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Guidelines, Policies and Statements

Joint Statement by the Australasian Society for Ultrasound in Medicine and Australian and New Zealand Society for Paediatric Radiology

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Australian & New Zealand Society for Paediatric Radiology

Statement on the Use of Ultrasound in the Diagnosis of Developmental Hip Dysplasia and Dislocation

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1. Introduction

The Australasian Society for Ultrasound in Medicine (ASUM) is a multidisciplinary society whose mission is to advance the clinical practice of diagnostic medical ultrasound for the highest standards of patient care. A primary aim of ASUM is to promote, educate and disseminate standards of ultrasound practice in this continually developing specialty.

1.1. Background

The early and accurate diagnosis of developmental hip dysplasia and dislocation in young infants remains a significant problem. There are inadequacies in radiologic examination of the hip, while the femoral head and portions of the acetabulum remain cartilaginous, and it may be difficult to decide on the basis of clinical signs alone which infants will benefit from treatment. Both under-treatment and over-treatment of this condition can result in morbidity, while early diagnosis and treatment are associated with good results.

Ultrasound examination has played a significant role in improving the display of hip anatomy and dynamics during infancy and in improving the selection of patients for treatment. All those involved in these studies (or contemplating involvement) should, however, be aware that the accuracy and reliability of the results produced are dependent on the training and experience of those involved. Inadequacy in either the technique of the examination or its interpretation can readily lead to incorrect conclusions and serious long-term consequences for the infant.

The following information is provided as a guide.

2. Indications

1. Infants with abnormal clinical examination
2. Infants with risk factors for DDH, including:
    a. Asymmetrical skin folds
    b. Family history
    c. Breech presentation
    d. Skull or foot moulding anomalies
3. Follow up studies to monitor acetabular development
4. Following application of a brace or harness to confirm satisfactory enlocation

3. Optimal Age for Ultrasound Assessment

Infants with risk factors:	6 weeks of age
Infants with clinically dislocated hip:	Immediately

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Ultrasound is suitable for infants up to the age of 6 months – after which femoral head ossification interferes with ultrasound imaging. Scanning can be performed between 6 – 9 months initially as ossification development varies; however, in this age range if landmarks are not visible due to femoral head ossification, the patient should proceed to pelvis x-ray.

4. Personnel

A service in ultrasonography of the infant hip should only be provided by those ultrasound practitioners who have competence in the examination, and appropriate qualifications to perform a paediatric ultrasound.

5. Equipment

The examination should be performed with a linear array transducer of appropriate length, frequency and near field resolution in order to provide high quality images of bony margins, cartilage and soft tissue structures associated with the infant hip joint. The frequency of the transducer used should be 9L4 at its highest frequency, or even 12 MHz on tiny babies.

6. Technique

- The examination should provide high quality coronal images of the hip, with adequate display of the bony and cartilaginous components of the acetabulum, perichondrium, the fibro cartilage of the labrum, the femoral head, and its relationship to the acetabulum.
- The section must be aligned in an accurate coronal plane and the section obtained over the deepest portion of the acetabulum.
- It must be appreciated that minor differences in transducer alignment can substantially alter the apparent acetabular development and the apparent relationship of the femoral head to the acetabulum.
- The anatomical study of the hip joint should be complemented by an accepted dynamic method of functional testing for joint instability.
- When splinting is in place, the ultrasound technique may need to be modified according to the type of splint. In these cases, reports can be confined to the presence or absence of enlocation.
- When using established measurement criteria (eg. Graf, Harcke, Terjesen, etc) to assess morphology, the ultrasound practitioner ensures that measurements are accurately placed in the correct position on the correct image according to the established technique described.

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7. Training

All those undertaking this examination should be aware of the potential pitfalls in both technique and interpretation. A consistently high standard can only be achieved with an adequate and ongoing level of training of the operator.

As a minimum, training must ensure understanding of normal hip development and the pathology and evolution of developmental hip dysplasia. It should include a full understanding of the bony, cartilaginous and soft tissue components of the hip joint and adjacent structures, together with the patterns of deformity, which ensue with pathologic changes.

It is necessary to understand the normal variation in rate of maturation of the bony acetabulum, and its relationship to age. Standard practice would be to perform ultrasound at 6 weeks if risk factors are present, or to follow-up potentially immature hips identified on a neonatal ultrasound. If hips are normal at 6 weeks then no further follow-up is required, however, if hips remain 'immature' then a further ultrasound at 12 weeks should be performed, in consultation with an orthopaedic service.

Training may include attendance at courses or lectures as available, and attendance in departments experienced in this technique.

Training should ideally be acquired in a situation where there is close contact with referring clinicians and opportunity for follow up with ongoing evaluation of results.

8. Summary

The technique requires considerable experience in its application and interpretation, together with close attention to detail of technique. Only in this way will accurate and reproducible results be obtained. It requires frequent and ongoing involvement in the technique to maintain an adequate standard and is not recommended in situations where only occasional examinations are performed.

9. Related and Supporting documents

The following documents are required to give effect to this guideline:

1. ASUM Guidelines for Reprocessing Ultrasound Transducers.

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