

Contents

1 Technique

- 1.1 Equipment 2
- 1.2 Additional Equipment
for Hip Ultrasound 2
- 1.3 Image Projection 2

2 Anatomy and Ultrasound of the Normal Infant Hip Joint

- 2.1 Explanation of Terminology Used in
Describing the Ultrasound Anatomy .. 6
- 2.2 Ultrasound Characteristics of the
Different Tissues in the Region of the
Hip Joint 6
- 2.3 The Proximal Femur in Hip
Ultrasound 6
- 2.4 Femoral Head 7
- 2.4.1 Femoral Head Ossification Centre ... 10
- 2.4.2 Ultrasonic Problems and Difficulties
with the Nucleus 10
- 2.4.3 Synovial Fold and Joint Capsule
(Fig. 2.7a–d) 13
- 2.4.4 The So-Called Fluid Film 14
- 2.5 The Acetabulum (Fig. 2.8) 14
- 2.5.1 The Perichondrium of the Hyaline
Cartilage Acetabular Roof 14
- 2.5.2 The Acetabular Labrum 15
- 2.5.3 The Acetabular Fossa 16
- 2.5.4 Definition of the Osseous Rim
(Fig. 2.12) 17

3 The Standard Plane

- 3.1 The Principle of the “Standard Plane” 20
- 3.1.1 The Importance of the Three
Landmarks 21
- 3.2 The Problem of the Variable Bone
Coverage of the Femoral Head 21

- 3.2.1 Shape of the Posterior Section 21
- 3.2.2 The Mid Section 22
- 3.2.3 Anterior Sections (Fig. 3.7) 22
- 3.2.4 Exceptions and Variations on the
Typical Sectional Silhouettes 22
- 3.2.5 Definition of the Mid Section of
Acetabular Roof 25
- 3.2.6 The Question of Reproducibility 25

4 Identifying the Anatomy and Checking the Landmarks and Tilting Effects

- 4.1 Anatomical Identification 28
- 4.2 Checking the Landmarks 28
- 4.3 Checking a Hip Sonogram 30

5 Definition of Types

- 5.1 Type I 33
- 5.2 Type II 34
- 5.3 Type III 34
- 5.4 Type IV 35
- 5.5 Differentiation Between Ossification
and Degeneration 35
- 5.5.2 Structural Disorder (Degeneration) .. 36
- 5.5.3 How to Assess Echogenicity in the
Hyaline Cartilage Acetabular Roof ... 36

6 Ultrasound Classification

- 6.1 Description 40
- 6.1.1 Basic Terms and Possible Variations . 40
- 6.1.2 Exceptions to the Systematic
Description 42
- 6.2 Systematic Reporting of a Sonogram . 43

7 Measurement Technique

7.1	The Bony Roof Line (Fig. 7.1a)	46
7.2	Base Line (Fig. 7.2a–c)	46
7.2.1	Auxiliary Base Line (Help Line) (Fig. 7.2c/d)	48
7.3	Cartilage Roof Line (Fig. 7.3a–c)	48

8 Classification Using the Sonometer

8.1	The Alpha Values	52
8.1.1	Subdivision of the Type II Joint	52
8.1.2	The Sonographic Alpha Value and the Radiological AC Angle	53
8.2	The Beta Value	53
8.2.1	Type Ia and Type Ib Hips	53
8.2.2	Type D Hip	54
8.3	Classification in Premature Infants . .	55
8.4	Certainty of the Diagnosis	55

9 Instability

9.1	Elasticity “Elastic Whipping” (Fig. 9.1.b–d)	59
9.2	Pathological Instability	60
9.2.2	Definition of Pathological Instability .	60
9.3	Summary of the Principal Differences Between Elasticity and (Pathological) Instability	60

10 The Terminology of Dislocation**11 Scanning Technique**

11.1	Preparation	64
11.2	Leading and Guiding the Mother	64
11.3	Scanning Procedure	65
11.3.2	Obtaining the Picture	66
11.3.3	Obtaining the Sonogram of the Left Hip Joint	69
11.4	Errors	69

12 Errors Due to Tilting the Probe

12.1	Antero-posterior Tilting	76
12.2	Postero-anterior Tilting	76
12.3	Cranio-caudal Tilting	76
12.4	Caudo-cranial Tilting	76
12.5	Cradle and Probe-Guiding Equipment (Figs. 11.1c, 11.4b)	77

13 Documentation and Quality

13.1	Image Documentation	82
13.1.2	Suggestions	82
13.2	Written Report	82
13.3	Tips for Checking and Ensuring the Quality of One’s Own Sonograms . . .	82

14 Principles of Ultrasound-Based Management

14.1	Basic Biomechanical Aspects Behind the Principles of Treatment	84
14.2	Goals of Treatment	84
14.3	Stages of Treatment	84
14.3.1	The Preparation Stage	85
14.3.2	The Reduction (Fig. 14.1)	85
14.3.3	Retention	85
14.3.4	The Maturation Phase (= Ossification Phase)	87
14.3.5	Maturation Curve	88
14.4	Why Errors Occur	93
14.4.1	The Problem of the Doctor	93
14.4.2	The Parental Problem (Compliance Problem)	93

15 Appendix