

Newborn Care's Neurodevelopmental Care

Royal Hospital for Women

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Neurodevelopmental care is a term used to describe care practices in NCC that promote normal growth and development of the preterm and term infant. We try to create an environment that manages the infant's stress and pain, while offering a calming approach that keeps the whole family involved in the infant's care and development.

These include:

- Recognising behaviour that indicates the infant is stressed and providing interventions that help your baby return to a stable state
- Ensuring the infant is positioned comfortably using positioning devices. This will help or reduce environmental stress (bright lights, loud noise, frequent handling and interrupted sleep)
- Encouraging parents to provide daily skin-to-skin care because of the positive sensory stimulation and neuroprotective properties it provides
- Involving parents in medical decisions, team rounds and daily care throughout the infant's hospitalisation
- Maximising the infant's developmental potential within the constraints of their hospital journey

It is important to recognise that the NCC environment is very different from the environment your baby experienced in the womb. The intrauterine environment is conducive to positive sensory input and protects against harsh outside stimulation. There is also unrestricted access to mum, and by the time the baby is born at term it is ready for a variety of sensory experiences with a consistent caregiver.

In utero:

- The uterine wall provides containment
- It is quiet (70db max), with only low pitched sounds
- The baby is floating in amniotic fluid so there is no gravity
- The environment is temperature controlled
- Nutrition is provided passively via the umbilical cord, with no need to digest food
- Light is filtered through the mother's stomach and it is dark when the mother is sleeping
- The baby sleeps most of the time (approx. 90%)

In the NCC:

- Gravity exists, and some babies are completely reliant on caregivers to adjust their position
- It is loud (up to 140db), with high pitched sounds
- The baby is physically separated from its parents most of the time
- The baby undergoes painful procedures
- Sleep deprivation is caused by frequent handling

- The baby experiences fluctuating temperature when in cribs
- Bright lights, especially when in cribs
- Unpleasant oral experiences due to feeding and breathing equipment
- The digestive system is required to actively ingest and digest nutrition

It is our responsibility, as care givers and parents, to do what we can to minimise the stress the NCC environment can cause for the baby. This is essential to help the baby's brain to develop and grow despite being forced to process information and stimuli that it would not have to experience in utero.

Pain Management

Any procedure that would be painful for an adult, is painful for a baby. Long term and repeated exposure to pain and stress hormones can alter the development of the preterm brain. It is therefore critically important to manage babies' pain exposure in the NCC through the following:

- **Prevention** - We aim to perform as many test and monitoring procedures non-invasively as possible. For example, using the Jaundice meter to read bilirubin levels instead of doing a blood test or a transcutaneous monitor to record Carbon Dioxide levels on ventilated babies instead of performing regular blood tests
- **Limit painful procedures** - There are times when procedures must be done, but in these instances we aim to perform all procedure(s) together and ensure we are providing all care required and avoiding unnecessary tests and procedures
- **We use a pain scoring tool called a PIPP score** – This tool helps us to identify signs that your baby might be in pain, so that we can respond and manage that pain if needed. Signs include increased heart rate, fast breathing, increased muscle tone, changes in blood pressure, etc.
- **Medication** - If the infant is experiencing pain, we can administer medications. Infants will be given 1-2 drops of oral sucrose prior to any painful procedure to minimise pain

We also know that adjusting your baby's environment to support them through painful procedures and stress can reduce the production of stress hormones and keep your baby comfortable. Most of these can be provided by nursing staff and all of them can be provided by the parent:

- **Clustering or cue based care** - Grouping care to minimise the number of times a neonate is handled. By reducing episodes of handling, periods of sleep can be protected and stress can be minimised. If neonates are displaying signs of stress (such as increased heart rate or facial expression), fewer procedures can be clustered on the next occasion and comfort measures can be provided
- **Breastfeeding** by mother as appropriate.
- **Non-nutritive sucking** - Refers to the use of a dummy to promote sucking without breast milk or infant formula
- **Repositioning** - Positioning the neonate, appropriate to their gestational age, supporting limbs/ trunk and taking care with any attached lines or equipment
- **Swaddling** - Neonates can be wrapped in a cloth or blanket, with their arms and legs tucked in, to make them feel secure
- **Nesting** - A positioning aid or roll that is placed around the neonate to help contain them and make them feel safe and secure by imitating a womb-like environment. It also helps keep the neonates limbs in alignment when they cannot be wrapped or swaddled
- **Facilitated tucking** - Holding a neonate so that their limbs are in close proximity to the trunk. The neonate is held side-lying in a flexed position. This technique involves touch and positioning, and promotes a sense of control and security for the neonate.

- **Containment holding** - The caregiver can use two hands to hold the baby and make them feel secure (i.e. one hand on the baby's head and one on their feet)
- **Decreasing environmental stressors** - Consider turning down the lights if you can, lowering alarm volumes and speaking quietly
- **Talking** - A familiar, soothing, quiet voice is extremely calming
- **Touch** - Allowing neonate to grasp a finger
- **Kangaroo Care** - Nursing of the neonate on the bare skin of their mother or father, upright at a 40-60 degree angle and covered by parent's shirt/gown, with an additional blanket as required
- **Smell** - Provide familiar smells, either through body contact or with a scent cloth. If you have not been provided with scent cloths, please ask your bedside nurse

Infant Positioning

We want babies to be in a *flexed midline position* imitating the position they would be in in the womb. This is important because babies that are positioned in a neuro-developmentally supportive way:

- Cry less
- Have less flailing of their extremities
- Have fewer behaviour indicators of pain
- Have improved physiological outcomes, including better motor development, less need for physiotherapy, better sleep patterns, enhanced cerebral blood flow, etc.

Safe positioning is essential in the incubator / open cot, both when awake and especially for safe sleeping, as well as when handling/holding your baby.

Positive Touch

Babies in the NCC have lots of handling, much of it highly stressful. Please be aware that stroking your baby can also cause significant stress, especially when they are not physiologically stable. The following are ways we can provide positive touch experiences for our babies:

- Gentle arousal - talk softly to your baby and touch gently before handling
- Gentle, slow and minimal handling,
- Containment of baby during handling/procedures including lifting and transfers
- Swaddling for weighing and bathing
- Avoid sudden position changes or rapid movements with your baby

Kangaroo Care (KC)

KC is a special way of holding your baby. The baby, wearing only a nappy, is placed 'skin to skin' against your bare chest. A blanket, gown or your clothes cover the baby's back to help keep them warm.

Benefits of Kangaroo Care for baby

- Regulates baby's heart rate and breathing – the rise and fall of your chest relaxes baby.
- Baby's body temperature remains normal because your body adjusts to keep baby at the right temperature.
- Decreases crying and encourages a more restful, quiet sleep. Babies in deep sleep use fewer calories, so the overall growth rate increases.
- Increases exclusive breastfeeding at discharge.

Benefits of KC for parents

- Increases bond between you and your baby.
- Enhances parent confidence. KC is something only parents can do.
- Less breast engorgement - babies that experience KC early breastfeed 50% longer and tend to breastfeed exclusively.

What do parents need to know?

- Both parents can do KC.
- Many babies can begin KC at a very early age - discuss with your nurse when your baby might be ready for KC.
- Wear a loose shirt or one that opens in the front, or we can provide a hospital gown for you
- Prior to KC, use the restroom, have a snack and drink (so that you are comfortable and don't need to cut your KC time short) and wash your hands.
- Your nurse will help you transfer your baby.
- A change in the baby's vital signs may occur with the transfer but will normalise during KC.
- Please allow for at least an hour of KC so your baby can complete one sleep cycle and get the full benefit of KC.



A father enjoying Kangaroo Care with his baby in the NCC



A mother enjoying Kangaroo Care with her baby in the NCC

Protecting Sleep

Sleep is when most brain growth and development occurs. Premature and newborn babies should sleep **at least 21 hours a day**. The amount of sleep an infant requires changes as they grow (e.g. around 3 months corrected).

Increased stress can cause over stimulation, poor sleep, and decreased weight gain. Having sleep/wake cycles is essential for the development of neurosensory and motor systems in neonates. This allows for development of memory, helps brain plasticity and brain functioning. Sleep disruption can interfere with growth and development by altering the maturation of brain cells and production of growth hormone, which is highest during REM sleep.

Sleep cycle lasts about 60 minutes and modulates between quiet sleep and active sleep. Drowsy state is between active and quiet sleep states. Easy to be woken and also easy to settle back to sleep.

Active Sleep (REM):

- Low activity level
- Random movements/ startles
- Irregular respirations
- Intermittent sucking
- Increased O₂ requirement
- Often misleads us to think baby is waking up

Quiet Sleep:

- For rest and recovery
- Difficult to rouse

- Regular breathing
- Eyes closed, no eye movement
- No spontaneous movement
- May have low heart rate
- Lowest O2 requirement

In order to protect your baby's sleep and encourage the most possible rest, it is important to manage **noise** and **light** as best we can:

- Always close incubator porthole doors quietly and encourage everyone else to do the same
- Always talk quietly in the nursery
- Do not talk across infant's cot or crib
- Try to minimise other noise around your bed-space
- Observe 'quiet' hours
- Seek to cluster cares / handling to minimise repeated disruption
- Use familiar songs/stories/language
- Cover incubator to limit the direct light from above, but lift up on the sides during the day to allow filtered light in (just like in utero)
- After eye exams, the pupils can remain dilated for 24 hrs and therefore very sensitive - Avoiding bright lights during this time is important
- Light cycling is important - It is good for your infants to have some exposure to light. It can help with the development of circadian rhythms and has an influence on your baby's endocrine system

Familiar, pleasant smells can decrease stress and promote sleep for your baby. This is a key feature of KC, but can also be achieved with scent cloths to keep your reassuring smells around baby when you are not there. Please avoid strong perfumes/colognes.

Endorsed 21 October 2021. Reviewed by clinicians and consumers in development stage July to August 2021. Should you wish to discuss any aspect of this information please send an email to portal@royalwomen.org.au