ΚΑΚΩΣΕΙΣ ΤΗΣ ΕΠΙΦΥΣΙΑΚΗΣ ΠΛΑΚΟΣ

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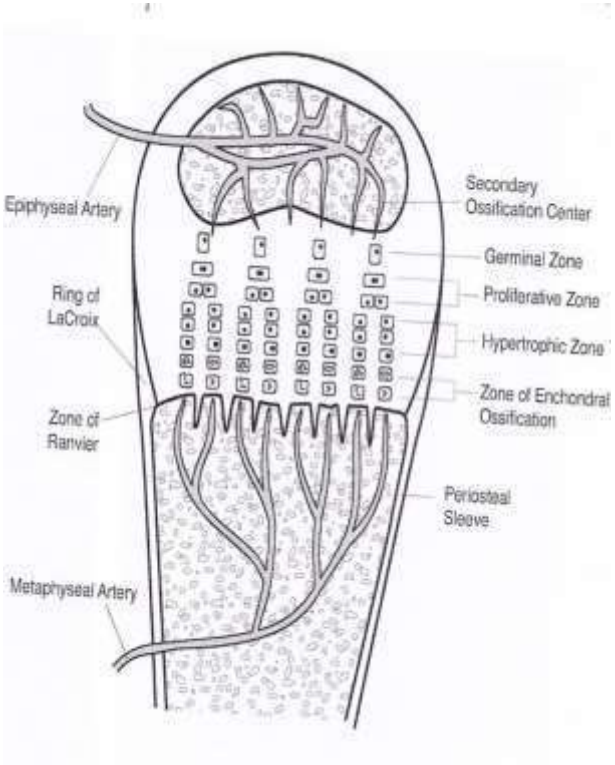
ΙΑΤΡΙΚΟ ΔΙΑΒΑΛΚΑΝΙΚΟ ΚΕΝΤΡΟ

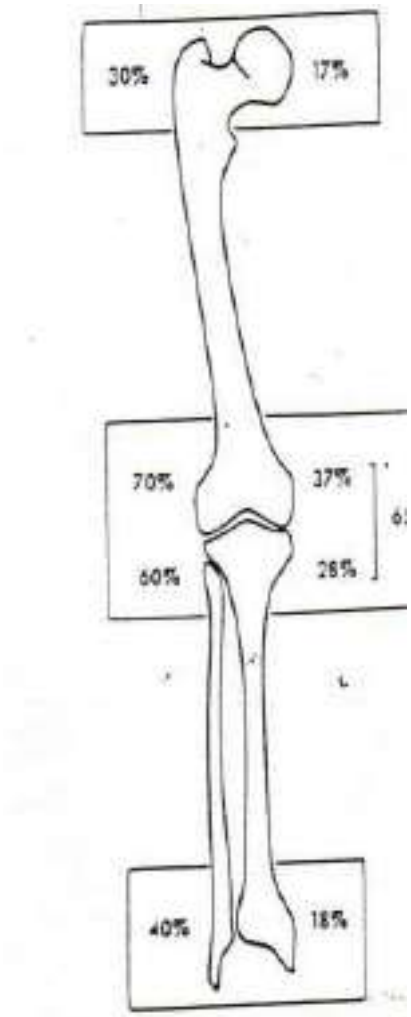
Επιφυσιακή πλάκα

- Ζώνη μεσεγχυματικών κυττάρων
- Ζώνη πολλαπλασιασμού
- **Ζώνη υπερτροφίας**
- Ζώνη χονδροποίησης
- Ζώνη οστεοποίησης
- Ζώνη ανασχηματισμού



Κατά μήκος ανάπτυξη του σκελετού

- Το 65% του ύψους των κάτω άκρων, προέρχεται από τις επιφυσιακές πλάκες στην περιοχή του γόνατος.
- Το 60% του ύψους των άνω άκρων, προέρχεται από τις επιφυσιακές πλάκες MAKPAN του αγκώνα



ig. 2-3. Contributions made by the growt

Ταξινόμηση των κακώσεων της επιφυσιακής πλάκας

- Salter Harris

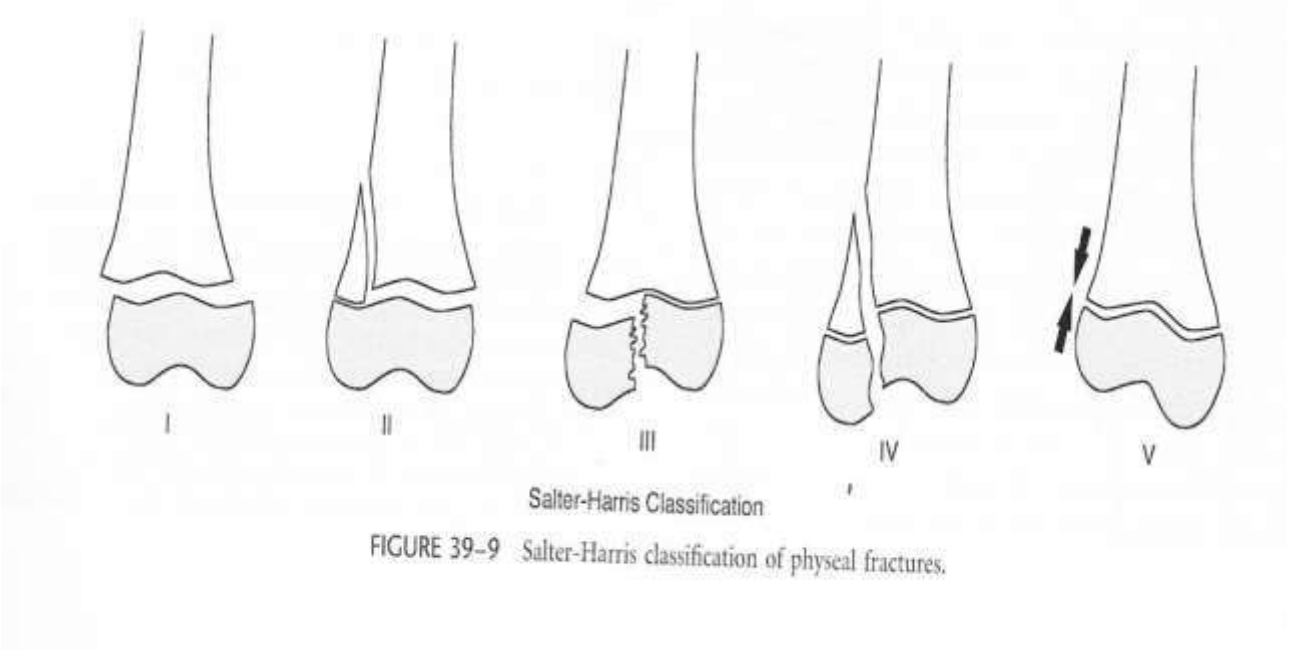
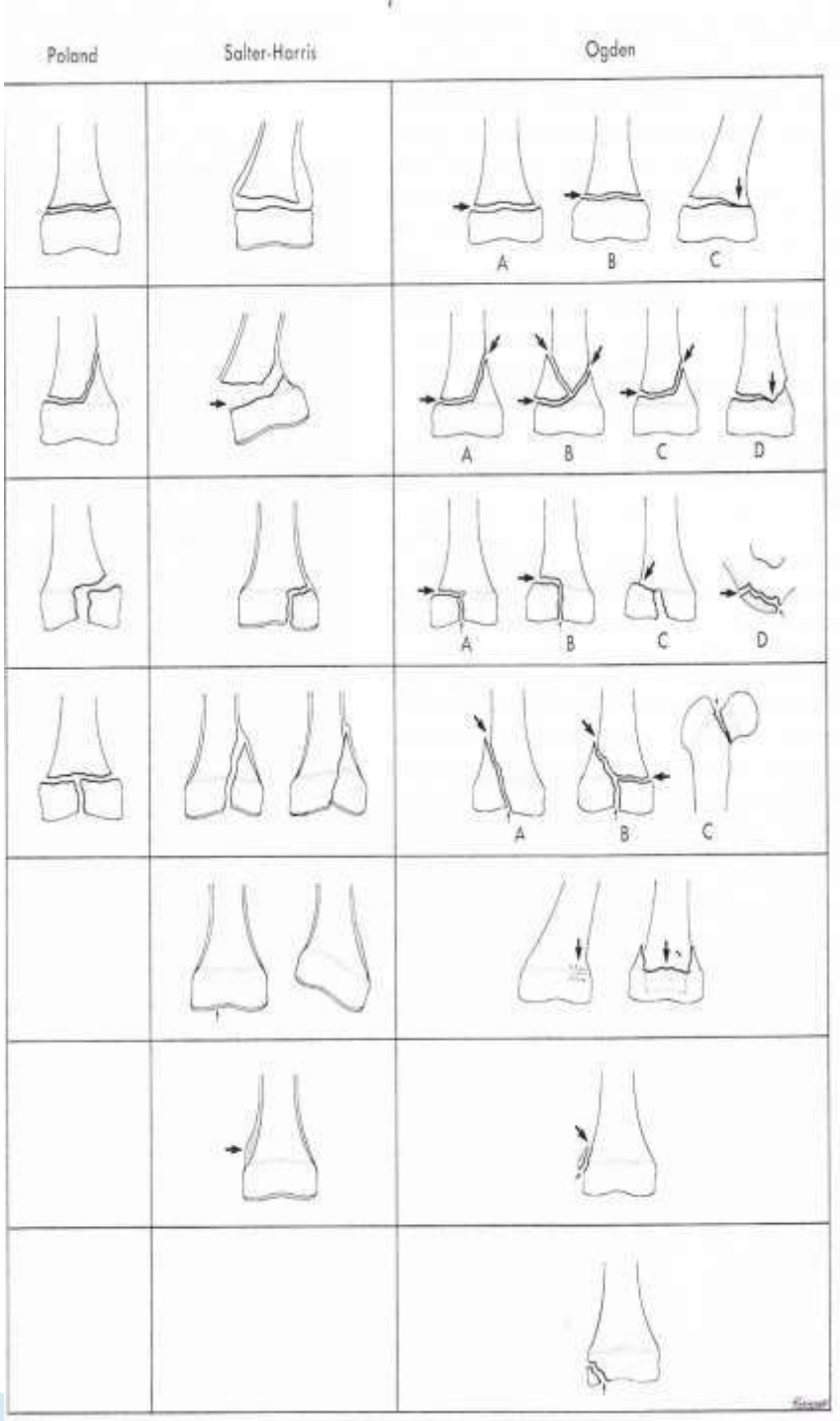


FIGURE 39–9 Salter-Harris classification of physeal fractures.

Ταξινόμηση των κακώσεων της επιφυσιακής πλάκας

- Salter Harris
- Ogden
- Polland
- Peterson



Physeal fractures of distal radius

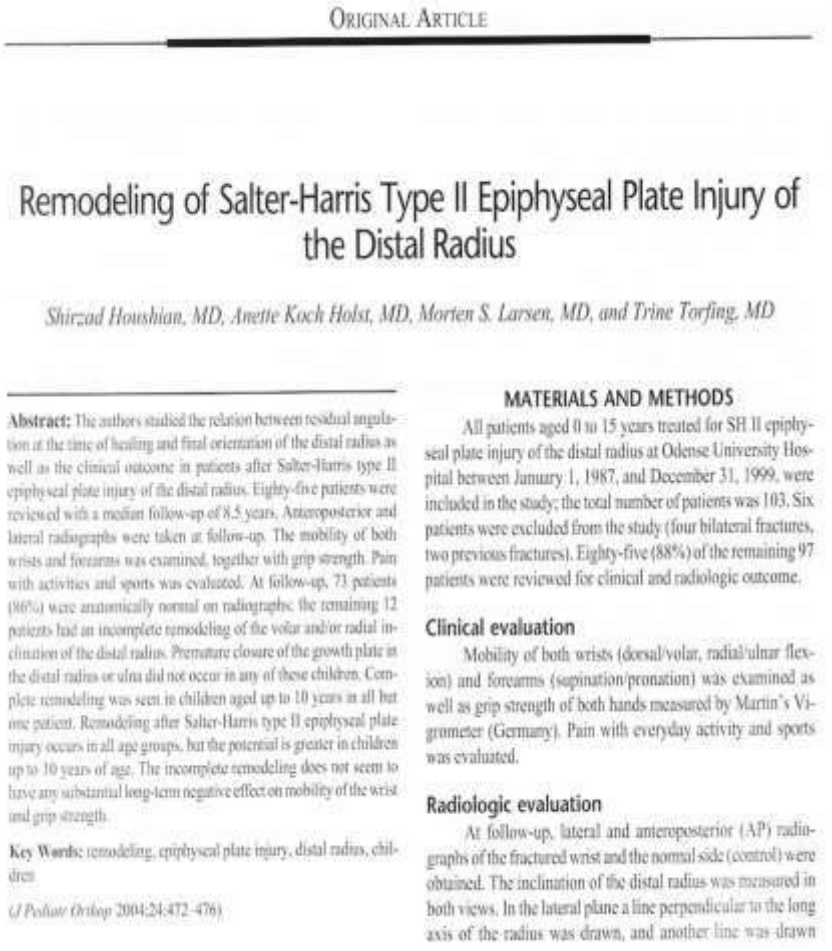
- Most common of pediatric fractures
- Main growth of the radius (75% of radial length
- Common in preadolescent period
- Common Salter Harris 2

Physeal fractures of distal radius

- Closed reduction when displaced with an angle > 10-15 d
- Accurate reduction (ORIF) in SH 3,or 4
- They are healed quickly , they have great remodelling potential, mainly in younger children
- **Repeat reduction or reduction after 10 days MUST BE AVOIDED**

Physeal fractures of distal radius REMODELLING POTENTIAL

- GOOD POTENTIAL FOR REMODELLING , MAINLY IN YOUNGER THAN 10 YRS
- We accept angulation up to 20d and axial deviation up to 40%
- No reduction in minimal displacement !
- growth arrest when attempted REPEATED manipulation



ORIGINAL ARTICLE

Remodeling of Salter-Harris Type II Epiphyseal Plate Injury of the Distal Radius

Shirzad Houshian, MD, Anette Koch Holst, MD, Morten S. Larsen, MD, and Trine Torfing, MD

Abstract: The authors studied the relation between residual angulation at the time of healing and final orientation of the distal radius as well as the clinical outcome in patients after Salter-Harris type II epiphyseal plate injury of the distal radius. Eighty-five patients were reviewed with a median follow-up of 8.5 years. Anteroposterior and lateral radiographs were taken at follow-up. The mobility of both wrists and forearms was examined, together with grip strength. Pain with activities and sports was evaluated. At follow-up, 73 patients (86%) were anatomically normal on radiographs; the remaining 12 patients had an incomplete remodeling of the volar and/or radial inclination of the distal radius. Premature closure of the growth plate in the distal radius or ulna did not occur in any of these children. Complete remodeling was seen in children aged up to 10 years in all but one patient. Remodeling after Salter-Harris type II epiphyseal plate injury occurs in all age groups, but the potential is greater in children up to 10 years of age. The incomplete remodeling does not seem to have any substantial long-term negative effect on mobility of the wrist and grip strength.

Key Words: remodeling, epiphyseal plate injury, distal radius, children

(J Pediatr Orthop 2004;24:472–476)

MATERIALS AND METHODS

All patients aged 0 to 15 years treated for SH II epiphyseal plate injury of the distal radius at Odense University Hospital between January 1, 1987, and December 31, 1999, were included in the study; the total number of patients was 103. Six patients were excluded from the study (four bilateral fractures, two previous fractures). Eighty-five (88%) of the remaining 97 patients were reviewed for clinical and radiologic outcome.

Clinical evaluation

Mobility of both wrists (dorsal/volar, radial/ulnar flexion) and forearms (supination/pronation) was examined as well as grip strength of both hands measured by Martin's Vigrometer (Germany). Pain with everyday activity and sports was evaluated.

Radiologic evaluation

At follow-up, lateral and anteroposterior (AP) radiographs of the fractured wrist and the normal side (control) were obtained. The inclination of the distal radius was measured in both views. In the lateral plane a line perpendicular to the long axis of the radius was drawn, and another line was drawn

Physeal fractures

- **IDEAL**
- **Ακριβής ανάταξη**
- **MUA , C arm**

Physeal fractures

Physeal fractures

- **CAST Below elbow**

Physeal fractures

- Ακριβής ανάταξη
- Παρεκτόπιση
- Πόση αποδεχόμαστε?
- Νέα ανάταξη?

Physeal fractures

- **Σπάνια η εμφάνιση growth arrest?**

Physeal fractures distal radius

- **Indications for reduction**

Physeal fractures distal radius

Physeal fractures distal radius

Physeal fractures radial head and ?

Physeal fractures radial head olecranon

Physeal fractures radial head olecranon

Physeal fractures radial head – olecranon consider osteogenesis imperfecta in solitary olecranon fractures

Physeal fractures radial head elbow dislocation

Physeal fractures radial head elbow dislocation

Physeal fractures radial head elbow dislocation

Κάκωση άνω επίφυσης κνήμης

Κάκωση άνω επίφυσης κνήμης

ΑΠΑΡΕΚΤΟΠΙΣΤΟ ΚΑΤΑΓΜΑ ΑΝΩ ΜΕΤΑΦΥΣΗΣ ΚΝΗΜΗΣ ΣΕ ΠΑΙΔΙ ΚΑΤΩ ΤΩΝ 4 ΕΤΩΝ

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επιφυσιολισθήσεις περιφερικού άκρου κνήμης

επιφυσιολισθήσεις περιφερικού άκρου κνήμης

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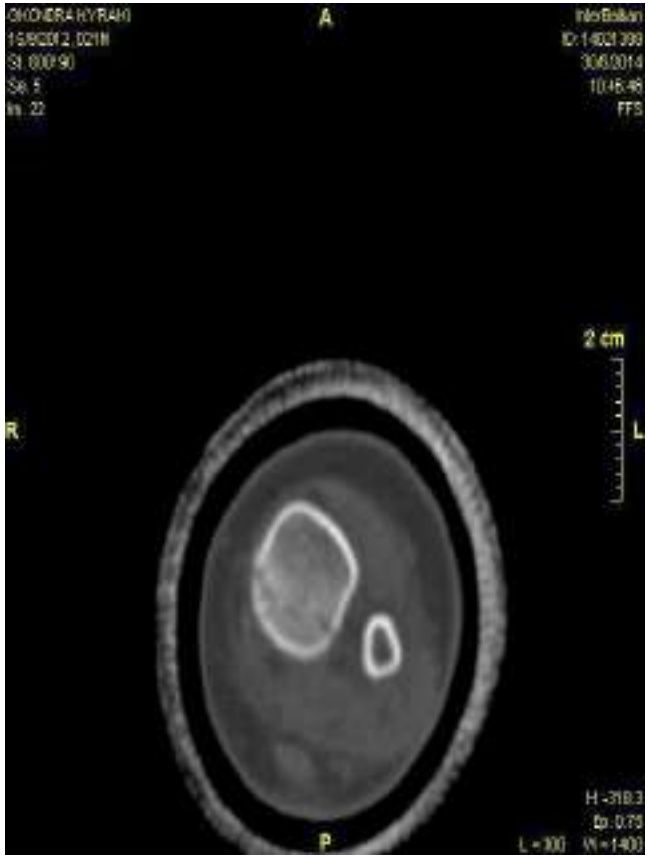
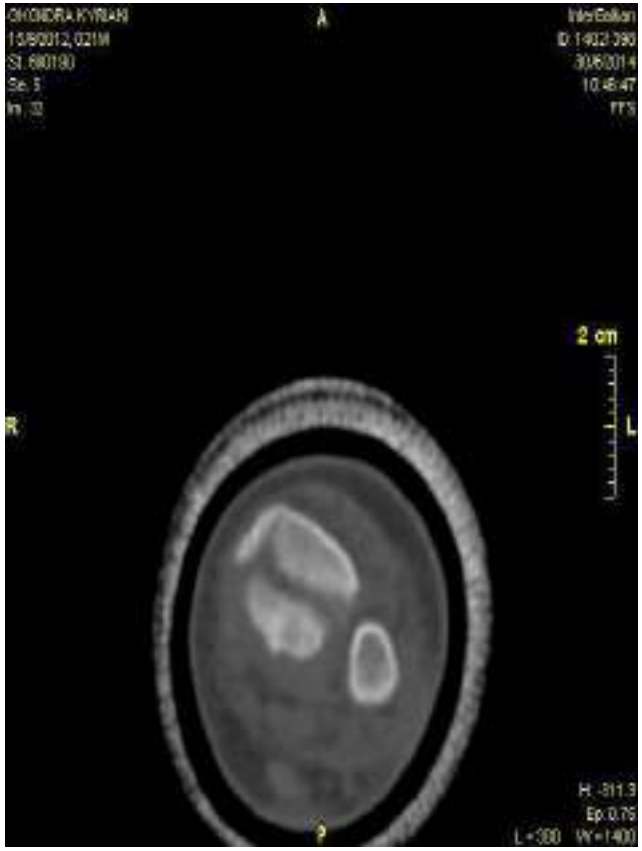
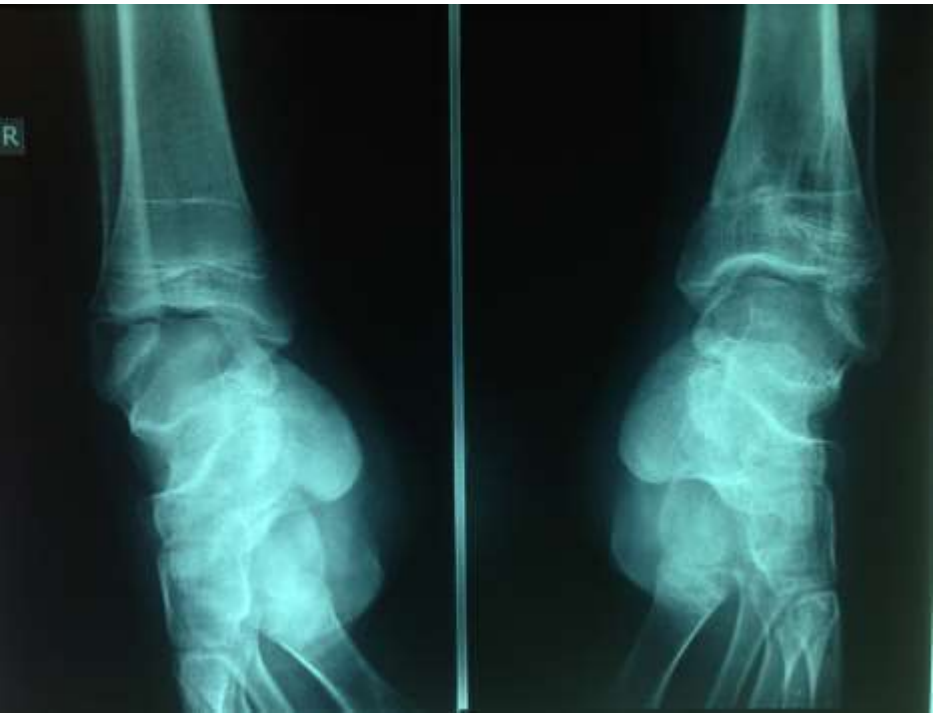




επιφυσιολισθήσεις περιφερικού άκρου κνήμης αντιμετώπιση

επιφυσιολισθήσεις περιφερικού άκρου κνήμης αντιμετώπιση



επιφυσιολισθήσεις περιφερικού άκρου κνήμης αντιμετώπιση

επιφυσιολισθήσεις περιφερικού άκρου κνήμης αντιμετώπιση gni

επιφυσιολισθήσεις περιφερικού άκρου κνήμης αντιμετώπιση gni

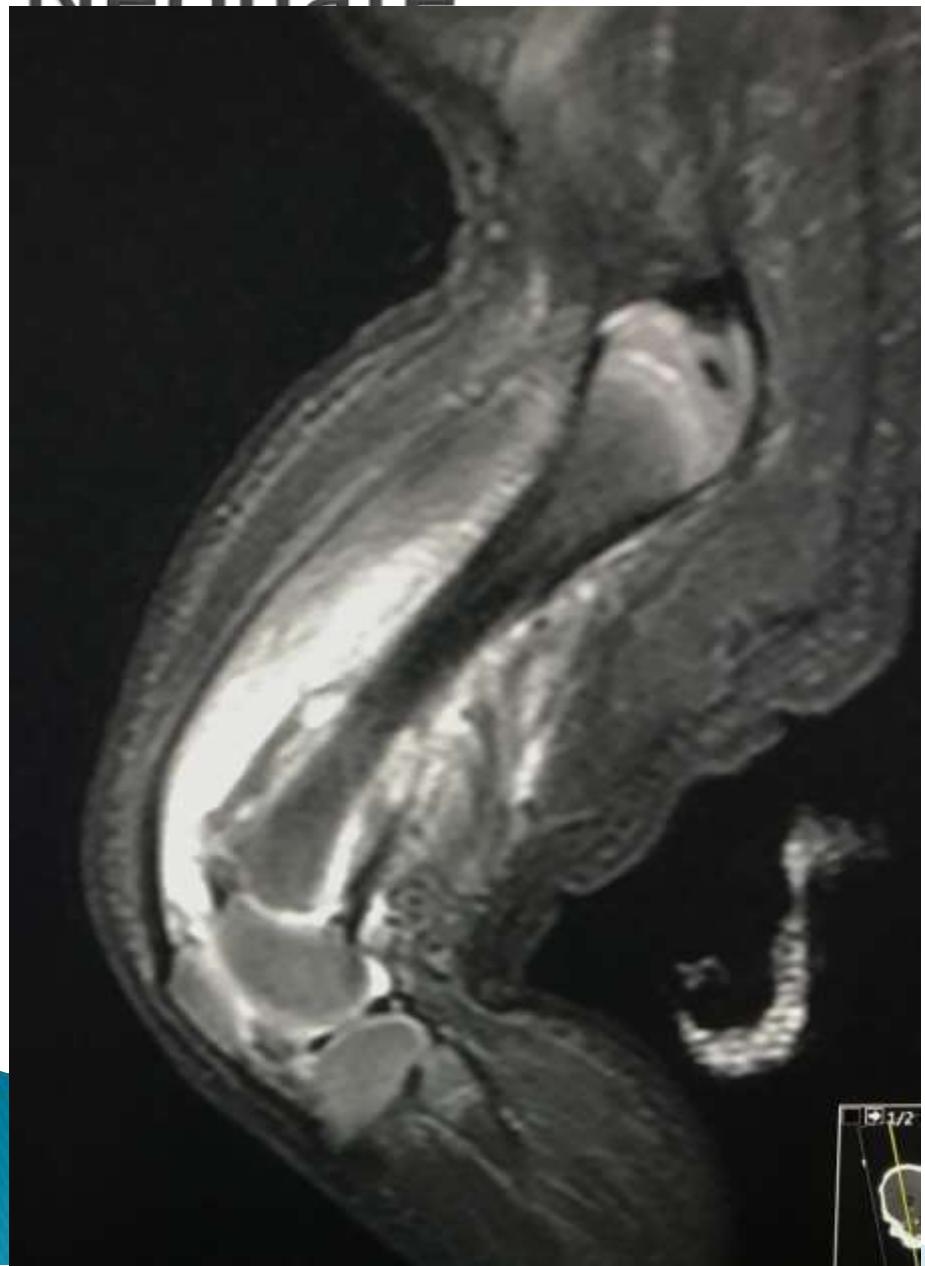
Fracture digits toes

Εξάρθρημα του αγκώνα κατά τον τοκετό

- Υπάρχει συγγενές εξάρθρημα?
- Επιφυσιολίσθηση

Neonate

Neonate



Neonate

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DOI: 10.1002/ccr3.2149

CLINICAL IMAGE

Clinical Case Reports WILEY

Salter-Harris type II fracture of the distal femur in a newborn: Acute anatomic imaging alterations after labor dystocia

Nicolaos Laliotis[1] | Stylianos Kapetanakis[1] | Grigorios Gkasdaris[1] | Panagiotis Konstantinidis[1] | Ritsa Karoutsou[1] | Danae Chourmouzi[2] | Lamprini Giannakopoulou[2]

[1]European Interbalkan Medical Center, Thessaloniki, Greece

[2]Radiology Department, European Interbalkan Medical Center, Thessaloniki, Greece

Correspondence

Key Clinical Message

A rare clinical presence of Salter-Harris type II fracture of the distal femur in a newborn. The crucial role of imaging in depicting urgent anatomical alterations.

KEYWORDS

Neonate

Ταξινόμηση της ΟΣΤΙΚΗΣ ΓΕΦΥΡΑΣ της επιφυσιακής πλάκας

- Περιφερική
- Κεντρική, που περιβάλλεται από φυσιολογικό ιστό
- Κεντρική σε όλη την διάμετρο

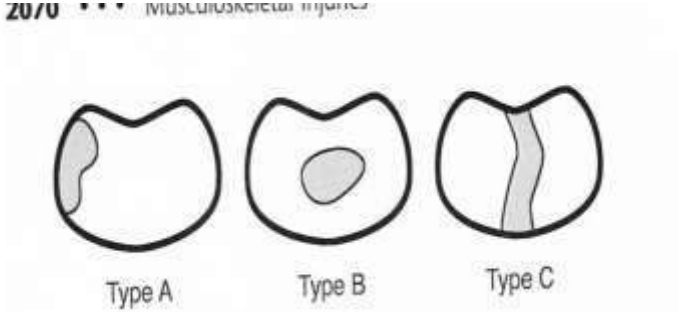
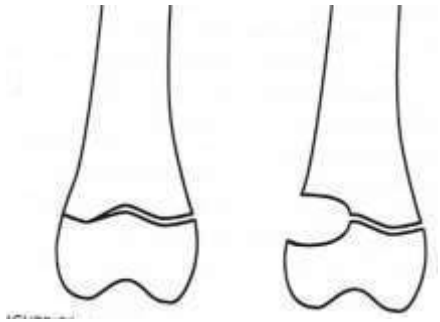
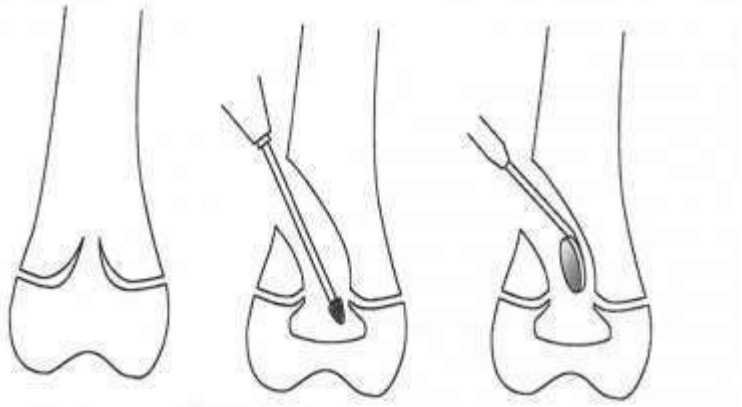


FIGURE 39–16 Classification of partial physeal arrest. Type A—peripheral; type B—central, surrounded by normal physis; type C—central, traversing the physis completely.

Αντιμετώπιση της βλάβης της επιφυσιακής πλάκας

- Αφαίρεση οστικής γέφυρας
- Διόρθωση παραμορφώσεων
- Διόρθωση ανισοσκελίας





Αντιμετώπιση της βλάβης της επιφυσιακής πλάκας

- Καλλιέργεια κυττάρων

Journal of Pediatric Orthopaedics
23:425–429 © 2003 Lippincott Williams & Wilkins, Inc., Philadelphia

Cultured Mesenchymal Stem Cell Transfers in the Treatment of Partial Growth Arrest

Fen Chen, MBBS, James H. P. Hui, FRCS, Wai K. Chan, BSc and Eng H. Lee, MD, FRCS(C)

Study conducted at the National University of Singapore, Republic of Singapore

Summary: Mesenchymal stem cells were cultured from periosteum harvested from the tibias of New Zealand White (NZW) rabbits. An experimental model for growth arrest was created by excising the medial half of the proximal growth plate of the tibia of 6-week-old NZW rabbits. The cultured mesenchymal stem cells were embedded in agarose and transferred into the growth-plate defect after excision of the bony bridge in established growth arrest. Transfer of agarose alone and a periosteum flap without cells served as the control groups. In cases of transfer of mesenchymal stem cells, growth arrest with angular deformation and loss of length of the tibia was corrected. Transfer of agarose alone and a periosteum flap yielded poor results. **Key Words:** bony bridge, growth arrest, mesenchymal stem cell culture, periosteum

Αντιμετώπιση της βλάβης της επιφυσιακής πλάκας

- Αφαίρεση οστικής γέφυρας

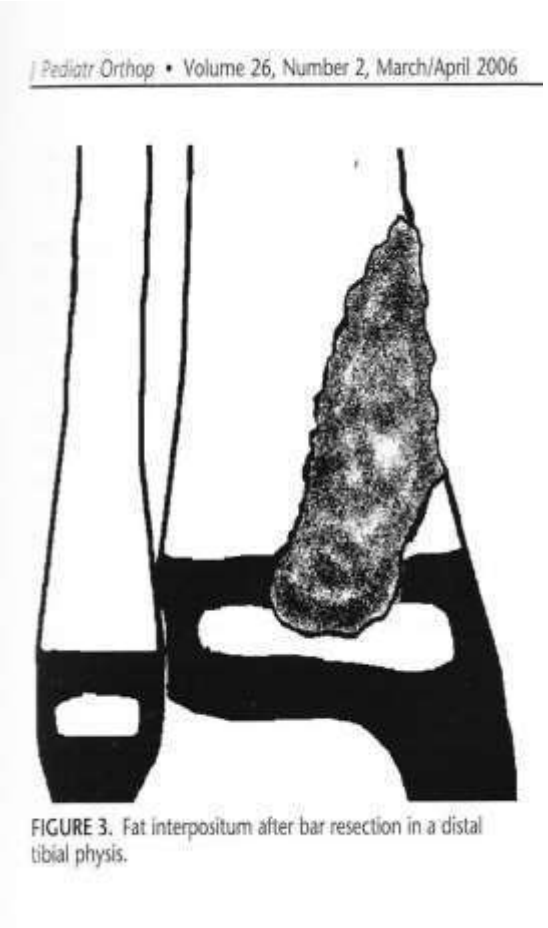


FIGURE 3. Fat interpositum after bar resection in a distal tibial physis.

Αντιμετώπιση της ΟΣΤΙΚΗΣ ΓΕΦΥΡΑΣ της επιφυσιακής πλάκας

- Αφαίρεση οστικής γέφυρας έχει ΠΤΩΧΑ αποτελέσματα
- Λαμβάνουμε υποψιν την διαφορά μήκους και την απόκλιση του άξονα
- Διόρθωση με 8 plate
- Διόρθωση με Ilizarov
- **Physeal transplantation**

Medicine (Baltimore). 2019 May;98(22):e15547. doi: 10.1097/MD.0000000000015547.

Combined navigated drilling and arthroscopy facilitate minimally invasive surgical treatment of ulnar-radial joint dislocation caused by epiphyseal premature closure: A case report.

Yu T[1], Yuan BM[1], Jiang YK[1], Li QW[2], Wang Q[3], Kang LH[1], Zhang XW[4], Wu DK[1], Zhao JW[1].

- The outcome of the present study suggests that the NDA maximizes the bone bridge resection accuracy in EPC treatment, which is made efficient by reducing surgical trauma and avoiding neurovascular injury. An experience was gained that in the process of bone bridge removal, the bit of navigated drill should be continuously washed with normal saline to cool down, so as to avoid damage of nerve caused by heat conduction

Eur Radiol. 2019 May 21. doi: 10.1007/s00330-019-06247-z. [Epub ahead of print]
Damage of the distal radial physis in young gymnasts: can three-dimensional assessment of physeal volume on MRI serve as a biomarker?
Kraan RBJ[1,2,3], Kox LS[4,5,6], Mens MA[4], Kuijer PPFM[7], Maas M[4,5,6].

The volume of the distal radial physis can be reliably assessed by creating three-dimensional physeal reconstructions. • Stress-related volume increase of the distal radial physis is present in symptomatic and asymptomatic gymnasts. • Gymnasts with clinically suspected physeal injury showed larger volume increases compared with asymptomatic gymnasts and may therefore be a valuable addition in the (early) diagnostic workup of physeal stress injuries.

J Magn Reson Imaging. 2019 May 1. doi: 10.1002/jmri.26771. [Epub ahead of print]

Status of growth plates can be monitored by MRI.

Wada H[1], Ikoma K[1], Oka Y[1], Nishida A[1], Onishi O[1], Kim WC[1], Tanida T[2], Yamada S[2], Matsuda KI[2], Tanaka M[2], Kubo T[1].

The volume of the distal radial physis can be reliably assessed by creating three-dimensional physeal reconstructions. • Stress-related volume increase of the distal radial physis is present in symptomatic and asymptomatic gymnasts. • Gymnasts with clinically suspected physeal injury showed larger volume increases compared with asymptomatic gymnasts and may therefore be a valuable addition in the (early) diagnostic workup of physeal stress injuries.

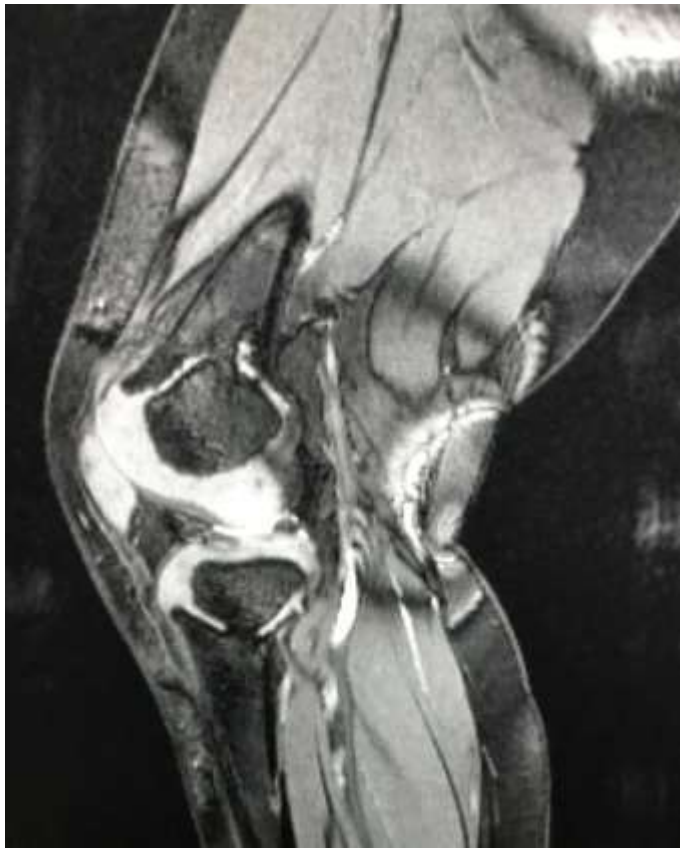
J Pediatr Orthop. 2019 Apr;39(4):e278-e283. doi: 10.1097/BPO.0000000000001289.
Is Anteromedial Drilling Safe in Transphyseal Anterior Cruciate Ligament Reconstruction in Adolescents with Growth Remaining?
Mathew S[1,2], Ellis HB[1,2], Wyatt CW[1], Sabatino MJ[1], Zynda AJ[1], Dennis G[1,2], Wilson PL[1,2].

With at least 2 years of growth remaining, transphyseal ACL reconstruction with anteromedial drilling did not significantly affect the physis or residual growth compared with the contralateral extremity. Although this technique may create a larger defect in the physis, standing radiographs demonstrate there is no change in limb length or angulation in growing adolescents approximately 2 years after surgery.

Growth plate arrest central

Growth plate arrest central

Growth plate arrest central



Ευχαριστίες στους δασκάλους μας

Merci bien