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An Operational Delivery Network
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Guideline for Family Centred Developmental Care

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Northern Neonatal Network Guideline

Guideline for Family Centred Developmental Care

Scope

Applies to all members of the Multi Disciplinary Team (MDT) involved in delivering care to babies on units within the Northern Neonatal Network. The interpretation of this guideline is the responsibility of the individual team member, who should also refer to local unit guidelines.

Purpose

To provide clinical guidance which will support consistent provision of Family Centred Developmental Care practice across the Network. It contains an over-arching summary guideline of the principles involved in Developmental Care and a more detailed set of individual guidelines for key areas.

Guidelines

1. Sound
2. Light and vision
3. Smell and taste
4. Positioning
5. Cue based cares and handling
6. Skin to skin
7. Developmentally supportive measures to minimise pain and stress

Summary

- Developmental Care is a philosophy of care that integrates the Developmental needs of each individual infant and their family within a medical framework.
- Modification of the nursery environment and care practices which support the ongoing development of the infant are recommended from delivery onwards.
- Education and involvement of Parents/Carers[1] acknowledging that their role is pivotal is key to Family Centred Developmental Care delivery.
- All infants are individual in their physiological condition, behaviour and gestational age. Therefore assessment of and response to each infants changing need, is central to the provision of appropriate Developmental Care and interpretation of this guideline .[1]

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Supporting documents

- **The Toolkit for High Quality Neonatal Services (2009)** [2]
  'Neonatal care adopts a family centred philosophy of care, helping them cope with the stress, anxiety and altered parenting roles that accompany their baby's condition. Family centred care may enhance attachment between a baby and the family and result in improved

long-term outcomes for both.' The Toolkit recommends that each Network and Unit has an identified Developmental Care Lead.

- **Bliss Baby Charter Standard (2009)**[3]
- **POPPY Project (Parents of premature babies) 2009**[4] – emphasized the need for effective information for parents, and the use of benchmarking to reduce variation in practice.
- **BAPM Service standards for hospitals providing Neonatal Care (3rd Edition 2010)**[5]
- **NICE Quality Statement 4 (2010)**[6]
  Principle 1: Respecting the baby's rights as an individual. The provision of cares which help to reduce the stress of the NICU environment..
- **Picker (2010/11)**[7]- survey of parental experiences emphasized the importance of consistency in Developmental Care, especially when babies are transferred between units in a Network.

Link to above documents can be found on Northern Neonatal Website; 'Publications and articles' www.nornet.org.uk

Background

The environment of the developing foetus is characterised by a supported flexed posture; containment, limited light and noise exposure, protected sleep cycles and an unrestricted access to his mother. This positive sensory environment is crucial for normal brain development.

In contrast to this a preterm or unwell newborn infant is exposed to painful procedures, excessive light and noise and handling, lack of containment and reduced ability to move, interrupted sleep and separation from his mother.

The third trimester is a period of rapid brain growth, developing more than at any other time during intra or extra- uterine life. Consequently a premature baby's immature brain is vulnerable to the abnormal influences and stresses of the Neonatal environment. From around 24/ 28 weeks gestation to 3 years of age tremendous refinements and restructuring of neuronal connections take place. Consequently this is a 'critical 'period when environmental factors may have a positive or negative influence on brain development. [8]

While advances in medical care have resulted in decreased mortality rates, there is evidence that infants who are born acutely unwell or who are born prematurely have increased morbidity.[7] In addition to medical complications, growth deficits and neurological problems, long term follow studies have also identified other more subtle problems neurosensory impairments such as cognitive and behavioural difficulties. These can have a significant influence on a child and their families' quality of life.[9]

Developmental care practices which aim to support more positive experiences and outcomes are therefore recommended by the Network.[10]. **Each unit has been provided with their own copy of 'A guide to developmental care in the Neonatal Nursery', Warren 2010 . Refer to this for futher information.**

Developmental Care Goals

1. Reduce Stress and pain
2. Conserve energy and promote physiological stability
3. Recognise and support infants emerging neurodevelopment maturity
4. Provide support and encouragement to parents/carers.

Developmental Care Interventions Support

- Behavioural organisation and maturity
- Protection of sleep patterns, growth and maturation.
- Involves and supports the family and carers
- Teamwork and professional competence.

Sleep Protection

There is growing evidence that supports the value of sleep in early preterm brain development. The relationship between active sleep states (Rapid Eye movement - REM) and quiet sleep states (non rapid eye movement) appear to have a role in the ability of the brain to re-wire itself to adjust to various sensory experiences[6]. At 28/30 weeks an infant is almost always in some stage of sleep, with 80 to 90 % of this being active sleep (REM).

There is growing evidence that supports the value of sleep in early preterm brain development. The relationship between active sleep states (Rapid Eye movement - REM) and quiet sleep states (non rapid eye movement) appear to have a role in the ability of the brain to re-wire itself to adjust to various sensory experiences[6]. At 28/30 weeks an infant is almost always in some stage of sleep, with 80 to 90 % of this being active sleep (REM). By term an infant will sleep only 70% of the time, with about half of this in active sleep. A premature infant does not experience the uninterrupted progression of sleep patterns as well term infants do. It is important therefore that care practises provide strategies to promote infant sleep. Graven S ‘Sleep and Brain development – the critical role of sleep in foetal and early Neonatal Brain development.[1]

Developmental Care Delivery

- Each infant’s development will be an integral part of their care plan, responding to and evolving with their changing needs.
- The infant’s developmental needs will be assessed through observation of their behaviour.
- The Nursery sensory environment will be adapted, within safe medical needs as appropriate for their gestational age.
- Care times should respond as far as practical to an infant’s developing sleep/wake patterns and observed stress responses to handling.

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5. BAPM 2010 standards for specialist neonatal care
6. NICE Quality Statement 4 (2010)Bliss Baby Charter
7. Picker survey 2011
8. WF Lui et al 'The development of potentially better practices to support the neurodevelopment of infants on NICU', Journal of Perinatology (2007) 27,S48-74.
9. Moore T et al, ' Neurological and developmental outcome in extremely preterm children born in England between 1995 and 2006:the EPICure studies. BMJ,2012;345:e7961
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Useful related Links and literature

www.nidcap.org Nidcap federation international

www.bliss.uk.org

www.nann.org *Age-Appropriate Care of the Premature and Critically Ill Hospitalized Infant: Guideline for Practice*, developed by Mary E. Coughlin, www.nann.org

NWPLN 2009/10 Developmental Benchmarking Project

1. SOUND

Evidence based background for sound
Background noise in the nursery should be quiet, an average of 45db, with peak noises up to 65db, American academy of paediatrics committee on environmental health, (Johnson , 2007).

Care interventions to help reduce noise include:

- Education of staff and parents about effects of sound and need for quiet(within limits of medical needs). Information posters.
- Regular audit of of unit noise levels – diffent times of day, ward rounds and handovers, feedback to Staff/Parents.
- Close incubator doors softly
- Avoid placing objects on top of incubator
- Silence alarms as soon as practicable
- Set alarms and phones at lowest safe level
- No radios in unit (age appropriate musical toys may be individually appropriate for post term infants).
- Consider ear muffs during excessively noisy procedured – MRI.

Explanation:

Recommended sound levels support early Parent/infant interaction. Babies have opportunities for exposure to their parents voices.

Noise disrupts sleep which is essential for growth and development.

High noise levels can be stressful for infants , Parents and Staff.

Threshold for cochlear damage in adults is 80db, immature cochlear is more sensitive.

Hearing well developed by around 27weeks gestation.

2. LIGHT AND VISION

Evidenced based guideline for Light

Light levels measured in 'Lux' levels using a light meter.
Ambient lighting should vary from 10- 600 lux

Lighting levels should be adjustable, allowing dimming and increased levels for safe working practice and procedures.

Aim to keep lighting levels low (300 lux),

Take the opportunity to 'dim' lighting especially in ITU areas whenever possible.

Care interventions include:

- Protect infants from light with levels below 25 lux until 32/34 weeks Corrected Gestational Age (CGA) – incubator cover or canopy with open cot. Also provide shading for older unstable infants.
- From 32 weeks CGA begin to introduce moderate light exposure – 2hrs per day - canopy or incubator cover reduced, while still shielding baby from bright overhead lights or sunlight.
- Gradually build up to 'cycled lighting', which reflects day/night lighting when infant is approaching term (35 – 37weeks CGA)
- Protect infants from focused lighting during medical procedures/examinations. Could use eye mask or carer's hand.
- Remember to also consider effect of increased lighting levels on infants in nearby cots.
- **Vision** - avoid placing strongly contrasting images in infants view before term
- **Vision** - Demonstrate to parents how infants may begin to follow the outline of their face from around 33/34 weeks.

Explanation:

Pupillary reflex is not fully effective before 32 weeks, infants unable to adjust to bright light. Higher light levels can disturb infant sleep cycles, and early interaction.

Some evidence that infant's benefit from 'cycled' lighting after 32 weeks; faster weight gain, (Jorgensen 1997).

The unborn baby matures within its Mothers circadian rhythms' (day/night). Light is perceived as a series of grey shadows through the Mothers abdominal wall; being lighter or darker depending on the time of day. Following delivery an infant's visual perception develops further as they experience cycled light and other visual stimulation. Infants need to gradually become accustomed to night/day changes to support circadian rhythms, transition to normal night time sleep patterns'

3. SMELL AND TASTE

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

Care interventions:

- Encourage Parent (mothers in particular) to leave a muslin cloth, or small piece of clothing with their odour next to their baby. Mother can place cloth near her breasts whilst expressing to obtain her odour. The mother will also be able to experience her babies odour whilst which will support her when expressing milk.

- Babies will experience their parents odour through regular skin to skin contact
  Where possible use expressed breast milk for mouth care (refer to Network mouth care guideline).

- Educate staff and Parents about the need to avoid introducing noxious smell when handling infants; strong perfumes, cigarette smoke.

- Allow alcohol gel to 'dry' before handling babies.

Explanation:

Through experience infants may begin to recognise their parent's familiar odour.

Knowing that infants will then be able to experience this when parents are not with their baby is positive for parents.

Infants have been observed to turn away from noxious stimuli – infants demonstrate that they can discriminate between tastes between 26 -28 weeks.

Infants may experience more unpleasant tastes and odours (medications , reflux) than pleasant.

May support feeding progression by providing some positive oral sensory experiences in contrast to negative associated with suction and intubation.

4. POSTURAL SUPPORT /POSITIONING

Infants should be supported in comfortable positions which help to protect their postural and movement development, behavioural organisation and stability.

Their needs will change depending on their gestational age and movement maturity and clinical condition.

Positioning should not compromise an infants medical care or stability.

Figure 1. Unsupported – abducted posture, unable to bring hands to midline

Figure 2. Side-lying – midline posture

Figure 3. Supine – Feet ‘tucked’ into nest.

Figure 4. Prone – avoid extreme abduction hips and eversion of feet. Hand to mouth

A variety of manufactured and 'made' nests are used across the network therefore staff should refer to local unit positioning guidelines / information.

Infants less than 34 weeks should be nested, aiming to provide containment and a supportive boundary. A gel pillow should also be used. Older infants who are unable to maintain or change their head position, due to tone or instability will also benefit from the appropriate sized gel pillow and boundaries.

Promote flexed symmetrical postures by encouraging:

- Shoulders forward with hands to their face, avoiding the shoulders 'back', retracted position.
- Hips to the midline with their feet tucked well into the nest or other support; avoiding the 'valgus', everted (turned out) posture widely abducted hips. Feet together.
- Head and neck should be in line, avoiding hyperextension and excessive rotation. Neck rolls are not recommended unless indicated medically for an individual infant.
- Trunk should be in mid flexion – avoiding extended postures.
- Gel cushions should be used for all infants until they have developed enough head control to maintain their head in the midline in supine without support.

Gel support needs to be from below shoulder level; avoiding excessive neck flexion and airway compromise.

Shown without cover for demonstration of position only.

Care interventions:

By 35weeks Gestational Age, most infants will have developed enough maturity of their muscle tone and spontaneous movements to maintain a midline posture without positioning support – they then need the opportunity to learn through movement. Therefore positioning support should be gradually reduced then removed.

Infants will be gradually prepared for sleeping supine in line with the 'Back to sleep guidelines', from around 35 -37 wks onwards.

Infants should not be discharged home with positioning aids unless individually prescribed in consultation with the Medical and Therapy staff.

Explanation

Preterm infants have low muscle tone, and large sudden and jerky arcs of spontaneous movement; this makes it difficult for them to control their movements against gravity. Their posture is hence completely dependent on the support they are lying on. This is in contrast to the foetus, supported in a flexed posture and able to learn to move within the amnioitic fluid. Consequently they are vulnerable to soft tissue imbalance and skeletal deformity, e.g. abducted hips, plagiocephally

Developmental positioning supports autonomic stability, behavioral organization (including state and sleep patterns) and musculoskeletal development.

Inappropriate positioning can result in cause discomfort, soft tissue contractures and muscle imbalance.

Promotion of flexed postures helps the infant conserve body temperature and energy, so growth and weight.

Supports infant sleep.

Facilitates midline motor skills and self calming behaviors – hands to face and mouth.

5. CUE BASED CARES AND HANDLING

Cares, handling and interventions should be adapted and delivered following observation of an infant's behavioural cues and physiological responses

Care interventions:

- Before any intervention consider and prepare environmental needs – lighting/noise etc
- Parent participation – encourage and involve parents form early on, with guidance they will begin to recognise their baby's behavioural patterns, and may then help to provide consistency and knowledge of what their baby responds to / dislikes.
- Observe the infants sleep state physiological stability and cues.

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- Positive Touch – gently let infant know whenever an intervention is about to happen, and then when you have finished. NB Infant massage is not recommended while babies are premature, but can be used post term.
- Support and teach parents Positive Touch and 'Comfort holding' from the beginning. Learning from observing staff until they feel confident themselves.
- Move and turn infants slowly, keeping part of their trunk in contact with the mattress or base of support. Avoid 'flip turning', this will stimulate a startle reflex and extensor postures.
- Pace care giving according to an infant's cues – pausing helping infant to settle when they show signs of stress / avoidance.

Explanation:

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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 confidence may be reduced if their baby continually shows signs of stress when they handle them - early parent participation enabling them to learn recognise and respond

to their baby's behavioural cues will help promote their confidence and also support the parent /infant relationship.

Sick preterm infants often require multiple interventions over 24 hours, which can result in increased physiological stability and stress responses. Recognising and responding to their cues appropriately may help to minimise their stress / pain response.

6. KANGAROO MOTHER CARE/"SKIN TO SKIN"



'Kangaroo Care (KC) a care intervention where an infant is held in 'skin to skin' contact in an upright prone position on a Parents chest.' The infant is covered in a blanket or enclosed within the parents clothing or KC wrap to maintain temperature stability.

KC should be considered for all infants.

Parents should be encouraged and supported to have their infant in the KC position regularly and consistently. This will depend on an individual infant's stability and the availability of staff to support safe administration as indicated by an infant's condition.

Identified by Parents in Picker survey as key area where consistency of availability of KC needs to increase, both within individual units and between Network Units.

- Time in KC position – Parents should be encouraged and supported to have their baby in KC ideally for a **minimum of 60 minutes each time**, to achieve the maximum benefits. This will need to be reduced when an infant shows signs of instability, distress or the Parent wishes to discontinue KC.

- Parents will be provided with information explaining the benefits, preparation for and delivery of KC – they also need to consider their own comfort as will be in KC position for over an hour; therefore advised to wear comfortable clothes, have a drink to hand. KC also needs to be a positive bonding experience for Parents.

- All staff will be given training and information re KC delivery.

- Recommended for – all medically stable infants, including those receiving respiratory support. Staff availability will need to be considered to ensure safe transfer for ventilated infants.

- KC – should be recorded, time and frequency .KC stickers and charts can be ordered free of charge from www.bliss.co.uk

- Feeding during KC – continuous and bolus feeds can still be given during KC; the feed may need to be given by a nurse or second Parent depending on individual unit policy.

Explanation

Evidence suggests that kangaroo care (KC) may increase oxygenation, decrease incidence of apnoea and improve autonomic stability compared to standard incubator care. Longer episodes of ‘Deep Quiet Sleep State’ have been described, which may aid brain development. Studies have also pointed to the positive effects of the intervention with regard to improving lactation and increasing parental confidence and attachment.(ref. Dodd, Kledniz, WHO)

Refer to individual unit guidelines for KC delivery

7. Developmentally supportive measures to minimise pain/stress

Developmentally supportive measures should be used to help minimise pain and stress responses prior to, during and once procedures are completed with and infant.

Infant's Pain and stress responses should be assessed, and recorded.

Parents where appropriate should be involved in the plan for managing their infants stress/ pain during procedures.

Explanation

Pain pathways are developed by late gestation, which allow the foetus to perceive pain.

Premature and sick term infants regularly experience painful and stressful procedures There is evidence that brain development is affected by stress and pain. [1]

The effects of stress can be more prolonged than acute pain. Carbejel et al found that preterm infants experienced between 2- 10 painful procedures a day on ITU, while Newham eta al found that infants experienced multiple stress experiences a day, ranging from nappy changes to eye examinations.

Studies in both animals and humans have demonstrated long term adverse effects following prolonged or repeated exposure to pain in the neonatal period. This includes altered behavioural responses to pain, which may persist through childhood and beyond. (Anand, Granau,Taddio et al).

It is often difficult to differentiate between pain and stress in preterm infants, as their behavioural response is also immature.

Developmentally supportive measures during stressful/painful care interventions

- Discuss with parents. Ask what they have observed helps their baby most eg. supportive holding , grasping finger, gently talking to. This is more relevant with long term babies, as over time they learn to read their babies cues and responses.

- Timing - when is best time for the infant? – Always considering medical need. Try to fit in with infants sleep pattern.

- Environmental – minimise infant's exposure to bright light, reduce noise levels. If high light is needed, protect infant from this.

- Comfort – provide nesting and support in flexed posture

- .Offer and facilitate infant sucking (NNS) – prior to during and following intervention. This can also be combined with Sucrose or EBM. Refer to local unit policy.

- Use Positive Touch – preparation and support of infants during procedures – teach Parents from earliest possible opportunity and then involve their help whenever possible and/or

appropriate.

- Facilitate baby to self comfort – hands to face/grasping / able to brace feet.
- Assess infant's behaviour/stability/ posture prior and on completion of procedure or care.
- Pace intervention in response to infants responses and stability.
- Refer Guideline **'Cue based cares and handling.**
- **Refer to 3.3 Evaluation of interventions, p155. "A guide to infant development in the newborn nursery." Warren and Bond (2010)**

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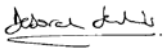
Signed off by Board	 D. Jenkins, Network Chair 24/04/14
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