Complete Summary

GUIDELINE TITLE

Developmental dysplasia of the hip.

BIBLIOGRAPHIC SOURCE(S)

Gunderman R, Strain JD, Cohen HL, Fordham L, McAlister WH, Slovis TL, Smith WL, Tosi L, Expert Panel on Pediatric Imaging. Developmental dysplasia of the hip. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 8 p. [38 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Babcock DS, Hernandez RJ, Kushner DC, Cohen HL, Gelfand MJ, McAlister WH, Parker BR, Royal SA, Slovis TL, Smith WL, Strain JD, Strife JL, Tosi L. Developmental dysplasia of the hip. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):819-27.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Developmental dysplasia of the hip (DDH)

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Family Practice
Pediatrics
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for developmental dysplasia of the hip (DDH)

TARGET POPULATION

- All infants in the United States
- Infants at high risk of developmental dysplasia of the hip (DDH)

INTERVENTIONS AND PRACTICES CONSIDERED

1. X-ray, bilateral hips, anteroposterior (AP) view
2. Ultrasound (US), bilateral hips

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1 to 9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of

each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Developmental Dysplasia of the Hip (DDH)

Variant 1: Patient <4 months of age, positive physical findings (Ortolani or Barlow maneuvers).

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, bilateral hips	8	Prefer to wait until the patient is at least 2 weeks of age to perform the US.
X-ray, bilateral hips, AP view	3	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Patient <4 months of age, equivocal physical findings.

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, bilateral hips	8	Prefer to wait until the patient is at least 2 weeks of age to perform the US.
X-ray, bilateral hips, AP view	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Patient <4 months of age, breech presentation or positive family history. Without physical findings.

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, bilateral hips	5	Prefer to wait until the patient is at least 2 weeks of age to perform the US.
X-ray, bilateral hips, AP view	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: Patient 4 months of age or older. Clinically suspicious for DDH (limited abduction or abnormal gait.)

Radiologic Exam Procedure	Appropriateness Rating	Comments
X-ray, bilateral hips, AP view	8	
US, bilateral hips	3	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 5: Clinically suspicious for teratogenic dysplasia.

Radiologic Exam Procedure	Appropriateness Rating	Comments
X-ray, bilateral hips, AP view	8	
US, bilateral hips	5	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Definition

Developmental dysplasia of the hip (DDH), formerly known as congenital dislocation of the hip, comprises a spectrum of abnormalities that affect the infant hip, including abnormal acetabular shape (dysplasia) and malposition of the femoral head ranging from mild subluxability to fixed dislocation.

Incidence

DDH affects 1.5 per 1,000 of the American Caucasian population; it less frequently affects African Americans. It is four to eight times more common in females. It is also more common in patients with a family history of DDH, in first-borns, in women with oligohydramnios, and in large infants. It is three times more common in the left hip than the right, likely due to the normal left occiput anterior position in utero, which places the left hip against the mother's spine and limits its abduction.

Etiology

The origin and pathogenesis of DDH are probably multifactorial. Abnormal laxity of the ligaments and hip capsule is seen in patients and families with DDH. The maternal hormone relaxin may also be a factor. Mechanical factors of reduced in utero space and movement restriction are thought to be causative in conditions such as oligohydramnios and being first born. Extreme hip flexion with knee extension, as in breech position, tends to promote femoral head dislocation and leads to shortening and contracture of the iliopsoas muscle.

Natural History

DDH has a bimodal clinical presentation, in the early neonatal period and late, at approximately 2 to 3 months of age. The acetabulum seems to be particularly

susceptible to remodeling during the first 6 weeks of postnatal life. The laxity and instability common in newborns may resolve spontaneously in the first month after birth, as in 80% of the cases, or progress to subluxation or dislocation.

Diagnosis

The diagnosis of DDH may be made by clinical examination or by imaging methods such as radiography or ultrasound (US). The timing and the selection of patients requiring imaging evaluation are controversial.

Clinical Evaluation

The clinical evaluation of the hips for DDH should be performed at each well-baby visit. The American Academy of Pediatrics recommends a well-baby visit at 1-2 weeks, and at 2, 4, 6, 9, and 12 months of age. As part of the clinical evaluation, it is important to elicit risk factors for DDH. Examination findings suggesting DDH include a positive Ortolani or Barlow test, asymmetric skin folds, and shortening of the thigh observed on the dislocated side. The Ortolani test consists of abducting and gently lifting the flexed thigh and pushing the greater trochanter anteriorly; this test is designed to enable the already dislocated hip to be detected by causing the femoral head to slip into the acetabulum; a "clunk" should be felt or heard. The second test, introduced by Barlow, consists of a gentle maneuver, with the thumb of one hand placed over the femoral neck and the fingers placed over the greater trochanter to try to 1) gently abduct the thigh and dislocate the femoral head posteriorly, and then 2) gently lift the thigh upward while abducting the leg with the fingers over the greater trochanter, endeavoring to relocate the femoral head in its socket. The Barlow test aims to elicit a dislocation followed by reduction and identifies unstable hips missed by the Ortolani test. Both tests are designed to detect instability between the femoral head and acetabulum, indicating ligamentous or capsular laxity.

In children older than 3 months of age, these tests are less likely to be positive. In the over 3-month age group, limitation of hip abduction and extra thigh folds secondary to shortening are more useful clinical signs of DDH. Once a child is walking, there is a typical limp and the child often toe-walks on the affected side. If both hips are dislocated, increased lumbar lordosis, prominent buttocks, and a waddling gait pattern are present. The physical exam may reveal a stable "clicking" hip, that is, a hip with no laxity but with a "click" elicited by the physical exam. The sensitivity and specificity of the clinical examination depend on the expertise of the evaluator. Effectiveness of clinical screening varies, depending on whether an orthopedic surgeon, experienced pediatrician, or intern performs the examination.

Radiographic Evaluation

In the first month of life, when the femoral heads are composed entirely of cartilage, radiographs are of limited value unless a dislocation is present. Instability may be undetectable, and evaluation of acetabular development is influenced by the infant's position at the time the x-ray is taken. By 4 to 6 months of age, radiographs become more reliable. They are readily available and relatively low in cost. Radiographs may be performed on patients with

neuromuscular disorders, myelodysplasia, or arthrogryposis (teratologic dislocation) to assess other bony abnormalities.

Radiography of the pelvis should be obtained with hips in neutral position. The von Rosen view, with legs at 45-degree angle, abduction, and thighs internally rotated, may be helpful in accentuating a dislocated hip that may not be apparent on routine views. Frog-leg view may be obtained to assess reduction when neutral view is abnormal.

Dislocation or subluxation of the femoral head can be recognized by evaluating the relationship of the ossific nucleus of the femoral head and metaphysis to the acetabulum. The nucleus of the femoral head ossifies at approximately 4 months (50^{th} percentile), with a normal range of 2 to 8 months. The ossified femoral head nucleus allows easy evaluation of the relationship of the femoral head to the acetabulum. However, if the nucleus of the femoral head is not ossified, its position can be estimated. In addition to evaluating the relationship of the ossific nucleus of the femoral head, the relationship of the proximal femoral metaphysis to the acetabulum must also be evaluated. The medial gap -- that is, the distance between the most medial portion of proximal femur and a line drawn perpendicular to the lateral edge of the acetabulum -- should not exceed 5 mm. Shenton's, Hilgenreiner's, and Perkin's lines provide an assessment of the lateral migration of the femoral head and neck. Shenton's line runs from the top of the obturator foramen and the medial femoral neck to the lesser trochanter, and should be a smooth curve. The proximal femoral metaphysis should not be lateral to Perkin's line, drawn through the superolateral corner of the acetabulum. It should also not be superior to Hilgenreiner's line, drawn through the triradiate cartilage.

As the child grows, adaptive changes of the hip joint and femur become more evident on routine radiography. In DDH, the roof of the acetabulum is vertically oriented, and often there is a delay in the appearance and growth of the ossific nucleus of the femoral head, as compared to the normal hip.

The radiographic evaluation consists predominantly of a visual assessment; however, measurement of the acetabular index is an objective parameter that may be used in the diagnosis and follow-up of patients with DDH. The 95% tolerance interval for intraobserver variability is 8.35 degrees, with interobserver variability exceeding intraobserver variability; this measurement error casts doubt on the reliability of the acetabular index based on a single reading.

Ultrasound Evaluation

A high-frequency linear array transducer should be used for US evaluation of the hip. Two methods have emerged: an acetabular morphology method proposed by Graf and a dynamic stress technique.

In 1980, Graf described a method of static US imaging in the coronal plane. In normal hips, the round, hypoechoic, speckled femoral head lies centered in the acetabulum. The Graf method is based on a single coronal image. The position of the femoral head, appearance of the bony acetabulum, configuration of the cartilaginous acetabular rim, position of the cartilaginous labrum, and shape and echogenicity of the cartilaginous roof are all assessed, and a visual assessment of

the hip is made. An important adjunct in the evaluation of the hips by this method is the alpha angle. This angle is obtained by drawing a line along the lateral aspect of the ilium and another line from the lower iliac margin in the acetabular fossa to the lateral edge of the bony acetabular roof.

Graf developed a morphologic and geometric hip classification scheme (types I-IV) using an alpha angle, which measures the osseous acetabular roof angle, and a beta angle, which defines the position of the echogenic fibrocartilaginous acetabular labrum. The hips are categorized according to the following classification:

- Type I hips are normal and require no treatment and no follow-up, the alpha angle is greater than 60 degrees.
- Type II hips are further subdivided into subtypes: IIa, IIb, IIc, and subtype D. In subtype IIa, seen in infants less than 3 months of age, the hip is normally located, but the bony acetabulum is immature (the alpha angle is between 50-59 degrees). These patients require no treatment but should be closely observed clinically and with US until they meet type I criteria, there is a small risk of delayed displacement or acetabular dysplasia in this group; therefore, follow-up is advised.
- Type III hips (low displacement) and type IV hips (high displacement) are usually very apparent clinically, and both require immediate treatment, the beta angle should be less than 55 degrees.

Harcke and Grissom, and others developed the dynamic or real-time method, which attempts to visualize the Barlow and Ortolani maneuvers on US. This technique is performed in both the coronal and transverse planes, with and without stress. The modified Barlow maneuver is performed by holding the knee with the hip flexed 90 degrees and in adduction. The femur is pushed (pistoned) posteriorly.

In 1993, at a meeting at the Alfred I. duPont Institute, Wilmington, Delaware, a North American standard for hip US was agreed upon which combines the two techniques. The standard consists of 1) a coronal view in the Graf format and 2) a transverse view with the hip flexed, with and without modified Barlow stress maneuver.

One study assessed the reliability of US assessment of neonatal hips. Five experienced observers commented on 62 scans of good quality selected at random. The mean kappa value was < 0.3 for the agreement of the shape of the triangular cartilage, the bony modeling, the shape of the promontory, and four other parameters. There was also very unsatisfactory agreement with regard to the beta and alpha angles described by Graf. The intraobserver variability was assessed with similar results: a kappa of < 0.67 and significant differences in the values of the alpha and beta angles were found.

The alpha angle is important when using the Graf technique; it separates intermediate type IIa hips (alpha angle=50°-59°), which require follow-up, from normal hips (alpha angle $\geq$ 60°). The difference between two measurements obtained several months apart on the same films was 2.3º (SD=10°). The large standard deviation results in a wide interval, approximately 40°, within which two separate measurements in the same patient could fall. Other authors have

reported similar findings regarding the reliability of US. This measurement error limits the usefulness of US measurements in following children undergoing treatment.

Other Imaging Modalities

Computed tomography (CT) and magnetic resonance imaging (MRI) may be used to evaluate DDH in patients with casts, late presentations, complex hip dislocations, or avascular necrosis. The primary use of CT in DDH is for follow-up purposes rather than for initial diagnosis. MRI may be used in complex dislocations and suspected avascular necrosis. Positive contrast arthrography is not indicated in the typical case, but may be performed when concentric reduction is questionable or difficult to maintain.

Timing of Evaluation

The goal of a screening program is to detect all patients with DDH early on, when therapy is most effective and noninvasive, and to eliminate those patients without DDH, in whom unnecessary treatment may be costly and harmful. Delayed diagnosis increases the risk of complications, and infants diagnosed after 6 months often require surgical correction. Two types of screening can be performed: generalized screening in which all neonates are evaluated, and selective screening in which only those at high risk are evaluated.

Generalized Screening

Clinical Evaluation

Currently, every neonate undergoes a routine physical examination that includes evaluation of the hips for stability. Despite neonatal physical examination screening programs, late presentation of DDH has not been eliminated. The incidence of late diagnosis with screening remains within the same range as that of late diagnosis without screening, albeit at the lower margin. However, it seems beyond debate that these tests for dislocation and dislocatability are far from accurate in identifying future cases of unequivocal dislocation of the hip.

Radiographic Evaluation

Radiographic evaluation during the first month of life is of limited value, because the hip may not be subluxed or dislocated at the time films are obtained, and secondary bony acetabular signs may not be present. However, radiographic screening at 3 months of age has been successfully implemented.

Ultrasound Evaluation

The major objectives of adding US to the evaluation of patients with DDH are to reduce the incidence of late diagnosis and to reduce the number of hips being treated. In one study, US evaluation of every neonate resulted in no late diagnosis of DDH. Others, however, have documented an increase in the number of treated hips and no difference in the incidence of late diagnosis of DDH. Another study reported a similar increase in the number of treated patients.

Selective Screening

Clinical Evaluation

All infants should be evaluated by physical examination at well-baby visits during the first year of life. A normal physical examination does not preclude the development of a dysplastic hip in an infant. Therefore, imaging (by radiography or US) should be performed despite a normal physical exam in all infants at risk. Because instability often resolves spontaneously by 2 weeks of age, evaluation for instability should not take place before then.

Radiographic Evaluation

By 6 weeks of age, radiographic changes in the acetabulum and lateral displacement of the femoral neck and metaphysis can be recognized. A radiographic screening program can be successfully implemented for infants at 4 months of age who were clinically normal at the neonatal exam but are considered to be at risk for DDH.

Ultrasound Evaluation

When US is used to evaluate high-risk infants, a not statistically significant trend toward a reduction in the number of late dislocations is observed, because DDH is diagnosed late in patients with no risk factors or abnormal clinical exam. Regarding the impact of US on the number of hips treated in high-risk patients, the results depend on the timing and frequency of examination. Resolution of US abnormalities occurs in approximately 50% of patients found initially to have major laxity on US. Of US abnormalities found using the Graf methodology, 96% spontaneously resolve. If US is used once during the newborn period and therapy is instituted on the basis of the US findings, the number of treated hips is substantially higher than if ultrasound is not used. The alternative approach of frequent monitoring of a group of high-risk patients requires significant resources. In addition, if a normal US were initially performed at 6 weeks of age rather than at birth, the number of lax hips requiring follow-up examinations would be significantly reduced. Therefore, US evaluation of high-risk patients should be performed at approximately six weeks of age.

In one study, patients were treated on the basis of their clinical findings, not the US results. The authors concluded that newborn infants who appear normal on clinical examination but whose US findings are abnormal or suggestive of DDH do not need treatment from birth; most of these infants' hips "settle" spontaneously; that is, the laxity resolves.

The routine use of US in screening all neonates and infants cannot be recommended. A prospective, randomized, controlled trial of over 15,000 infants showed no significant difference in the rates of detection in infants screened with US versus those screened with high-quality serial physical examinations. A systematic review of US screening for DDH found that, compared to clinical screening, US screening may increase treatment rates, but is also associated with shorter and less invasive treatment. The authors concluded that evidence is lacking either for or against general US screening of newborns for DDH.

Evidence-based medicine reviews have suggested that US evaluation should be regarded as the technique of choice for evaluating high-risk infants (especially breech presentation and positive family history), clarifying equivocal physical examination findings, and monitoring treatment in infants with DDH.

In a 33-center study by the United Kingdom Hip Trial, the use of US examinations in infants with clinically detected hip instability allowed a reduction in abduction splinting and was not associated with an increase in abnormal hip development, higher rates of surgical treatment, or significantly increased healthcare costs. In a 10-year prospective study of 34,723 British infants, 2,578 with clinical instability or risk factors were imaged with US. Instability was present in 77, of whom only 31% had a risk factor. The authors concluded that selective US examination may be justified for infants with clinical instability, family history of DDH, breech presentation, and postural foot deformity. In an Irish study of 52,893 infants, US examination was performed on 5,485 infants who had a first-degree relative with DDH, breech presentation, or a persistent "click" in an otherwise stable hip. Eighteen (.33%) were found to have dislocated hips, and 153 (2.78%) were found to have dysplastic hips. Based on the finding that 3.2/1,000 infants required treatment, the authors conclude that US screening in infants with such risk factors is worthwhile.

Treatment

Early treatment results in improved outcome. Although there is agreement in the literature that patients with displacement should be treated and that those with stable "clicking" hips should be followed clinically, there is some disagreement regarding the treatment of patients with unstable (lax, but not displaced) hips. Some advocate early treatment for every patient with instability. Others prefer clinical observation, because a significant number of these patients (80%) progress spontaneously to clinically normal status.

Abbreviations

- AP, anteroposterior
- US, ultrasound

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for evaluation and early diagnosis of developmental dysplasia of the hip (DDH)

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Gunderman R, Strain JD, Cohen HL, Fordham L, McAlister WH, Slovis TL, Smith WL, Tosi L, Expert Panel on Pediatric Imaging. Developmental dysplasia of the hip. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 8 p. [38 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1999 (revised 2005)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Pediatric Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Richard Gunderman, MD, PhD; John D. Strain, MD; Harris L. Cohen, MD; Lynn Fordham, MD; William H. McAlister, MD; Thomas L. Slovis, MD; Wilbur L. Smith, MD; Laura Tosi, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Babcock DS, Hernandez RJ, Kushner DC, Cohen HL, Gelfand MJ, McAlister WH, Parker BR, Royal SA, Slovis TL, Smith WL, Strain JD, Strife JL, Tosi L. Developmental dysplasia of the hip. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):819-27.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® *Anytime*, *Anywhere*™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

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