PASSOS PARA EXAMINAR O RN

Background

The Newborn Infant Physical Examination (NIPE) must be performed within 72 hours of birth by a qualified practitioner.[1]

The purpose of the examination of the newborn is:[2]

- To screen for congenital abnormalities that will benefit from early intervention
- To make referrals for further tests or treatment as appropriate
- To provide reassurance to the parents

A second examination is performed at 6-8 weeks of age, usually by GP, to identify abnormalities that develop or become apparent later.

Where to perform the NIPE

The NIPE exam should be undertaken in a private area which provides confidentiality for parents when personal information is being discussed.

The room should be warm and well lit (preferably natural light, especially if jaundice is to be assessed).[2] Visual inspection, however, cannot reliably assess the level of jaundice so if this is suspected a bilirubin level needs to be checked. [3]

You'll ideally require a changing mat to carry out the examination on.

Always make sure that the mother/parents are present for the newborn check, as an important part of the reason for the check is to answer queries and give reassurance.

Introduction

Wash hands:

- Hand hygiene is essential before and after the newborn check
- Always wash and use alcohol gel on your hands before examining the newborn
- Alcohol gel must dry completely before handling the newborn

Introduce yourself to the parents – state your name and role

Explain that you need to carry out a routine head to toe examination of their child.

Gain consent:

- Parents should have received the National Screening Committee leaflet '*Screening tests for you and your baby*' in the antenatal period
- If the parent has not read the information booklet they must be given a copy to read before to the examination
- The aims and limitations of the examination should fully explained

Ask the parent to undress the child down to their nappy.

Encourage the parents to ask questions during the check and to participate where appropriate.

The optimal way to perform the newborn check is by examining from head to toe sequentially. In reality, it's an opportunistic examination – if the baby is settled listen to their heart first, if they open their eyes check the red reflexes and if they're crying look at the palate!

Questions to ask the parents

Below are some key points you would ideally cover in a full assessment of a newborn baby. It should be noted however that in the context of an OSCE you are unlikely to be expected to cover all these history points due to time constraints.

- **Maternal history:**
  - Pregnancy – date/time and type of delivery/complications/high-risk antenatal screening results
  - Breech – if breech at 36 weeks gestation or delivery (if earlier), the baby will need to have ultrasound scan of their hips as there is an increased risk of developmental dysplasia of the hip
  - Risk factors for neonatal infection
  - Abnormalities noted on antenatal scans
  - Family history – First-degree relatives with…hearing problems/hip dislocation/childhood heart problems/congenital cataracts/renal problems

- **Newborn history –** feeding pattern/urination/passing of meconium/parental concerns

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Weight

Ensure that the baby's weight is recorded and check on a weight chart whether the baby is:

- Small for gestational age *(<10th centile)*
- Appropriate weight for gestational age *(10th-90th centile)*
- Large for gestational age *(>90th centile)*

If a baby is small, you should also plot head circumference and length to determine whether this is symmetrical (small in all measurements) or asymmetrical (weight disproportionately low, head circumference preserved).

***Asymmetrical growth restriction** is commonly due to placental insufficiency, whilst symmetrical growth restriction is more commonly due to fetal factors such as genetic abnormalities or intrauterine infection.*

General inspection

Colour:

- Pallor
- Cyanosis
- Jaundice
- Rashes/erythema

Cry – note the volume (*a weak cry may be an indicator the newborn is unwell*) – in reality, this is not a particularly helpful sign

Posture – note any gross abnormalities of posture (e.g. hemiparesis/Erb's palsy)

Tone

Assess tone by gently moving the newborn's limbs passively and observing the newborn when they're picked up (your assessment of tone should continue throughout the examination).

***Hypotonic infants** are often described as feeling like a 'rag doll' due to their floppiness. Hypotonic infants often have difficulty feeding, as their mouth muscles cannot maintain a proper suck-swallow pattern or a good breastfeeding latch.*

Head

Size

Measure head circumference and record it in the baby's notes.

Microcephaly *describes a head that is smaller than expected for age and sex. May be associated with reduced brain size or atrophy.*

Macrocephaly *describes a head that is larger than expected for age and sex. It may be normal, but may be associated with hydrocephalus, cranial vault abnormalities or genetic abnormalities.*

Shape

Inspect the shape of the head and note any abnormality.

Inspect the cranial sutures and note if they are closely applied, widely separated or normal.

Cranial moulding *is common after birth and resolves within a few days.*

Caput succedaneum *is a diffuse subcutaneous fluid collection with poorly defined margins (often crossing suture lines) caused by the pressure on the presenting part of the head during delivery. It does not usually cause complications and resolves over the first few days.* [4]

Cephalhaematoma *is a subperiosteal haemorrhage which occurs in 1-2% of infants and may increase in size after birth. The haemorrhage is bound by the periosteum, therefore, the swelling does not cross suture lines (in contrast to a caput succedaneum). Cephalhaematoma is more common with instrumental delivery and may cause jaundice, therefore, bilirubin should be monitored.*

Subgaleal haemorrhages *occur between the aponeurosis of the scalp and periosteum and form a large, fluctuant collection which crosses sutures lines. They are rare, but may cause life-threatening blood loss.*

Craniosynostosis *is a condition in which one or more of the fibrous sutures in an infant skull prematurely fuses, changing the growth pattern of the skull which can result in raised intracranial pressure and damage to intracranial structures. Surgical intervention is required with the primary goal being to allow normal cranial vault development to occur. This can be achieved by excision of the prematurely fused suture and correction of the associated skull deformities.* [7]

Fontanelle

Palpate the anterior fontanelle – *note if it feels flat (normal), sunken or bulging (abnormal)*

*A **tense bulging fontanelle** may suggest raised intracranial pressure – e.g. hydrocephalus*

*A **sunken fontanelle** may suggest dehydration.*

Skin

Colour – *pallor / cyanosis / erythema / jaundice*

Bruising / lacerations – *may be secondary to trauma during childbirth*

Facial birthmarks:

- Salmon patch
- Port wine stain
- Dry abrasions

Vernix – *waxy or cheese-like white substance found coating the skin of newborn human babies (normal)*

It is very important to document any birthmarks or bruising/lacerations from birth trauma found on initial examination in case there are any child protection concerns in the future. There are body maps in the red book to help with this.

Other potential findings

***Mongolian spot** is a benign, flat, congenital birthmark with wavy borders and irregular shape, usually located over the sacrum. It is most commonly blue in colour and can be mistaken for a bruise. They normally disappear within 3-5 years after birth.* [5]

***Nevus simplex** (stork bite, salmon patch) is a common congenital capillary malformation present in newborns, most commonly on the eyelid, glabella or back of the neck. It usually disappears during first year of life.*

***Naevus flammeus** (port-wine stain) is a vascular malformation that does not regress.*

Milia *are tiny white cysts containing keratin and sebaceous material. They are very common on the face, and most resolve within the first few weeks of life.*

Erythema toxicum *is a very common and benign condition seen in newborn infants. It presents with various combinations of erythematous macules, papules, and pustules. Lesions usually appear from 48 hours of age and resolve spontaneously.*

Neonatal jaundice *can be physiological, appearing at 2-3 days and resolving by day 10. It can also be caused by a wide range of different pathologies including haemolytic disease, infection and Gilbert's syndrome.*

Face

Appearance – *note any dysmorphic features*

Asymmetry – *e.g. facial nerve palsy*

Trauma – *likely to have occurred during labour (e.g. instrumental delivery)*

Nose – *patency of nasal passages – infants are obligate nasal breathers, therefore, will present with respiratory distress and cyanosis at rest if they have bilateral choanal atresia.*

Eyes

Inspect the eyes for evidence of erythema or discharge (*e.g. conjunctivitis*).

Inspect the sclera by gently retracting the lower eyelid noting any discolouration (*e.g. jaundice)*

Position and shape *(e.g. any ptosis, epicanthic folds)*

Assess for red reflex:

- Use your ophthalmoscope to assess for red reflex
- An absent red reflex requires immediate ophthalmology referral as it may suggest congenital cataracts or rarely retinoblastoma

Subconjunctival haemorrhages – *these look dramatic but are fairly common after delivery and benign, you should, however, document their presence*

Ears

Inspect the pinna – *asymmetry / prominence / accessory auricles*

Note position and any skin tags or pits

All infants should have a hearing screening test prior to discharge from hospital.

Mouth and palate

Clefts of the hard or soft palate – *The full palate should be examined by visual inspection. You will need to use a tongue depressor and a torch, and ask a parent to help keep the baby's head still. You must visualise the whole palate, and see the central uvula to ensure it is intact. You cannot rely on palpation to exclude a cleft.*

Tongue and gums – *inspect for evidence of tongue-tie (ankyloglossia)*

Neck and clavicles

Length of neck – *e.g. abnormally short in Turner's syndrome*

Webbing of the neck – *e.g. Turner's syndrome*

Neck swellings – *e.g. Cystic hygroma*

Clavicular fracture – *secondary to traumatic birth (e.g. shoulder dystocia)*

Upper limbs

Inspect for symmetry – *ensure equal in size and length*

Inspect fingers – *ensure correct number and morphology*

Inspect palms – *should have two palmar creases on each hand*

Palpate brachial pulses

Polydactyly is a congenital abnormality where there are supernumerary fingers or toes.

A single palmar crease is associated with Down's syndrome.

Chest

Inspect

Chest wall deformities *(e.g. pectus excavatum)*

Chest wall expansion – *asymmetry may be noted unilateral lung pathology (e.g. pneumonia)*

Lungs

Note any respiratory distress (e.g. subcostal or intercostal recession, tracheal tug, grunting) – normal respiratory rate is 30-60 in newborns

Auscultate the lungs:

- Auscultate to ensure there is air entry bilaterally
- Listen for any added sounds – *wheeze / crackles / grunting*

Heart

Auscultate the heart:

- Use a paediatric stethoscope
- Normal heart rate is around 120-150bpm
- Listen for any added sounds (murmurs)
- If a murmur is noted, try to identify where it is heard loudest and if it radiates anywhere

Pulse oximetry: Some centres recommend checking preductal and postductal oxygen saturations to improve detection of critical congenital heart disease in newborn infants. Both readings should both be ≥95% and within 3% of each other.

Abdomen

Inspect for evidence of abdominal distension

Inspect for evidence of any inguinal hernias – *will need paediatric surgical review*

Palpate the abdomen:

- **Liver –** *should be no more than 2cm below costal margin*
- **Spleen –** *may be just about palpable*
- **Kidneys –** *only palpable on deep bimanual palpation*
- **Bladder –** *should not be palpable*

Umbilicus

Inspect for any discharge or hernias

Note any offensive smell and erythema – *may suggest infection*

Genitalia

Note any ambiguity of genitalia – *e.g. congenital adrenal hyperplasia (in girls, boys with CAH will have normal genitalia)*

Males:

- Position of meatus (exclude hypospadias or epispadias)
- Size of penis – should be at least 2cm
- Hydroceles – *collection of fluid in the scrotum – transilluminates*
- Palpate scrotum to ensure both testes are present – *unilateral undescended testis is common and should be followed up over time; bilateral absence is considered a disorder of sexual development and should be investigated*

Females:

- Inspect labia – *ensure they are not fused*
- Inspect clitoris – *ensure it is normal size*
- Vaginal discharge – *white discharge is normal due to maternal oestrogens*

Lower limbs

Inspect limb symmetry – *should be equal in size and length*

Assess tone in both lower limbs

Assess movement in both lower limbs

Palpate femoral pulses – *This can be difficult, particular in an active baby, and requires practice! Weak, absent or delayed femoral pulses are a sign of coarctation of the aorta.*

Assess for oedema

Assess knees – *hyper-extensile/dislocatable*

Ankle deformities – *e.g. talipes*

Ensure correct number of digits on each foot

Hips

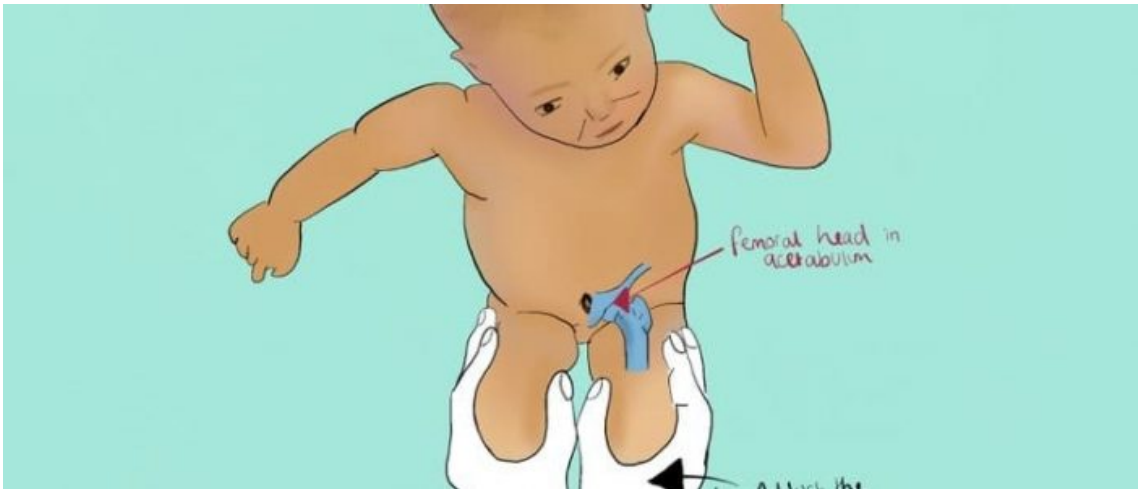
Barlow's and Ortolani's test are carried out as part of the routine newborn examination to detect hip joint instability and dislocation. Hips should be examined individually with all clothing and nappy off.

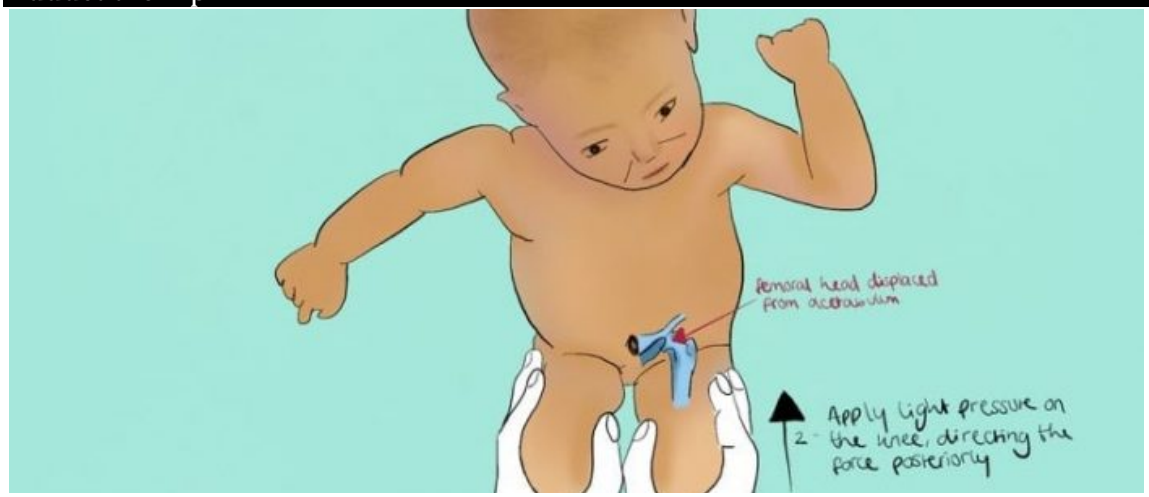
Barlow's test

1. Barlow's test is performed by adducting the hip (bringing the thigh towards the midline) whilst applying light pressure on the knee with your thumb, directing the force posteriorly. [6]

If the hip is unstable, the femoral head will slip over the posterior rim of the acetabulum, producing a palpable sensation of subluxation or dislocation.

If the hip is dislocatable the test is considered positive. The Ortolani maneuver is then used to confirm the positive finding (i.e. that the hip actually dislocated).

- 

Adduct the hip
- 

Apply gentle force posteriorly

1. 1
2. 2

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Ortolani's test

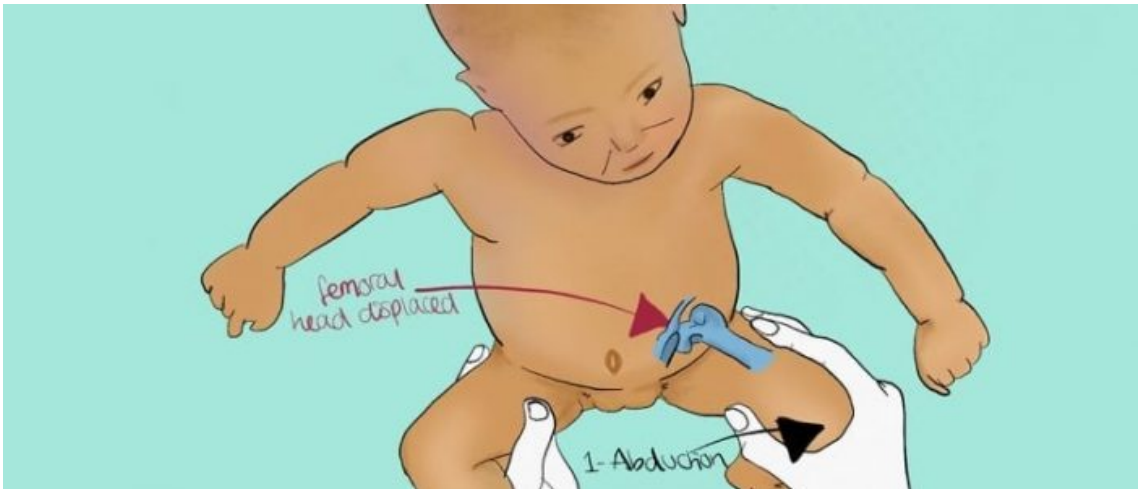
Ortolani's test is used to confirm posterior dislocation of the hip joint.[7]

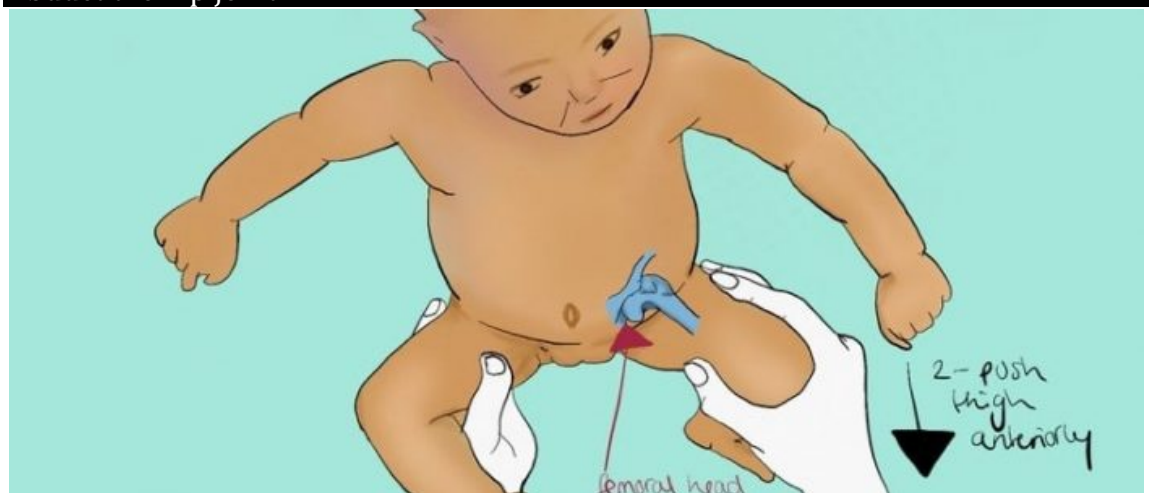
1. Flex the hips and knees of a supine infant to 90 degrees

2. Then with your index fingers placing anterior pressure on the greater trochanters, gently and smoothly abduct the infant's legs using your thumbs

A positive sign is a distinctive 'clunk' which can be heard and felt as the femoral head relocates anteriorly into the acetabulum.

This tests assesses specifically for posterior dislocation of the hip.

- 

Abduct the hip joint
- 

Push the thigh anteriorly

1. 1
2. 2

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Back and spine

Inspect the spine for:

- Scoliosis
- Hair tufts
- Naevus
- Abnormal skin patches
- Birthmarks
- Sacral pits

Hair tufts and sacral pits can be associated with underlying neural tube defects (spina bifida).

Anus

Inspect the anus for patency

Meconium should be passed within 24 hours – delay is suggestive of obstruction or Hirschsprung's disease

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Reflexes

Assess the newborn's reflexes

Palmar grasp reflex – When an object is placed in the infant's hand and strokes their palm, the fingers will close and they will grasp it with a palmar grasp. [8]

Sucking reflex – Causes the child to instinctively suck anything that touches the roof of their mouth.

Rooting reflex – Present at birth and disappears around four months of age, as it gradually comes under voluntary control. A newborn infant will turn its head toward anything that strokes its cheek or mouth to aid breastfeeding. [9]

Stepping reflex – When the soles of their feet touch a flat surface they will appear to walk by placing one foot in front of the other. [10]

Moro reflex – Support the infant's upper back with one hand, then drop back once or twice into your other hand. The legs and head extend while the arms jerk up with the fingers extended. The arms are then brought together and the hands clench into fists, and the infant cries. Asymmetry may be due to hemiparesis, brachial plexus injury or fractured clavicle.

To complete the examination…

Share the results of the assessment with the parents, explaining the reason for any referrals you feel are required

Ask if the parents have any further questions

Thank the parents

Offer to dress the baby or allow parents to do so (*depending on their preference)*

Wash hands

Document your findings and suggest any relevant investigations or referrals

- In the UK the NIPE is documented using a national online system (which you would print and place in the babies notes)