

THAMES VALLEY & WESSEX NEONATAL OPERATIONAL DELIVERY NETWORK

Positioning and Handling on the Neonatal Unit.

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reducing stress through swaddled bathing. Infant, Vol 4, No 6, pp198-201.

Hough.J.L et al (2013) Effect of Body Position on ventilation distribution in ventilated preterm Infants. Pediatric Critical Care Medicine, Vol 14, No 2, pp171-77.

Hurley.A (2007) Plagiocephaly. Information for parents Version 1. Nuffield Orthopaedic Centre NHS Trust. Paediatric physiotherapy department.

Jeanson.E (2013) One to one bedside nurse education as a means to improve positioning consistency. Newborn and Infants Nursing reviews, Vol 13, No 1, p27-30.

JBI (2010) Positioning of the preterm Infant for optimal physiological development. Best Practice information Sheet- the Joanna Briggs Institute. Vol 14, no 18, pp1-4.

J.H.C.H (2012) Guideline. Positioning of the preterm or sick neonate in the NICU. John Hunter Children's Hospital. Pp1-14

Jocheim De Vall, L and Rubarth.L.B (2014) Swaddled bathing: Implementing a quality improvement project. Creighton University. Found at;
https://dspace.creighton.edu/xmlui/bitstream/handle/10504/62591/DeVall_manuscript_05172014.pdf?sequence=1

KEMH (2014) Section 18: Family and developmental care, Positioning Guideline. P1-3.
<http://www.kemh.health.wa.gov.au/services/nccu/guidelines/documents/7387.pdf>

Kugelman.A (2013)Late preterm Infants: Near term but still in a critical development time period. Pediatrics, Vol 132, No 4, Oct.

Loots.C (2014) Body Positioning and medical therapy for infantile gastroesophageal reflux symptoms. Journal of pediatric gastroenterology and nutrition. Vol 59, No 2, pp237-43.

Lullaby Trust (2013) Safer sleep for babies, a guide for parents. The Lullaby Trust. www.lullabytrust.org.uk

Morris.D (2013) Arkansas Children's Hospital NICU positioning protocol, NICU Developmental Services Team, August 2013.

NBD (2017) Nurtured by Design, found at
<http://www.nurturedbydesign.com/en/thezaky/parents-hospital.php>

Maichuk.G, Zahorodny.W and Marshall.R (1999) Use of positioning to reduce the severity of neonatal narcotic withdrawal syndrome, Journal of Perinatology, Vol 19, No 7, pp510-13.

Marcellus.L (2004) Determination of positional skin-surface pressures in premature infants. Neonatal Network, Vol 23, No 1, Jan/Feb, pp25

McMullen.S.L (2013) Transitioning Premature Infants Supine: MCM American Journal of Maternal and Clinical Nursing, Jan/ Feb 2013, Vol 38, No 1, p8-12.

Pereira.F.L et al (2013) Handling of preterm infants in a neonatal intensive care unit, Revistita da Escola de Enfermagem da USP. Dec 13,

Perkins.E, Ginn.L , Fanning J and Bartlett,D (2004) Effect of nursing education on positioning of infants in the neonatal intensive care unit, Pediatric Physical Therapy, Vol 16, No 1, pp2-12.

Quraishy.K (2013) A protocol for swaddled bathing in the Neonatal Intensive Care Unit, NAINR, vol 13, No 1, pp48-50.

Ramsey (2017) found at ramseypediatric.com
<http://ramseypediatric.com/pediatrics-blog/flat-head-baby-or-positional-plagiocephaly-in-babies/>

Turnage-Carrier.C, McLane.K.M and Gregurich.MA (2008) Interface pressure comparison of healthy premature infants with various neonatal bed surfaces, Advances in Neonatal Care, Vol 8, No 3, June, pp176-84.

Vaivre-Douret et al (2007) Comparative effects of two positional supports on neurobehavioural and postural development in preterm neonates. Journal of Perinatal and Neonatal Nursing, Vol 21, No 4, pp323-30.

Waitzman KA (2007) The importance of positioning the near term infant for Sleep, Play and Development. Newborn and Infant Nursing Reviews, Vol 7, No 2, June, pp76-81.

Young.J (1994) Positioning premature babies. Nursing preterm babies in intensive care: Which position is best? Journal of Neonatal Nursing, Sept, pp27-31.

Warren. I (2010) Part 4, The Nursery Environment. In: Warren.I and Bond.C A Guide to Infant Development in the Newborn Nursery (5th Ed) Winnicott Baby Unit. London.

Warren. I and Bond.C (2009) Letters to the editor- Practicing developmentally supportive care during infant bathing: reducing stress through swaddle bathing. Infant, Vol 5, No2, p62.

Warren.I (2014) Practical Skills for Developmental Care, Work book. FINE course.

Zarem.C et al (2013) Neonatal Nurses' and Therapists perceptions of positioning for Preterm Infants in the Neonatal Intensive Care Unit. Neonatal Network, Vol 32, No 2, pp110-16.

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	<p>Sister, who can be contacted on the Neonatal Unit at the John Radcliffe Hospital, Oxford, OX3 9DU, UK.</p> <p>All images in section 3.15 and the Appendix, document 1, were taken by and remain the property of Carol Buxton- Neonatal Sister, who can be contacted on the Neonatal Unit at Queen Alexandra’s Hospital, Portsmouth, UK.</p> <p><u>Image acknowledgements.</u></p> <p>Fig 11b found at https://cheekychums.files.wordpress.com/2011/08/bigstockphoto_premature_baby_1588512.jpg</p> <p>Fig 14 d http://www.usa.philips.com/c-dam/b2bhc/us/Products/Category/mother-and-child-care/infant-positioning/mcc-positioning-thm.jpg</p> <p>Fig 17b https://www.tommys.org/sites/default/files/positioning%20prem%20baby%20new.png</p> <p>Fig 17c found at http://www.edspire.co.uk/year_2012/12/06/wpd12-bonding-with-your-premature-baby-with-baba-sling-and-poddle-pillow/</p> <p>17d found at https://www.ctvnews.ca/polopoly_fs/1.1427917.1377560637!/httpImage/image.jpg_gen/derivatives/landscape_960/image.jpg</p> <p>Fig 18a found at http://www.aboutkidshealth.ca/En/ResourceCentres/PrematureBabies/AboutPrematureBabies/Pages/default.aspx</p> <p>Fig 18b found at http://www.mc.vanderbilt.edu/reporter/index.html?ID=2822</p> <p>Fig 22 found at www.noatbook.com</p>
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Guideline for Positioning and Handling on the Neonatal Unit.

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2.0 Aim of Guideline To ensure preterm and sick neonates receive individualised supportive positioning and handling, that optimises their musculo-skeletal development, supports their neuro-development and minimises complications.

3.0 Scope of Guidelines

The guideline applies to all neonatal units and maternity units covered by South Central Neonatal Networks. This includes the following hospitals:

Thames Valley	
Buckinghamshire Healthcare NHS Trust	- Stoke Mandeville Hospital, Aylesbury
Frimley Health NHS Foundation Trust	- Wexham Park Hospital, Slough
Milton Keynes University Hospital NHS Foundation Trust	- Milton Keynes General Hospital
Oxford University Hospitals NHS Foundation Trust	- John Radcliffe Hospital, Oxford
Royal Berkshire NHS Foundation Trust	- Reading
Wessex	
Dorset County Hospital NHS Foundation Trust	- Dorset
Hampshire Hospitals NHS Foundation Trust	- Basingstoke
Hampshire Hospitals NHS Foundation Trust	- Winchester
Isle of Wight NHS Trust	- St Mary's Hospital
Poole Hospital NHS Foundation Trust	- Poole Hospital
Portsmouth Hospitals NHS Trust	- Queen Alexandra Hospital
Salisbury NHS Foundation Trust	- Salisbury
University Hospital Southampton NHS Foundation Trust	- Princess Anne Hospital
Western Sussex Hospitals NHS Foundation Trust	- St Richard's Hospital, Chichester

4.0 Guideline Summary

When positioning a baby on the neonatal unit;

- Although positioning of the preterm and sick infant is very important, safety needs must always be prioritized above positioning needs.
- A flexed midline position should be maintained, without overextending the baby's head and neck.
- Aim to give the baby a balance of positions over the 24 hour period- alternating between prone or semi-prone, supine and lateral (left/ right side.)
- Positioning aids should be used to provide gentle resistance for bracing but that do not restrict the baby's movement altogether.
- There are advantages and disadvantages for each of the different positions a baby may be nursed in, so each baby should be individually assessed and positioned according to their individual condition, preferences and behavioural cues.
- Ensure the baby is not laying on any lines, wiring or tubing that will be uncomfortable and may cause pressure sores or indentations/ bruising on the baby's skin.
- The mattress surface should be angled at 30 degrees so the baby's head is elevated. The baby will require support to prevent them from sliding down the bed.
- Record the baby's position, with the observations, on the baby's chart. As well as stating the baby's position include which side of the face is touching the mattress i.e. right, left

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

- Check babies pressure areas on repositioning to note any changes in skin integrity.
- Staff should ensure they are aware of how to use the variety of available positioning aids safely. As some items may cause harm if used incorrectly.

When handling a baby on the Neonatal Unit;

- Time repositioning or handling of a baby to coincide with their natural sleep/ wake cycle
- Staff should consider clustering activities together for each baby, to reduce the overall amount and frequency of handling that a baby receives.
- When turning a baby try to use a palmer grip as opposed to fingertip pressure,
- All position changes should be slow and steady.
- Swaddled weighing should be used as a way to improve the weighing experience.
- Swaddled bathing should be used as a way to improve the bathing experience.

When preparing for discharge;

- Babies who are being discharged home must be acclimatized to sleeping only in the supine position without positioning aids and with the head of the bed in the flat position.
- Educate parents on the differences in positioning between the neonatal unit and home. In particular after discharge; unless medically directed:
 - No nesting or positioning roles to be used.
 - No soft layers between the baby and the mattress- e.g. sheepskin or fleece.
 - Mattress to be level, head NOT elevated.
 - Baby to be laid supine for sleeping
 - Emphasize cot death prevention guidelines including 'feet to foot' recommendation.

4.0 Practice Guidelines

4.1 Background Information

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

Premature babies have low muscle tone (have not achieved physiological flexion) as they have missed out on some or all of the essential stages of muscle tone development in the womb. They have to work against gravity in order to move their limbs and research has shown that it is often difficult for them to maintain the positions that best provide and support rest, sleep and self-comfort. Without appropriate intervention these babies can develop head flattening and cranial molding, which research has shown makes these babies appear less attractive to their parents, and may cause bonding problems. In extreme cases, the baby may develop an arched palate or myopia due to facial distortion, or may also experience difficulty turning and moving their heads due to the lengthened occiput.

Without support, gravity tends to cause preterm babies shoulders and hips to flatten onto the bed, often called 'frog leg position' and 'W arm position'. This excessive abduction and rotation of the hip and shoulder joints can result in poor or delayed development and mobility problems in the future, including the ability to crawl, stand, walk and fine motor skills such as hand-mouth co-ordination. Babies usually feel more secure and are more physiologically stable if they have boundaries (nesting) placed around them, as they are used to an enclosed womb. In addition they gain comfort from being able to grasp their hands together, suck their fingers or hold onto bedding. Often babies need assistance to find a position in which they are able to do these things.

It is regularly observed that babies nursed in the neonatal unit will develop a preference to turn their head in one direction, due to being positioned too often in the same way. The muscles in their neck and shoulders then tighten, making it uncomfortable for them to lie in any other position. This then

requires physiotherapy to correct the muscular imbalance, known as torticollis. In addition, babies who are near to term (34-37 weeks gestation) and often presumed to have no need for supportive positioning, have actually not achieved 'complete' physiological flexion, so if cared for on the neonatal nursery they too will benefit from supportive positioning practices and follow up.

It is recommended that a flexed, midline position is maintained without overextending the baby's head and neck. Positioning aids should be used to provide gentle resistance for bracing but that do not restrict the baby's movement altogether. Further information on how to carry out supportive positioning is included in the practice guidelines below.

There are advantages and disadvantages for each of the different positions a baby may be nursed in, so each baby should be individually assessed and positioned according to their individual condition, preferences and behavioural cues.

It is accepted practice to nurse babies in the neonatal unit so that the mattress surface is angled at 30 degrees and the baby's head is elevated. Whether the baby is prone, supine or lateral this angle has been found to benefit pulmonary, cardiovascular and intestinal function. The physiological reasons for these advantages are not fully understood but it is presumed that elevating a baby's head will reduce the pressure of the abdominal organs on the lungs, and lowering a baby's stomach in relation to its oesophagus will harness the benefits of gravity to reduce reflux and increase gastric emptying.

4.2 Supportive Positioning.

- Aim to give the baby a balance of positions over the 24 hour period- alternating between prone, supine and lateral (left/ right side.)
- If the baby does not tolerate certain positions well, such as supine, then try to give them a short period (i.e. half an hour or as tolerated) in these positions, to give relief to joints and limbs, and try to acclimatize a baby to a new position.
- Record the baby's position, with the observations, on the baby's chart. As well as stating the baby's position include which side of the face is touching the mattress i.e. right, left (or midline) so that the next staff member can see how they have been positioned over the last 24hours and position the baby accordingly.

- If the baby's bed is elevated then provide support to prevent them from sliding down the bed, this is especially important if the baby is receiving ventilation or CPAP, as moving down the bed will cause pulling on or dislodgement of the ET tube or CPAP prongs. This is usually achieved by providing a nest for the baby that is deep enough to provide comfortable boundaries and also act a physical barrier to stop them gradually moving down the incline. See further guidance on nest selection and construction in section 3.3.
- Do not put rolled up bedding between the baby's legs like a sling to stop them moving down the bed- or tuck one leg in and one leg out of a roll. This position is very unbalanced and unnatural for a baby, is likely to be uncomfortable and may cause muscular imbalance.
- Even the best fitting nappy can be too wide between the baby's legs, stopping their legs lying parallel. Try squashing the section that lies between the baby's legs to reduce its volume before putting the nappy on. Also, try the next sized nappy down which may fit better. This should be more comfortable for the baby and will help to prevent frog position of legs.
- Ensure the baby is not laying on any lines, wiring or tubing that will be uncomfortable and may cause pressure sores or indentations/ bruising on the baby's skin. Be especially aware of gastric feeding tubes, that may press on a baby's ear or transcutaneous monitoring attachment discs, that can be left on the baby skin and the baby accidentally laid onto them.
- Check babies pressure areas on repositioning to note any changes in skin integrity.
 - Any areas of marked or broken skin should be documented.
 - Action taken or planned to treat or prevent the damage should be recorded.
 - Note the time in one position that allowed damage to occur to the baby's skin and ensure from now on that the baby is repositioned more frequently than this length of time.
 - See skin integrity guideline for further guidance.
- Ensure rolls/nests are appropriate size for baby. The baby should be positioned in a nest so that their feet are inside the nest, where they can use the nest walls as a boundary that gives them security. Avoid placing a baby so that the nest or positioning rolls are at bottom level, as their legs may then be flailing unsupported in the air.
- When a baby has been positioned in a selected position, they should not be forced to stay in this one fixed position. Each baby is an individual and will show variation, as to which position they find most comfortable, how they enjoy sleeping, and whether they like to be tucked in and nested securely, or spread their limbs in all directions. Babies should be given some freedom to move and choose their own position, where possible.
- Staff should take note of each baby's positioning preferences, and record them in an agreed place, where colleagues can access this information- to guide subsequent positioning efforts.
- Scoring tools are available for positioning (see example below) which assess the position a baby is placed in and give a score out of 12, which indicates how well they have been positioned. It is recommended that staff learning to position babies use one of these tools to score their practice, alongside an experienced colleague. The

ensuing discussion is an effective way for staff to improve their positioning knowledge and skill.

- These position scoring tools, should also be used as part of the positioning auditing/ benchmarking process, to assess how effectively positioning is being carried out in neonatal unit.

**Fig 1: Positioning Comfort observation Tool
(taken from Warren.I, 2014)**

		Least comfortable				Most Comfortable
1	Aah! factor	Baby looks uncomfortable (includes facial expression and colour)- you feel you want to do something about it!	0	1	2	Baby looks relaxed, comfortable, cosy and content.
2	Head and trunk	Trunk arched/ rotated/ or curved with a) Head extended or b) Chin on chest or c) Head flat to side with twisted neck	0	1	2	Head and trunk in line, with head in midline, or ¼ to the side of head (no twisted neck)
3	Arms	a) Flaccid or stiff and stretched out or b) "W" position with shoulders retracted (pushed back) or c) Twisted/ trapped under body or between body and bedding/ immobilised.	0	1	2	All of the following a) Shoulders forward (protracted) b) Arms flexed; relaxed. c) Possibility to reach face/ mouth with ease.
4	Hands	a) Fingers splayed or b) Hands tightly fist ed or c) Immobilised, or restricted by clothing.	0	1	2	One or more of the following: a) Hands relaxed, open or fingers softly folded. b) Hands together/ clasped. c) Touching head, face, mouth or body. d) Holding on to something.
5	Legs and feet	a) Flaccid, with straight or "Frog leg" posture (abducted and externally rotated at hips) with feet pointing outwards, or b) Stiff, straight legs with toes splayed or curled tight, and or pushing hard on bedding, turned outwards.	0	1	2	In all positions a) Flexed legs with feet touching each other or resting against the other leg and b) Able to reach boundary for bracing feet. In prone knees should be tucked under body, feet angled towards each other (not turning out.)
6	Arousal	a) Agitated/ jerky/ jittery movements and/or b) Fussing or crying.	0	1	2	a) Sleeping restfully or quietly awake. b) Minimal smooth movement.
	Total					(Max score 12)

4.3 Positioning equipment.

- Effective positioning can be achieved without using expensive positioning aids. See Fig 2, Fig 3 and Fig 4, also Appendix 1, which show a range of ways to use hospital towels and cot sheets to create nests and positioning supports for babies.
- Staff should be aware of the varied surfaces babies are nursed on (incubator mattress, pressure relieving gel mattress, synthetic sheepskin, positioning supports) in particular the varying levels of firmness of these surfaces. Whilst no evidence based guidance currently exists for the 'ideal' surface to nurse a neonate on it is clear that surface firmness will have an effect on cranial moulding and tissue compromise.
- It seems wise to consider nursing the most vulnerable neonate on the softer more gently supportive surfaces, if available. For example babies less than 28 weeks gestation, babies with reduced mobility (critically ill, muscular conditions, muscles relaxed,) babies with skin integrity problems or with known surface: skin pressure vulnerabilities, ie hydrocephalus/ abnormal limbs/ joints.
- Whether making your own, or using a commercial nest, certain principles apply, to ensure that the nest meets the positioning needs of the baby. These include;
 - The edges are substantial enough to stay in place if a baby kicks or pushes against them.
 - The edges are high enough to give a sense of containment for head, shoulders, body and legs, not only the baby's feet.
 - The walls are high enough to offer bracing for the baby's feet, even when they are kicked up off the mattress.
 - The edges come close enough to the baby to offer support and boundaries when they are quiet or sleep.
 - Many staff have found when constructing a nest using hospital linen, that folding the linen rather than rolling it, creates a more effective boundary. The walls are deeper and the straight sides seem to enable the baby's lower limbs to 'stay within' the nest. See the comparison photographs below.

Fig 2: Showing the same amount of linen used to roll a nest on the left and fold a nest on the right. Significant difference can be seen in the depth of nest created and the boundary made available for the baby.



Fig 3: One technique for creating a nest from bedding. Such a nest may be used for positioning a baby prone, supine or laterally.



- 1-Hospital linen is used to make an oval of bedding, the number of towels and sheets can be varied depending on the size of the baby.
- 2-Soft bedding lines the oval, providing a nest for the baby.
- 3-Many stable babies enjoy being ‘tucked in with a cover, which gives them extra boundaries and a sense of security.

Fig 4: A different technique for creating a nest from bedding.



1) Layers of bedding are laid flat on top of each other, the number used will depend on the size of the baby. 2) The bedding is folded to create a resistant boundary, the depth of the fold made will decide how high the boundary will be. 3) Soft bedding lines this 'U' shape and is manipulated to provide just the size and height of nest the baby prefers.

When using bean bag aids they can be used in a range of ways. These include;

- Creating additional boundaries for the baby that enjoys feeling enclosed, for example around the head area.
- Using part of the bean bag and some of the beans, to lie on or over a baby, giving them the sense of being held or tucked in.
- Adding extra substance to a boundary created by a nest, for the larger or more active baby.
- See images below, which do not demonstrate best positioning practice, but do show babies benefiting from additional boundaries provided by, one of the many commercially available beany products.

Fig 5: Images from a commercial website- showing use of the ‘the Zaky’ product to provide containment and boundaries. (NBD, 2017)



4.4 Safe practice.

- Although positioning of the preterm and sick infant is very important, safety needs must always be prioritized above positioning needs. Example of this would include;
 - Regular checking of infusion sites, i.e. PVL or CVL- even when this requires some disturbance of the baby.
 - Continuing to position a baby prone, instead of altering their position, to gain benefit of optimized respiratory physiology.
- Staff should ensure they are aware of how to use the variety of available positioning aids safely. As some items may cause harm if used incorrectly. Always refer to the manufacturer’s instructions, and do not use if any doubt exists. Some important principles include;
 - Gel pillows or mattress should be pre warmed before use so the baby does not get chilled. This can be done by placing the pillow in the baby’s incubator to warm before use or by holding the pillow under warm running water and massing gel to distribute heat throughout the pillow. Dry pillow outside before use.

- Due to the risk (low but possible) of a baby obstructing their airway when laid on a gel pillow or positioning bean bag - these babies should be monitored using a pulse oximeter or an apnoea monitor.
- When a baby is receiving High Frequency Oscillatory Ventilation (HFOV) the effectiveness of the ventilation may be reduced if a baby is nursed on either, a gel pillow/ mattress or a positioning bean bag. As the energy of the 'wobble' intended to ventilate the baby can instead be transmitted into the gel or beans. If the baby is not ventilating effectively on HFOV staff should consider removing these positioning aids.
- The full weight of a positioning bean bag item should **NEVER** be put onto the baby, as the weight may restrict the baby's ventilation, especially in the extreme preterm infants.
- If a baby requires an x-ray, certain positioning equipment will show up on the x-ray, and must be temporarily removed from under a baby whilst the x-ray is performed. These include, bean bags, gel pillows, extra thick bedding and commercial nests.
- When selecting manufactured positioning aids, great care must be taken to select the correct size for the baby. For example CPAP pillows are available to help give support to keep a baby's airway open when supine. Using too large a pillow would hyper- extend a baby's neck, and cause discomfort and inappropriate pressure on the carotid vessels in the neck.

4.5 Practical guidance on positioning the neonate

The photographs in the following section show a 'baby' being positioned lying on a synthetic sheepskin. This item was used for photographic purposes to represent the soft bed surface, but is not being recommended for use in clinical neonatal practice.

4.51 Prone

Poor practice.

- Over rotation of the head and neck, which can easily occur without appropriate support.
- Arms and legs in the frog position, as the baby will readily 'flatten' onto the bed surface, as seen in fig 6.

Fig 6: Babies below 34 weeks gestation lack physiological flexion and will 'flatten' to the bed surface if not appropriately supported.



Good practice.

- Nest/provide boundaries (rolls) to the feet and arms with rolls/nests
- Alternate the head right and left in turn
- Consider placing a roll under the hips, this is a simple way to prevent hips from turning outwards (see fig 7 below)

Fig 7: The simple insertion of a small soft roll at hip level (NOT below the stomach) brings the knees into midline and flexes the hip joints.



4.52 Surf boards.

- A flattened roll of bedding can be utilized as a soft surface to provide support for a baby positioned prone. Often known as a 'surfboard'. If used correctly, a surf board can enable the baby to lie prone, but to still be able to flex their hips and bring their knees together, and to bring their shoulders and arms forwards. However a surfboard is only beneficial if made to the correct size and used appropriately;

Fig 8: Showing a surfboard in use- with surrounding boundaries removed for easier visualization.



- The width of the surf board should be the same as the baby's shoulders, but no wider, or the baby's shoulders will be forced out of alignment (see fig 8 above)
- The roll should start at hip level , but not lower, so that it supports the body, but does not lie between the baby's legs or it will push the hips outward (see fig 8 above.)
- The baby's head/ face can be on the surfboard, but care should be taken to ensure the baby is lying with their head and neck in line with their body.
- Soft fabric such as fleece, muslins, should be used to make the surf board which a baby's face and body will be lying on for some hours. It is advised NOT to use hospital sheets, because when they are rolled or folded over a hard and unyielding 'lump' of

bedding will be formed.

- Every baby nursed on a surf board will require boundaries, to keep them secure and comfortable. This can be achieved by placing the surfboard into a correctly sized nest, or by creating and positioning a boundary of bedding around the baby.
- Consider 'tucking in' the baby nursed on a surfboard, with a sheet/ blanket/ muslin or strip of fleece material, for extra security as shown below in fig 9.

Fig 9: Baby nursed on a surf board, given extra boundaries and covering.



4.53 Support in prone.

Fig 10: Once positioned prone the baby can be given boundaries and support in a variety of ways.



For example, using rolled up bedding, positioning rolls or nests. Most babies will also benefit from 'tucking in' with a cover or nest straps, as long as their movement is not restricted or prevented.

4.54 Semi prone.

- When a baby is required to spend a long time in the prone position, some variation can be given by using the 'semi-prone position'. This requires the baby's body to be tilted approximately 45° so they are not parallel to the bed surface. This enables the pressure to the knees and elbows to be reduced on one side, and also for the baby to bring their head and neck nearer to the ideal midline position.
- This semi prone position can be varied right and left, and intermixed with the more usual prone position, to give variety and pressure relief, to the baby with poor respiratory function. See fig 11 below.

Fig 11: Showing how a baby can be positioned semi prone, by providing support from soft bedding to help them stay 'tilted' to a 45° angle.



Fig 12: Table showing the Pros and cons of prone positioning.

Advantages	Disadvantages
Particularly beneficial for babies with respiratory compromise as it improves oxygenation, ventilation (higher tidal volumes) and lung compliance. Believed to be due in part, from the mattress surface bracing the chest wall and compensating for weak muscles. Also the prone position inhibits other body movements that might disrupt breathing.	Without appropriate support the baby's head and neck will be over rotated, causing marked discomfort and muscle imbalance.
Gastro-oesophageal reflux is reduced and gastric emptying is optimized. These may lead to an improved sleep state as the baby is more comfortable and consequently a decrease in energy expenditure.	The baby cannot be positioned midline (head, spine and neck in alignment), which is necessary for developing physiological flexion.

Heat loss is minimized and metabolic rate is reduced, babies tend to sleep more often and have lower levels of apnoea of prematurity.	Not safe if umbilical lines are newly sited, as the insertion site cannot be closely monitored for oozing or bleeding or dislodgement of the lines. It is possible for a baby to die from excessive blood loss caused by bleeding around umbilical lines or from umbilical vessels.
Hand to mouth behaviours' are encouraged	The baby's chest cannot be seen, so there is In increased risk of delay in recognizing upper airway obstruction.
Has been found in one study to reduce the distress levels of babies withdrawing from narcotics when compared to the supine position. Felt to be a prone quieting response.	The head is always to one side so bilateral head flattening and facial molding are encouraged.
	The hips are forced into abduction and rotation (frog leg position) as lower limb flexion and elevation under the pelvis cannot be well maintained.
	Gravity has the greatest effect as it pushes the limbs to the sides, shoulders become elevated (W arm position.)

4.6 Lateral

Poor practice.

- Putting a roll behind the head as it may encourage the baby to arch back against it and adopt an overextended neck.
- Thick rolls or bedding should not be placed between the baby's legs as it prevents the knees and hips coming together in midline flexion, instead pushing the legs apart. If support is needed place a roll around the baby's feet, and legs, or position the baby inside a nest. If the baby is being nursed on an angled surface and tends to slip down the bed then make the size of the boundary higher, providing a physical barrier for the baby.

Fig 13: Showing incorrect positioning, where bedding is placed between the baby's legs.



Good practice.

- Provide nests/boundaries for supporting a midline position and promoting fine motor skills.
- Alternate left and right lateral positions with position changes.

Fig 14: A variety of different ways of supporting a baby in the lateral position.



Fig 15: Table showing the pros and cons of lateral positioning.

Advantages	Disadvantages
There is evidence that preterm infants nursed laterally and with boundaries have lower mean pain scores.	If the baby is muscle relaxed or unable to move independently their lower arm and leg could feel 'squashed' and/or receive pressure injuries if left in the same position for a prolonged period.
<u>Left lateral</u> position reduces gastric reflux, because the oesophagus attaches to the top of the stomach at an angle. Gravity will mean the stomach contents have to flow upwards, making reflux more difficult.	Head flattening is exacerbated as weight is always placed on the side of the face.
<u>Right lateral</u> position increases gastric emptying, as the stomach empties to the right and is aided by gravity.	
Babies more frequently feel secure and able to self-regulate, meaning they are most likely to reach an awake-alert state, and then be able to interact with their carer / bond with parent.	
Beneficial for self-comfort and fine motor skill development as the baby can easily hold its own hands and explore its face, body and surroundings	
Gravity tends to draw the arms and legs towards the midline.	
Minimizes hip and shoulder abduction and rotation and allows the baby to lie in a flexed position, closest to the foetal position maintained in the womb.	

Fig 16: Showing the effective use of a commercial positioning aid to provide additional support and boundaries in the lateral position. (NBD 2017)



4.7 Supine.

Poor practice.

- Rolls under the neck/head, which are not appropriate for routine practice, as they put pressure on the carotid vessels in the neck and may affect blood flow to the brain.
- No positioning aids use, hence baby is laid in a splayed out position

Fig 17: A range of images showing ineffective positioning of the baby supine.



In all four photographs the support provided for the baby is not effective, as the baby's legs and feet have no boundaries for security and are instead left 'floating'. Consequently the baby cannot develop its muscles by pushing against the bedding and is likely to feel vulnerable and exposed.

Fig 18: No attempts have been made to provide support or boundaries for the baby on the left, whereas the boundary is not deep enough to offer effective bracing or boundaries for the baby on the right.



a

b

Best Practice.

- provide nests/boundaries(rolls), especially for the feet
- support the arms -allowing for the arms/hands to be brought towards the face
- turn the head to left, right or midline alternately

Fig 19: A range of strategies can provide boundaries and comfort for the baby nursed supine.



a



c



b

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d



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Fig 20: Table showing pros and cons of supine positioning.

Advantages	Disadvantages
This position is recommended to reduce the risk of sudden infant death syndrome	Infants have the least control of their movements, having to fight gravity for all movements.
If the baby is maintained in a supine, midline position then gravitational pressure is more evenly distributed, leading to a more rounded head shape.	Gastric emptying is delayed.
It is easy to observe the baby and provide nursing care.	If not supported correctly limbs will 'flay' out and this can result in poor muscle tone.
	Head flattening will occur if the head is always to one side
	Increased energy expenditure and less effective ventilation lead to higher oxygen requirements.
	Heat loss from the baby is highest when supine.

Fig 21: Three common mistakes when positioning the neonate.



- Believing that use of a positioning aid means a baby is effectively positioned.
- Rigidly restraining a baby into a position, rather than providing flexible boundaries and security.
- Providing insufficient boundaries so that the baby is not supported to retain its position.

4.8 Handling

- Time repositioning or handling of a baby to coincide with their natural sleep/wake cycle
- Whenever possible a baby should be touched gently before they receive any handling, allowing them time to become more wakeful before more handling occurs. This gives them an opportunity to self-regulate, and not to be 'surprised' by a sudden position change, or other manoeuvres. Position changes should be slow and steady, so the baby has time to adjust to care and is not distressed. This also ensures that invasive monitoring equipment is not dislodged.
- When turning a baby try to use a palmer grip as opposed to fingertip pressure, reducing the risk of pressure damage to the fragile skin.
- During handling and repositioning, the baby's arms and legs should be kept close to their body.
- A baby should never be rapidly 'flipped over' 180 degrees –known in the literature as the 'preemie flip'. This sudden position change is likely to be distressing, destabilizing and increases the risk of the baby having an intra-ventricular haemorrhage, due to sudden rotation of the head affecting blood flow to the carotid vessels.
- All members of the multi-disciplinary team should remember to reposition a baby once they have completed the task, i.e. blood test, examination or nursing care. If a staff member is uncertain how to do this, they should inform the baby's allocated nurse on that shift, who will do it for them and/or educate and support them to learn to do it themselves.
- Recent research has shown that babies nursed in neonatal units continue to receive excessive handling. In a typical 24 hour period Pereira et al (2013) found that babies on average received 67 procedures, grouped into 38 episodes of 'manipulation'. The majority of these were in the morning shift and for 65.6 % of these episodes, just one procedure was performed. This, and similar research has led to the recommendation of grouping or clustering care activities.
- Individualized assessment should take place, of the baby's needs and preferences (see behavioural cues guideline for further advice.) Staff should where possible, be guided in the timing of handling the baby, by the baby and its cues.
- It can be helpful to cluster 1-2 activities together for a baby, to reduce the overall amount and frequency of handling that they receive. However, this should be limited to what the baby can tolerate, as extremely sick and/ or preterm babies will not cope with a number of activities being performed close together. All babies will need time to recover following procedures.

4.9 Plagiocephaly.

- This refers to 'an uneven shape of the head caused by repeated pressure to the same area of the skull' (See fig 22 and Fig 23). The number of babies with plagiocephaly has increased since the 'Back to Sleep' campaign which recommends that babies sleep on their backs to reduce the risk of sudden infant death syndrome.
- This problem is more prevalent in premature babies because the premature skull is softer than at full term. Also in neonatal units, babies may be repeatedly nursed in the same position, either because they are very sick, or when staff do not take care to change the way the baby is facing regularly.
- This problem can then be exacerbated as the baby may also develop a preferred lying side, when they are able to choose the position in which they sleep, thus reinforcing this uneven shape.

Fig 22: Illustration showing the effect of plagiocephaly on the bones of the skull. (thenoatbook.com)

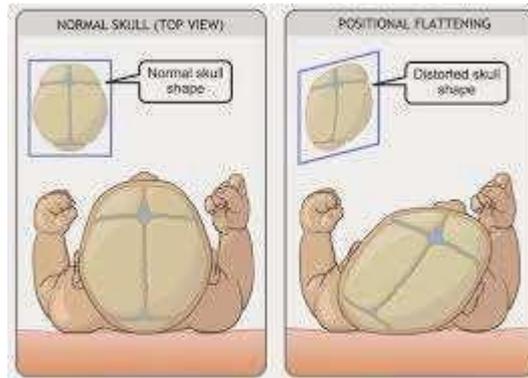
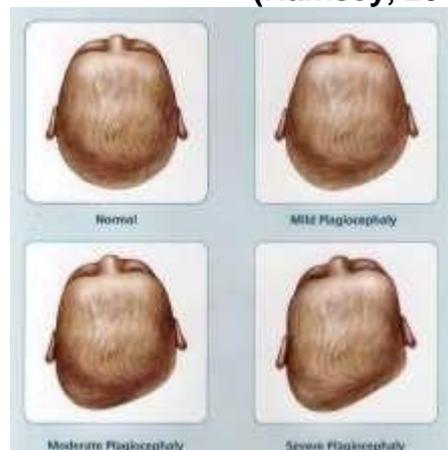


Fig 23: Illustration showing the external Appearance of plagiocephaly in the neonate. (Ramsey, 2017)



4.10 Neonatal abstinence syndrome.

- Babies in the process of withdrawing from medications, have additional needs for positioning measures that would not usually be recommended for the 'well term baby'. This included swaddling to settle and aid sleep and also the prone position.
- It is appropriate for these methods to be used in the hospital setting, for these babies, where they will be monitored by an apnoea mattress if swaddled and pulse-oximeter if nursed prone.
- As with all other babies, additional positioning support must be removed before discharge and babies should ideally have one week before discharge sleeping as they will at home.

4.11 Referring babies on.

- It is considered best practice to refer babies to the physiotherapist (physio) and occupational therapist (OT), who were born at less than 32 weeks gestation, because they are at significant risk of having motor delay or motor problems relating to prematurity. Also these problems can usually be treated simply if caught early or even prevented. However, units without a dedicated physio or OT will probably find that their in hospital service is unable to support routine referral and review of such babies.

- Babies with actual or potential postural problems should always be referred to the physiotherapist. For example babies with conditions known to affect movement, talipes or neuromuscular associated problems, tone problems or any mobility concerns, hydrocephalus causing an increase in head size.

4.12 Post term babies.

- Babies who are 4 weeks post term and older, and still requiring care on a neonatal unit will begin to have additional positioning needs related to their development. This is because babies of their age are developing physically and also awake for longer periods and seeking interaction and stimulation from their environment.
- For full information and support for this area of practice staff should contact their neonatal/ paediatric occupational therapist and, or neonatal /paediatric physiotherapist. Basic changes to care are likely to be;
 - Time in a supported sitting seat such as a Tumble form chair - individually set up with the specific support required for each baby.
 - Time when awake in a bouncy chair- usually limited to a maximum of half an hour at any one time. With the specification that the baby be removed if they fall asleep in the seat.
 - 'Tummy Time' may be introduced, when a baby spends supervised time on their front, developing shoulder, neck and back strength and improved motor control, as part of their natural development towards sitting and crawling.

4.13 Discharge planning.

- Babies who are being discharged home must be acclimatized to sleeping only in the supine position without positioning aids and with the head of the bed in the flat position. Support can be removed gradually, but babies should have a minimum of have one week before discharge, and ideally two weeks, sleeping as they will at home. This helps to educate their parents and gives babies time to adapt whilst still in hospital to the safest way of sleeping at home.

4.14 Parents

- Actively involve parents in supportive positioning and explain the reasons for the importance of it. Offer written information on positioning to parents where available locally, or direct them to useful internet information websites.
- Educate parents on the differences in positioning between the neonatal unit and home. In particular after discharge; unless medically directed
 - No nesting or positioning roles to be used.
 - No soft layers between the baby and the mattress- e.g. sheepskin or fleece.
 - Mattress to be level, head NOT elevated.
 - Baby to be laid supine for sleeping
 - Emphasize cot death prevention guidelines including 'feet to foot' recommendation.

4.15 Staff

- Staff who need help and support with positioning should:
 - Discuss and ask for help from colleagues, the nurse in charge, developmental care leads, positioning champions or the clinical education team.
 - Refer to the education resources such as journal articles, positioning e-learning, developmental care literature and the internet.
- New research, knowledge and understanding of best practice for supportive positioning

is always ongoing. Staff should make every effort to update their knowledge and skill base as new ideas and practices arrive.

- This guideline framework relates to supportive positioning on the neonatal unit which is aimed at supporting musculoskeletal development and optimizing neuro- development. Positioning of the neonate is also important for many other reasons which are not covered in this guideline. For the topics listed below readers must seek full information elsewhere;
 - Positioning during therapeutic cooling
 - Positioning for gastro oesophageal reflux.
 - Cot death guidelines.
 - Use of car seats and baby slings following discharge
 - Tummy time, bouncy chairs- and ongoing positioning needs of post term neonates.
 - Positioning for respiratory physiology.

4.16 Swaddled weighing.

- Many babies nursed in the neonatal unit will require weighing each day. This often requires removal of all clothing and nappy, and then a transfer out of the incubator onto the firm surface of the scales, where a baby is laid with no clothes on and weighed. The baby is then transferred back into the incubator.
- Swaddled weighing is now recommended as a way to improve the weighing experience, by supporting physiologic stability and behavioral organization.
- It is recommended that where possible babies are weighed in the daytime, to reduce disturbance at night time when they should be sleeping, also because this gives parents and opportunity to be present and involved.

Method for swaddled weighing

1. Two people should be available for the weighing process; ideally one of these would be the baby's parent/ guardian.
2. Ideally the baby will be awake- often weighing can be done when cares are performed, as the baby will already be awake and will have a clean, dry nappy on.
3. Prepare the weighing scales with a soft surface on the weighing pan area, such as a folded towel. Ensure the weigh is set to '0' once the towel is in place.
4. Ensure the nappy the baby is wearing is clean and dry and pre- weighed.
5. Gently wrap the baby in the lining of its nest- so that he/she is enclosed in a flexed midline position.



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



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



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



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



11. Return the baby to the incubator by the reverse process.
12. Gently remove the nest lining from under the baby and weigh.
13. Delete the weight of the nest lining and the clean nappy from the baby's weight to get the correct weight.



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

4.17 Swaddled Bathing.

- Research and observation has noted that bathing is a stressful experience for full term babies, and can therefore be reasonable presumed to be even more stressful for vulnerable preterm babies.
- Swaddled bathing has been shown to reduce behavioural stress cues during bathing- such as crying and back arching. Temperature stability is improved and many parents feel their baby finds the experience more pleasurable than using the standard bathing method.
- Swaddled bathing is now recommended as a way to improve the bathing experience, by supporting physiologic stability and behavioral organization.
- Bathing should be reserved as a parenting activity whenever possible. The demonstration or rehearsal can be done with a doll, and the first bath can be planned as a special family event.

- Usual practice should be that babies are weighed in the daytime, to reduce disturbance at night time when they should be sleeping. Also because this generally gives parent's the opportunity to be present and involved. Before a feed, when the baby is settled is a good time.

Method for swaddled bathing.

1. Fill the bath with warm water and position near to the bed side. The water should be deep enough to immerse the baby to shoulder level and allow floating.
2. Remove baby's clothes and nappy- cleaning nappy area if required.
3. Gently wrap the baby in a clean dry sheet or towel, so their head and face are exposed.
4. If the baby needs their face or hair washing, this can be done first with the baby out of the bath. This makes it easier to support the baby whilst washing and to dry their hair and avoid them getting cold.
5. Hold baby securely against your body (as seen in photograph below) and move to the bath.



6. Gently wash the baby's hair and then dry with a separate towel.
7. Introduce the baby to the bath slowly, watching for signs of tension. If these are seen, pause to allow the baby to relax before moving on.



8. Position the baby so they can brace their feet against the end or side of the bath, without having to stretch out.
9. The baby should be held so that their head is out the water and their shoulders are supported all times, and never with the carer's hand wrapped around their neck.
10. Once the baby is calm then the wrapping can be loosened step by step, both to wash the baby, and to allow them if they wish, to stretch out and kick about or 'float' in the water.



11. If at any time the baby is unsettled, pause and rewrap if necessary.
12. The length of the bath can be adjusted to reflect the baby's enjoyment and stability.
13. When the baby is ready to be lifted out, place a warm dry towel on parent/ carer's chest.
14. Turn the baby to the side, this helps keeps their limbs tucked in. Then lift the baby out and place them directly onto parent/ carer's chest as they lean over the bath. Allow the wrapping to stay behind in the bath water.



15. Gently dry the baby and dress in nappy and warm dry clothing, interacting with them as appropriate.



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

5.0 Appendix - Illustrated Poster: 'Nesting a baby in NICU'.

Nesting a Baby in NICU.

(Adapted from Inga Warren, Rebecca Abrey, Sumaya Tickner 'Making a Nest' 2011)

This technique should **NOT** be used after 34 weeks corrected age, unless medically indicated.

Also it should **NOT** be used by parents following discharge home (reducing the risk of SID guidelines)



You will need 2 blankets, a sheet & a muslin (or similar)



Lay out the 2 blankets flat (this can easily be done quietly on the top of an incubator)



Fold the sheet, as shown above.



Place folded sheet on top of blankets



FOLD (not roll) blankets & sheets starting from the pointed ends until complete. The depth can be adapted for baby's size



Shape the nest to go around the baby (mimic the uterus!)



The top of the nest sides can be flattened for tiny babies or to help position tubing



Arrange muslin or soft sheet around nest as shown



The pictures opposite show babies in this version of nests.

Try to position babies on their side, this enables easier self soothing.

If they need to be supine or prone, please consider their arm/shoulders & leg/feet positioning.

Muslins/blankets can be folded & positioned over their feet/upper body to aid soothing.

Carol Buxton July 2014

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				Approved by lead Nurses and Practice Educators Group- May 2018.
Review Date:	August 2021			