



ULTRASOUND INFANT HIP SCAN PROTOCOL

TRUST IMAGING DEPARTMENTS (RADIOLOGY)

AIM AND SCOPE OF PROTOCOL

Definition: Ultrasound screening of the infant hip for Developmental Hip Dysplasia (DDH) and dislocated hip in high-risk infants.

To include:

- Hip ultrasound pathway
- National hip risk factors
- Timeliness of ultrasound scan.
- Non-attendance (DNA) pathway
- Exclusions, limitations and repeat scans
- Guidelines on obtaining, recording and reporting images

APPROVAL PROCESS

Approved by	Date
Radiology Directorate Governance Meeting	13 th December 2023
Issue date	13 th December 2026
Key Amendments:	
Changes to timeliness of ultrasound scan in line with Standards and pathway in the NHS NIPE- SO3, SO4	March 2021
Changes to clarify hip ultrasound pathway	
Addition of DNA flowchart to appendices	
Changes to re-scan timing to allow onward referral < 10 weeks	May 2022
Complete review and update	December 2023

Around 1 or 2 in 1000 babies have hip problems that require treatment. Undetected unstable hips with delayed treatment may result in the need for complex surgery and/or long-term complications such as

- Impaired mobility and pain
- Osteoarthritis of the hip and back

Early diagnosis and intervention will improve health outcomes and reduce the need for surgical intervention.

Babies with hip screen positive results are identified at the 'Newborn and Infant Physical Examination' (NIPE) check. The scan referral outcome is entered onto the NIPE (S4N) system by the Antenatal and Newborn screening team. Public Health England (PHE) audit these outcomes quarterly directly from S4N.

Hip pathway: The screen positive pathway will apply to babies with either:

- Suspected dislocated or dislocatable hip(s) at clinical examination
- The presence of one or more national hip risk factors.

Screen positive results following new born examination are:

- Hip risk factors (NIPE hip examination)

Clinical findings:

- Different leg length
- Knees different level when hip and knee bilaterally flexed
- Restricted unilateral limitation of hip abduction (20% difference between the hips)
- Gross bilateral limitation of hip abduction, loss of 30% abduction or more
- Palpable 'clunk' when performing Ortolani manoeuvre- ultrasound within 2 weeks of age

National hip risk factors

- **Breech presentation:**
 - At birth (≥ 28 weeks gestation)
 - If breech presentation is corrected spontaneously or by external cephalic version at or after 36 weeks' gestation, the infant hips should be scanned.
 - Where one of a set of twins was breech presentation, both twins should be scanned. Where both twins are vertex presentation, no hip scan is required.
- **Family history:** DDH in a first degree relative (parent or sibling and half sibling) that required orthopaedic treatment i.e. splint or surgery for DDH. This does not include relatives with 'clicky' hips or those 'treated' with double nappies alone.

NOTES:

- Isolated 'clicks' in the absence of other positive factors are **NOT** screen positive. Where a second clinical opinion is obtained and the outcome still unclear an ultrasound may be considered. This is considered a local clinical referral and as such is not part of the national NIPE hip screening pathway.
- Asymmetrical skin creases are **NO** longer part of the NIPE screen.

Timeliness of ultrasound scan of the hips for developmental dysplasia

Infants with screen positive results on new born clinical examination should attend for hip ultrasound scan by 2 weeks of age. If this scan result describes immature hip, a re-scan will be arranged in another 4 weeks by local agreement.

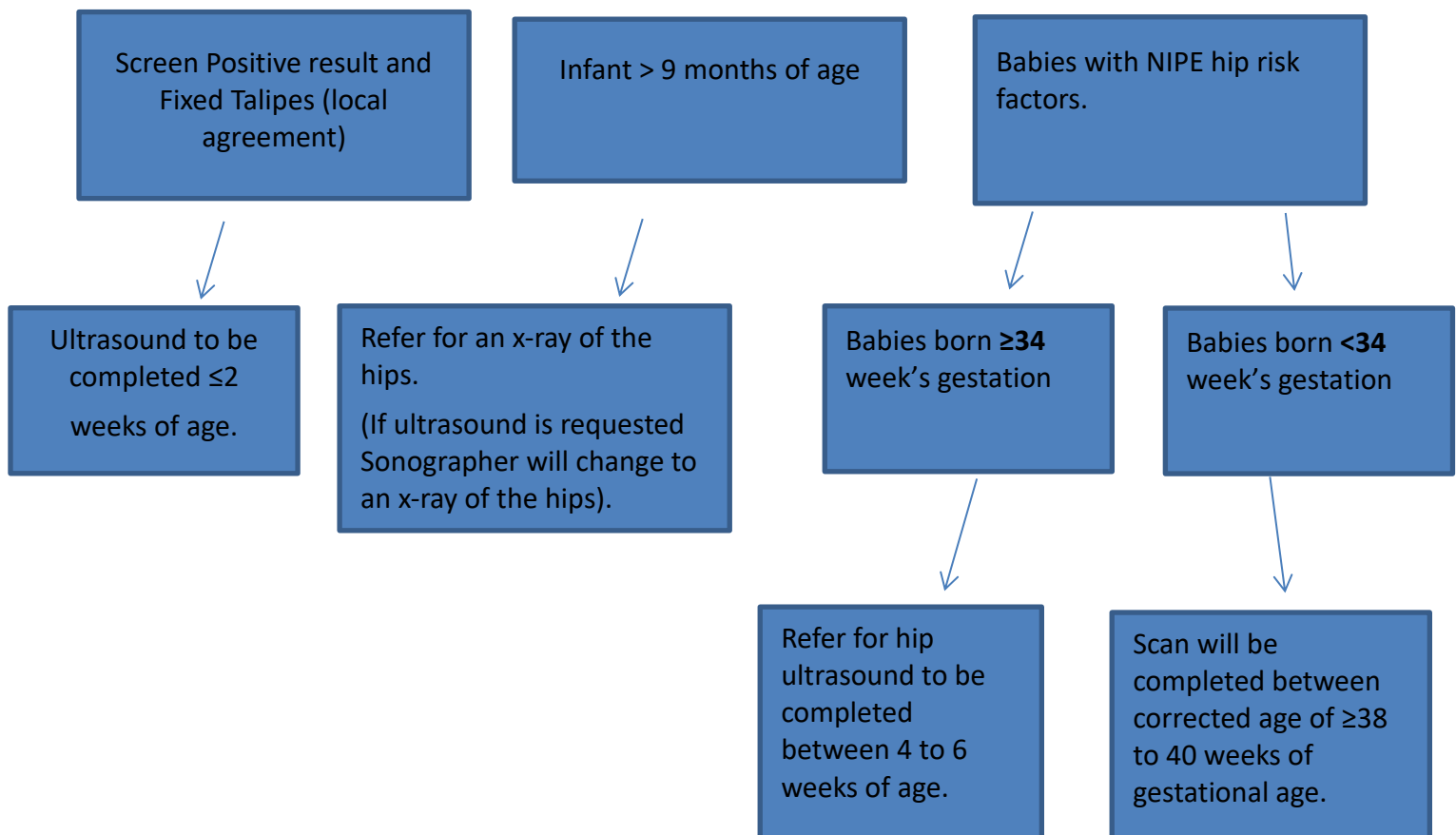
Infants with NIPE hip risk factors should undergo hip ultrasound by 6 weeks of age. For timeliness of scan see below:

- 4 to 6 weeks of age for babies born ≥ 34 weeks.
- 38 to 40 weeks corrected gestational age for babies born < 34 week's gestation.

Time scale of Initial ultrasound referral for screening of the infant hip for Developmental Hip Dysplasia (DDH) and dislocated hip in high-risk infants.

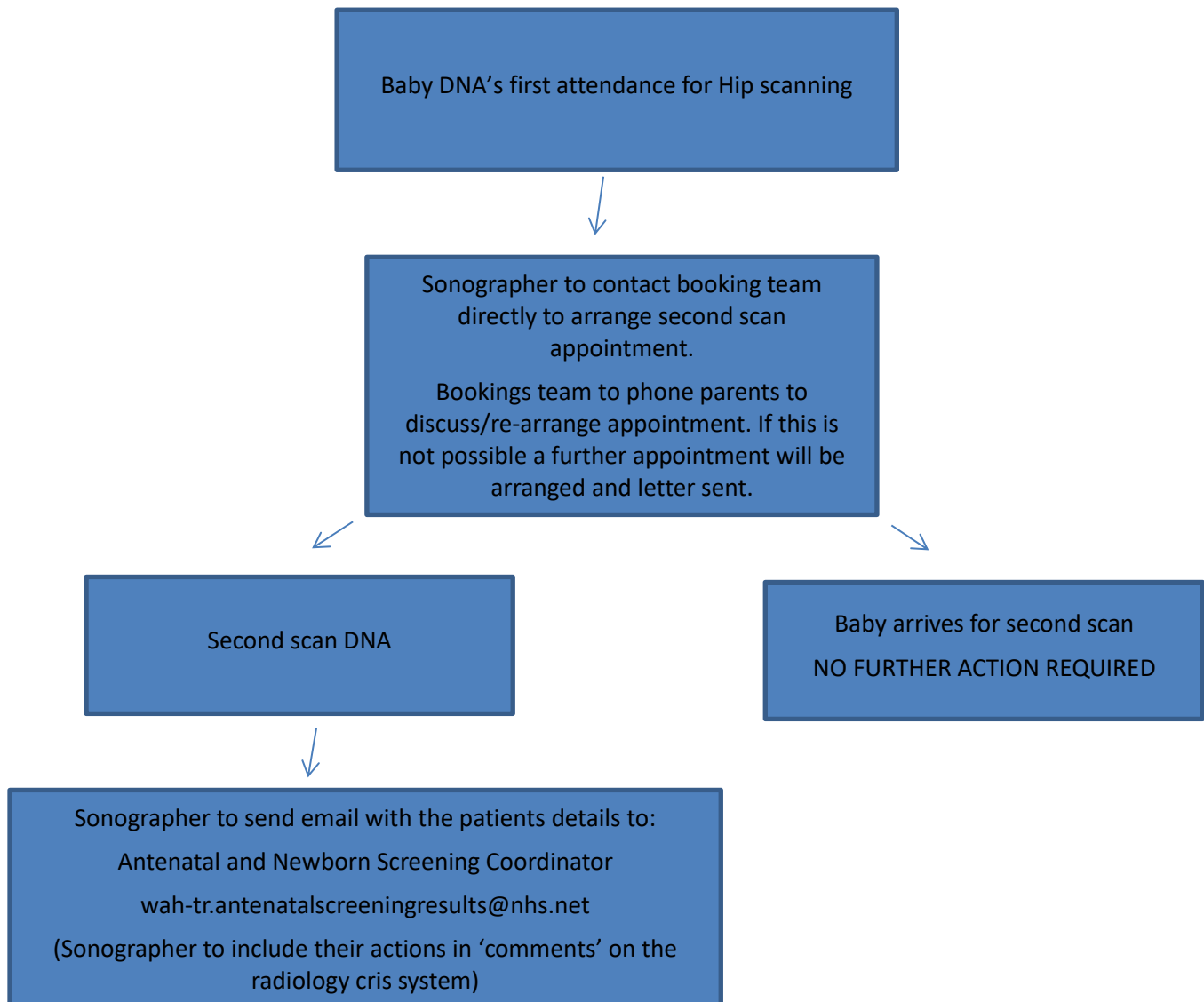
***ALL requests require justifiable history, EDD and gestational age at delivery. Insufficient/incorrect history – request rejected and Antenatal & Newborn Screening Co-ordinator notified:**

wah-tr.antenatalscreeningresults@nhs.net *



Non-compliance /DNA pathway

- A missed appointment (DNA) will trigger one further re-scheduling discussed with the family by telephone where possible. If this is not possible then a further appointment will be arranged and letter sent.
- Ultrasound referral cancelled after any further unexpected non-attendance and Antenatal and Newborn Screening Coordinator informed by e-mail (wah-tr.antenatalscreeningresults@nhs.net).



Exclusions:

- Ultrasound performed only at request of Consultant Paediatrician. General Practitioner concerns to be referred to Paediatrics for assessment.
- Infant aged over 9 months to be referred for x-ray rather than ultrasound. The limiting factor is the calcification of the femoral head nucleus. Where ultrasound is not successful due to calcification of the femoral head nucleus, the request will be converted to x-ray by the scanning sonographer.

Limitations:

- Infant movement
- Calcification of the femoral head nucleus.

Repeat scans:

- Repeat scan for Graf indicated immature hip booked within 4 weeks. The time-frame of the repeat scan may be adjusted to allow the infant to **SEE** an orthopaedic Consultant by the age of 10 weeks when the hip remains immature for age (pathological). NICE guidance suggests that referral should be made by 6 weeks but as the scan is being performed outside of a tertiary referral centre it is agreed with the Consultant Paediatrician team that all referrals should be made as soon as possible to ensure that orthopaedic review can occur by 10 weeks at the latest.
- Follow-up scan arranged by the reporting sonographer.
- Booking team to escalate ultrasound request to hip sonographers where there is difficulty booking scan within the correct time frame.

Guidelines on obtaining, recording and reporting ultrasound images:

Equipment selection:

- Ultrasound machine with DDH Hip protocol pre-set.
- Appropriate linear transducer (high frequency).
- Graf patient support.
- Foot pedal.

Patient preparation:

- Ask parent/carer to remove infant's lower clothing articles (usually leave nappy on) and place infant in the support.
- Parent/carer to be in the scan room and aid infant during the scan.
- Second member of staff to aide in infant immobilisation/correct placement.

Training:

- All sonographers involved in paediatric hip scanning must complete a recognised Graf technique course prior to commencement of training.
- Sonographers to complete Trust training 'Safeguarding Children level 3'.

Vetting:

- All paediatric hip scans to be vetted by one of the paediatric hip trained Sonographers.

Scanning Protocol:

The Graf technique is a recognised method to obtain reproducible, standardised images of the infant hip. This is based on a coronal image and the use of measurements to qualify the coverage of the femoral head by bony and cartilaginous roof.

Graf Anatomical identification checklist:

Identification of all landmarks on the ultrasound image to avoid diagnostic error

1. Chondro-osseous border
2. Femoral Head
3. Synovial fold
4. Hip joint capsule
5. Acetabular labrum
6. Hyaline cartilage roof
7. Bony roof
8. Bony rim (turning point)

Graf Standard sequence: To ensure that the cartilage roof is identified and not forgotten. Lateral to medial

1. Labrum
2. Hyaline cartilage roof
3. Bony roof

Graf usability check/standard plane: Standardised cross section of hip joint to allow reproducibility for measurement

1. Lower limb of ilium
2. Plane (cross section through mid- portion of the bony roof)
3. Acetabular labrum

Measurement Protocol:

- Measurements must only be carried out in the Graf method 'Standard Plane', therefore images used must comply with the Graf anatomical and usability checklists. Alpha and Beta angles to be on image used for measurement.
- Measurement lines should be drawn on the images using the measurement package on the ultrasound equipment and saved to PACS
- May not be able to perform measurements if the hip is decentred or other abnormality detected. Attempt measurements if possible.

Recorded Images: To include -

- Name of patient
- Date of birth
- Left or right-side marker
- Two standard plane images of each hip (not repeat images)
- One image of each hip with measurement lines included.
- Scale of magnification 1.7: 1

Report: Provided by the scanning Sonographer, to include -

- Name of patient
- EDD and post gestational age (weeks/days)
- Description of the hip
- Graf type
- Alpha measurement to be recorded on all reports to one decimal place.
- Beta angle measurements to be recorded to one decimal place when Alpha measurement is <60 degrees.
- Details of re-scan interval when required.
- Referral recommended for expert consultation and treatment via orthopaedics at Birmingham Children's Hospital (BCH) where the hip is clearly abnormal (very shallow, or dislocated Graf type IIc,III or IV)

- Recommendation to re-scan within 4 weeks if hips are immature at 4-6 weeks of age. Advise referral to BCH if hip is abnormal on the review scan.
- ALL scan reports requiring BCH opinion/referral must be sent to the referrer as a significant finding 'S'.
- Include radiology statistics code.

Graf Descriptive report:

Type	Bony roof	Bony rim region	Cartilage roof
I	good	Angular/blunt	covering
II	deficient/adequate	round	covering
III	poor	flat	Displaced upwards
IV	poor	flat	Displaced downward

Bibliography:

- Graf, R et al. (2014) Essentials of Infant Hip Sonography According to Graf. Sonocenter Stolzalpe
- WHAT –TP-047 Neonatal Guidelines Worcestershire key documents. Paediatric-Neonates Pathway (2015-2017) [
- Public Health England (phe screening.blog.gov.uk/2021/01/11) Standards and pathways are changing in NHS newborn physical examination screening (NIPE)
- Public Health England (2021) New-born and Infant Physical examination (NIPE) screening programme handbook [updated 28/4/21]. [Newborn and infant physical examination \(NIPE\) screening programme handbook - GOV.UK \(www.gov.uk\)](#)
- BMJ Best Practice – Developmental Dysplasia of the hip, [Developmental dysplasia of the hip - Symptoms, diagnosis and treatment | BMJ Best Practice](#)