Positioning and Handling Guideline

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Introduction

Therapeutic positioning in the neonatal unit is a fundamental mainstay and can influence not only neuromotor and musculoskeletal development but also physiologic function and stability, skin integrity, thermal regulation, bone density, sleep facilitation, brain development[1 2] and feeding.

Optimal positioning is one of the key areas and core skills of developmentally supportive care, which should be considered from delivery.

Ensuring the infant is positioned optimally is the responsibility of all neonatal staff involved with their care. The delivery of developmentally supportive care right from day one can only be achieved with parents taking an active role in all care. Parents should be educated in the principles of positioning and handling from delivery and encouraged to position their infant in accordance with this guideline.

Purpose

To provide guidance to the NWNODN Units multi-disciplinary teams on the principles of optimal positioning and handling of infants to enhance developmentally supportive care, promote comfort and optimise developmental outcomes. The NWNODN are not endorsing any specific positioning product range. We aim however through this document to promote the principles of optimal positioning and handling to establish continuity of care for infants and their families across the NWNODN.

FiCare

'Family integrated care is a model that supports and educates parents and carers to become integral participants in their baby's care from the time of admission to the NNU in partnership with the neonatal team' NWNODN FiCare Special Interest Group July 2017

It is vital that parents are empowered to take an active lead role in the care of their infant. FiCare is integral to the development to this. Parents should be educated in the principles of positioning and handling from delivery and encouraged to position their infant in accordance with this guideline using the principles of the 5-step dialogue. This approach aims to ensure interaction is based on infant's cues, optimising stability and reducing effects on long term outcomes.

It must be emphasised to parents that whilst in the Neonatal Unit, infants are nursed in a range of positions for developmental and medical reasons whilst they are fully monitored. Prior to and post discharge from the neonatal unit infants must be positioned in accordance with Lullaby Trust safer sleep guidance.

Principles of Positioning

Physiological flexion has been attributed to the typically flexed position held by most fetuses during their third trimester in utero. Gestational age must be considered alongside individualised assessment

of the active antigravity movements of the infant. Although well-term babies should have no need of special positioning, those who are ill and/or heavily sedated may need additional support in the form of nesting to help provide extra comfort.

Core principles of positioning aim to replicate in-utero positioning post-natally

The core principles of using postural support / positioning aids include:

1. Promote flexion of the trunk and limbs.
2. Promote midline.
3. Promote symmetry.
4. Promote normal movement and posture.
5. Promote comfort and behavioural state regulation.

Aim for containment ***not restraint,*** *facilitation of movement within* boundaries ***not restriction.***

Flexion

The natural position of a term infant is one where their arms and legs are flexed.[3] However due to a degree of hypotonia and the effect of gravity, preterm infants require assistance to maintain a flexed position.[4] The infant should be positioned in such a way that the arms and legs are folded in towards the body.
Flexion allows the infant to make natural exploratory movements. These movements support the self-regulation of the infant.[5]

Midline

Midline refers to an imaginary line through the middle of body dividing it into two equal parts, with symmetry on either side. This means that when positioning the infant in supine and side-lying the infant's head and torso should be in midline. In the prone position, the head will need to rest in right or left rotation to protect the airway. This rotation should always be less than 90 degrees.

Symmetry

Symmetry in the infant refers to the left and right parts on either side of midline. These should look equal.

Normal movement and posture

Normal movement and posture in utero mean the infant is actively moving from the latter part of the first trimester. As the infant grows, and space is restricted movement becomes more resistive as they explore the elasticity of the womb wall. This allows for the development of flexed posture, muscle power and therefore bone density optimising skeletal development and biomechanical alignment. Due to the fluid filled environment, this movement is without the effects of gravity and supports.[6]

Comfort and behavioural state regulation

Containment through optimal positioning and handling is used to provide the infant with a sense of security aiming to replicate experience in the womb.[7] It allows the infant to make natural exploratory movements. These movements support the self-regulation of the infant e.g. moving hands to mouth to suck and provide comfort, moving hands over eyes to shield from light. [5] When the infant is comfortable it reduces the chances of startled movements in response to noxious stimuli which in turn conserves energy, minimises stress and helps to keep the physiological state in balance.

Benefits of optimal positioning:

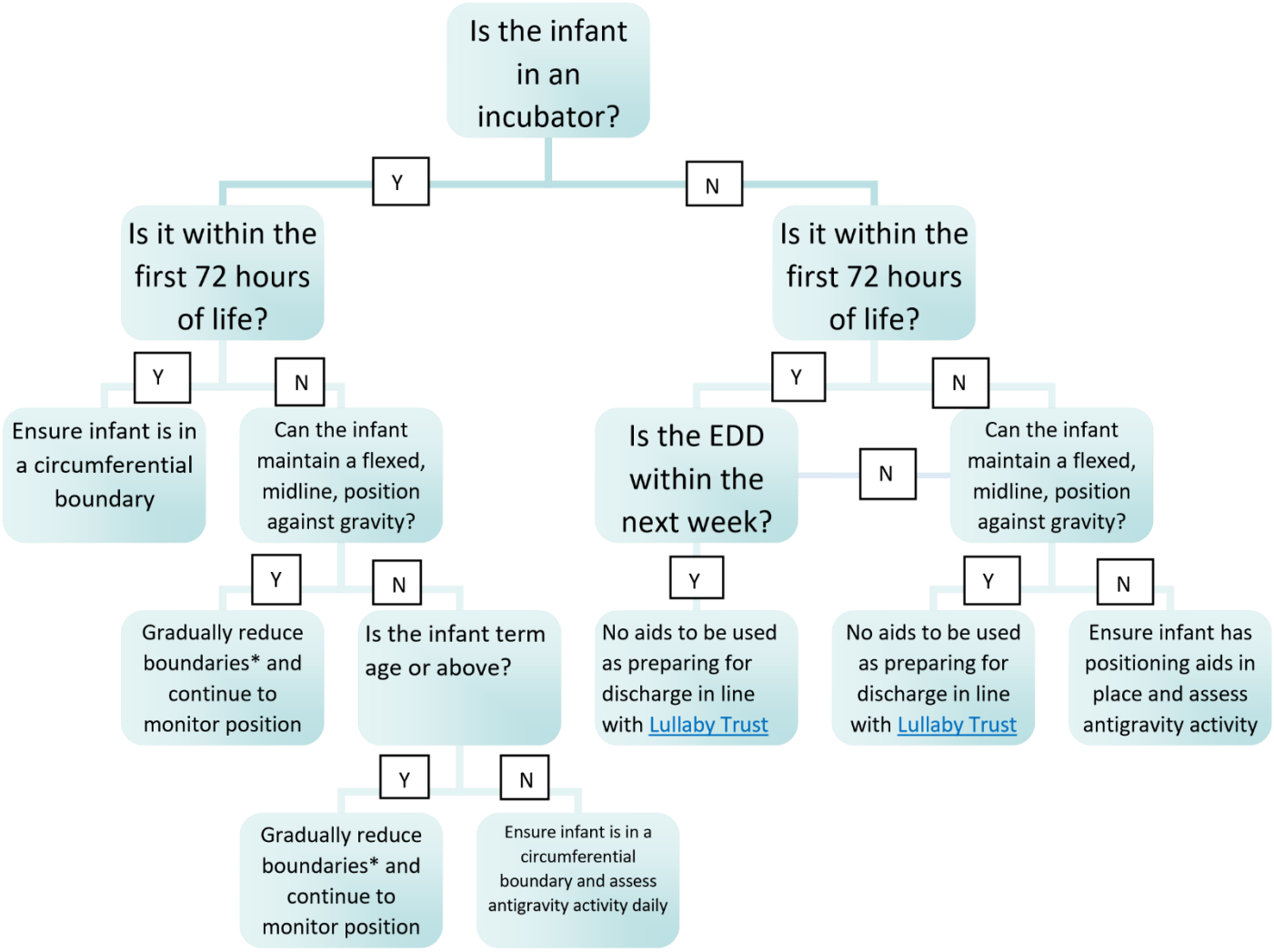
- Prevents musculoskeletal abnormalities.[9]
- Aids bone density development.[6]
- Helps maximise neuromotor and brain development.[8]
- Can improve physiological function and stability.[9 10]
- Improvement in cardiorespiratory function.[11 12 13 14 15 16 17 18]
- Assisting with skin integrity, thermal regulation and sleep facilitation.[1 12 5 19 20 21]
- Decreases stress felt by the preterm infant on the neonatal unit. [22]
- Parents will be comforted to see their infant looking settled, snug and secure and will be reassured that their infant is being well cared for.[5]
- Increase self-regulatory behaviours. [5]
- Promoting a coordinated suck/swallow/breathe sequence.

Impact of incorrect positioning:

- Infants born preterm and sick term infants can be compromised by the forces of gravity.[3 2]
- Impact spontaneous movement and ongoing musculoskeletal development.[1]
- Preterm and sick term infants left in unsupported, extended positions frequently exhibit increased stress and agitation with decreased physiologic stability.[5 8]
- Vulnerable to stress responses such as tachycardia, bradycardia, apnoeic episodes and decreased oxygen saturations.[21 7]
- Stress can also have a negative effect on growth and on the development of the preterm infant's brain.[5]
- Incorrect positioning can also cause abnormal shaping of particularly the vulnerable preterm infant's joints, skull and spinal curvature.[12]
- These abnormalities can impact on and slow future development such as hand-eye coordination, head control and cognitive development.[12]
- Problems with both gross motor and fine motor skills are common in children born preterm.[23 24 25 26] Even relatively minor motor coordination problems can have a negative impact on cognition, school performance, life skills and social integration.[27]
- Incorrect/unsupported positioning of head, neck, chest, ULs can have impact on infant's work of breathing and feeding/swallow.
- Incorrect positioning can have direct impact on the coordination of suck/swallow/ breathe pattern.

Positioning on admission

Positioning should always be individualised based on your observations of the infant's movement and posture against gravity. The transition from the womb into the neonatal room environment is a traumatic event for the infant. Optimal positioning of the infant in the first 72 hours of life is one vital way to reduce stress and aid comfort; this can be challenging at a time when the infant requires multiple medical lifesaving interventions. This is evidenced in the research around the use of intraventricular haemorrhage (IVH) care bundles[28] which also references an incubator tilt of 15-20 degree.



IMPORTANT: Positioning aids must only be used on monitored infants within the unit. This includes those on an apnoea monitor. "No monitors. No aids".

See reduction of circumferential boundaries

Supine

Positioning should always be individualised based on your observations of the infant's movement and posture against gravity at least up to 40 weeks gestation (see positioning term infant section) or up to week of discharge (see preparing for discharge section).

This position is the most difficult to achieve correctly due to the impact of gravity.[29]

Advantages	**Disadvantages**
Reduces the risk of sudden infant death syndrome (supine position is essential when infant is not being monitored or ready for discharge home)[5 30]	Some babies may have airway difficulties with head in midline if chin over tucked
May be required for medical reasons e.g., if chest drains are in situ or close abdominal observation is required	Reflux is more likely to occur [12 40]
	Rain out from ventilation tubing
	Negative effect of gravity makes it harder to control movements and create a tucked in position[5 31]
	At risk of retracted shoulders (arms in "W" position) and abducted and externally rotated legs (frog leg position) which can lead to muscle shortening that may result in delayed sitting and conspicuous gait[30 5]
	At risk of changes in head moulding[30]

Sleep states, skin integrity, and surgical interventions should be taken into consideration when repositioning an infant. However, babies should be regularly repositioned at least 3-4 hourly [26] over every 24-hour period utilising all positions available, unless clinically indicated otherwise, including skin to skin.

Action	Rationale
Wash and gel hands prior to any contact with the infant	To prevent any possible transmission of infection
Ensure you follow the principles of the 5-step dialogue, throughout the interaction	Provide interaction based on infants' cues to optimise stability and reduce effects on long term outcomes
Have created appropriate circumferential boundaries from cotton breathable bedding or use positioning aids if available (please refer to NWNODN videos for further guidance to build appropriate boundaries)	To provide circumferential boundaries in close contact with infant's bodies to replicate uterine environment to promote autonomic and motor stability, and comfort, to optimise developmental outcomes
Aim to keep head in midline or in less than 30 degrees from midline (if ventilated/CPAP ensure tubing is appropriately supported)	Uterine development is symmetrical, a normal head position would be midline
Once infant has been positioned in supine monitor degree of chin tuck. This should not be greater than 10 degrees. Use a positioning aid to support this – a nappy is not a recommended positioning aid, and its use is not supported	Chin tuck greater than 10 degrees can obstruct the infant's airway causing desaturations and bradycardia
Shoulders softly rounded to allow opportunities to bring hands together in midline towards face. This should also facilitate correct degree of chin tuck	To ensure the development of hand-to-mouth coordination and non-nutritive sucking and to prevent stressful unorganised movement
Ensure hips and pelvis are softly flexed	To replicate the midline fetal flexion position in the womb
Knees, ankles, feet aligned and softly flexed within high bottom boundary wall. NB: Feet should always be inside boundary walls not resting on top	This facilitates the development of normal muscle tone and bone density. Allows for feet to feet contact which is self-regulatory
Ensure the infant is not lying on wires, probes or IV line	To promote comfort and prevent pressure sores
Use IPAT assessment tool to evaluate adherence to above steps	12 = ideal cumulative score 9 – 11 = acceptable cumulative score 8 = need for repositioning

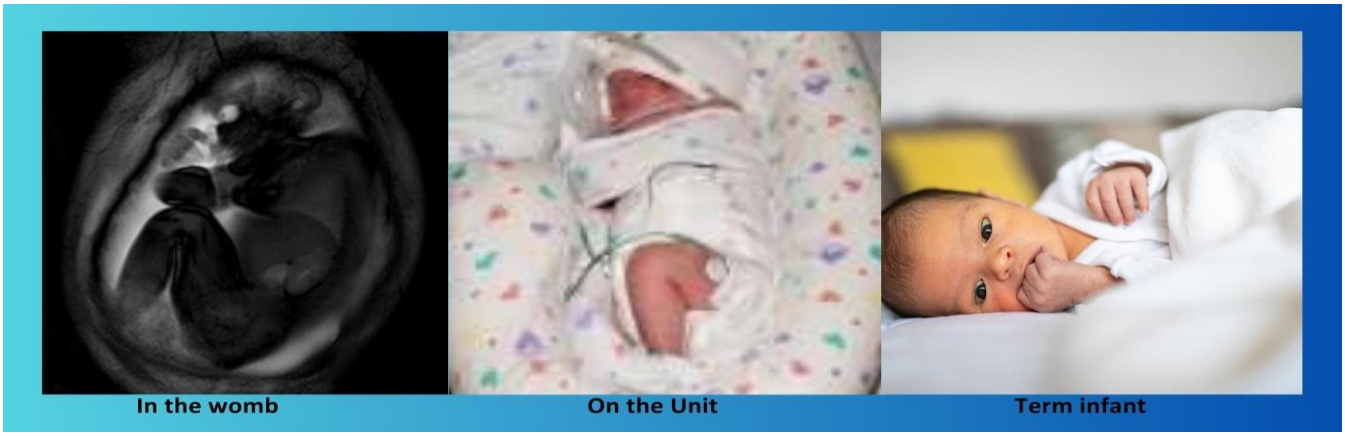
Head turning preference:

Most infants show preferential head turning to the right but in some infants, this is exaggerated, possibly as a result of positioning practices executed by predominantly right-handed caregivers.[32] This has an impact on head shape, and symmetry.[33] To avoid head moulding and musculoskeletal problems e.g. cranial abnormalities malformation of the head[34], muscular abnormalities e.g. torticollis, joint contractures and pressure sores[4] aim to keep head in midline or in less than 30 degrees from midline (if ventilated/CPAP ensure tubing is appropriately supported) by following the principles of positioning.

Alternate Side-lying/Lateral

Positioning should always be individualised based on your observations of the infant's movement and posture against gravity at least up to 40 weeks gestation (see term infant section) or up to week of discharge (see preparing for discharge section).

This position allows gravity to facilitate the ongoing development of the midline and flexion of the preterm infant. It also provides opportunities for self- regulation.[29] [5]



Advantages	**Disadvantages**
Promotes midline symmetry and a flexed position, discouraging the abducted "frogged" leg and arm positions [12] [33] [35]	Breathing and digestion can be adversely affected by too much flexion of the head and trunk if the infant's is not fully supported by boundaries
Facilitates the infant to succeed with self-calming strategies such as hand-to-mouth, foot-to-foot and hand-to-hand.[36] Allows for more physiological control, better motor organisation, improved neuromuscular development and less stress-inducing experiences [12] [5]	At risk of head moulding changes laterally (Scaphocephaly) if position is not changed regularly[30]
May reduce gastric reflux if lying on the left side [37]	Right lateral increases gastric emptying which may increase the risk of aspiration [34] [29] [37]
Less energy expenditure than when in supine position. [38]	For infants with a chest drain or having High Frequency Oscillatory Ventilation (HFOV) needs discussion with medical team around use of micro turns towards each side
Less interrupted sleep than when in supine position[5]	Not to be encouraged for infants nearing discharge[5]
Promotes cardiorespiratory stability[12]	

Please see NWNODN Feeding Guideline Section 11 and Appendix 14 for use of side lying during feeding.

Sleep states, skin integrity, and surgical interventions should be taken into consideration when repositioning an infant. However, babies should be regularly repositioned at least 3-4 3-4 hourly [26] over every 24-hour period utilising all positions available, unless clinically indicated otherwise, including skin to skin.

Action	Rationale
Wash and gel hands prior to any contact with the infant	To prevent any possible transmission of infection
Ensure you follow the principles of the 5-step dialogue, throughout the interaction	Provide interaction based on infants' cues to optimise stability and reduce effects on long term outcomes
Have created appropriate circumferential boundaries from cotton breathable bedding or use positioning aids if available (please refer to NWNODN videos for further guidance to build appropriate boundaries)	To provide circumferential boundaries in close contact with babies' body to replicate uterine environment to promote autonomic and motor stability, and comfort, to optimize developmental outcomes
Aim to keep head in midline or in less than 45 degrees from midline (if ventilated/CPAP use ventilator tree to support tubing)	Uterine development is symmetrical, a normal head position would be midline
Once infant has been positioned in side lying monitor degree of chin tuck. This should not be greater than 10 degrees	Chin tuck greater than 10 degrees can obstruct the infant's airway causing desaturations and bradycardia
Shoulders softly rounded to allow opportunities to bring hands together in midline towards face	To ensure development of hand to mouth coordination and non-nutritive sucking and to prevent stressful unorganised movement
Ensure hips and pelvis are softly flexed	To replicate the midline fetal flexion position in the womb
Knees, ankles, feet aligned and softly flexed within high bottom boundary wall. NB: Feet should always be inside boundary walls not resting on top	This facilitates the development of normal muscle tone and bone density. Allows for feet to feet contact which is self-regulatory
Ensure the infant is not lying on wires or probes	To promote comfort and prevent pressure sores
If using a manufactured nest, ensure the soft fabric straps are positioned across the infant to help facilitate a flexed midline posture. NB If humidity levels in incubator are low enough	This is to maintain a flexed midline posture. The bedding should be soft enough to be comfortable, firm enough to provide some resistance but not restrict infants' movements (cotton sheets/muslin, not acrylic blankets)
Use IPAT assessment tool to evaluate adherence to above steps	12 = ideal cumulative score 9 – 11 = acceptable cumulative score 8 = need for repositioning

Prone

Positioning should always be individualised based on your observations of the infant's movement and posture against gravity at least up to 40 weeks gestation (see term infant section) or up to week of discharge (see preparing for discharge section).

Prone positioning appears to improve sleep quality, so infants have less active sleep and cry less which in turn conserves energy [7]. Prone positioning can also have advantages in regard to ventilation[5].

Advantages	Disadvantages
Promotes temperature stability.[29 38]	At risk of retracted shoulders (arms in "W" position) if dais not used, reducing ability to bring hands to face
Less energy expenditure than when in supine position.[38]	At risk of abducted and externally rotated legs (frog leg position)
Lifting a preterm infant in the prone position is less stressful for the infant than if you lift or move them in the supine position.[5]	Prolonged prone lying can cause postural problems e.g. the two disadvantages above can lead to muscle shortening that may result in delayed sitting and conspicuous gait. [5 30]
Reduces gastric reflux.[39 40 41]	At risk of torticollis if head not repositioning regularly. [30]
Mechanical advantage for infants placed in a prone position leading to reduced work of breathing. [42]	Please adhere to local Trust policy as the following examples may be listed as contraindicated: • Umbilical lines in situation • Abdominal distension • Congenital diaphragmatic hernia • Chest drains in situ • Infants being cooled Surgical infants should be assessed on an individual basis

Sleep states, skin integrity, and surgical interventions should be taken into consideration when repositioning an infant. However, babies should be regularly repositioned at least 3-4 hourly [26] over every 24-hour period utilising all positions available, unless clinically indicated otherwise, including skin to skin.

Action	Rationale
Wash and gel hands prior to any infant contact	To prevent possible transmission of infection
Ensure you follow the principles of the 5 step dialogue, throughout the interaction.	Provide interaction based on infants cues to optimise stability and reduce effects on long term outcomes.
Check if any additional aids have been placed under existing nest and remove as appropriate as you change position.	To avoid leaving unnecessary aids under the infant which could compromise infant stability
Have a prone positioner (dais/platform/surfboard) ready. this must be no larger than infant's chest width. These can be, created from folded sheet, muslin or manufactured prone positioning products e.g., or birdy™, dandy prone pad™, Prone Plus, Bertie etc. (see appendix 2). This should be placed inside nest/boundary underneath the top layer of the nest/boundary. (Please see NWNODN videos for further guidance to correctly placement; from hips to head, arms adducted and hands towards face)	To ensure the head and trunk are elevated to allow flexion and adduction of the limbs; - This is to reproduce the in-utero midline orientated fetal flexion position; with knees, ankles, feet aligned, and softy flexed. Optimising breathing and digestion.11
Have created appropriate circumferential boundaries from bedding or use positioning aids if available (please see NWNODN videos for further guidance to build appropriate boundaries)	To provide circumferential boundaries in close contact with infants body to replicate uterine environment to promote autonomic and motor stability, and comfort, to optimize developmental outcomes.
Aim to keep head towards the midline and not in full 90 degrees left or right rotation (please refer to NWNODN videos for further guidance on flattening prone positioner).	Uterine development is symmetrical, a normal head position would be midline, but as infant is in prone this is not possible in order to maintain airway patency
Once infant has been positioned in prone monitor degree of chin tuck. This should not be greater than 10 degrees.	Chin tuck greater than 10 degrees can obstruct the infant's airway causing desaturations and bradycardia
Shoulders softly rounded around prone positioner to allow opportunities to bring hands towards midline and face.	To prevent 'w' of upper limbs against mattress, or arms down to side of body as this will not promote optimal development
Ensure hips and pelvis are softly flexed (please refer to NWNODN videos for further guidance on hip alignment)	To replicate the midline fetal flexion position in the womb
Knees, ankles, feet aligned and softly flexed within high bottom boundary wall. NB: Feet should always be inside boundary walls, please note ankle and foot alignment	This facilitates the development of normal muscle tone and bone density. Allows for feet to feet contact which is self-regulatory. Prevent abnormal foot positioning.
Ensure the infant is not lying on wires, probes and IV lines	To promote comfort and prevent pressure sores.
If using a manufactured nest, ensure the soft fabric straps are positioned across the infant to help maintain position. NB If humidity levels in incubator are low enough.	This is to maintain a flexed midline posture. The bedding should be soft enough to be comfortable, firm enough to provide some resistance but not restrict infants movements (cotton sheets/muslin, not acrylic blankets).
Use IPAT assessment tool to evaluate adherence to above steps.	12 = ideal cumulative score. 9 – 11 = acceptable cumulative score. 8 = need for repositioning.

Individualised considerations

Always consult with wider lead team involved should you have any ongoing concerns or questions regarding positioning. Below is a list of some common themes that may require some adaptation to optimise positioning.

Endotracheal tubes	These can be accommodated within the boundary by ensuring only the side at tube level is flattened down, ensuring the boundary remains circumferential around the head as to replicate the womb. 'U' shaped nests should not be used.
Chest drains	These can be accommodated within the boundary by ensuring only the side at tube level is flattened down, ensuring the boundary remains circumferential around the body.
Umbilical arterial catheters	These can be accommodated within the boundary by ensuring sides are flattened down whilst maintaining high bottom foot boundary
Cooling	Circumferential boundaries should be optimised for duration of cooling and in relation to gestation and ability to maintain flexion and midline posture against gravity. There is no evidence to suggest boundaries or getting infant out for cooled cuddles increases babies core temperature.[45]
Phototherapy	Circumferential boundaries should be optimised for duration of phototherapy and should not compromise surface area for treatment.
Chest x-ray changes	Even with specific lobe changes on CXR regular position changes should be considered. Even if only for shortened periods of time. This is to optimise movement of secretions in the chest and help prevent further consolidation.
Oscillation	Micro movements should also be considered with quarter turns as well full turns to side lying throughout the 24-hour period.
Surgical procedures	Always check with the surgical team(s) involved for any positioning contraindications. Unless contraindicated infants' position should be changed regularly through available range of positions as possible. E.g. exomphalos major, myelomeningoceles, Pierre Robin
Metabolic bone disease	The preterm cohort are at higher risk of fractures due to metabolic bone disease of prematurity (MBOP). See handling section.
Specific medical diagnosis	Always consult with your specialist teams involved for any positioning contraindications. Unless contraindicated infants' position should be changed regularly through the available range of positions as possible e.g. SMA, Moebius,
Neonatal abstinence syndrome (NAS)	Swaddling is a technique that can be used for specific activities on the unit e.g. elevated side lying feeding (see NWNODN Feeding Guideline Appendix 14), weighing, bathing, transfers. If NAS infants are to be swaddled the core principles of positioning should be adhered to (see swaddling section). Any swaddled infant should always be monitored.

Positioning the term infant

Infants whose neonatal stay extends should be considered for referral to OT/PT for ongoing advice around management and appropriate, safe use of positioning aids to optimise developmental outcomes up to discharge from the neonatal unit.

Positioning should always be individualised based on your observations of the infant's movement and posture against gravity. Continued positioning aids should be considered carefully in term babies (40 weeks+). These babies should now be starting to explore extension outside of the womb environment; however, admission to the neonatal unit indicates predisposing factors, which may influence their ability to maintain their position against gravity.

Advantages	Disadvantages
Helps to comfort and stabilise medically vulnerable infants.	At risk of retracted shoulders (arms in "W" position) and abducted and externally rotated legs (frog leg position) which can lead to muscle shortening that may result in delayed sitting and conspicuous gait [30] [5].
May allow additional postural support for those babies requiring medical and surgical interventions or babies with emerging genetic or neuromuscular conditions e.g. exomphalos major, myelomeningoceles, SMA,	If positioned consistently in lateral rolls without positional changes, lack of opportunity for active movement may increase the risk of joint contractures through muscle shortening.
For infants who demonstrate a head-turning preference continued postural support (while fully monitored) can reduce further head moulding, risk of muscled shortening, sensory changes, vestibular, visual and proprioceptive.	Parental reliance on supports when thinking about discharge home. Essential education is needed on Lullaby Trust "safe sleep guidance" with staged reduction before discharge home (see preparing for discharge section)
	Positioning in circumferential boundary or other supportive positioning aids for a prolonged period post term can lead to muscle shortening.

Sleep states, skin integrity, and surgical interventions should be taken into consideration when repositioning an infant. However, babies should be regularly repositioned at least 3-4 hourly [26] over every 24-hour period utilising all positions available, unless clinically indicated otherwise, including skin to skin.

Reduction of circumferential boundary

Positioning should always be individualised based on your observations of the infant's movement and posture against gravity. Reduction of circumferential boundaries often occurs when the infant is transitioned from the incubator to a cot. At this point it is essential to have a 'stepped down' approach to positioning aids based on observations of the infant's ability to maintain the core principles of positioning; not just removing all positioning aids.

Reduction of circumferential boundaries whilst infant in incubator (positioning the term infant only)

The first 72 hours is often a crucial stabilisation period for any infant on the neonatal unit therefore circumferential boundaries can aid stability by promoting feelings of safety and comfort. If the infant is unable to maintain the core principles of positioning post 72 hours consideration must be given to the type of boundary used, as a term infant would now be starting to move against gravity.

Reduction of circumferential boundaries when infant transitioned to cot

Option 1: Keep circumferential boundary with lower bottom base 	Circumferential boundary height may need to be reduced to allow for bedding to be tucked in, to keep infant thermoregulated.
Option 2: lateral rolls and head scroll +/- lower limb square 	Positioned on top of bottom sheet to always allow visibility. Should only be used in supine. Head scroll/roll: **Should**: • not be positioned under the shoulders. • be made of cotton sheets. • only be chin to forehead size of the infant's head. • be removed for all feeds (NG included) and only replaced 20-30 mins post feed; to reduce risk of aspiration. Lateral rolls: **Should**: • be made from cotton sheets to avoid overheating • be small subtle guides more than big 'blocking' supports. • go from shoulder height to full length of infant. Lower limb square: **Should:** • be made from cotton sheets to avoid overheating placed under the top of leg down to feet to support the foetal flexion position

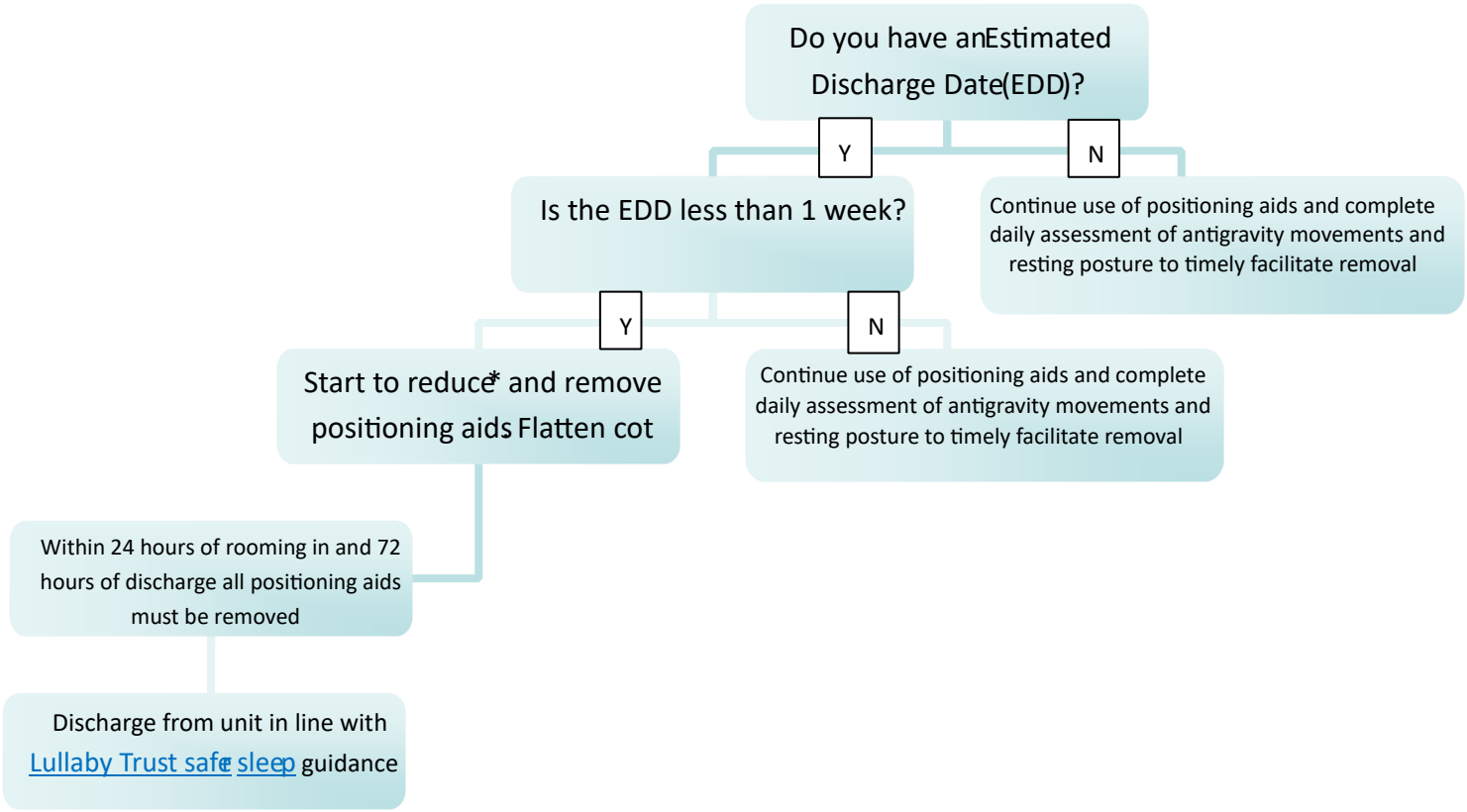
Option 3: lateral rolls and head scroll * hot cot/layers 	<u>Head scroll/roll:</u> **Should**: • not be positioned under the shoulders. • be made of cotton sheets. • only be chin to forehead size of the infant's head. • be removed for all feeds (NG included) and only replaced 20-30 mins post feed; to reduce risk of aspiration. <u>Lateral rolls:</u> **Should**: • be made from cotton sheets to avoid overheating • be subtle guides more than 'blocking' supports. • go from shoulder height to full length of infant.
Option 4: tucked in with head scroll. (see video 'transition to a cot') 	<u>Head scroll/roll:</u> **Should**: • not be positioned under the shoulders. • be made of cotton sheets. • only be chin to forehead size of the infant's head. • be removed for all feeds (NG included) and only replaced 20-30 mins post feed; to reduce risk of aspiration.
Option 5: all removed 	Baby in cot no positioning aids Cot flat

Please remember if EDD is within 1-week cot should be flat

Preparing for discharge

In light of the Lullaby Trust safer sleep campaign decreasing the rate of sudden infant death syndrome, the supine position is always recommended for term infants and this should indeed be encouraged and promoted to parents as the ideal position when an infant is ready for discharge or being nursed in a cot without monitoring.

Guidance for removal of positioning aids flowchart



*See reduction of circumferential boundaries section

IMPORTANT: Positioning aids must only be used on monitored infants within the unit. This includes those on an apnoea monitor. "No monitors. No aids".

Handling

Handling can be a stressful event for any infant on a neonatal unit. Consideration must be taken when performing all procedures or tasks, including routine cares. All staff should follow infants' cues and tasks should be completed at the infant's pace. (Please see Appendix 3 for 5 step dialogue)

Elevation of the pre-term infant's legs during nappy change or during dressing, can raise intraabdominal pressure which increases intracranial pressure and the risk of IVH. Best practice is the use of splayed handling, or cares completed in side lying with minimal elevation of the infant's legs – Please see the NWNODN video.

A pincer grip hold of a limb can increase the risk of fractures in those infants with metabolic bone disease of prematurity or those with underlying conditions resulting in lower bone density. This grip may also impact skin integrity due to reduced skin layers in the preterm infant.

When handling or moving any infants cared for on the neonatal unit, this should be in the form of manual containment using splayed hands or swaddling to maintain extremities flexed and near midline during handling. Uniform and stable support must be provided when infants are moved slowly to decrease the likelihood of stress reactions (changes in breathing, heart rate, skin colour, large uncontrolled arm/leg movements), especially in infants who are physiologically unstable. It's essential to avoid stop start touch, once contact is started it should be firm but gentle and consistent, with a graduated peel off, of pressure to end the contact.

The neck must be supported in a neutral position or in slight flexion less than 30 degrees, extreme care must be taken to prevent accidental excavation when handling intubated infants.

Where possible infants should be lifted in side-lying to reduce the impact on the vestibular system which can cause the infant stress.

Handling techniques

1. *Use **widespread "splayed"** hands.*

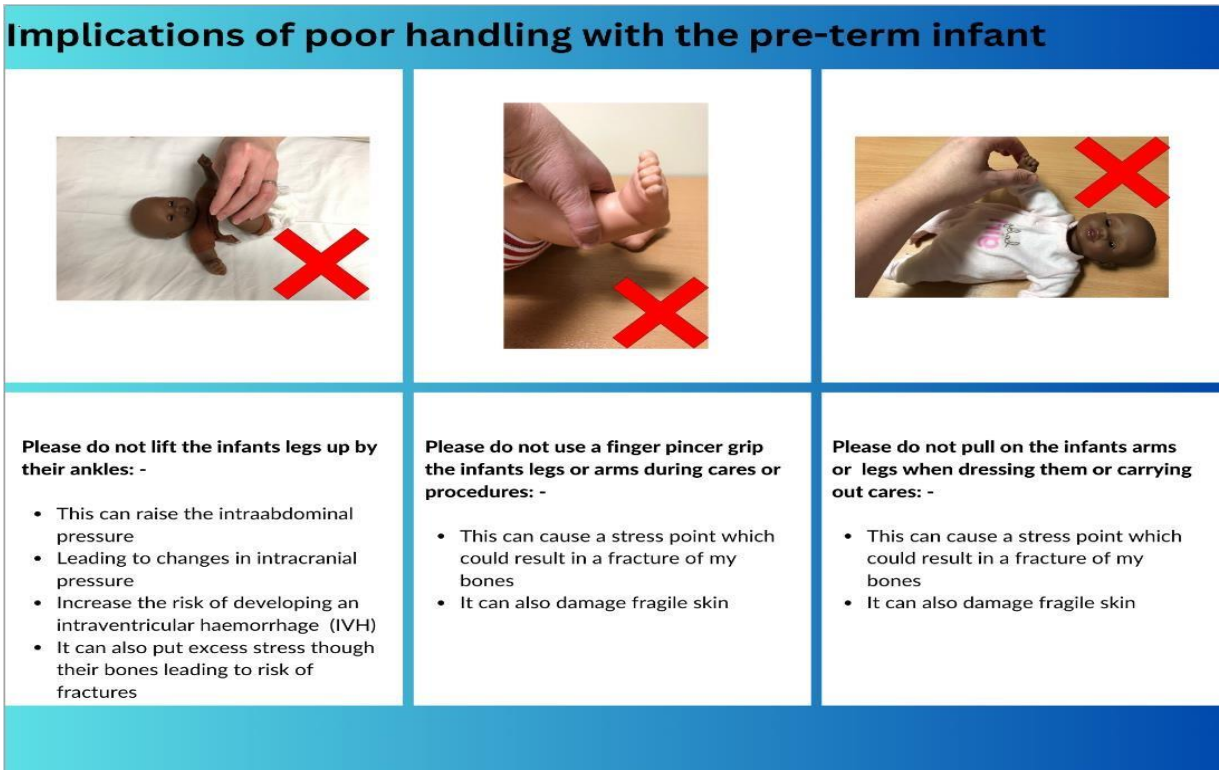
   To provide support to my body head and limbs, rather than pulling or holding with a finger pincer grip, which could lead to a point of fracture.

1. *Use a cuddle wrap, muslin or cotton sheet to handle an infant.*

When swaddling an infant for handling/transfers please ensure both hands are brought to midline and to infant's face. Swaddle should be loosened away from infant once they have been repositioned/transferred. (Please refer to NWNODN videos 'using cuddle wrap for weighing' for further guidance). See Infant feeding guideline for swaddled elevated side lying.

2. *Turning infant with a sheet.*

When using a sheet to turn an infant keeping one hand on the infant, help them to keep their hands near their face and to stay flexed. Hold the end of the sheet in your other hand and lift it up to help the infant roll. Use the tension of the sheet to help the infant roll, keeping your hand on the infant. Continue to use the tension of the sheet to guide the infant, keeping hands near their face. Take care as the infant rolls away from you to support the shoulders and arms. Once on the side use still hands to help the infant to rest and adjust. Always keep contact with the infant as you bring the nest back to support the body and ensure the feet can reach the bottom of the nest (please refer to NWNODN videos infant positioning techniques for further guidance).



Swaddling

Swaddling has been used for centuries to promote calming and to maintain physiological and motor stability in new-borns. The deep tactile and proprioceptive support offered by swaddling resembles the intrauterine containment possibly helping babies to feel secure. It also helps to promote self-calming behaviours such as hand to mouth, hand on face movements, hand clasping, and sucking.

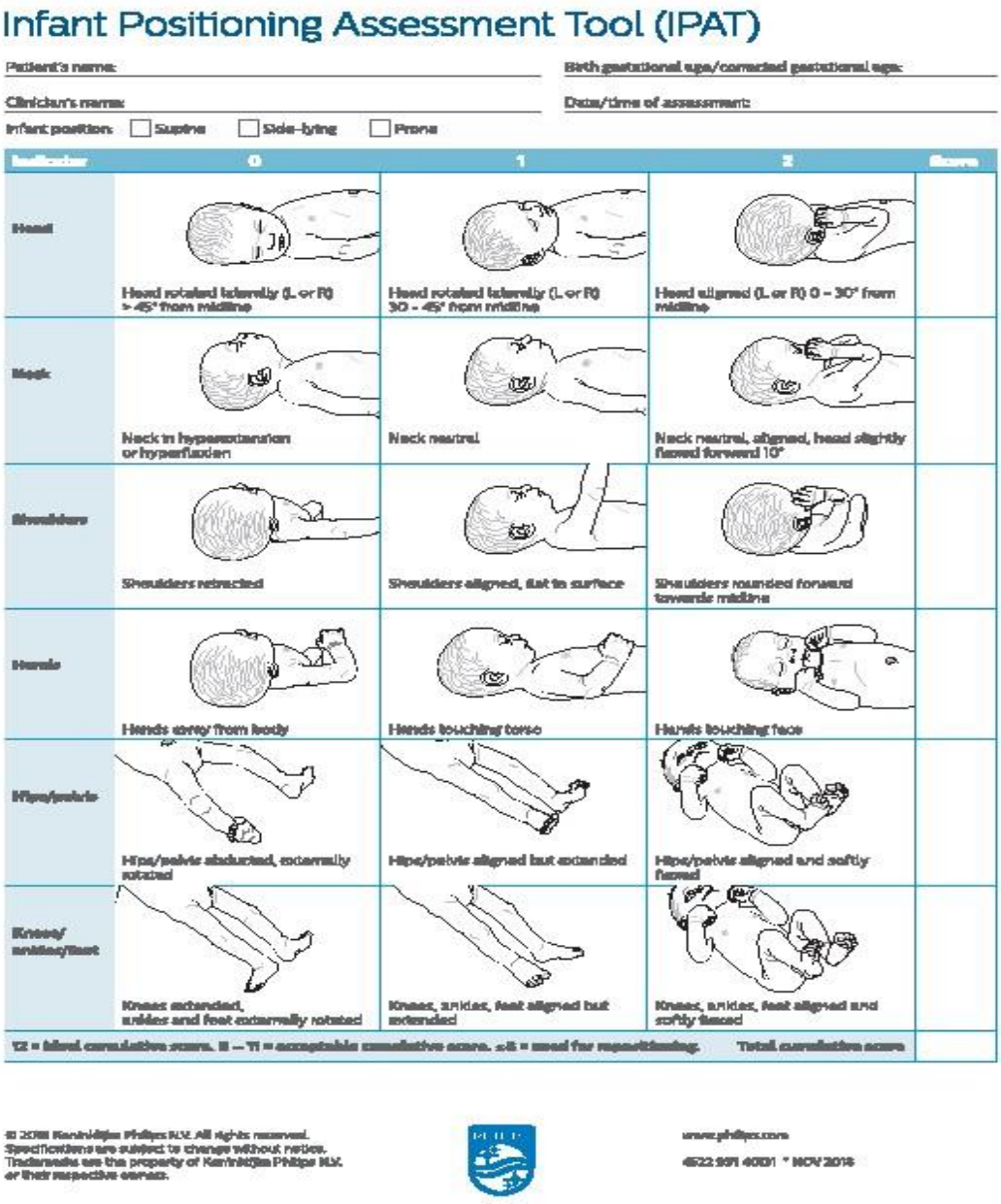
Swaddling/wrapping should not be confused with restraint. The preterm infant needs to move to develop muscles and joints and for self-regulation.[43] Hands should be free to reach each other (not wrapped separately to the body) and the face. Legs must not be wrapped tightly in an extended position because of the risk of hip dysplasia.[44]

To reduce the risk of overheating a light blanket made of breathable fabric, muslin or a blanket designed for swaddling e.g. cuddle wrap should be used.

Appendix I: Infant Positioning Assessment Tool (IPAT)

The IPAT, Infant Positioning Assessment Tool, (Koninklijke Philips Electronics NV: Altimier et al 2015) was adopted to standardize best positioning practice in NICU ORC. This tool evaluates posture at the head, neck, shoulders, hands, hips, knees/ankles/feet.

- A two point scoring system is used with a score of 2 for appropriate positioning, a 1 for acceptable alternative positioning and a 0 for unacceptable positioning.
- A full score of 12 was indicative of perfect positioning according the IPAT.
- A score of 9 to 12 was acceptable as it accommodated for the asymmetry of positioning often needed when technology interfaces are present.
- Scores of 8 or lower indicate a need for repositioning.
- Picture representation for scoring comparison is provided with the IPAT
- Each infant should be scored at the start of each shift and again if cares are undertaken. The score can be recorded with the infant's current position on the nursing chart.



Infant Positioning Assessment Tool (IPAT)

Patient's name: Birth gestational age/corrected gestational age:

Clinician's name: Date/time of assessment:

Infant position: ☐ Supine ☐ Side-lying ☐ Prone

	0	1	2	Score
Head	Head rotated laterally (L or R) > 45° from midline	Head rotated laterally (L or R) 30 – 45° from midline	Head aligned (L or R) 0 – 30° from midline	
Neck	Neck in hyperextension or hyperflexion	Neck neutral	Neck neutral, aligned, head slightly flexed forward 10°	
Shoulders	Shoulders retracted	Shoulders aligned, flat to surface	Shoulders rounded forward towards midline	
Hands	Hands away from body	Hands touching torso	Hands touching face	
Hips/pelvis	Hips/pelvis abducted, externally rotated	Hips/pelvis aligned but extended	Hips/pelvis aligned and softly flexed	
Knees/ankles/feet	Knees extended, ankles and feet externally rotated	Knees, ankles, feet aligned but extended	Knees, ankles, feet aligned and softly flexed	
12 = ideal cumulative score. 9 – 11 = acceptable cumulative score. ≤8 = need for repositioning.			Total cumulative score	

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Appendix 2: Equipment frequently used on the unit – please see manufacturer's guide for use.

The following equipment is available for purchase from various manufacturers the NWNODN are not endorsing any specific positioning equipment.

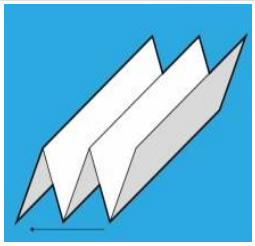
When choosing positioning aids to use on the unit. Please consider:

- The weight of the product versus the current weight of the infant
- Humidity level of the incubator and the potential of product retaining moisture against the fragile skin of the infant
- If the product meets the infants individualised positioning needs e.g. are, they high enough at the bottom boundary, replicating the womb wall boundary

Product	These positioning aids can be used to help support the developmental positions you place the infants in.
Cuski Bertie  Positioning Aid MEDICAL FOR HOSPITAL USE ONLY	Can be placed around the head to aid circumferential containment Also, following a thorough unit risk assessment this positioning aid can now be used to help position the infants prone in order to aid their respiratory function (Infant's respiratory rate must be monitored). See NWNODN video guidance on Bertie use. This aid should NOT be used as a pillow, to hold dummies or prevent displacement of tubes. See manufacturers guide for correct usage.
Cuddle wrap  Neonatal Cuddle Wraps For Neonates/PICU (cuski.com)	This can be used with comfort care, painful procedures, wrapped bathing, lining nests/ boundaries, sheets and cuddles. See NWNODN video guidance on use of cuddle wrap. The cuddle wrap can be folded to make a 'dais'/surfboard or prone positioner. See manufacturers guide for correct usage.
Claires nest  Cuski Claire s Clinical Nest Non-Collapsible MEDICAL FOR HOSPITAL USE ONLY	Can be used as an alternative to making circumferential boundaries out of hospital linen. Collapsible Claire's nest can be used to provide cares to infants without disturbing and moving the infant as the whole boundary does not have to be removed. See manufacturers guide for correct usage.

Birdy 	conceptnatal - Prone positioning cushion	Can be used as a 'dais'/surfboard or prone positioner. See manufacturers guide for correct usage.
Gel pillow 	Dandle•LION® Gel Pillows - Dandle•LION Medical (dandlelionmedical.com)	Dandle LION soft gel-filled pillows are designed to provide a comfortable cushion. See manufacturers guide for correct usage.
Dandle Roo 	Dandle® ROO2 - Dandle•LION Medical (dandlelionmedical.com)	Can be used as a 'dais'/surfboard or prone positioner. See manufacturers guide for correct usage.
Dandy Prone Pad 	Dandy Prone Pad™ - Dandle•LION Medical (dandlelionmedical.com)	Can be used as an alternative to making circumferential boundaries out of hospital linen. See manufacturers guide for correct usage.
Cozy Cub 	Cozy Cub™ - Dandle•LION Medical (dandlelionmedical.com)	Can be used to provide a supportive layer outside a boundary. See manufacturers guide for correct usage.
Bendie bumper 	Better Bendy Bumper Infant Positioning Aid | International Biomedical (int-bio.com)	Can be used to provide a supportive layer outside a boundary. See manufacturers guide for correct usage.

Snuggle up  Cuski Claire s COLLAPSIBLE Clinical Nest &x28;MEDICAL FOR HOSPITAL USE ONLY& x29;	Can be used as an alternative to making circumferential boundaries out of hospital linen. See manufacturers guide for correct usage.
Frederick T Frog  Fredrick T. Frog Infant Positioning Aid | International Biomedical (int-bio.com)	The Frederick T frog can be used as an extra set of hands during procedures or to assist with a facilitative tuck. Freddy" may be placed around the head, neck, or hips, or used to position an extremity. See manufacturers guide for correct usage.
Prone plus  Prone Plus Infant positioning aid | Philips Healthcare	Can be used as a 'dais'/surfboard or prone positioner. See manufacturers guide for correct usage.
Zaky Hand  The Zaky HUG® – The Zaky - Official Website and Store	The Zaky Hand can be used as an extra set of hands during procedures or to assist with a facilitative tuck. Zaky Hand may be placed around the head, neck, or hips, or used to position an extremity. See manufacturers guide for correct usage.
Sleep Angel  Sleep Angel Medical Barrier Bedding with a Filter (sleepangel-medical.com)	Can be used to supplement circumferential boundaries made from hospital linen. See manufacturers guide for correct usage.
Spry – Flo form  Developmental Positioning - Spry Therapeutics	Can be used as an alternative to making circumferential boundaries out of hospital linen. See manufacturers guide for correct usage.

Head "Scroll/Roll" 	Head scroll may sometimes be required to aid midline positioning. **Should**: • not be positioned under the shoulders. • be made of cotton sheets. • only be chin to forehead size of the infant's head. be removed for all feeds (NG included) and only replaced 20-30 mins post feed; to reduce risk of aspiration.
Shoulder positioner   Concertina fold	A shoulder positioner may be required to reduce chin tuck and open airway. To make a flat shoulder positioner take a cot sheet and concertina **fold** long ways. Place under the shoulders and ensure edges are visible, so it is not left in during position changes.
Prone positioner / 'Dais' / Surfboard 	A 'dais'/surfboard or prone positioner can be made out of folded cotton sheets, muslins or products such as the cuddle wrap, if manufactured product not available. This must be no larger than infant's chest width. It should go from, hips to head, arms adducted and hands towards face. Please see NWNODN videos for further guidance to correctly placement.
Lateral roll 	Lateral rolls: **Should**: • be made from cotton sheets to avoid overheating • be subtle guides more than 'blocking' supports. • go from shoulder height to full length of infant.

Appendix 3: 5 step dialogue [32]

The 5 Steps' can be applied to all infants, at any stage or their journey through neonatal care and for any caregiving interaction. Their purpose is to:

- Focus on the infant as a unique little person rather than a medical case.
- Maintain the infant's physiological stability and make caregiving safer.
- Create opportunities for caregiver-infant attunement.
- Guide parents to feel confident and effective in caring for their infant.
- Improve consistency in caregiving practices.
- Help to relieve or avoid the infant's stress or discomfort.
- Enhance the infant's sensory experiences.
- Demonstrate respect and humanity.

STEP 1: Preparation

Make sure that you and the infant are well prepared for the caregiving.

- Consider optimal timing, depending on urgency and the infant's sleep pattern·.
- Consider how parents will be involved and prepare them.
- Consider if it would be wise to co-opt a second pair of hands to support the infant.
- Gather everything needed so that contact with the infant will be unbroken.
- Adjust the scene to suit the infant's level of sensitivity and maturity e.g., light, sound, and positioning support.
- Watch the infant for a few minutes and note signs that tell you when and how to proceed.

STEP 2: Permission

Introduce yourself to the infant in a way that supports a smooth transition, giving the infant the opportunity to adjust and show readiness for you to proceed.

- Approach gradually; watch and wait for the infant to adjust to your presence.
- Begin with a word of intention. Let the infant know you are there and about to do something.
- Rub hands together to warm and forewarn.
- Keeping the hands near without touching, can be calming before resting your hands on the infant. Wait for the infant to relax to your touch before beginning care.

STEP 3: Connection

Tune your responses to the infant's behavioural signs during the caregiving connection.

- Think of the activity as a dialogue rather than a monologue. You are doing something with the infant rather than to the infant. Answer behavioural signs with your hands and your voice.
- Be aware of your breathing and state of relaxation and how this may affect the infant.
- Let the infant lead the way. Observe and respect signs of sensitivity and efforts to self-regulate.
- Tell the infant what is happening; your voice can help the infant to adjust.
- If the infant reaches a state of quiet alertness pause to enjoy this moment of connection.

STEP 4: Adaptation

- Find ways to adapt the activity to suit the infant.
- Allow a moment with a resting hand before moving the infant.
- Pace your interaction with the infant; pause when you see avoidance signs and help the infants to reorganise e.g. with gentle holding, your voice, or a change in position.
- Consider different ways to organise activities to maintain the infant's stability and comfort e.g.: Position, four-handed care, wrapping, sucking, grasping.
- Taking time can save time as the infant may be more stable and settled afterwards.

STEP 5: Completion

- Breaking contact is an important last step
- Tell the infant you have finished before you remove your hands.
- Parting can be very distressing for parents. Suggest they tell their infant they love them and when they will be back.
- Withdraw hands slowly.
- Wait and watch to make sure infant settles.

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