Clinical Practice Guidelines

Surveillance for Developmental Dysplasia of the Hip in India: Consensus Guidelines From the Pediatric Orthopaedic Society of India, Indian Academy of Pediatrics, National Neonatology Forum of India, Indian Radiological and Imaging Association, Indian Federation of Ultrasound in Medicine and Biology, Federation of Obstetric and Gynaecological Societies of India, and Indian Orthopaedic Association

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ABSTRACT

Justification: When developmental dysplasia of the hip (DDH) is diagnosed during infancy, conservative management is often successful, with good long-term outcomes. In India, DDH is often not diagnosed until walking age and there are limited guidelines for its screening.

Process: A multidisciplinary Expert Group consisting of members of the Paediatric Orthopaedic Society of India, Indian Academy of Pediatrics, National Neonatology Forum of India, Indian Radiological and Imaging Association, Indian Federation of Ultrasound in Medicine and Biology, Federation of Obstetric and Gynaecological Societies of India, and Indian Orthopaedic Association worked collaboratively to develop surveillance guidelines for DDH.

Objectives: To enhance the early detection rate of DDH in India through development and implementation of a standardized surveillance care pathway, thus reducing the burden of late-presenting DDH.

Recommendations: Routine clinical hip examinations must be performed on all infants at birth and during immunization visits at these approximate time points: 6, 10, and 14 weeks; 6, 9, 12, 15, and 18 months of age. Assessments include Ortolani and Barlow tests for infants <14 weeks; limited hip abduction and leg length discrepancy for infants >14 weeks; and evaluation of limp in walking children. If clinical examination is abnormal or inconclusive, referral to orthopedic for further evaluation and management is recommended. In infants younger than 6 weeks with positive Barlow test but negative Ortolani test, hip ultrasound is recommended at 6 weeks of age. Infants must also be screened for DDH risk factors: breech presentation, family history of DDH, unsafe hip swaddling, and hip instability at any previous clinical examination. In infant with risk factors but normal clinical examination, further evaluation should include ultrasound taken no earlier than 6 weeks of age for infants younger than 14 weeks, ultrasound or *X*-ray for infants 14 weeks to 6 months of age, and *X*-ray for infants older than 6 months. Referral to an orthopedic surgeon is recommended if radiological tests are abnormal.

Keywords: *Care pathway, Early detection, Hip dislocation, Screening*.

Developmental dysplasia of the hip (DDH) represents a wide spectrum of hip abnormalities, present at birth or developed during infancy, that ranges from sub-clinical dysplasia to complete hip dislocation [1]. When DDH is diagnosed and treated during infancy, conservative management is often successful at achieving a safe and effective reduction with good long-term outcomes [2-5]. In contrast, DDH that is diagnosed after the child starts walking often results in the need for more complex surgical reconstructive procedures and can lead to significant morbidity [4-7]. A recent scoping review [8] estimated the incidence of DDH in India to be between 0-75 per 1000 live births when considering the entire spectrum of hip dysplasia, but the incidence of true DDH to be between 0 – 2.6 per 1000 live births. Until now, only limited guidelines have been available for DDH screening in India and DDH is often not diagnosed until the child starts walking [8-10]. The aim of this guideline is to

enhance the early detection of DDH through the development of a standardized surveillance care pathway, thus reducing the burden of late-presenting DDH. This guideline has been developed specifically for the Indian context, with the goal of identifying all cases of hip dislocation, instability and dysplasia before the child starts walking, but ideally before six months of age.

OBJECTIVES

To devise consensus guidelines for surveillance and diagnosis of DDH in India, so as to help healthcare providers detect most cases of DDH before walking age, and ideally before six months of age.

PROCESS

A multidisciplinary Expert Group consisting of members of the Paediatric Orthopaedic Society of India (POSI), Indian Academy of Pediatrics (IAP), National Neonatology Forum of India (NNFI), Indian Radiological and Imaging Association (IRIA), Indian Federation of Ultrasound in Medicine and Biology (IFUMB), Federation of Obstetric and Gynaecological Societies of India (FOGSI), and Indian Orthopaedic Association (IOA) was convened. The Executive Committee of each organization nominated representatives from various regions of the country to join the group, based on their expertise in DDH and leadership within their respective organizations. Care was taken to include representatives from all five zones of India and a wide range of experts working in the Government public healthcare sector, private sector and university teaching hospitals. Two representatives (one from IAP and one from IOA) represented the rural population. The resulting expert group, designated as the DDH India Care Pathway Working Group worked collaboratively to develop a list of consensus statements that were used to frame surveillance guidelines for DDH screening in India, as outlined in this document.

The guidelines were developed by the Expert Group, with technical support from the Department of Orthopaedics at the University of British Columbia, Canada. A three-phased process was used, consisting of a preparatory phase, a consensus-building phase, and a writing phase. The study methodology used in developing the guidelines was reported and published earlier [11]. In the initial phase, members reviewed the existing evidence during a series of virtual meetings beginning on 31 May, 2020 and concluding on 2 August, 2020. Group members participated in an informal literature review process in which presenters synthesized relevant high-quality articles on designated topics, including the incidence of DDH in India, clinical examination, the role of imaging, and comparisons of existing screening programs. A repository of literature was created and stored on a cloud-based server for group members to access at their convenience. In addition to the articles selected for group discussion, the repository included publications cited in a recent systematic review of DDH in children younger than 6 month [12], on the Delphi consensus process, and other articles selected by group members. Key topics included clinical examination, risk factors, the role of ultrasound and *X*-ray, and management of DDH. A preliminary survey of NNFI and IAP membership was designed and circulated to understand their knowledge and practices regarding DDH.

Delphi process: During the second phase, which began on 15 October 2020, group members participated in the Delphi process to reach consensus on a list of statements about DDH screening that were used to frame the

guideline. The Delphi approach employed two online rounds of surveys along with virtual meetings between each round until consensus was achieved [11,13].

Upon the conclusion of the consensus-building phase on 10 February, 2021, the final guidelines were drafted by a core writing group and then distributed to the Expert Group for feedback. During a final consensus meeting on 14 March, 2021, the group reviewed the guidelines prior to finalization and endorsement by the participating organizations. While no formal external review was performed, DDH experts from Canada (who were part of the American Academy of Orthopaedic Surgeons Clinical Practice Guidelines development) were integrated into the process to bring perspective from outside of the Indian context.

GUIDELINES

The Rashtriya Bal Swasthya Karyakram (RBSK) program under the National Health Mission (NHM), aims at providing child health screening and early intervention services for a number of pediatric conditions, including DDH. This current guideline aims to expand and elaborate upon the RBSK program, improving practicability, feasibility and effectiveness. The guidelines (**Fig. 1**) are broad in order to remain applicable to India's diverse public and private healthcare settings. The guidelines have been developed for use by a wide cadre of clinical healthcare providers, especially pediatricians, neonatologists, primary care physicians and other trained healthcare providers who care for children, so as to maximize uptake across the country.

The focus of this guideline is on 'surveillance' rather than 'screening' – emphasizing the concept of periodic physical examinations as part of regular well baby checks/immunization visits until the child is of walking age. For the Indian context, we have recommended regular clinical examination of the hips at every well-baby check/immunization visit in addition to selective imaging using ultrasound or *X*-ray for any baby with abnormal clinical finding(s) and/or risk factor(s) present. These recommendations are in alignment with those of the Pediatric Orthopedic Society of North America (POSNA), the American Academy of Pediatrics (AAP), the American Academy of Orthopaedic Surgeons (AAOS), and the Canadian Task Force on DDH.

To create ease of use, the recommended periodic hip examinations have been aligned with the immunization schedule recommended under the Universal Immunization Programme (UIP) and Government of India.

Terminology

Quality ultrasound: Refers to both accessibility of ultrasound and expertise in interpretation of its results in the area of practice, at the discretion of the screener. While ultrasound facilities are widely available in urban areas and even in rural regions of India, diagnostic ultrasound is tightly controlled under the restrictive Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act, 1994. Furthermore, expertise in performing and interpreting pediatric musculoskeletal ultrasound is often lacking in the country, and this must be considered by the healthcare provider while choosing the appropriate imaging tool for screening.

Routine hip surveillance: Refers to regular clinical hip examinations using age-appropriate tests that occur at birth and during well-baby checks/immunization visits.

Referral to Orthopedics: Referral should be to a pediatric orthopedic/orthopedic surgeon. While a pediatric orthopedic surgeon is preferable, whenever possible, an orthopedic surgeon is sufficient if a pediatric orthopedic surgeon is not available in the area of practice.

Inconclusive Exam: Refers to instances where the healthcare provider performing the clinical examination suspects hip instability or dysplasia but is uncertain of the clinical finding, or the examination lacks a definitive positive or negative result. If the examiner is unsure of the clinical examination or has reason for heightened suspicion of DDH, referral to a pediatric orthopedic/ orthopedic surgeon is prudent so as not to miss a potential case.

Clinical Examination Schedule

All babies should undergo routine clinical examinations of the hip to check for hip dysplasia. A newborn clinical examination is universally accepted to screen for DDH [14–16]. Clinical hip examinations will primarily be performed by pediatricians, neonatologists, and primary care physicians, but can be performed by any trained clinical healthcare provider involved in the care of children, including paramedical personnel. These examinations should occur at birth, before the baby and mother are discharged, and also during well-baby checks/immunization visits. To align with the national immunization schedule as much as possible, these examinations should occur at these approximate time points: at birth, 6 weeks, 10 weeks, 14 weeks, 6 months, 9 months, 12 months, 15 months, and 18 months of age.

Minimum Clinical Tests

There are many clinical tests that can be used to screen for DDH. The minimum clinical tests that are required for each age group are outlined in **Table I** and **Fig. 2**.

The Barlow and Ortolani tests (**Fig. 2a** and **b**) were established in the 1960s as critical clinical tests to determine instability and reducibility in the infant hip [14,17,21]. Both these tests are most effective in early infancy (up to 3 month of age), since they tend to become negative as the baby grows [3,15,21]. Consequently, other clinical tests such as leg length discrepancy (Galeazzi sign) (**Fig. 2c**) and limited hip abduction (LHA) (**Fig. 2d**) become more valuable over time [5,18–20]. Unilateral limitation of hip abduction beyond eight weeks of age is an important clinical indicator of pathologic DDH, with high specificity (>90%) and moderate sensitivity (>70%) [18,19]. A limp in the walking child can also indicate DDH. Bilateral hip dislocations can lead to hyperlordosis of the lumbar spine (exaggerated C-shaped lumbar curve) and a waddling gait. Unilateral dislocations may cause a short limb gait and a Trendelenburg lurch, in which the pelvis fails to remain in the neutral position but tilts downwards to the unaffected side.

Imaging Guidelines

Ultrasound: An ultrasound can be used as a screening tool anytime from birth to six months of age, provided that quality ultrasound imaging and interpretation is available. Beyond six months of age, the appearance and growth of the ossification centre of the femoral head begins to obscure key sonographic landmarks including the ilium [22,23]. Expertise in performing and correctly interpreting musculoskeletal ultrasound, especially in an infant,

may not be uniformly available, and thus, these guidelines provide practical alternatives if ultrasound accessibility and expertise is an issue.

X-ray**:** The earliest that an *X*-ray can be used as a screening tool is at 14 weeks of age**.** The recommended time to transition from ultrasound to *X*-ray imaging screening is between 4–6 months of age, as this is when the femoral head ossific nucleus typically becomes visible radiographically [5,24,25]. However, the working group reached consensus to give healthcare providers the option to perform an *X*-ray slightly earlier (14 weeks), as this aligns with the national immunization schedule and ensures that infants requiring imaging can still be screened if quality ultrasound is not available. The International Hip Dysplasia Institute (IHDI) classification [26] is a reliable radiographic system to quantify DDH severity using the midpoint of the proximal femoral metaphysis, rather than the femoral head utilized in the commonly used Tonnis criteria [26]. Consequently, the IHDI classification holds value even prior to ossification of the femoral head, enabling the use of *X*-ray when needed in these younger infants. Use of *X*-ray in this younger age group is only recommended if quality ultrasound is not available; in order to prevent potential missed cases that may arise if left without surveillance until after four months of age. A single antero-posterior (AP) pelvis radiograph is required for DDH screening, without the need of a frog-leg lateral radiograph [27].

Key imaging recommendations are outlined in **Box I**.

Guidelines As Per the Age of the Child

1. **Baby Younger Than Six Week**

*Clinical tests***:** The minimum clinical tests for babies less than six weeks of age include both Ortolani and Barlow tests.

Positive clinical exam: If the Ortolani test is positive, the baby should immediately be referred to a pediatric orthopedic/orthopedic surgeon for further management. This recommendation is consistent with the AAOS Appropriate Use Criteria (AUC) and AAP Guidelines [15,28].

*Positive Barlow test***:** If the Barlow test is positive, the baby does not require immediate referral to orthopedics, as these hips may spontaneously resolve [29]. Ideally, babies with a positive Barlow test should wait to obtain an ultrasound at six weeks of age, consistent with the AAOS AUC [28]. Prior to six weeks of age, most hip instability and morphologic abnormalities detected on ultrasound are due to immaturity of the hip joint. Most of these abnormalities spontaneously resolve during normal maturation and development of the hip joint in infancy [30,31]. Thus, ultrasound performed before six weeks of age is prone to detecting morphologic abnormalities that will self-resolve over time. However, if the examiner believes the baby is at risk for loss to follow-up, an ultrasound can be obtained right away. If quality ultrasound is not easily available, an AP pelvis *X*-ray should be scheduled at 14 weeks of age. Any abnormal imaging findings on ultrasound at 6 weeks or *X*-ray at 14 weeks should prompt a referral to orthopedics, again consistent with the AAOS AUC [28]. If imaging is normal, the baby can return to routine hip surveillance. Alternatively, if the first imaging is normal, an examiner can choose

to schedule an additional follow-up X-ray at six months. This additional follow-up imaging for a baby with an initial positive Barlow test is recommended, particularly if there are also risk factor(s) present.

*Normal clinical exam***:** If clinical examination is normal, babies must undergo risk factor screening, as the AAOS clinical practice guideline (CPG) found that there is moderate evidence to support additional imaging before six months of age for infants with breech presentation, family history of DDH or history of clinical hip instability [32].

*Inconclusive exam***:** If the clinical exam is inconclusive or uncertain, the baby should be referred to a pediatric orthopedic/orthopedic surgeon for further assessment.

2. Age Between 6 to 14 Week

*Clinical tests***:** The minimum clinical tests for babies in this age range include both Ortolani and Barlow tests.

*Positive Ortolani and/or positive Barlow test***:** If the Ortolani and/or Barlow tests are positive, the baby should be referred to a pediatric orthopedic/orthopedic surgeon. This recommendation is consistent with the AAOS AUC [28].

Normal clinical exam: If clinical examination is normal, the baby must undergo risk factor screening.

*Inconclusive exam***:** If the clinical exam is inconclusive or uncertain, the baby should be referred to a pediatric orthopedic/orthopedic surgeon.

3. Age Between 14 Week and 6 Month

Clinical tests: The minimum clinical tests for babies in this age range include both limited hip abduction and Galeazzi sign/leg length discrepancy (LLD).

Limited hip abduction and/or positive Galeazzi sign / LLD: If the baby has limited hip abduction and/or a positive Galeazzi sign/LLD, the baby should be referred to a pediatric orthopedic/orthopedic surgeon, consistent with the AAOS AUC [28].

Normal clinical exam: If clinical examination is normal, the baby must undergo risk factor screening [32].

*Inconclusive exam***:** If the exam is inconclusive or uncertain, the baby should be referred to a pediatric orthopedic/orthopedic surgeon.

4. Baby Older Than 6 Month

Clinical tests: The minimum clinical tests for babies >6 months who are younger than the age of walking include limited hip abduction and Galeazzi sign/leg length discrepancy (LLD). If the baby is walking, the minimum tests include limited hip abduction, Galeazzi sign/LLD, and limp.

Limited hip abduction and/or Positive Galeazzi sign / LLD and/or Sign of limp: If the baby has one or more positive clinical tests (limited hip abduction, positive Galeazzi sign/LLD, sign of limp), they should be referred to a pediatric orthopedic/orthopedic surgeon.

Normal clinical exam: If clinical examination is normal, the baby must undergo risk factor screening.

Inconclusive exam: If the examination is inconclusive or uncertain, the baby should be referred to a pediatric orthopedic/orthopedic surgeon.

Risk Factor Screening

All babies should be assessed for the presence of risk factors along with their clinical examination. With a normal clinical examination, the baby's risk factor status becomes important, since defined risk factors warrant additional screening regardless of clinical examination status. While girls are approximately 4 – 5 times more likely than boys to have DDH, with girls born breech having the highest risk [33], female sex alone will not be used as an indication for risk factor screening in this surveillance guideline. The risk factors are listed in **Box II**.

No risk factor(s) present: If no risk factors are present, the baby can return to routine hip surveillance.

One or more risk factors present: If one or more risk factors are present, the baby will require further imaging. The recommended imaging (ultrasound vs *X*-ray) will depend on the age of the child and the availability of the imaging tool (**Box I**). The AAOS clinical practice guideline described two moderate strength studies that suggested a significant role for further imaging in infants with risk factors of family history, breech presentation or history of clinical instability in order to prevent late detection of dysplasia or dislocation [39,43].

Any abnormal imaging findings should prompt a referral to orthopedics. If imaging findings are normal, the baby can return to routine hip surveillance.

Guidelines in the context of RBSK Program

The RBSK program provides valuable screening, examination and care recommendations for the detection and treatment of DDH in the government and public healthcare sector in India. The RBSK recommends that screening for DDH occur at the public health facility level at birth by Auxiliary Nurse Midwives (ANMs), Medical officers (MOs) or gynecologists, and by the mobile health team at anganwadi centers at six weeks and beyond. Children with positive clinical findings and/or risk factors are referred to the District Early Intervention Centre (DEIC) or District Hospital (DH) for further examination, imaging and treatment. Under the RBSK program, screening/examination is recommended to occur at birth, 6 weeks, and 3-, 6- and 12- months. The intent of the current guideline is to integrate, where applicable, with the existing RBSK guidelines and improve practicality and feasibility of its successful implementation. Endorsement by national professional organizations, whose members provide healthcare to children, will encourage adoption of these guidelines especially for infants who do not access public healthcare and hence do not come under the ambit of the RBSK program. A key difference this guideline presents from the RBSK program is a more structured surveillance schedule that links hip examinations with immunization visits. While the recommended clinical examinations are similar between the two guidelines (Ortolani / Barlow tests, limited hip abduction, Galeazzi sign/leg length discrepancy), the current guideline elaborates more on age-appropriate clinical tests and provides clear guidelines for referral. Additionally, the RBSK does not address availability of quality ultrasound, and consequently, does not discuss the important role of *X*-rays when ultrasound access is lacking.

Limitations

There are a few limitations to these guidelines. First, patients/families were not included as stakeholders in the care pathway development process. To facilitate timely completion and practicability of the project, a decision

was made to develop the pathway with relevant medical experts and stakeholders, and instead include patients/families in the implementation and knowledge translation phases. Second, the expert group lacked sufficient representation from rural areas, a limitation that will be addressed by recruiting involvement and input from rural practitioners in the implementation process. Third, discussion of the management of DDH was not within the purview of these guidelines. The aim was to develop screening and surveillance guidelines to ensure a timely referral to a pediatric orthopedic/ orthopedic surgeon, who would offer appropriate management using established treatment protocols.

We provide consensus guidelines for screening and surveillance of DDH in India (**Table II**), targeting the practicing pediatricians and trained healthcare workers in the country. We feel that widespread adoption of these will improve the outcomes of children with DDH with early diagnosis and timely initiation of treatment.

Contributors: AA,ES,JL: conceptualised and designed the study; AA,RPA,ES,JL: wrote the first draft of the manuscript. All authors commented on and edited initial versions of the manuscript. All authors read and approved the final manuscript. All authors agree to be accountable for all aspects of the work.

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Table I Clinical Tests for Screening for Developmental Dysplasia of the Hip As Per Age of the Baby

<14 weeks of age	*14 weeks – 6 months*	*> 6 months*
Ortolani test [17]	Limited hip abduction [5,18–20]	Limited hip abduction [5,18–20]
Barlow test [14]	Galeazzi sign / leg length discrepancy (LLD) [5,20]	Galeazzi sign / leg length discrepancy (LLD) [5,20]
		Limp (if child is walking) [5,20]

Table II Summary of Guidelines for Screening for Developmental Dysplasia of the Hip

Clinical workup	*Imaging recommendations*	*Timing for referral to orthopedics*
Risk factors: Breech presentation Family history of DDH Improper swaddling practices History of hip instability in any previous clinical exam *Clinical tests*: Ortolani test (<14 wk) Barlow test (<14 wk) Limited hip abduction (>14 wk) Galeazzi test/leg length discrepancy (>14 wk) Sign of limp (walking age)	*Indications for imaging*: One or more risk factor(s) present Positive Barlow in baby <6 wk Inconclusive/uncertain clinical exam *Age-dependent imaging recommendations:* 6 wk ultrasound for babies <6 wk of age Immediate ultrasound for babies 6-14 wk of age Immediate ultrasound or AP pelvis *X*-ray for babies between 14 wk-6 mo of age Immediate AP pelvis *X*-ray for babies >6 mo of age *Imaging alternatives*: Ultrasound before 6 wk of age if baby is at risk for loss to follow-up AP pelvis *X*-ray not earlier than 14 wk of age if quality ultrasound is not available	*Urgent* Abnormal imaging findings Abnormal clinical exam: - Positive Ortolani - Positive Barlow in baby >6 wk - Limited hip abduction - Positive Galeazzi test/leg length discrepancy - Limp in walking age child *Not urgent* Positive Barlow in baby <6 wk[a] *Referral not required* Normal physical exam and no risk factors present Normal imaging findings

[a]*May spontaneously resolve. Only refer if first imaging is abnormal.*

Box I Imaging Recommendations for Developmental Dysplasia of the Hip
Younger than 6 week *Recommendation*: Ultrasound at 6 weeks of age. *Alternative approach*: Ultrasound immediately, if potential for loss to follow-up. *X*-ray at 14 weeks of age, if quality ultrasound unavailable.
6 to <14 week *Recommendation*: Ultrasound at earliest possible time. *Alternative approach*: *X*-ray at 14 weeks of age, if quality ultrasound unavailable.
14 week to 6 month *Recommendation*: Ultrasound or AP pelvis *X*-ray, depending on availability.
Older than 6 month *Recommendation*: Antero-posterior pelvis *X*-ray.

Box II Risk Factors For DDH Screening

Breech presentation at any point after 36 weeks of pregnancy, irrespective of presentation at birth or mode of delivery.

Family history of DDH, defined as first-degree (parents, siblings) or second-degree (grandparents, aunts, uncles) relatives diagnosed with DDH.

Improper swaddling practices. Swaddling is the traditional practice of wrapping a baby in cloths or blankets that can tightly restrict limb movements. While swaddling has been shown to have several beneficial effects for the newborn, tight swaddling of the legs with the hips in extension and adduction can tighten the muscles around the hip joint and predispose to hip dislocation. 'Hip-safe swaddling' permits the lower limbs of the infant to be positioned loosely in a frog-leg attitude within the swaddle and allows space for the legs to have unrestricted flexion-abduction movements, facilitating normal hip development.

Presence of hip instability at any previous clinical examination.

Other risk factors historically associated with DDH, such as, oligohydramnios, multiple pregnancy, foot deformities, torticollis, asymmetric thigh or gluteal skin creases, and hip clicks, have not been included among risk factors warranting screening due to the lack of strong evidence of association.

Prepared from references 34-42. DDH - developmental dysplasia of the hip.

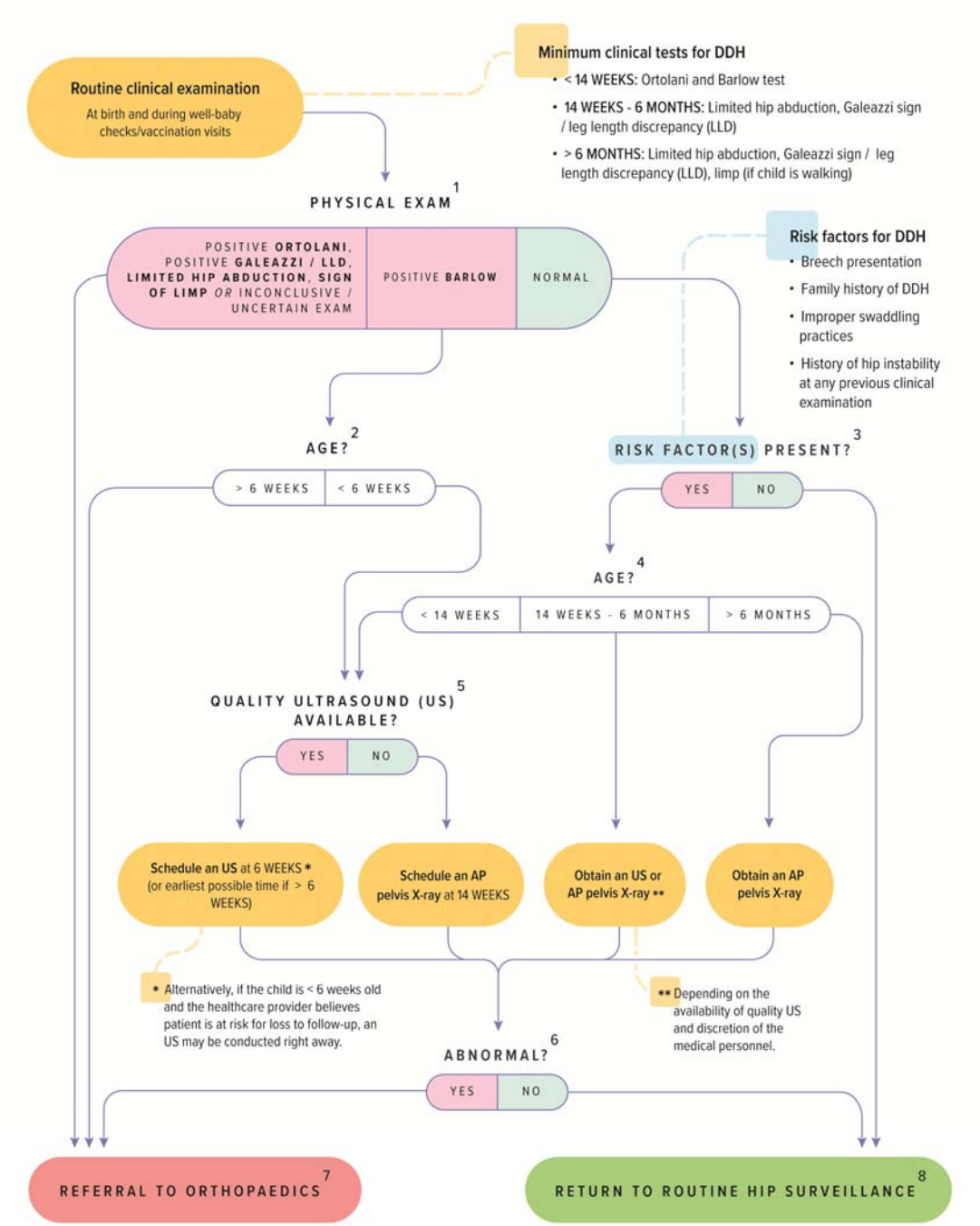

Fig. 1 Flowchart showing clinico-radiological surveillance protocol for screening infants for developmental dysplasia of the hip (copyrighted to the Paediatric Orthopaedic Society of India [POSI] and reproduced with permission).

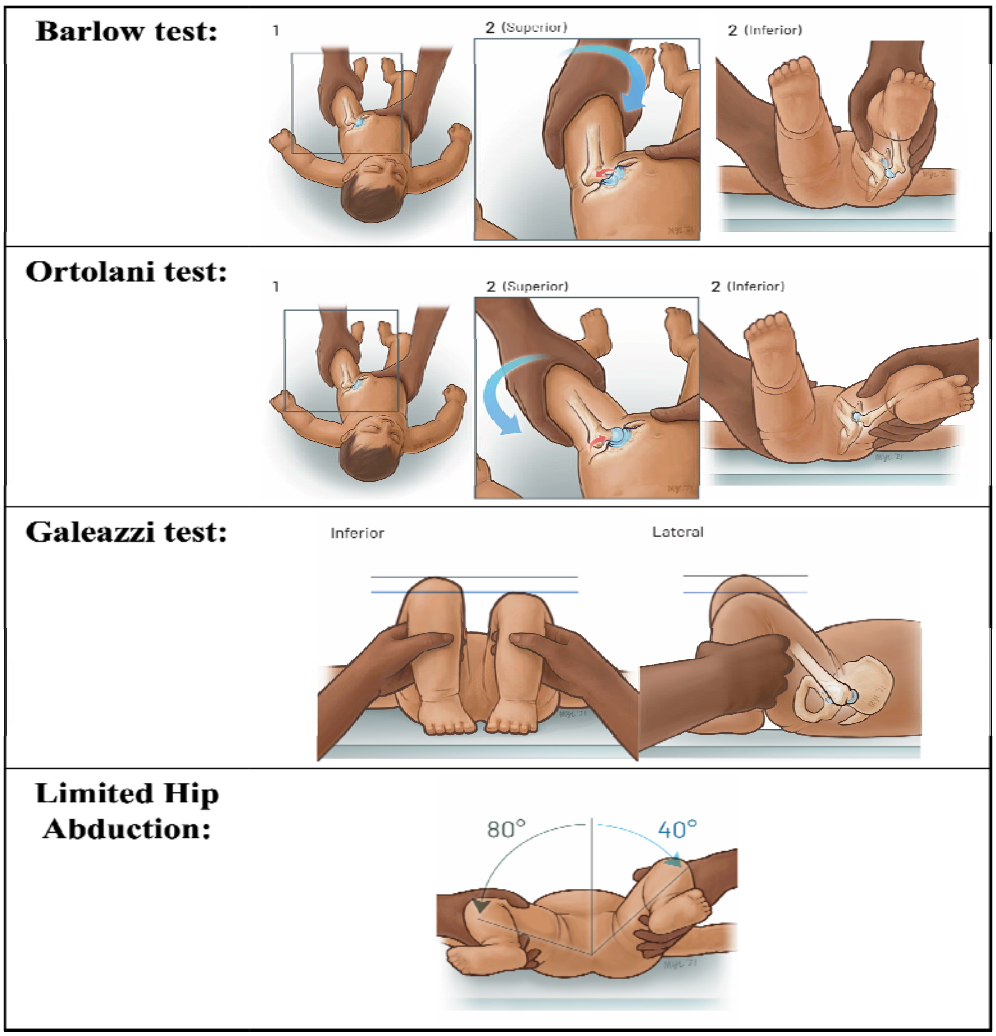

Fig. 2 Pictorial representation of various clinical tests used for screening of developmental dysplasia of the hip in infants (copyrighted to the International Hip Dysplasia Registry [IHDR] and reproduced with permission).

a: The Barlow provocative test is performed with the newborn positioned supine and the hips flexed to 90^0. The leg is then gently adducted while posteriorly directed pressure is placed on the knee. A palpable clunk or sensation of movement is felt as the femoral head exits the acetabulum posteriorly – this is a positive Barlow sign, which indicates hip instability.
b: The Ortolani maneuver is performed with the newborn in the supine position and the examiner's index and middle fingers placed along the greater trochanter with the thumb placed along the inner thigh. The hip is flexed to 90^0, and the leg is held in neutral rotation. The pelvis is stabilized with the other hand and the hip is gently abducted while lifting the leg anteriorly. With this maneuver, a "clunk" is felt as the dislocated femoral head reduces into the acetabulum.
c: The Galeazzi test is conducted with the infant supine, on a firm, flat surface with the pelvis stabilized and level. The hips are flexed to 90^0 and placed in neutral adduction/abduction, with knees in flexion. In this position, the vertical level of the knees can be assessed for asymmetry.

d: The clinical assessment of limited hip abduction (LHA) is made with the child supine with both hips flexed to 90^0 and full abduction of both hip joints is attempted. Any block to full abduction is noted from the horizontal, and the sign is considered positive if there is a limitation of $>20^0$ as compared to the opposite hip in unilateral cases or if $<60^0$ of hip abduction is possible on each side in bilateral cases [18–20].

ANNEXURE

NATIONAL DDH EXPERT GROUP

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