Η ΕΞΕΛΙΞΗ ΤΩΝ ΠΑΘΗΣΕΩΝ ΤΟΥ ΙΣΧΙΟΥ, ΑΠΟ ΤΗΝΠΑΙΔΙΚΗ ΗΛΙΚΙΑ ΣΤΗΝ ΕΝΗΛΙΚΙΩΣΗ

Συντονιστής: Ν. Λαλιώτης

Διάγνωση και αντιμετώπιση της δυσπλασίας του ισχίου στην νηπιακή και παιδική ηλικία

Ν. Λαλιώτης

Οστεοχονδρίτιδα του ισχίου (ν Perthes), αντιμετώπιση και τελική διαμόρφωση

Ν. Μαρκέας

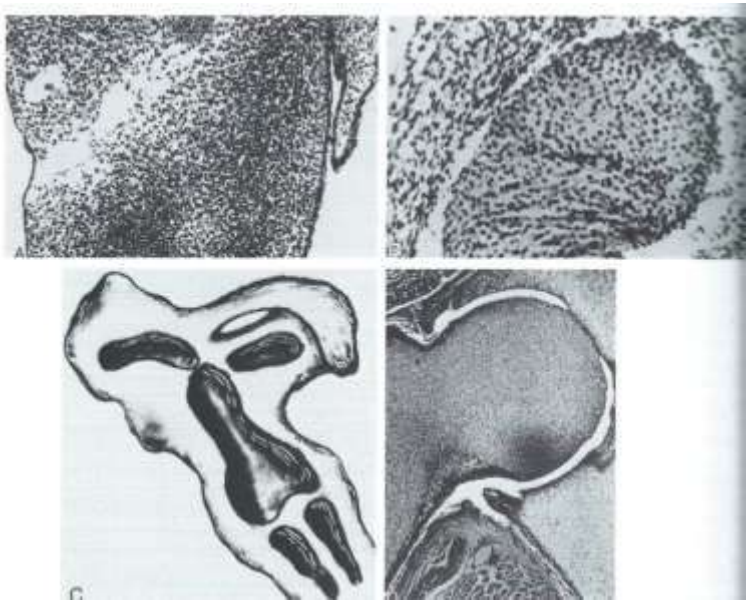
Επιφυσιολίσθηση άνω μηριαίας επίφυσης

Ι. Αναστασόπουλος

Διάγνωση και αντιμετώπιση της δυσπλασίας του ισχίου στην νηπιακή και παιδική ηλικία

Νικόλαος Λαλιώτης
M.Ch.(Orth)
τ Επίκουρος Καθηγητής
Ορθοπαιδικής – Ορθοπαιδικής Παίδων ΑΠΘ
ΙΑΤΡΙΚΟ ΔΙΑΒΑΛΚΑΝΙΚΟ ΚΕΝΤΡΟ

EMBRYONIC STAGE



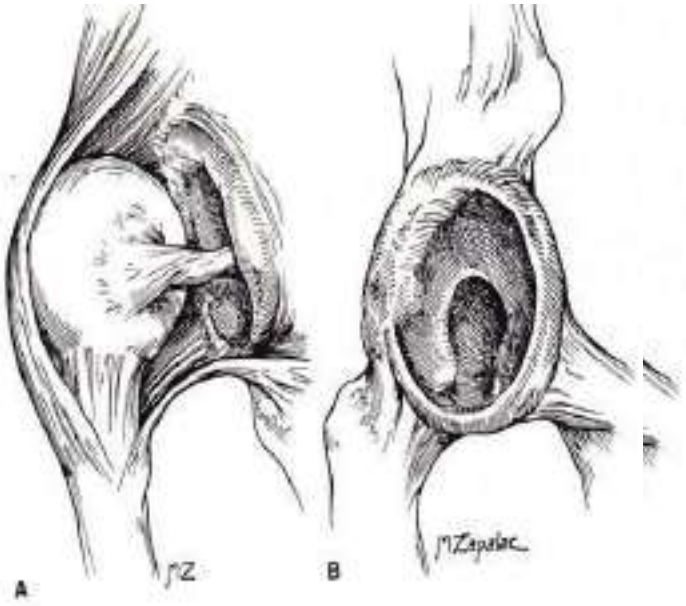
- At 6 wks the acetabulum appears as a shallow depression in the cartilaginous model of the future pelvis (ilium, ischium, pubis) JUST RPOXIMAL to the head of the femur
- By the 7 wk of gestation, the cartilaginous model for femur and acetabulum are complete.
- Mass of primitive cells undergo apoptosis to yield a fluid filled cleft

- AT 7 wks theoretically is the EARLIEST time in development during which a HIP DISLOCATION may occur

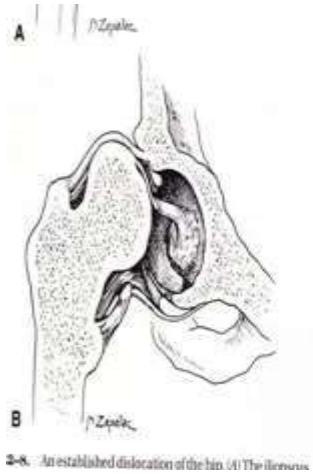
LIMB POSITION, FEMORAL ANTEVERSION, NECK SHAFT ANGLE

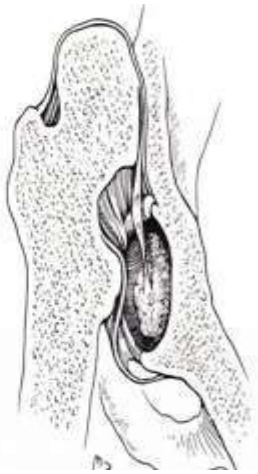
- The mechanism of femoral anteversion and neck shaft angle development, is elusive
- It is mainly related to muscle forces that act on the hip during development

Ανατομία νεογνικού ισχίου



Ανατομία της βλάβης





ΑΝΑΠΤΥΞΙΑΚΗ ΔΥΣΠΛΑΣΙΑ ΙΣΧΙΟΥ

- Εξάρθρημα ισχίου
- Υπεξάρθρημα ισχίου
- Εξαρθρώσιμο
- Ανατασσόμενο
- Χαλαρά ισχία

Developmental Dysplasia Hip
P J Klisic 1999

BRIEF REPORTS

CONGENITAL DISLOCATION OF THE HIP – A MISLEADING TERM:

BRIEF REPORT

P. J. KLISIC

BRIEF REPORTS

CONGENITAL DISLOCATION OF THE HIP – A MISLEADING TERM:

BRIEF REPORT

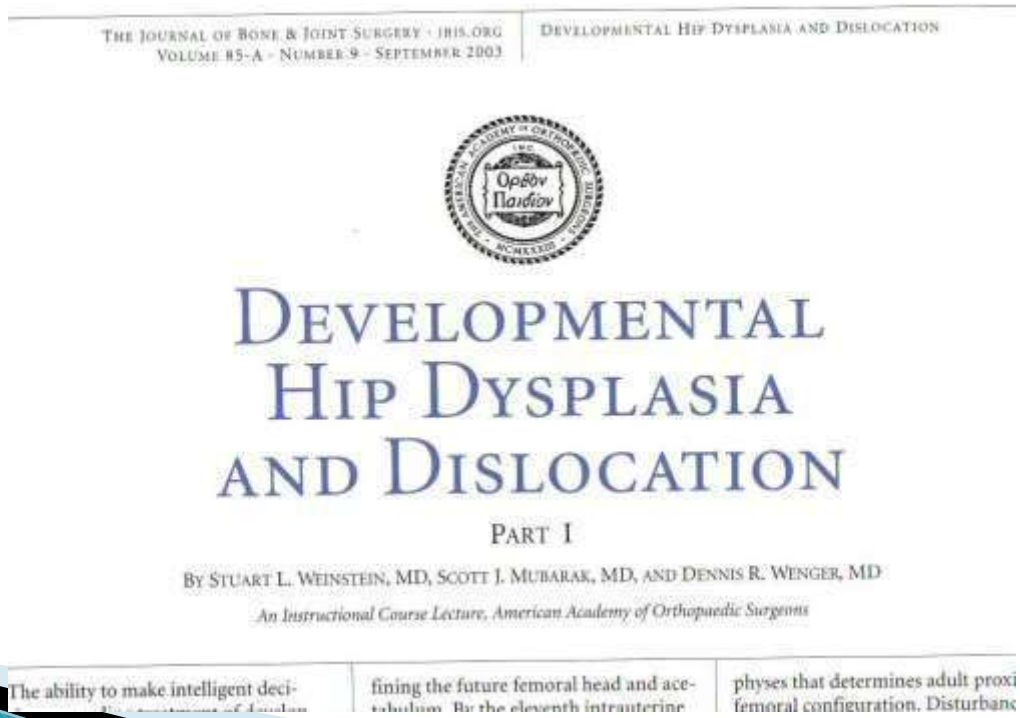
P. J. KLISIC

ΑΝΑΠΤΥΞΙΑΚΗ ΔΥΣΠΛΑΣΙΑ ΙΣΧΙΟΥ

Όρος ΟΜΠΡΕΛΛΑ που περιλαμβάνει σημαντικό αριθμό παθολογικών καταστάσεων

- ΣΥΓΓΕΝΗΣ ΠΑΘΗΣΗ ΙΣΧΙΟΥ
  Γ Χαρτοφυλακιδης

- The term DYSPLASIA tend to be used for any hip with **positive** Ortolani sign, a hip that can be provoked to dislocate or relocate
- The term dislocation is reserved for a hip with **negative** Ortolani sign, ie an unreducible hip



THE JOURNAL OF BONE & JOINT SURGERY · JBJS.ORG
VOLUME 85-A · NUMBER 9 · SEPTEMBER 2003

DEVELOPMENTAL HIP DYSPLASIA AND DISLOCATION

PART I

BY STUART L. WEINSTEIN, MD, SCOTT J. MUBARAK, MD, AND DENNIS R. WENGER, MD

An Instructional Course Lecture, American Academy of Orthopaedic Surgeons

The ability to make intelligent deci-

fining the future femoral head and ace-

physes that determines adult proxi
femoral configuration. Disturban

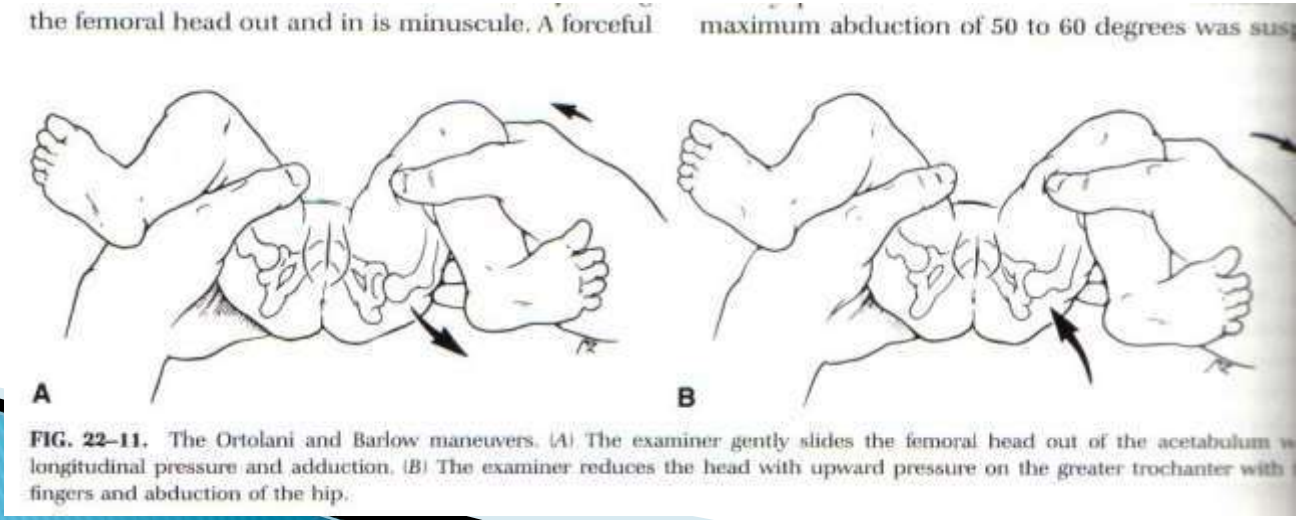
Κλινικά ευρήματα

- Θετικό σημείο Ortolani – Barlow
- Περιορισμός απαγωγής ισχίου
- Ανισοσκελία
- Κλίκ ?
- ΕΠΙΒΑΡΥΝΤΙΚΟΙ ΠΑΡΑΓΟΝΤΕΣ

Κλινική εικόνα cdh par 2

Κλινικά ευρήματα στην 1η εβδομάδα

- Θετικό σημείο Ortolani – Barlow
- Περιορισμός απαγωγής ισχίου
- Ανισοσκελία
- Η αρχική χαλαρότητα εξαλείφεται σε σύντομο διάστημα

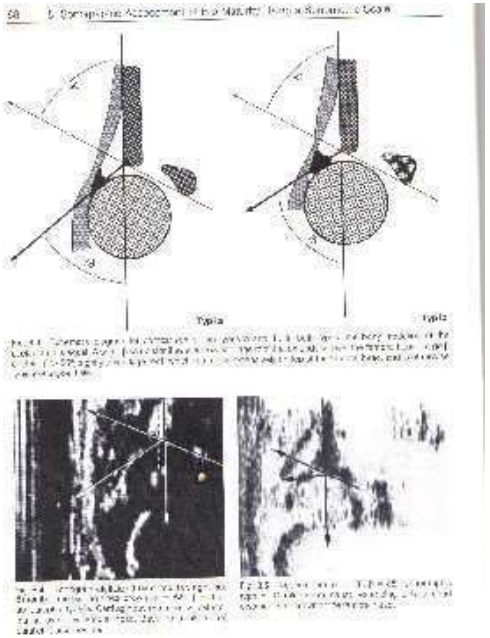


ΥΠΕΡΗΧΟΓΡΑΦΗΜΑ
Το πρώτο βήμα στην διερεύνηση

- Graf R. New possibilities for the diagnosis of congenital hip joint dislocation by ultrasonography.
  J Pediatr Orthop 1983

ΥΠΕΡΗΧΟΓΡΑΦΗΜΑ ΔΥΣΠΛΑΣΙΑ ΙΣΧΙΩΝ

- Ταξινόμηση Graf 4 τύπους
- Δυναμική ταξινόμηση
- Δείκτης κάλυψης της κεφαλής



Normal ultrasound 2 classification

Υπερηχογραφικές μετρήσεις

- Γωνία α
- Γωνία β
- Graf classification
- Harcke real time
- Δυναμική εξέταση
- Κάλυψη κεφαλής Torjhersen

Double parallel circles EFORT 2015

33° Ετήσιο Συνέδριο Ο.Τ.Ε.ΜΑ.Θ.

1° ΒΡΑΒΕΙΟ

Καλύτερης Προφορικής Ανακοίνωσης

Λαλιώτης Ν., Γεωργίου Β., Αλαφροπάτης Η.,
Πετράκης Ι., Καπετάνου Α., Κύρκος Ι.

ΟΜΟΚΕΝΤΡΟΙ ΚΥΚΛΟΙ
Μία νέα μέθοδος στην υπερηχογραφική αξιολόγηση
του νεογνικού ισχίου

24-27 Απριλίου 2014

Normal versus dysplasia us figures

CDH bilateral difficult diagnosis

Neonatal positive Ortolani

Ακτινολογικές μετρήσεις

- Διάσπαση θυρεοαυχενικού τόξου
- Τεταρτημόρια κοτύλης
- Κοτυλιαία γωνία Sharp
- Ποσοστό κάλυψης κεφαλής
- Γωνία CE

Ακτινολογικές μετρήσεις

findings of a dislocated hip. The patient is positione

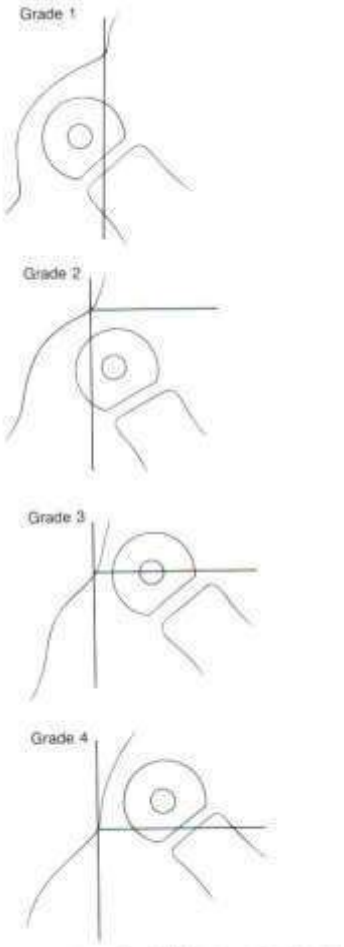


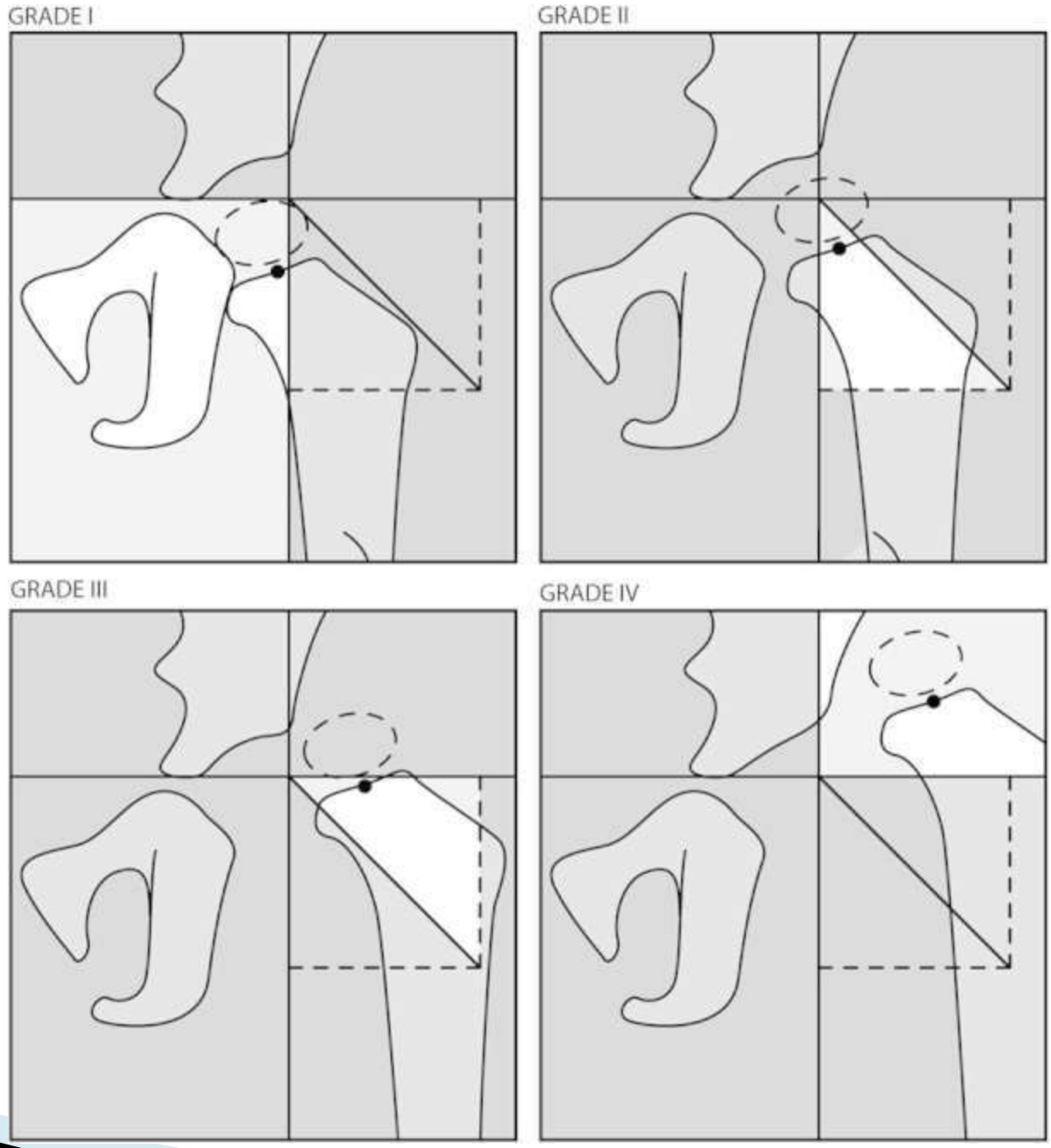
FIG. 23–16. The Tonnis grades of dislocation: grade 1—nuc
medial to Perkins' line; grade 2—nucleus lateral to Perkins'
and below the acetabular rim; grade 3—nucleus at the lev
the superior rim; grade 4—nucleus above the superior rim.

- Tonnis classification

- J Pediatr Orthop. 2015 Jul; 35(5): 478–484.

  Reliability of a New Radiographic Classification for Developmental Dysplasia of the Hip

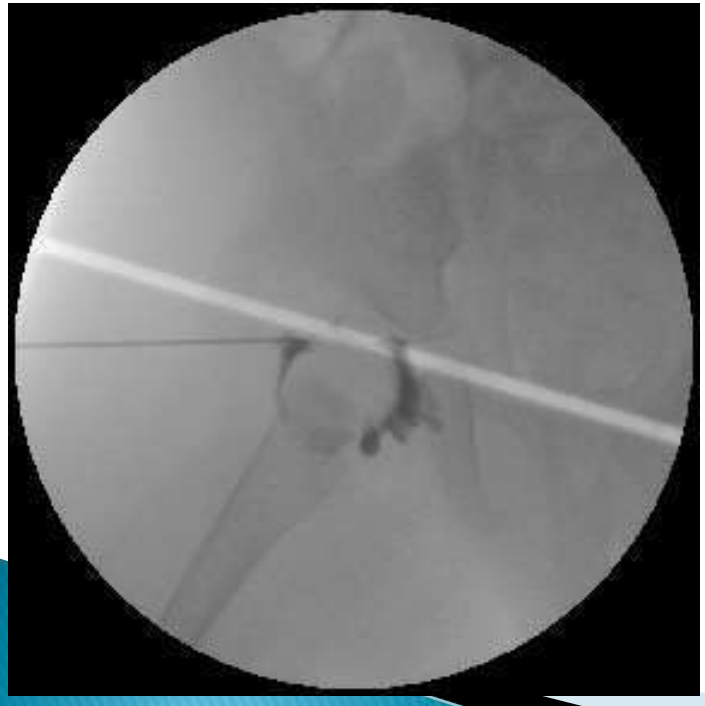
- Unni Narayanan, MBBS, MSc, FRCS(S),* Kishore Mulpuri, MBBS, MS (Ortho), MHSc(Epi),† Wudbhav N. Sankar, MD,‡ Nicholas M.P. Clarke, ChM, FRCS, FRCS.Ed,§ Harish Hosalkar, MBBS, MD,‖ Charles T. Price, MD, FAAP,¶ and International Hip Dysplasia Institute



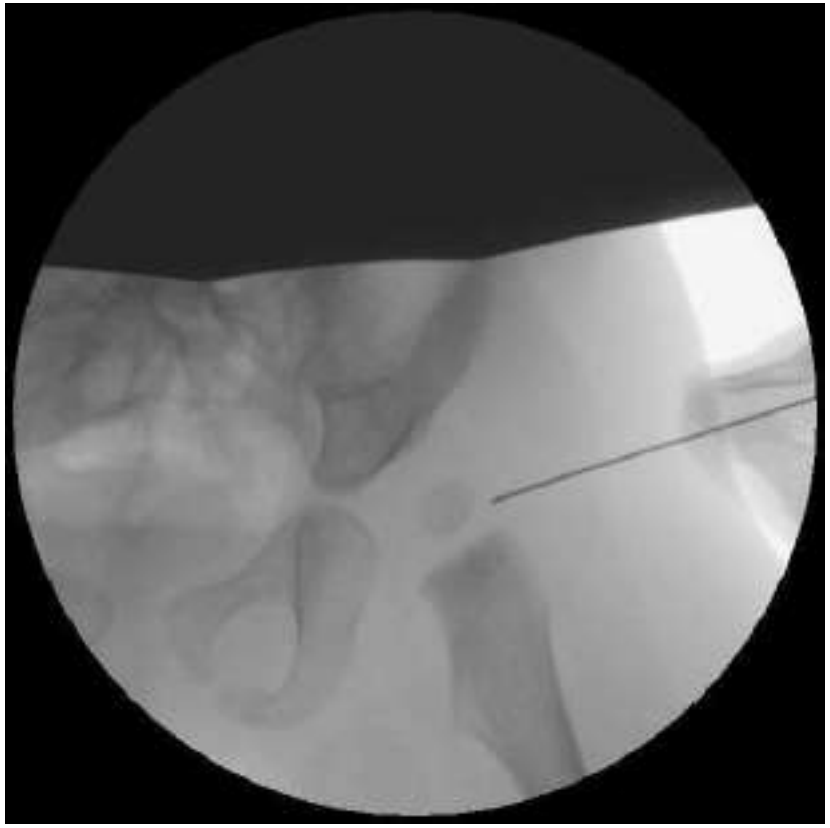
Δυσπλασία ισχίου

- Δυσπλασία ισχίου Graf 3, 4
- Κλειστή ανάταξη ΥΠΟ ΝΑΡΚΩΣΗ
- ΑΡΘΡΟΓΡΑΦΗΜΑ
- Παρακολούθηση εξέλιξης

Αρθρογράφημα Γερ



Κλειστή ανάταξη, αρθρογράφημα κοντοπ α



Κλειστή ανάταξη, αρθρογράφημα κοντοπ β

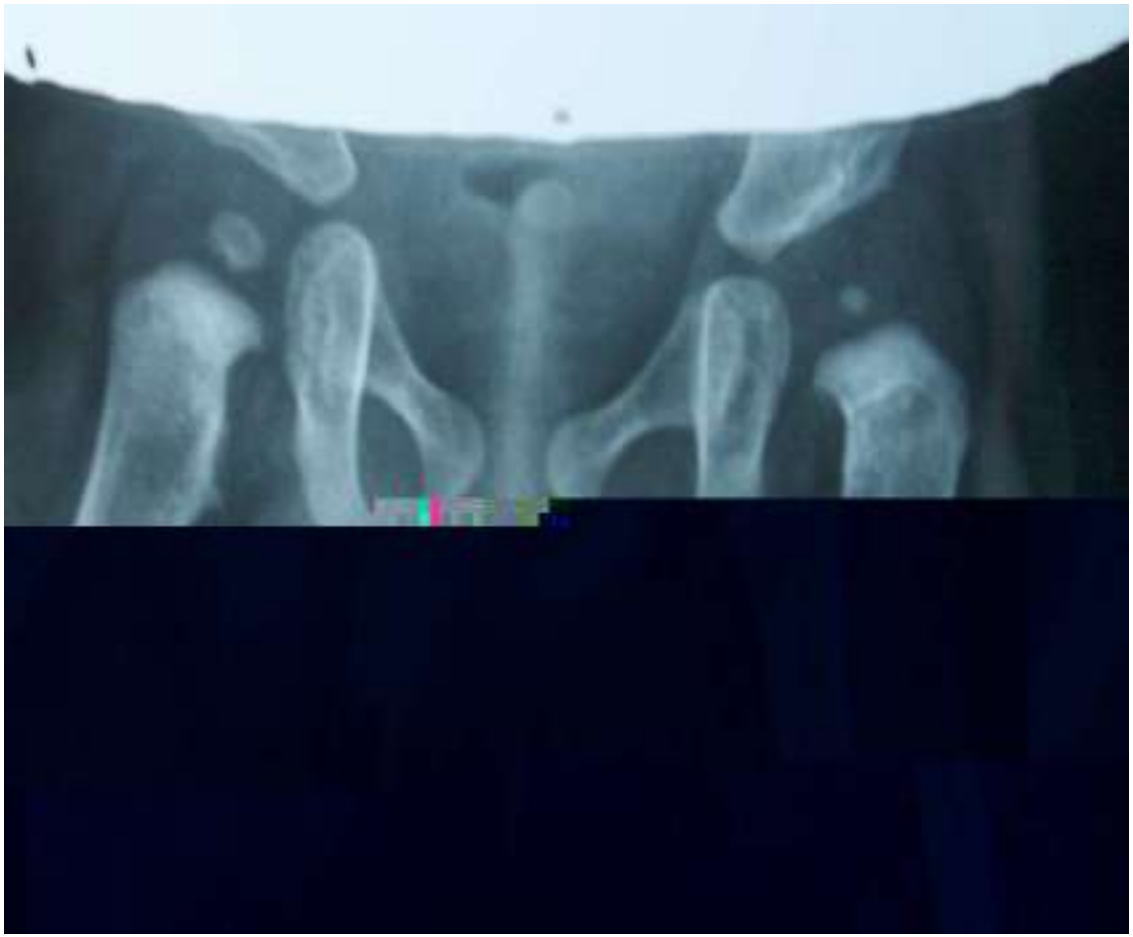
Κανόνες αντιμετώπισης εξαρθρήματος ισχίου

- Ανάταξη κεφαλής
- Διατήρηση ανάταξης
- Σχηματισμός φυσιολογικής οροφής ισχίου

Ο αριθμός των παιδιών με αληθές εξάρθρημα του ισχίου, που εμφανίζονται μετά την ηλικία του έτους, έχει ΣΑΦΩΣ ελαττωθεί

Κλειστή ανάταξη δυσπλασικού ισχίου zib xray 1st

Κλειστή ανάταξη δυσπλασικού ισχίου zib post op xray



Κλειστή ανάταξη δυσπλασικού ισχίου zib 18 months xray

Ανοικτή ανάταξη οστεοτομία πυέλου Δισκ Φωτ

Ανοικτή ανάταξη οστεοτομία πυέλου δισκ τελική

Christoph Thallinger, Renata Pospischill, [...], and Franz Grill

Long-term results of a nationwide general ultrasound screening system for developmental disorders of the hip: the Austrian hip screening program

J Child Orthop. Feb 2014; 8(1): 3–10

- Since the introduction of the screening program, the number of patients who require pelvic surgery to treat DDH has decreased by 46 % and the number of open reductions is as low as 0.16 per 1,000 live births. Hospital admissions for the treatment of DDH decreased from 9.5 to 3.6 per 1,000 live births.

Definition of Developmental Dysplasia of the Hip

- Developmental dysplasia of the hip comprises a continuum that includes an immature hip, a hip with mild acetabular dysplasia, a hip that is dislocatable, a hip that is subluxated, and, finally, a hip that is frankly dislocated. There is overlap between these states, but the treatment and treatment risks differ across this continuum

Standardized Diagnostic Criteria for Developmental Dysplasia of the Hip in Early Infancy

Andreas Roposch, MD, MSc, FRCS, Liang Q. Liu, MBBS, PhD, [...], and John H. Wedge, OC, MD, FRCS(C)

Conclusion

We established a consensus regarding the most relevant **criteria for the diagnosis of DDH** in early infancy and established their relative importance on an international basis. The highest ranked clinical criteria included the Ortolani/Barlow test, asymmetry in abduction of 20° or greater, breech presentation, leg-length discrepancy, and first-degree relative treated for DDH.

Standardized Diagnostic Criteria for Developmental Dysplasia of the Hip in Early Infancy

Andreas Roposch, MD, MSc, FRCS, Liang Q. Liu, MBBS, PhD, [...], and John H. Wedge, OC, MD, FRCS(C)

DDH is one of the most common congenital musculoskeletal conditions [10]. Its most severe form, **hip dislocation**, occurs in **one to two per 1000** of predominantly northwest European ancestry living in the UK, Scandinavia, North America, and Australia [10]. Milder forms occur more frequently, with prevalence estimates ranging from **40 to 60 per 1000 if ultrasound definitions** are used. **If detected by clinical examination**, prevalence estimates between **two and 28 per 1000** have been reported for neonatal DDH

- **The use of X-ray at 5 months in a selective screening programme for developmental dysplasia of the hip**
- Kathryn R. Price, Rosemary Dove, and James B. Hunter
- Journal of Children's Orthopaedics
- June 2011, Volume 5, Issue 3, pp 195-200

- We now check the Graf α-angle, FHC and dynamic stability in the ultrasound assessment and only perform X-ray at 5 months if there was a low α-angle or low FHC. Since this change, there have been no late presentations of DDH from the population screened by ultrasound.

J Pediatr Orthop. 2019 Apr;39(4):187-192.

Does Late Hip Dysplasia Occur After Normal Ultrasound Screening in Breech Babies?

Morris AR[1], Thomas JMC[1], Reading IC[2], Clarke NMP[1,3]

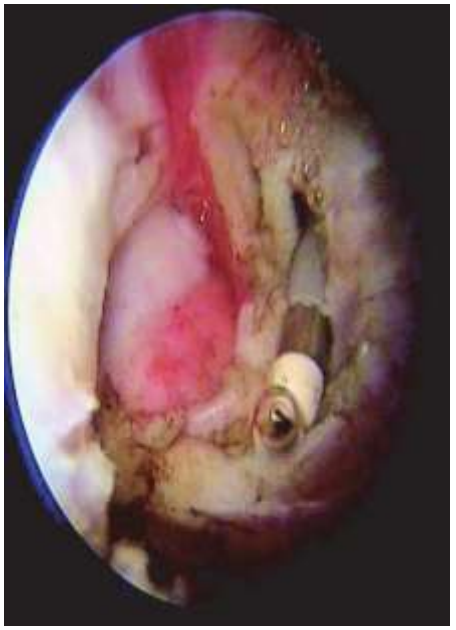
- Recent literature has raised concern regarding the occurrence of late dysplasia after normal screening in breech babies. **One paper states a late dysplasia incidence of 29%**

- Ninety babies were prospectively enrolled into the study and randomized to either the observational arm or prophylactic treatment with the Healthy Hip Diaper (HALO, Minnetonka, MN). All babies had a normal initial clinical examination and ultrasound. Regular follow-up including clinical and ultrasound examination was undertaken culminating in pelvic x-rays performed at 13±1 months
- **RESULTS:** The overall rate of radiographic dysplasia at 13 months was 7.4%. The rate was 5% in those using a Healthy Hip Diaper and 8.3% in those under observation only. This was not a statistically significant difference
- We conclude **that late radiographic dysplasia** does occur after normal clinical and ultrasound screening in breech babies, although not to the same extent as recently published data

Arthroscopic reduction of the dislocated hip in infants

O. Eberhardt, F. F. Fernandez, T. Wirth
From Olgahospital, Stuttgart, Germany
Bone Joint J 2012

- We present our early experience of arthroscopic reduction of the dislocated hip in very young infants with developmental dysplasia of the hip (DDH).
- Eight dislocated hips, which had failed attempts at closed reduction, were treated by arthroscopy of the hip in five children with a mean age of 5.8 months (4 to 7). A two-portal technique was used, with a medial sub-adductor portal for a 2.7 mm cannulated system with a 70° arthroscope and an anterolateral portal for the instruments.
- Following evaluation of the key intra-articular structures, the hypertrophic ligamentum teres and acetabular pulvinar were resected, and a limited release of the capsule was performed prior to reduction of the hip. All hips were reduced by a single arthroscopic procedure, the reduction being confirmed on MRI scan.
- None of the hips had an inverted labrum. The greatest obstacle to reduction was a constriction of the capsule. At a mean follow-up of 13.2 months (9 to 24), all eight hips remained stable. Three developed AVN



Male cdh

Rena il


INTERBALKAN EUROPEAN MEDICAL CENTER
05/05/2012
09:33:40
PENA
IARA
24X30A
ΑΕΚΑΝΗ
02/05/2010

Rena il

Rena il final

Bone Joint J. 2017 Sep;99-B(9):1250-1255. doi: 10.1302/0301-620X.99B9.BJJ-2016-1325.R1.

Late presentation of developmental dysplasia of the hip : a 15-year observational study.

Talbot C[1], Adam J[2], Paton R[3]

- Between 01 January 1997 to 31 December 2011, a prospective, longitudinal study was undertaken of a cohort of 64 670 live births.
- There were 31 infants with an irreducible dislocation of the hip
- Of the 18 late presenting cases 72% (n = 13) had no risk factors
- CONCLUSION: Despite universal clinical neonatal and selective ultrasound screening, late cases of irreducible hip dislocation still occur. We recommend an update of the national screening programme for DDH, a review of training and education of healthcare professionals involved in the physical examination of neonates and infants, and the addition of a further assessment after the six to eight week check.

Int Orthop. 2018 Mar;42(3):631-640. doi: 10.1007/s00264-017-3726-5. Epub 2017 Dec 29.

Acetabular index is the best predictor of late residual acetabular dysplasia after closed reduction in developmental dysplasia of the hip.

Li Y[1], Guo Y[2], Li M[3], Zhou Q[1], Liu Y[1], Chen W[1], Li J[1], Canavese F[1,4], Xu H[5,6]; Multi-center Pediatric Orthopedic Study Group of China.

- The changes in the acetabular index (AI), centre-edge angle of Wiberg (CEA), Reimer's index (RI)

- According to our results, surgery is indicated if AI >28° 1 year following CR or AI >25° two to four years after CR. CEA and RI should be used as a secondary index to aid in the selection of patients requiring surgery

Age at surgical intervention

Surgical Correction of Residual Hip Dysplasia in Two Pediatric Age-Groups

By François D. Lalonde, MD, Steven L. Frick, MD, and Dennis R. Wenger, MD

Investigation performed at the Division of Orthopedic Surgery, Children's Hospital San Diego, and the University of California at San Diego, San Diego, California

Background: The goal of operative treatment of hip dysplasia or subluxation in children is to normalize the hip joint to delay or prevent the premature onset of osteoarthritis. In theory, intervention in early childhood, when the remodeling potential is greater, should provide the best opportunity for the development of a normal joint.

Methods: To determine the efficacy of early surgical intervention in restoring the normal morphology of the hip, according to radiographic criteria, we reviewed the cases of thirty-six children (fifty hips) with residual dysplasia or subluxation who were managed with either a femoral and/or a pelvic osteotomy when they were between two and eight years old (Group I). The average age at the time of surgery was 3.7 years, and the average duration of follow-up was 4.3 years. We compared these results with those achieved in fourteen patients (eighteen hips) with residual hip dysplasia or subluxation who were treated surgically at an older age, between eight and eighteen years old (Group II). The outcome was assessed with use of clinical as well as multiple radiographic criteria. We believe that a normal relationship between the acetabulum and the femoral head was established when there was an acetabular index of <20° or a Sharp angle of <42°, a center-edge angle of >20°, and an intact Shenton's line.

Αμφοτερόπλευρη εικόνα εξαρθρήματος σε παιδί 3 ετών der A

Αμφοτερόπλευρη εικόνα εξαρθρήματος σε παιδί 3 ετών der B

Ανεπιτυχής ανάταξη der A

Αντιμικροβιακή θεραπεία, εκτεταμένος χειρουργικός καθαρισμός, σταθεροποίηση

Εξέλιξη άμφω ισχίων der

Σημερινή εικόνα der

Closed reduction in a spica a

AVN, 4 yrs old

Coxa breva

Coxa breva 2

Ανισοσκελία από παθήσεις του ισχίου

Ανισοσκελία από παθήσεις του ισχίου

Δυσπλασία ισχίου στην προεφηβική περίοδο iris

Δυσπλασία ισχίου στην προεφηβική περίοδο iris 3 D

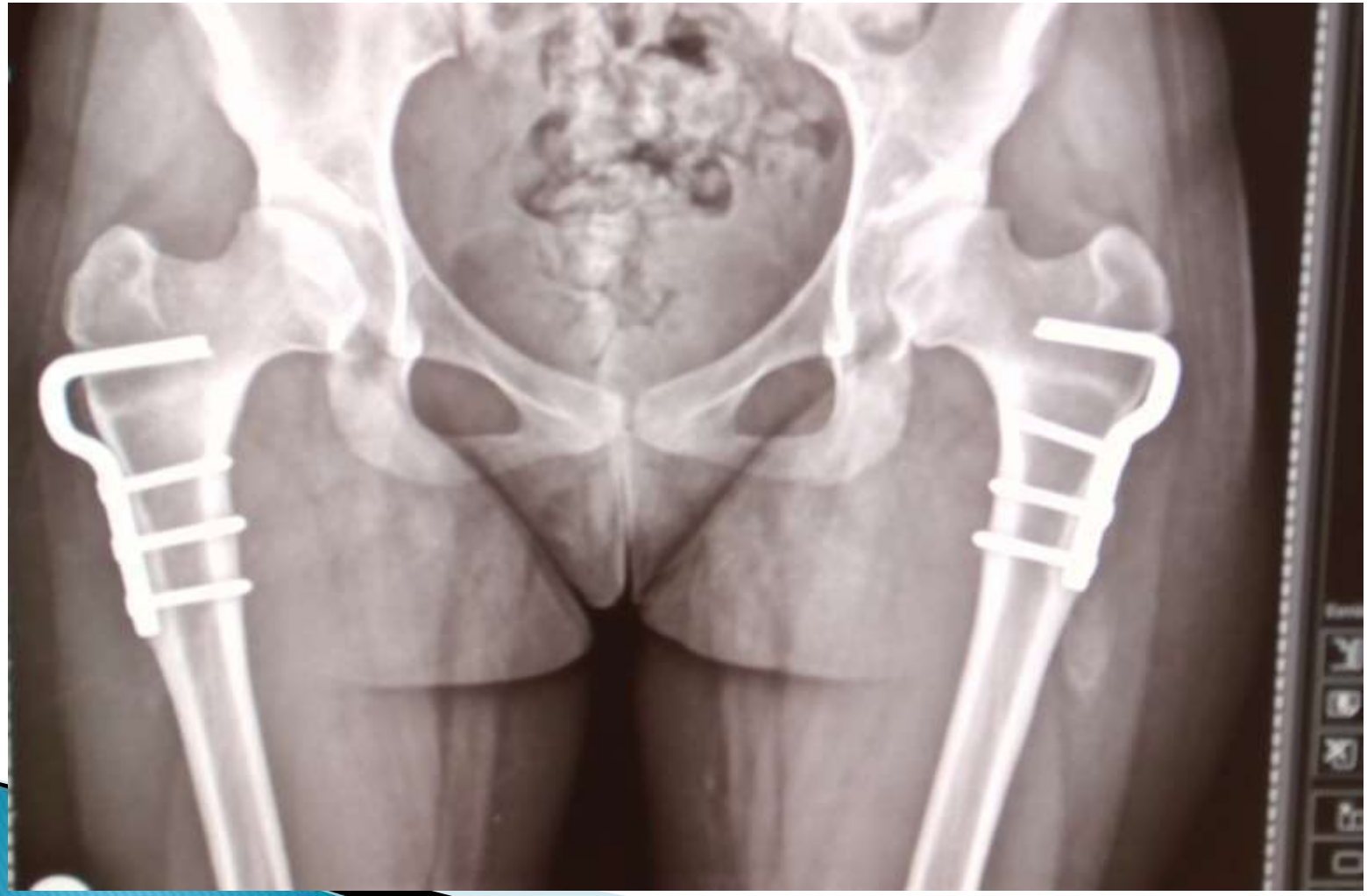
Δυσπλασία ισχίου στην προεφηβική περίοδο iris RIGHT hip

Δυσπλασία ισχίου στην προεφηβική περίοδο iris 2016

Δυσπλασία ισχίου στην προεφηβική περίοδο gam

Δυσπλασία ισχίου στην προεφηβική περίοδο

Δυσπλασία ισχίου στην προεφηβική περίοδο



J Pediatr Orthop. 2013 Jul-Aug;33
Is there a role for acetabular dysplasia correction in an asymptomatic patient?
Wenger DR[1]

- **Children who have no symptoms yet have abnormal radiographs present a puzzling circumstance.** In these cases, surgeons need to use quoted radiographic normal values for acetabular coverage of the femoral head as well as long-term natural history studies to decide whether to proceed with a corrective acetabular osteotomy. Long-term follow-up studies confirm that even patients with borderline dysplasia are likely to have significant hip symptoms and arthritis by middle age

- **CONCLUSIONS: It is impossible to state with certainty which children with residual radiographic hip dysplasia, but without symptoms, should have a corrective acetabular osteotomy**
- Current data suggest that surgery should be performed in borderline cases. Skill of the surgeon in performing acetabular osteotomies and/or ease of referral to a treatment center may temper the timing of such decisions.

Δυσπλασία ισχίου στην εφηβική περίοδο αντιμετώπιση?

Δυσπλασία ισχίου στην προεφηβική περίοδο sal afroditi

15yrs post op sal afroditi

2015 missed diagnosis

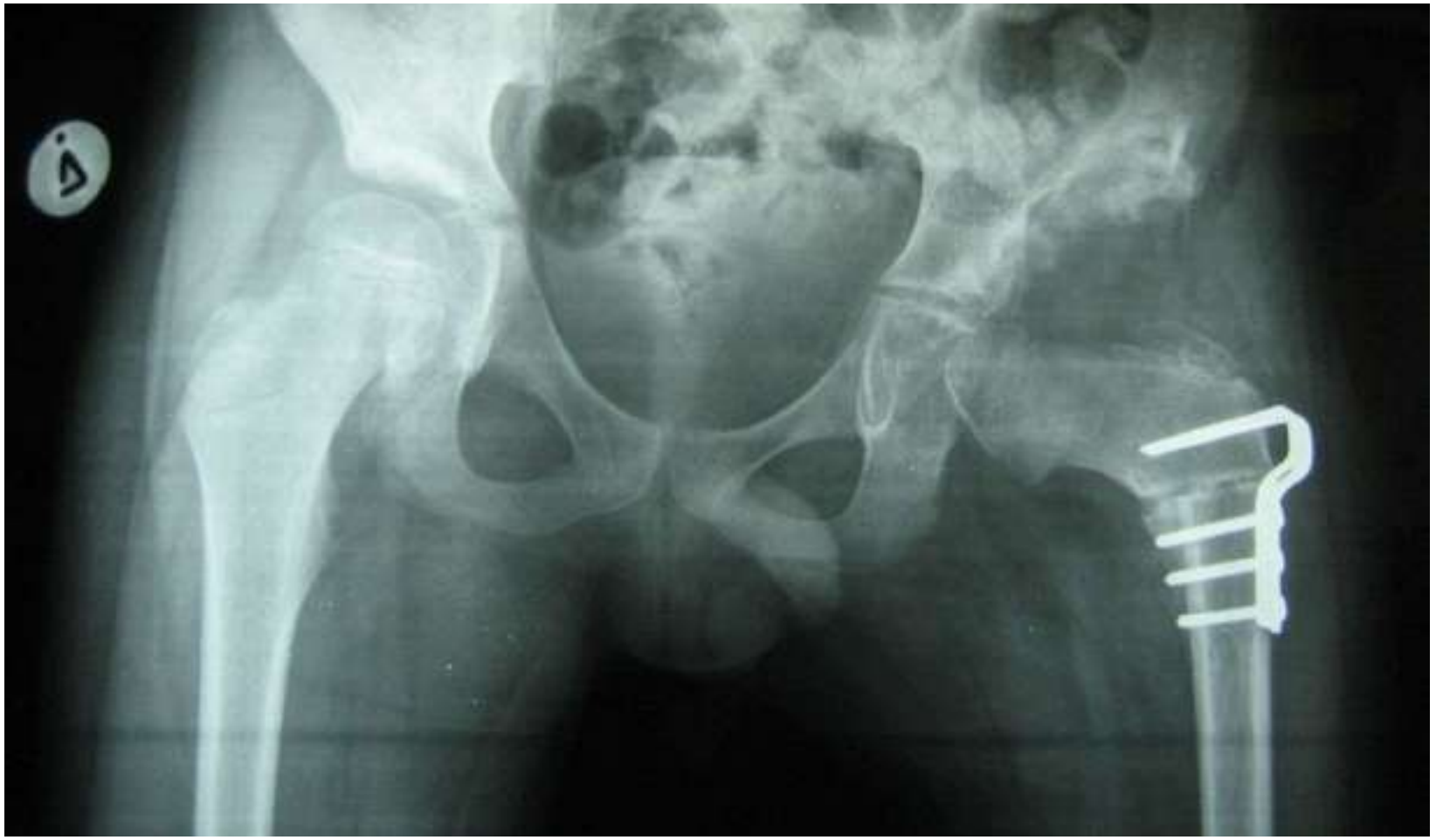
2016 miss
diagnosis

2016 missed diagnosis

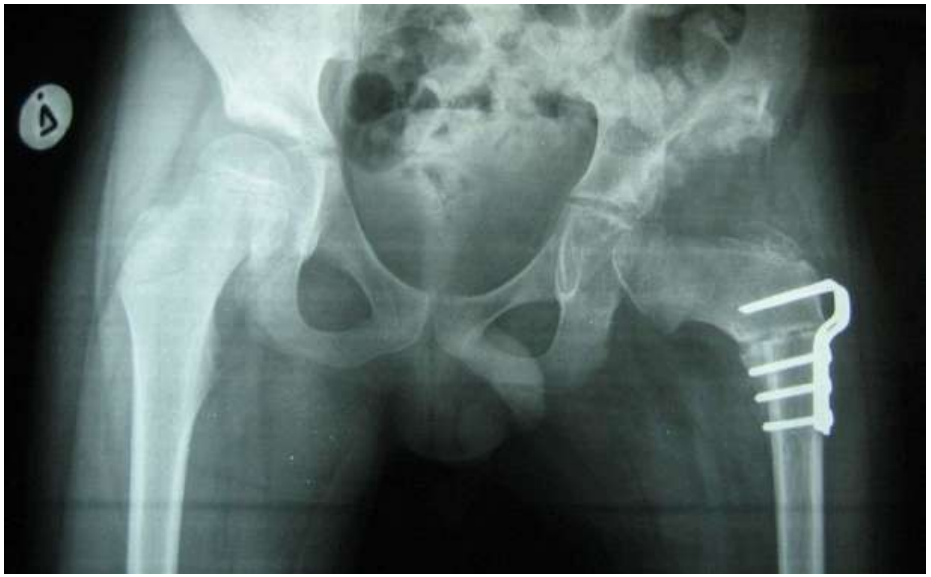
2018 normal walking

Extreme cases

Reduction



Compare

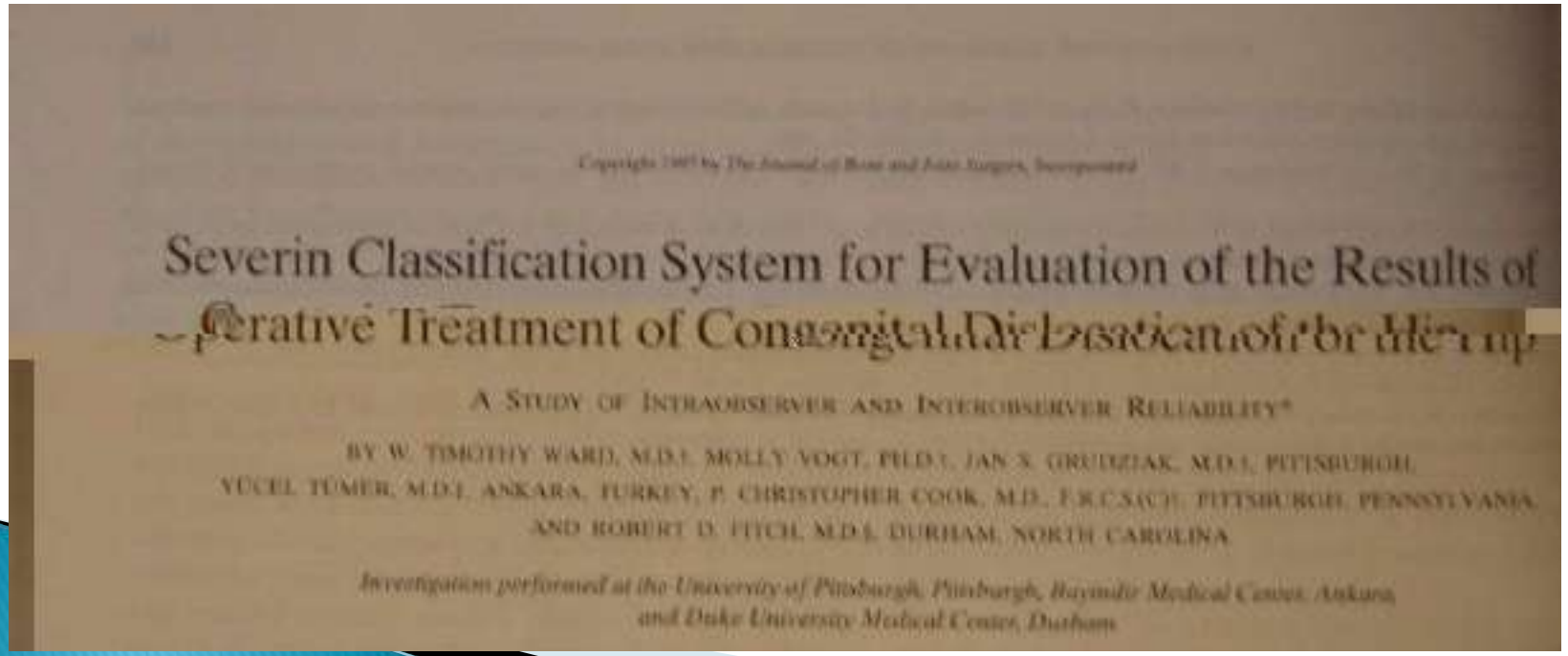


Compare

16 Yrs old

Evaluation of results for CDH

- **Severin classification**
- Xray classification, CE angle



Severin Classification System for Evaluation of the Results of
erative Treatment of Cong

A Study of Intraobserver and Interobserver Reliability*

By W. Timothy Ward, M.D.†, Molly Vogt, Ph.D.†, Jan S. Grudziak, M.D.†, Pittsburgh, Yücel Tümer, M.D.†, Ankara, Turkey, P. Christopher Cook, M.D., F.R.C.S.(C)†, Pittsburgh, Pennsylvania, and Robert D. Fitch, M.D.‡, Durham, North Carolina

Investigation performed at the University of Pittsburgh, Pittsburgh, Bayindir Medical Center, Ankara, and Duke University Medical Center, Durham

Evaluation of results for CDH

- Se
- Xr

TABLE 1
MODIFIED SEVERIN RADIOGRAPHIC CLASSIFICATION

Group I (normal)	CE>15° (age 8 to 13 yrs) CE>20° (age >14 yrs) no deformity
Group II (mild)	CE>15° (age 8 to 13 yrs) CE>20° (age 14 yrs) mild deformity head, neck, acetabulum
Group III (dysplastic)	CE 10° to 15° (age 8 to 13 yrs) CE 15° to 20° (age >14 yrs) and/or moderate deformity
Group IV (subl.)	CE<10° (age 8 to 13 yrs) CE<15° (age >14 yrs)
Group V	Head articulates with secondary acetabulum
Group VI	Redislocation
Group VII	Arthritis

J Bone Joint Surg Am. 2002 Jul;84-A(7):1148-56.
Surgical correction of residual hip dysplasia in two pediatric age-groups.
Lalonde FD[1], Frick SL, Wenger DR.

- We believe that a normal relationship between the acetabulum and the femoral head was established when there was an acetabular index of <20 degrees or a Sharp angle of <42 degrees, a center-edge angle of >20 degrees, and an intact Shenton's line.

Ευχαριστώ για την προσοχή σας