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What's so special...

Periostium

Elasticity

Growth









The envelope

Periostium

Elasticity

Growth

Connects displaced fragments building a bridge during healing





Interposed between fragments makes the reposition difficult

The envelope



Compliance

Periostium

Elasticity

Growth

Stable fractures



Tendency to underestimate force/trauma.

Pelvic/costal/vertebral fractures

Compliance

Periostium

Elasticity

Growth

Torus fracture

Green stick

Compliance





Friend or foe

Periostium

Elasticity

Growth

Some deformities improve by growth



Some deformities worsen by growth



No screws crossing growth plate Final surgery within few days



Articular surface has priority over growth plate

Progressive deformity by growth → early intervention

A deformity can be corrected – joint surface can not

Invisibility

Invisibility

Characteristics of childrens bones

- Periosteum can heal the bone despite severe dislocation
- Bowing fractures is difficult to diagnose and difficult to treat.
- Injury to the growth plate gives progressive deformity.
 Joint surface, however, has the highest priority.

 Imm
 10
 20
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Fraktur af radiale condyle - operation

- NO dissection posterior to the condyle - vascular supply
- **Direct inspection**
- Two diverging K-wire from the

JAKOB'S CLASSIFICATION (JBJS 1975)

- Jakob et al (1975)
- Reproduced #s in a cadaveric study
- Presence/absence of medial cartilage hinge is the key prognostic factor

Best way to identify hinge

- I. Nondisplaced < 2 mm gap
- II. Minimally displaced 2-4 mm
- III. Displaced > 4 mm
- (complication Stage 3 >>> Stage 2 >Stage 1)

et al 2009

Stage 1

Stage 2

Stage 3

In your experience how effective is this classification in determining management prospectively?

Weiss

Lateral condyle

Intraarticular fractures heal slowly

K-wires cut under the skin allows for early mobilisation

Risk of pseudarthrosis and fish-tail-deformity

• Fracture of the lateral condyle:

- Intraarticular fracture
 NO deformity accepted
- Open reduction with direct inspection of the joint surface
- Long time to heal, and risk of pseudarthrosis.

Case 9

12-year-old boy, fall from tree, painful swollen elbow

What are your thoughts about this injury?

Case10

9-year-old boy fell whilst running in playground

What are your thoughts about this fracture?

Case10

9-year-old boy fell whilst running in playground

Classification 22u – D /6.1

21r – M/3.1 III AOTRAUMA Pediatric
9-year-old boy fell whilst running in playground



How would you treat this?



Technique

















9-year-old boy fell whilst running in playground



This is what was done



Case10 9-year-old boy fell whilst running in playground



This is what was done

Previous position



Case10 9-year-old boy fell whilst running in playground



This is what was done



Case10 9-year-old boy fell whilst running in playground



9-year-old boy fell whilst running in playground





08.11.2004, 08:23:15



əəb.dat.: 19.08.1995 at.ID.: 0002538725 079144

12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

What are your thoughts about this fracture?





12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

Classification 31 - M/3.1 |





12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

How would you treat this?





12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

Treatment? Non – operative? // operative? If operative, then how? àclosed // open reduction? à which implant?





12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

This is what was done







Pediatric

12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

This is what was happen







12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries

Right leg in neutral position; **Clinically** decreasing abduction, no rotation, flexion up to 40°





12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries



16 months after injury



AOTRAUMA

Pediatric

12-year-old girl, Traffic accident; swollen, painful right hip, no other injuries



Treatment options?

- Wait and see; later total hip?
- initial total hip?
- surgical hip dislocation and

head reshaping?

- intertrochanteric OT?



15-year-old girl, car accident, no other injuries, neuro-vascular o.k.



What are your thoughts about this fracture?



15-year-old girl, car accident, no other injuries, neuro-vascular o.k.



Classification

Oblique femoral shaft fracture (32 – D/5.1)

> 30°

AOTRAUMA

Pediatric

15-year-old girl, car accident, no other injuries, neuro-vascular o.k.



How would you treat this?



15-year-old girl, car accident, no other injuries, neuro-vascular o.k.



Treatment?

Operative / conservative?

Operative

- Plate?
- ExFix?
- solid nail (ALFN)?
- ESIN?
- MIPO



15-year-old girl, car accident, no other injuries, neuro-vascular o.k.





This is what was done In a first step: X-ray of the other side!

How would you treat this now?



15-year-old girl, car accident, no other injuries, neuro-vascular o.k.



15-year-old girl, car accident, no other injuries, neuro-vascular o.k.





15-year-old girl, car accident, no other injuries, neuro-vascular o.k.



4 months after surgery full weight bearing was allowed



15-year-old boy, closed isolated injury, 70 kg, 1.80 m



What are your thoughts about this fracture?





15-year-old boy, closed isolated injury, 70 kg, 1.80 m



Classification

transverse femoral shaft fracture (32 – D/4.1)





15-year-old boy, closed isolated injury, 70 kg, 1.80 m



How would you treat this?



15-year-old boy, closed isolated injury, 70 kg, 1.80 m



How would you treat this?

- 1. Conservative
- 2. ORIF and Plate
- 3. ExFix
- 4. ESIN
 - 5. MIPO
 - 6. ALFN



15-year-old boy, closed isolated injury, 70 kg, 1.80 m

This is what was done





AOTRAUMA Pediatric

15-year-old boy, closed isolated injury, 70 kg, 1.80 m



What is the difference? 3 weeks after surgery Asking when he can return to sport



15-year-old boy, closed isolated injury, 70 kg, 1.80 m



12 weeks after injury

- No symptoms
- Normal strength
- FROM hip & knee
- Asking to return to sport ?
- Answer ?



2 years later returns with complaint of low back pain.

- 2.1 cm longer left
- lower limb
- (14mm femur + 7mm tibia)
- Relevant?
- Other investigations ?
- Diagnostic tests ?
- Treatment ?





11-year-old boy, ski accident, neuro-vascular o.k.; closed!



What are your thoughts

about this fracture?



11-year-old boy, ski accident, neuro-vascular o.k.; closed!



How would you treat this?



11-year-old boy, ski accident, neuro-vascular o.k.; closed!



How would you treat this?

Conservative / operative?

- ORIF and Plate
- ExFix
- Closed reduction MIOP
- ESIN
- ESIN and EndCaps
11-year-old boy, ski accident, neuro-vascular o.k.; closed!





11-year-old boy, ski accident, neuro-vascular o.k.; closed!



Situation 8 months after nailing



15-year-old girl; supination injury during school sport

What are your thoughts about this fracture?





15-year-old girl; supination injury during school sport



15-year-old girl; supination injury during school sport

How would you treat this?





15-year-old girl; supination injury during school sport



How would you treat this? Operative / conservative Operative:

 \rightarrow open / closed reduction

- cannulated screws
- Screws + K-wires
- Only K-wires
- Others



15-year-old girl; supination injury during school sport



This is what was done Closed treatment, foot direct on the intensifier

