



Acetabular dysplasia

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Acetabular dysplasia

- Definition
- Causes
- Signs & symptoms
- Classification

Definition

underdeveloped or shallow, upwardly sloping acetabulum



Causes

- Not all acetabular dysplasia is due to DDH
- Concave acetabulum cannot develop without concentric force exerted by reduced femoral head

Causes other than DDH

- Cerebral palsy
- Hereditary motor and sensory neuropathy
- Poliomyelitis
- Hyperlaxity
- Down's syndrome
- Ehlers-Danlos syndrome
- Skeletal dysplasias
- proximal femoral focal deficiency
- Perthes' disease
- Triradiate cartilage injury (sepsis/trauma)

Symptoms

- Range depending upon level of dysplasia
- Insidious/acute
- Sharp, activity-related groin pain
- Exacerbated by pregnancy/weight gain
- Exacerbated by rising from seat, downstairs, sudden rotation
- Instability
- clicking

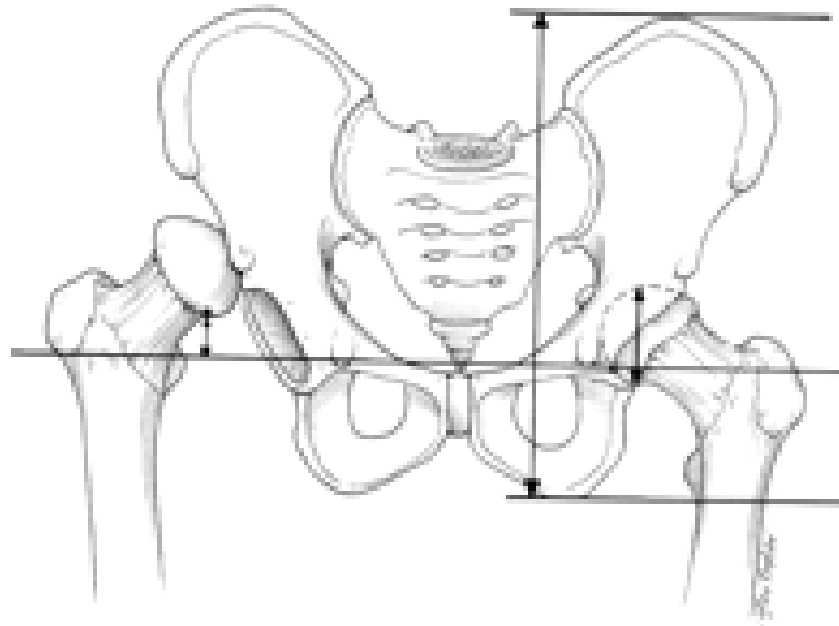
Signs

- Maybe normal
- FROM – internal rotation in flexion painful
- Impingement in flexion, adduction & internal rotation
- Antalgic gait
- Trendelenberg positive
- Shortening: subluxation/dislocation, OA, femoral osteotomy
- Signs of PMH: surgery, hypermobility, neuro disorder
- Lump sign – palpable femoral head in groin

Classification

Crowe classification (USA, 1979)

Hartofilakidis classification (Greece, 1988)



Crowe Classification

More recently, Harris and associates described the use of femoral-head bone-grafting for severe acetabular dysplasia⁵. Other methods for support of the acetabulum have also been described³, but follow-up on the involved patients has not been extensive.

In this paper we report on thirty-one total hip replacements in twenty-four patients with secondary degenerative arthritis due either to complete congenital dislocation of the hip or to subluxation of severe degree. Follow-up averaged four years. Six of these hips required bone graft as part of the reconstruction of the

had had mild intermittent aches in the groin or thigh region. The pain began to be more severe between the third and fifth decade of life, with the peak onset being in the fourth decade. The interval between onset of severe pain and total hip replacement ranged from two to thirty-five years, with an average of thirteen years.

Nine patients had associated symptomatic degeneration of the knees, and four of them had genu valgum. Ten patients had symptoms from degenerative joint disease of the lumbosacral spine.

Each patient was rated preoperatively according

- I - <50% subluxation or proximal displacement 10% of pelvic height
 - II – 50-75% subluxation or 10-15% displacement
 - III – 75-100% subluxation or 15-20% displacement
 - IV - >100% subluxation or displacement >20%
-
- 31 THR in 24pts were classified into groups depending on AP pelvis

, AND C. S. RANAWAT

E I

RY — HIP RATING SYSTEM*

Walking

- | | | |
|---|-------------------------|--|
| 0. Bedridden. | | |
| 2. Wheelchair. Transfer activities with walker. | | |
| 4. No support — house bound or | } Markedly restricted | |
| One support — less than one block | | |
| Bilateral support — less than three blocks | | |
| 6. No support — less than one block | } Moderately restricted | |
| One support — up to five blocks | | |
| Bilateral support — unrestricted | | |
| 8. No support — limp | } Mildly restricted | |
| One support — no limp | | |
| 10. No support or appreciable limp — unrestricted | | |

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FIG. 1

Anteroposterior roentgenogram of a patient with a dislocation of the left hip. In the normal right hip the head-neck junction lies 0.6 centimeter below the line joining the teardrop. The left hip head-neck junction is 2.8 centimeters above the teardrop, and this represents the degree of subluxation.

The ratio (1.5) of the diameter of the femoral head (solid bar on right) and the height of the pelvis (hatched bar on extreme right) represents

I: <50% subluxation

II: 50 - 75%

III: 75 - 100%

IV: >100% subluxation

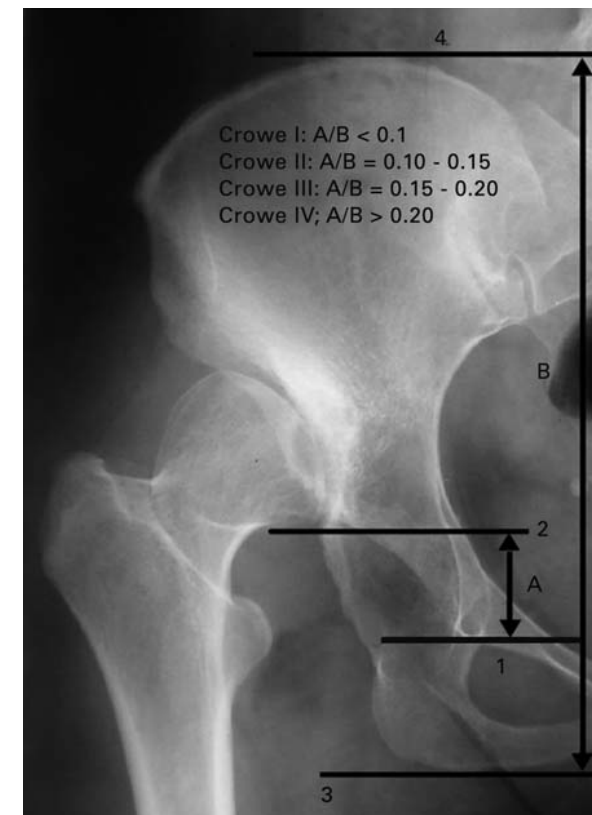
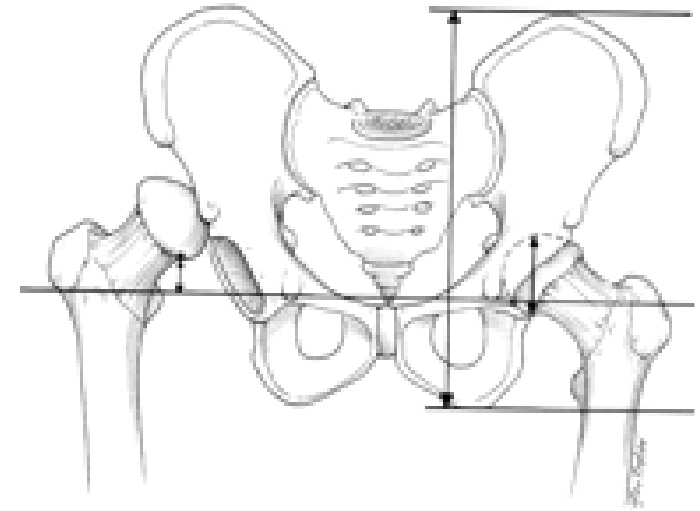
To calculate, first measure the height of the femoral head

If head deformed, take 20% of the total pelvic vertical height as the estimation of femoral head height

Next, measure the vertical distance from the inter-teardrop line to the inferomedial head-neck junction

Divide that distance by the femoral head height

Eg. : If the head is 40 mm and migrated 20 mm proximally (20/40), migrated 50%



Crowe classification summary

- I - <50% subluxation or proximal displacement 10% of pelvic height:
 - Minimal abnormal development
- II - 50-75% subluxation or 10-15% displacement
 - Acetabular rim horizontal, but head not dislocated
- III - 75-100% subluxation or 15-20% displacement
 - Acetabulum lacks roof, false acetabulum starts forming
- IV - >100% subluxation or displacement >20%
 - Dislocated. Femur high up pelvis.

Hartofilakidis Classification

The operation is technically demanding because of the disordered anatomy and has many pitfalls, but is possible with specially designed implants. The lack of these must be one reason for Sir John Charnley's rather pessimistic view of replacement in such cases (Charnley and Feagin 1973). More recently, a number of papers on comparatively small numbers of cases have reported good results with various surgical techniques (Coventry 1976; Dunn and Hess 1976; Harris, Crothers and Oh 1977; Hess and Umber 1978; Crowe, Mani and Ranawat 1979; Fredin and Unander-Scharin 1980; Woolson and Harris 1983; Buchholz et al. 1985).

We present our experience with 42 hips and discuss the special surgical techniques we have used.

into contact with the upper lip of the true one.

In contrast, in the dysplastic hip (Fig. 4) the femoral head is partly contained within the original acetabulum though often with a steep inclination accentuated wear, while osteophyte formation may produce a picture of two overlapping acetabula.

PATIENTS AND HIP

From 1974 to 1986 we performed 42 total hip replacements on 34 patients with neglected CDH. We have included dysplastic hips, only true dislocations. Three of the 42 operated hips were "high" dislocations and nine were "low". The height of the dislocation was recorded by the method of Crowe et al. (1979), measured

- Hartofilakidis G et al. JBS Br 1988; 70: 182-6

Dysplasia



AL DISLOCATION OF THE HIP

Fig. 1c

Low dislocation



TY FOR OLD UNREDUCED CONGEN

. 1a

Fig. 1b

Cadaveric specimens to show

High dislocation



LOW FRICTION ARTHRO



Hartofilakidis classification summary

| | | |
|------------------|---|---|
| Dysplasia | The femoral head is contained within the original acetabulum despite the degree of subluxation | Segmental deficiency of the superior wall Secondary shallowness due to fossa-covering osteophyte |
| Low dislocation | The femoral head articulates with a false acetabulum which partially covers the true acetabulum to a varying degree | Complete absence of the superior wall Anterior and posterior segmental deficiency Narrow opening and inadequate depth of the true acetabulum |
| High dislocation | The femoral head is completely out of the true acetabulum and migrated superiorly and posteriorly to a varying degree | Segmental deficiency of the entire acetabulum with narrow opening Inadequate depth Excessive anteversion Abnormal distribution of bone stock, mainly located superioposteriorly in relation to the true acetabulum |

- Hartofilakidis G et al. Congenital hip disease in adults. JBJS Am 1996; 78; 5: 683-92

Which classification system?



**Inter- and intra-observer variability of the
Crowe and Hartofilakidis classification
systems for congenital hip disease in adults**

- **Both systems equally reliable
& reproducible, good inter- &
Intra-observer reliability**

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Pre-op imaging

- X-rays – standing AP pelvis, Judet views, functional pelvic view (supine, hip adduction & int rotation), templating
- CT scan (3D recon) – early degen change, diameter & depth of acetabulum, bone stock, femoral & acetabular version, CAM on femoral neck, analysis of prev surgery, templating
- MRA – labral tears & assessment of articular cartilage. Rarely used

Treatment

- Dependent upon degree of symptoms, degree of dysplasia, patient goals
- Reorientation of acetabulum to normal joint-contact pressures
- Major problems: reconstruction of acetabulum, lengthening, implantation of femoral component in narrow canal.
- Karachalios T, Hartofilakidis G. Congenital hip disease in adults. JBJS Br 2010; 93: 914-21

Surgical options

- **Peri-acetabular osteotomy (PAO)**
 - Relieves pain, improves function, delays progression of OA
 - Type depends upon aims of surgery
-
- Millis et al. Rationale of osteotomy and related procedures for hip preservation: a review. Clin Orthop 2002; 405: 108-21

THR

- **Acetabulum**
- Placement of acetabular component at level of true acetabulum
- Uncemented cup if can achieve 80% cover
- Auto/allograft augmentation of superior structural defects – good short term, ? poor long-term
- False acetabulum cup placement – longer lever arm for body weight, abductor shortening, shear forces

Thank you

