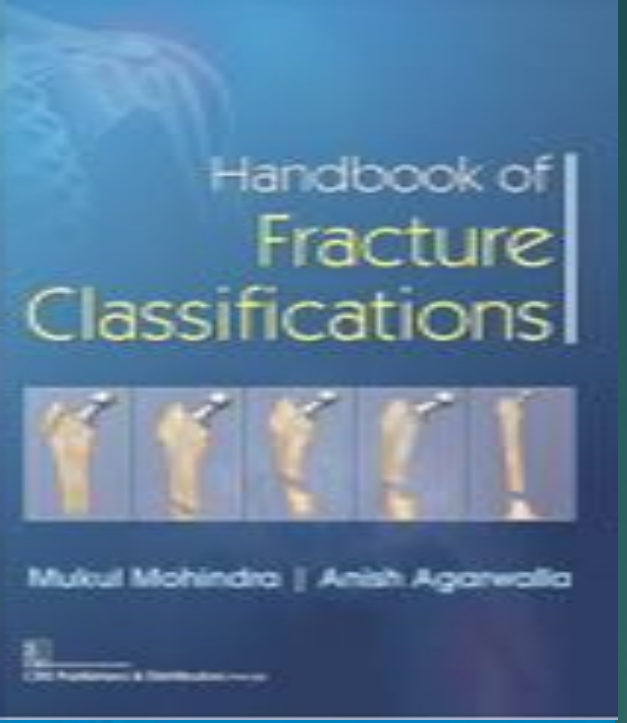
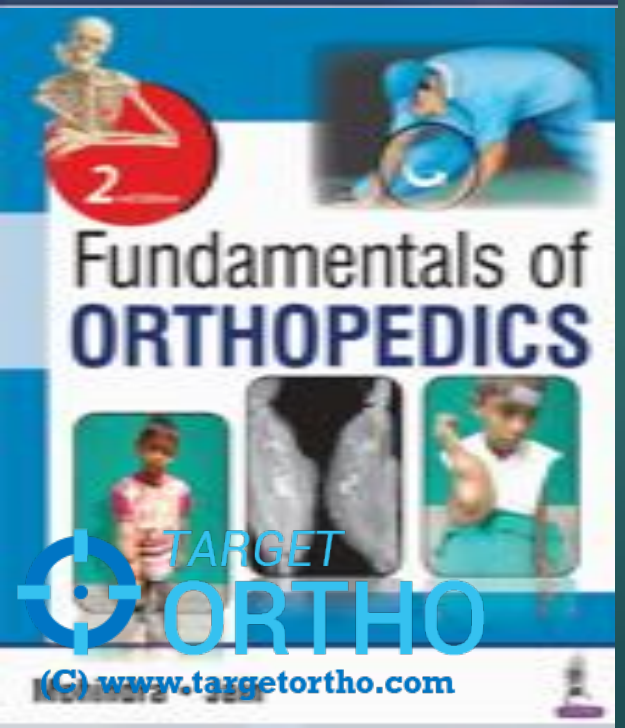




TOTAL HIP ARTHROPLASTY

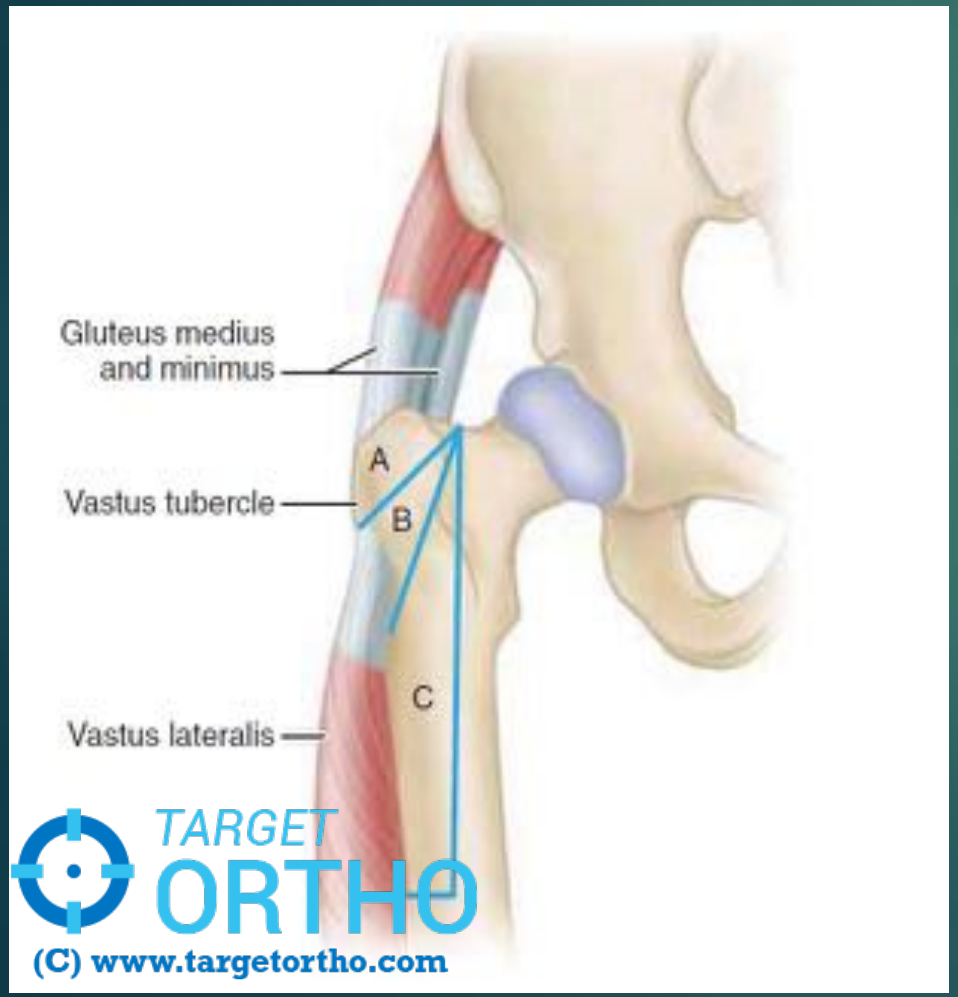
THE DIFFICULT SCENARIOS

M.S [Ortho], DNB, MNAMS
Dip. SICOT [Belgium]
FNB [Sports Medicine]
Fellowship in MIA, Athens [SICOT]

COMMON POINTS

- All options on table must be there (implant and graft)
- Posterior approach <MOST EXTENSILE>
- *Trochanteric osteotomy to be added if needed*
- Explore Sciatic nerve IN ALL DIFFICULT SCENARIOS
- Weight bearing to be limited for 3 months

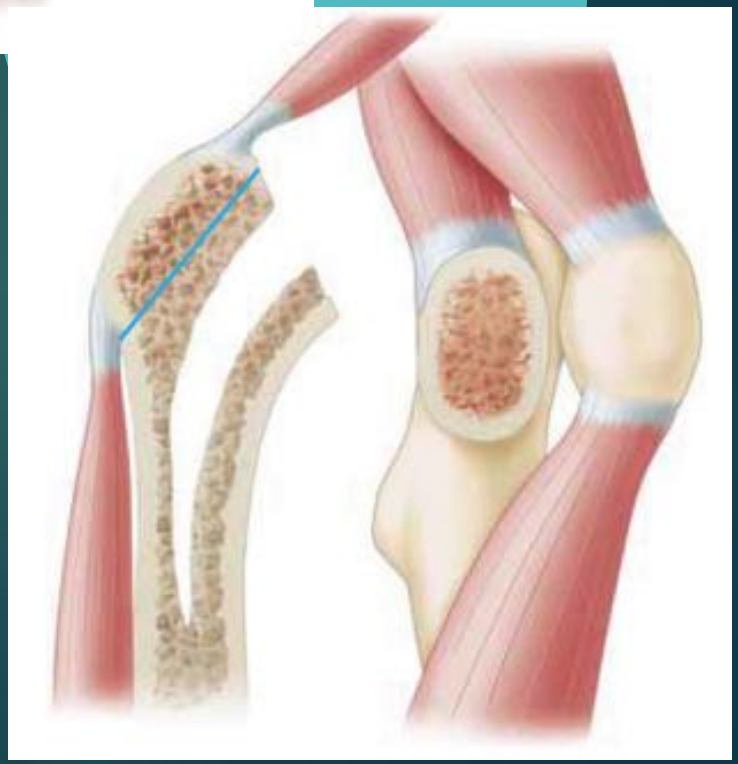
TROCHANTERIC OSTEOTOMY

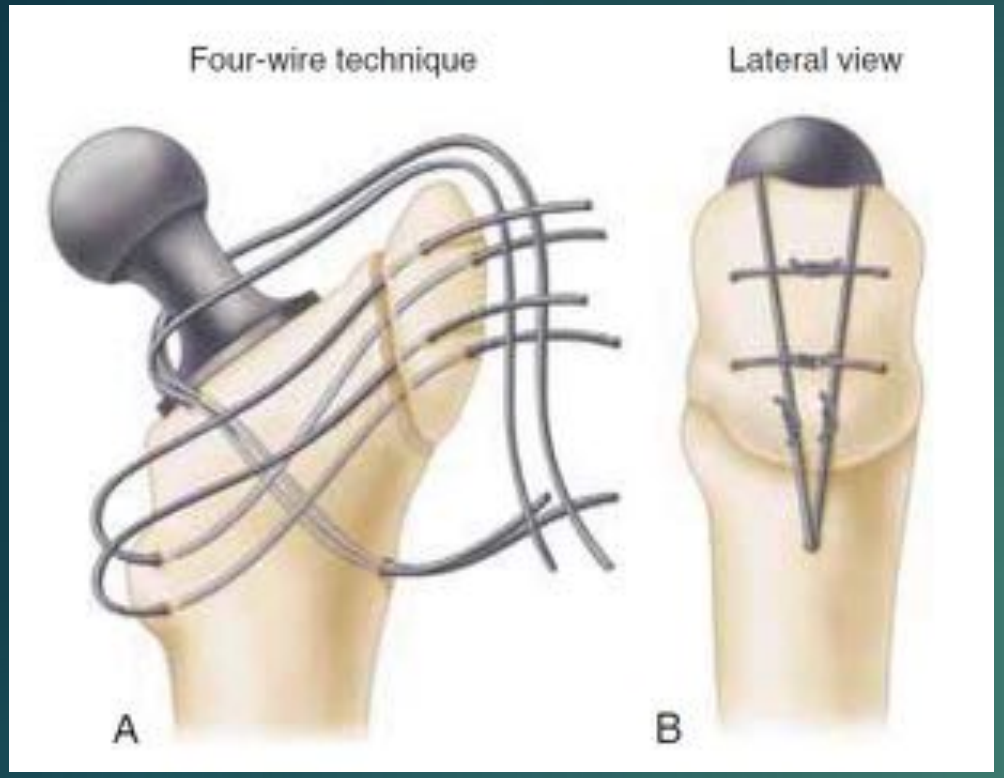


A — **STANDARD**

B — **SLIDE**

C — **EXTENDED**





Harris
Four wire technique

Dall Miles
Cable Grip Device

THE DIFFICULT SCENARIOS

DEVELOPMENTAL DYSPLASIA

DDH

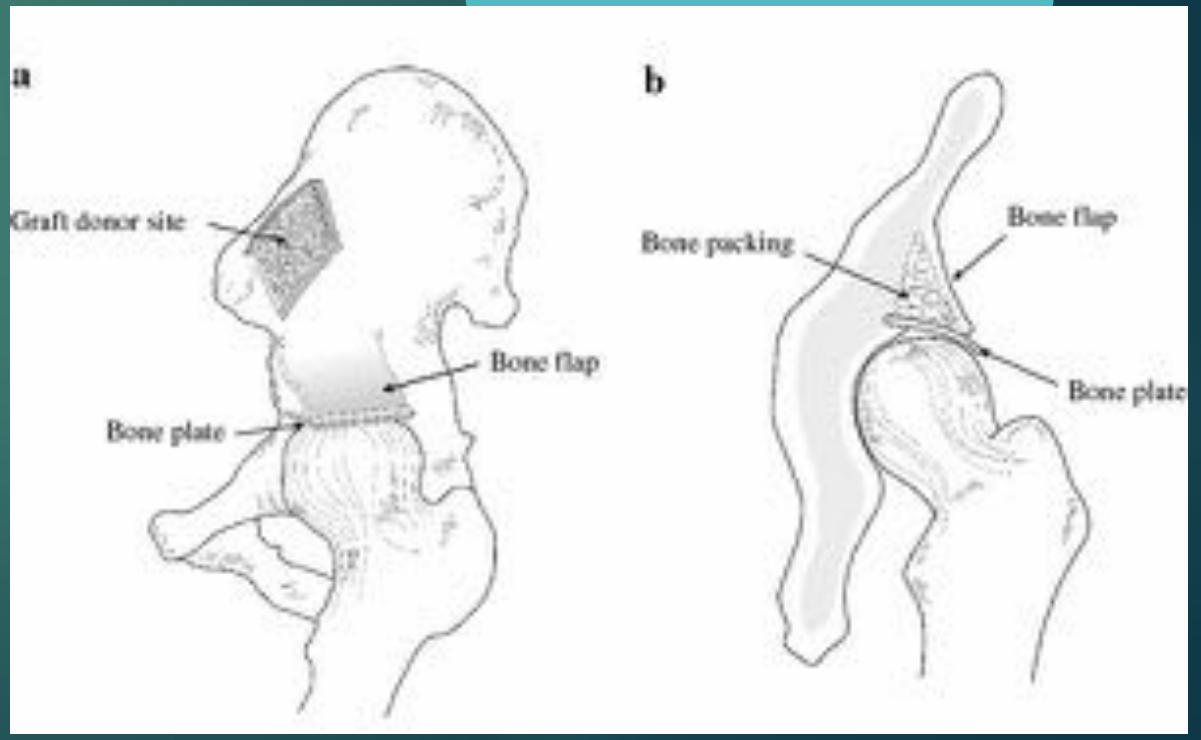
Developmental Dysplasia of Hip

INDICATION

Symptomatic arthritis secondary to dysplasia

TECTOPLASTY

Painful hip
< 30 years age



DDH

Developmental Dysplasia of Hip

- Femoral head is small and deformed
- Femoral neck is narrow and short with marked anteversion
- The greater trochanter usually is small
- and often located posteriorly
- The femoral canal is narrow and there is more of anterior bowing
- The acetabulum is oblong and its roof is eroded
- The abductor muscles frequently are poorly developed and oriented more transversely than normal

CROWE's Classification

DDH

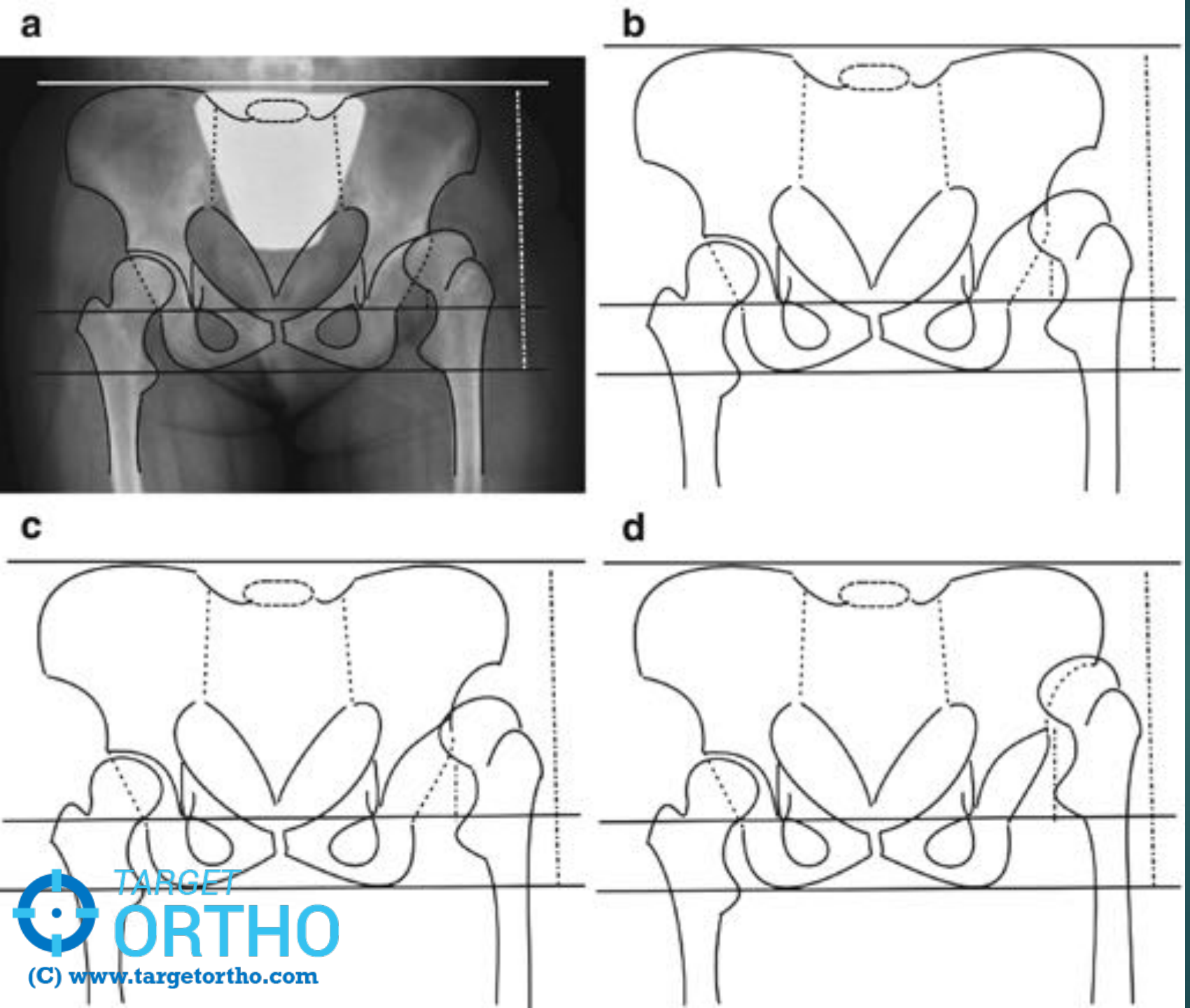
AP X ray Pelvis

Complexity of surgery depends on degree of anatomical abnormality

The magnitude of proximal femoral migration relative to the acetabulum

Relation: Opposite femoral head	Relation: Pelvic height
Subluxation < 50%	< 0.1 % of pelvic height
Subluxation 50-75%	0.1-0.15 % of pelvic height
Subluxation 75-100%	0.15-0.20 % of pelvic height
Subluxation > 100%	> 0.20 % of pelvic height

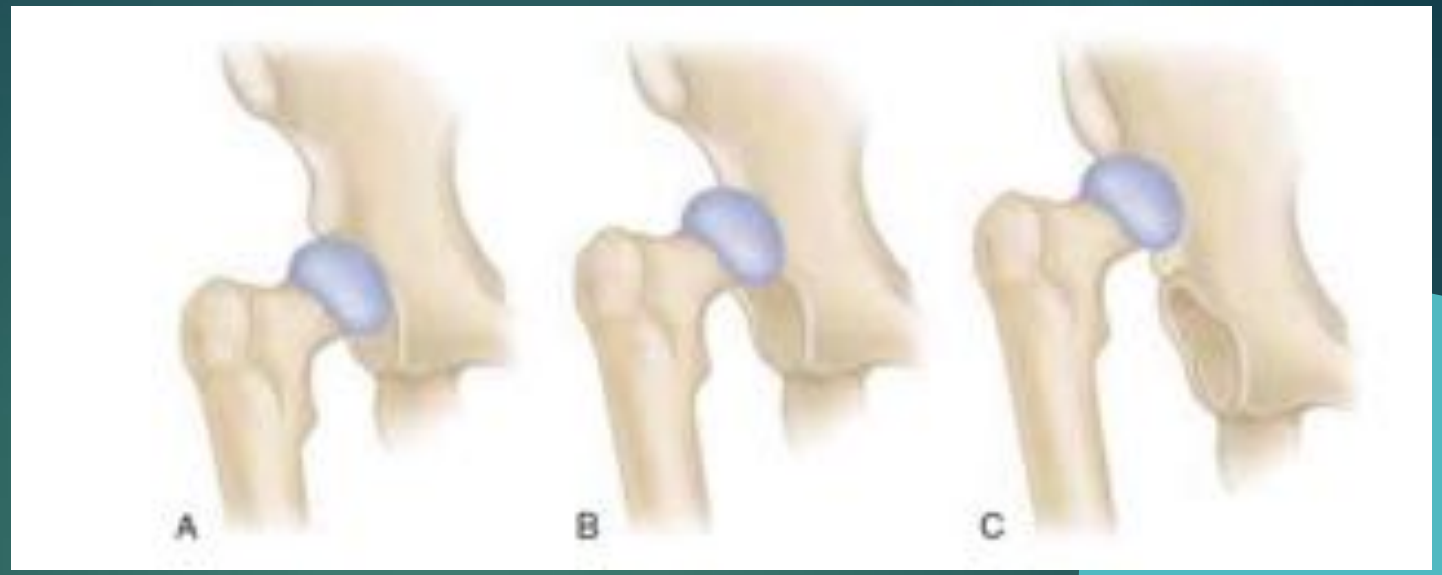
I
II
III
IV



Parameters

- Pelvic height
- Medial Head-Neck Junction
- Tear drop (inferior margin of acetabulum)

Hartofilakidis et al. Classification



A. HIP DYSPLASIA

Femoral head subluxated
but still contained within the true acetabulum

B. LOW DISLOCATION

Femoral head subluxated and migrated up and lateral.
The subluxated part articulates with a false acetabulum

C. HIGH DISLOCATION

Head fully dislocated and gone postero-supero-laterally

HIP DYSPLASIA <CROWE I/II>

Medialize the acetabular component by careful reaming and fit cementless cup.
Be careful while handling ***anterior wall*** as it may be thin

Charnley and Feagin warned that no more than 5 mm of the cup should protrude beyond the bone!

LOW DISLOCATION (oval shallow acetabulum) <CROWE III>

Recognize acetabulum: Inferior margin and acetabular notch
Remove all soft tissues, ream medially to deepen.

If >20% cup is uncovered

- Use graft/ augments to build coverage
- COTYLOPLASTY: Perforate medial wall → centralize cup and put graft medially → cement cup in place
- Or reconstruct acetabulum at a high hip centre

HIGH DISLOCATION (Flat acetabulum) <CROWE IV>

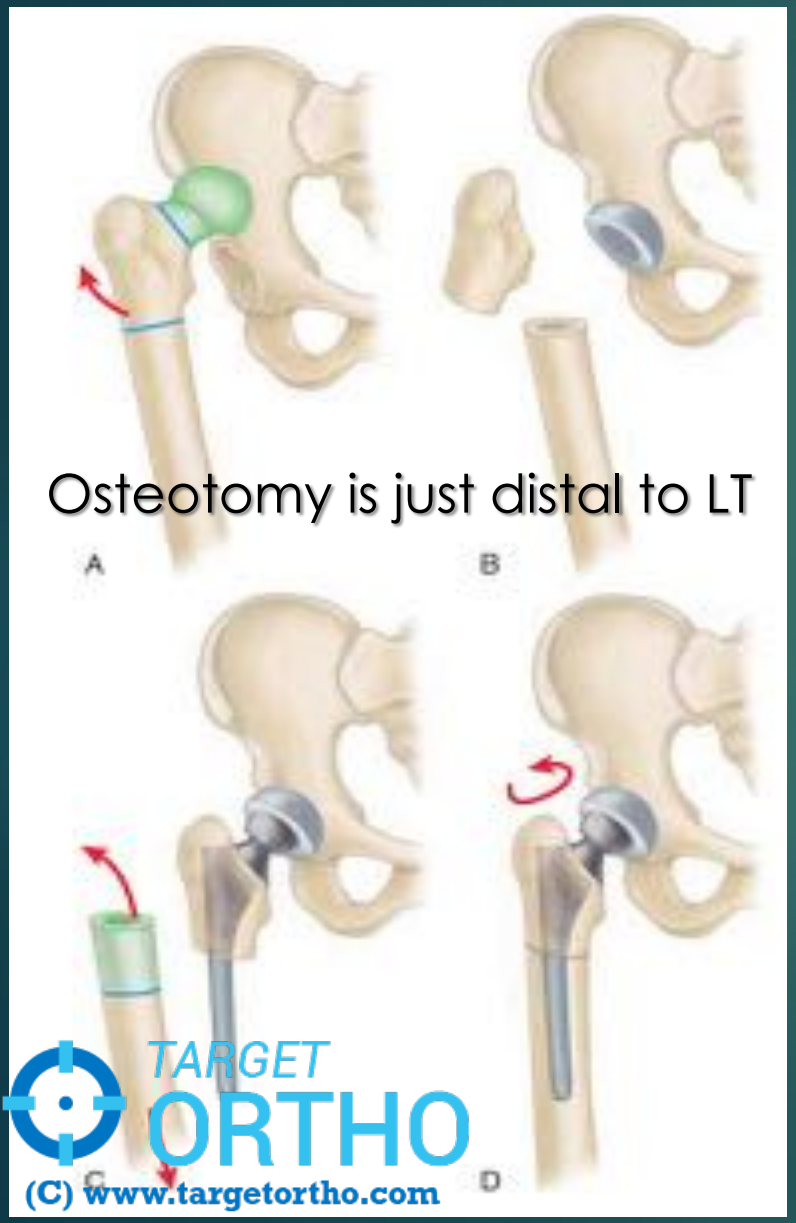
Extensive capsulotomy + soft tissue releases

Femoral shortening/ GT distalization

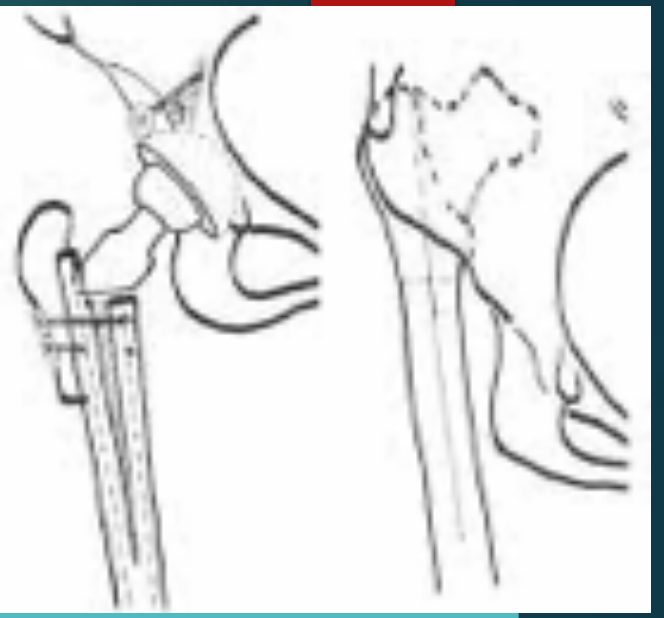
Place small acetabular shell in *anatomic centre*

Lies at cross section of ischium and pubic ramus

Femoral shortening



Osteotomy is just distal to LT



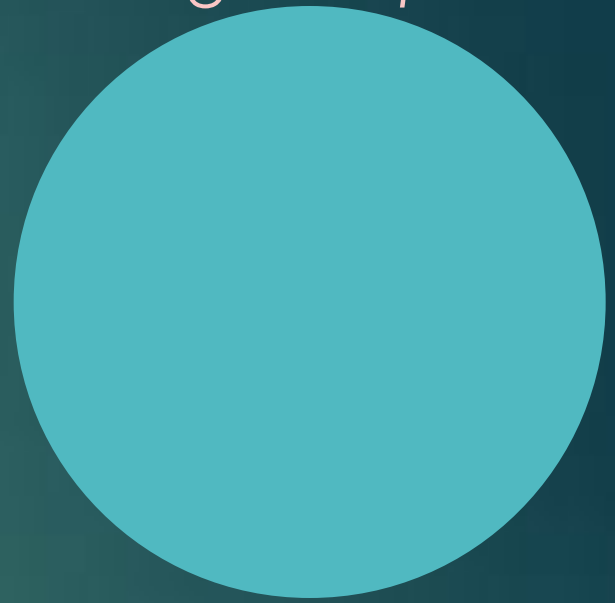
Dunn and Hess Osteotomy

DDH

Surgical Tips!!

ACETABULAR COMPONENT: The shallow dysplastic acetabulum may require a very small acetabular component (≤40 mm).

A 22-mm femoral head size should be used because it can be difficult to maintain adequate polyethylene thickness when a larger head size is used with a small cup.



FEMORAL COMPONENT: Arrange small sizes: Dunn and Hess found its average width 2 cm inferior to the lesser trochanter to be only 1.5 cm.

PROTRUSIO

PROTRUSIO

PRIMARY (ARTHROKATADYSIS)

Mostly Bilateral

Young women

SECONDARY

U/L: Migration of an endoprosthesis, septic arthritis, or prior acetabular fracture.

B/L: Paget's disease, Arachnodactyly (Marfan syndrome), Rheumatoid arthritis, Ankylosing spondylitis, and Osteomalacia.

PROTRUSIO

The Surgical Challenges

Difficult Dislocation: At times extremely difficult as the femoral head is incarcerated within the acetabulum

- Removal of a small overhanging portion of the
posterior acetabular wall may facilitate dislocation.

- In severe cases, the femoral neck must be osteotomized in situ at the appropriate angle

Protecting the Nerve!

Often, because of the medial migration of the femur, the sciatic nerve is nearer the joint than normally, and consequently it should be identified and protected.

Principles of Reconstruction

(1) the hip centre must be placed in an ***anatomic location*** to restore proper joint biomechanics;

(2) the intact peripheral rim of the acetabulum should be used to support the acetabular component; and

(3) the remaining cavitary and segmental defects in the medial wall must be reconstructed, preferably with bone grafting

Reconstructing Hip Center

Dorr and Inglis proposed a method of *determining the hip centre* by the radiographic relationships of the Kohler and Shenton lines and the height of the pelvis.

Particulate bone grafts are contained by intact soft tissues over the medial wall defect and incorporate readily.

Sloof et al.

Particulate cancellous bone grafts measuring 0.5 to 1.0 cm are tightly impacted into the medial acetabular defects, and a segment of wire mesh is placed on top of the bone graft. A conventional acetabular component is cemented into the construct.

Don't hesitate from use of cage in case there is a doubt regarding the strength/ integrity of medial wall

Medialization Vs Lateralization

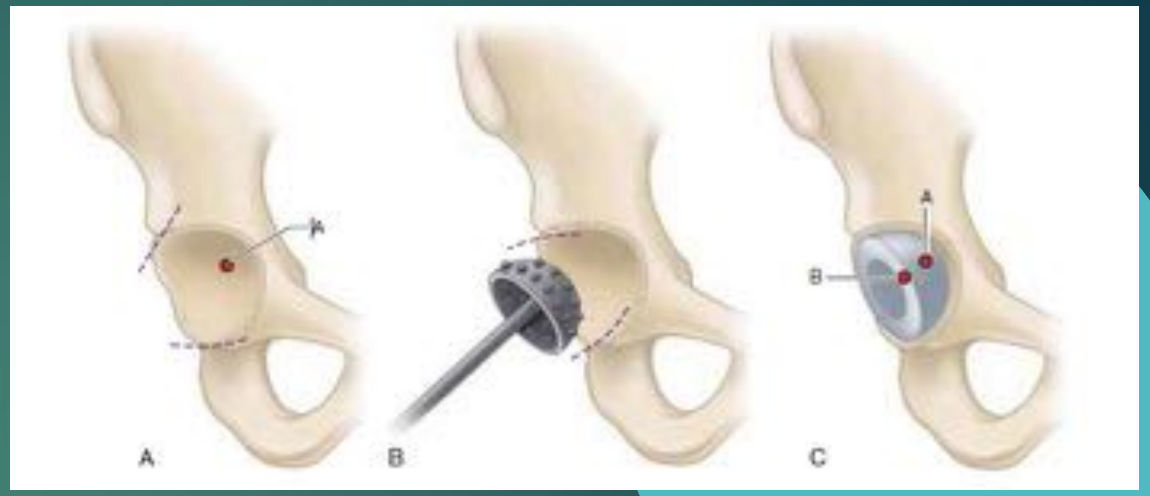
Lateralization is advisable as the medial wall is thin to offer proper support and fails with time

Lateralize by putting medially morselized graft of femoral head that has been resected

Use bigger sized acetabular cup to achieve additional stability as medial side has only graft

Lateralization also improves horizontal and vertical offsets

Often over lengthening can occur so cut neck at lower level so that prosthesis can be sinked in. Femoral component with higher offset can also be helpful.



Converting convergent to divergent walls

ANKYLOSIS

Surgical Tips

First cut neck (perform *double neck osteotomy* to create acetabulum exposure), dislocate and now ream. Drill hole can be done to determine depth of reaming clinically.

Use of C arm advisable. Ream under c arm initially
Then confirm acetabulum from 2 landmarks: Inferior margin with obturator foramen and transverse acetabular ligament.

Sciatic nerve exploration is also advisable as soft tissue releases may be extensive.

Lengthening mostly occurs post op, so counsel.

The Decider !!!

Functional integrity of abductors is the biggest predictor of prognosis

Any role of EMG or MRI?

The Decider !!!

Functional integrity of abductors is the biggest predictor of prognosis

Function of the abductors is difficult to evaluate before surgery, but in some patients active contraction of these muscles can be palpated.

Examination of the hip with the knee flexed helps differentiate the tensor fasciae latae from the abductor muscles.

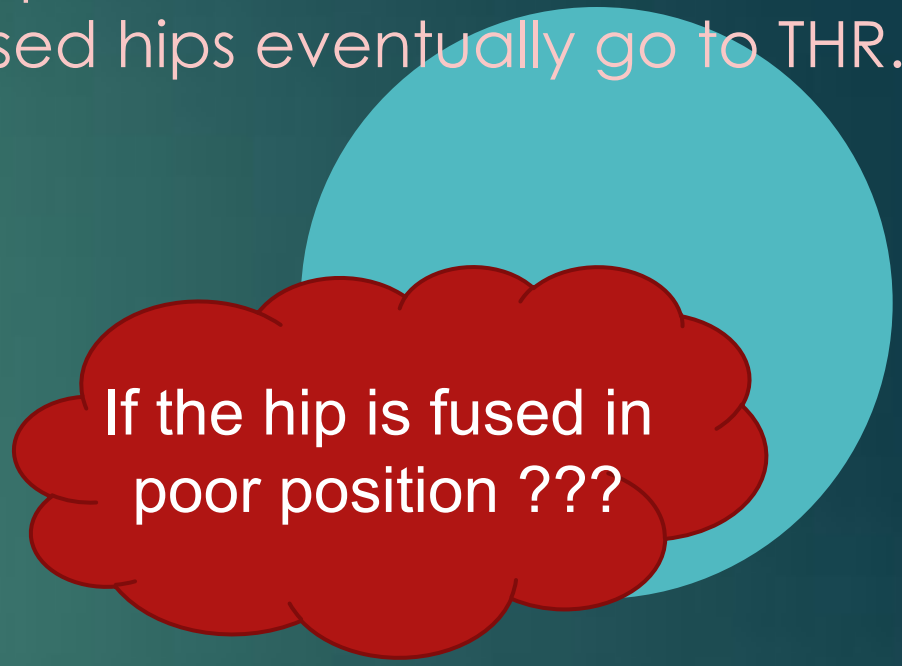
If the hip has been fused since childhood, and the trochanter appears relatively normal, the abductor muscles are probably adequate.

Abductor muscle strength can take up to 2 years to return to normal. Pain can persist till then.

ARTHRODESIS

Prognosis is poorest in THR done in surgically ankylosed hips (hip arthrodesis). Heterotopic ossification risk is also higher.

As per literature; 10-20% of fused hips eventually go to THR.

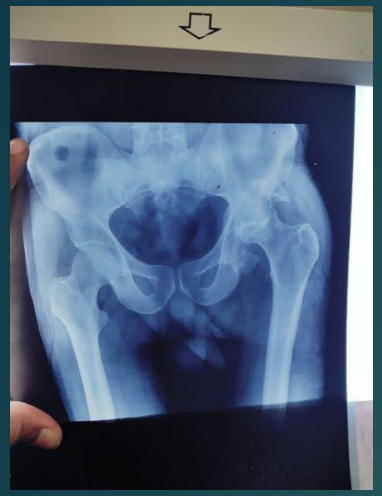


INDICATION

THR is indicated if a fused hip causes severe, persistent low back pain or pain in the ipsilateral knee or *contralateral hip* or if a pseudarthrosis after an unsuccessful fusion is sufficiently painful.

Arthrodesis of one hip also applies greater mechanical stress to the opposite hip.

BONE DEFECTS



The Etiology!

(1) Osteolysis: caused by wear, loosening, or infection

(2) Excessive bone resection at the time of previous surgery

(3) Pre-existing bone deficit from acetabular fracture or dysplasia that was not corrected

(4) Inadvertent destruction of bone during removal of a previous component or cement.

ACETABULAR DEFECTS

Paprosky Classification of Acetabular Deficiencies, 1994

Type I Supportive rim with no bone lysis or migration

Type II Distorted hemisphere with intact supportive columns and <2-cm superomedial or superolateral migration

a. Superomedial
b. Superolateral (no dome)
c. Medial only

Type III Superior migration >2-cm and severe ischial and medial osteolysis

a. Kohler's line intact, 30%-60% of component supported by graft (bone loss: 10 o'clock to 2 o'clock position)
b. Kohler's line not intact, >60% of component supported by graft (bone loss: 9.00 o'clock to 5.00 o'clock position)

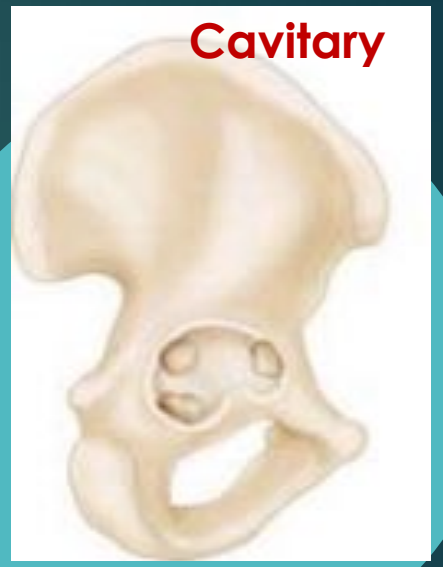
AAOS, 1989

ACETABULAR DEFECTS

Paprosky Classification

Segmental

Cavitary



Combined

Pelvic Discontinuity

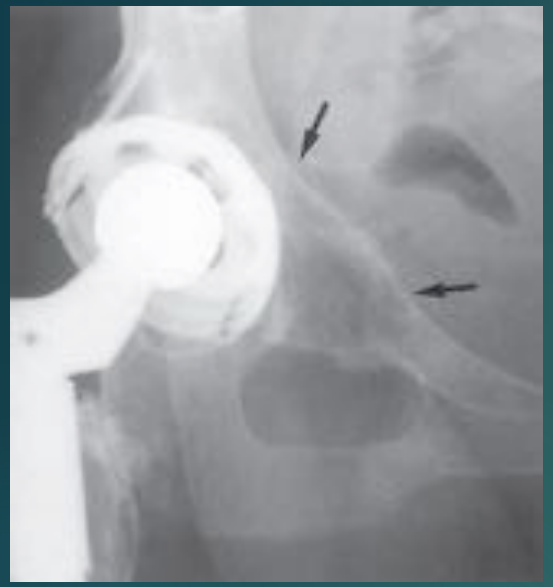
Rx

If the deficits are very small, ream to a slightly larger size.

Judicious reaming and Careful implant sizing

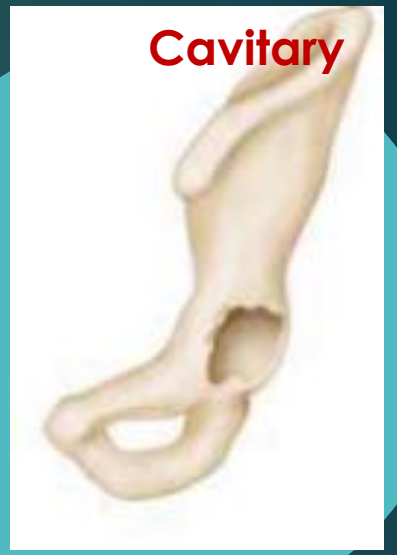
Easiest

- If the deficits are larger, significant additional reaming would compromise the rim of the acetabulum
- Fill deficiencies with morselized bone grafts and impact them into place **by using the last-sized reamer, turning in reverse** or by impaction with an acetabular trial component.
- A larger than average final acetabular component may be required



Segmental deficits in the anterior column usually do not require reconstruction; Posterior and superior coverage is prime

Structural augmentation is needed most commonly for a *large posterior or superior segmental deficiency* that compromises the stability or that requires superior displacement of the centre of rotation of the hip more than 2.5 cm.



Results tend to be best when at least 50% of the support of the revision acetabular component gets provided by host bone rather than graft!

Augments Vs Grafts

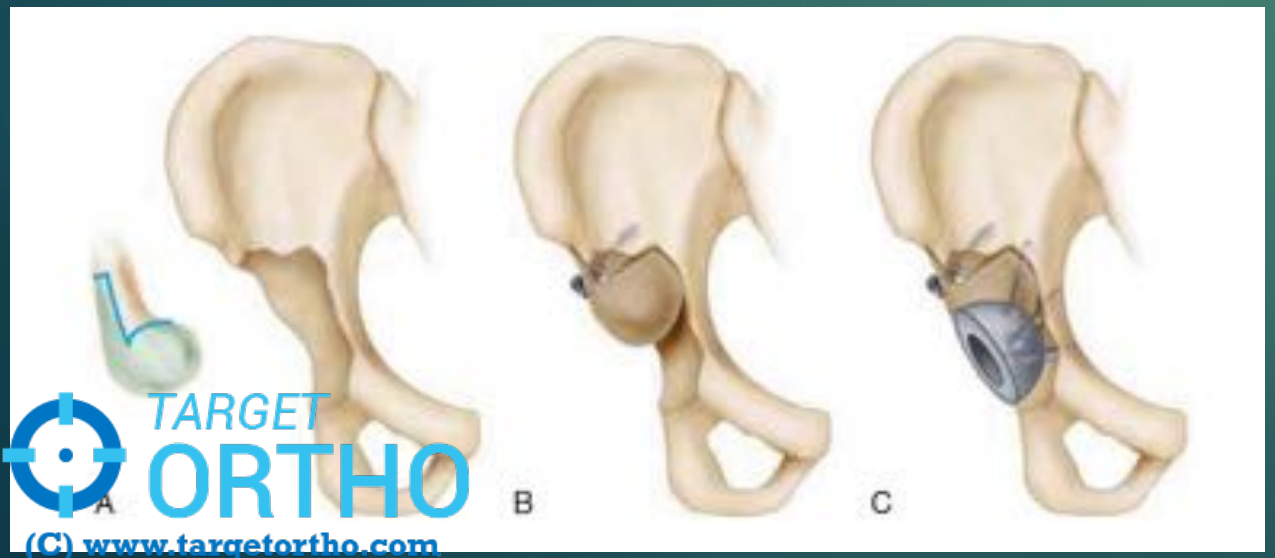
Modular augments are advantageous because rigid initial fixation of the augment can be achieved, resorption of the augment is not a concern (unlike with allograft), and multiple augment sizes and configurations are available to accommodate complex bone loss and deformity!

Combined deficiencies are usually are too large to be managed with only a femoral head graft.

The Bailouts!

- Distal femoral allografts, modular metal augments, *Antiprotrusio cage*, Custom triflanged acetabular components need to be arranged.
- Hemispherical components placed at a high hip centre can also be used.
- A tantalum metal revision socket has been developed, which may require less than 50% host bone available for stability, but long-term results are unavailable.

Paparosky "7" graft construct



Mostly result from a transverse fracture of the acetabulum with complete separation between the superior and inferior halves!

If healing potential exists → compression plating of the posterior column and graft and then later do THR.

ANTI-PROTRUSIO CAGE

Cup-Cage Construct

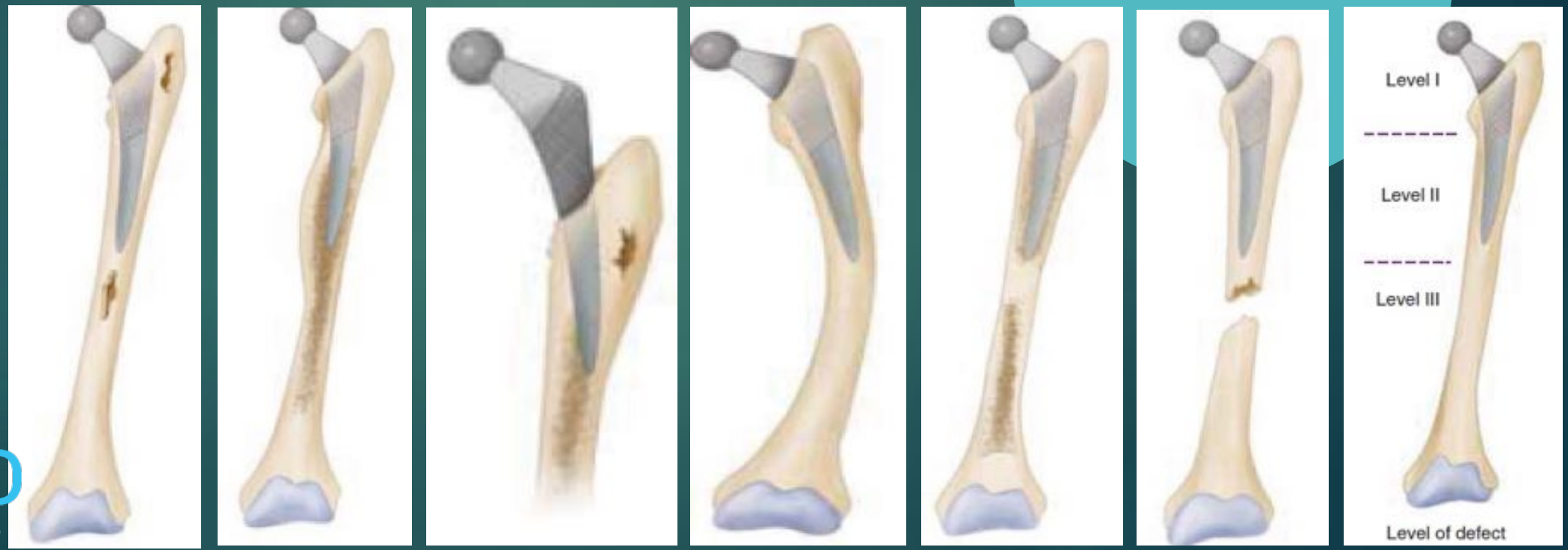
FEMORAL DEFECTS

AAOS, 1993

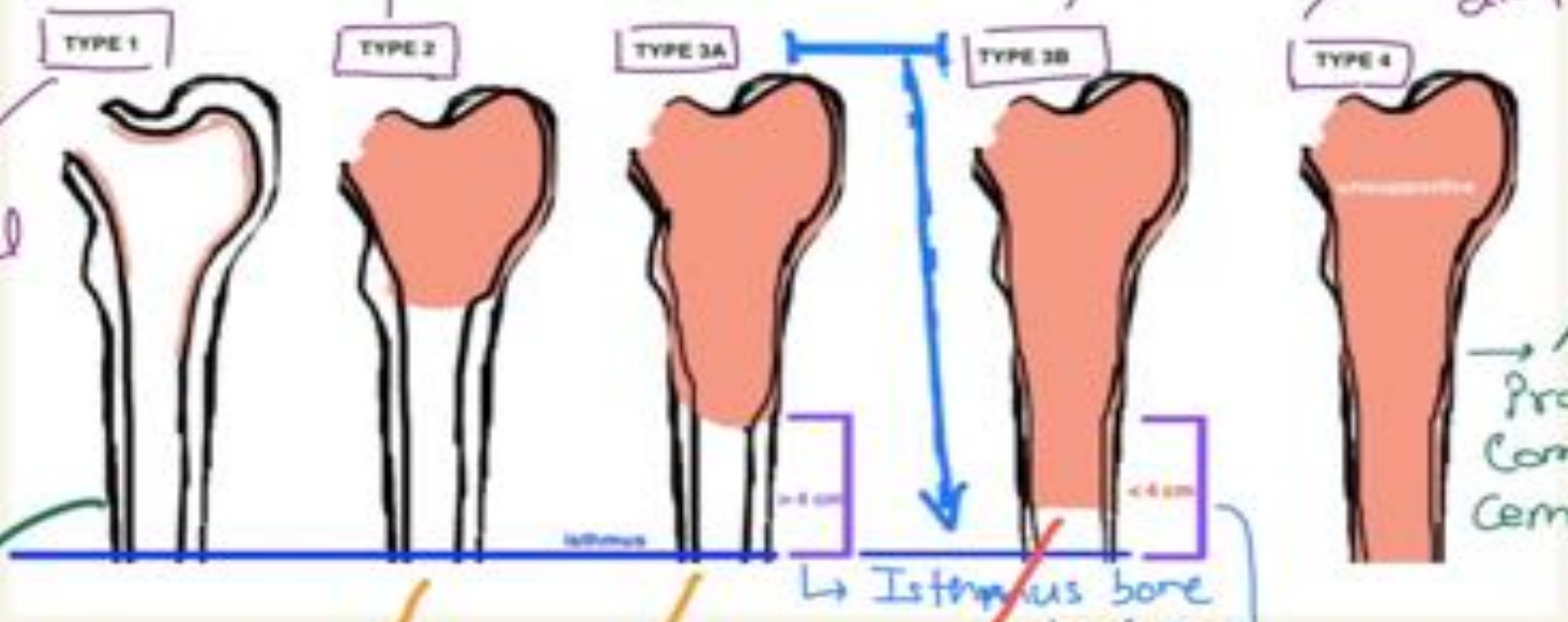
- Segmental
- Cavitary
- Combined
- Femoral mal-alignment
- Femoral stenosis
- Femoral discontinuity

A segmental deficit is defined as any loss of bone in the supporting cortical shell of the femur.

A cavitary deficit is a contained lesion representing an excavation of the cancellous or endosteal cortical bone without violation of the cortical shell of the femur



PAPAROSKY CLASSIFN for Femoral bone loss in THR



Minimal metaphyseal bone loss

Significant metaphyseal bone loss but Diaphysis completely intact

Extensive proximal metaphyseal bone loss ± some bone loss extending into diaphysis

Extensive metaphyseal + diaphyseal bone loss

→ Allograft Prosthetic Composite ± Cemented Stem

↳ Isthmus bone intact (Difference)

No Cementless Stem can be used

Extensive poros Coated Stem for Good bone ingrowth if intact bone stock

Distally tapered & fluted stems

Distal taper allows diaphyseal fit, prevents subsidence & proximal Stress shielding (already proximal bone loss ⇑ here)

Flutes provide rotational stability to stem & surface allows bone ingrowth!

Bhaiya aap ko meri problem sab pata hi hai

10:13 AM

How can I help

10:30 AM

Forwarded

Isko dhekh lo plz🙏

10:33 AM

Write bale me halki problem ho rahi hai

10:34 AM

(C) me tomorrow morning then to show once

10:35 AM

INFLAMMATORY ARTHRITIS

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