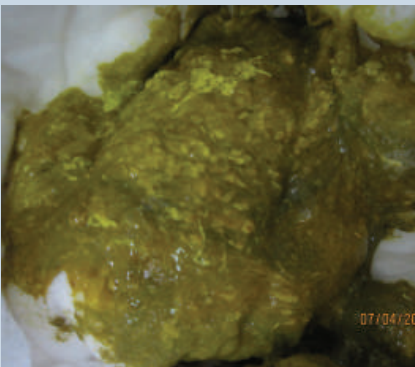
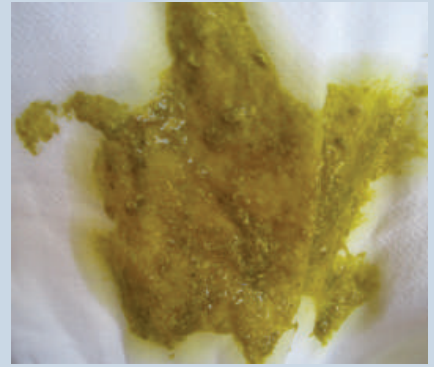


Image 4.5.7 Stool with bile and a lot of undigested milk clumps



Image 4.5.8 More defined stool



Image 4.5.9 Normal formed stool



Case Study 1

History and Symptom

The healthy 3-month-old baby, with rashes on the face and body, is brought to hospital. The baby feeds on dairy milk since birth. His usual bowel movement is 2-4 times per day. When he approaches three months, rashes are found on the face and back of the body as well as liquid stool with blood and mucus (Image 4.5.1). Sometimes, mucus is found in the stool and other times blood, 2-4 times per day, according to the images on the opposite page. For example, mucus mixed with blood (Image 4.5.2) interchanges with more mucus, presence of undigested milk clumps (Image 4.5.3), and returns to mucus mixed with blood (Image 4.5.4). Sometimes, there is little of stool but a lot of mucus present and green in color due to bile, and the presence of undigested milk clumps (Image 4.5.5-4.5.6). Sometimes, there is a lot of bile and undigested milk clumps (Image 4.5.7). Stool examination and culture do not show any infection. Once dairy milk is stopped and replaced with special milk for patients with dairy milk protein allergies, the condition becomes better. The stool appears normal with more defined or normally formed textures (Image 4.5.8 and 4.5.9).

Theory

The diagnosis of dairy milk protein allergy can either be done with a skin test or the discontinued intake of dairy milk. If the condition improves, wait for two weeks and continue to feed dairy milk. This is called the challenge test. Repeat this for three times. If the condition returns two out of three times, then the baby is diagnosed with dairy milk protein allergy. Common dermatologic symptoms: Once they feed on dairy milk, the lips will swell and rashes will form on the body (allergic dermatitis). People in the olden times call this “milk ringworm” which is present with rashes that come and go on both cheeks, body, legs, arms, and hands. It is often itchy and babies often feel irritated. Babies who are older will scratch, leading to wounds. Gastrointestinal symptoms: Stools from babies will often be found with mucus, blood, bile, and undigested milk clumps. Other than those symptoms mentioned, the baby will appear alert. Mucus and blood present in the stool with no infection is often found.

Intervention guidelines

If the baby still feeds on breast milk, then he should return to exclusive breastfeeding during the first six months. Observe the condition of the baby and the stool. If the condition does not improve, the mother should stop consuming dairy milk and all other dairy milk products until the baby is one year old. In the case of the baby feeding on dairy milk, switch to special milk in which foreign dairy milk protein has been destroyed.



Case Study 2



Image 4.5.10 Two-month-old healthy baby

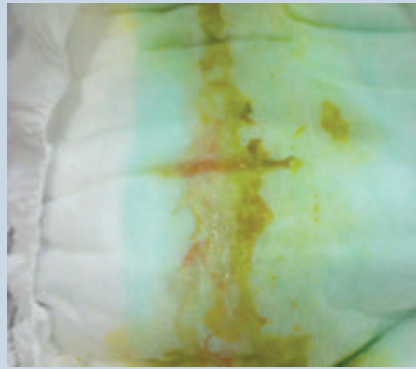


Image 4.5.11-4.5.12 Liquid stool with mucus and blood

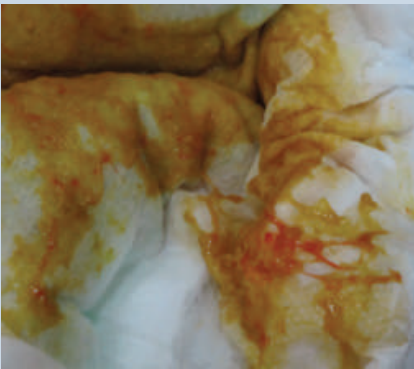
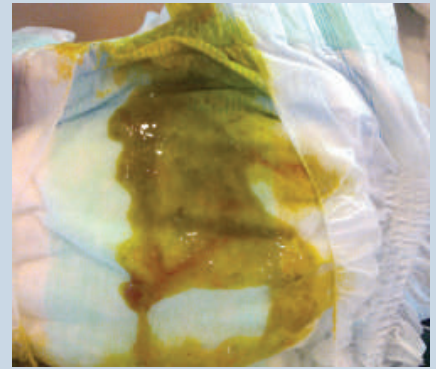


Image 4.5.13 Liquid stool with mucus and blood



Image 4.5.14 Mucus in stool



Image 4.5.15 Three-month-old baby appearing alert



Image 4.5.16 Liquid stool with mucus



Image 4.5.17 Stool appearing more solid



Image 4.5.18 Six-month-old starting on supplementary food



Case Study 2

History and Symptom

The healthy full-term newborn with exclusive breastfeeding and normal golden color stool. (Image 4.5.10), The a mother had a history of rashes during pregnancy and paternal grandfather a history of asthma, At two months, the baby starts to pass mucous and bloody stools 4-5 times a day (Image 4.5.11-4.5.12). Stool examinations show a high number of white blood cells of more than 100 cells/HD. Antibiotics is given for the first seven days. The baby still passes mucous and bloody stools 4-5 times a day (Image 4.5.13). Stool cultures show no infection. It may be dairy milk protein allergies and recommendation is made for the mother to drink soy milk instead of dairy milk, and is prescribed antibiotics and probiotics. Liquid stools decrease to 1-2 times a day, but stools still contain mucus and blood (Image 4.5.14).

At the age of three months, the baby appears alert, is able to suckle without vomiting, and happy (Image 4.5.15). However, the stools are still liquid with a lot of mucus (Image 4.5.16). Three-day injectable antibiotics is prescribed. The condition does not improve. Stool cultures show no infection in the stools. Thus, he is transferred to the gastrointestinal specialist, at the age of four months. He continues to pass mucous and bloody stools. Membrane or plaque is found dispersed in the stools mixed with mucus and blood. Lab results show a large number of neutrophils, an indication of diarrhea associated with prolonged use of antibiotics or pseudomembranous colitis. Stool examinations show *Clostridium difficile* toxin. Medication for this condition is prescribed. The stools become more solid with less bowel movement from 4-5 times to 1-2 times (Image 4.5.17) a day. Supplementary food is started at six months (Image 4.5.18).

Theory

Prolonged exclusive breastfeeding is the primary prevention for allergic sensitization as it reduces the risk of dairy milk protein allergy. It can also be the secondary prevention for babies against allergic sensitization which will appear later. In the case where the baby receives exclusive breast milk and still develops dairy milk allergies, the following are possible causes:

1. Feeding dairy milk to newborns (in the past 20-30 years, for testing gastrointestinal system).
2. Feeding dairy milk to newborns to help the mother to be able to rest after delivery or when breast milk has not come in yet.
3. During pregnancy, the mother has a high intake of dairy milk, thus allowing a leak of dairy milk protein into the placenta, inducing allergic reaction in the fetus during pregnancy.
4. During breastfeeding, the mother has a high intake of dairy milk, allowing a leak of dairy milk protein into the breast milk and inducing allergic reaction in babies.
5. As a result of the treatment mucous bloody stool with antibiotics even if the lab results are negative for infection, which can lead to pseudomembranous colitis as seen in this case.



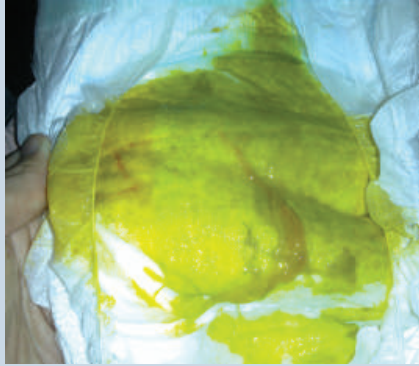


Image 4.5.19 Liquid stool with mucus



Image 4.5.20 Liquid stool with mucus and blood



Image 4.5.21 1-year-7-month healthy patient



Image 4.5.22 Normal stool



Image 4.5.23 Patient and family



Intervention guidelines

This case is an example of the exclusively breastfed baby with dairy milk protein allergy.

During the mother's pregnancy, she has been careful to avoid drinking dairy milk. Later on, she starts to drink soy milk instead. One possibility can be the intake of cheese. The mother was advised to stop eating dairy milk products, such as butter, cake, and soy milk with the mixture of dairy milk. She is advised to stop taking food that can cause allergy, such as green beans, soy beans and seafood.

Complications from treatment can occur, such as in this patient with prolonged antibiotic usage causing pseudomembranous colitis. This baby has severe food allergy. Once the mother stops eating the food mentioned above, the baby loose stools become more solid, but still with the presence of mucus (Image 4.5.19). When given supplementary food, such as chicken soup or pork broth, the stool become mucous and bloody (Image 4.5.20). Egg white consumption also causes mucous bloody stool. Therefore, such food consumption should increase bit by bit. The baby still receives breast milk and special formula milk for babies with dairy milk protein allergy.

Examples of this baby supplementary food

At 6 months	Begins supplementary food with brown rice broth. Baby tolerates well and has better bowel movement with less mucus in stool.
At 6 months 3 weeks	Begins feeding from small amount of egg yolk to a lot (1/2 teaspoon to 1 teaspoon to currently 1 1/2 eggs). Baby tolerates well with normal bowel movement.
At 7 months	Tries pork broth. Infant has mucous bloody stool and stops taking pork broth.
At 8 months	Tries chicken broth 1st time. Baby has mucous bloody stool and ends diet of chicken broth.
At 9 months	Tries chicken broth soup 2nd time. Baby has mucous bloody stool and stops such diet but will consider it again after 1 year old.
At 1 year	Begins on fish. Baby tolerates well with normal bowel movement and soft stool.
At 1 year 2 months	Tries egg white bit by bit until eating 1/2 egg. Baby has mucous bloody stool and stops such diet.
At 1 year 4 months	Tries green beans boiled with sugar. Baby has more mucous bloody stool and stops such diet.

This is a case study of a patient with severe food allergy, beginning from dairy milk protein allergy and then other food allergies. The baby has allergy from what he eats directly, such as pork broth and egg, and also from the mother's food diet which he is allergic to. For example, when the mother eats mung beans, the baby has mucous bloody stool, even though he did not eat that. The mother can eat shell fish, but not buttered shell fish.

The baby is currently two years old, and can eat pork, chicken, soy milk and fish. He is healthy with average weight and height gain (Image 4.5.21). His stool is solid (Image 4.5.22). The parents take good care of him, and are happy to share their photographs (Image 4.5.23).



Opinions

1. Babies with mucous and bloody stool due to dairy milk protein allergy. usually are happy, without fever or vomit symptom, and have a good appetite with no weight loss or abdominal distension.
2. Most cases usually come from a hygienic family background, with cautious care for him.
3. Most cases have a family history of allergy (approximately 30%).
4. Most common in babies less than one year old with a misdiagnosis of an infection.
5. Most cases would have very little bowel pain with mucous bloody stools as compared to infectious dysentery
 - a. Even if stool examination shows mucus, white blood cells are scarcely found. When using methylene blue staining, eosinophils are predominant.
 - b. Repeated series of stool cultures are often negative.
6. If a large number of white blood cells, especially neutrophils, are found, other complications, such as *Clostridium difficile* infection in Case Study 2 should be considered. Fungal infection is also found in some reported cases.
7. The exclusively breastfed baby can develop this condition through dairy milk products in the mother's diet. Sensitivity towards allergens are different in each mother-baby pair.





4.6 Mother with chicken pox or shingles

Case Study 1



Image 4.6.1 Chicken pox vesicle at breast area



Image 4.6.2 Different stages of chicken pox vesicles



4.6 Mother with chicken pox or shingles

Chicken pox and shingles are caused by the Varicella-Zoster virus (VZV). Chicken pox in breastfeeding mothers may be passed on to the babies. The problem in clinical practice is, should breastfeeding continue, as the main mode of transmission of chicken pox is through droplets or nasal secretion, and skin contact. However, if the mother has shingles, the baby may become infected through direct contact with the shingle wounds. Because of the different modes of transmission of chicken pox and shingles, different cautions are to be taken.

History

The mother of 4-month-old baby, with regular nursing, contracts chicken pox from her neighbor. There are chicken pox vesicles all over the body for two days, including the breast area (Image 4.6.1).

Theory

Chicken pox is spread through the respiratory route and direct skin contact. The infective period is 1-2 days prior to the appearance of vesicles and up to the drying up stage (Image 4.6.2). Even if immunity to infection can be passed to the baby via breast milk, we have no solid evidence to show when the immunity to chicken pox will get into breast milk, to protect the baby from infection. However, studies have shown that babies with postpartum chicken pox do not develop any severe symptoms, even though the mortality rate of children with chicken pox under one year old is higher than older children, it is still considered to be very low.

Intervention guidelines

The Pediatric Clinics of North America recommends all chicken pox infected mothers of infants more than one month old to continue nursing, especially if the babies have already received Varicella immunoglobulin (VZIG) as there will be no contraindication to breastfeeding. VZIG is not recommended for all infants. In the case where the mother takes acyclovir, there is no need to worry that acyclovir will pass into breast milk and cause harm to the baby because very low amount of medication is found in breast milk (less than 1-2mg/kg). Compared to acyclovir dosage in the baby, which is 20 mg/kg/dose every 6-8 hours, there is a huge difference between the amount in breast milk and the dosage used to treat the disease in babies.

VZV infection can cause complications in infants such as encephalitis. If the baby has been in contact with mother with chicken pox for 7-10 days, then consider giving acyclovir for seven days to prevent chicken pox in the case of low immunity infants. For healthy babies, acyclovir is not recommended for prevention, nor VariZIG or IVIG recommended for babies that come into contact with chicken pox. Consider giving it to the immuno-compromised or low immunity host only.



Case Study 2

Mother has shingles (herpes zoster).

History and Symptom

The nursing mother of 5-month-old baby since birth develops pain and itchiness on the right breast skin full of rows of vesicles. Doctor diagnosed her as herpes zoster.

There are questions like: Can the mother continue breastfeeding? Is milk from the right breast safe? Will the baby be infected and if so, how? As the mother will nurse with only one breast, there may be insufficient milk or milk stock.

Theory

The only mode of transmission of herpes zoster is through direct contact with the vesicles. If the baby is in close contact with the mother whose vesicles are still intact, he has a slight chance of VZV infection.

Intervention guidelines

Can the infant continue breastfeeding? The chance of infection will increase if there is direct contact with the ruptured vesicles. If it is impossible to avoid breastfeeding from the right breast, milk expression is another option. The baby can continue to breastfeed safely once the mother completes the course of treatment, the vesicles dries up, scabs occur, or 7-10 days have passed after appearance of vesicles.

If the baby is with the mother with shingles for some time until the vesicles have dried up, scabs occur, or the mother has taken acyclovir for 3-5 days, the virus will be eliminated and so it is unnecessary to give any medication to him. Do not worry about VZV infection from the breast milk but be vigilant about chicken pox infection in the future.





4.7 Mother with excessive breast milk



Image 4.7.1-4.7.2 Breast milk spurts



Image 4.7.3 Breast milk overflow during nursing



4.7 Mother with excessive breast milk

(Hyperactive letdown / Overactive letdown / Hypersensitivity letdown)

With excessive breast milk, babies tend to be fussy during feeding, mothers often complain of infants biting and pulling at the nipples. There are also many cases of babies falling asleep while breastfeeding. It is one of the top five problems in many lactation clinics.

History and Symptom

The 34-year-old mother with 15-day-old newborn feeling sore in the breast during and after nursing. As breast milk is excessive, milk will spurt all around (Image 4.7.1-4.7.2) when she manually expresses the breast, so intolerably sore. Breast milk spills out during feedings and he chokes (Image 4.7.3). The breasts hurt so much to the point that she is afraid to nurse. The baby does not seem to be satisfied. The mother feel depressed and had low grade fever. She has low milk supply after delivery, and so she needs to pump her breast with a mechanical pump every 2-3 hour or after each feeding. She is anxious of not producing enough breast milk. During the first period of pumping, not much breast milk is pumped out. She increases the length of pumping time as recommended. Three to four days before coming to the clinic, a lot of breast milk is produced. Yet, she still feels that the baby cannot suckle.

Physical examination of the mother shows no fever with breast engorgement and swollen areola, although the breast skin color and consistency are normal. She experiences nipple hypersensitivity and sore nipples. The baby weighs 300 grams more since born. His urine and stool are normal.

Theory

Excessive breast milk in the mother most likely is from hyperactive let-down reflex i.e., rapid and continuous rise of prolactin due to frequent stimulation of the breast like every 1-2 hours. High prolactin causes excessive milk production. Sore breast during nursing is due to the contraction of nipples and engorgement of the breast stimulating the milk ducts to develop neuritis, which later leads to deep sharp pain in the breast.

In this case, the infant does not feel full after feeding because there is excessive breast milk squirt. There is too much to swallow and so the baby chokes and fears to suckle. Frequent complaints include the baby fussing, falling asleep on the breast, or biting and pulling at the nipple with frustration.

Generally, mechanical breast pumps are not recommended during the first six weeks because it will interfere with normal breast milk production according to baby demand. If the mother opts to use the mechanical breast pump after that, she should not pump more than 6-8 times in 24 hours, but pump each side for 10-15 minutes in a total of 30 minutes, or pump both sides at the same time for no longer than 15 minutes.





Image 4.7.4 Applied head-high football position



Image 4.7.5 Applied head-high cradle position



Image 4.7.6 Horse-ride position



Image 4.7.7 Lie-on-the-back breastfeeding position



Image 4.7.8 Breastfeeding baby crying due to breast milk squirt

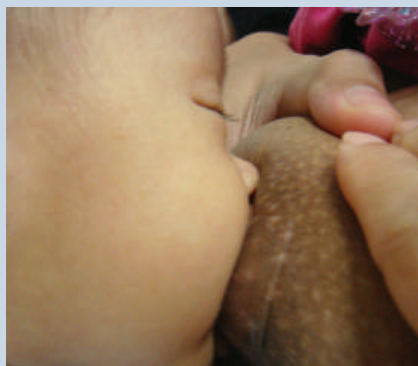


Image 4.7.9 Suckling through nipple shield for control of breast milk squirt

Intervention guidelines

- Stop pumping breast milk. If the breast feels engorged or painful, pump or press just enough to feel better.

- Let the baby breastfeed in the applied head-high football position (Image 4.7.4), head-high cradle position (Image 4.7.5), horse-ride position (Image 4.7.6), or lie-on-the-back position (Image 4.7.7), or even the lie-on-the-side position. Support baby neck to put his nose above the nipple level.

- If the baby still cries after position adjustment (Image 4.7.8), consider using the nipple shield to help at times when the baby cries a lot as the nipple shield is a tool that can restrain and reduce the milk squirts at the baby throat (Image 4.7.9).

In the case where the baby has good head control, at about 2-3 months, the horse-ride position can be used as it is convenient and able to let the baby sit and suckle, without the use of the cushion as in the head-high football position.

- The problem of piercing pain deep in the breast may need 400 grams ibuprofen every 4-6 hours for about 2-3 days. Ibuprofen does not pass into breast milk, safe for the mother, and more efficient than paracetamol.

4.8 Plugged duct



Image 4.8.1 Lump on right breast



Image 4.8.2 Milk pumping



Image 4.8.3 Feeding position



Image 4.8.4-4.8.5 Ultrasound treatment of plugged milk duct (cause of breast lump)



Image 4.8.6 Ultrasound machine



Image 4.8.7 White dot on nipple



4.8 Plugged duct

Plugged duct is a common problem. The mother usually has a painful lump in the breast due to an obstruction in collecting ducts, a result of clogged milk fat, which is not drained continuously as in the working mother, or from the mother's diet of high calcium content in the food or supplements. Calcium can deposit and clog the duct. It is usually seen as a white dot on the nipple, and the mother is found has no fever and is healthy.

History and Symptom

The 30-year-old mother with a lump on the right breast (Image 4.8.1), slightly painful when touched but painless during feeding, with no swelling of skin around the breast, nor redness or heat; but palpation shows a 7 × 8 cm fist-size lump.

Theory

There are several causes for lump in the breast. In the case of the fist-size lump, slightly painful but painless during feeding, without mastitis, it is usually due to plugged duct.

This problem is due to insufficient draining of breast milk, for example, if the baby is not feeding frequently enough, or the mother is away for too long, or the bra wire presses and obstructs the duct. This causes the fat to deposit and plug the duct. Milk cannot flow out and painful lump develops.

Intervention guidelines

- The best solution is to let the baby breastfeed regularly and frequently.
- If the baby breastfeeds and the lump does not decrease in size, the mother should express milk (Image 4.8.2), prior to feeding, so as to reduce the amount of breast milk. When the baby feeds, the lump will decrease in size. (Image 4.8.3)
 - Massage around the area of the plugged duct and compress it with warm water before nursing.
 - If there is pain around the breast, let the baby feed on the other breast first to induce the let-down reflex on the other breast without stimulation from breastfeeding. After that, let the baby feed on the affected breast. Ensure the complete drainage of breast milk. If not, pump breast milk out first, then let the baby continue suckling. The mechanical pump works faster than manual pumping. Encourage the mother that the best solution is to breastfeed frequently.
 - From experience, the milk duct can be plugged again if breast milk is not adequately expressed. Breast massage prior to feeding can help release the lump that is plugging the duct.
 - Usually, breast massage around the lump can solve the problem of plugged duct.
 - In the case where the lump does not reduce in size, adjust the feeding position for the baby chin to be on the lump
 - Consider requesting for an ultrasound scan (Image 4.8.4-4.8.6)

White dot, white spot, or white bleb is often found on the nipple with plugged duct because the watery part of breast milk retained in the duct near the nipple has evaporated and left fat residue in the milk duct after evaporation.

White spot on the nipple is covered by a thin membrane (Image 4.8.7). The mother often experiences sharp pain during feeding. A sterile needle can be used to remove the membrane and let the milk flow out. Plugged duct and white spots, if not properly treated, can lead to mastitis.

4.9 Relactation



Image 4.9.1 Manual expression of breast milk



Image 4.9.2 Mechanical pumping of breast milk



Image 4.9.3 Latch-on practice



Image 4.9.4 Lie-on-back position while breastfeeding for mother to rest



Image 4.9.5-4.9.6 Kangaroo Mother Care



Image 4.9.7-4.9.8 Lactation aid



4.9 Relactation

Case Study

History and Symptom

The two-month-old baby, delivered through C-section and separated from the mother after birth, is brought to the mother every three hours to induce lactation through suckling, but he cries and refuses to suckle. The nurse helps feed him from a cup. Four days after birth, the mother's breasts become engorged, and the baby cries a lot for failure to latch on. At seven weeks old, a friend recommends the mother to consult the lactation clinic via telephone. The mother is still unable to nurse, so she comes to the clinic for direct help.

Theory

C-section birth, analgesics injection and mother-baby separation after birth interrupt breast milk production. The baby is not trained to suckle the breast right after birth. An important hormone for re-lactation is prolactin, which normally works with estrogen, progesterone and other hormones from the womb or ovaries. Prolactin is involved in breast milk production and re-lactation while oxytocin helps to secrete breast milk.

The best way to stimulate prolactin is through nipple suckling. To stimulate oxytocin, the mother should have good support and relax by having close skin contact with the baby. This will lead to successful re-lactation for both pregnant and non-pregnant mothers.

The best period for re-lactation is 2-3 months after delivery. However, it is possible to re-lactate at any stage.

Intervention guidelines

- Express breast milk every two hours (Image 4.9.1).
- Use the mechanical pump for faster stimulation (Image 4.9.2)
- Practice breastfeeding position so the infant is familiar with the mother's breasts, nipples and scent (Image 4.9.3)
 - Let the baby breastfeed in the lie-on-back position for the mother to rest, and breastfeed often like every 2-3 hours for 10-15 minutes. While nursing, let the mother help express breast milk for the baby (Image 4.9.4)
 - The Kangaroo Mother Care technic involves skin-to-skin contact between mother and baby (Image 4.9.5-4.9.6)
 - If the infant is fussy for lack of sufficient breast milk, while the baby is suckling on the breast, give him expressed breast milk or formula milk from the dropper or lactation aid. This will help the baby get sufficient milk (Image 4.9.7-4.9.8).
 - Manually express or use the mechanical pump for stimulation of adequate milk production. If possible, use the double-cylinder electric pump, 8-12 times a day.
 - At the beginning, assess baby's health regularly, and weigh the baby at least once a week.

Increasing breast milk with medication

Basically, natural stimulation is the key. If it does not work in 1-2 weeks, consider using medication to stimulate milk production, such as 20 mg domperidone (motilium) 4 times a day (2 × 4 per day) for 10 days. There may be minimal side effects.



References

1. Sangsupawanich P. Editor. Literature review: Breast milk and allergic disease. Bangkok: Sangsue Co., Ltd.; 2008.
2. Jittinun S, Chatranon W, Savasdivorn S, Editors. Breastfeeding: From knowledge to practice. 2nd ed. Bangkok: Bangkok Medical Publisher Ltd. Part.; 2003.
3. Academy of Breastfeeding Medicine Protocol Committee. ABM clinical protocol #22: guidelines for management of jaundice in the breastfeeding infant equal to or greater than 35 weeks' gestation. *Breastfeed Med* 2010;5(2):87-93.
4. American Academy of Pediatrics. Red Book. 26th ed. Elks Grove Village, IL: American Academy of Pediatrics; 2003; 672-85.
5. Butte NF, Smith EO, Garza C. Energy utilization of breast-fed and formula-fed infants. *Am J Clin Nutr* 1990; 51:350-8.
6. Cant A, Marsden RA, Kilshaw PJ. Egg and cows' milk hypersensitivity in exclusively breastfed infants with eczema, and detection of egg protein in breastmilk. *Br Med J (Clin Res Ed)* 1985;291:932-5.
7. Dewey KG, Heining MJ, Nommsen LA, Peerson JM, Lonnerdal B. Growth of breast-fed and formula-fed infants from 0-18 months: the DARLING study, *Pediatrics* 1992;89:1035-41.
8. Dewey KG. Nutrition, Growth, and complimentary feeding of the breastfed infant. *Pediatr Clin North Am* 2001;48:87-104.
9. Lawrence RA, Lawrence RM. *Breastfeeding: a Guide to the Medical Profession*, 7th ed., St. Louis: Mosby, Inc.; 2011.
10. Oddy WH, Holt PG, Sly PD, Read AW, Landau LI, Stanley FJ, et al. Association between breastfeeding and asthma in 6 year old children: findings of a prospective birth cohort study. *BMJ* 1993;319(7213):815-9.
11. Rowntree S, Cogswell JJ, Platts-Mills TA, Mitchell EB. Development of IgE and IgG antibodies to food and inhalant allergens in children at risk of allergic disease. *Arch Dis Child* 1985;60:77-35.
12. Saarinen UM, Majosaari M. Breastfeeding as prophylaxis against atopic disease; prospective follow-up study until 17 years old. *Lancet* 1995;8982):1065-9,.
13. Walker M. *Breastfeeding management for the clinician: using the evidence*. Sudbury, Massachusetts: Jones and Bartlett Publishers, Inc.; 2006.
14. World Health Organization. The WHO child growth standards. <http://www.who.int/childgrowth/en/>
15. Wilson-Clay B, Hoover K. *The breastfeeding atlas*. 4th ed. New York: Lactnews Press; 2008,.
16. World Health Organization: review of experience and recommendations for practice. Geneva: WHO 1998.



Unit 5:

Breastfeeding for Working Mothers

- 5.1 Manual and mechanical breast milk expression
- 5.2 Breast milk storage
- 5.3 Feeding with the feeding cup or spoon
- 5.4 Baby wearing (Cloth baby carrier)
- 5.5 Breastfeeding lingerie and apparels
- 5.6 Baby bag (gift set to promote breastfeeding)
- 5.7 Breastfeeding corner

5.1 Manual and mechanical breast milk expression

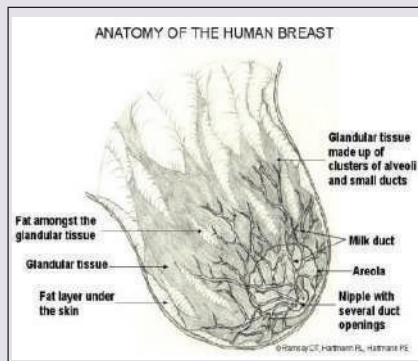


Image 5.1.1 Anatomy of milk duct



Image 5.1.2 Thorough hand wash before breast milk pumping or breastfeeding



Image 5.1.3 Breast massage



Image 5.1.4 Manual milk expression: C-squeeze with thumb and index finger around areola



Image 5.1.5 Manual milk expression: Place hand as in Image 5.1.4, press down with ends of thumb and index finger

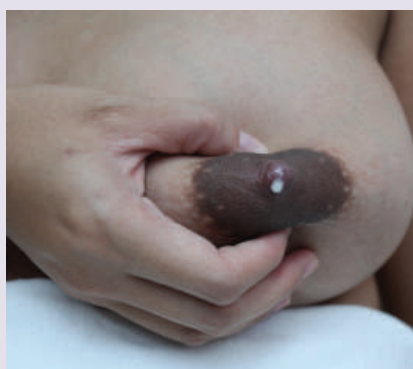


Image 5.1.6 Manual milk expression: Follow Image 5.1.4 and Image 5.1.5, squeeze towards areola with ends of thumb and index finger, and then release



5.1 Manual and mechanical breast milk expression

Breast milk is stored in the milk duct, which resembles a long net line leading up to the nipple. The milk ducts in the areola were once referred as the breast milk pouch. (Refer to Image 5.1.1)

Manual breast milk expression by hand

- Wash hands thoroughly. (Image 5.1.2)
- Massage the breast. (Image 5.1.3)
- Align the index finger and thumb with the nipple at about 3 centimeters away from it. (Image 5.1.4)
- Press on breast with the ends of the index finger and thumb. (Image 5.1.5)
- Squeeze the ends of the index finger and thumb toward the nipple and then release or relax the hold of the fingers. (Image 5.1.6)
- Move the fingers around the areola in a circular motion.
- Express milk from each breast for about 15 minutes. The total time for both sides should not exceed 30 minutes.

Breast milk expression with the breast pump

- Wash hands thoroughly and sterilize the equipment in boiling water for about 20 minutes.
- Pump milk from each breast for about 15 minutes each. Totally for both breasts, no more than 30 minutes the same as manual expression. Another option is to pump milk from both breasts at the same time for around 15 to 30 minutes.
- The mother should feel comfortable with the breast pump, and should not experience any pain in the nipple.
- Do not set the suction power too strong, as it will cause pain in the nipple. The suction power of a standard mechanical breast pump ranges from 180 to 220 mmHg.



Image 5.1.7 Hospital-grade breast pump used for only one breast at a time



Image 5.1.8 Hospital-grade breast pump used for both breasts at once



Image 5.1.9 Bulb-style pump not recommended for mothers



Image 5.1.10 Motor-powered breast pumps - both electric and battery-operated pumps available



Image 5.1.11 Hands-free breast pump - manual or powered by batteries.



Image 5.1.12 Breast pump requiring manual pumping with piston.



Image 5.1.13 Breast pump requiring manual squeezing of pump handle.

Types of Breast Pumps

Manual breast milk expression is convenient and can be done anywhere. The mother can control the force of expression by hand, increasing it or lowering it as desired. The breast pump is not only costly but comes with the risk of germ contaminations in the gadget.

A good quality breast pump does not mean that it can suck out more milk. Instead, it is a pump with adjustable suction strength of 180-220 mmHg as it is the most appropriate level that resembles baby breastfeeding. The gadget should have a short, consistent suction cycle to stimulate the production of milk.

The electric breast pump is categorized into two types: hospital-grade and personal grade. From the images, the mother is shown using a hospital-grade pump from the breastfeeding clinic, which is the preferred pump used in hospitals as it has three different suction strengths and is highly durable. It can pump one breast (Image 5.1.7) at a time, or both at the same time (Image 5.1.8). The electric breast pump, with adjustable suction force, is popular with mothers of premature babies. Mothers are advised to avoid the use of the bulb-style breast pump to store the expressed milk (Image 5.1.9), It is a manual pump with a red rubber bulb used to discard breast milk. The milk collected in the bulb should not be used as it is extremely difficult to clean the bulb. Therefore, germs can thrive inside the bulb and contaminate the milk. The personal electric pump (Image 5.1.10-5.1.11) is acceptable for home use.

There are many types of inexpensive manual breast pumps, including the piston breast pump (Image 5.1.12) and another that requires the squeezing of the pump handle (Image 5.1.13). The pump handle type usually causes the problem of too much pressure applied to the breast and needs to be used with care, as it can clog the milk ducts.

5.2 Breast Milk Storage



Image 5.2.1 Storing breast milk in cooler full of ice



Image 5.2.2 Storing breast milk in storage bag with cooling block



Image 5.2.3 Storing breast milk in foam box full of ice



Image 5.2.4 Storing breast milk in freezer of two-door refrigerator



Image 5.2.5 Storing breast milk in deep freezer

Storage Duration

Storage	Duration
At room temperature (above 25°C)	1 hour
At room temperature (below 25°C)	4 hours
In a cooler (below 15°C)	24 hours
In a refrigerator (4°C)	96 hours (4 days)
In freezer compartment of a single-door refrigerator	2 weeks
In freezer compartment of a separate-door refrigerator (-19°C)	3 months
In a deep freezer (-19°C)	6 months

Image 5.2.6 Breast milk storage timetable



Image 5.2.7-5.2.9 Pumping breast milk at an office desk with a blanket or cover allows mothers to express milk and do work at the same time.



5.2 Breast Milk Storage

A month after giving birth, the mother can start pumping breast milk for storage. She can express milk after breastfeeding, or every three hours. Once it is expressed, the container should be closed immediately. She should also write her name, date and time the milk is stored. The storing containers should also be kept in order. If she is storing the milk containers in the refrigerator, then they should not be stored at the door because the temperature will not be constant due to its constant opening and closing. The working mother can successfully breastfeed if she knows how to express and store enough breast milk with the following points:

1. Start expressing breast milk for storage one month after childbirth.
2. While on leave from work, express breast milk every hour, from both breasts at the same time for about 15 to 30 minutes. If the baby breastfeeds continuously, meaning almost every hour, thus barely leaving time for the mother to express milk, she should express milk from one breast while the baby is breastfeeding from the other.
3. Once the baby is one and a half months old, start training the baby to drink the stored milk so that he gets used to its taste as frozen milk can have a rancid smell.
4. Once the mother goes to work, she should express breast milk every 2-3 hours to maintain the production level. Pump breast milk while working at the office desk and it will provide the opportunity to do it frequently according to needs.
5. The caregiver of the baby should use the mother's breast milk sparingly, meaning no more than one ounce per hour. For instance, if the mother is away from home for 12 hours, no more than 12 ounces of stored breast milk should be used. If the baby has too much stored milk, once the mother returns home, he will be full. If he does not breastfeed often enough, her milk supply will drop.

Breast milk can be stored in the cooler full of ice if kept at a temperature of 15 degree Celsius for up to 10 hours (Image 5.2.1).

Breast milk that is stored in the breast milk bag with four 100 ml cooling blocks at 15 degree Celsius can be kept for up to 12 hours (Image 5.2.2).

Breast milk can be kept 8 -12 hours in the foam container full of ice with a constant temperature of 15 degree Celsius (Image 5.2.3).

In the two-door refrigerator, breast milk can be kept in the freezer compartment for three months (Image 5.2.4).

The deep freezer can be used to store breast milk for 6-12 months (Image 5.2.5) as specified in the breast milk storage timetable (Image 5.2.6).

Pumping breast milk at the office desk under a blanket allows the mother to express milk and work at the same time (Image 5.2.7-5.2.9).

5.3 Feeding with the Feeding Cup or Spoon



Image 5.3.1 Feeding milk with spoon



Image 5.3.2 + Image 5.3.3 Feeding milk with feeding cup



Image 5.3.4 Feeding milk with soft cup or soft feeder



Image 5.3.5 Feeding milk with dropper



Image 5.3.6 Feeding milk via finger feeding to train baby to use tongue to avoid use of bottle



Image 5.3.7 Supplementing milk above mother's breast with dropper, and baby breastfeeding from same breast



Image 5.3.8 Lactation aid: use of No. 5 feeding tube with its end placed near mother's nipple



Image 5.3.9 Combination of lactation aid and supplementing milk



5.3 Feeding with the Feeding Cup or Spoon

Using the Spoon (Image 5.3.1)

- Swaddle the baby and hold him with his head held high.
- Place the spoon on the baby's tongue to allow the baby to move his tongue to receive milk, thus relaxing the tongue.

Using the Feeding Cup and Soft Cup or Soft Feeder (Image 5.3.2-5.3.4)

- Swaddle the baby and hold him with his head held high.
- Place the cup rim on the baby lower lip without pouring the milk into his mouth. Let the baby stick his tongue out to lick the milk from the cup.

Using the Dropper (Image 5.3.5)

- Swaddle the baby and hold him with his head held high.
- Place the dropper against the baby upper lip to encourage him to use his tongue to lap up the milk from the dropper.

Finger Feeding (Image 5.3.6)

Finger feeding is used when the baby refuses to latch on the breast. This prepares him to use his tongue before a particular breastfeeding session.

Drop and Drip (Image 5.3.7)

This technique is appropriate when

- the baby latches on but the mother wishes to boost feeding, or slightly increase the baby's milk intake milk the baby is receiving.
- the baby's weight does not increase and milk supplements are required during breastfeeding.

Lactation Aids (Image 5.3.8-5.3.9)

These aids are useful when

- the baby latches on but the breast milk is insufficient, or the baby prefers a faster flow.
- the baby's weight does not increase, and milk needs to be supplemented externally.

5.4 Baby Wearing (Cloth Baby Carrier)



Image 5.4.1 Handmade loincloth baby carrier for baby to sleep in



Image 5.4.2 + Image 5.4.3 Hand-sewn cloth pouch sling

5.4 Baby Wearing (Cloth Baby Carrier)

Carrying the baby with the cloth sling is an expression of the mother's own handwork of love. Using such a sling is admired by all while the mother carries the baby from place to place. Cloth slings have made a comeback to the western heritage not long ago in 1981 after Mr. Rayner Garner, a father in Hawaii, created a cloth carrier using a piece of cloth and two rings for his wife to carry their baby, and for her to conveniently perform her daily chores. In 1985, Dr. William Sear studied the positive effects of a sling on the bond between the care giver and the baby, and discovered that the baby was more peaceful and less prone to crying. Moreover, the sling places the baby in surroundings similar to the womb with an uninterrupted touch. This boosted confidence, helped the baby adapt better and was found to reduce the stress experienced in the newborn, thus enabling him to gradually develop at the appropriate rate for that particular baby. Referring to the Nine-In, Nine-Out (NINO) concept, this conducive setting promotes the baby development and ability to adapt, with the close resemblance between the nine months in the womb and the next nine months outside. Dr. William Sear referred to this use of a cloth baby carrier as "baby wearing".

Using the cloth baby sling helps to make breastfeeding easier. Both the mother and the baby are happy, and the baby can grow and develop well. Baby wearing can be categorized into the following:

- Various original cloth carriers depending on geographical region, culture and use (Image 5.4.1).
- The Mai Tei, developed from the cloth slings made by the hill tribe villagers or Asians.
- Sewn pouch slings with various sizes, depending on the hip height (Image 5.4.2-5.4.3).
- Ring sling, which is a cloth carrier made with two rings to prevent the cloth from coming loose. This size-adjustable sling can be used immediately from birth and resembles the mother kangaroo pouch. This type of carrier can be used to carry the sleeping baby in the front or back carry style.
- The wraparound, made with a long piece of cloth, can be used straight from birth and also resembles the mother kangaroo pouch. This carrier is size-adjustable and can be used to carry the sleeping baby in the front or back carry style.

Benefits of Baby Wearing

1. The baby is less fussy or cries less than babies who are not cloth carried because he is physically close to the mother.
2. The baby is peaceful, breastfeeds better, and sleeps better because of the constant movement that provides the feeling of security.
3. The baby falls asleep more easily, and for a longer period of time. He can sleep whenever he wants, and can always sleep close to his mother.
4. The baby can breastfeed better and for as often as required, and will gain weight at a good rate.
5. The baby will have better digestion as his abdomen is gently massaged from the constant contact with the mother's body.
6. Baby wearing helps fix the position of the femurs (thigh bones) and hips where he will be in a frog-like pose when carried.
7. Engaging in daily activities while carrying the baby in a cloth carrier is convenient, and can help the mother burn up to 300 more kilocalories per day.



5.5 Breastfeeding Lingerie and Apparels



Image 5.5.1 Bra with opening from top



Image 5.5.2 Bras with opening from center



Image 5.5.3 Bras with opening from inner side



Image 5.5.4 + Image 5.5.5 + Image 5.5.6 Breastfeeding apparels



Image 5.5.7 + Image 5.5.8 + Image 5.5.9 Breastfeeding apparels



5.5 Breastfeeding Lingerie and Apparels

The nursing bra is an innovation designed to make breastfeeding more convenient as the mother does not need to completely remove her bra. Nursing bras have been designed to make it possible for the mother to uncover either of her breasts immediately when needed by the baby. The bras can also provide needed support for the nursing mother as the breasts increase in size and weight after childbirth. There are many different nursing bra designs and styles to meet the varying fashion tastes and requirements of mothers. The key feature of nursing bras is the ability to provide support at all times for the breasts that have increased in size and weight. Therefore, the mother should choose the appropriate fitting nursing bras that are not loose. At the same time, the bras should not be too tight because they will add extra pressure on the milk ducts, causing disruption to circulation and leading to plugged ducts or breast infection (mastitis).

Nursing bras designed to open from the top (Image 5.5.1).

Nursing bras that uncover the breast from the center (Image 5.5.2).

Nursing bras that uncover the breast from the side (Image 5.5.3).

Breastfeeding Apparels

These types of clothes are designed to help today's mothers to undress less and more conveniently, at any time and place. The mother can even breastfeed in public without having to worry about other parts of the body being exposed. The mother can choose from a variety of breastfeeding clothes to meet her own personal need, taste and fashion. These kinds of non-revealing breastfeeding clothes can be worn to work, and selected according to the time and current fashion.

Pictures of the different fashion styles of breastfeeding outfits (Images 5.5.4-5.5.9).



5.6 Baby Bag (Gift Set to Promote Breastfeeding)



Image 5.6.1 - 5.6.2 Baby bag under the royal patronage of the then royal consort to His Royal Highness Crown Prince Maha Vajiralongkorn.



Image 5.6.3 + Image 5.6.4 + Image 5.6.5 Baby gift sets for Queen Sirikit National Institute of Child Health personnel from the fiscal year of 2006-2008, respectively



Image 5.6.6 + Image 5.6.7 + Image 5.6.8 Baby gift sets for Queen Sirikit National Institute of Child Health personnel for the fiscal year of 2009-2011, respectively



5.6 Baby Bag (Gift Set to Promote Breastfeeding)

The Baby Bag is a baby gift set to promote breastfeeding consisting of:

- A large shoulder bag of newborn toiletries, blouses, pants, diapers and so forth.
- A thermal breast milk bag.
- Four 100 ml ice bricks to keep the breast milk temperature at 15 °C inside the thermal milk bag for approximately 10 hours at an outside temperature of 32-34 °C (based on ice brick research done by the Breastfeeding Center, Queen Sirikit National Institute of Child Health (QSNICH) in 2006, 2008 and 2010). The bricks are an alternative to ice, but do not melt and are reusable and portable, as well as help to maintain the temperature inside the bag for an extended period of time.
- A non-revealing breastfeeding blouse.
- 40 breast milk storage bags.
- The book entitled “Breast Milk: A Baby’s Intelligence Building Block”.
- CD on storing breast milk.
- Brochure detailing how to store breast milk and more, along with the business card of lactation clinic.
- A greeting card to congratulate the new mother, and encourage breastfeeding.

The thermal breast milk bag is to store the mother’s breast milk until she returns home from work. Alternatively, it can be used to bring breast milk from home to the hospital if the baby is ill and needs to be admitted.

There is also the breast milk bag under the then royal consort to His Royal Highness Crown Prince Maha Vajiralongkorn, as featured in Image 5.6.1 - 5.6.2.

The Queen Sirikit National Institute of Child Health (QSNICH) also has the baby gift sets for their personnel who have babies, so as to promote breastfeeding, and photos of the bags from the fiscal years of 2006-2011, respectively, can be seen on the opposite page (Images 5.6.3 - 5.6.8).

5.7 Breastfeeding Corner



5.7.1 Staff member utilizing Breastfeeding Corner in Lactation Clinic at Queen Sirikit National Institute of Child Health (QSNICH)



5.7.2 A client of breastfeeding services at Lactation Clinic, QSNICH.



5.7.3 Marigot Jewellery Co., Ltd - knowledge corner



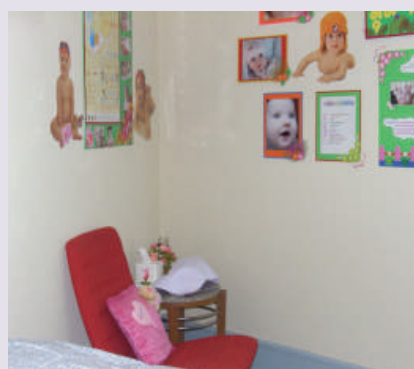
5.7.4 Officer teaching mother how to express milk by hand



5.7.5 Staff gathering to manually express breast milk together



5.7.6 Krung Thai Bank - breast milk pumping corner



5.7.7 Krung Thai Bank - knowledge corner



Standard Chartered Bank

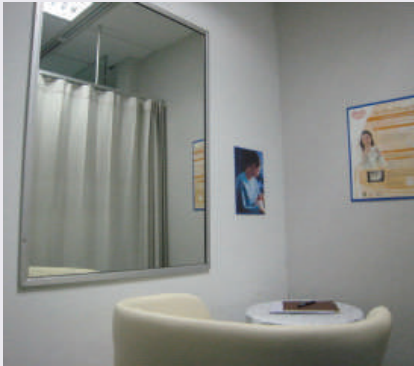


Image 5.7.8 Hand washing corner



Image 5.7.9 Well-arranged breast milk expression corner



Image 5.7.10 Breast milk expression corner ambience



Image 5.7.11 Thai Military Bank - breast milk expression corner



Image 5.7.12 Delta Co., Ltd. - breast milk expression corner



Image 5.7.13 Siam Denso Co. - breast milk pumping corner



Image 5.7.14 Jim Thompson - Baan Kasiratara



Image 5.7.15 Lampang Hospital - breastfeeding learning corner



Image 5.7.16 Lampang Hospital - breast milk pumping station



Image 5.7.17 Kasem Phitiya School - breastfeeding room



Image 5.7.18 Kasem Phitiya School - breast milk pumping corner



5.7 Breastfeeding Corner

Given today's economy and society, most mothers need to work away from home. In Thailand, the Department of Labor Protection and Welfare under the Ministry of Labor, the Department of Health under the Ministry of Public Health, and the Thai Breastfeeding Center Foundation have collaboratively pioneered breastfeeding corners in workplaces. Setting up such facilities helps employers and employees of organizations realize the importance of breastfeeding, and promotes more establishment of similar facilities. It also helps the employees to save on their expenses, and improves the quality of life for employees and their children. Moreover, it boosts the employee morale and encouragement as they work, and also strengthens employer-employee relations.

Requirements for Breastfeeding Corners at the Workplace

1. Comfortable seats or sofas.
2. Hand washing basin with soap and hand towels.
3. Refrigerator for storing breast milk or an ice bucket, and a pen for writing down the name and dates.
4. Breast pumps.
5. Radio or stereo to provide relaxing tunes.

Benefits for the Employers

1. Employees can take leave less often.
2. The work efficiency of mothers and fathers will be improved.
3. Employers will be commended by their employees, which will lead to improved employee's faithfulness, confidence and loyalty to the organization.

References

1. Jitinun S, Chatranont W, Savasdivorn S, Editors. Breastfeeding: From knowledge to practice. 2nd ed. Bangkok: Bangkok Medical Publisher Ltd Part.; 2003.
2. Blois M. Hold Me Close: Encouraging Essential Mother/Baby Physical Contact[1]. Excerpt from Blois M. Birth: Care of Infant and Mother: Time Sensitive Issues[2]. Best Practices in the Behavioral Management of Health from Preconception to Adolescence, edited by William Gordon and Jodie Trafton. Lost Altos: Institute for Disease Management. 2007-8 pp. 108-132.
3. Davanzo R. Nutrition with human milk: research and practice. Trieste, Italy: Medela AG; 2010.
4. Hunziker UA, Garr RG. Increased Carrying Reduces Infant Crying: A Randomized Controlled Trial[3]. Pediatrics 1986; 77: 641-648.
5. Lawrence RA., Lawrence RM. Breastfeeding: A Guide for the Medical Profession[4]. 7th ed. St. Louis: Mosby, Inc.; 2011.
6. Old SB, London ML, Ladewig PA. Maternal-Newborn Nursing: A Family and Community-Based Approach[5]. 6th ed. Upper Saddle River, NJ: Prentice Hall, Inc.; 2000.
7. Sears W, Sears M. The Baby Book: Everything You Need to Know about Your Baby from Birth to Age Two[6]. 2nd ed. New York: Little, Brown and Company; 2008.
8. Wilson-Clay B, Hoover K. The Breastfeeding Atlas[7]. 4th ed. New York: Lactnews Press: 2008.



Unit 6:

Relevant Truths about Breastfeeding

- 6.1 Evolution of breastfeeding**
- 6.2 Lactation clinic in hospitals**
- 6.3 Growth Graph for babies**
- 6.4 Food for babies**
- 6.5 Regulating the marketing strategies of foods for babies and young children**
- 6.6 Breastfeeding Information Source**

6.1 Evolution of Breastfeeding

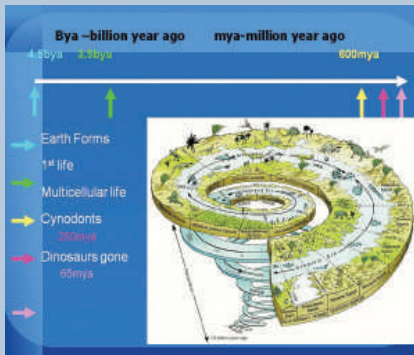


Image 6.1.1 Evolution of the world and living things (1)

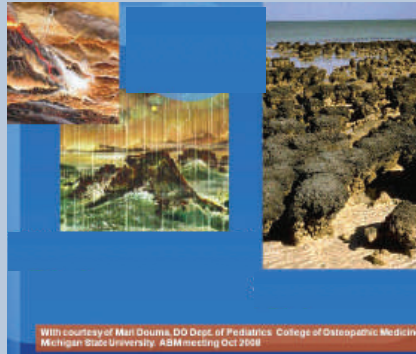


Image 6.1.2 Evolution of the world and living things (2)



Image 6.1.3 First appearance of plants and reptiles 400 million years ago

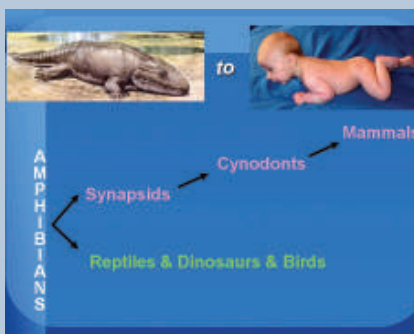


Image 6.1.4 From amphibians to mammals



Image 6.1.5 First appearance of mammals 200 million years ago



Image 6.1.6 Different kinds of mammals over the past 60 million years

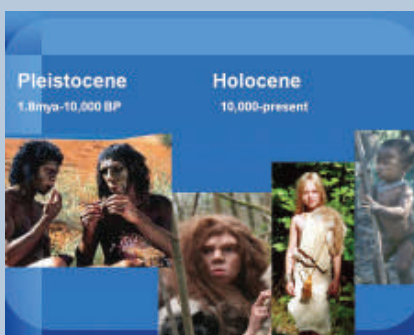


Image 6.1.7 Holocene humans walked with only their feet and had features, behavior, and brain size similar to that of present-day humans



Image 6.1.8 Long evolutionary history of natural phenomenon of nursing young with milk



Image 6.1.9 Breastfeeding relies on physiological-behavioral-hormonal-endocrinological input of mother and baby



6.1 Evolution of Breastfeeding

When the world came into existence approximately 4.5 billion years ago (Image 6.1.1), the first billion years were completely void of living organisms. From 3.5 billion years to 600 million years, unicellular organisms began to appear, which resulted in oxygen in the atmosphere (Image 6.1.2). The next evolutionary development was the appearance of multicellular organisms.

600 million years ago	Appearance of aquatic organisms.
450 million years ago	The first fish existed.
400 million years ago	Simple plants and arthropods came into existence.
350 million years ago	Development of the first amphibians.

At about 300 million years ago, amphibians could be categorized into two groups, namely reptiles and synapsids. It was the latter group, synapsids, that humans evolved from (Image 6.1.4).

Mammals first inhabited the earth about 200 million years ago. This was after the time of the dinosaurs (Image 6.1.5) and their evolution had been continuous ever since. Their development became more definite after the dinosaurs became extinct around 65 million years ago (Image 6.1.6). It was not until 27 million years ago that the great apes were born and 6-7 million years ago that human development diverted from that of chimpanzees in that they began to walk on two legs but with relatively a small brain. The Pleistocene humans existed during 1.8 million years to 10,000 years ago and still had resemblance to monkeys. It was only until 10,000 years ago that came the beginning of the period known as the Holocene where humans had features, behavior and brains more like that of present-day humans (Image 6.1.7).

Since then, 4,237 different kinds of mammals had gone through evolutionary development (Image 6.1.8). Each mammal milk type differs depending on their habitat, their surroundings and how the young are cared for. For instance, aquatic mammals' milk has a higher fat content. Mammals that nurse their young less frequently, about 2 to 3 times a day, have milk that is more concentrated with proteins and fat. What remains identical for all mammals is that the mother's milk is both a source of nutrition and immunity for their young.

The evolution of mammals inclusive of human beings has been a long-lasting process. The ability to breastfeed from the mother stems from the instinct emerged in different stages of development. It begins with the young being with the mother, getting her scent and touching her which in turn evokes the baby's reaction of opening its mouth, reaching for the mother's breast and drinking the milk lactated by the mother (i.e. the physiological-behavioral-hormonal-endocrinological input of the mother and child). This is a natural process that exists for the continuation and survival of the species. Providing the infant with any formula milk will only upset this process and undermine the natural means (Image 6.1.9).



6.2 Lactation Clinic in Hospitals



Image 6.2.1 Mother waiting to receive service assistance at lactation clinic in hospital



Image 6.2.2-6.2.3 Nurses training mothers with ill babies to nurse their babies during stay in hospital



Image 6.2.4-6.2.5 Fathers assisting mothers as they train their babies on breastfeeding



Image 6.2.6-6.2.8 Beds used to practice nursing babies in lie-on-side position, or for mothers' rest





Image 6.2.9 Mothers expressing milk in lactation clinic



Image 6.2.10 Breastfeeding leaders' training



Image 6.2.11 Breastfeeding talk



Image 6.2.12-6.2.14 Interior of lactation clinic



Image 6.2.15-6.2.16 Promotional materials and aids concerning breastfeeding



Image 6.2.17 Lactation clinic equipment



Image 6.2.18-6.2.19 Consultation services at Lactation clinic



Image 6.2.20 Call center and follow-up calls made to mothers of newborns 1-2 weeks after hospital discharge



6.2 Lactation Clinic in Hospitals

Lactation clinics play important role in providing assistance, counseling and problem-solving services to nursing mothers. With its significance comparable to that of health promotion and specialty clinics, any maternal and child care hospitals need to have a lactation clinic. The Lactation clinic is one of the key indicators of the hospitals in Sai Yai Rak (Love and Care in Family) Project.

The experience of many clinics reveals that breastfeeding clinics in major hospitals are crowded with several mothers requiring assistance, such as Siriraj Hospital (Image 6.2.1). The Queen Sirikit National Institute of Child Health (QSNICH) is a specialized hospital offering treatment only to children. Therefore, the nurses there must train mothers with sick babies, such as the premature ones (Image 6.2.2-6.2.3), while they are treated in hospital. Lactation clinics all around the country help fathers play an active role in helping the mothers teach their babies how to breastfeed properly (Image 6.2.4-6.2.5). The clinics also have beds for mothers to practice the lie-on-side nursing position, or for them to rest as needed (Image 6.2.6-6.2.8). They also provide a corner for mothers to express breast milk (Image 6.2.9). Some lactation clinics carry out very effective proactive operations. For instance, they train their employees to be breastfeeding core leaders (Image 6.2.10), and encourage mothers to share and exchange their knowledge and experiences with medical staff (Image 6.2.11). Moreover, a crucial requirement of the lactation clinic is to be situated in a quiet and private location so that the mothers who seek assistance can feel at ease and comfortable as if they are in their own homes (Image 6.2.12-6.2.14). Printed materials offering necessary and helpful knowledge should be made available, well organized, and also easy to obtain (Image 6.2.15-6.2.16). Lactation clinics should also have the necessary equipment, such as breast pumps, breast shields, breast models and so forth (Image 6.2.17). In addition to helping mothers successfully nurse their babies, these clinics also offer consulting services to mothers, fathers and families (Image 6.2.18-6.2.19). A clinic can also have a call center for mothers to call for help with their nursing problems as some issues do not require the mother and baby to make the trip to the clinic (Image 6.2.20).

Equipment in the Breastfeeding Clinic

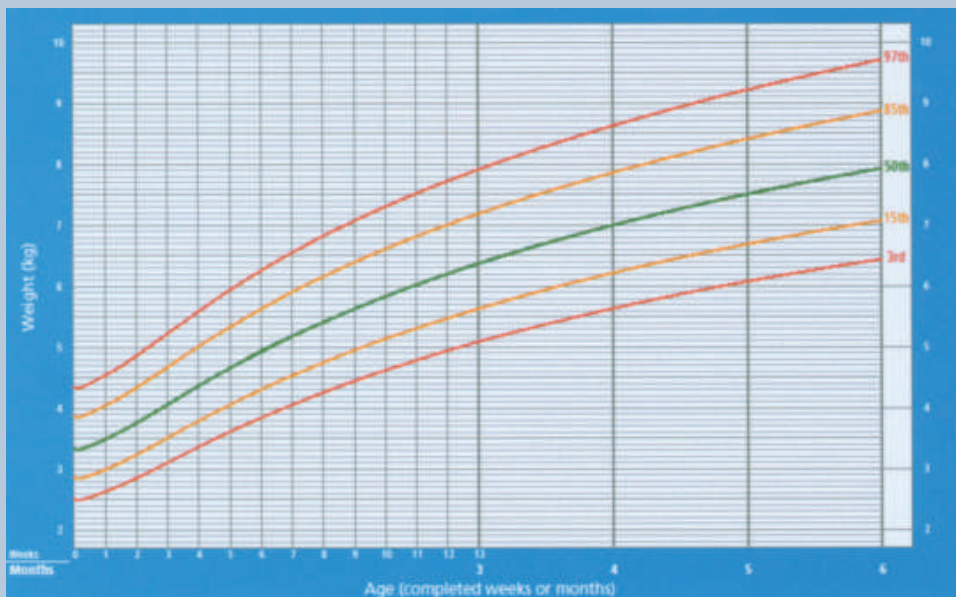
- Chairs with back support for breastfeeding practice.
- Pillows of various sizes including reclining pillows and breastfeeding pillows.
- Footrests in the form of chairs, pillows, boxes and so forth.
- Beds for mothers to nurse in the lie-on-side position.
- Thermos, water jug and glasses.
- Bowls, wide-mouthed jar and towels for a breast compress.
- Sterilized bottles for pumping and storing breast milk as well as labels for the name and time of expression.
- Refrigerator, weighing scales for the mother and baby, tools to measure the baby height and thermometers.
- Sink, hand soap and hand towels.
- Problem-solving tools
 - Flat nipple tools used in cases where the mother with short, flat or inverted nipple, or a cracked and hurt nipple.
 - Nipple pullers used for the flat or inverted nipples, or tight areolas.
 - Breast pumps for engorged breasts, or expressing milk for storage.
 - Medicine dropper, bowls, spoons, syringes and feeding tubes.



6.3 Growth Graphs for Babies

Weight for Boys according to Age

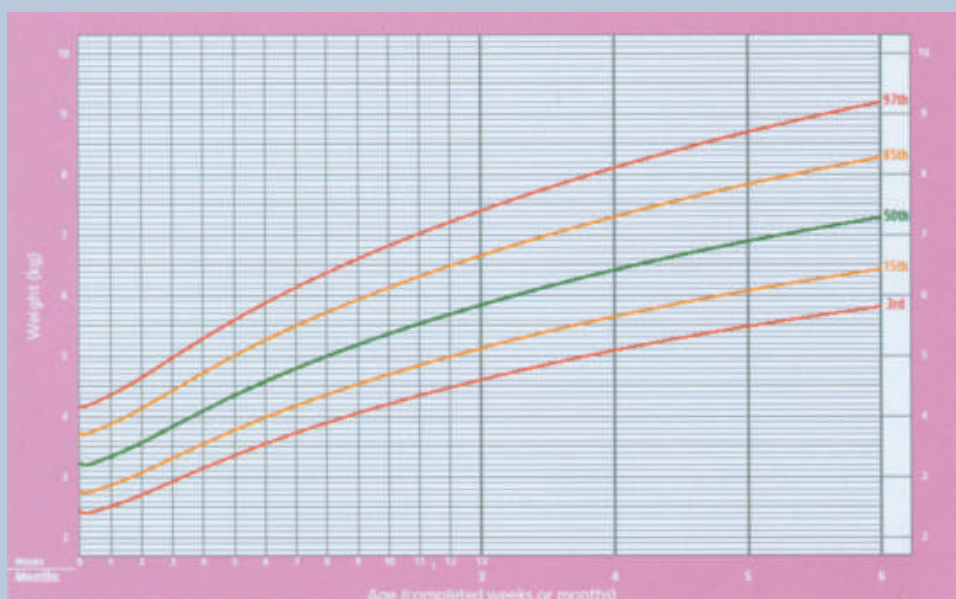
(Newborn to 6 months)



(WHO Child Growth Standards)

Weight for Girls according to Age

(Newborn to 6 months)



(WHO Child Growth Standards)



6.3 Growth Graphs for Babies

New Global Growth Standards for Breastfed Babies

Most mothers are unsure if their breast milk would be enough to support their baby growth. The standards that indicate the appropriate growth for babies at different ages, thus act as a map showing the growth for newborns and babies. Because mothers should be able to keep track of their baby growth on their own, medical staff need to understand the standards, and be able to give the correct advice to mothers, so that they can feel relieved and be confident about breastfeeding. This also helps reduce unnecessary use of formula milk.

Developing New Global Growth Standards for Breastfed Babies

The new standards issued by the World Health Organization (WHO) in 2005 were developed from a study of a sample of breastfed babies from various regions across the world in six countries and five continents, including Brazil, Ghana, India, Norway, Oman and the United States of America. Over a period of 24 months, the sample group of babies received high quality nutrition, were placed in pleasant surroundings, and also had their health well taken care of. Moreover, the mothers had healthy habits (i.e. they did not smoke during or after pregnancy). The WHO comparison of these new growth standards with the former set proved that the new standards were appropriate benchmarks for mothers to assess their babies' growth.

The new growth standards have a median weight for the first six months that is higher than the ones in the previous growth standards. This proves that providing exclusive breast milk to the baby for the first 4-6 months does not lead to sub-standard weight. In fact, these babies gain weight better than those who are given formula milk.

The effect of the WHO new baby growth standards on nutritional assessment is that it is more sensitive in terms of pinpointing a deficiency in weight and length when compared to the previous standards. Therefore, these new standards should be sufficiently applicable to Thai children. Mothers who provide only breast milk to their babies for the first six months should be able to use these new standards to ensure that their baby growth is acceptable as they were developed specifically for breastfed babies. Furthermore, the mothers will be able to detect early on if their baby growth is hindered.

At present, the Thai Department of Health, Ministry of Public Health shares the same views as with specialists, and is working with them to prepare new growth standards to monitor the growth of Thai children.



6.4 Food for Babies



Image 6.4.1 Ground rice, egg yolk and ivy gourd



Image 6.4.2 Ground rice, chicken liver, tofu and sweet leaf



Image 6.4.3 Ground rice, mackerel and pumpkin

Examples of food for babies 6 to 8 months old



Image 6.4.4 Rice porridge, egg and ivy gourd



Image 6.4.5 Fish rice porridge with carrots



Image 6.4.6 Ground pork rice porridge, pig blood pudding and ivy gourd

Examples of food for babies from 9 to 11 months of age



Image 6.4.7 Egg fried rice and chicken, sweet leaf and pumpkin in broth



Image 6.4.8 Rice, sauted soft tofu and pig blood pudding, ground pork, carrot and ivy gourd in broth

Examples of food for babies aged one year and older



6.4 Food for Babies

Complementary food for babies refers to other food that the babies receive as meals in addition to breast milk or formula. This is for the babies to receive a complete and sufficient amount of the necessary nutrients needed for their growth. This also prepares them to switch from liquid food to semi-solid food, and eventually adult food so that they develop appropriate eating skills.

Practical Guidelines

The guidelines for providing babies with the appropriate complementary food are that it should be right for their age, and sufficient in amount and safe. It should also satisfy their hunger, be filling and suit their skill developments. There are three age categories as indicated in the next section.

1. Ages 6-8 Months

Babies that are 4-6 months old are ready to take on semi-solid food. At this age, they are capable of keeping their heads and torsos steady and are also able to put things in their mouths, while the extrusion reflex of the tongue is reduced. They are also able to express acceptance of food when hungry or refusal when full, which prevents the caregivers from overfeeding the baby.

On average, babies who are breastfed should be given 1-2 meals of complementary food at this age. This total amount of complementary food should provide approximately 200 kilocalories of energy per day for the baby. This means that one meal consists of 4 tablespoons of rice in 10 tablespoons of broth, and half an egg alternating between 1 to 1 1/2 tablespoons of pork, chicken or fish as well as 1 to 2 tablespoons of mashed vegetables, such as pumpkin and ivy gourd. About half a teaspoon of oil can be used to cook the food. The meal should also include 1 serving of fruit such as 1 banana or 2 pieces of papaya. Food for 6-month olds should be mashed until decently fine, which will make it easier to swallow. However, it should not be completely mashed because this will not give the infant the chance to practice chewing and swallowing.

2. Ages 9-11 Months

Once the infant is 9-11 months old, the total number of meals per day should increase to two to three meals. Moreover, the texture of the food should be coarser when the baby can start chewing and swallowing better. It does not need to be mashed too much. For instance, the meal can consist of boiled rice with small pieces of meat, so that the baby becomes familiar with pieces of small food. At this age, the baby needs approximately 300 kilocalories of energy from food. This means that one meal should consist of 4 tablespoons of rice in 10 tablespoons of clear soup, one egg alternating between 1 to 1 1/2 tablespoons of pork, chicken or fish and 2 tablespoons of mashed vegetables like pumpkin or ivy gourd cooked using approximately 1/2 teaspoon of oil, as well as fruit.

3. Ages 12-23 months

Once the baby is 12 months or more, he should be consuming three whole meals. At this age, he needs 400-500 kilocalories of food per day. As such, a meal should consist of 5 tablespoons of rice cooked using one teaspoon of oil, half an egg together with 1 to 1 1/2 tablespoons of pork, chicken or fish. The meal should also include 3-4 tablespoons of vegetables like carrots and Chinese cabbage, along with some fruit. The baby can also eat the same food as adults now, though it should be easy to chew, soft and not too big of a piece, but not too seasoned or too rich in taste.

Examples of food for infants aged 6 to 8 months for 1 to 2 meals a day

Mashed rice with egg yolk and ivy gourd



Ingredients for one meal	Amount	Weight (Grams)
Rice	4 tablespoons	40 grams
Clear soup	10 tablespoons	100 grams
Egg yolk	1/2 egg	7 grams
Ivy gourd	1 and 1/2 tablespoons	12 grams
Vegetable oil	1/2 teaspoon	2.5 grams

Energy	106 kilocalories	: Energy ratio from
Protein	3.1 grams	: Carbohydrates: Fat: Protein
Energy intensity	0.8 kilocalories/gram	: is 48:41:11

Mashed rice with chicken liver, tofu and sweet leaf



Ingredients for one meal	Amount	Weight (Grams)
Rice	4 tablespoons	40 grams
Clear soup	10 tablespoons	100 grams
Chicken liver	1/4 tablespoon	4.25 grams
Soft egg tofu	2 tablespoons	34 grams
Sweet leaf	1 and 1/2 tablespoons	7.5 grams
Vegetable oil	1/2 teaspoon	2.5 grams

Energy	106 kilocalories	: Energy ratio from
Protein	4.0 grams	: Carbohydrates: Fat: Protein
Energy intensity	0.66 kilocalories/gram	: is 52 : 33 : 15



Mashed rice with egg yolk and ivy gourd



Ingredients for one meal	Amount	Weight (Grams)
Rice	4 tablespoons	40 grams
Rice	4 tablespoons	40 grams
Clear soup	10 tablespoons	100 grams
Steamed or fried mackerel	1 and 1/2 tablespoons	13.5 grams
Pumpkin	1 and 1/2 tablespoons	13.5 grams
Vegetable oil	1/2 teaspoon	2.5 grams

Energy 122 kilocalories : Energy ratio from
 Protein 5.6 grams : Carbohydrates: Fat: Protein
 Energy intensity 0.84 kilocalories/gram : is 47 : 35 : 18

Examples of food for infants aged 9 to 11 months for 3 meals a day

Boiled rice with egg and ivy gourd



Ingredients for one meal	Amount	Weight (Grams)
Rice	4 tablespoons	40 grams
Clear soup	10 tablespoons	100 grams
Egg	1/3 egg	16.5 grams
Ivy gourd	2 tablespoons	16 grams
Vegetable oil	1/2 teaspoon	2.5 grams

Energy 110 kilocalories : Energy ratio from
 Protein 4.3 grams : Carbohydrates: Fat: Protein
 Energy intensity 0.74 kilocalories/gram : is 48 : 36 : 16

Boiled rice with fish and carrot



Ingredients for one meal	Amount	Weight (Grams)
Rice	4 tablespoons	40 grams
Clear soup Boneless saltwater fish	10 tablespoons	100 grams
Carrots	1 and 1/2 tablespoons	22.5 grams
Vegetable oil	2 tablespoons	20 grams
	1/2 teaspoon	2.5 grams

Energy 109 kilocalories : Energy ratio from
 Protein 6.3 grams : Carbohydrates: Fat: Protein
 Energy intensity 0.70 kilocalories/gram : is 51 : 26 : 23

Mashed rice with chicken liver, tofu and sweet leaf



Ingredients for one meal	Amount	Weight (Grams)
Rice	4 tablespoons	40 grams
Clear soup	10 tablespoons	100 grams
Ground pork	1 tablespoon	15 grams
Pork blood jelly	1/2 tablespoon	6.5 grams
Sweet leaf	2 tablespoons	10 grams
Vegetable oil	1/2 teaspoon	2.5 grams

Energy 119 kilocalories : Energy ratio from
 Protein 4.9 grams : Carbohydrates: Fat: Protein
 Energy intensity 0.81 kilocalories/gram : is 44 : 40 : 16



Examples of foods for babies aged 12-23 months for 3 meals a day

Fried egg rice and chicken, sweet leaf and pumpkin soup



Ingredients for one meal	Amount	Weight (Grams)
Rice	5 tablespoons	50 grams
Clear soup	10 tablespoons	100 grams
Chicken	1 tablespoon	15 grams
Chicken liver	1/4 tablespoon	4.25 grams
Egg	1/3 egg	16.5 grams
Pumpkin	2 tablespoons	20 grams
Sweet leaf	2 tablespoons	10 grams
Vegetable oil	1 teaspoon	5 grams

Energy 186.8 kilocalories : Energy ratio from
 Protein 7.6 grams : Carbohydrates: Fat: Protein
 : is 41 : 43 : 16

Rice with fried softtofu and pork blood jelly, ground pork carrots and ivy gourd soup



Ingredients for one meal	Amount	Weight (Grams)
Rice	5 tablespoons	50 grams
Clear soup	10 tablespoons	100 grams
Ground pork	1 tablespoon	15 grams
Pork blood jelly	1 tablespoon	13 grams
Egg tofu	2 tablespoons	34 grams
Ivy gourd	2 tablespoons	16 grams
Carrot	2 tablespoons	20 grams
Vegetable oil	1 teaspoon	5 grams

Energy 183 kilocalories : Energy ratio from
 Protein 8.1 grams : Carbohydrates: Fat: Protein
 : is 40 : 42 : 18



6.5 Regulating Marketing Strategies of Food for Babies and Young Children



Image 6.5.1 Distribution of samples of food for babies and young children



Image 6.5.2 Gift for mothers



Image 6.5.3-6.5.4 Conference on setting regulations for baby and young children food marketing strategies



6.5 Regulating Marketing Strategies of Food for Babies and Young Children

Towards the end of the 19th century, breastfeeding decreased across Europe and in North America. This trend started with the first-world countries and communities, and expanded to the less privileged ones. Aiming to protect babies and ensure that they receive proper breastfeeding and care from their mothers, an alliance against formula milk set out to establish measures to regulate the marketing strategies conducted by the food industry targeting babies and young children that was undermining breastfeeding.

In January, 1981, the 67th WHO executive board meeting deliberated the legal aspect of the International Code of Marketing of Breast-Milk Substitutes. The board unanimously resolved to issue recommendations which were not obligatory for member countries to follow rather than regulations. The international code was adopted during the 34th World Health Assembly (WHA) under WHA Resolution 34.22 with overwhelming support from representatives of 118 countries, 1 “no” from the United States and 3 abstentions (namely Argentina, Japan and Korea). Moreover, the guidelines were emphasized as being the minimum requirements.

The International Code of Marketing of Breast-Milk Substitutes provides measures to prevent unethical marketing and advertising of baby and children’s food. This does not include the regulation of the sales or uses of the products. The code also outlines the roles, duties and responsibilities of medical and public health staff as well as the public health centers and public health system.

As of 2006, the International Baby Food Action Network (IBFAN) included 193 countries over five continents consisting of 46 countries from Asia, 14 from Oceania, 36 from America, 52 from Africa, and 45 from European. Thirty-two of these countries enforced the International Code of Marketing of Breast-milk Substitutes as law.

The marketing of baby food and food for children affects the values and preference for and use of formula milk. A review of studies on nine topics with a sample of 3,730 mothers in North America was conducted. The review revealed that in regard to mothers of newborns who received gift sets from companies consisting of formula milk, or printed material promoting modified formula milk, as they were returning home from the hospital after their babies’ birth, the portion of mothers who exclusively breastfed their babies for six weeks and three months (13 weeks) after birth, and the proportion of those who breastfed exclusively for the first six months, reduced in comparison to mothers who received other gift sets that did not include formula milk samples.



In 2008, Thailand's Bureau of Health Promotion conducted a study that discovered modified formula milk manufacturers and marketers violating the Thailand Code of Marketing of Food for Babies & Young Children and Related Products. These violations include forms of advertisements targeted at the public, provision of baby and young children food samples (Image 6.5.1), and directly offering gifts to mothers and families (Image 6.5.2). In addition, marketing staff were using public health facilities to promote food for babies and young children, donating baby food and food for young children to these public health facilities, handing out samples to health workers and offering information on food for babies and young children, without explaining the benefits of breastfeeding or the costs and dangers of breast-milk substitutes. The academic papers pertaining to food for babies and young children have no scientific evidence and were exaggerated. Furthermore, the labels for the food include images or texts that encourage use of the product.

Through the Bureau of Health Promotion, The Thai Department of Health proposed the regulation of the marketing of food for babies and young children (Image 6.5.3-6.5.4) in the 3rd National Health Assembly on December 3, 2010 with the following objectives:

1. To request that the National Health Commission propose to the Cabinet for approval and designate the Ministry of Public Health as the key agency to co-ordinate with other units as follows:

- 1.1 Regulating the marketing of food for babies and young children in accordance with the Thailand Code of Marketing of Food for Babies & Young Children and Related Products, 2008 with the involvement of different parties including the Ministry of Public Health, Ministry of Education, Ministry of Commerce, Ministry of Agriculture and Cooperatives, Ministry of Interior, Ministry of Labor and other related agencies.

- 1.2 Developing a royal act for food for babies and young children successfully within 2012 by setting operational mechanisms based on the Thailand Code of Marketing of Food for Babies & Young Children and Related Products, 2008 (Health Assembly 3/Tenet 2/Appendix 1).

- 1.3 Strengthening the mechanisms of policy implementation and assessment.

2. To have the members of the National Health Assembly cooperate to build and promote social consciousness with regard to breastfeeding; promote the rights of female workers to take maternity leave willingly; improve the monitoring of the Code of Marketing of Food for Babies & Young Children and Related Products violations by public and private sectors along with the general public including for instance, the Thailand Health Promotion Fund, Network for Age-Appropriate Nutrition, Foundation for Consumers, Family Network Foundation, Confederation of Consumer Organization, Local Administrative Organizations (LAO), Organization for Healthcare Professionals, Federation of Thai Industries, Board of Trade of Thailand, and Advertising Association of Thailand.



3. The request that the Ministry of Labor through the Department of Labor Protection and Welfare in considering to amend the laws related to maternity leave rights of female employees in the workplace, by increasing the duration of the leave while also receiving full pay, as well as implementing measures or benefits to promote and support breastfeeding for female employees who have returned to work in the workplace.

Regulating the marketing of food for babies and young children should include a campaign to increase awareness through public and private media and also in the workplace, and to encourage leaders in the public and private sectors, local level and civil society, to take an active role in monitoring, regulating and following up on violations of the Code of Marketing of Food for Infants & Young Children and Related Products. Lessons on the value of breastfeeding should also be included in the educational curriculum of school-age children until they reach their teens, to cultivate a social value and culture of breastfeeding. Measures can also be taken to make the environment more conducive to breastfeeding, and to include steps such as establishing consultation clinics in hospitals and nursing corners in both hospitals and workplaces. Pushing for a royal decree concerning food for babies and young children will help to deal with the problems of marketing food for babies and young children. This as well as other matters related to food for infants and young children will be better managed with the adoption of the International Code of Marketing of Food for Babies & Young Children and Related Products, 2008 as the basis for this law. The foundation of this is based on academic knowledge and facts. A law should also be passed requiring workplaces to provide measures or benefits for pregnant employees and working mothers with children. Moreover, the law regarding the right to maternity leave should be amended to extend the duration of the leave as well as ensure that remuneration is provided for the entire leave period. Adjustments should be made to the process of monitoring, regulating and following up on practices that are carried out in accordance with the law pertaining to the marketing of food for babies and young children. Every sector should be involved to ensure health protection for mothers and children alike. Finally, all parties in this monitoring network should be continually motivated and honored to mold the Thai people into a breastfeeding-centric society.



6.6 Breastfeeding Information Sources

Thai knowledge centers and information sources

1. Thai Breastfeeding Center Foundation, <http://www.thaibreastfeeding.org>
2. Thai Breastfeeding Center: Digital Repository, <http://www.breastfeedinglib.saiyairak.com>
3. <http://www.breastfeedingthai.com>
4. Queen Sirikit National Institute of Child Health, <http://www.childrenhospital.go.th>
5. Thai Health Promotion Foundation (ThaiHealth), <http://www.thaihealth.or.th>
6. Sathira Dhammasathan, <http://www/sdsweb.org>

Foreign Knowledge centers and information sources

1. American Academy of Pediatrics www.aap.org/healthtopics/breastfeeding.cfm
2. Academy of Breastfeeding Medicine www.bfmed.org
3. American Academy of Family Physicians www.aafp.org
4. American College of Obstetrics and Gynecology www.acog.org
5. Australian Breastfeeding Association <http://www.breastfeeding.asn.au>
6. Baby-Friendly USA www.babyfriendlyusa.org
7. Best Start Social Marketing www.beststart.com
8. Breastfeeding Basics <http://www.breastfeedingbasics.org>
9. Breastfeeding Inc. www.breastfeedinginc.ca
10. Breastfeeding Online www.breastfeedingonline.com
11. Healthy Mothers, Healthy Babies Coalition www.hmhb.org/index.html
12. Emergency Nutrition Network www.enonline.net/life
13. International Baby Food Action Network www.ibfan.org
14. International Lactation Consultants Association www.ilca.org
15. International Society of Research in Human Milk and Lactation www.isrhmil.org.ume.se
16. La Leche League International www.llli.org
17. Medicine Plus <http://www.nim.nih.gov/medicineplus/breastfeeding>
18. National Library of Medicine on-line service regarding drugs during lactation (LactMed) <http://foxnet.nim.nih.gov/cgi-bin/htmgigen?LACT>
19. UNICEF www.unicef.org



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| 20. USBC | www.usbreastfeeding.org |
| 21. U.S. Centers for Disease Control | www.cdc.gov/breastfeeding |
| 22. U.S. Office of Women's Health | www.womenshealth.gov/breastfeeding |
| 23. Washington State Physician's Collaborative | www.withinreachwa.org |
| 24. Wellstart International | www.wellstart.org |
| 25. World Health Organization (WHO) | www.who.int/child_adolescent_health
www.who.int/nutrition/en |
| 26. World Alliance for Breastfeeding Action (WABA) | www.waba.org.my |

Instructional Materials (Books, CDs, VDOs and pamphlets)

- | | |
|---|--|
| 1. Breastfeeding Basics | www.breastfeedingbasics.org |
| 2. Human Lactation Center, University of California | http://lactation.ucdavis.edu |
| 3. Wellstart International | www.wellstart.org |

References Documents

1. Jittinun S, Chatranon W, Savasdivorn S, Editors. Breastfeeding from knowledge to practice. 2nd ed. Bangkok: Bangkok Medical Publisher; 2003.
2. Suthutvoravut U, Tantracheewathorn S, Khunsanong S. Editors. Complementary food for infants and young children Handbook. Bangkok: Beyond Enterprise; 2010.
3. Suthutvoravut U, Saleepan S. Infant Feeding Handbook. Bangkok. dd
4. World Health Organization. The WHO child growth standards. <http://www.who.int/childgrowth/en/>



Name List of Lactation Clinics

Name	Address
Faculty of Medicine, Khon Kaen University	123 Moo 16 Mittraphap Rd., A. Muang, Khonkaen 40002 Tel: 043-202-222-41, 043-363-512-13
Bangkok Christian Hospital	124 Suriyawong, Bang Rak, Bangkok 10500 Tel: 02-235-1000 # Nursery
Krabi Hospital	325 Utarakit Rd., T.Paknam, A. Muang, Krabi 81130 Tel: 075-611212
BMA General Hospital	514 Luang Rd., Thap Sirin, Pom Prap Sattru Phai, Bangkok 10100 Tel: 02-221-6141 # 11320
Kho Pha-ngan Hospital	6 Moo 4 T. Koh Pha-ngan, A. Koh Pha-ngan, Suratthani 84280 Tel: 077-377034
King Chulalongkorn Memorial Hospital	1873 Rama 4 Rd., Pathumwan, Bangkok 10330 Tel: 02-256-5282, 02-256-4808
Charoenkrung Pracharak Hospital	8 Charoen Krung Rd., Bang Kho Laem, Bangkok 10120 Tel: 02-289-7134
Chaophraya Yommaraj Hospital	950 Phrapanwasa Rd., Tha Phi Liang, A. Muang, Suphanburi 72000 Tel: 035-524088
Chai Nat Hospital	199 Moo 5, T. Ban Kluai, A. Muang, Chainat 17000 Tel: 056-411055



Name	Address
Chumphon Ket Udomsakdi Hospital	222 Pisit Payabal Rd., T. Tha Taphao, A. Muang, Chumphon 86000 Tel: 077-503-674 ext. 274
Saint Louis Hospital	27 South Sathorn Rd., Yannawa, Sathorn, Bangkok 10120 Tel: 02-675-5000 # 10242, 10245
Trat Hospital	108 Sukhumvit Rd., T. Wangkrajae, A. Muang, Trat 23000 Tel: 039-5111-040 # 644
Trang Hospital	69 Khok-khan Rd., T. Thab-Thiang, A. Muang, Trang 92000 Tel: 075-218018
Takua Pa Hospital	39/2 Moo 1 Phetkasem Rd., T. Bang Nai Si, A. Takua Pa, Phang-nga 82110 Tel: 076-421770
Taksin Hospital	543 Somdejchaopraya Rd., Klong San, Bangkok 10600 Tel: 02-437-0123 # 1415
Thonburi 1 Hospital	34/1 Soi Itsaraphap 44, Ban Chang Lo, Bangkok Noi, Bangkok 10700 Tel: 02-412-0020 # 6065-67
Thammasat University Hospital	95 Moo 18 Phaholyothin Rd., T. Khlongnueng, A. Khlongluang, Pathumthani 12120 Tel: 02-926-9976
Nakhon Nayok Hospital	Kho 1-100, Suwannasorn Rd., T. Nakhon Nayok, A. Muang, Nakhon Nayok 26000 Tel: 037-311151-2



Name	Address
Nakhon Pathom Hospital	196 Tesa Rd., T. Phra Prathom Chedi, A. Muang, Nakhon Pathom 73000 Tel: 034-254150-4
Nopparat Rajathanee Hospital	679 Ram Intra Rd., Khan Na Yao, Bangkok 10230 Tel: 02-517-4279-9 # Neonatal Patient Department
Bang Bo Hospital	89 Moo 1 Thepharak Rd., T. Bang Phriang, A. Bang Bo, Samut Prakan 10560 Tel: 02-2338-1133
Ban Pong Hospital	12 Sangchuto Rd., T. Ban Pong, A. Ban Pong, Ratchaburi 70110 Tel: 032-222-836-39, 032-222-841-46 # 273
Buriram Hospital	1 Nahsathani Rd., T. Nai Mueang, A. Mueang, Buriram 31000 Tel: 044-615002 # 3551
Pathum Thani Hospital	7 Pathumthani-Latlum Kaew Rd., Pathum Thani 12000 Tel: 02-598-8908
Pattani Hospital	2 Nongchik Rd., T. Sabarang, A. Muang, Pattani 94000 Tel: 073-333-8095 # 26
Phra Nakhon Si Ayuthaya Hospital	46/1 Moo 4, U-thong Rd., T. Pratuchai, A. Phra Nakhon Si Ayuthaya, Phra Nakhon Si Ayuthaya 13000 Tel: 035-322-555-5505
Prapokklao Hospital	38 Leab Noen Rd., T. Wat Mai, A. Mueang, Chanthaburi 22000 Tel: 039-324-975 # 345558
Phahol Pol Payuha Sena Hospital	572/1 Moo 3, Sangchuto Rd., T. Pak Phrak, A. Muang, Kanchanaburi 71000 Tel: 034-622-999 # 6600, 6601



Name	Address
Phang Nga Hospital	436 T. Thai Chang, A. Mueang, Phang Nga 82000 Tel: 076-411-616
Petchabun Hospital	203 Samakkhichai Rd., T. Nai Mueang, A. Mueang, Petchabun 67000 Tel: 056-717-600-1 # 6500
Phon Na Kaew Hospital	196 Moo 10, T. Na Kaew, A. Phon Na Kaew, Sakhon Nakhon 47230
Bhumibol Adulyadej Hospital	171 Phaholyothin Rd., Klong Thanon, Sai Mai, Bangkok 10220 Tel: 02-534-7223
Mongkutwatana General Hospital	34/40, Thung Song Hong, Lak Si, Bangkok 10210 Tel: 02-574-5000-9 # 8210
Makarak Hospital	47/12 Sangchuto Rd., T. Tha Maka, A. Tha Maka, Kanchanaburi 71120 Tel: 034-542-035
Maharaj Nakhon Chiang Mai University Hospital (or Suandok Hospital)	110 Intawaroros Rd., T. Sripum, A. Mueang, Chiang Mai 50200 Tel: 053-946-799
Maharaj Nakhon Si Thammarat Hospital	198 Ratchadamnoen Rd., T. Nai Mueang, A. Mueang, Nakhon Si Thammarat 80000 Tel: 075-340-250 # 1024, 075-399-460-4
Maharaj Nakhon Ratchasima Hospital	49 Changphuek Rd., T. Nai Mueang, A. Mueang, Nakhon Ratchasima 30000 Tel: 044-235-371, 044-342-596
Maha Sarakham Hospital	1105 Phadungwithi Rd., T. Talat, A. Muang, Maha Sarakham 44000 Tel: 043-740-993-6 # 144



Name	Address
Mueang Chachoengsao Hospital (Buddhasothorn Hospital)	174 Maruphong Rd., T. Na Meuang, A. Mueang, Chachoengsao 24000 Tel: 038-814-375-8
Ranong Hospital	11 Kamlang Sap Rd., T. Khao Niwet, A. Mueang, Ranong 85000 Tel: 077-812-630
Ramathibodi Hospital	270 Rama VI Rd, Thung Phyathai, Ratchathewi, Bangkok 10400 Tel: 02-201-2663-4
Ladkrabang Hospital	2 Soi LaT Krabang 15, Lat Krabang, Bangkok 10520 Tel: 02-326-9995 # 260
Vichaiyut Hospital	114/4 Set Siri Rd., Samsen Nai, Phyathai, Bangkok 10400 Tel: 02-618-6200 # 51252, 02-618-6201
Siriraj Hospital	2 Prannok Rd., Siriraj, Bangkok Noi, Bangkok 10700 Tel: 02-419-7000 ext. 5994-5, 02-419-5994
HRH Princess Maha Chakri Sirindhorn Medical Center (MSMC)	62 Moo 7, Rangsit-Nakhon Nayok Rd., T. Ongkharak, A. Ongkharak, Nakhon Nayok 26120 Tel: 037-395-085 # 10804, 10805
Somdej Na Siracha Hospital (or Queen Savan Vadhana Memorial Hospital)	290 Jermjompol Rd., T. Siracha, A. Siracha, Chonburi 20110 Tel: 038-322-157-9 # 1418, 1146
Somdech Phra Pinklao Hospital	504 Somdet Phra Chao Tak Sin Rd., Bukhalo, Thonburi, Bangkok 10600 Tel: 02-460-0000 # 11550



Name	Address
Somdejprasangkharach XVII Hospital	165 Bang Li -Nongwanpreang Rd., T. Song Phi Nong, A. Song Phi Nong, Suphanburi 72110 Tel: 035-531-007 # 2222
Samutprakan Hospital	71 Chakkaphak Rd., T. Pak Nam, A. Mueang, Samut Prakan 10270 Tel: 02-173-8355
Samitivej Hospital	133 Sukhumvit 49, Klong Tan Nuea, Watthana, Bangkok 10110 Tel: 02-711-8238
Singburi Hospital	917/3 Khunsan Rd., T. Bang Phutsa, A. Mueang, Singburi 16000 Tel: 036-522-507-11 # 284
Wetchakarunrasm Hospital	48 Moo 2, Leabwaree Rd., Krathum Rai, Nong Chok, Bangkok 10530 Tel: 02-543-1307, 02-543-1150 # 425, 426
Luang Por Thaweesak Chutinatharo Uthit Hospital	39 Moo 4, Soi Phetkasem 81, Nong Khaem, Bangkok 10160 Tel: 02-429-3576 # 8567
Huaiyot Hospital	17 Moo 2, T. Khao Khao, A. Huai Yot, Trang 92130 Tel: 075-271-049
Uttaradit Hospital	38 Chetsada Bodin Rd., T. Tha It, A. Mueang, Uttaradit 53000 Tel: 055-411-064 # 457
Queen Sirikit National Institute of Child Health (QSNICH)	420/8 Ratchawithi Rd., Thung Phya Thai, Ratchathewi, Bangkok 10400 Tel: 02-354-8350, 02-354-8945, 090-008-7125 Fax: 02-354-8945
Regional Health Promotion Center 1, Bangkok	18 Phaholyothin Rd., Anusawaree, Bangkhen, Bangkok 10220 Tel: 02-521-6552 # 206 Fax: 02-986-1022



Name	Address
Regional Health Promotion Center 2, Saraburi	1 Moo 11, T. Ban Mo, A. Ban Mo, Saraburi 18130 Tel: 036-300-830 # 152
Regional Health Promotion Center 3, Chonburi	43 Moo 7, T. Na Pa, A. Mueang, Chonburi 20000 Tel: 038-786-977
Regional Health Promotion Center 4, Ratchburi	429 Si-Suriyawong Rd., T. Na Mueang, A. Mueang, Ratchaburi 70000 Tel: 032-310-368-71 # 2312, 032-310-404-5 # 2312, 032-310-368-71 # 221
Regional Health Promotion Center 5, Nakhon Ratchasima	117 Moo 6, T. Khokkruad, A. Mueang, Nakhon Ratchasima 30280 Tel: 044-291-677 # 150
Regional Health Promotion Center 6, Khon Kaen	195 Sri Chan Rd., T. Nai Mueang, A. Mueang, Khon Kaen 40000 Tel: 043-235-902 # 5805
Regional Health Promotion Center 7, Ubon Ratchathani	45 Moo 4, T. That, A. Warin Chamrap, Ubon Ratchathani 34190 Tel: 045-288-586 # 319
Regional Health Promotion Center 8, Nakhon Sawan	157 Moo 1, T. Nakhon Sawan Nok, A. Mueang, Nakhon Sawan 60000 Tel: 081-534-6239, 056-255-451 # 287
Regional Health Promotion Center 9, Phitsanulok	21 Moo 4, T. Makham Sung, A. Mueang, Phitsanulok 65000 Tel: 055-299-280-2 # 121
Regional Health Promotion Center 10, Chiang Mai	51 Prachasamphan Rd., T. Chang Klan, A. Mueang, Chiang Mai 50100 Tel: 053-272-740 # 212
Regional Health Promotion Center 11, Nakhon Si Thammarat	4013 T. Bang Chak, A. Mueang, Nakhon Si Thammarat 80330 Tel: 075-399-460
Regional Health Promotion Center 12, Yala	95 Tesaban 1 Rd., T. Sateng, A. Mueang, Yala 95000 Tel: 073-212-860 # 127



From Humble Beginnings...

- Confidence gained from promoting the academic breastfeeding book in Thai whose title translates as *Breastfeeding: From Knowledge to Practice* with support from the Pediatric Society of Thailand, 2002.
- Complimentary Breastfeeding Atlas from Mrs. Kay Hoover, one of the editors of the book, on the occasion of a breastfeeding study trip in Philadelphia, USA in April 2006.
- True friendship of breastfeeding workers from hospitals, universities and various agencies who brainstormed with us on the Thai Breastfeeding Atlas in July 2009.
- Support from the Thai Health Promotion Foundation in setting up the Thai Breastfeeding Center to promote breastfeeding since 2003 and in providing funding for this book.
- Recommendation from Dr. Suwit Wibulpolprasert, Deputy Permanent Secretary of the Ministry of Public Health for foreign affairs which helped secure a practitioner residency grant from the Rockefeller Foundation to brainstorm for the Thai Breastfeeding Atlas at the Bellagio Conference Center in Bellagio, Italy from March 23 to April 20, 2009 and also major sponsorship for printing from the Rockefeller Foundation.
- Invitation from the Academy Breastfeeding Medicine (ABM) to expand our reach and promote in English as well as help with requesting additional funding from the Rockefeller Foundation at the 14th International ABM in Williamsburg in Virginia, USA from November 5 to 8 of 2009.
- Assistance from four volunteer editors as well as almost 20 expert writers and Associate Professor Dr. Khunying Saree Jittinan who helped do the final proofreading.
- Invitation and opportunity for a representative of the editors to present the Thai Breastfeeding Atlas at the 16th International ABM in Miami, Florida, USA from November 4 to 6, 2011.
- Invitation from Karyn Grace Clarke, Vice President of the Gold Conferences International for the editors of the Thai Breastfeeding Atlas to attend the GOLD 2012 (Global Online Location Discussion).
- A large amount of time needed to collect photos for this as well as the coordinator having to find someone to create sketches of the photos since the photos were not detailed enough; several rounds of text revision with more corrections to be made each time, the number of which never discouraged the housekeeper-like coordinator who swept up all the details; and a true friend and publisher who was always happy to make change after change and wholeheartedly offered assistance.
- Gratitude and thanks that will be forever felt for our cute little models: Baby Boy Jin Sawasdivorn, Baby Girl Yanisa Bunyarat, Baby Girl Vachirana Muangmanee and Baby Boy Kawinsitti Kasemsup.



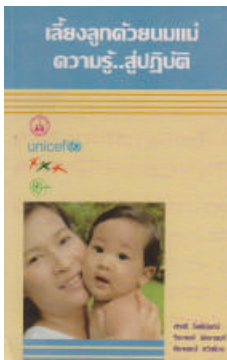


Image 1 Breastfeeding: From Knowledge to Practice, 2002.



Dr. Penny Sopas

Image 2 - 3 Receipt of the Breastfeeding Atlas from Kay Hoover (featured in the single shot) during a breastfeeding study trip with Dr. Penny Sopas (2nd from right) in Philadelphia, USA.



Image 4 Doctors, nurses and academics of Thailand brainstorming over the best format for the breastfeeding book.



Image 5-6 Bellagio Conference Center in Bellagio, Italy



Image 7 From right Dr. Kannika Bangsainoi, Dr. Kusuma Chusilp, Dr. Siraporn Sawasdivorn and Ms. Walai Chetawan who received the practitioner residency grant from the Rockefeller Foundation in Bellagio, Italy from March 23 to April 20, 2009.





Image 8 Breastfeeding story shared with fellow Rockefeller Foundation practitioner residents hailing from many different careers such as physicists, writers, poets, painters, composers, scientists and businessmen



Image 9 14th Academy Breastfeeding Medicine conference in Williamsburg, Virginia, US



Image 10-11 Dr. Siraporn Sawasdivorn, as head of the project, presenting the results to the 16th International ABM in Miami, Florida, USA from November 4 to 6 of 2011



Image 12 Conference participants lining up to ask questions after presentation

Words of appreciation from breastfeeding experts who attended the presentation at the 16th ABM academic conference on breastfeeding:

“Phenomenal model!”

“Wonderful promotion of breastfeeding!”

“We’re doing what we want you to do.”

“The leadership that you’ve shown, I am very proud of you.”



Image 13-14 Behind the scenes with the editorial team.



www.thaibreastfeeding.org
<http://breastfeedinglib.saiyairak.com>

