# Developmental Care Guidelines

**Title**

| Developmental Care Guidelines for Neonates |

**Author**

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<tr>
<th>Author’s job title</th>
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<td>Lead Nurse Neonatal and Children’s Services</td>
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**Directorate**

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**Main Contact**

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**Lead Director**

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**Superseded Documents**

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1. Introduction

This document sets out Northern Devon Healthcare NHS Trust’s guideline for the developmental care of the preterm infant.

2. Purpose

The purpose of this document is to provide guidelines for individualised developmental care of the preterm infant.

The guideline applies to all staff working on SCU with babies under 35 weeks gestation.

Implementation of this guideline will ensure that:

- Recognised evidence based best practice is delivered.
- Delivery of developmental care is across the region is standardised.
3. **Definitions**

A medical guideline (also called a clinical guideline, or clinical practice guideline) is a document with the aim of guiding decisions and criteria in specific areas of healthcare, as defined by an authoritative examination of current evidence (evidence-based medicine). It should enable the staff to adopt safe and effective working practice to achieve high standards and ensure accuracy and consistency.

- EBM – Expressed breast milk
- FCC – Family Centred Care
- FIC – Family Integrated Care
- KC – Kangaroo care
- MDT – Multi-disciplinary team
- NCPAP – Nasal continuous airways pressure
- NGT – Naso-gastric tube
- NNS – Non-nutritive sucking
- OGT – Oro-gastric tube
- SCU – Special care unit
- REM – Rapid eye movement
- ROP – Retinopathy of prematurity

4. **Responsibilities**

4.1. **Role of Developmental Care Interest Group SCU:**

- To be main contact for the guideline, to periodically review evidence, updating guideline in accordance with best practice and group recommendations, networking and disseminating it to main stakeholders and target audience for further approval.
- To ensure best practice is delivered according to the guideline
- To educate and supervise staff in accordance with the guideline
- To provide parents with up to date information and empower them to deliver developmental care

4.2. **Role of Neonatal Nurses**

- To deliver care to Neonates according to the guideline

5. **Guidelines for Developmental Care**

5.1. **Introduction**

- The key concepts for delivery of developmental care include promoting organised infant neurobehavioural and physiological function and tailoring the physical environment, such as light and sound, to protect vulnerable developing sensory systems, all within a context of family centred care. (Newborn Services Developmental Care Clinical Guideline, [NSDCG], 2004).
• The sensory systems have critical periods of development that occur in the following sequence: touch – vestibular – chemosensory – auditory – visual. At the moment we only have a rough idea about the timing of critical periods in foetal human development. Inappropriate or out of phase sensory experience may interfere with normal development during critical periods, (Warren, 2001).
• There is significant evidence of the detrimental impact of overwhelming environmental sensory inputs on the developing human brain (Roué et al, 2017).

5.2. Neonatal Developmental Assessments

There are many examples of assessments of newborn development and they usually involve a mix of observation and controlled procedures that produce responses that can be compared.

Some examples are:
• Naturalistic Observation of Newborn Behaviour (NIDCAP), (Als, 1986)
• Observation of Spontaneous Movement, (Prechtl 1997)
• Psychoanalytic Observation, (Cohen, 2003)
• Neonatal Behavioural Assessment Scale, (Brazelton et al 1985)
• Neurological assessment of the pre-term and full-term infant, (Dubowitz and Dubowitz, 1981)

5.3. Considerations when delivering Developmental Care

The baby is unique and can display a wide variety of behaviours. The physiological condition of the infant differs widely. Thus, assessment of infant cues are central in the provision of developmental care, and the guidelines below should not be used rigidly but in response to the individual requirements of each baby. Guidelines below have been written specifically for the following aspects of Developmental Care according to gestational age:

- 6 Noise
- 7 Light
- 8 Smell and Taste
- 9 Non-Nutritive Sucking
- 10 Positive Touch
- 11 Kangaroo Care
- 12 Positioning
- 13 Parental Involvement
6. Noise - Developmental Care Guidelines for Noise

6.1. Aim

To reduce noise levels thus limiting over-stimulation, promoting sleep and stable vital signs, improving speech and reducing potential adverse effects on the auditory development of premature infants.

6.2. Introduction and key points

- 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 newborn enters the SCU.
- “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”, (Bowden et al, 2000, cited by Byers et al, 2006, p 25).
- The neonate requires REM sleep for the normal development of the auditory systems, (Graven and Brown, 2009).
- Preterm neonates exposed to their mothers maternal sounds have shown enhanced development of the auditory cortex (Webb et al, 2014).
- Beneficial sound includes the parents voice and interaction with care givers, (Krueger et al, 2005), which may be masked by excessive noise in the SCU.
- Talking to preterm infants is associated with higher language and cognitive scores, (Caskey et al 2014).
- There is an urgent need for SCU caregivers to implement noise reduction strategies to make SCU auditory environments more developmentally friendly, (Levy et al, 2003; Grey & Philbin, 2004).
- Sound intensity can also interfere with caregiver communication and job performance, (Thomas and Martin, 2000).
- The abrupt transition of the baby from the protected environment of the womb to the exposed environment of the hospital imposes significant challenges on the developing brain.

These challenges have been associated with:

- Neuropathologic consequences, including reduction in regional brain volumes, white matter microstructural abnormalities, and poor cognitive and language outcomes in preterm compared with full-term newborns , (Webb et al 2014).
- Hearing loss. Neonates admitted to a neonatal intensive care unit are 10.2 times more likely to have a sensori-neural or mixed hearing loss than those who are not, (Surenthiran et al, 2003).
- Increase stress with associated factors. High noise levels may result in increased stress, (DH, 2009) apnoea, bradycardia, fluctuations in heart rate, respiratory rate, blood pressure, oxygen saturation (Williams et al, 2009; Byers et al, 2006; Bremmer et al, 2003; Morris et al, 2000; Philbin, 2000), and neonates may develop also abnormal auditory development and hearing loss.
- Changes in sleep-wake states, and self-regulatory skills (Lejeune et al, 2016; Kuhn et al, 2013)
- Detrimental influence on sensory learning (Lejeune et al, 2016)
• Speech delay. Many long-term follow-up studies of preterm infants find increased frequencies of speech delay, language-related problems, attention deficit and a wide range of learning problems that may be related to auditory function, (Graven, 2000; Grey & Philbin, 2004).

6.3. Risk Factors

• Environmental noise
• Low gestation
• Hypoxia/hypoxic-ischaemia
• Hyperbilirubinaemia
• Neonatal meningitis
• Ototoxic medication: most commonly aminoglycosides and diuretics
• Chromosome or genetic abnormality
• Maternal Factors e.g. sustained loud noise in pregnancy/measles etc. (Newton, 2001)

6.4. Examples of Recorded Noise Levels in the SCU

<table>
<thead>
<tr>
<th>Event</th>
<th>Noise level</th>
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<tbody>
<tr>
<td>Telephone ringing</td>
<td>80 dB</td>
</tr>
<tr>
<td>Dash Alarms (set at 70%)</td>
<td>70 dB at 1 meter distance</td>
</tr>
<tr>
<td>Closing incubator doors</td>
<td>100 – 135 dB</td>
</tr>
<tr>
<td>Noise levels inside incubator</td>
<td>50-66 dB</td>
</tr>
<tr>
<td>Tapping incubator with fingers</td>
<td>80 dB</td>
</tr>
<tr>
<td>Bubbling in ventilator circuit</td>
<td>62 – 87 dB</td>
</tr>
<tr>
<td>CPAP at high pressure</td>
<td>Possible 100dB in post nasal passages</td>
</tr>
<tr>
<td>Talking around the bedside</td>
<td>60 dB</td>
</tr>
<tr>
<td>Mean general working noise</td>
<td>50-90 dB</td>
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6.5. Definition of terms

• **Noise** – undesirable sound.
• **Sound** – vibration in a medium, usually air. It is perceived through vibration of the ear’s tympanic membrane and neurological transfer to the brain.
• Sound has:
  o intensity – loudness
  o frequency – pitch
  o periodicity
  o duration.
• dB (Decibels) - sound is measured in decibels. The loudness of sound is measured in a logarithmic scale, (American Academy of Pediatrics, [AAP], 1997). For example at >40 dBA a 6-10 dBA increase in sound level can reflect doubled perceived loudness
• A-weighted slow response – a sound measurement system that approximates human perception of sound
• dBA – sound level in A-weighted decibels which is closest to human perception of sound.
• L10 – sound level that is exceeded 10% of the time during data collection period
• Leq – loudness equivalent sound level during data collection period
• Lmax – maximum sound level during data collection period
• Lmin – minimum sound level during data collection period

(Byers et al, 2006)

6.6. Recommendations for Noise Levels

• AAP, (1997), recommends that 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).
• The sound study group established by the AAP recommends that sound levels be maintained below an hourly loudness equivalent (Leq) of 50 dBA, and hourly L10 (sound level exceeded 10 per cent of the time) of 55 dB, and a 1-second maximum level (Lmax) of 70 dB, (Warren and Bond, 2010; Graven, 2000).
• SCU noise frequently surpasses these recommended standards, (Levy et al, 2003; Kruger et al, 2005).

6.7. General Nursing Considerations for Noise

• Nursery’s should be designed to reduce noise e.g. by use of sound absorbent surfaces, re-arranging room layout etc. Provide thick curtains/blinds for windows (which reflect noise back into the room), (Warren and Bond, 2010).
• SCU equipment often exceeds the maximum recommended decibel levels, (Byers et al, 2006)
• Although the incubator partially attenuates room noise, (Glass, 2005). The inside of the incubator can be noisier than the outside, (Warren and Bond, 2010). Some outside sound may be muffled but others will penetrate. The neonate inside has to survive with two sound fields existing simultaneously;
  o Direct sound – caused by the neonate and the care giving equipment.
  o Reverberant sound – which increases as sound waves reflect off the surrounding surfaces inside the incubator.

   (Nagorski Johnson, 2001)

• Old incubators and equipment may create more noise than new equipment. (Byers et al, 2006). Modern incubators are designed to deflect and cut out sound.
• Infants placed in radiant warmers will experience higher sound levels than those placed in incubators, (Byers et al, 2006).
• Alarms on monitors are often set well above limits. (Warren and Bond, 2010).
• When purchasing new equipment, or planning/ renovating facilities, sound control should be addressed, (BAPM, 2004; Byers et al, 2006; Philbin, 2004; Grey & Philbin, 2004; White, 2002).

6.8. Consideration regarding Ear Muffs
Use of appropriate ear muffs have been shown to encourage increased quiet sleep and fewer behavioural state changes, (Zahr and de Traversay, 1995). Ear muffs may be considered:-

- During transfers by air/ambulance. Sound levels during neonatal transportation exceed recommended levels, (the highest being during aircraft transfer), (Buckland et al, 2002).
- During MRI scanning.
- For short term use:
  - if environmental noise is high and cannot be attenuated.
  - if environmental noise is high and causing the baby to be agitated, (Levy et al, 2003)
  - to induce quiet sleep and fewer behavioural changes in the sick neonate

6.9. **Ear Muffs should be used with caution**

This may amplify internal sounds the baby makes e.g. crying, (Warren and Bond, 2010). In conjunction with NCPAP as the noise of the NCPAP generated in the mouth may be exaggerated. Because auditory input could be particularly important for critically hearing impaired infants, (hearing tests to detect this are only performed when discharge is close), Because socially relevant auditory stimuli may be needed for the normal development of the hearing neonate. So it may be best to model the attenuation provided by the womb, (Glass, 2005). MDT may feel confident to allow noise levels to be higher if they are used, yet they may only attenuate noise by 7 dB

Please refer to age appropriate guidelines:

- **24 - 27 weeks Corrected Gestational Age**
- **28 - 32 weeks Corrected Gestational Age**
- **33 - 36 weeks Corrected Gestational Age**
- **37 weeks plus Corrected Gestational Age**
Development

- The inner ear has attained full adult size and function.
- The infant may respond to soft voice and sound and may show preference for mother’s voice.
- The infant may demonstrate physiological instability to noise/auditory activity. (NSDCG, 2004)
- The infant will find high pitched and sudden loud noises disturbing, (Warren and Bond 2010).

Nursing Considerations

- Observe how well the infant copes with sounds and adapt care accordingly, (Warren and Bond 2010).
- Manage noise levels to minimise stress (DH, 2009). Aim for background noises below 50dB and peaks below 70dB, (Warren and Bond, 2010).
- The MDT should be aware of noise levels in SCU and noise should be monitored and kept within recommended levels, (Warren and Bond, 2010; Levy et al, 2003; Graven, 2000). A decibel monitor should be used to monitor sound levels, (BLISS, 2009; Levy et al, 2003; Warren, 2001).
- Quiet times (BLISS, 2009) and day night patterns, protect and enable REM sleep, (Graven and Brown, 2009).
- Monitor alarms and telephones are set to the lowest audible level and are to be answered promptly, (BLISS, 2009; Levy et al, 2003). Where possible, any unnecessary electrical equipment e.g. radios, fridges, television sets, should be removed from the nursery, (Warren and Bond, 2010). Where available, set bleeps to ‘vibrate’ or silent mode, (Warren, 2001).
- All conversation should be kept to a low level, and where possible outside the nursery, (Warren, 2001).
- Collections of water in ventilator/CPAP tubing should be removed promptly, and suction switched off when not in use, (Levy et al, 2003 and Warren, 2001).
- NCPAP flow should be kept below 9 litres if possible, (Surenthiran et al, 2003). The filter/silencer, if used, should be kept outside the incubator.
- Nursery floors are mopped, not vacuumed, (Warren, 2001).
- Items are not placed on incubator surfaces, and the incubator should not be tapped or knocked for any reason, (AAP, 1997). Avoid using as a work/writing service.
- Audiotapes should not be used for this gestational age group, (Graven, 2000)
- Expose the baby to maternal sounds, (Webb et al 2014). Encourage parents to talk softly to their infant according to condition and cues, (Caskey et al, 2014; Graven, 2000).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age

Development

- Middle ear and transmission section of auditory system is complete.
- Orientation to soft sound develops during this period.
- The infant can quickly fatigue due to auditory stimulation.
- The infant is sensitive to loud noise and can demonstrate physiological instability to noise/auditory activity. (NSDCG, 2004)

Nursing Considerations

- Observe how well the infant copes with sounds and adapt care accordingly, (Warren and Bond 2010).
- Manage noise levels to minimise stress (DH,2009) Aim for background noises below 50dB and peaks below 70dB, (Warren and Bond, 2010).
- The MDT should be aware of noise levels in SCU and noise should be monitored and kept within recommended levels. (Warren and Bond, 2010; Levy et al, 2003; Graven, 2000). A decibel monitor should be used to monitor sound levels, (BLISS, 2009; Levy et al, 2003; Warren, 2001).
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- Monitor alarms and telephones are set to the lowest audible level and are to be answered promptly, (BLISS, 2009; Levy et al, 2003). Where possible, any unnecessary electrical equipment e.g. radios, fridges, television sets, should be removed from the nursery, (Warren and Bond, 2010). Where available, set bleeps to ‘vibrate’ or silent mode, (Warren, 2001).
- Encourage exposure to mother’s voice against a quiet background. Encourage association of voices with enjoyable social contact, (Warren and Bond, 2010).
- All conversation should be kept to a low level and if possible outside the nursery, (Warren, 2001).
- Collections of water in ventilator/CPAP tubing should be removed promptly, and suction switched off when not in use, (Levy et al, 2003 and Warren, 2001).
- NCPAP flow should be kept below 9 litres if possible, (Surenthiran et al, 2003). The filter/silencer, if used, should be kept outside the incubator.
- Nursery floors are mopped, not vacuumed, (Warren, 2001).
- Items are not placed on incubator surfaces, and the incubator should not be tapped or knocked for any reason. (AAP, 1997). Avoid using as a work/writing service.
- Audiotapes should not be used for this gestational age group, (Graven, 2000).
- Expose the baby to maternal sounds, (Webb et al 2014).
- Encourage parents/carers to talk softly to their infant as cues allow, (Caskey et al, 2014; Graven, 2000).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age

Development

- Sensory and transmission portions of the auditory system are functional.
- Increasing responsiveness to voice stimuli with preference for soft human voice.
- Responses to noise and auditory environments begin to organise.
- Startle response with loud noise still evident. (NSDCG, 2004)

Nursing Considerations

- Observe how well the infant copes with sounds and adapt care accordingly, (Warren and Bond 2010).
- Manage noise levels to minimise stress (DH,2009). Aim for background noises below 50dB and peaks below 70dB, (Warren and Bond, 2010).
- The MDT should be aware of noise levels in SCU and noise should be monitored and kept within recommended levels. (Warren and Bond, 2010; Levy et al, 2003; Graven, 2000). A decibel monitor should be used to monitor sound levels, (BLISS, 2009; Levy et al, 2003; Warren, 2001).
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- Quiet times (BLISS, 2009) and day night patterns, protect and enable sleep.
- Encourage exposure to mother’s voice against a quiet background. Encourage association of voices with enjoyable social contact, (Warren and Bond, 2010).
- All conversation should be kept to a low level and if possible outside the nursery, (Warren, 2001).
- Collections of water in ventilator/CPAP tubing should be removed promptly and suction switched off when not in use, (Levy et al, 2003 and Warren, 2001).
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- Items are not placed on incubator surfaces, and the incubator should not be tapped or knocked for any reason, (AAP, 1997). Avoid using as a work/writing service.
- Audiotapes should not be used for this gestational age group, (Graven, 2000).
- Expose the baby to maternal sounds, (Webb et al 2014).
- Encourage parents/carers to talk softly to their infant as cues allow, (Caskey et al, 2014; Graven, 2000).
- 35 weeks gestation onwards audiology screening will be performed prior to discharge.

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
6.15 Noise. Developmental Care guidelines for 37 plus weeks gestation

Development

- Response to noise is more consistent and organised.
- Can localize and discriminate sounds.
- Stress behaviours may still be displayed to certain loud sounds.
- Gradual onset of auditory stimuli preferred.  
  (NSDCG, 2004)

Nursing Considerations

- Observe how well the infant copes with sounds and adapt care accordingly, (Warren and Bond 2010).
- Manage noise levels to minimise stress (DH, 2009). Aim for background noises below 50dB and peaks below 70dB, (Warren and Bond, 2010).
- The MDT should be aware of noise levels in SCU and noise should be monitored and kept within recommended levels. (Levy et al, 2003; Graven, 2000). A decibel monitor should be used to monitor sound levels, (BLISS, 2009; Levy et al, 2003; Warren, 2001).
- Collections of water in ventilator/CPAP tubing should be removed promptly, and suction switched off when not in use, (Levy et al, 2003 and Warren, 2001).
- NCPAP flow should be kept below 9 litres if possible, (Surenthiran et al, 2003). The filter/silencer, if used, should be kept outside the incubator.
- Quiet times (BLISS, 2009) and day night patterns protect and enable sleep.
- Auditory stimulation as per baby’s cues. Start with soft voice leading on to normal conversation volume/tone.
- Encourage exposure to mother’s voice against a quiet background. Encourage association of voices with enjoyable social contact, (Warren and Bond, 2010).
- Audiotapes/musical toys may be used for infants in cots if parents wish – not to be set on continuous play, and sources are to be kept at reasonable distances from the infant’s ears and played at levels below 55 dB, (Graven 2000). Earphones and other devices that deliver noise or music directly to the infant’s ears should not be used under any circumstances, (Philbin, 2004). Be aware of neighbouring babies’ individual gestational requirements.
- Use of static patterned audio stimuli e.g. heart beat, womb sounds, etc. may be of benefit in calming the baby, but there is no known supportive evidence, (Philbin, 2004). There is no substitute for the mother’s voice talking in response to their baby, (Warren and Bond, 2010).
- Audiology screening will be performed prior to discharge.

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
7. Light-Developmental Care Guidelines for Light

7.1. Aim

To recognise factors that influence the development of the eye and provide care that minimises potential damage from light sources while promoting development of circadian rhythms and maintaining normal neurological development.

7.2. Introduction and key points

- Little light penetrates the womb. This light is reddish long-wave light. Light levels in neonatal units may be chaotic, unpredictable and high intensity for long periods of time including short wave, blue and ultraviolet, (Warren and Bond, 2010).
- The neonatal intensive care environment with its continuous bright light levels may have negative effects on the growth and development of preterm infants (Brandon et al, 2002).
- Light may have an adverse effect on the developing visual system. Light does not effect ROP. Cerebral visual impairment may be a possible association of light exposure, (Graven et al, 2008; Sliverman 1999 cited by Fielder & Mosley, 2000).
- However, Kennedy et al, (2001) found that reduced lighting up to 31 weeks gestation had no effect on length of stay, growth, supplemental oxygen and ventilator days.
- Brandon et al, (2002) showed that infants receiving cycled light compared to those in near darkness gained significantly more weight.
- 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 infants care plan, (Warren and Bond, 2010).
- Light levels should be managed to minimise stress (DH,2009)

7.3. Risk Factors

- Environmental light.
- Low gestation
- Neurological disturbance
- Chromosome or genetic abnormality
- Phototherapy
- Maternal Factors

7.4. 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, (Blackburn, 1996).

- 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
- Lighting levels need to be flexible to meet the needs of infants at differing stages of development as well as the needs of the caregiver, (Warren and Bond, 2010).
- BAPM, (2004), and Consensus Committee on Recommended Design Standards for Advanced Neonatal Care, (CCRDSANC), (2007), recommend 10-600 lux for ambient lighting in neonatal units. However the consensus group on the physical and developmental environment of the high risk infant recommends lighting of 200-300 lux maximum for infants, (White, 2004).
- 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. (Warren et al, 2004).
- Circadian Rhythm is the 24 hour clock to which cardiovascular, hormonal and behavioural systems function in relation to cycled light/dark pattern, (S. W. Neonatal Benchmarking Group, 2007).
- Some neonatal units favour day-night pattern, (circadian rhythms) in neonatal units, (BLISS, 2009; Brandon et al, 2002 and Fielder & Mosley, 2000), whilst others such as NIDCAP support continuous dim/dark light, (mimicking the womb environment), (Ariagno, 2001).
- Ariagno, (2001), recommends eliminating chaotic lighting and using a natural transition of the light-dark cycle from the baby’s admission to SCU onwards. Circadian biology may become an increasingly important component of neonatal care, (Rivkees, 2003).
- In neonatal care it is important to avoid chaotic light patterns (i.e. extreme changes in light) and to maintain light levels between dim and dark, (Glass, 2005). It is better to keep lighting stable rather than veering from light to dark, (Warren and Bond, 2010).

### 7.5. General considerations for Neonatal Unit lighting

- One source of daylight should be visible from newborn care areas, (CCRDSANC, 2007). Windows provide an important psychological benefit to staff and families. Daylight is the most desirable illumination for nearly all caregiving including evaluation of infant’s tone, (Warren and Bond, 2010; CCRDSANC, 2007).
- Lighting should be specifically designed for individual workspaces without disturbing neighbouring infants. All artificial ambient lighting should be indirect, except for lights required for procedures, (CCRDSANC, 2007). Any direct ambient lighting used outside the infant care area shall be located so as to avoid any infant’s direct line of sight to the fixture. Each light must be individually switch-controlled and adjustable, (BLISS, 2009; BAPM, 2004, CCRDSANC, 2007, Warren, 2001).
- Light sources should be balanced and as free as possible from glare or veiling reflections, as perception of skin tones is critical in SCU, (CCRDSANC, 2007).
- Babies cots should be at least 0.6 meters, (2 feet), from external windows, (BAPM, 2004, CCRDSANC, 2007). North facing windows are optimal, as potential problems can occur with radiant heat loss/gain/glare from windows.
- All external windows should have opaque blinds/curtains, (CCRDSANC, 2007, Warren, 2001) that are neutral or opaque colour to minimize colour distortion from transmitted light. They should be contained within the window or easily cleanable. This will also promote day/night patterns, and avoid direct sunlight from striking the infant, iv fluids etc.
- Appropriate lighting levels can improve job performance, (Figueiro et al, 2001), and reduce errors for staff. Light “showers” for night shift workers and those with seasonal affective disorder are recommended. Locations should be available for staff to access bright light, for at least 15 minutes each shift, (CCRDSANC, 2007).
- Families should have access to suitable lighting at the cotside that will not spill over into the baby’s visual field. This will facilitate relaxation activities near the bedside. (Access to daylight is important).
- Light fixtures should be easily cleanable, (CCRDSANC, 2007).
Please refer to age appropriate guidelines

24 - 27 weeks Corrected Gestational Age
28 - 32 weeks Corrected Gestational Age
33 - 36 weeks Corrected Gestational Age
37 weeks plus Corrected Gestational Age

7.6. Light. Developmental Care Guidelines for 24-27 weeks gestation

Development

- Eyelids may be fused at 23 – 25 weeks.
- Under developed eyelid tissue transmits light.
- Cornea hazy until 27 weeks. Pupil reflex is absent, (Glass, 2005).
- Limited ability to maintain lid tightening in response to light.
- Eyelids separate and eyelashes form. Eyes may open but do not focus with rapid poorly co-ordinated eye movements.
- Infant typically responds to light / visual stimuli with behavioural and physiological signs of stress, (NSDCG, 2004).
- Metabolic changes are triggered by bright, (Warren and Bond, 2010)

Nursing Considerations

- Observe the infant for signs of sensitivity to light, (Warren and Bond, 2010). Manage light levels to minimise stress (DH,2009).
- Adjust light according to individual needs based on observation of the infant’s behaviour, (Warren and Bond, 2010).
- Minimise light levels when possible. Bright light may have a damaging effect on the development of the immature visual system, (Graven et al, 2009). The infant cannot monitor the amount of light entering the eye and the eyelids are thin and let considerable light through, (Warren and Bond, 2010). Once the eyelids are no longer fused the eye may be open or partially open most of the time. White, (2004) recommends continuous dim lighting <20 lux as the most suitable environment. Protect infant’s eyes from bright light during care giving procedures, (BLISS, 2009; CCRDSANC, 2007). Reduce exposure to light in incubators by using a cover, (BLISS, 2009; Warren, 2001). Use penlights to check babies in near darkness, (Warren and Bond, 2010).
- Visual toys and pictures are not appropriate for this gestational group. Ensure toys and pictures are not placed within direct visual space, (NSDCG, 2004).
- Dim lights in room at night if safe to do so, to enhance development of circadian rhythms, (BLISS, 2009; Brandon et al, 2002 and Fielder & Mosley, 2000).
- Avoid flash photography

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age

7.7. Light. Developmental Care Guidelines for 28-32 weeks gestation

Development
- Sluggish pupil response to light, (Glass, 2005)
- Under developed eyelid tissue transmits light
- Able to maintain lid tightening in response to bright light
- Eye opening increases in dim light
- May focus briefly on visual stimuli
- Rapid uncoordinated eye movements,(NSDCG, 2004)
- Visual cortex development dependent on REM sleep, (Warren and Bond, 2010).

**Nursing Considerations**

- Observe the infant for signs of sensitivity to light, (Warren and Bond, 2010). Manage light levels to minimise stress (DH,2009).
- Adjust light according to individual needs based on observation of the infant’s behaviour, (Warren and Bond, 2010).
- Minimise light levels where appropriate. Bright light may have a damaging effect on the development of the immature visual system, (Graven et al, 2009). The infant cannot monitor the amount of light entering the eye and the eyelids are thin and let considerable light through, (Warren and Bond, 2010). Once the eyelids are no longer fused the eye may be open or partially open most of the time. Protect infant’s eyes from bright light during care giving procedures, (BLISS, 2009; CCRDSANC, 2007). Reduce exposure to light in incubators by using a cover, (BLISS, 2009; Warren, 2001). Use penlights to check babies in near darkness, (Warren and Bond, 2010).
- Minimise visual stimuli. Toys and pictures should not be placed in direct visual space, (NSDCG, 2004)
- Dim lights in room at night if safe to do so, to enhance development of circadian rhythms, (BLISS, 2009; Brandon et al, 2002 and Fielder & Mosley, 2000).
- Shading from light and the provision of continuous dim lighting gives appropriate opportunities for spontaneous eye opening, (Fielder & Mosley, 2000).
- Research does not support the use of black and white pictures for this group.
- Avoid flash photography
- Ensure routine eye checks are completed to ensure problems are detected and treated early.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*
7.9. **Light. Developmental Care Guidelines for 33-36 weeks gestation**

**Development**

- Pupil has complete reflex, (Glass, 2005).
- Increased ability to lid tightening in response to bright light.
- Eye opening and alert state are facilitated by low lighting.
- Infant may have difficulty breaking gaze on a highly stimulating object. (NSDCG, 2004)
- Fixes best at 15-23 cm (6-9 inches). May show visual interest in strong patterns in low lighting. May fix on a face or object when it is moved slowly horizontally, (Warren and Bond, 2010).

**Nursing Considerations**

- Observe the infant for signs of sensitivity to light, (Warren and Bond, 2010). Manage light levels to minimise stress (DH,2009).
- Adjust light according to individual needs based on observation of the infant’s behaviour, (Warren and Bond, 2010).
- Expose infant to 1-8 hours moderate lighting daily, (Liu et al, 2007).
- Support emerging need for eye contact – generally the infant shows preference for human faces
- Research does not support the use of black and white visual stimuli. Brightly coloured toys with flashing lights are overstimulating and promote arousal rather than visual development, (Glass, 2002).
- Dim lights at night if safe to do so, thereby promoting development of circadian rhythms, (BLISS, 2009; Brandon et al, 2002 and Fielder & Mosley, 2000).
- Avoid flash photography.
- Ensure routine eye checks are completed to ensure problems are detected and treated.

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
Development

- Generally shows preference for human face. May recognise mother’s face within a few days, fixes on external contours.
- Sees best at a distance of 20 to 25 cms.
- Sight is still immature with much development to follow at 0-6 months. Fovea (sensitive to colour) less mature than peripheral area of retina (sensitive to brightness/contrast). May show response to red objects. (Colour vision develops from 2 months).
- Visual system is activated by light. Orientates towards soft light.
- Novelty, change and movement are important in the visual field. Can fix and follow horizontally across midline. Best from side to middle. Can relocate object after loss of visual contact.
- Best perceives close objects with high contrast. More responsive to pattern than plain, curvy than straight lines, horizontal than vertical.
- Head and eyes do not usually move together for the first 10 days. Constant strabismus (squint) or prolonged nystagmus are abnormal.

(Warren and Bond, 2010; NSDCG, 2004)

Nursing Considerations

- Observe the infant for signs of sensitivity to light, (Warren and Bond, 2010). Manage light levels to minimise stress (DH, 2009).
- Adjust light according to individual needs based on observation of the infant’s behaviour, (Warren and Bond, 2010).
- Protect infant’s eyes from bright light during care giving procedures, (BLISS, 2009; CCRDSANC, 2007).
- Continue to protect eyes from bright lights and direct sunlight
- Dim lights at night, to promote development of circadian rhythms, (BLISS, 2009; Brandon et al, 2002 and Fielder & Mosley, 2000).
- Offer opportunities for visual stimulation if infant is displaying longer attention spans. Adequate light levels are required to enable the infant to see objects clearly to begin to focus, (Warren and Bond, 2010). Brightly coloured toys with flashing lights are overstimulating and promote arousal rather than visual development, (Glass, 2002).
- Ensure routine eye checks are completed to ensure problems are detected and treated.

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
8. **Smell and Taste - Developmental Care Guidelines relating to Smell and Taste**

8.1. **Aim**

To minimise noxious smells and tastes experienced by the neonate and to maximise parent-infant attachment.

8.2. **Introduction and Key Points**

- In the womb the fetus initially experiences different flavours through the amniotic fluid which is affected by the foods the mothers eats, (Menella et al, 1995). The mothers’ diet can also influence the neonate’s initial olfactory responses, (Sahaal et al, 2000).
- Periods of REM sleep are necessary for normal development of smell and taste, (Graven and Brown, 2009)
- At birth, the sense of smell, taste and hearing are the most mature of the full-term newborn’s sensory capacities, (Fifer et al, 2004 cited by Jones, 2005). In general pleasant odours induce approach behaviours and unpleasant odours (e.g. alcohol), elicit avoidance, (Bartocci et al, 2001). Studies show that newborns respond to maternal odours shortly after birth and are soon able to distinguish their own mother’s aroma, (Sullivan and Toubas, 1998, and Mizuno et al, 2004). The newborn’s suckling response is affected by olfactory stimuli present in the odours perceived immediately after birth. Babies exposed to the odour of amniotic fluid or those exposed to breast milk cry less than controls, (Varendi et al, 1998, and Jeffery, 1998). The mothers own odour caused increased mouthing, (Sullivan and Toubas, 1998).
- Although the mother’s odour is most desirable, odour preferences may be taught allowing infectious agents normally carried in biologic substrates to be avoided i.e. by avoiding used breast pads that are potential carriers for infection. This could give parents control over their infant’s environment by tailoring odours to their own identity, (Schaal et al, 2004).
- Vanilla flavour is reported as being attractive to babies, (Menella and Beachamp, 1996).
- Sucrose and breast milk dropped on the tongue stimulate the taste receptors which in turn stimulates the endogenous opioid systems to raise the threshold to noxious stimuli, (Shah et al, 2006, Stevens et al 2004, Carbajel et al, 1999 and Anand, 2001).
8.3. Positive Issues

- Enhanced nipple acceptance and feeding, (Schaal et al, 2004; Sullivan and Toubas, 1998)
- Calming the baby.
- Use of sweet taste (e.g. sucrose or mother’s EBM) ameliorates the neonatal pain response, (Shah et al, 2006, Stevens et al, 2004, Carbajel et al, 1999 and Anand, 2001).
- Use of familiar odours may help pain control, (Schaal et al, 2004).
- Use of oral administration of chemostimulus (e.g. lemon) may be used to stimulate respiration rather than tactile stimulation, (Schaal et al, 2004).

8.4. Negative issues

- Use of mother’s milk soaked breast pads for a hungry baby unable to feed may increase distress, (Jeffery, 1998).
- Infants that are formula fed may find it difficult to recognise the odour of their mother, (Cernoch and Porter, 1985).
- Mothers diet in pregnancy and whilst breastfeeding may influence early taste preferences, (Menella et al, 2001)
- Flavour preferences in childhood may be influenced by early taste experiences, (Liem and Mennella, 2002, Haller et al, 1999)

Please refer to age appropriate guidelines

24 - 27 weeks Corrected Gestational Age
28 - 32 weeks Corrected Gestational Age
33 - 36 weeks Corrected Gestational Age
37 weeks plus Corrected Gestational Age
8.5. **Smell & Taste. Developmental Care Guidelines for 24-27 weeks gestation**

**Development**

- Smell and taste receptors probably functional. Unpleasant olfactory stimuli can result in physiological responses, (NSDCG, 2004).
- Nasal passages are unplugged. Flavours of amniotic fluid (related to mother’s diet) sensed by receptor organ on nose, (Warren and Bond, 2010).
- Taste buds present, 26-27 weeks fetuses may experience differing tastes of amniotic fluid caused by different maternal diet, (Warren, 2004). Starts to react to bitter taste and begins to discriminate between tastes and intensity of stimuli, by facial expressions (Warren and Bond, 2010).

**Nursing Considerations**

- Familiarise infant with smell and taste of maternal milk during feed.
- Protect from noxious odours.
- Open alcohol wipes and antiseptic preparations away from incubators, (Warren and Bond, 2010 and NSDCG, 2004).
- Encourage parents to bring in one small item that has been close to their skin, (remove and replace daily).
- Avoid cigarette smells on clothes and breath; parents and staff that smoke are advised to come in clean clothes and not to smoke prior to visit, (Warren and Bond, 2010).
- Consider kangaroo care (see guidelines) if baby is stable to sense their mothers scent (Kardas and Guduca, 2014).
- Frequent mouth assessment and oral care.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 – 32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*
8.7. Smell & Taste. Developmental Care Guidelines for 28-32 weeks gestation

Development

- Taste and smell receptors are functional.
- Physiological responses to unpleasant olfactory stimuli may occur, (Warren and Bond, 2010 and NSDCG, 2004).
- 31 weeks onward shows responses to different tastes e.g. pucker lips to sour tastes and prefer sweet tastes, (Warren and Bond, 2010).

Nursing Considerations

- Familiarise infant with smell and taste of maternal milk (if breast fed) or formula milk (if mum does not intend to breast feed), during feed. Consider coating pacifier/teat in milk if used.
- Consider the use of a sweet taste (e.g. sucrose or mother’s EBM) prior to procedures, (Shah et al, 2006, Stevens et a, 2004, Carbajel et al, 1999 and Anand, 2001).
- Protect from noxious odours, (Warren and Bond, 2010 and NSDCG, 2004).
- Open alcohol wipes and antiseptic preparations away from incubators, (Warren and Bond, 2010 and NSDCG, 2004).
- Avoid strong scented perfumes, (Warren and Bond, 2010).
- Encourage parents to bring in one small item that has been close to their skin, (remove and replace daily).
- Avoid cigarette smells on clothes and breath, parents and staff that smoke are advised to come in clean clothes and not to smoke prior to visit, (Warren and Bond, 2010).
- Administer oral medications by feeding tube wherever possible to avoid contaminating the taste of milk, (Warren and Bond, 2010).
- Consider kangaroo care (see guidelines) if baby is stable.
- Maintain frequent mouth assessments and oral care.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*
8.9. Smell & Taste. Developmental Care Guidelines for 33-36 weeks gestation

Development

- Taste and smell receptors are functional.
- 34 weeks onwards can distinguish bitter, sour, salt and sweet flavours
  (Warren and Bond, 2010)

Nursing Considerations

- Familiarise infant with smell and taste of maternal milk (if breast fed) or formula milk (if mum does not intend to breast feed), during feed. Consider coating pacifier/teat in milk if used.
- Consider the use of a sweet taste (e.g. sucrose or mother’s EBM) prior to procedures, (Shah et al, 2006, Stevens et al, 2004, Carbajel et al, 1999 and Anand, 2001).
- Protect from noxious odours, (Warren and Bond, 2010 and NSDCG, 2004).
- Open alcohol wipes and antiseptic preparations away from incubators, (Warren and Bond, 2010 and NSDCG, 2004).
- Avoid strong scented perfumes, (Warren and Bond, 2010).
- Encourage parents to bring in one small item that has been close to their skin, (remove and replace daily).
- Avoid cigarette smells on clothes and breath, parents and staff that smoke are advised to come in clean clothes and not to smoke prior to visit, (Warren and Bond, 2010).
- Administer oral medications by feeding tube wherever possible to avoid contaminating taste of milk, (Warren and Bond, 2010).
- Consider kangaroo care (see guidelines) if baby is stable.
- Maintain frequent mouth assessments and oral care

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 – 32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
8.11 Smell & Taste. Developmental Care Guidelines for 37 weeks onwards

Development

- Taste and smell receptors are functional with physiological responses to unpleasant stimuli, (Jones, 2005).
- Can differentiate between bitter, sour, salt and sweet flavours. Prefers sweet.

Nursing Considerations

- Familiarise infant with smell and taste of maternal milk (if breast fed) or formula milk (if mum does not intend to breast feed), during feed. Consider coating pacifier/teat in milk if used, (Warren and Bond, 2010)
- Consider the use of a sweet taste (e.g. sucrose or mother’s EBM) prior to procedures, (Shah et al, 2006, Stevens et al, 2004, Carbajel et al, 1999 and Anand, 2001).
- Protect from noxious odours.
- Avoid strong perfumes and open alcohol wipes away from baby, (Warren and Bond, 2010),
- Encourage parents to bring in one small item that has been close to their skin, (remove and replace daily).
- Avoid cigarette smells on clothes and breath, parents and staff that smoke are advised to come in clean clothes and not to smoke prior to visit, (Warren and Bond, 2010).
- Administer oral medications by feeding tube wherever possible to avoid contaminating taste of milk, (Warren and Bond, 2010). If there is no tube, consider adding medications to small amount of milk and giving prior to the main feed.
- Consider kangaroo care (see guidelines) if baby is stable.
- Maintain frequent mouth assessments and oral care.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*
9. Non-Nutritive Sucking (NNS) - Developmental Care Guidelines for the use of Non-Nutritive Sucking

9.1. Aim

To be able to offer Non-Nutritive Sucking (NNS) as a developmentally supportive intervention in response to the behavioural cues of the neonate when bottle/breast-feeding opportunities are not available.

9.2. Introduction

- Non-nutritive sucking (NNS) provides sucking opportunities on a dummy (pacifier), (Spence, 2000), where no nutrient is delivered.
- NNS may also be achieved by encouraging the baby to suck on his/her hand, by providing mouth care, or if possible an empty breast, (Sparshott, 1997).
- Most infants have a habit of NNS during their infancy, (Klackenberg, 1971 cited by Aarts et al, 1999).

If possible NNS should only be given with informed parental consent or on medical grounds.

9.3. Benefits associated with use of NNS

- Pleasurable oral experience, used to settle and comfort the distressed baby, (Gotsch, 1995).
- Used to gain optimum behavioural state needed for preterms to commence and sustain a feed, (McCain, 1995 and Gill et al, 1992).
- Helps the pre-term regulate himself/herself, (Reid and Frier, 2000).
- Speeds transition to oral feeding, (Foster et al, 2017; Kaya and Aytekin 2017; Pinelli and Symington, 2005).
- Speeds transition to full breastfeeding (Kaya and Aytekin 2017).
- Matures sucking reflex and helps the disorganised bottle feeder suck consistently, (Kaya and Aytekin 2017, Meyer Palmer and VandenBerg, 1998)
- Useful for the infant born with congenital abnormalities which preclude them from establishing feeding normally but can benefit from sucking on a pacifier, (Rainsford, 2001)
- May increase gastric emptying, (Pinelli and Symington, 2005).
- Positively linked with digestion, internal digestive transit, energy expenditure and weight gain, (Bernbaum et al, 1983).
- Raised insulin secretion, promoting glucose absorption and thus weight gain, (Marchini et al, 1987 cited by Picker et al, 1996)
- Used to ameliorate a baby’s response to pain, (Stevens et al, 2013;Carbajal et al, 1999; Thakkar et al, 2016), most effective when used in conjunction with sucrose compared with any other single intervention, (Stevens et al, 2013; Thakkar et al, 2016).
- Lowers heart rate (Miller and Anderson, 1993).
- Reduction in incidence of necrotising enterocolitis, (Pickler and Terrell, 1994).
• Shortens hospital stay, (Foster et al, 2017; Kaya and Aytekin 2017; Pinelli and Symington, 2005).
• Reduced incidence of Sudden Infant Death Syndrome (SIDS), (AAP, 2005; Flemming et al, 1999).
• Lessens stress in the infant and their carers, (Webster, 1999).

9.4. Negative Issues associated with use of NNS

• Detrimental to exclusive breastfeeding, (Howard et al, 2003) and can cause nipple confusion, (Neifert et al, 1995, Fish and Inch, 1996). Although Warren and Bond (2010) state that use of soothers with preterm babies does not have an adverse effect on breast feeding.
• Early weaning, (Barros et al, 1995).
• Historically there have been issues in the use of NNS as it goes against the advice of the Baby Friendly Hospital Initiative, (Unicef / World Health Organisation, 1989). However, UNICEF UK (1998), have now issued additional guidance for its use.
• Long-term pacifier use is associated with:
  • Higher rates of ear-infection, (Niemela et al, 1995).
  • Orthodontic problems (La Leche, 1988), however the American Academy of Pediatric Dentistry (2003), policy statement says non-nutritive sucking habits are considered normal in infants and young children and are unlikely to cause long term problems in children under the age of three.
  • A lower intelligence quota, (Gale and Martyn, 1996).
  • Increased incidence of respiratory and gastro-intestinal illness, and oral candida, (North et al, 1999).

9.5. Indications for use of NNS

• Behavioural signs of wanting to suck.
• Distressed baby requiring comfort.
• Unorganized 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 feed to achieve a modulated quiet awake state.
• During a tube feed.
• For quick transition to bottle-feeding.
• 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.
• For prevention of SIDS up to 12 months.

9.6. Equipment

The appropriate pacifier should be chosen to suit baby, complying with safety standards, (British Safety Standards, 2002 and Consumer Product Safety Commission, 2001). Pacifiers should be a similar shape to teat/nipple with which they will be later feeding. They should promote normal sucking, using wide jaw and tongue extension, causing negative pressure.
9.7. **Types of pacifier, (Drosten, 1997)**

- **Traditional long pacifier.**
  These can be used to help babies open their mouth wider.

- **Orthodontic pacifiers.**
  These encourage babies to use a wider mouth and utilise the anterior of their tongue, which lifts and presses the teat against the palate.

- **Small pacifiers**
  These are used for small and premature babies, but they tend to be long which dissuades tongue movement. Change to larger pacifiers when able.

- **Firm pacifiers**
  These may give proprioceptive input to infants with sensory deficits. They can be used to push down tongues when babies keep them up against the roof of their mouth. May cause nipple-teat confusion in infants whose mothers have very soft breast tissue.

- **Large ball-type pacifier.**
  Avoid if possible as it encourages little tongue movement. Babies own hand or fingers or an empty breast may be used as an alternative if desired.

- **Scented pacifiers.** (Some pacifiers are scented with vanilla which is said to calm the baby, but this is not based on evidence at present).

9.8. **General Nursing guidelines for use of NNS**

- Give parent/carers written/verbal information on the use of pacifiers. Gain and document consent before use.

- Meet, if possible, any needs the baby may have, (Drosten, 1997).
  - Is there air in the stomach?
  - Does the baby need a nappy change?
  - Is the baby comfortable or in pain?
  - Change the infant’s position.

- 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, (Webster, 1999). Put pacifier in his/her mouth. A variety of pacifiers may be used to prevent nipple preference if babies are using NNS frequently, (Drosten, 1997).

- Leave in place for only a few minutes assessing effect. Remove and store as per unit guideline.

- Educate parents on 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 suckle, (Warren and Bond, 2010). Sucking cues should ideally be met by nuzzling at the breast.

- When a baby who has had NNS is allowed to breast-feed extra input into fixing on the nipple may be required. Observe the feeding technique to ensure superficial nipple sucking does not occur.

- Ensure parents have information on use of NNS to prevent SIDS and the negative effects of habitual long-term pacifier use.

9.9. **Use of NNS for amelioration of pain, (Carbajal et al, 1999 and Stevens et al, 2004).**
  (See pain management guidelines and guidelines for sucrose use).

9.10. **Use of NNS to establish quick transition from tube feeding to bottle feeds.**
• Use NNS prior to and during tube feeds, achieving a quiet awake state and thus associating a full stomach with the sucking technique.
• Use NNS prior to bottle-feeds for up to 5 minutes to achieve a quiet awake state, (McCain, 1995).
• The pacifier may be dipped in formula or mothers breast milk to suck on during the tube feed.

9.11. **Recommended use of NNS for prevention of SIDS, (AAP, 2005),**

• Use the pacifier when placing the infant down for sleep. Do not reinsert once asleep. Do not force the baby to take it.
• Do not coat the pacifier in a sweet solution.
• Clean and replace pacifier regularly.
• For breastfed infants delay use of pacifier until one month old to ensure establishment of breastfeeding where possible.
• Do not continue pacifier use after one year old.

9.12. **Storage of pacifier**

Pacifier may be stored in sterilising solution when not in use in a denture pot. Solution is changed daily and date of change recorded.

*Please refer to age appropriate guidelines*

- 24 - 27 weeks Corrected Gestational Age
- 28 - 32 weeks Corrected Gestational Age
- 33 - 36 weeks Corrected Gestational Age
- 37 weeks plus Corrected Gestational Age

9.13. **NNS. Developmental Care Guidelines for 24-27 weeks gestation**

**Development**

- In utero sucking is observed from 13 weeks gestation, (Hafstrom and Kjellmer, 2000).
- Immature gastrointestinal system.
- Gag reflex present at 26 weeks gestation.
- Sucking may appear but is not synchronized with swallow, (NSDCG, 2004).

**Nursing Considerations**

- Encourage hand to mouth contact.
- No pacifier unless sucking cues evident.
- Suction orally only when clinically necessary.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*


**Development**

- Sucking and swallowing components are present, (Bu Lock et al, 1990), there is poor suck, swallow and breathe co-ordination that matures over this period.
- Rooting reflex is present but a delayed response can occur, (NSDCG, 2004).

**Nursing Considerations**

- Encourage hand to mouth contact.
- Nipple feedings are generally unsafe at 28-30 weeks gestation. Infants >30 weeks gestation may nuzzle at breast during KC with close assessment.
- Offer appropriate pacifier to support non-nutritive sucking, (Drosten, 1997).
- Encourage non-nutritive sucking during NGT/OGT feeds and for comfort.
- May be offered with/without sucrose/EBM prior to and during painful procedures, (Shah et al, 2006, Carbajal et al, 1999).
- To help the stressed, disorganised preterm settle, (Reid and Frier, 2000).
- Oral suction only when clinically necessary.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*

### 9.15. NNS. Developmental Care Guidelines for 33-36 weeks gestation

#### Development

- Suck, swallow and breathe co-ordination maturing – some rhythmicity but co-ordination can be inconsistent.
- Rooting reflex emerges, (NSDCG, 2004).
- 34 weeks is usually the earliest a baby can successfully feed, (Medcoff-Cooper et al, 2000).

**Nursing Considerations**

- Encourage hand to mouth contact.

- Offer standard pacifier to encourage wider jaw excursion and therefore breast feeding and nutritive sucking patterns.
- Encourage non-nutritive sucking during NG/OG feeds and for comfort.
- To gain optimal behavioural state prior to feeding, (Gill et al, 1992).
- May be offered with/without sucrose/EBM prior to and during painful procedures, (Shah et al, 2006, Carbajal et al, 1999).
- To help the stressed, disorganised preterm settle, (Reid and Frier, 2000).
- Oral suction only when clinically necessary.

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*
9.17 NNS. Developmental Care Guidelines for 37 plus weeks corrected gestation

**Development**

- Suck swallow and breathe co-ordination becomes more consistent and organized.
- Endurance for oral feeding increases.  
  (NSDCG, 2004)

**Nursing Considerations**

- Encourage hand to mouth contact
- Encourage non-nutritive sucking during NG/OG feeds and for comfort.
- To help the stressed, disorganised infant settle, (Reid and Frier, 2000).
- To gain optimal behavioural state prior to feeding, (Gill et al, 1992).
- Offer standard pacifier to encourage wider jaw excursion and therefore breast feeding and nutritive sucking patterns.
- May be offered with/without sucrose/EBM prior to and during painful procedures, (Shah et al, 2006, Carbajal et al, 1999).
- Oral suction only when clinically necessary.
- Dip soother in milk first to remove smell and taste of steriliser, (NSDCG, 2004).

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 – 32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age.*
10. Positive/Comforting Touch - Developmental Care Guidelines for the use of Positive/Comforting Touch

10.1. Aim

To provide a counterbalance to the inevitable unpleasant touch a neonate experiences in the SCU, (Warren and Bond, 2010).

10.2. Introduction and key points

- Positive Touch is specially adapted touch for babies who are premature or fragile. Touch is given according to the individual behavioural and physiological responses of the baby. Parents are the rightful and best givers of positive touch as they are the most consistent observers of their infants and have the essential emotional investment needed to give consistent loving care, (Bond, 2010).
- Positive Touch establishes a connection between the parent and child who have had an abrupt and untimely separation, (Bond 2010).
- Whenever possible, comforting touch should be baby-led and individualised by interpreting the baby's cues, (Bliss, 2009).
- Low birth-weight infants may expect at over 300 procedures per hospital stay, (Barker & Rutter 2001) and many more if handling is counted. Disruptive tactile stimulation can precipitate a negative physiological chain of events and lead to intracranial pressure and haemodynamic fluctuations. Excessive handling can also cause hypoxia, (NSDCG, 2004), bradycardia, apnoea, disruption of sleep patterns and behavioural distress, (Harrison, 2001).
- Germinal matrix intraventricular haemorrhage is one of the most frequently encountered neurological problems in preterm neonates, therefore it is essential to understand the risks and be aware of recommended ways to care for these babies to avoid further problems.
- Up to 90% of IVH occur during first 3 days of life; 7-20% in next 4 days of life until the incidence reduces to below 5% by day 7.
- Blood vessels in the germinal matrix are thin walled and vulnerable to damage due to changes in perfusion, caused by an increase, decrease or fluctuating blood pressure. Changes in blood pressure may occur as a result of handling, for example moving, crying, feeding, intubation, suctioning and stimulation, (NSDCG, 2004).
- The skin is the largest sensory organ in the body and the tactile system is the earliest sensory system to become functional. It is the medium by which the infant’s external world is perceived. (Bond, 2002). High-risk infants can be extremely sensitive to stimulation, often overreacting to care giving resulting in distress when touched, (Weiss & Wilson, 2006). Neonates can even experience normal touch as pain, (Findlay, 2004). It is important to constantly assess and document infant’s responses to touch, and carefully introduce and modify environmental stimuli so that it is supportive, calm and in synchrony with the infant’s sleep-wake states as well as behavioural cues, (Browne & VandenBerg, 2000).
- The two general approaches to tactile intervention in the SCU provide either reduction of general handling or provision of planned touch experiences.
- Touch should be provided appropriately in the right amounts at the right time for each individual preterm infant, to allow prolonged rest periods for enhancing growth, maximizing development, and minimizing the negative effect of the SCU environment, (Liaw, 2000).
- The early introduction of Positive Touch lays the foundation for continued positive interaction with the infant, after discharge from the hospital, through infancy and childhood into adult life, (Warren & Bond, 2010).
10.3. Goals

- To establish a connection between the parent and child (bonding and attachment), (Bond, 2010; Griffin, 2000)
- To gently guide parents to some sense of mastery and ownership of their infant’s care giving, (Bond, 2002 and Browne & Vandenberg, 2000).
- To facilitate parental attunement to the behaviour of their infant, (BLISS, 2009; Bond, 2010 and Wall, 2002).
- To enhance the parents’ and the immature infant’s experience in the harsh SCU environment, (Bond, 2002 and Browne & Vandenberg, 2000).
- To generally improve developmental outcomes on the premise of enhanced social and environmental factors, (Bond, 2002).
- To reduce the impact of post-natal depression, (Glover et al, 2002).
- To promote infant’s sleep, (Glover et al, 2002; Appleton, 1997).
- To minimise infant stress, (Bond, 2010).
- To improve the neuro-psychological outcome.
- To promote infant weight gain, (Harrison, 2001).
- To encourage respect for the baby as an individual, (Bond, 2010)

10.4. Positive Touch Methods

- Looking and listening
- Connecting to the baby without touch
- Permission
- Still & containment holding
- Pacing
- Kangaroo Care
- Letting go (Bond, 2004)

The Five Step Dialogue, (Bond, 2010)

Recommended by Bond as a sequence for use when performing procedures or giving nurturing touch.

1. Preparation and observation

Adjust the environment creating a calm atmosphere. Prepare all you need so as not to break contact with the baby during the care. Observe/assess the baby before starting. Looking at colour, breathing, sleeping and waking behaviours. Consider what individualised care the infant needs and what touch is appropriate, safe and pleasurable.

2. Permission

Prepare the baby of intending approach e.g. by word or rubbing hands together. To help infant sense the approaching touch.

3. Tuning in to baby and pacing

Be alert to infant cues that signal engagement, disengagement, self-regulatory and interactive abilities, to guide appropriate safe touch paced to suit the baby at any given time. Give guidance to parents on recognition of their baby’s cues at every opportunity.

4. Touch connection and initiating touching.
This can be parental communication/care giving or any procedure. Always start and end all touch with a still, resting hand and a soft comforting voice.

5. Completion
Adjust the infant’s position/bedding/environment as required to help him/her settle.
Break contact with the baby slowly with a resting hand and with verbal/silent intent.

10.5. Assessment

The carer should:

- Observe, evaluate and document the infant’s cues and behaviour.
- Assess, evaluate and document the infant’s responses and ability to tolerate activities.
- Monitor for signs of stress and exhaustion.
- Recognise that the quality of touch will affect the baby’s responses, i.e. light v. deep pressure.
- Considerations for touch are duration, intensity, frequency, location, action, and sensation, (Liaw, 2000).
- Individualised care planning for handling and procedures can be made in response to this assessment, taking into account changes may be required when adapting to baby’s cues and needs, (Bliss, 2005, Liaw, 2000, Browne & VandenBerg, 2000 and Appleton, 1997).
10.7. **Brazelton Neonatal Behavioural Assessment Scale**

A useful tool to help carers recognize and respond to behavioural cues when handling their baby.

<table>
<thead>
<tr>
<th>System</th>
<th>Green Light (Go)</th>
<th>Yellow Light (Wait)</th>
<th>Red Light (Stop)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autonomic</strong></td>
<td>Good even colour</td>
<td>Mild colour change (paling, mottling, acrocyanosis)</td>
<td>Substantial colour change</td>
</tr>
<tr>
<td></td>
<td>Smooth breathing</td>
<td>Grunting or rapid, shallow breathing</td>
<td>Chest wall retractions</td>
</tr>
<tr>
<td></td>
<td>No tremors or startles</td>
<td>Few startles or tremors</td>
<td>Laboured breathing or shallow breathing with pauses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bowel movements</td>
<td>Vigorous hicups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gagging or regurgitating</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Many startles or tremors</td>
</tr>
<tr>
<td><strong>Motor</strong></td>
<td>Relaxed tone</td>
<td>Jerky movements</td>
<td>Stiffening and arching away</td>
</tr>
<tr>
<td></td>
<td>Good range of motion</td>
<td>Flaccidity or hypertonia</td>
<td>Disorganized activity</td>
</tr>
<tr>
<td></td>
<td>Hand-to-mouth movement</td>
<td>Uneven tone</td>
<td>Flailing and frantic movements</td>
</tr>
<tr>
<td></td>
<td>Sucking</td>
<td>Body held tensely</td>
<td>Limpness</td>
</tr>
<tr>
<td></td>
<td>Hand grasping</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smooth movements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Postural change</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Body kept calm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>State and Social-Interaction</strong></td>
<td>Bright-eyed alert state</td>
<td>Shutting out by moving into drowsy or sleep states</td>
<td>Inconsolable crying</td>
</tr>
<tr>
<td></td>
<td>Readiness for interaction</td>
<td>Irritability and difficulty being consoled</td>
<td>Extreme irritability</td>
</tr>
<tr>
<td></td>
<td>Visual/auditory locking</td>
<td>Gaze aversion</td>
<td>Saccadic (twitching) eye movement</td>
</tr>
<tr>
<td></td>
<td>Self-quieting behaviour</td>
<td>Hyperalert state</td>
<td>Setting sun eyes</td>
</tr>
<tr>
<td></td>
<td>Robust sleep, alert and crying states</td>
<td></td>
<td>Panicked alertness</td>
</tr>
<tr>
<td><strong>Carer’s response to cues</strong></td>
<td>Continue with intervention</td>
<td>Pause and observe: Which direction is the baby going to go?</td>
<td>Allow resting period until colour, tone and respirations return to normal. If the baby continues to look stressed and does not recover easily, do not continue</td>
</tr>
</tbody>
</table>

(Adapted from Neonatal Behavioural Assessment Scale, Brazelton Institute, 1999, cited by Lowman et al, 2006)

**Please refer to age appropriate guidelines**

- **24 - 27 weeks Corrected Gestational Age**
- **28 - 32 weeks Corrected Gestational Age**
- **33 - 36 weeks Corrected Gestational Age**
- **37 weeks plus Corrected Gestational Age**
10.8. **Positive Touch. Developmental Care Guidelines for 24-27 weeks gestation**

**Development**

- Cortical pathway is intact and some myelin is present, the body is sensitive to touch, (Glass, 2005).
- Behavioural states poorly differentiated.
- Response to handling results in physiological instability which may be variable ranging from signs of stress to exhausted collapse.
- Movements mostly jerks, twitches and startles that increase with stressful input. (NSDCG, 2004)

**Nursing considerations**

- Wherever possible all touch episodes should be individualized in response to the baby’s behavioural cues, (Bond, 2010; Bliss, 2009; Lowmant et al, 2006, Bliss, 2005; Liaw, 2000; Browne & VandenBerg, 2000 and Appleton, 1997).
- Enable parents to read and respond to their baby’s cues, (Bond, 2010).
- Provide opportunities for undisturbed rest, (Graven and Brown, 2009).
- Suctioning only if necessary, (Appleton, 1997).
- Cluster cares, (East, 2000), but avoid completing a number of potentially distressing interventions at one time, (Bliss, 2009; Appleton, 1997).
- Allow ‘time out’ if infant showing signs of distress, (Bliss, 2005).
- Slow, controlled, firm but gentle handling, (Wall, 2002 and Harrison, 2001).
- Avoid abrupt, fast changes in position.
- Prepare for handling with soft voice or gentle touch as this helps promote physiological stability and state organization, (Bond, 2010; Wall, 2002).
- Take care when nappy changing to prevent IVH: slide nappy under baby and do not raise legs above baby’s head.
- Soothe baby by containment holding, (Bond, 2002).
- Avoid stroking or patting. Touch may be pressure alone, (Glass, 2005).
- Consider day/night patterns, (Appleton, 1997), e.g. weigh infant/ change bedding during day.
- Swaddle baby on transfer to/from incubator, (Courff et al, 1995).
- Consider kangaroo care, (Black, 2005, and Who, 2003), see guidelines.
- Soft natural fibres are recommended next to baby’s skin, (BLISS, 2009).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
10.10. Positive Touch. Developmental Care Guidelines for 28-32 weeks gestation

Development

- Quiet deep sleep increases around 30 weeks.
- Behavioural states more distinct by 32 weeks.
- Response to handling results in physiological instability, but baby displays more typical signs of stress.
- Twitches and startles common at 28wks leading to more controlled movements by 32 weeks. (NSDCG, 2004)

Nursing considerations

- Wherever possible all touch episodes should be individualized in response to the baby’s behavioural cues, (Bond, 2010; Bliss, 2009; Lowmant et al, 2006, Bliss, 2005; Liaw, 2000; Browne & VandenBerg, 2000 and Appleton, 1997).
- Enable parents to read and respond to their baby’s cues, (Bond, 2010).
- Provide opportunities for undisturbed rest, (Graven and Brown, 2009).
- Suctioning only if necessary, (Appleton, 1997).
- Cluster cares, (East, 2000), but avoid completing a number of potentially distressing interventions at one time, (Bliss, 2009; Appleton, 1997).
- Allow ‘time out’ if infant showing signs of distress.
- Slow, controlled, firm but gentle handling, (Wall, 2002 and Harrison, 2001).
- Avoid abrupt, fast changes in position.
- Prepare for handling with soft voice or gentle touch as this helps promote physiological stability and state organization, (Wall, 2002). Handling should be ideally when infant in a gently aroused state, (Bond, 2002).
- Soothe baby by containing them with head and hands midline, shoulders forward, lower limbs flexed and adducted towards midline and extremities in a flexed position, (Bond, 2002).
- Avoid stroking or patting.
- Consider day/night patterns, (Appleton, 1997), e.g. weigh infant/ change bedding during the day.
- Use supportive positioning techniques that will enhance flexion and promote comfort.
- Swaddle baby on transfer to/from incubator, (Courff et al, 1995).
- Stable infants 30+ weeks may nuzzle at breast.
- Soft natural fibres are recommended next to baby’s skin, (BLISS, 2009).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
10.12. **Positive Touch. Developmental Care Guidelines for 33-36 weeks gestation**

**Development**

- Behavioural states become more distinct with smoother transition between states.
- Quiet/deep sleep continues to increase.
- Infant may arouse for feeding.
- Stress response to noxious stimuli may vary but physiological instability still evident.
- Improved capability to use posture and movement to self regulate.

(NSDCG, 2004)

**Nursing considerations**

- Enable parents to read and respond to their baby’s cues, (Bond, 2010).
- Cluster cares, (East, 2000), but avoid completing a number of potentially distressing interventions at one time, (Appleton, 1997).
- Provide opportunities for undisturbed rest, (Graven and Brown, 2009).
- Suctioning only if necessary, (Appleton, 1997).
- Slow, controlled, firm but gentle handling, (Wall, 2002 and Harrison, 2001).
- Avoid abrupt, fast changes in position.
- Prepare for handling with soft voice or gentle touch as this helps promote physiological stability and state organization, (Bond, 2002).
- Soothe baby by containment holding, (Bliss, 2005), with the head and hands midline, shoulders forward and lower limbs flexed and adducted towards midline.
- Patting or stroking may be tolerated.
- Hold infants during feeding if awake, this includes tube feeding.
- Consider day/night patterns, (Appleton, 1997), e.g. weigh infant/ change bedding during the day.
- Swaddle baby on transfer to/from incubator or during handling/bathing if signs of stress occur, (Courff et al, 1995). May not be necessary at this stage.
- Soft natural fibres are recommended next to baby’s skin, (BLISS, 2009).

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 –32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age*

Development

- Tolerance of handling and interventions usually increases.
- States well defined with clear transitions.
- Periods of alertness for socialisation and longer attention span develops.
- Can self regulate behaviour with movement or posture.

(NSDCG, 2004)

Nursing considerations

- Interventions or opportunities for sensory experiences should take place with consideration for infant cues (Lowmant et al 2006, Liaw, 2000, Browne & VandenBerg, 2000 and Appleton, 1997).
- Enable parents to read and respond to their baby’s cues, (Bond, 2010).
- Provide rhythmic care patterns with day and night routines to organise sleep/ wake states.
- Cluster cares, (East, 2000), but avoid completing a number of potentially distressing interventions at one time, (Appleton, 1997).
- Provide opportunities for undisturbed rest, (Graven and Brown, 2009).
- Suctioning only if necessary, (Appleton, 1997).
- Breastfeed during or after painful procedures, (Gray et al, 2002).
- Swaddle/ contain during painful/ noxious interventions, (Courff et al, 1995).
- Consider day/ night patterns, (Appleton, 1997), e.g. weigh infant/ change bedding during the day.
- Hold infants for feeding (including tube feeds).
- Swaddle for bathing if showing signs of distress.
- Massage techniques may be offered if a trained professional is available, (Wall, 2002).
- Soft natural fibres are recommended next to baby’s skin, (BLISS, 2009).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 –32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
Skin to skin/Kangaroo Care – Developmental Care Guidelines for use of Skin to skin/Kangaroo Care

10.15. **Aim**

To be able to offer skin to skin/kangaroo care, (KC) from birth onwards on an individualized basis as a developmentally supportive intervention for the infant and a positive enhancement of the attachment relationship between parent and child.

10.16. **Introduction and key points**

- Supporting families, within the neonatal unit, to bond and build a close relationship with their baby(s) is paramount. Ensuring that every infant and family are given the opportunity to participate in skin to skin contact and comfort holding is crucial when considering the unnatural environment they in, (SWNN 2017).
- Low birth weight or prematurity results in the separation of infants from their mothers immediately after birth because of the need for specialised care. They may be placed in an isolated environment within an incubator. Although necessary this isolation and separation reduces the opportunities for parents to interact with their infants which in turn may affect the parent-infant relationship, the parent’s ability to care for the infant and could be detrimental to the infant’s overall development.
- Kangaroo Care is skin-to-skin contact, when an infant is placed against the parent’s chest. In the potentially overstimulating environment of being outside of the womb positive touch and holding is a reassuring way of communicating love and affection to infants. By empowering families to engage in skin-to-skin we can support them along the journey of understanding their babies needs and learning to subtly communicate in a safe and pleasurable way for all involved, (SWNN 2017).
- During kangaroo care the infant is clad only in a nappy and a hat and is placed vertically between the breasts of the mother or on the chest of the father directly onto her/his skin. The parent encloses the infant in his or her clothing to ensure that his or her body maintains the infant’s temperature, (Warren and Bond, 2010; Clifford et al, 2001).
- It is a powerful, easy-to-use method to promote the health and well-being of infants born preterm as well as full-term, (AWHONN, 2016; WHO, 2003). It was first initiated in Bogota, Columbia in 1979 to compensate for the lack of staff and equipment to care for premature and small infants, (WHO, 2003).

10.17. **Benefits of Kangaroo Care for the Infant**

- Reduces morbidity and mortality, (Conde-Aguelo et al, Cochrane review 2014, 2016; O’Brien-Abel, 2016)
- Reduced hypoglycaemia (O’Brien-Abel, 2016).
- Improved oxygen saturation levels, (Feldman et al, 2002; O’Brien-Abel, 2016).
- Longer quiet sleep periods, (Bastani et al, 2017; Messmer et al, 1997).
- Longer quiet alertness states, (Bastani et al, 2017; Messmer et al, 1997).
• Positive effect on duration and exclusiveness of breast-feeding, (Hake-Brooks and Anderson, 2008; Mizuno et al, 2004; Moore et al 2016; O'Brien-Abel, 2016), demonstrates that babies offered early skin-to–skin contact immediately following delivery show enhanced recognition of their mother’s milk odour and longer breastfeeding duration.
• Reduces crying time (Johnston et al, 2017; Baker-Rush, 2016).
• Decreased incidence of infection and increased immunity, (Conde-Aguelo et al, Cochrane review 2014; O'Brien-Abel, 2016; Shiau and Anderson, 1997).
• Increased infant weight gain, (Evereklian et al, 2017; Feldman et al, 2002).
• Less stress behaviour, (Ludington-Hoe, 2015; Ohgi et al, 2002).
• KC care provides security and the best recognition of mother’s voice/heart beat as the baby’s ear is on her body, and voice sounds are conducted via vibration through the body to the baby’s inner ear. Just as it was in the womb. (Philbin 2015).
• Shortened hospital stay, (Conde-Aguelo et al, Cochrane review 2014; Feldman et al, 2002).
• Decreased risk of readmission to hospital, (O'Brien-Abel, 2016).
• Less resources required compared to conventional neonatal care, (Conde-Agudelo et al. 2016).
• Improved growth and development after 12 months (Bera et al; 2014)

10.18. Benefits of Kangaroo Care for the Mother/Parents

• Increases maternal-infant attachment and bonding (Baker-Rush, 2016; Eun-Sook et al 2016).
• Babies recognise mother’s milk odour, (Mizuno et al, 2004)
• Increased maternal milk production, (Baley, 2015; Feldman et al, 2002).
• Reduced breast feeding problems, (Conde-Agudelo, 2003).
• Reduced incidence of post-natal depression and improved parental mood, (Feldman et al, 2002).
• Reduced maternal stress (Eun-Sook et al 2016).
• Increases maternal satisfaction with care given, (Conde-Agudelo, 2003).
• Initiates maternal role identity (Roller, 2005).
• Enhances sense of parental empowerment (SHO, 2003).

10.19. Adverse effects of Kangaroo Care

Transfer of the baby from bed to parent can be stressful for the infant, (Kledzig, 2005).
Increased stress on dislodgement of venous or arterial lines or accidental extubation, (Black, 2005).
Parental /Nursing staff feelings of guilt if infant physiologically unstable during kangaroo period, (Black, 2005).

10.20. Who can participate in Kangaroo Care?

• Medically stable infants.
- Physiologically stable and fully consenting mother, father or family member/carer
- Twins.
10.21. Criteria for not instituting Kangaroo Care

- Infants < 30 weeks gestation in first 5 days of life, (NSDCE, 2005).
- Caution with infants < 28 weeks gestation, (Black, 2005).
- Preterm infants with immature/friable skin.
- Chest drain/s in situ.
- Infants receiving intense phototherapy.
- Infants receiving inotropic support.
- Unstable on respiratory support (CPAP/Ventilation), (NSDCE 2005).
- After major procedures or treatment changes e.g. extubation, (NSDCE, 2005).
- Clinical discretion is always essential, discuss with medical staff/ANNP. Exceptional circumstances such as infants receiving palliative care may be considered for KC.
- Umbilical or venous lines need not be a contraindication but need to be well secured, (NSDCG, 2004).
- Parents are not ready to hold their baby, (Kledzig, 2005).

10.22. Nursing Guidelines for Kangaroo care

Give parents information and encouragement (Penn, 2015). The infant is normally wearing only a nappy and has a receiving blanket covering the infant’s back. The optimal chair for experiencing KC is a recliner.

10.23. Preparation of the infant for Kangaroo Care

The planning and preparation are designed to make the transfer of the infant from bed to parent happen in a very controlled manner and within the infant’s tolerance, (Kledzig, 2005).

10.24. Nursing Guidelines for Kangaroo Care and the Ventilated Infant/ the infant receiving nasal CPAP

10.24.1. Prior to Transfer

- Give parents full information about benefits of KC, assess parental readiness and gain informed consent.
- The medical team/ANNP will be contacted for consent to KC the infant and confirmation of the infant’s haemodynamic stability.
- Record the infant’s baseline ventilator parameters.
- Record the infant’s vital signs and axilla temperature. These measures should be carefully monitored during KC to ascertain the infant’s tolerance of this intervention, (Ludington-Hoe et al, 2003).
- Change the infant’s nappy if necessary. Very small babies will require a hat.
- With support of a second person, place the infant in supine position. Note any significant changes in the infant or mechanical ventilator requirements.
- Ensure a patent airway, suction if necessary and ensure stability of the endotracheal tube, (Kledzig, 2005).
- Drain the ventilator circuit of condensation.
- Assess infant’s response to the above actions. Observe for 15 minutes to allow for physiological adaptation to the above handling. Adaptation is defined as all physiological
parameters returning to baseline and staying there for three minutes. If adaptation has not
occurred in 15 minutes, the infant is probably not stable enough to receive KC on that day.

- Help the infant to become organised prior to the challenge of being lifted and moved.
  Position baby to support access of hand to face, offer sucking opportunities, provide
  containment and boundaries and allow period of time with little or no additional stimulation
to facilitate achievement of regulation, (Kledzig, 2005).

- Place a receiving blanket, (folded), underneath the infant, so when transferring hands are
  placed underneath the blanket, and baby and blanket are moved simultaneously, (Black,
  2005).

- Review and discuss with parents the infant’s responses to handling, behavioural cues of over
  stimulation and readiness for interaction, (Kledzig, 2005).

- Discuss the anticipated length of time the baby will be held and possible reasons for ending
  the holding time with the parents, (Kledzig, 2005).

- Bring a comfortable, (reclining if possible), chair to the bedside and position near the
  ventilator and oxygen source, (Kledzig, 2005). Advise the parent to prepare themselves, e.g.
  toilet, drink etc, (Warren and Bond, 2010). Suggest they wear loose front opening clothing or
  a dressing gown.

- Check resuscitation equipment is available and that the neopuff and suction can reach the
  infant.

**10.24.2. Transfer from Incubator**

Transfer is indicated to be the greatest contributing factor to heat loss and stress, resulting in
tachycardia or apnoea.
Lifting is commonly associated with oxygen desaturation, (Peters, 1992).
Involving 2-3 nurses in the transfer minimises the risk of extubation or physiological disruption,
(Ludington-Hoe et al, 2003).

**10.24.3. Transfer Technique**

- If possible have two or three staff members assist the mother in the transfer of the infant.
- Have the parent stand at the side of the incubator while one staff member gathers all the
  infant’s lines on one side of the infant.
- A second staff member is responsible for transferring and securing the ventilator tubing. (A
  third staff member may be needed to assist the parent).
- Disconnect the ventilator tubing from the Endotracheal Tube and have the parent lift the
  infant and place prone on their chest in one movement, keeping the blanket over the back if
  possible.
- Reconnect the ventilator tubing and adjust the blanket across the infant’s back to minimise
  heat loss.
- Disconnect the ventilator tubing and help the parent move backwards to the chair, assisting
  them in sitting once they feel the chair against their calf, supporting all parenteral lines,
  monitoring lines, feeding tubes and chest tubes during the move.
- Reconnect ventilator tubing to the Endotracheal Tube.
- Immediately after arrival on the parent’s chest give the infant a minute or two with
  supported containment and minimal stimulation to adjust to the move. This short delay in
  minor adjustments in infant or equipment position facilitates a more speedy return to a well
  regulated state, (Kledzig, 2005).
- Once the infant is settled reposition as needed and make sure the infant is tucked in a
  slightly flexed or comfortable position underneath the blanket or within the parent’s
  clothing, (Black, 2005).
• Encourage the parent to recline if in a suitable chair. When the parent is upright, gravity pulls the infant down and away from the ventilator connection. This may result in displacement of the Endotracheal Tube and loss of alignment, which compromises the airway as well as chest volume. Positioning the parent in a semi reclining position can help avoid this problem, (Kledzig, 2005).
• Check the parent is comfortable and offer a screen to create a sense of privacy, (Kledzig, 2005) and a hand held mirror to allow parents to view the baby’s face, (Warren and Bond, 2010).
• Position flexible tubing in a downward direction if possible away from the baby’s face so it does not obstruct the infant’s and parent’s view of each other, (Kledzig, 2005).
• Check the parenteral lines, central lines and any chest tubes for placement and function, arrange lines to avoid kinks or tension, (Kledzig, 2005).
• Recalibrate arterial transducer for blood pressure monitoring, (Kledzig, 2005).
• Suction if indicated – the change in position and movement during the transfer often results in the infant requiring endotracheal suctioning. If clinical indicators are present, describe the need and procedure of suctioning to parents and proceed to suction the infant while held, (Kledzig, 2005).
• For infants at risk of intra ventricular haemorrhage it is advisable to take the additional precautions of maintaining midline head position by cradling and keeping the baby in the same plane during slow and very supported movement. The cradle position, which allows the infant to keep his head in midline and to maintain a horizontal plane, minimises the possibility of changes to cerebral haemodynamics and would be preferable for those infants at risk. Simple containment and attention to the infants position are all that is needed to transfer them for cradle position holding, (Pellicer et al, 2002).
• Monitor infant’s condition continuously. A holding time of at least an hour seems to maximise the benefits to both the parent and the baby. It allows recovery from the transfer, achievement of regulation, rest and some interaction before the disruption of being transferred back to the cot, (Kledzig, 2005).
• Infant tolerance as indicated by physiological stability is the guiding parameter for determining the length of time the infant is held. Physiological stability is defined as being not tachycardic, maintains a mean arterial blood pressure with minimal fluctuation, is not acidotic and whose pulse oximetry is stable, (Clifford, 2001).
• Another clinical indication that the holding time has been enough is infant restlessness that does not abate, (Kledzig, 2005).

10.24.4. Transfer from KC back to incubator

• Help the parent in moving to the front edge of the chair, one person handle the lines, and a staff member disconnect the ventilator tubing.
• Assist the parent to a standing position, reconnect the ventilator tubing, and give the infant several ventilator breaths.
• Disconnect the ventilator tubing and replace the infant in the incubator in one movement.
• Reconnect the ventilator tubing and make sure all ventilator tubing is stabilised and all lines are placed securely within the incubator.
• Document infant’s participation in and tolerance of KC.

(Guidelines adapted from Ludington-Hoe et al, 2003 cited by Black, 2005).

10.25. Guidelines for the Kangaroo Care for the Non-Ventilated Infant.

• Give parents full information about benefits of KC, assess parental readiness and gain informed consent.
Discuss the anticipated length of time the baby will be held and possible reasons for ending the holding time with parents, (Kledzig, 2005). If possible the experience should continue for at least one hour.

Seek medical/ANNP permission prior to initiating Kangaroo Care, (Black, 2005).

Chose suitable time taking into account the ability to create a quiet, calm environment. Assess ward routine, staffing, infants stability, when a feed is due, and parental commitments, (Warren and Bond, 2010).

Record the infant’s vital signs and axilla temperature. These measures should be carefully maintained during KC to ascertain the infant’s tolerance of this intervention, (Ludington-Hoe et al, 2003).

Bring a comfortable chair, (reclining if possible) to the bedside, (Kledzig, 2005). Advise the parent to prepare themself, e.g. toilet, drink etc, (Warren and Bond, 2010). Suggest they wear loose front opening clothing or a dressing gown.

Check the resuscitation equipment is available and that the neopuff, suction and oxygen can reach the infant.

If clothed, undress the infant. Change infant’s nappy if necessary. Very small babies will require a hat. If undressing will make the baby over tired then the baby can receive KC care dressed or just open the clothes at the front.

Place the baby in a supine position with a folded blanket underneath so when transferring, hands are placed underneath blanket, baby and blanket are moved simultaneously, (Black 2005).

Position parent at side of incubator and have parent lift baby and place prone on their chest in one movement, keeping blanket over infant’s back if possible. Support all lines and feed tubes during the move.

Help parent move backwards to chair assisting them to sit once they feel the chair against the calf.

Let infant settle then reposition as needed and make sure baby is tucked in a slightly flexed or comfortable position either underneath the blanket or within the parent’s clothing, (Black, 2005).

Check the parent is comfortable and offer a screen to create a sense of privacy, (Kledzig, 2005) and a hand held mirror to allow parents to view the baby’s face, (Warren and Bond, 2010).

Assess infant’s condition every 15 minutes during Kangaroo Care, (continuous if monitored). A holding time of at least an hour seems to maximise the benefits to both the parent and the baby. It allows recovery from the transfer, achievement of regulation, rest and some interaction before the disruption of being transferred back to the cot, (Kledzig, 2005).

Reassure the parent that you are nearby if they require help.

If the baby shows interest in the breast the position can be change so the infant can nuzzle

Tube feeds may be administered during skin to skin contact.

Infant tolerance is indicated by physiologic stability as the guiding parameter for determining the length of time the infant is held, (Clifford 2001).

Another clinical indication that the holding time is enough is infant restlessness that does not abate, (Kledzig, 2005).

At the end of Kangaroo Care help the parent move to one front edge of the chair. Assist the parent to standing position supporting all line and feeding tubes during the move.

Replace the infant back in the incubator in one movement and reposition.

Document infant’s response and tolerance of Kangaroo Care. (Ludington Hoe et al, 2003)

As parents become more confident they may be able to transfer the baby out of the incubator themselves with assistance. When the baby is in a cot they will be able to manage alone.
Please refer to age appropriate guidelines

24 - 27 weeks Corrected Gestational Age
28 - 32 weeks Corrected Gestational Age
33 - 36 weeks Corrected Gestational Age
37 weeks plus Corrected Gestational Age


Development

- Cortical pathway is intact and some myelin is present, the body is sensitive to touch, (Glass, 2005).
- Behavioural states poorly differentiated.
- Response to handling results in physiological instability which may be variable ranging from signs of stress to exhausted collapse.
- Movements mostly jerks, twitches and startles that increase with stressful input.
  (NSDCG, 2004).

10.27. Nursing Considerations

- DO NOT kangaroo care in first 5 days of life. Return to incubator at any signs of distress once kangaroo care initiated. (A baby not expected to live may be an exception to this).
- Educate and support parents through initial KC procedure and assess their psychological readiness. Encourage parents to have dedicated shirt on ward specifically for KC use
- Gain informed parental consent, (NMC,2008).
- Infant’s condition should be stable prior to KC.
- Minimise the stress of transfer to and from the incubator.
- Minimise stress to infant by standing transfer if mother able.
- Duration of 1 hour at least is recommended for kangaroo care, with close observation for signs of stress/ intolerance, (Warren and Bond, 2010).
- Monitor physiological status throughout KC. Return to incubator if condition deteriorates.
- Encourage the mother to talk quietly to her baby (Philbin 2015).
- Document positioning, tolerance of kangaroo care, and parental perception and feedback (DiCioccio, 2017).

(Kledzig, 2005).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
10.29. Kangaroo Care. Developmental Care guidelines 28-32 weeks gestation

Development

- Behavioural states more distinct by 32 weeks.
- Quiet deep sleep increases around 30 weeks.
- Response to handling results in physiological instability, but baby displays more typical signs of stress.
- Twitches and startles common at 28 weeks leading to more controlled movements by 32 weeks. (NSDCG,2004).

Nursing Considerations

- Assess infant for individual suitability for kangaroo care. If below 30 weeks avoid kangaroo care in first 5 days. (A baby not expected to live may be an exception to this).
- Gain informed parental consent (NMC,2008).
- Educate and support parents through initial KC procedure and assess their psychological readiness. Encourage parents to have dedicated shirt on ward specifically for KC use.
- Infant’s condition should be stable prior to KC.
- Minimise stress to infant by standing transfer if mother able.
- Duration of 1 hour at least is recommended for kangaroo care, with close observation for signs of stress/ intolerance, (Warren and Bond, 2010).
- Monitor physiological status throughout KC. Return to incubator if condition deteriorates.
- Stable infants >30 weeks gestation may nuzzle at breast during KC, (Warren and Bond, 2010).
- Encourage the mother to talk quietly to her baby (Philbin 2015).
- Document positioning, tolerance of kangaroo care, and parental perception and feedback (DiCioccio, 2017).

(Kledzig, 2005).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age


Development

- Behavioural states become more distinct with smoother transition between states.
- Quiet/deep sleep continues to increase.
- Infant may arouse for feeding
- Stress response to noxious stimuli may vary but physiological instability still evident.
- Improved capability to use posture and movement to self regulate.

(NSDCG, 2004).

Nursing Considerations

- Assess infant for kangaroo care and continue to provide opportunities during transition to oral feeds. Infants showing signs of deterioration should be returned to incubator/cot.
- Gain informed parental consent (NMC,2008).
- Educate and support parents through initial KC procedure and assess their psychological readiness. Encourage parents to have dedicated shirt on ward specifically for KC use.
• Stable infants may nuzzle at the breast during KC, (Warren and Bond, 2010).
• Encourage the mother to talk quietly to her baby (Philbin 2015).
• Document positioning, tolerance of kangaroo care, and parental perception and feedback (DiCioccio, 2017).
  (Kledzig, 2005).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age

10.31. Kangaroo Care. Developmental Care guidelines for 37 weeks onwards gestation

Development

• Tolerance of handling and interventions usually increases.
• States well defined with clear transitions.
• Periods of alertness for socialisation and longer attention span develops.
• Can self regulate behaviour with movement or posture.
  (NSDCG, 2004).

Nursing Considerations

• Assess infant’s suitability for Kangaroo care.
• Gain informed parental consent (NMC,2008).
• Encourage early skin-to-skin contact following delivery, (Mizuno et al, 2004).
• Kangaroo care opportunities for babies developing oral feeding, hold during tube feeds.
• Stable infants may nuzzle at the breast during KC, (Warren and Bond, 2010).
• Educate and support parents through initial KC procedure. Encourage parents to have dedicated shirt on ward specifically for KC use.
• Encourage the mother to talk quietly to her baby (Philbin 2015).
• Encourage parents to feel confident to perform KC care unaided
• Document positioning, tolerance of kangaroo care, and parental perception and feedback (DiCioccio, 2017).
  (Kledzig, 2005).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
11. Positioning - Developmental Care Guidelines for Positioning

11.1. Aim

To position the infant effectively and comfortably, protecting them from muscular and skeletal deformities and promoting self regulation and normal development.

11.2. Introduction

Good positioning helps make the baby comfortable and encourages self-calming movements, self-regulation and ensures the baby feels safer and more secure.

Premature babies have hypotonic (floppy) muscles. In utero the natural foetal position is one of flexion, this is not easily replicable, (Cole & Gavey, 2001). Outside the womb premature babies have to work against gravity and it is difficult for them to hold themselves in position or carry out smooth movements, (Sweeney & Gutierrez, 2002). If nursed on a flat surface without support they may assume a flattened posture which if allowed to persist may result in characteristic postural patterns described as frog legs and “W” arms. These postures may interfere with normal development.

11.3. Benefits of Effective Positioning

11.3.1. Physiological

- **Respiratory** The chosen position should support the baby’s efforts to breathe as comfortably as possible. Infants with respiratory difficulty may improve when nursed prone, (Balaguer et al, 2003). This position is thought to compensate for weak chest muscles by having a bracing effect and it may also inhibit other body movements that may disrupt breathing. Unmonitored babies **must not** be nursed prone as this increases the risk of cot death, (AAP, 2005).

- **Neurological** Effective positioning can prevent fluctuation in intracranial pressure which may increase the incidence of intra-ventricular haemorrhage, (Pellicer et al, 2002).

- **Digestion** Prone or left-side lying on a gentle slope is thought to reduce reflux, (Ewer et al, 1999). Warren and Bond (2010) recommend prone and alternate side lying positions. Effective positioning saves energy, (Bliss, 2005).

- **Temperature Control** Babies use most energy and lose more body heat when they are supine. Therefore supported supine positions using nesting etc should promote a calm and comfortable state, minimising heat loss and thus energy consumption, (Warren and Bond, 2010).

- **Movement Patterns** The movements of preterm babies are often large, sudden and disorganised. They tire the baby, cause physiological disruption and make sleep/wake states difficult to achieve. Effective positioning and boundaries reduces this and encourages the infant to adopt smoother movement patterns, flexion and promotes comfort, (Reid and Frier, 2000).
11.4.1. Psychological

- **Emotional Impact**  A comfortable, well-positioned baby gives parents a strong positive message that reflects the sensitivity and empathy of carers and respects the dignity of the infant. It promotes positive infant-parent attachment, (Jack, 2000).

- **Self-regulation**  Effective positioning assists the baby to make movements that helps them to stay calm and improves the quality of the baby’s sleep, (Bliss, 2005). Positioning should give enough freedom of movement to not overly constrict the infant and hamper development, (Sweeney and Gutierrez, 2002).

11.5. Complications of Poor Positioning

“Incorrect positioning can have a deleterious effect upon long-term motor development and may also affect neurodevelopment,” (Cole & Gavey, 2001 p25).

11.5.1. Head and Neck

- Care needs to be taken to prevent twisted limbs and neck that may obstruct blood flow. Weak neck muscles allow the head to rest flat on its side and this can obstruct blood flow from the brain and alter intracranial pressure, (Pellicer et al, 2002) causing intra ventricular haemorrhage.

- Since newborns have incomplete muscle development the head tends to fall sideways, causing shortening of the neck muscles. This can lead to preferred head turning and interferes with visual/perceptual and sensory integration and can cause a misshapen skull, (Hummel & Fortado, 2005). Supine positioning can cause plagiocephaly (meaning abnormal head shape), usually with secondary torticollis, (Sweeney & Gutierrez, 2002), this is more common since the ‘back to sleep campaign. Prone and side-lying positions can cause dolichocephaly, (tall narrow heads), (Hummel & Fortado, 2005).

- Care needs to be taken to avoid putting pressure on the occiput, (Hummel & Fortado, 2005 and Jackson, 2006).

- Excessively extended neck posture overstretches and weakens anterior neck flexor muscles, contributing to later difficulty with head centring, downward visual gaze and hand co-ordination to midline and to the mouth. It also has a negative effect on swallowing and feeding, ET tube placement/position and airway management, (Hummel & Fortado, 2005 and Sweeney & Gutierrez, 2002). Over flexion of the neck should be avoided as it too can compromise the airway.

11.5.2. Shoulders

If lying in the “W” position the baby may get a flattened posture with scapular retraction. This makes it difficult to bring the shoulders and hands forward to midline and to encourage self-regulatory behaviour e.g. getting fingers and hands to mouth and sucking, hand clasping and bracing, touching mouth and head. Longer term this may delay prone lying on elbows, crawling, sitting and balance, (Sweeney & Gutierrez, 2002).

11.5.3. Hips

Hips without positioning are externally rotated and the feet point outwards, (east and west). The affected muscles shorten and will interfere with crawling, standing and walking. Frog postures in the long-term can cause hip dislocation, (Sweeney & Gutierrez, 2002).

11.6. Goals of positioning
11.7. Commercial positioning tools available:

- Soft padded mattresses.
- Baby bendies.
- Gel products including: mattresses, wedges, donuts, gel rectangles
- Beanbag products.
- Nests.


11.8.1. Benefits of Nesting

- Helps babies keep warm and conserve energy
- Give babies boundaries to rest and push against similar to those in utero.
- Helps babies achieve and keep a secure and comfortable curled up position

11.8.2. Recommendations for Nesting

- Materials should be soft and stretchy without creases.
- Padded base stitched to boundaries are useful when transferring babies in and out of incubator.

11.8.3. Boundaries should be:

- Firm, maintaining shape but able to adapt to baby’s size and environment.
- Steep around the feet keeping baby’s limbs inside rather than allowing them to slide out.
- High enough (at least 8cm) and near enough for baby to brace against when stretching out.
- Snug not constricting of movement.
- Encircle the head as well as body and legs for small babies.

Nesting should be discontinued before infants are discharged or when monitoring is discontinued in accordance with SIDS safety advice.

*Developmental positioning tools to provide partial containment or to aid midline postures may be formed with the use of rolled up blankets, sheets, and towels, (Bliss, 2005, Sweeney & Gutierrez, 2002). However Health and Safety issues should be considered when adapting equipment. Health and Safety Executive, (1998) says equipment should be suitable for its intended use.*
11.10. **Examples of Developmentally Supportive Positioning**

**11.10.1. Midline head positioning**

This aims at keeping the head midline whether sidelying or supine. For infants at risk of intraventricular haemorrhage it is beneficial to take the additional precautions of maintaining midline head position by keeping the baby in the same plane during slow and very supported movement to reduce changes to cerebral haemodynamics, (Pellicer et al, 2002).

**11.10.2. The Supine Position**

The most challenging position to manage biomechanically, but AAP, (2005) recommend that most high-risk babies sleep in the supine position prior to and following hospital discharge. The supine midline position of the head favours cerebral venous drainage and helps prevent elevation of cerebral blood flow, (Pellicer et al, 2002).

- Shoulders are rounded forward and supported off the mattress.
- Legs are flexed and together with strong boundaries for foot bracing.
- Head near midline.
- Allow hands to chest or mouth.

**11.10.3. The Side-lying Position**

Use of the lateral position up to 3 hours, as part of normal nursing care of preterm infants, has no adverse effects on lung volumes and its regional distribution, (Van der Burg et al 2016).

This position promotes postural organisation and flexion.

- The scapular rounding forward, not “sticking out”.
- Legs are flexed with boundaries for foot bracing.
- Hands are midline and near face.
- The trunk and neck are supported in soft flexion.
- Alternate sides aiming at keeping head midline.
Park et al (2014) have shown that the use of the semi-elevated side lying position during feeding maintains greater physiological stability in premature infants than using the semi-elevated supine position.

11.10.4. The Prone Position

This position promotes postural organisation and flexion and may have respiratory benefits, (Rivas-Fernandez et al, 2016; Balaguer et al, 2003). It can promote sleep, enhance oxygenation, and improve feeding tolerance, (Chang, 2002 cited by Hummel & Fortado, 2005). It also reduces pain, stress and crying time (Kahraman et al 2017). It is suggested to be the most favourable position for facilitating sleep and reducing stress in preterm infants, (Peng et al 2014)

- Shoulders are rounded and fall forward with the aid of a rectangular jelly wedge which also acts as a head support.
- Hands to face if possible.
- Legs are tucked together under the body and supported with boundaries, (Bliss, 2005).
- Do not over extend or flex the head/neck, and alternate the direction of the head.
- Avoid externally rotating the hips.

- Small roll under hips may help pelvic tilt and hip flexion, (Sweeney & Gutierrez, 2002),
- Ensure hips are positioned below the level of the head.
- Caution must be taken if umbilical lines are in place.
- Ensure that carers understand that this position is only used whilst baby is monitored in SCU and not for discharge, due to risk of SIDS, (Levy Raydo & Reu-Donlon, 2005).

(Photographic material reproduced with the kind permission the baby’s family Barnstaple SCU)

Please refer to age appropriate guidelines

24 - 27 weeks Corrected Gestational Age
28 - 32 weeks Corrected Gestational Age
33 - 36 weeks Corrected Gestational Age
37 weeks plus Corrected Gestational Age
11.12. **Positioning. Developmental Care Guidelines for 24-27 weeks gestation**

**Development**


**Nursing Considerations**

The baby’s position is changed according to individual needs and cues, (Bliss, 2009). Use supportive positioning techniques that will enhance flexion and promote comfort, (Sweeney & Gutierrez, 2002). These techniques should be continued when manoeuvring or handling the baby, such as swaddling when transferring to and from incubator and during nappy changing. Position with the head midline either supine or side-lying and the head of the bed slightly elevated at least for the first 5 days in this high risk group, (Pellicer et al, 2002 and NSDCG, 2004). Vary infant head and body position, paying attention to signs of stress on handling, (Cole & Gavey, 2001, Hummel & Fortado, 2005 and Young, 1994). Prone positioning may aid respiratory effort, (Balaguer et al, 2003) but caution in the first 5 days, nurse supine if medically stable, (Levy Raydo & Reu-Donlon, 2005). Gel pillow in situ to minimise head flattening, (Hummel & Fortado, 2005). Neck in neutral or soft flexion. Shoulders softly rounded forward with arms and hands to midline, (Sweeney & Gutierrez, 2002). Trunk supported in flexed “C” shape when side-lying, (Short et al, 1996 and Bliss, 2005). Hands near to mouth or face for self-calming, (Sweeney and Gutierrez, 2002). Lower limbs flexed and adducted towards midline, keeping hips below the level of the head, and to acknowledge this during nappy changing, (NSDCG, 2004). Strong boundaries using nest/ rolls in place to maintain appropriate positioning and surface for foot bracing whilst providing opportunities for movement. (Sweeney & Gutierrez, 2002 and Bliss, 2005). The principals of positioning are explained to the parents, (Jack, 2000), parental involvement is promoted, (according to baby’s condition), and appropriate information given, (Bliss, 2005). See guidelines for Kangaroo care. The baby’s responses to position changes are documented, (BLISS, 2009).

**Important Notes**

Problem solve when medical equipment or condition interferes with optimal positioning, (NSDCG, 2004). Be aware of right-sided head turning preference occurring which can be exacerbated by care practices in the neonatal intensive care, (Hummel & Fortado, 2005). For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
11.14 Positioning. Developmental Care Guidelines for 28-32 weeks gestation

Development

- Muscle tone weak, but develops slowly over this gestational period.
- Leg movements increase with beginning of flexion in hips/legs, (NSDCG, 2004).

Nursing Considerations

- The baby’s position is changed according to individual needs and cues, (Bliss, 2009).
- Use supportive positioning techniques that will enhance flexion and promote comfort, (Sweeney & Gutierrez, 2002). These techniques should be continued when manoeuvring or handling the baby, such as swaddling when transferring to and from incubator and nappy changing.
- Position with the head midline either supine or side-lying and the head of the bed slightly elevated at least for the first 5 days in this high risk group, (Pellicer et al, 2002 and NSDCG, 2004).
- Vary infant head and body position, paying attention to signs of stress on handling, (Cole & Gavey, 2001 and Hummel & Fortado, 2005).
- Prone positioning may aid respiratory effort, (Balaguer et al, 2003) but caution in the first 5 days, nurse supine if medically stable, (Levy Raydo & Reu-Donlon, 2005).
- Gel pillow in situ to minimise head flattening, (Hummel & Fortado, 2005).
- Neck in neutral or soft flexion.
- Shoulders softly rounded forward with arms and hands to midline, (Sweeney & Gutierrez, 2002).
- Trunk supported in flexed “C” shape when side-lying, (Short et al, 1996 and Bliss, 2005).
- Hands near to mouth or face for self-calming, (Sweeney & Gutierrez, 2002).
- Lower limbs flexed and adducted towards midline, keeping hips below the level of the head, and to acknowledge this during nappy changing, (NSDCG 2004).
- Strong boundaries using nest/ rolls in place to maintain appropriate positioning and surface for foot bracing whilst providing opportunities for movement. (Sweeney & Gutierrez, 2002, Bliss, 2005).
- The principals of positioning are explained to the parents, (Jack, 2000) parental involvement is promoted, (according to baby’s condition), and appropriate information given, (Bliss, 2005).
- The baby’s responses to position changes are documented, (BLISS, 2009).

Important Notes

Problem solve when medical equipment or condition interferes with optimal positioning (NSDCG, 2004).
Be aware of right-sided head turning preference occurring which can be exacerbated by care practices in the neonatal intensive care, (Hummel & Fortado, 2005).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
11.16. Positioning. Developmental Care Guidelines for 33-36 weeks gestation

**Development**

- Smoother and more controlled movements with stronger flexion of knees and hips during rest and development of tone in lower extremities.
- Can turn own head from side to side, (NSDCG, 2004).

**Nursing Considerations**

- The baby’s position is changed according to individual needs and cues, (Bliss, 2009).
- Vary infant head and body position whilst using developmental aids, paying attention to signs of stress on handling.
- Prone positioning may aid respiratory effort, (Balaguer et al, 2003), but nurse supine if medically stable, (Levy Raydo & Reu-Donlon 2005).
- Use supportive positioning techniques that will enhance flexion and promote comfort.
- Provide boundaries using nest/rolls, (Bliss 2005).
- Infants in cots should be positioned on their backs with feet to foot allowing hand to mouth contact. Infants who display limited flexion in their cot may require a nest or swaddle below shoulder level. No nests or blankets around face. Consider monitoring these babies as per unit protocol, (NSDCG, 2004).
- Vary the position of the infant head for sleep, (Hummel & Fortado, 2005).
- Consider removal of developmental aids when moved into cot or baby >35 weeks gestation, (AAP, 2000).
- Remove developmental aids if monitoring is discontinued.
- If baby requires developmental aids >35 weeks gestation then this should be documented in the MDT notes with rationale.
- Consider supervised tummy lying when awake if close to discharge, (Bliss, 2005).
- The principals of positioning are explained to the parents, (Jack, 2000), parental involvement is promoted, (according to baby’s condition), and appropriate information given, (Bliss, 2005).
- The baby’s responses to position changes are documented, (BLISS, 2009).

*For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 –32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age.*

11.17. Positioning. Developmental Care Guidelines for 37 weeks gestation onwards

**Development**

- Wider range of controlled movements develops.
- Limbs and trunk are normally flexed at rest.
- Even at term, the flexor tone of preterm infants does not match the strong flexion of the infants remaining in the cramped, intrauterine environment until 40 weeks gestation, (Sweeney & Gutierrez, 2002).

**Nursing Considerations**

- The baby’s position is changed according to individual needs and cues, (Bliss, 2009).

• If baby has dolicocephalic head, (typical flat sided preterm head), then babies should be positioned to encourage maintaining the head in the midline position to promote resolution.

• If the baby has occipital flattening, (flattened back of the head), then babies should spend a minimal amount of time in a seat, (Hummel and Fortado, 2005 and Sweeney & Gutierrez, 2002).

• Vary caregiver’s approach to infant to avoid right sided head preference, and encourage parents who bottle feed their infants to hold them in different arms as they do at the breast, (Hummel & Fortado, 2005). Encourage hand to mouth contact.

• Remove developmental aids unless specifically requested for individual needs, (AAP, 2005).

• Document any specific requirements for continued use of developmental aids in MDT notes.

• Lie on back, feet to foot, unswaddled allowing hand to mouth movement, (AAP, 2005).

• Supervised tummy lying when awake, (AAP, 2005 and Sweeney & Gutierrez, 2002).

• Consider supported sitting, whilst awake. Keeping head in midline, (Hummel & Fortado, 2005 and Bliss, 2005) with good airway maintenance.

• Parental involvement is promoted, (according to baby’s condition), and appropriate information given.

• The baby’s responses to position changes are documented, (BLISS, 2009).

  Specific discharge teaching on the following is advised:-

• The principals of positioning are explained to the parents, (Jack, 2000) including recent cot death prevention advice, (Bliss, 2005). Demonstrate positions for sleep, play, feeding and carrying, (Hummel & Fortado, 2005).

• Vary the direction of the head turn for sleeping.

• Place head in midline positions in car seats and swings.

• Limit use of the infant seat and replace with supervised tummy play whilst awake, (Hummel & Fortado, 2005).

• Discuss value of supervised prone position for strengthening of the neck, arms and trunk in preparation for rolling, sitting and standing.

• The importance of follow up if advised for musculoskeletal and neurodevelopmental monitoring.

• Parents are advised to seek medical opinion if they notice signs of head flattening, asymmetrical arm use, lateral head tilt or strong head turn preference.

• Specific teaching on positioning may be required for some infants by physiotherapists to maximise motor development, (Sweeney & Gutierrez, 2002).

For other gestational ages see appropriate guidelines i.e.: 24 – 27 weeks; 28 -32 weeks; 33 – 36 weeks, 37 weeks + corrected gestational age
12. Parental Involvement - Developmental Care Guidelines for Parental Involvement

12.1. Aim

To encourage a collaborative approach between carers and professionals to promote participative, individualised care planning empowering ownership, bonding and parent–infant interaction. Supporting and encouraging parents to become the primary care givers.

12.2. Introduction and Key Points

- National Service Framework for Children, (Department of Health, 2004) states that parents should be involved as partners in care.
- Family-centred care (FCC) should be provided by Neonatal Units. This involves combining a philosophy of care that emphasises partnership working and shared decision-making, a range of policies to help to ensure that information, support and parents’ sense of involvement in their baby’s care is of a consistently high quality, and a range of organisational features and facilities to welcome parents, respond to their needs and build their confidence, (Poppy, 2009). FCC has been shown to benefit patient health, parent satisfaction and the quality of health care, (McKechnie, 2016, Bastani et al, 2015). Readmission to hospital has also decreased in infants who have had a FCC approach to their neonatal care.
- A recent initiative named Family Integrated Care (FIC) (Berrington and Platt, 2016; McKechnie, 2016; O’Brien et al 2015 and 2013, O’Connor, 2106) incorporates FCC but it has been adapted to be a model of care where the nurses, through education, coaching and mentoring, support the parents to become the primary caregivers in their infant’s journey through neonatal care. FIC has been shown to improve breast feeding rates, increase family satisfaction, decrease length of stay and readmission. This guideline supports this local neonatal unit’s commitment to delivering FIC to all its babies and their families.
- Bliss Charter Principle 2, (BLISS, 2009) states ‘Neonatal care decisions are based on the baby’s best interest, with parents actively involved in their baby’s care. Decisions on the baby’s best interest are based on evidence and best practice, and are informed by parents who are encouraged and supported in the decision-making process and actively participate in providing comfort and emotional support to their baby.
- Parents will have to live with the consequences of all decisions, (Warren and Bond, 2010).
- Many parents of premature infants experience a high level of stress, anxiety, depression, anger including posttraumatic stress disorder. These factors could have long-term effects on the quality of parent-infant interaction in the postnatal period (Ionio et al 2016).
- Maternal distress remains one of the most consistent factors in infant development, (Anderson and Cacola, 2017).
- Health care professionals can play a key role in recognising and acknowledging parental perspectives and needs, establishing collaborative partnerships in care, (Ionio et al, 2016; McAllister & Dionne, 2006).
- The family are the single most important factor in the baby’s life, (Bond, 1999) they provide continuity of care on a personal level and the baby’s most consistent care givers, (Warren and Bond, 2010).
- Depriving parents and baby of social contact can seriously interfere with the parent-infant attachment process and may have life-long consequences, (Rees, 2005).
- Neonatal staff should adopt a positive partnership with parents and ensure that they recognise the contribution that they alone can make to their infant’s well-being, (Poppy, 2009; Appleton, 1997). Good communication is the key to successful partnerships, (Warren and Bond, 2010)
- Parental involvement is a key principal of developmental care (Spittle and Treyvaud 2016) and enhances parents’ confidence in preparation for discharge, (VandenBerg, 2000, Vecchi et al, 1996 cited by Rick, 2006).
- Developmental care is reported to change practice from task oriented to individually appropriate care that accounts for the needs of the whole family, (Prentice and Stainton, 2003).
- “Family-centred developmental care should be incorporated into the philosophy of care for every neonatal unit.” (Rick, 2006 p60).

**Supporting parents to have a close and loving relationship with their baby**

- This service recognises the profound importance of secure parent-infant attachment for the future health and wellbeing of the infant and the challenges that the experience of having a sick or premature baby can present to the development of this relationship. Therefore, this service is committed to care which actively supports parents to develop a close and loving bond with their baby. All parents will:
  - Have a discussion with an appropriate member of staff as soon as possible (either before or after their baby’s birth) about the importance of touch, comfort and communication for their baby’s health and development. Information leaflets are also given to parents.
  - Be actively encouraged and enabled to provide touch, comfort and emotional support to their baby throughout their baby’s stay on the neonatal unit
  - Be enabled to have frequent and prolonged skin contact with their baby as soon as possible after birth and throughout the baby’s stay on the neonatal unit [as described in this guideline].

**Valuing parents as partners in care**

- This service recognises that parents are vital to ensuring the best possible short and long term outcomes for babies and therefore, should be considered as the primary partners in care.
- The service will ensure that parents:
  - Have unrestricted access to their baby unless individual restrictions can be justified in the baby’s best interest
  - Are fully involved in their baby’s care, with all care possible entrusted to them
  - Are listened to, including their observations, feelings and wishes regarding their baby’s care
  - Have full information regarding their baby’s condition and treatment to enable informed decision-making
  - Are made comfortable when on the unit, with the aim of enabling them to spend as much time as is possible with their baby
Nursing Considerations

- Antenatal preparation (DH, 2009; Poppy, 2009).
- Orientation and accessibility to unit. (Warren and Bond, 2010; Bliss, 2009; Poppy, 2009; Discenza, 2009b; BAPM, 2004; Department of Health (DH), 2004; Todd, 1998). Ward facilities to accommodate needs of carers, there should be rooms to stay and where parents can rest, wash, prepare food and drinks. Play area for siblings. Secure lockers for belongings and access to phone and internet. Open visiting with unrestricted parental access to their baby, (DH, 2009; Poppy, 2009; White, 2004).
- Interventions should be aimed at enhancing the parent-infant relationship. Focusing on sensitising parents to infants cues and teaching appropriate and timely responses to infants’ needs, (Spittle et al 2015).
- Establish and support the relationship between the father and his baby, (Martel et al, 2016; O’Brien and Kelly, 2014).
- Acknowledge cultural identity, (Warren and Bond, 2010). Individualise care to the diverse needs of each family.
- Continuity of care, (McAllister & Dionne, 2006). By :-
  - Identifying a core group of staff to be consistently involved with the family to establish relationships and to provide continuity of care.
- Collaborative care planning, (McKechnie, 2016; Warren and Bond, 2010; Bliss, 2009; DH, 2009; Poppy, 2009; McAllister & Dionne, 2006; Rick, 2006).
- Encourage empowerment and ownership, (McKechnie, 2016; Warren and Bond, 2010; Bliss, 2009; DH, 2009; Poppy, 2009; Shaw et al 2009, 2006; McAllister & Dionne, 2006; Bond, 2002; Lawhorn, 2002; Griffin, 2000; VandenBerg, 2000).
- Sensitive approach providing positive feedback and encouragement, fostering attachment, (Warren and Bond, 2010; Discenza, 2009a; VandenBerg, 2000).
- Listening, (McAllister & Dionne, 2006; Malusky, 2005).
- Approachability and flexibility, (Bliss, 2009; McAllister & Dionne, 2006; Malusky, 2005).
- Information is available for parents, (Mosher, 2017; Warren and Bond, 2010; Bliss, 2009; DH, 2009; Poppy, 2009; Alderson et al, 2006; McAllister & Dionne, 2006). .
- Support and information sharing for absent parents.
- Cultural diversity, (NMC, 2004).
- Family education, including understanding of the preterm’s behaviour and cues, (Mosher, 2017; Bliss, 2009; McAllister & Dionne, 2006; Rick, 2006; Lawhorn, 2002; Griffin, 2000 and Young, 1994),
- Involvement of MDT, (Rick, 2006; Griffin, 2000; Appleton, 1997 and Young, 1994) with
- Parents have access to staff with specialist roles e.g. for breastfeeding, counselling and bereavement support, (DH, 2009; Poppy, 2009).
Discharge planning and follow up, (Bliss, 2009; DH, 2009; Poppy, 2009; Shaw et al 2009, 2006; Scherf & Reid, 2006; Sweeney & Gutierrez, 2002; VandenBerg, 1999).

12.3. Parental Involvement. Guidelines for infants of all gestational ages

Nursing guidelines (see above)

- Make families welcome. Give ward welcome/orientation leaflets. Provide facilities for family support including accommodation, wash rooms, kitchen facilities, opportunities for privacy, sibling play area, internet access and free parking.
- Foster a good communication with parents to engender a trusting collaborative relationship, (Warren and Bond, 2010).
- Assess family for coping abilities, stresses, needs and desire for involvement, (Lord, 2009; Alderson et al, 2006; McAllister & Dionne, 2006; Shaw, 2006) and adapt care in collaboration with them to fit in with their individual requirements.
- Introduce the concept of family integrated care (Berrington and Platt, 2016; McKechnie, 2016; O’Brien et al 2015 and 2013, O’Connor, 2106). Provide an environment conducive to enabling this initiative. Support and enable parents to become care-givers to their baby by use of information, education, supervision and competencies.

Encourage early attachment, (Warren and Bond, 2010) by:

- SENSITIVELY promoting early and continual parental involvement, fostering ownership and encouraging decision-making (Berrington and Platt, 2016; McKechnie, 2016; Warren and Bond, 2010; Bliss, 2009; DH, 2009; Poppy, 2009; Alderson et al, 2006; Rick, 2006; DH, 2004 and Browne & VandenBerg, 2000).
- Enabling unrestricted access according to the best interest of the baby, encouraging parents to stay and care for their baby as much as they are able.
- Use of web based cameras (skype to skype) if families are unable to visit or mother is too ill etc.
- Encouraging parents to observe and recognize infant cues and respond to low tolerance for stimulation, (Berrington and Platt, 2016; McKechnie, 2016; Spittle et al 2015; Bliss, 2009; Poppy, 2009; Lowman et al, 2006, Browne & VandenBerg, 2000).
- Working in partnership with the parents encouraging them to take ownership of their baby, collaboratively plan and deliver their care where they are able, in particular positive touch, containment holding during and after handling, top and tail washing, tube feeding, and KC where appropriate, (Berrington and Platt, 2016; McKechnie, 2016; D’Agata and Mcgrath, 2016; Spittle et al 2015; Bliss, 2009; DH, 2009; Poppy, 2009; Bond, 2002). Use a competency based approach to educate and support the parents to feel confident in caring for their baby. Give encouragement and praise for their efforts.
- Offering information to parents and educate them in relation to developmental care, (Bliss, 2009; DH, 2009; Poppy, 2009; Rick, 2006; Griffin, 2000 and Young, 1994).
- Ensuring parents are continually updated on the condition of their baby. Collaboratively involving them in ward rounds and handovers.
- Gaining informed consent wherever possible for all care, treatment and procedures. Document form of consent given and by whom. Give parents information on consent for routine procedures on admission and file signed agreement in medical notes.
- Providing information on support services available both financial and social and help to access them.
- Enabling collaborative MDT discharge planning meetings where families are involved, aware and up to date with the plan for discharge.
13. **Resources**

13.1. Various Trust parent information leaflets are available including Developmental Care, Positioning, Consent, Ward Welcome (orientation), Security, Pain/sucrose use and Non-nutritive sucking.

These are given to parents on admission and during their stay on SCU. They are also available on the Trust intranet, on the information holder outside SCU and in the quiet room.

In addition other information is given to parents which are available from:


14. References

14.1. General Refs (used in several guidelines)

- Poppy Steering Group (2009). Family-centred care in neonatal units. A summary of research results and recommendations from the POPPY project. London. NCT.
14.2. Kangaroo /Skin to skin Care

- AWHONN (2016). Immediate and sustained skin to skin contact for the healthy term newborn after birth. AWHONN Best Practice Brief no.5.
- Bera, A; Ghosh, J; Singh, A; Hazra, A; Mukherjee, S; Mukherjee, R. (2014). Effect of kangaroo mother care on growth and development of low birthweight babies up to 12 months of age: a controlled clinical trial. Acta paediatrica vol. 103 (no. 6); p. 643-650.
- Conde-Agudelo, A. Diaz-Rossello, JL. and Jose, L. (2016). Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. The Cochrane database of systematic reviews; Aug 2016 (no. 8); p. CD002771

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  Pediatrics. 117 (5). pe909-e923.


  Paediatric Nurse. 23 p408-14

• Moore ER, Bergman N, Anderson GC, Medley N. (2016). Early skin-to-skin contact for mothers and their healthy newborn infants. 

• Neu, M. (2004). Kangaroo care – is it for everyone? 
  Neonatal Network. 23 (5). p47-54.

• Neu, M. (1999). Parents perception of skin to skin care with their pre-term infants requiring assisted ventilation. 
  JOGNN. 28 p157-164.

  Paediatrics. 9. p182-90.


• Roller C, (2005). Getting to know you: Mothers experiences of Kangaroo care. JOGNN. 34. p210-217


• SWNN (South West Neonatal Network), (2017). Skin to skin guidelines (draft).


14.3. Light

14.5. Noise


14.6. Non-Nutritive Sucking

  Archives Diseases in Childhood. 81 p112-116.
  Lancet. 1072-1075.
  Scandinavian Journal of Caring Sciences. 6 (1). p 3-7.
  Early Human Development. 60 p13-24.
- Medcoff-Cooper, B. McGrath, J. and Bilker, W. (2000). Neurological Development in Preterm Infants from 34 weeks PCA to Term. 
  MCN. 25 (2). p64-70.
  Neonatal Network. 17 (2). p77-79.
  Pediatrics. 96 (5). p884-888.
  www.pediatrics.org/cgi/content/full/103/3/e34 (accessed 13/01/06).
  Nursing Research. 45 (3). p132-135.


14.8. Positioning

- Peng, N; Chen, L; Li, T; Smith, M; Chang, Y; Huang, L. (2014). The effect of positioning on preterm infants’ sleep-wake states and stress behaviours during exposure to environmental stressors. Journal of Child Health Care; vol. 18 (no. 4); p. 314-325.
- S Rivas-Fernandez, M; Roque I Figuls, M; Diez-Izquierdo, A; Escribano, J and Balaguer, A (2016). Infant position in neonates receiving mechanical ventilation. The Cochrane database of systematic reviews; Nov 2016; vol. 11 ; p. CD003668
14.10. Positive Touch

14.12. Smell and Taste


The Cochrane Database of Systematic Reviews 2004, Issue 3. Art. No.: CD001069. DOI: 10.1002/14651858.CD001069.pub2


Arch Dis Child. 90: p 1058-1065


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15. **Descriptions of Levels of Evidence Used & Grading Recommendations**

**Levels of evidence:**

1a – evidence obtained from systematic review of meta-analysis of randomised controlled trials

1b – evidence obtained from at least one randomised controlled trial

11a – evidence obtained from at least one well-designed controlled study without randomisation

11b – evidence obtained from at least one other type of well-designed quasi-experimental study

111 – evidence obtained from well-designed non-experimental descriptive studies such as comparative studies, correlation studies and case studies

1V – evidence obtained from expert committee reports or opinions and/or experience of respected authorities

**Grading of recommendations:**

A = level of evidence from 1a or 1b (see above)

B = level of evidence from 11a, 11b or 111 (see above)

C = level of evidence from 1V (see above)

√ = recommended good practice based on the clinical experience of the Guideline Development Group

**Reference:**


16. **Cross References and associated documentation**

- Cup feeding Neonatal Guideline
- Guidelines for Pain and Stress Management
- Neonatal Care Planning SOP
- Neonatal and Paediatric Services Operational Policy
- Parental competencies for delivering care to their baby
- Skin care for Neonates Guidelines
- Sucrose for prevention of procedural pain in the neonate – Guidelines
17. **Education and Training**

17.1. All Staff should be familiar with the contents of the guideline and will be advised of any revision.

17.2. Education will occur during induction, preceptorship, formal study days, ward education days, informal training, ward meetings and one-to-one mentoring/supervision.

17.3. Formal education will be arranged by the developmental care lead nurse and interest group on SCU.

18. **Standards/ Key Performance Indicators**

   Special Care Unit quality indicators:
   - BLISS Baby Charter Audit
   - NICE Neonatal Quality Standards
   - NHS Toolkit for High Quality Neonatal Services
   - National Neonatal Audit Programme
   - Neonatal Critical Care Quality Indicators
   - NHS Standard Contract for Neonatal Critical Care

19. **Process for Implementation & Monitoring Compliance and Effectiveness**

19.1. Initial approval of the guideline was sought from the South West Nurses Neonatal Benchmarking Group and the Neonatal Nurses Guideline Review Team. This guideline has now been reviewed and updated. Approval is gained via the Paediatric Specialty Team.

19.2. Staff are informed of revised documentation. There is an expectation that staff are responsible to keep updated on improvements to practice and deliver care accordingly.

19.3. Data is collected by use of Badger data base and Vermont Oxford Network. This is used to generate output for clinical and operational benchmarking.

19.4. Non adherence to the guideline (without appropriate rationale) are reported as incidents and monitored via datix. Incidents are monitored by the neonatal governance team and neonatal network.

19.5. Non-adherence is reviewed and action plans made if required. Discussion and reviews occur at Directorate meetings, Governance meetings, Paediatric Team meetings and Ward meetings. Learning and action plans are cascaded and improvements implemented.

19.6. Key findings and learning points are disseminated to relevant staff.