University Hospitals of Derby and Burton NHS Foundation Trust

Family Integrated Developmental Care - Full Clinical Guideline

Reference no.: NIC PP08 NICU

1. Introduction

Advances in perinatal care have resulted in decreased mortality rates in preterm neonates, however, morbidity rates remain significantly high.

In addition to cerebral palsy, hearing loss, visual impairments and developmental delay, long-term follow-up studies have identified other important neurosensory impairments that may not become evident until preschool or school age such as cognitive and behavioural problems.

Preterm infants are born prior to or during critical periods of brain development. The third trimester of fetal development is a period of rapid brain growth and negative environmental influences such as noise, light, pain, or handling may impact on the developing brain. On our neonatal units, modifications we make in partnership with families to the nursery environment and care practices using the information in this guideline is crucial for later cognitive, social, and emotional development.

Developmental care is an approach using individualised care to maximize neurological development and reduce long-term cognitive and behavioural problems. This can be achieved by involving, including, and educating the family from admission through to discharge, thereby investing in the family's future and improving the hospitalisation experience for the infant and family.

The education and involvement of parents and/or carers is critical to the infant's social, emotional, and physical wellbeing and is a crucial factor in the process of family-integrated developmental care.

2. Aim and Purpose

- For families to have a better experience of neonatal care.
- Improved physiological stability for the infant.
- Confident parenting and attachment
- To encourage postural development for the infant.
- Reduced infant stress and pain.
- Individualised sensory experience,
- Improved feeding/ enhanced nutrition,
- Improved sleep patterns/ protected sleep,
- Decreased respiratory support.
- Decreased incidence of moderate/severe chronic lung disease,
- Improved short term growth outcomes.
- Enhanced staff satisfaction.

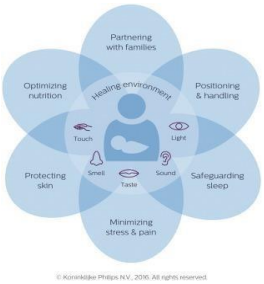

Illustration 1

- Decreased length/cost of stay,
- Improved neurodevelopmental outcomes to 24 months of age.

3. Definitions, Keywords

Ethical – providing humane care that protects the child from stress and pain, to be with their parents, be listened to, breast fed and sleep.

Environmental – creates an environment that minimizes stress for the infant, parent and healthcare workers and provides developmentally appropriate sensory experience for the infant.

Neurodevelopmental – Incorporates specific interventions linked to evidence of better outcome e.g. skin to skin, breast feeding.

Individualised care – All aspects of care adapted to fit the needs and progress of each infant and family.

4. Main body of Guidelines

1.0 Behavioural Cues

1.1 Observation and recognition of behavioural cues

Recognition of signs that a baby may be experiencing stress is vital. Babies will display different cues and at different stages of development according to their wake/sleep state.

Defensive/avoidance behaviour	Coping/approach behaviour
Any of the following indicate baby may need help or some time out: • Respiratory pauses, tachypnoea , gasping • Colour changes – dusky/mottled. • Yawning, sighing • Gagging/posseting • Sneezing • Coughing • Hiccoughing • Straining • Flaccidity (limp posture) • Hypertonia • Arching • Finger splays (high guard hands/saluting) • Fisting, hand-on-face • Facial grimace • Jerky movement • "salute" • Tongue thrust • Mouth hanging open • Sudden movement Frantic diffuse motor activity: • Crying/whimpering • Hyper alertness • Staring or gaze aversion • Fussing or irritability • Squirming • Twitching • Frowning	The following may indicate how well baby is able to settle itself, cope with interventions and to interact: • Easily consoled. • Attentional smiling • Cooing • Alert • Defined sleep states • Rooting/sucking • Hands to midline • Hand holding • Hand to mouth activity • Grasping • Smooth movements • Smooth well- modulated posture and normal tone • Reduction of tremors, twitches and stress cues • Able to regulate colour and breathing pattern • Relaxed expression • Orientation to voice or sound • Settles self

1.2 Care-giving and interventions

Handling and invasive procedures may cause:

- Destabilisation of blood flow, cardiac regulation, oxygenation and digestive functions
- Discomfort and pain.
- Poor thermo-regulation
- Disrupted growth.
- Altered sleep patterns.
- Delay in development of normal movement and posture.

Basic strategies for comfort during interventions are seen below and will be covered more thoroughly throughout this guideline:

- Parent participation
- Structuring the baby's day – coordinate the baby's day with parents and colleagues to allow for periods of rest.
- The environment
- Smooth transition – sleep is important, wherever possible try to introduce care and activities as the baby wakes.
- Positioning and handling
- Pacing
- Comfort
- Finishing – at the end of any intervention make the transition a smooth one.

2.0 Environment

The baby needs an environment that encourages:

- Effortless working of bodily functions
- Coordinated movements.
- Restful sleep
- Focused, attentive alertness.
- Sociability
- Self-regulation
- Mastery and enjoyment of feeding

The family needs a welcoming environment that gives them:

- Confidence
- Opportunities to practice parenting skills.
- A sense of well being
- Privacy

The staff need an environment that facilitates:

- Safe practice
- Good communication
- Empathy
- Teamwork
- Job satisfaction

Nursing care:

- Ensure there is always access to the infant.
- Make available two comfortable chairs at the cot/incubator side, at least one of which is a recliner.
- Invite and encourage the family to personalize and decorate their infant's bed space. Use of the Caterpillar discharge tool and 'this is me' chart/'all about my baby'.
- Maintain a very calm, quiet, and soothing atmosphere at all times.
- Handle emergency situations in a calm and quiet manner.
- Move all staff interventions away from the bedside unless they are directly relevant to the infant.
- Individualise bedding and clothing in keeping with the infant's preferences and needs.
- Adjust all medically necessary equipment that is in direct contact with the infant's body to provide maximum comfort for the infant.
- Use of IV boards, soft and padded and ensure they are securely held in place.
- Procedures and cares will be less demanding for baby and carer in a quiet, calm atmosphere with gentle ambient lighting.
- Set alarms to a low setting and silence them promptly.

3.0 Family Integrated Care (FIC)

On neonatal units, infants are physically separated from their parents, and this often has an impact on the physical, psychological, and emotional health of both the parents and the infants. Family Integrated Care is an approach to planning and delivery of health care that encourages greater parent involvement in their infant's care.
FIC is based on the understanding that the family is the baby's primary source of strength and support, and that the family's perspectives and informed choices are important in clinical decision making. It has been recognised that family integrated care can enhance parents' confidence in their role and parental involvement improves emotional, cognitive and physiological outcomes for babies.

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3.1 Benefits

- It benefits patient health, parent satisfaction and the quality of healthcare.
- Readmission to hospital has also decreased in infants who have had a FIC approach on their Neonatal care.
- Improves breast feeding rates.
- Decreases length of stay

- The family are the single most important factor in the baby's life, they provide continuity of care on a personal level and the baby's most consistent care givers.
- Benefits of secure parent-infant attachment for the future health and wellbeing of the infant.

3.2 Goal of FIC

- Humane care
- Brain development
- Nurturing relationships
- Supporting each infant's personal development and ensuring the best possible outcome for the infant and family.
- Neonatal staff should adopt a positive partnership with parents and ensure that the parents recognise the contribution that they alone can make to their infants wellbeing.
- To facilitate a partnership and collaboration between parents and the NNU staff, to promote parent-infant interactions and to build parent confidence.
- To ensure good communication between families and HCP as this is the key to successful partnerships.
- Share information, support, and respond to parents needs and build their confidence.
- All parents will have a discussion with an appropriate member of staff as soon as possible about the importance of touch, comfort and communication and document this in the notes and on the admission to discharge pathway (burton site)
- Actively encourage and enable parents to provide touch, comfort and emotional support to their baby throughout their baby's stay on the NNU
- Teach parents to be involved in all possible aspects of their infant's care - feeding, nappy changes, bathing, providing oral medications, checking temperature, ward round involvement, and decision-making.
- Parents should be enabled to have frequent and prolonged skin to skin contact with their baby as soon as possible after birth if appropriate and throughout the baby's stay.
- Encourage Parental involvement in rounds as this supports parents in their partnership with the care team, helps them understand and participate in care decisions, and helps to strengthen relationships with the medical team.
- Give parents support and education to provide care for their infants and grow into their roles as care providers for their infants.
- Encourage parents to spend extended periods of time in the NICU interacting with their infant, gaining knowledge, skills, and confidence in caring for their infant's progress.
- Inform parents of the importance of their role in their infant's care
- As parents grow more confident in the environment, encourage them to participate as much as possible in their infant's care while gradually reducing nursing supervision.

3.3 Interventions

- Obstetric staff to liaise with neonatal staff before delivery.
- Tour of neonatal unit if possible before delivery
- Photo to be provided to parents.
- Ask parents how they would like to be addressed and their baby's name.
- Identify any religious, spiritual, or cultural needs the family may have.
- Volunteer an update to parents when they visit and provide an opportunity for questions. Ensure the family are regularly updated.
- Provide verbal and written information on visiting policy and ward rounds.
- Give various Bliss leaflets, unit information leaflets on admission.
- Provide information regarding free parking.
- Show the layout of the unit including the family room.
- A consultant should meet with parents within 24 hours of their baby's admission and this should be clearly documented on Badgernet.
- Organise interpreting services as required.
- Secure lockers for belongings
- Establish and support the relationship between father / partner and baby.
- Signpost parents to the parents' diary, communication sheet, 'know your baby' folder, and admission to discharge form (Burton site).
- Acknowledge differing parental experiences, anxieties and confidence.
- Family dynamics should be assessed, and coping abilities of family members should be determined.
- Ask parents how they wish their baby to be fed.
- Teach mothers how to hand express and ensure the birthing person knows who they can ask for help and advice with expressing and breast feeding.
- Encourage parents to talk, sing and read stories to their babies.
- Initiate a baby diary for all babies either a paper diary or use the badgernet system.
- Ask the family how the siblings are coping. Suggest how siblings could be encouraged to draw pictures, read stories or choose a small toy.
- Consider the discharge process from as early as possible in the baby's admission.
- Involve external agencies where required.
- Family Integrated care lead will develop, implement and evaluate strategies for the unit and will facilitate audit of the parent experience and establish whether there is room for improvement.
- Collaborative care planning
- Support and information sharing for absent parents, using badger net diary or Microsoft teams.
- Recognise the importance of celebration – first feed, first day dressed, first bath etc.
- Provide information on support services available both financially and socially and help them to access them.
- Peer-to-peer support can help parents cope more effectively with the NICU therefore Sign post parents to our Veteran parents in our Queens early starter group/Facebook group.
- Enable collaborative MDT discharge planning meetings where families are involved.

4.0 Cue based care/Positive touch

- Inappropriate handling may cause stress pain, physiological instability, poor temperature control, disrupted sleep patterns and growth and disruption of smooth transitions between infant states.
- Parental involvement from an early stage will help them to recognise and respond to their babies' cues appropriately to minimise stress/pain response
- Before any intervention consider and prepare environmental needs – lighting and noise.
- Encourage and involve parents as soon as possible to become involved with the care of their baby and provide guidance on baby's behavioural cues.
- Observe the infant's sleep state physiology and cues.
- Positive touch - use of still touch, resting hand, kangaroo care/skin to skin, cuddling and containment holding (See Illustration 2).
- Support and teach parents positive touch and comfort holding.
- Changes in position must be slow, always keeping part of the trunk in contact with the mattress.
- Pace cares according to infant cues

Illustration 2

- Utilise pain assessment tool, which will be regularly audited, and results shared with the multidisciplinary team.

5.0Sleep

Sleep is essential for health. Definable sleep states emerge from 28 weeks gestation. Near term the foetus will spend 85-90% of the time in a sleep state. Disrupting sleep and sleep cycles profoundly affects the creation of permanent neural circuits, interfering with the early process of sensory and brain development which can lead to adverse neurodevelopmental outcomes later in life.

- Observe the level of arousal and avoid disturbing sleep for procedures.
- Schedule baby-led interventions
- Wake from active sleep cautiously and use a gentle voice and soft touch.
- Encourage kangaroo care/skin to skin as this helps to improve sleep/wake cycles and increases quiet sleep.
- Facilitate a dark, quiet and calm environment for sleep.
- Support self-regulatory strategies such as positioning and use of boundaries.

6.0 Smell and Taste

In the womb the foetus initially experiences different flavours through the amniotic fluid which is affected by the foods the mother eats. The mother's diet can also influence the neonate's initial olfactory responses.
At birth the sense of smell, taste and hearing are the most mature of the full-term infants sensory capabilities

Exposure of babies to noxious odours and unpleasant tastes should be minimized. Support early exposure to parents odour and opportunities for positive taste and oral sensory experiences.

- Parents are given two knitted squares, one to stay with the baby, and one to stay with the mother. The mother can place the cloth next to her breasts while expressing to obtain her odour. The mother will also be able to experience her babies odour which will support her breast feeding. These squares should be regularly swapped between baby and mother.
- Encourage regular skin to skin contact as babies will experience their parents odour
- Educate staff and parents about the need to avoid introducing noxious smell when handling baby.
- Allow alcohol gel to dry before handling babies.
- Cleansing wipes containing alcohol or other chemicals should not be opened inside the baby's incubator. Instead, they should be opened outside the incubator and approximately 30 seconds should elapse before taking the wipe into the incubator.
- Smoke residue in clothes or on a parents skin can be irritating to a baby's eyes or nasal passages and exposure should be avoided. Parents should be informed of the risks of smoke exposure to their baby and given advise how to minimise this.
- Where possible medications should be administered via nasogastric or orogastric feeding tube. If orally administer with a small volume of milk (if very concentrated medication or unpleasant taste either split into more frequent but smaller doses or give in a larger volume of feed)
- Maintain frequent mouth assessments and oral care.

7.0 Mouth Care

The aims of mouth care are:

- To keep the oral mucosa clean, soft and moist.
- Remove debris without damaging the oral mucosa.
- Alleviate pain or discomfort.
- Reduce oral colonisation of gram-negative flora.

7.1Interventions

Whenever possible mouth care should be performed with colostrum or maternal early breast milk, as this offers the baby a positive oral experience and supports early sensory development of taste and smell along with the health benefits of the milk absorbing into the oral mucosa.

- Dip a cotton bud or wrap damp gauze around your gloved finger using breastmilk or sterile water. Rest in the middle of baby's bottom lip. If baby is comfortable with this move the cotton bud/finger slowly with a scooping action along the bottom lip from one corner to another
- Repeat for top lip
- Ensure baby is settled after this had been undertaken.
- Mouth care should be performed at least once in a 12-hour period, however the frequency of mouth care should be individualised for each baby and based on behavioural cues, sleep state and tolerance of handling
- When a baby has vomited mouth care should be given to remove the unpleasant taste
- Educate parents about mouth care and support/encourage to participate in this process for their own baby.
- During tube feed if a baby is awake and receptive they should be given the opportunity to taste the milk as they will enjoy the taste of the milk and develop an association between the taste of the milk and feeding. A pacifier can be dipped into the milk and offered to the baby to suck or offer an oral feed if developmentally appropriate.

8.0 Non Nutritive sucking

8.1 Benefits

- Pleasurable oral experience, used to settle and comfort a distressed baby
- Used to gain optimum behavioural state needed for preterm babies to commence and sustain an oral feed.
- Helps the preterm infant regulate themselves.
- Mature sucking reflux can help the disorganized bottle feeder suck consistently.
- Linked with digestion, internal digestive transit, energy expenditure and weight gain.
- Raised insulin secretion, promoting glucose absorption and thus weight gain.
- Lowers heart rate.
- Raises saturation levels.
- Reduces the incidence of necrotising enterocolitis.
- Reduces incidence of sudden infant death syndrome
- Lessens stress in the infant and their carers.

8.2 Indications for use

- Behavioural signs of wanting to suck.
- Distressed baby who requires comfort.
- Disorganised baby.
- Nil by mouth, restricted fluids yet hungry/distressed.
- Babies whose condition deteriorates by restless activity including the need to suck.
- Babies on NCPAP.
- Prior to and during invasive procedures.
- Prior to feeding to achieve a modulated quiet awake state.
- During a tube feed.
- As a developmental aid for the premature baby and those born with congenital abnormalities.
- By parental choice when there is unavoidable separation to enable the baby to self-console.

8.3 Interventions

- Try to settle the baby using developmentally supportive procedures (see developmental care guidelines), according to the infant's condition and gestation.
- Choose the appropriate pacifier to suit the baby.
- Encourage the baby to open the mouth wide and extend the tongue (to mimic pre-feeding behaviour) by stroking around the mouth and on each side of the cheeks, put pacifier in his/her mouth if consent gained from family.
- Leave in place for only a few minutes assessing effect. Remove and store as per unit guideline.
- Educate parents in hygiene techniques, e.g. not to leave pacifier lying around in the cot.
- Consider reducing the use of NNS once baby matures or is ready to suck
- When a baby who has had NNS is allowed to breast-feed extra input into attachment may be required. Observe the feeding technique to ensure sucking is not superficial.
- Ensure parents have information on use of NNHs to prevent SIDS and the negative effects of habitual long-term pacifier use.
- Store pacifier in sterilising solution when not in use in a denture pot.
- Change solution daily and record date and time of change.

9.0 Noise

- Preterm infants are especially vulnerable to high sound levels because their neurologic systems are not mature, and the infants are less able to process and filter noxious stimuli and to maintain self-regulation.
- Neonate requires REM sleep for the normal development of the auditory systems.
- Noise is an environmental aspect that impacts on the baby and has far reaching consequences. Our responsibility is to nurture and protect babies whilst in our care.
- Noise is a major source of stressful stimulation causing agitation to the baby, decreasing saturation levels, increasing blood pressure heart rate and respirations further complication medical management. Increased oxygen consumption and calorie requirement means there are fewer calories and oxygen available for growth and repair. Blood pressure affects cerebral flow potentially causing Intraventricular Haemorrhage.
- Intense or prolonged exposure to sounds can directly damage the very fine stero cilia or the cochlea directly and permanently. Speech is a low frequency sound so hearing damage in this range has a great impact on language development and communication. Babies lack the ability to distinguish between background and foreground noise and the baby may 'shut down' and become more difficult to rouse for social interaction or to feed.

9.1 Cause of noise on a Neonatal Unit: Examples of Recorded Noise Levels in special care.

Event	Noise level
Telephone ringing	80 dB
Closing incubator doors	100 – 135 dB
Noise levels inside incubator	50-66 dB
Tapping incubator with fingers	80 dB
Bubbling in ventilator circuit	62 – 87 dB
CPAP at high pressure	Possible 100dB in postnasal passages
Talking around the bedside	60 dB
Mean general working noise	50-90 dB

9.2 Recommendations for Noise Levels

Noise levels greater than 45 dB should be avoided where possible. BLISS, 2009 states that units should care for babies in a comfortable auditory environment that protects them from loud or continuous noise (below 50 dB).

9.3 Risk Factors

- Environmental noise
- Low gestation
- Hypoxia/hypoxic-ischaemia
- Hyperbilirubinemia
- Neonatal meningitis
- Ototoxic medication: most commonly aminoglycosides and diuretics
- Chromosome or genetic abnormality
- Maternal Factors e.g. sustained loud noise in pregnancy/measles

9.4 Interventions to reduce the noise within the nursery – details in below subsections.

Equipment

- Maintain all equipment as per manufacturers' instructions, reporting any equipment with faults or out of service date.
- Keep monitor alarms as quiet as possible but audible enough to be safe. Silence alarms promptly.
- Empty water in CPAP and ventilator tubing quickly.
- Avoid dragging equipment.
- Close incubators doors, drawers and portholes gently and avoid putting anything directly on top.
- Cover incubators of preterm, sick or neurologically compromised babies to muffle sound, whilst keeping a corner or flap open for observation. Fold cover back rather than removing completely for procedures.

- Place syringes into sharps boxes as gently as possible.

Staff and Visitors

- Encourage all staff and visitors to speak quietly, not directly over the baby and preferably away from the babies, including discussions during the ward round.
- Be aware that until a baby can habituate even repetitive, non-noxious sounds such as footsteps, talking, water running
- Avoid calling another person across a room.
- Avoid having musical toys near preterm and sick babies.
- Be aware of noise from packaging, paper towels and changing rubbish bins and paper towels.
- Observe the baby's behaviour and physiological cues to ensure levels of noise do not indicate stress.
- Be aware of noise from closing doors and drawers
- Staff to wear soft soled shoes
- Notice how sensitive a baby is to sound

What type of sounds does the baby need to hear?

- One of the first acoustic stimuli a baby is exposed to before birth is the voice of the mother and the sounds of her heartbeat. The maternal auditory nursery provided by the womb vanishes as the new-born enters the Neonatal Unit.
- The parents voice is the most important, preferably without background noise, to allow the baby to hear clearly. As babies hear low-pitched sounds best.
- Encourage parents, carers and visitors to talk softly to the babies.
- If the environment is noisy, preterm babies may stop feeding, as they do not cope well with multi-sensory input.
- There is a need to be aware that repetitive sounds; running water, musical toys, radios and footsteps, can disturb babies until they are able to habituate to these sounds
- Talking to preterm infants is associated with higher language and cognitive scores.

10.0 Light

Within the womb the foetus matures within the maternal circadian rhythms and in near darkness. The unborn babies see an orange glow shining through the mother's abdominal wall. This turns lighter or darker depending on the time of day.

The features of prematurity are that the baby has thin eyelids, lack of pupil constriction up to 30-32 weeks gestation and retina set for lux of 200. The impact of bright light can cause distress physiological instability, sleep disturbances, restlessness and negative effects on growth and development.

REM sleep is essential for the development of the visual system, staff should be able to recognise sleep states and protect REM as part of the infant's care plan.

10.1 Risk Factors

- Environmental light.
- Low gestation
- Neurological disturbance
- Chromosomal or genetic abnormality
- Phototherapy
- Maternal factors

10.2 General Information and Recommendations for Light in Neonatal Units

Measuring Light:

There are two common measurements in describing light environments

Illuminance (how much light), describes the intensity of light falling from a source and is measured in units such as lux or foot candles.

Irradiance (what kind of light), is the amount of radiant energy emitted over wavelength bands. Only wavelengths in the visible spectrum are seen by the human eye

The lux is a measure of illumination, e.g.

Moonlight: 5 lux

Indoor lighting: 200-1000 lux

Neonatal nurseries: 400-1000 lux common, some exceed 10,000 lux.

Phototherapy: 2400 – 3000 lux

Bright sunlight at midday: 11000 lux

The retina is set for 200 lux and moderates incoming light by constricting or dilating the pupil of the eye. These pupil reflexes are absent in very preterm infants. Pupil constriction develops from about 32-34 weeks gestation and is slow at first.

10.3 Modifying nursery lighting to support neurodevelopment

- Individual bedside lighting - assess whether it is necessary to have the main nursery lights on.
- Turn off bright overhead lights whenever possible
- Protect baby's eyes during any procedure when focal light is needed
- Cover incubators with incubator covers; ensure that corner/flap is always up to allow safe observation of the baby and to allow infant to interact if cues indicate.
- Be aware of position of baby in relation to the light source/s. Use your body or hands to shield baby from direct light when holding.
- Position the cot so light does not shine directly into the baby's face.
- Consider using pen lights to check babies near darkness e.g. with incubator covers.
- Consider covering eyes during procedure that requires bright illumination.
- Decrease lighting when parents visit so baby can open his/her eyes.
- Babies who have had their pupils dilated for retinopathy screening should be screened from bright light. Sensitivity to light may persist up to 18 hours .
- Use the individual developmental care plan in the baby's folder to check what is recommended for their gestation. Term babies need enough light to see shapes and forms clearly in order for vision to develop normally.
- Introduce appropriate level of lighting according to gestation age.
- Be aware of the position of the baby in relation to light sources
- Daylight is preferable to fluorescent overhead lighting
- Notice and document how well the baby copes with light
- Notice signs of sensitivity to light and document in the care plan

10.4 Parental Involvement

- It is important to involve parents in promoting their babies development by encouraging them also to consider lighting levels.
- Give parents accurate information on the impact this has upon sleep and feeding.

10.5 Staff

Staff should have the opportunity to spend time away from the nursery in a well – lit room.

11.0 Positioning

It has been identified that active muscle tone starts to develop at around 36 weeks gestation, when babies achieve a postural state known as physiological flexion. At this stage the baby is curled up in a confined space, in the womb, developing stronger muscles by pushing up against the walls during movement. If the baby were to be born at this time, they would be able to keep their body in a midline position, with flexed arms and legs. They would be able to use this position of stability to observe the world and begin to learn to move and explore. Therefore, these final weeks in the womb, moving towards physiological flexion are essential to each baby's future development.

Premature babies have low muscle tone (have not achieved physiological flexion) as they have missed out on some or all of the essential stages of muscle tone development in the womb. They must work against gravity in order to move their limbs and research has shown that it is often difficult for them to maintain the positions that best provide and support rest, sleep and self-comfort. Without appropriate intervention these babies can develop head flattening and cranial moulding (plagiocephaly), leading to difficulty turning and moving their heads due to the lengthened occiput, which could further inhibit development.

In all positions try to follow these principles:

- Encourage physiological flexion,

- Encourage midline/symmetry,

- Head in midline,

- Optimum airway management,

- Hands together and near chest/face,

- Feet together with lower limbs in a flexed position,

- Deep boundaries to provide postural support,

- Alternate position regularly between supine, side lying and prone and document these clearly.

When positioning a baby consider the following:

- The principals of positioning are explained to the parents with the appropriate information given and parental involvement is promoted,
- Use of Gel pillow to minimise head flattening for preterm infants (where available).
- Alter the baby's position over the 24-hour period alternating between prone, supine and side lying (left/ right). If the baby does not tolerate certain positions, then try to give them a short period (i.e. half an hour or as tolerated) in these positions, to give relief to joints and limbs, and try to acclimatise a baby to a new position,
- Record the baby's position with the observations on the baby's chart. As well as stating the baby's position include which side of the face is touching the mattress i.e.

right, left (or midline) so that the next staff member can see how they have been positioned over the last 24hours and position the baby accordingly.

- Even the best fitting nappy can be too wide between the baby's legs, stopping their legs lying parallel. Try squashing the section that lies between the baby's legs to reduce its volume before putting on the nappy. Consider trying the next sized nappy down which may fit better. This may be more comfortable for the baby and will help to encourage legs to midline.
- Ensure the baby is not laying on any lines, wiring or tubing that will be uncomfortable and may cause pressure sores or indentations/ bruising on the baby's skin.
- All members of the multi-disciplinary team should remember to reposition a baby once they have completed a task, i.e. blood test, examination or nursing care.
- Position changes should be slow and steady, to minimise distress and to prevent invasive and monitoring equipment from being dislodged
- The baby should be touched gently and talked to before changing their position. This gives them warning that handling is about to occur, and can minimise distress.
- Check babies pressure areas on change of position and document on the tissue viability assessment chart.
- Talk to the physiotherapist on your unit for further information or support.

Safe sleep

- Prior to discharge all parents should be made aware of current safe sleep guidance.
- Parents have had the opportunity to discuss the difference between sleep in the NICU and safe sleep at home.
- Once monitoring has been removed from baby, follow safe sleep guidance e.g removal of boundary, teddies and cot horizontal.

See links below for further information:

Term babies:

https://www.lullabytrust.org.uk/safer-sleep-advice/

Premature babies:

https://www.lullabytrust.org.uk/wp-content/uploads/The-Lullaby-Trust-Safer-Sleep-Advice-For-Premature-Babies.pdf

11.1Supine Position

- Acutely ill infants tend to be nursed in the supine position in order for procedures to be carried out and for ease of monitoring.
- The baby should be nursed with boundaries around the body:
- Upper limbs together in midline with elbows flexed and shoulders supported and gently rounded to enable baby to bring hand to mouth/face.

- Hips flexed towards the midline, knees slightly flexed and feet in neutral position within the boundary.
- If not supported limbs will be flat to the mattress and in abduction resulting in potential muscle imbalance and poor coordination.
- A gel pillow could be used under the head and shoulders encouraging a midline position and evenly distributing gravitational pressure leading to a more rounded head shape.
- Infants will be gradually prepared for sleeping supine prior to discharge in line with the 'safe sleep' guidelines.
- Some disadvantages to this position could be:
- Makes baby more prone to reflux.
- Gastric emptying is delayed.
- Potentially more heat and energy loss.
- Less effective ventilation and increased energy expenditure often leading to higher oxygen levels if baby is unwell.
- Head flattening can occur if the head is always one side.
- More heat and energy loss
- See illustration 4

Illustration 4

11.2 Prone Position

Babies should be positioned with a prone positioning aid within a deep boundary.

- Encourages hip and knee flextion
- Encourages upper limb flexion helping to bring hands to mouth
- Reduce excessive neck extension.
- Optimises respiration and ventilation.
- Babies tend to lose less heat.
- Gastro-oesophageal reflux is reduced as gastric emptying is optimised. These may lead to an improved sleep state and reduced energy consumption as the baby is more comfortable.

Some of the disadvantages to this position could be:

Illustration 5

- Possible risk of plagiocephaly due to limited options for head position.
- Not safe if umbilical lines are in situ
- Always have continuous cardiorespiratory and oxygen saturation monitoring in situ.
- Parents to be advised that this is not the sleeping position they should use at home, refer to safe sleep guidelines.

See illustration 5

11.3 Side Lying

- Side lying facilitates movements towards the midline and reduces the need for the baby to work against gravity.
- It also reduces the likelihood of stiffness in the shoulder and hip joints, which can lead to developmental problems (Warren and Bond, 2010)
- Easiest position for babies to use self-calming measures e.g. hand to hand, hand to mouth and foot to foot.
- Babies feel more secure and able to self-regulate, meaning they are most likely to reach an awake alert state and able to interact and bond with their parent.
- Right side lying increases gastric emptying as the stomach empties to the right
- Left side reduces gastric reflux because the oesophagus attaches at the top of the stomach at an angle. Gravity will mean the stomach contents have to flow upwards making the action of reflux more difficult.

Illustration 6

- Encourages a flexed position.
- Hands near to mouth or face for self-calming
- Some disadvantages to this position could be:
- Plagiocephaly could be exacerbated as weight is always placed on the full side of the head.
- See illustration 6

11.4 Nesting

Details in below subsections

11.5 Boundaries should be:

- Individually made for each baby depending on their needs and size.
- Boundary edges should be deep and firm.
- Steep around the feet enabling baby's limbs to remain inside rather than allowing them to slide out, also allow feet to brace against wall of the boundary.
- Significant depth of the entire boundary to provide baby with postural support to maintain flexed midline position.
- Encircle the head as well as body and legs for small babies.
- Materials should be soft with no creases and washable.

- Nesting should be discontinued before infants are discharged or when monitoring is discontinued in accordance with current safe sleep advice.

11.6 Neurodevelopmental benefits of providing a boundary

- Support physiological flexion like in the womb.
- Supports midline alignment.
- Facilitates hands together/to face.
- Facilitates feet together and opportunities for foot bracing.
- Help with the development of strength in all limbs.
- Provides sensory/tactile stimulation for orientation of body in space.
- Improves quality of sleep to aid brain development.
- Supports the development of oral feeding skills.
- Improves baby's oxygenation.
- Improves physiological stability.
- Helps reduce stress.

There could be additional scenarios where providing a boundary could be beneficial e.g. Neonatal Abstinence Syndrome.

11.7 Positional Plagiocephaly.

Plagiocephaly is a name that can be given to describe the shape of a baby's head.

It appears an asymmetrical shape of the head where the back or side of the baby's head appears flattened. This can be caused by repeated pressure to the same area of skull.

It seems to affect premature babies more often than those born at term. This is probably because the skull plates become stronger in the last few weeks of pregnancy and preterm infants often spend long periods in the same position.

Babies frequently develop a head turning preference which can lead to exacerbating the uneven shape. Gel pillows can be used with babies below 34 weeks gestation to help prevent this.

When a baby is nursed on a gel pillow :

- They should be monitored using a pulse oximeter as they can obstruct their airway.
- They should be pre warmed before use which can be done by placing the pillow in the baby's incubator to warm before use.
- Position should be documented.
- Regular observation of the baby.
- Regular position changes and head turning.

- Position baby in different positions throughout the day on the NNU and if a baby prefers their head in one position encourage a different position even for a short period to take the pressure from the one side.
- After 34 weeks remove the gel pillow and once off monitoring use of safe sleep guidance should be encouraged.
- Encourage skin to skin.
- Switch or alternate sides when cuddling baby or feeding.

Please see illustration 8

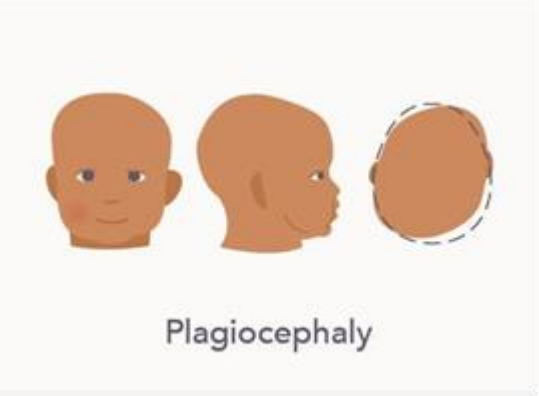

Illustration 8

11.8 Neonatal abstinence syndrome

• Babies in the process of withdrawing from medications, have additional needs for positioning measures that would not usually be recommended for the 'well term baby'. This included swaddling to settle and aid sleep and also the prone position.

• It is appropriate for these methods to be used in the hospital setting, for these babies, where they will be monitored by a pulse-oximeter if nursed prone or with positioning support

• As with all other babies, additional positioning support must be removed before discharge as per safer sleep

12.0 Infant Feeding

During an infant's stay on the NNU it is possible that they will experience facial and/or oral stimulation which might be unpleasant and uncomfortable but nevertheless necessary to their care.

Supportive practices can facilitate positive experiences.

These practices include Kangaroo care, containment holding/use of positioning aids as boundaries, developmentally sensitive mouth care, offering NNS opportunities, offering support during tube feeding and supporting the production of breastmilk.

Breast feeding:

Breast feeding should be the preferred method of feeding if at all possible, supportive factors for breastfeeding success are :

• Consistent supportive approach and advice from staff

• Realistic expectations for progress explained to parents

• Unit staff not seen to be promoting alternative feeding methods

Bottle feeding:

Babies can show signs that that are ready to be supported to bottle feed from around 34 weeks, for some babies this will be later.

Consistent cues of readiness will need to be evident over a number of days before support to bottle feed is started. These might include;

- Respiratory state is stable
- Baby is able to remain awake for longer
- Baby is showing consistent cues of readiness to feed
- Baby will suck on their dummy or fingers

If parents choose to support their baby/babies to bottle feed; All babies born at 37 weeks or less are to be supported to feed using Sterifeed premature teats provided on the unit in the first instance, unless parents have bought in their own choice of bottle/teat. The benefits of slow flow rate commercially produced teats should be explained to parents.

Flow rates of Sterifeed teats are as follows:

Preterm teat flow rate is 8.5ml/min

Standard teat flow rate is 23.3ml/min

Orthodontic teat flow rate is 23.3.ml/min

Some clinical benefits for use of slow flow rate teats are, as follows:

- Improves coordinated sucking, swallowing and breathing.
- a slower flow rate teat will support positive and responsive feeding
- use of a teat with a flow rate which is too fast may result in higher re-admission of babies
- use of a slower flow rate teat supports the development of suck:swallow:breathe synchrony and improves oxygen saturation levels during bottle feeding.

12.1 Elevated side-lying position when supporting bottle feeding

All babies born at 37 weeks or less are supported to bottle feed using the elevated side-lying (ESL) position.

Benefits of ESL

- provides a safe and comfortable position for supporting bottle feeding
- a flexed, midline position (which the baby has been in whilst in-utero) is replicated, as far as possible
- replicates breast feeding positioning
- promotes optimal postural control for babies when feeding
- the supportive position conserves the baby's energy during feeding
- provides better airway protection.
- enables safer clearance of any oral residue
- helps regulate the flow of milk
- facilitates baby's use of self-regulatory strategies
- improves oxygenation during feeding
- supports improved pacing of the feed
- supports the development of suck:swallow:breathe synchrony
- supports opportunities for typical feeding experiences for such as tasting, rooting, licking, sucking, swallowing and flexion
- encourages the release of oxytocin if parents are involved in feeding; from maternal/paternal proximity, voice, touch, skin to skin contact
- supports babies brain growth and skills development
- infants fed in elevated side-lying positioning were shown to have longer feeding times, more feeding endurance, showed increased engagement and consumed increased volumes of milk

Nursing care:

- Ensure the family have made an informed choice for their baby to be supported to bottle feed and encourage the family to be available for as many feeds as possible.
- Observe the baby's behaviour before feeding.

- Provide a peaceful, quiet, distraction free environment with subdued lighting.
- Always ensure a parent is present to give the first feed.
- The infant must be 34 weeks gestational age, stable and completely self-ventilating in air or low/high flow oxygen within accepted flow rate and oxygen range before support to bottle feed can be considered.
- The feeds should be offered when the baby is beginning to wake and show signs of readiness to feed.
- Always use a pillow to support positioning.
- The feeder should be seated comfortably with the legs and knees together and knees higher than the base of the lap.
- Always use of a footstool to achieve elevation.
- Place the pillow on the feeder's lap to ensure a comfortable place for the baby to be laid and to provide the required postural support.
- The baby should be placed in a side-lying position on the feeder's lap, with their head at the top of the lap and bottom against feeder's stomach. Placing baby on their LEFT side is the preferred position.
- Check that the baby's neck and spine are in a natural alignment and the hips are flexed at 90 degrees allowing the legs to curve around the feeder's stomach.
- Ensure the baby is supported on your lap or pillow rather than being held.
- Swipe the teat along the width of the baby's mouth to offer the feed. When the baby opens their mouth, insert the teat. If the baby does not open their mouth, the teat should not be forced into the mouth, nor should the baby be encouraged to open their mouth by downward swiping of the teat in the midline of their lips.

- For winding, sit the baby upright or transfer the baby slowly with support to an upright position against your chest.

12.2 Paced Feeding

Paced feeding is a technique that mimics breastfeeding and allows the baby to take control of the process of feeding.

Pacing

When establishing bottle feeding, many premature babies and those with difficulties with breathing will go through a maturational phase of continuous suck/swallowing without pausing for respiration. This can result in desaturations and may also result in bradycardic and apnoeic episodes. Risk of aspiration is high in these circumstances.

Pacing can be used to provide external support to the baby and eliminate resulting instability and potential choking/aspiration.

Pacing can be an important tool in controlling RISK and in ensuring that feeding provides a safe and positive learning experience for the baby.

How to provide pacing:

1. Based on observation of the baby, the number of suck: swallows allowed before providing a pause can be determined

2. Count the baby's suck: swallows and if/when the number determined have been seen without the baby taking a breath.

3. Leaving the teat in the baby's mouth, LOWER the bottle so that the teat empties of milk. (The baby may continue to suck but as they do not have to manage the extraction of milk, they will be able to recover and breathe.)

4. Do not worry about air being swallowed as air has a different density to milk it will be directed from the mouth via the nasal cavity.

5. Observe the baby taking catch up breaths and observe for signs of stability. If the baby is stable and if you are happy that they are ready to feed again, raise the bottle so that milk enters the teat again.

6. Continue to provide breaks as above. As time goes on, most babies will adjust to the imposed rhythm of sucking and breathing and may begin to adopt the pattern.

13 Procedures

13.1 Wrapped tucked position for lumbar punctures







Advantages

- The baby is able to self-soothe and appears more comfortable
- Strenuous holding is avoided
- The baby can easily receive sucrose/expressed breast milk for pain relief
- Temperature regulation is improved
- Easier to locate the correct lumbar region

13.2 Swaddle Bath

All bathing should be carried out by the parent. To promote family integrated care, with explanation /support and education surrounding the bathing technique should be given as soon as baby is clinically able to be bathed. A show bath can be performed if necessary, using a doll.

Nursing Care:

- Discuss how parents will be bathing baby at home.
- Provide a relaxing atmosphere which is quiet and calm.
- Ensure the room is warm and there are no drafts.
- Fill the bath with warm water and position it near to the bed side. The water should be deep enough to immerse the baby to shoulder level and allow floating.
- Remove baby's clothes and nappy- cleaning nappy area if required.
- Gently wrap the baby in a clean dry sheet or towel, so their head and face are exposed.
- If the baby needs their face or hair washing, this can be done first with the baby out of the bath. This makes it easier to support the baby whilst washing and to dry their hair and avoid them getting cold.
- Hold baby securely against your body and move to the bath.
- Gently wash the baby's hair and then dry with a separate towel.
- Introduce the baby to the bath slowly, watching for signs of tension. If these are seen, pause to allow the baby to relax before moving on
- Position the baby so they can brace their feet against the end or side of the bath, without having to stretch out.
- The baby should be held so that their head is out of the water and their shoulders are supported all times, and never with the carer's hand wrapped around their neck.
- Once the baby is calm then the wrapping can be loosened step by step, both to wash the baby, and to allow them if they wish, to stretch out and kick about or 'float' in the water.
- If at any time the baby is unsettled, pause, and rewrap if necessary.
- The length of the bath can be adjusted to reflect the baby's enjoyment and stability.
- Turn the baby to the side, this helps keep their limbs tucked in. Then lift the baby out and place them directly onto parent/ carer's chest as they lean over the bath. Allow the wrapping to stay behind in the bath water.
- Gently dry the baby and dress in nappy and warm dry clothing, interacting with them as appropriate.
- Take pictures for parents and make a note in the baby's diary.
- Observe baby for fifteen minutes after the bath.
- Note the baby's reactions.

Throughout the process, the parent/ carer should talk to the baby, and match their actions with their voice. This is an opportunity for parents to learn to recognise their baby's behavioural cues and to continue learning how to sensitively interact with their babies.

13.3 Swaddled weighing

Swaddled weighing is recommended to improve the weighing experience, by supporting physiological stability and behavioural organization. It is recommended that where possible babies are weighed in the daytime, to reduce disturbance at nighttime when they should be sleeping, also because this gives parents an opportunity to be present and involved.

Nursing care

Two people should be available for the weighing process; ideally one of these would be the baby's parent/ guardian.

Ideally the baby will be awake - often weighing can be done when other personal care is performed, as the baby will already be awake and will have a clean, dry nappy on.

Prepare the weighing scales with a soft surface on the weighing pan area, such as a folded towel.

Ensure the weight is set to '0' once the towel is in place.

Ensure the nappy the baby is wearing is clean and dry and pre- weighed.

Gently wrap the baby in the lining of its nest- so that he/she is enclosed in a flexed midline position.

Turn the baby gently into the side lying position, then pick the baby up and out of the incubator/cot.

Hold the baby against your own body, for security. Do not elevate them through the air unsupported.

Transfer the baby to the weighing scales, whilst maintaining their side lying contained position. Provide containment and/ or a dummy as required.

Weigh the baby and document the weight.

One person should change the bedding in the incubator, if required, whilst it is empty. The second person- often the parent can keep the baby safe on the scales and interact with the baby if appropriate.

Return the baby to the incubator by the reverse process.

Gently remove the nest lining from under the baby and weigh.

Delete the weight of the nest lining and the clean nappy from the baby's weight to get the correct weight.

Parent/helper to settle the baby back into a comfortable position- until peaceful and recovered.

13.4 Supporting babies during retinopathy of prematurity (ROP) Screening

Nursing Interventions

- Explain to parents in advance when the examination will be done and give an information sheet.
- The nursery should be quiet and calm for the examination.
- Ensure someone is available to support the baby.
- Administer sucrose 2 mins before and offer soother.
- Prepare the baby's position – with the feet able to brace, blanket tucked around baby or swaddling with hands free.
- Approach the baby gradually, talk then gentle touch before the intervention.
- Encourage the baby to grasp your fingers with the hand by face.
- Facilitate sucking if the baby wishes.
- Talk soothingly to baby
- After the examination comfort and reassure the baby
- Reposition
- Avoid other procedures for at least an hour
- Protect from the light
- Give parents the result of the examination

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6. Documentation Controls (these go at the end of the document but before any appendices)

Reference Number NIC PP 08	**Version:** 1.3		**Status** Final	
Version / Amendment History	Version	Date	Author	Reason
	1	July 2014	Helen Lenihan, Teresa Hurst, Judith Ann Andrews, Kerry Wood	
	1.2	December 2020	Teresa Hurst	Review
	1.3	April 2024	Rachel Shephard	Review
Intended Recipients: All staff working across neonatal units at Derby and Burton				
Training and Dissemination: Communications				
Development of Guideline: Rachel Shephard **Job Title: Senior Clinical Educator**				
In Consultation with: Allied Health Professionals, Neonatal Consultants, Senior Nurses				
Linked Documents: Bliss Baby Charter				
Keywords: (Search term for KOHA) Developmental care family integrated development				
Business Unit Sign Off			**Group:** Paediatric Guidelines Group **Date: 02/10/2024**	
Divisional Sign Off			**Group:** Women's and Children's Clinical Governance Group **Date: 02/12/2024**	
Date of Upload			13/12/2024	
Review Date			October 2027	
Contact for Review			Rachel Shepard	

7. Appendices