



Creating a womb-like environment for your preterm baby |

(An article for parents)

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In this article the importance of creating a womb-like environment for your preterm baby is discussed. Information is given on the developmental stimulation and protection the womb provided to your unborn baby. Guidelines are provided on how to make environmental adaptations within the NICU (neonatal intensive care unit) and handle your preterm baby to closely resemble the developmental stimulating and protective environment of the womb. These adaptations and handling strategies protect your preterm baby and improve her general developmental outcome.

The womb environment vs the NICU environment:

The womb provided the optimal natural environment for your unborn baby to grow and develop. It supported her* physiological functions and protected her against the harsh sensory environment of the outside world. It provided her with just the right amount of stimulation she needed for the optimal development and maturation of her neurological and sensory systems. This also included the development of physiological, motor, behavioral, emotional and cognitive functions that would have enabled her to survive and interact with the outside world if she was born full term¹.

Because your baby was born prematurely her sensory and neurological systems are still immature and very sensitive¹. She left the quiet, dark, unobtrusive, safe and painless womb environment too early and was separated from you, her primary source of life. She entered the NICU environment where she is both bombarded by inappropriate sensory stimuli such as bright lights, noise, painful stimuli and excessive handling and deprived from appropriate sensory stimulation such as the correct movement and touch².

Your preterm baby will now have to complete her growth and development outside the protective boundaries of the womb. Her immature sensory and neurological systems can easily be over-stimulated by the sensory overloaded NICU environment. Over-stimulation might cause her to become stressed and unstable¹ and may permanently alter her normal

* For the sake of simplicity, the sex of the baby will be referred to in the female for the remainder of this article

brain development³. This may result in cognitive delays, speech and language disorders, neuro-motor problems, perceptual problems⁴, and sensory integration difficulties².

To address these concerns we are going to look at how the womb environment supported the development of your unborn baby's sensory and neurological systems. Guidelines are given on how to mimic the womb environment for your baby, while she is in the NICU. This will help her to complete her development outside your womb. Each sensory system is discussed separately.

TOUCH: Your unborn baby's *sense of touch* was supported by the amniotic sac and fluid. The amniotic sac and fluid provided her with warm and constant boundaries all around her body and gentle but firm positive touch experiences, almost like a permanent hug³. The constant touch and containment provided by the amniotic sac boundaries made her feel safe and calm². In the NICU, your preterm baby is deprived of this constant calming touch stimulation and boundaries. She is often exposed to negative, uncomfortable and painful touch experiences when handled during care giving and medical procedures³. It is therefore recommended that you provide your preterm baby with the following positive touch experiences similar to what she experienced in the womb:

1) **Nesting:** Let your baby lie inside a "nest" made of flexible material (e.g. rolled-up towels or commercially available positioning nests) all around her. The nest will provide her with constant boundaries and gentle but firm touch experiences similar to what she experienced in the womb¹.

2) **Kangaroo Mother Care (KMC):** Skin-to-skin contact between you and your baby. Dress your baby only in a nappy and hat and place her on your naked chest between your breasts for at least 90 minutes. You can use a Thari or KMC wrap to keep your baby in position and give you the opportunity to have your hands free for activity¹.

3) **Positive Touch:** Cover your baby's whole body with your hands while providing her with firm and deep pressure similar to what she experienced in the womb. This will help her to get used to touch as a positive experience. Positive touch can be done during and after painful and stressful procedures to calm your baby and help her cope better¹.

4) **Swaddling:** Swaddling will provide your baby with deep pressure and boundaries similar to what she experienced in the womb. Your baby's hands must always be in the midline and close to her face when she is swaddled¹.

5) **Pain management:** KMC, positive touch, swaddling and non-nutritive sucking (NNS) can be used for pain management³. NNS is done by letting your baby suck on her thumb,



fingers, your fingers, an expressed breast or a pacifier. NNS is not used for feeding but for pain management, calming your baby and teaching her how to suck. It is important to use the right size and shape pacifier for NNS to stimulate the correct sucking movements. If your baby is younger than 32 weeks or finds sucking hard and tiring you should use a pacifier similar to the size of her thumb. If she is older than 32 weeks and/or her sucking is strong the pacifier should be of a similar size to your nipple. The pacifier must be long enough to reach the back of her soft palate and have a rounded bolus on the end. It should have a large, soft mouth shield to stimulate the nerve endings around the mouth and a handle on the shield for your baby to hold onto¹.

6) Light touch (stroking, rubbing) should be avoided as your preterm baby's skin is very sensitive and she will experience it as painful¹.

MOVEMENT: The development of *the sense of movement (muscle tone, posture, balance)* was supported by the confined space within the amniotic sac and the mostly gravity-free environment created by the amniotic fluid¹. Additional movement stimulation was provided by your movements, and your unborn baby's movements². Limited space within the womb supported her in the curled-up fetal position², and the weightless feeling created by the amniotic fluid made it easy for her to move against gravity to exercise her muscles and remain in the curled-up fetal position¹. In the NICU your preterm baby is intermittently exposed to excessive and improper handling or no movement as she lies still in the incubator². Her muscles are not strong enough to move against gravity and remain in the fetal position. You can help your preterm baby to remain in the fetal position and provide her with just the right amount of movement stimulation similar to what she experienced in the womb in the following ways:

- 1) **Positioning:** Position your baby inside a nest in the curled-up fetal position (arms and legs in flexion in the midline with her hands close to her face). The nest will provide her with boundaries and help her lie in and maintain a position that closely resembles the fetal position, almost as if she was placed back in the womb. Change her position every 2-3 hours when she is awake from her back to her side and then to her tummy. Use slow movements and hold her in a flexed/fetal position when changing her position¹.
- 2) **Slow movements:** Move your baby slowly when changing her position and during care taking. Always keep her in the fetal/flexed position when handling and moving her.
- 3) **Containment hold:** Cover your baby's whole body with your hands and keep her in the fetal position when handling and moving her.



4) **Cluster care:** Group and do all care taking and medical interventions together when your baby has woken up spontaneously¹.

5) **Kangaroo Mother Care:** KMC will provide your baby with the movement stimulation of your own body movements, similar to what she experienced in the womb.

TASTE: The development of your unborn baby's *sense of taste* was supported by the amniotic fluid which she started to swallow from 12 weeks gestation¹. All the tastes that you experienced when eating was absorbed by the amniotic fluid and therefore your unborn baby tasted everything you ate¹. The womb protected her from dangerous and strong tastes². While in the womb she started to practice her sucking by doing Non-Nutritive Sucking ¹e.g. sucking her tongue, fingers and thumb. NNS prepared her for feeding after birth by desensitizing the sensitive mouth area and stimulating the sucking reflex¹. In the NICU your preterm baby is exposed to unpleasant tastes (oral medication) and negative stimulation around and in the mouth (tubes inside her mouth for feeding and suctioning). Until she is able to coordinate the sequence of her sucking, swallowing and breathing pattern without choking when drinking fluids, she will depend on tube feeding. Tube feeding deprives her of normal in-utero sensory experiences in and around the mouth³. Following the guidelines below from birth will provide your baby with positive taste and sensory experiences in and around her mouth and also prepare her for oral feeding:

1) **NNS:** NNS should be done during tube-feedings and when transitioning from tube to oral feeds³. A drop of breastmilk can be placed on the appropriate pacifier or her lips while doing NNS to positively stimulate her sense of taste

2) **Kangaroo Mother Care:** Skin-to-skin contact close to your breasts will provide her with positive sensory stimulation around the mouth area and opportunities to suckle on your expressed breast.

SMELL: The womb provided a buffer to protect your unborn baby's *sense of smell* against strong and unpleasant smells¹. After birth your preterm baby has a preference for your body odor and the smell of breastmilk¹. In the NICU she is separated from you and exposed to strong and unpleasant smells of cleaning chemicals, alcohol swabs, disinfectant, toiletries and perfumes. Providing your preterm baby with the smell of your body and breastmilk will make her feel safe⁴ and prepare her for oral feeding¹. This can be done in the following ways:



- 1) Kangaroo Mother Care: This will constantly provide your baby with your body odor as well as the smell of your breastmilk.
- 2) Provide your baby with a “cuddle blanket”: When you cannot be with your baby to do KMC you can sleep with a little blanket for 1-2 nights and place it next to her in the incubator with a drop of breastmilk on. This will provide her with your smell and keep her calm as she will experience that you are close to her¹.
- 3) Limit the use of strong and unpleasant smells: Protect your baby against exposure to strong and unpleasant smells of cleaning chemicals, alcohol swab, disinfectant, toiletries and perfumes by limiting their use as much as possible.

HEARING: The *sense of hearing* of your unborn baby was protected from the high noise levels outside the womb. Your unborn baby heard the sounds of your voice, heartbeat, breathing and intestines. Sounds from the outside world were filtered through bone, tissue and water and was therefore muffled and of a low frequency². In the NICU your preterm baby is constantly exposed to high noise levels such as equipment, monitors, telephones and people talking. You can protect your baby against high noise levels and provide her with sound experiences similar to the womb in the following ways:

- 1) Minimize the general noise level next to her incubator.
- 2) Use ear covers (e.g. earmuffs, beanies) and padded incubator covers that will provide additional protection from environmental sounds.
- 3) Kangaroo Mother Care: KMC will provide her with the sound of your voice and heartbeat

VISION: Your unborn baby’s *sense of vision* was protected from bright lights as it was relatively dark inside your womb. She could only see an orangey glow of the light shining through your abdomen and womb. It is only from 36 weeks gestation that your baby will be able to control the muscles that protect her retina’s against the painful and harmful effect of bright light¹. Your preterm baby’s visual system is thus immature and sensitive to continuous bright and direct light. In the NICU she is constantly exposed to bright lights with little difference between day and night cycles. By doing the following you can protect your baby’s eyes and provide her with controlled visual stimulation:

- 1) Cautiously expose her to low level (dimmed) lights.
- 2) Lights should be cycled to introduce her to day and night cycles.
- 3) Cover the incubator to protect her eyes against bright and direct overhead lights.



4) Cover her eyes when she has to undergo procedures where direct and bright light is needed (e.g. phototherapy).

Conclusion:

Mimicking the womb environment in the NICU protects your preterm baby against the harsh sensory environment of the NICU and provides her with continuity of the sensory environment she was used to in the womb. It provides her with just the right amount of stimulation to complete her sensory and neurological development outside the womb and improves her general developmental outcome. This can be attained by being close to her, adapting the environment and handling her in a developmentally appropriate and supportive way.



References:

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