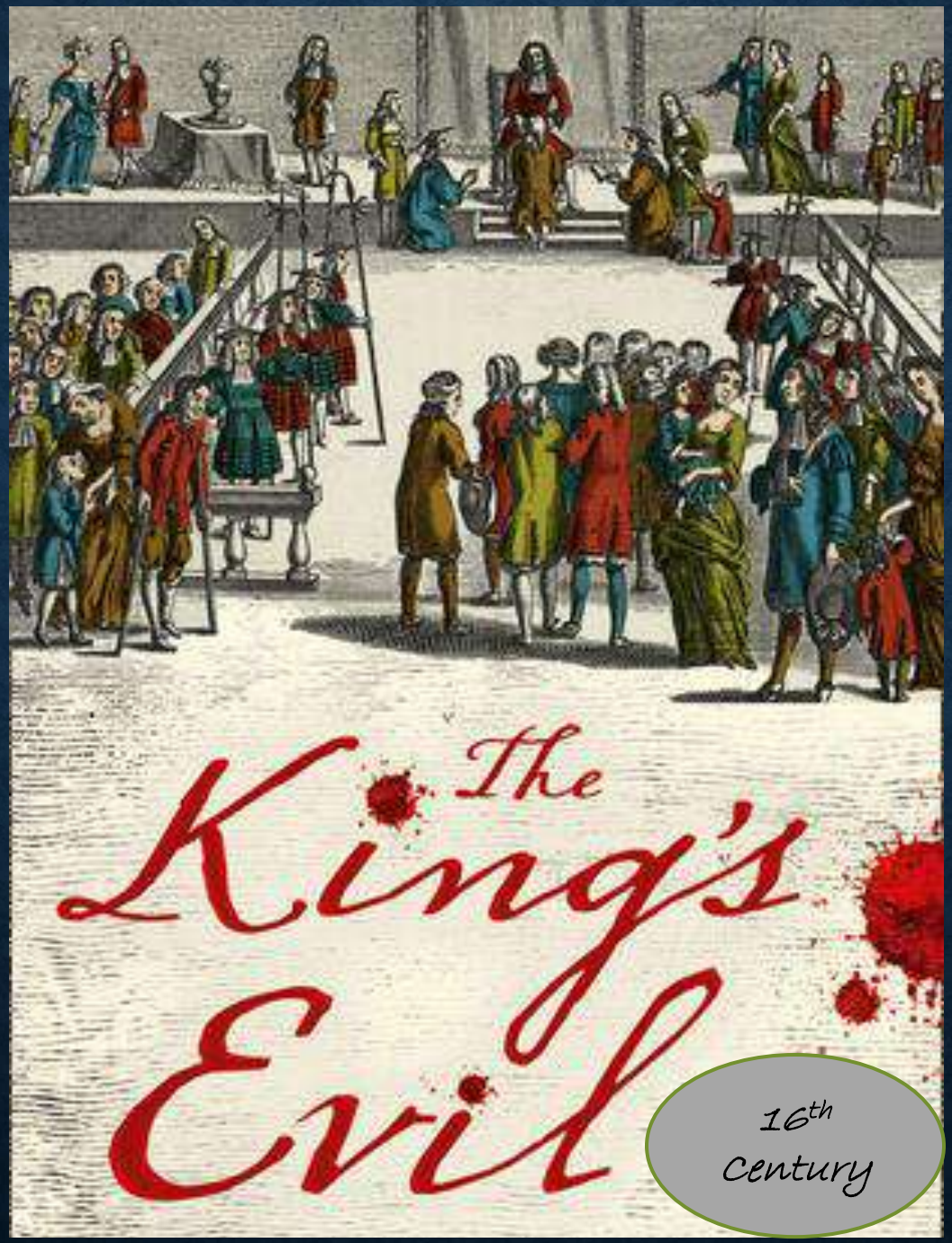
# HELLO EVERYONE !!



# TUBERCULOSIS OF HIP JOINT

BY DR DAIVIK T SHETTY

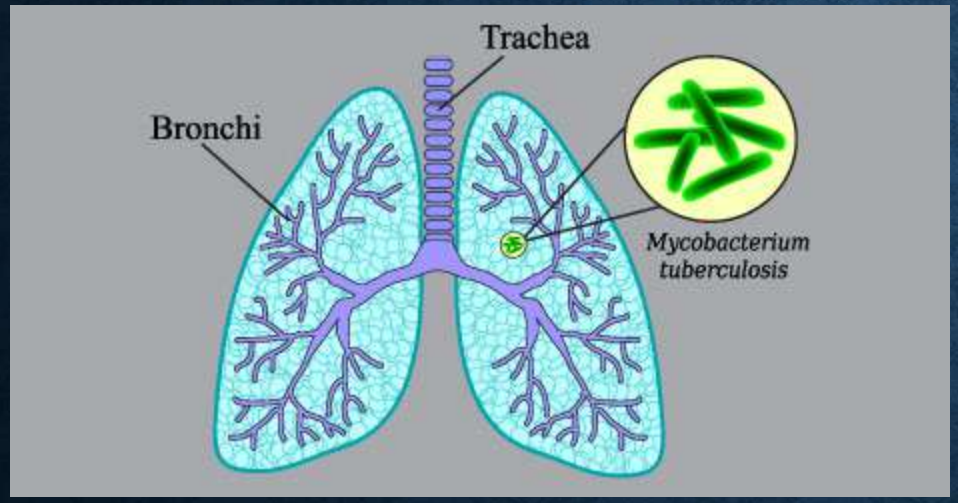
# GENERAL CONSIDERATIONS

- Very common infection in developing countries

- After lung and lymph nodes , bone and joint are the next common site of TB in the body

- Common bone and joint TB are
  - Spine (50%)
  - Hip
  - Knee
  - Elbow

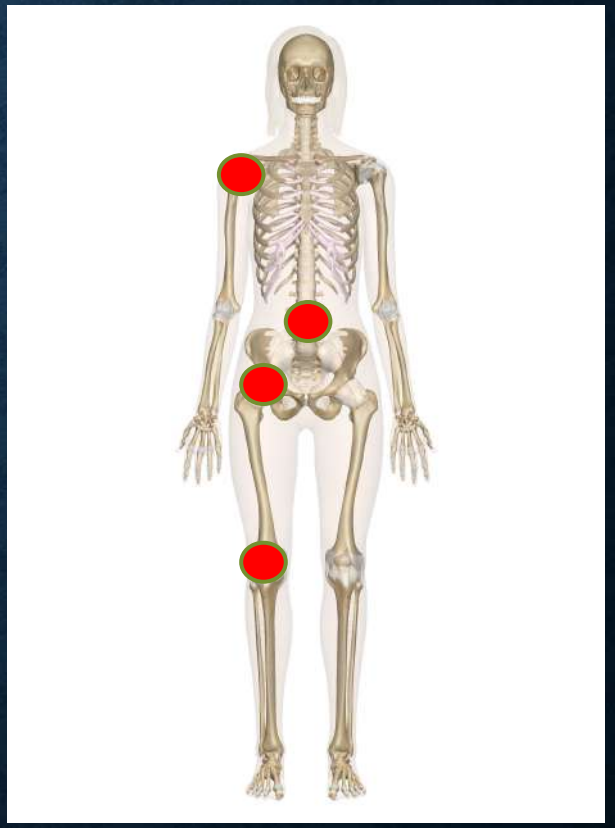
# BONE AND JOINT TUBERCULOSIS IS ALWAYS SECONDARY




Primary focus is in lungs, lymph nodes

Hematogenous

Direct extension neighbouring focus

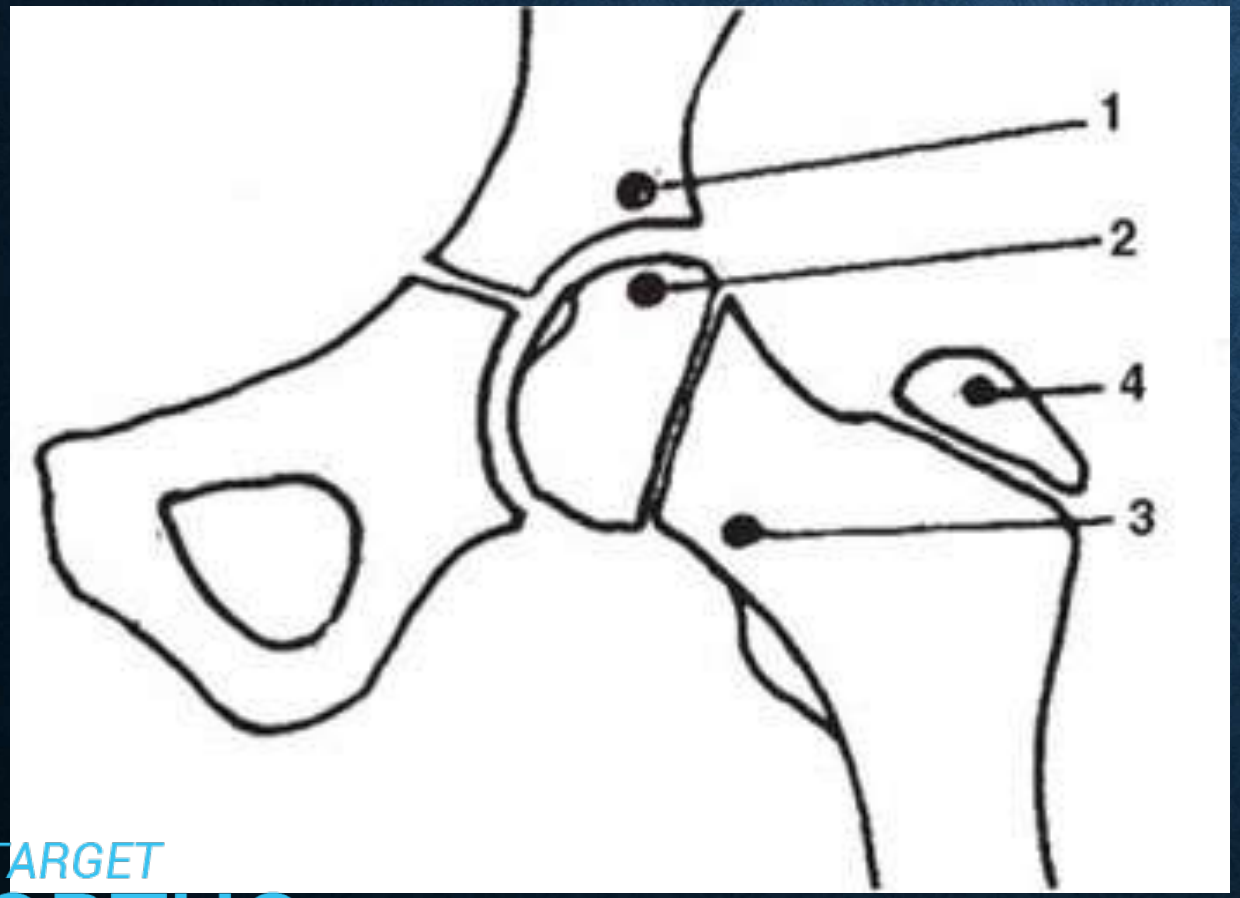


OSTEO-ARTICULAR TB

# INTRODUCTION

- TB HIP IS RANKED NEXT TO SPINAL TB
- CONSTITUTES 15% OF ALL OSTEOARTICULAR TB
- COMMON IN FIRST 3 DECADES OF LIFE
- "DIAGNOSTIC DILEMMA" – mimics several hip pathologies

# INITIAL FOCUS

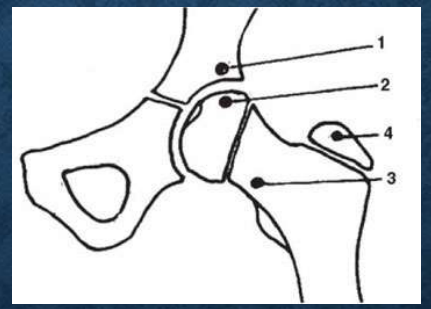



| | |
|---|---|
| 1 | ACETABULAR ROOF (USUALLY) |
| 2 | EPIPHYSIS |
| 3 | METAPHYSEAL REGION (BABCOCKS TRIANGLE) |
| 4 | GREATER TROCHANTER |
| OTHER | SYNOVIAL MEMBRANE TROCHANTERIC BURSA |

# PATHOGENESIS

PRIMARY FOCUS – lungs, lymph nodes, viscera

Bone




Synovium

Synovial membrane swollen and congested

Necrosis of subchondral bone
Sequestra
Kissing lesions

Cold abscess
Perforates the capsule

# CLINICAL FEATURES

- **Systemic symptoms**
  - Fever
  - Evening rise of temperature
  - Cough
  - Loss of weight
  - Loss of appetite
  - Night sweats

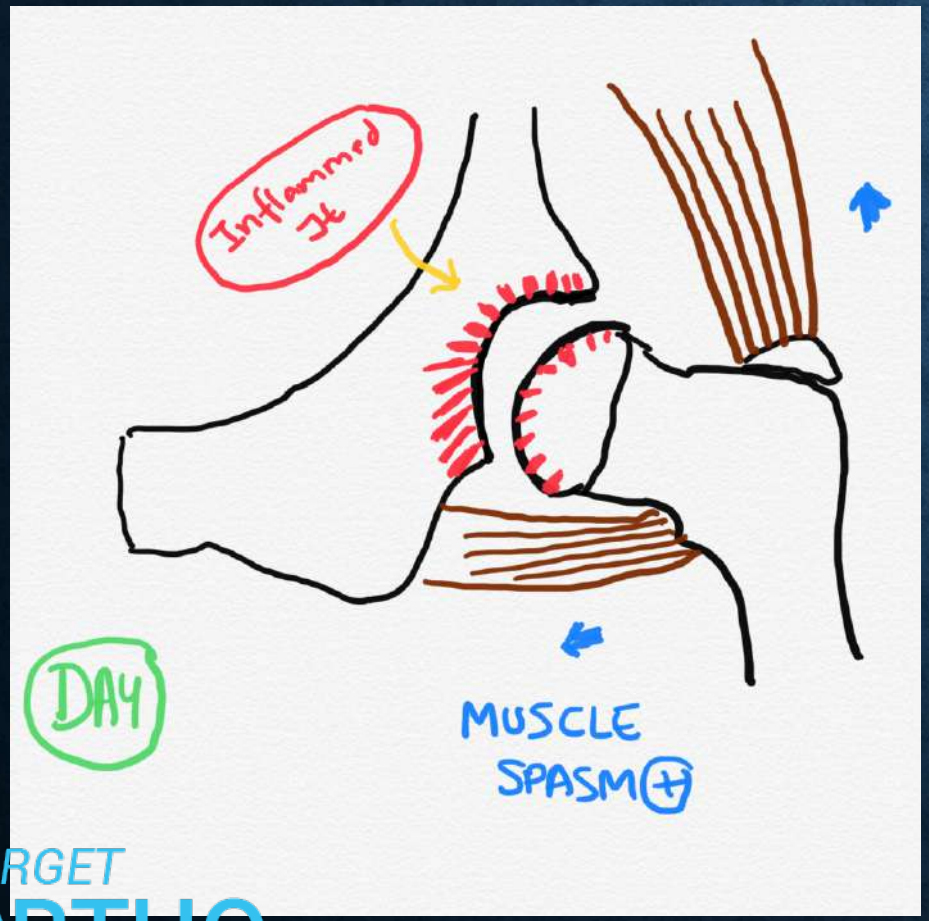
# CLINICAL FEATURES – EARLY DISEASE

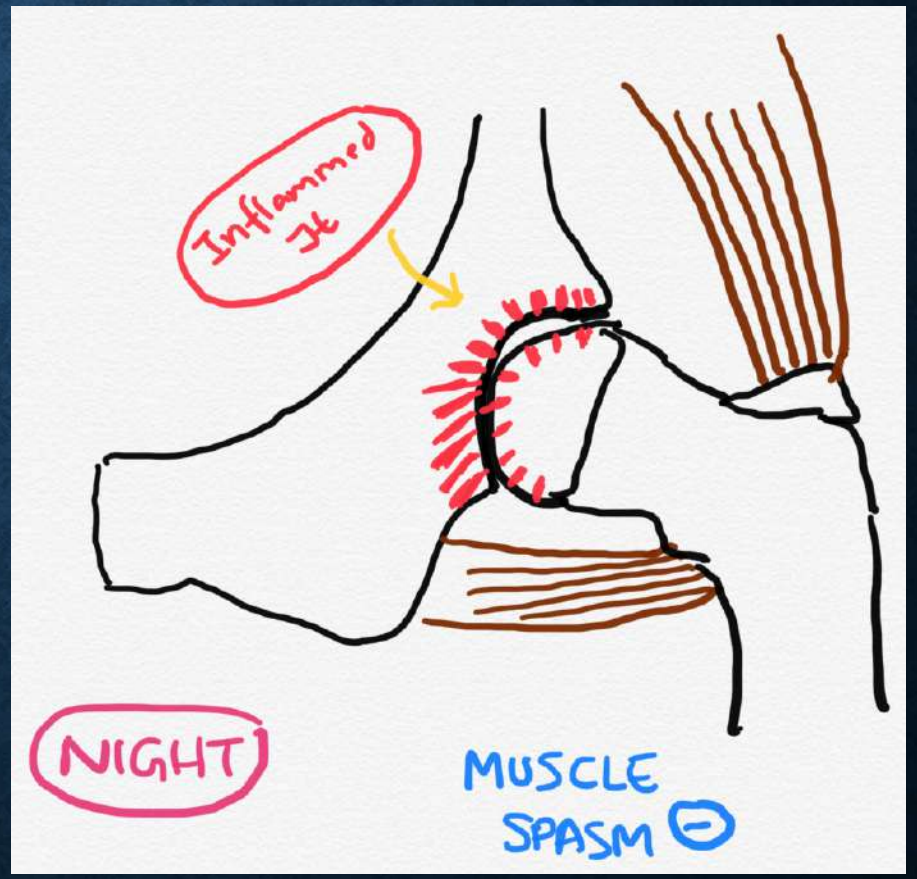
- Pain
  - ❖ Insidious onset
  - ❖ Referred to medial knee and thigh
- Tractioning affected limb
- One of the first symptoms is stiffness of hip → Limping
- "Night cries"
- Fullness around the hip

Cold abscess

Due to exudative reaction
Consists of WBC , serum, caseous material, bone debris and TB bacilli

# WHY NIGHT CRIES ??



# LIMPING IN DIFFERENT STAGES

| Early stage | Disease progression | Advanced stages |
| --- | --- | --- |
| • Stiffness and flexion deformity<br>• Body bent forward | • Pain due to grating of nude bones | • True shortening<br>• Gross joint destruction |

# LATE DISEASE

- LIMB LENGTH INEQUALITY
- DEFORMITY
- STIFFNESS
- PATHOLOGICAL DISLOCATION
- COLD ABSCESS OR SINUS

# IN LATE STAGES

Eventually the femur head and acetabulum gets partially absorbed

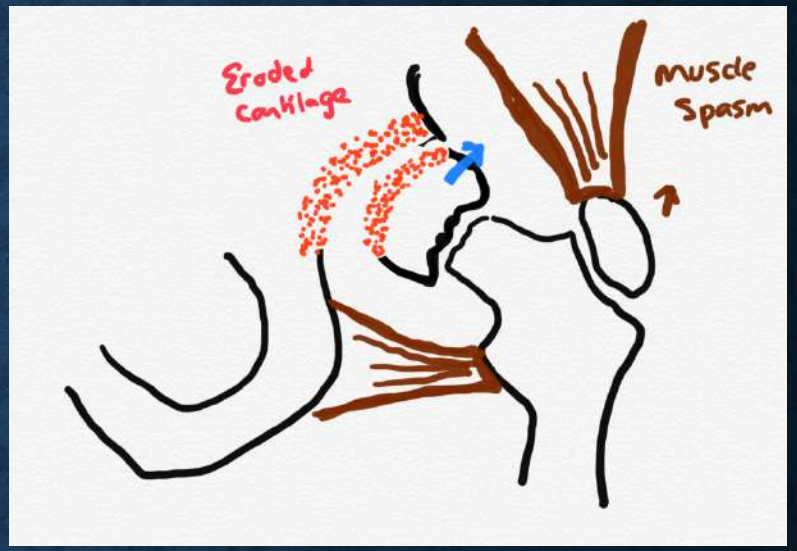
↓ Constant pull of muscles

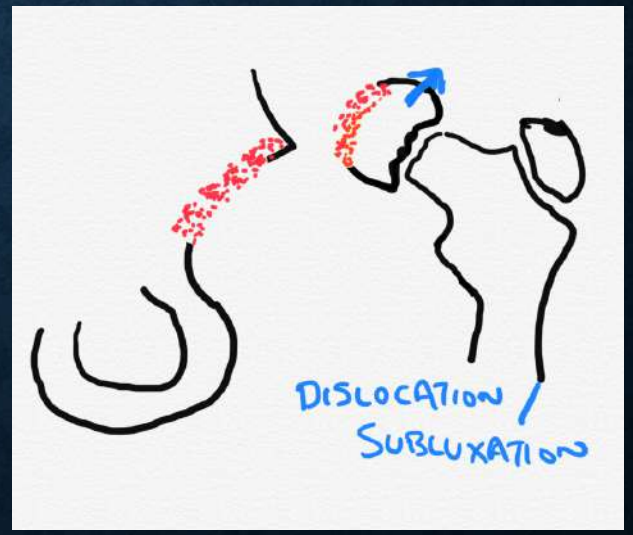
Remaining part of the head dislocates from acetabulum into the ilium

"WANDERING ACETABULUM"

↓

DISLOCATION AND SUBLUXATION

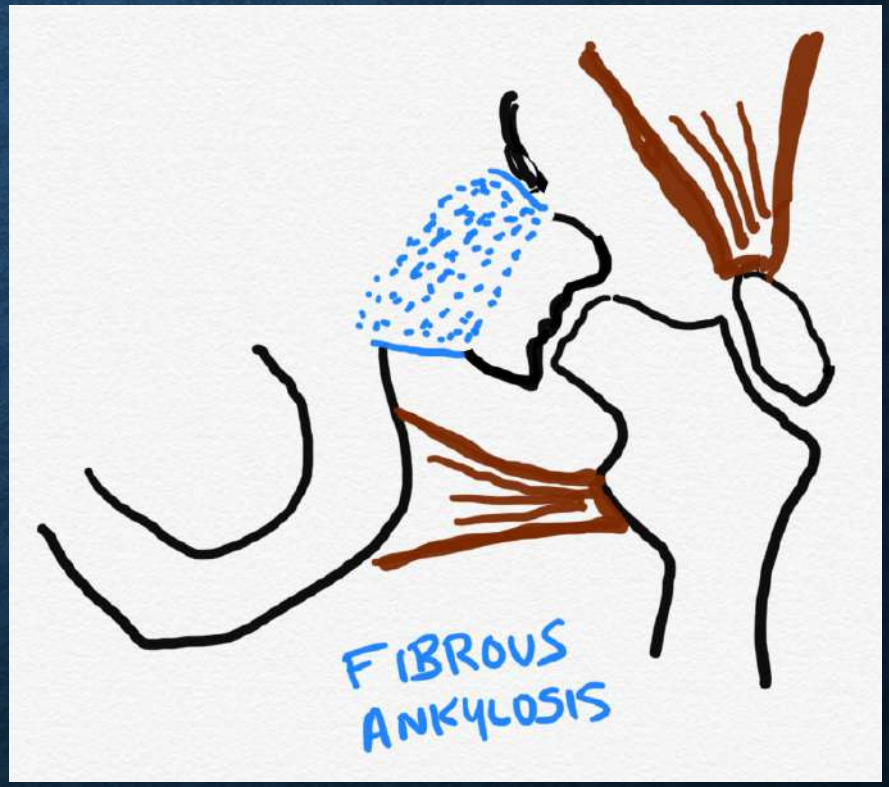


# HEALING

IF LEFT UNTREATED
Healing takes place by fibrosis
Leading to ankylosis of hip in a deformed position

**FIBROUS ANKYLOSIS**



# PAST HISTORY

- Old case of pulmonary TB
- Close contact with TB patients
- BCG vaccination

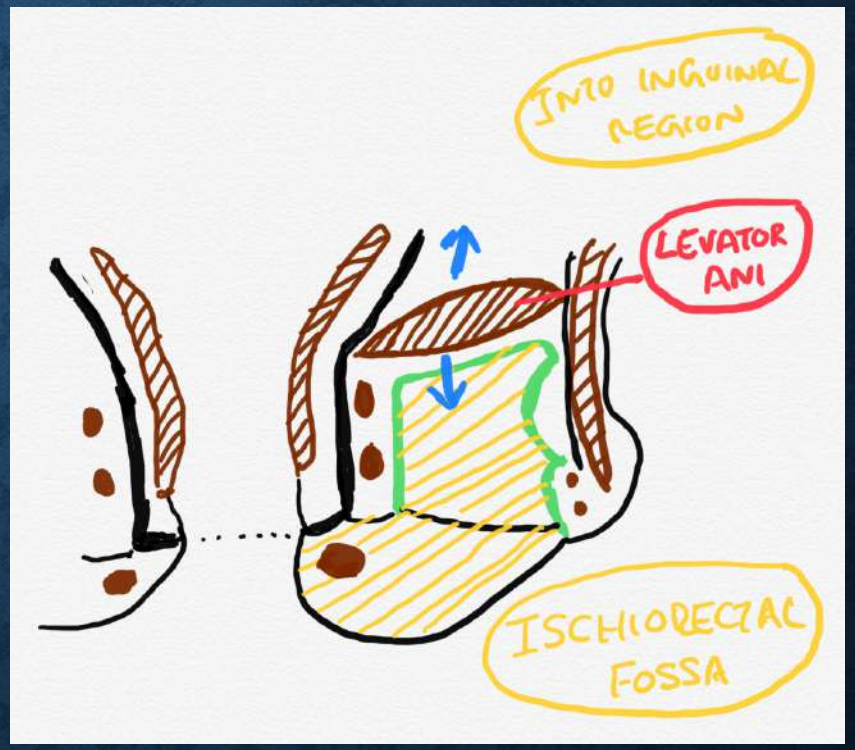
# SITES OF COLD ABSCESS

Pus formed within the joint

Pierces out from the inferior weaker part of capsule perforates

Forms a intra pelvic abscess

Intrapelvic abscess




Femoral triangle

Medial, lateral, posterior aspect of thigh

Ischiorectal Fossa

# STAGES OF TB HIP

Untreated disease

1. Stage of synovitis
2. Stage of early arthritis
3. Stage of advanced arthritis
4. Stage of advanced arthritis with subluxation/dislocation

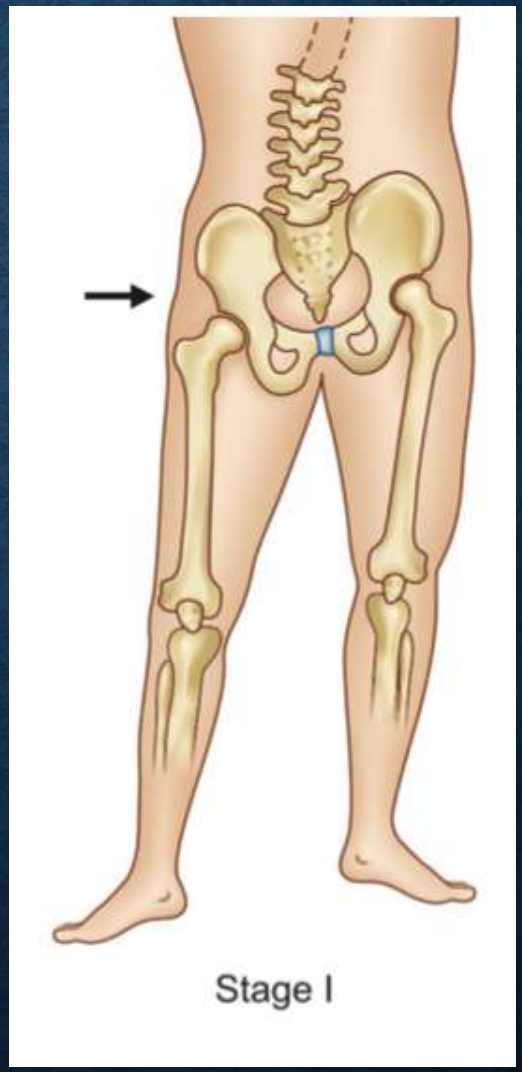
# STAGE OF SYNOVITIS

Early stage of TB

Increased fluid in hip joint

To accommodate increased joint fluid
Hip takes up a position where maximum space is available

**F**LEXION, **AB**DUCTION, **E**XTERNAL **R**OTATION (FABER)




STAGE OF APPARENT LENGTHENING

# FABER

- Due to continuous of this posture for relief of pain

- Due to destruction of Ilio-femoral Y ligament by tuberculous process

# STAGE OF EARLY ARTHRITIS

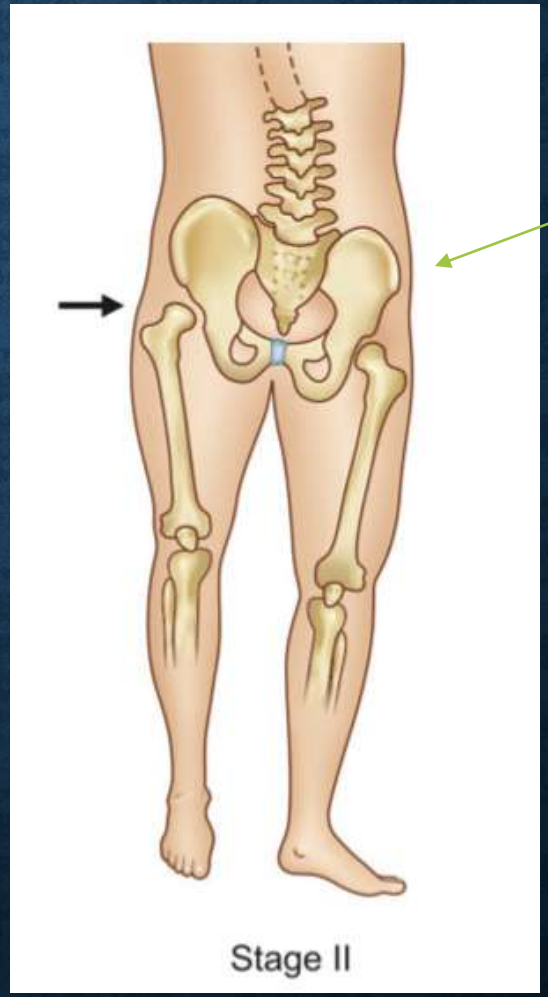
In this stage , articular cartilage is involved

Leads to spasm of powerful muscles around the hip

Extensors
Abductors

Flexors
Adductors

**F**LEXION, **AD**DUCTION, **I**NTERNAL **R**OTATION (FADIR)




PELVIS TILTS UPWARDS

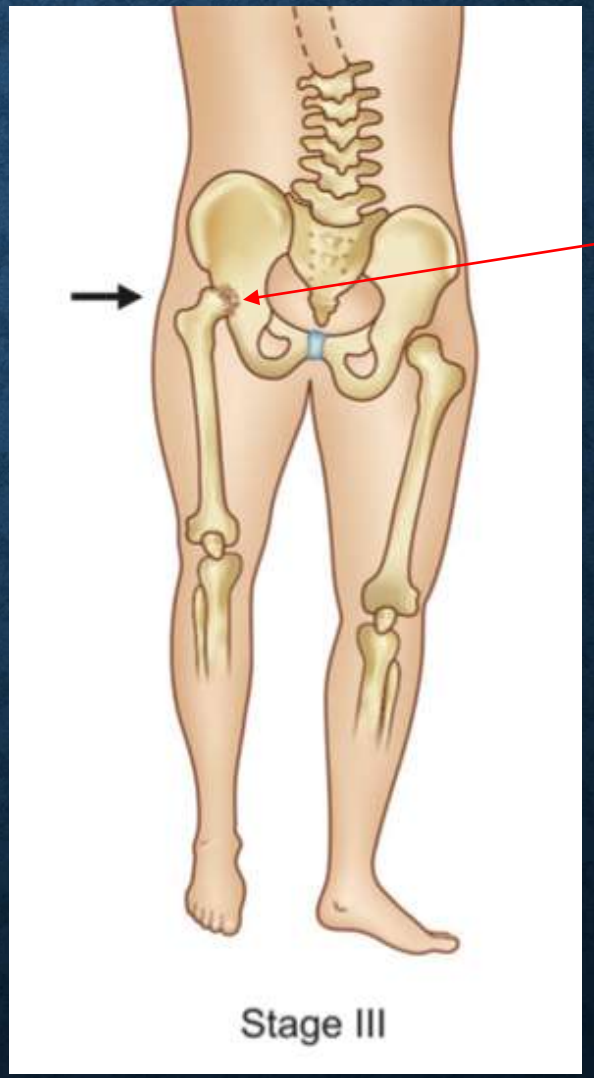
STAGE OF APPARENT SHORTENING

# STAGE OF ADVANCED ARTHRITIS

- In this stage cartilage is destroyed
- Head of femur or acetabulum is eroded

- Articular cartilage damaged, hence deformities exaggerated

**F**LEXION, **AD**DUCTION, **I**NTERNAL **R**OTATION (FADIR)




Destruction of articular cartilage
Reduced joint space

STAGE OF TRUE SHORTENING

# STAGE OF ADVANCED ARTHRITIS WITH SUBLUXATION OR DISLOCATION

- Gross shortening
- Gross destruction and reduction of joint space

| Stage of TB Hip | Presentation | Imaging findings |
|---|---|---|
| **STAGE OF SYNOVITIS** | FABER<br>*Apparent lengthening*<br>*!*<br>nent lost ?? | Soft tissue swelling<br>Haziness of articular margins and rarefaction |
| **EARLY ARTHRITIS** | *m)* | Osteopenia<br>Start of marginal bony erosion in femoral head, acetabulum or both<br>NO JOINT SPACE REDUCTION |
| **ADVANCED ARTHRITIS** | *True shortening (<3cms)*<br>*<50% ROM* | Destruction of articular cartilage<br>Reduction of joint space |
| **ADVANCED ARTHRITIS WITH SUBLUXATION/DISLOCATION** | FADIR<br>Gross shortening (>3cms)<br>Only jog of movements if FIBROUS ANKYLOSIS | Gross destruction and reduction of joint space<br>Wandering acetabulum<br>Hip dislocation |

# LOCAL EXAMINATION

**GAIT**

EARLY- STIFF-HIP GAIT

LATE- ANTALGIC OR PAINFUL GAIT

**MUSCLE WASTING**

**Swelling, discharging sinus**

**Movements**

BOTH ACTIVE AND PASSIVE MOVEMENTS RESTRICTED

**Shortening**

**Joint line tenderness**

**Inguinal lymphadenopathy**

**Deformity**

Depending On stage

# DIAGNOSTIC TOOLS IN DIAGNOSIS OF OSTEOARTICULAR TB

# INVESTIGATIONS

- X-RAY – pelvis with both hips

Haziness
Osteopenia
Lytic lesion

Reduction
joint space

Destroyed
femoral neck
trabeculae

Shows only bony changes, leads to delayed diagnosis

In advanced arthritis -

Juxta articular
Osteoporosis

*PHEMISTER TRIAD*

Reduced joint space

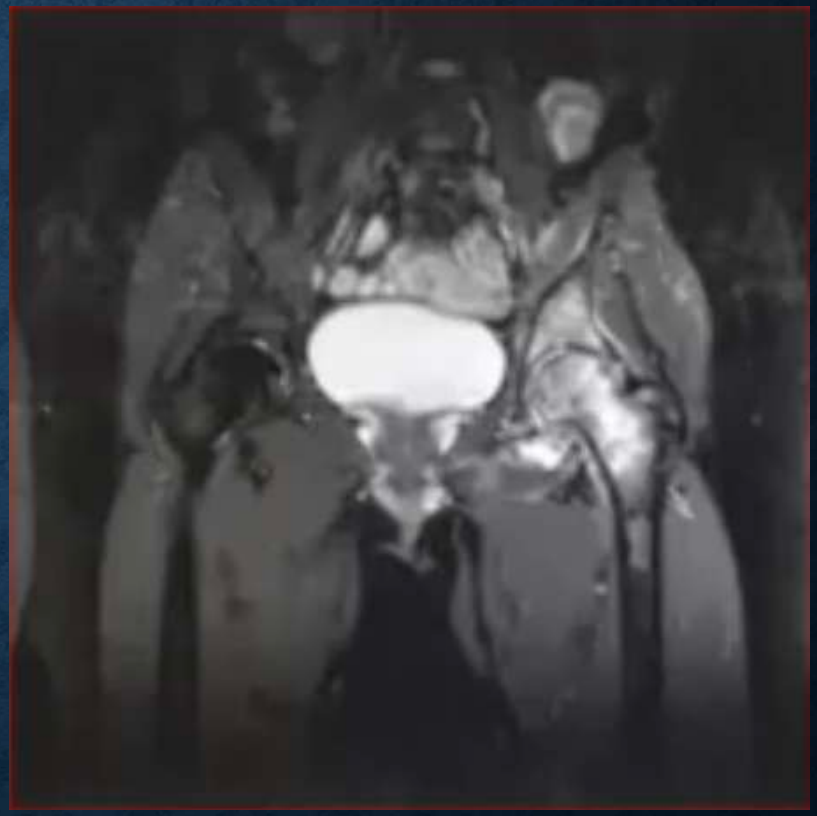
Peripheral erosion

# MRI

To diagnose suspected TB Hip

Sensitive, not specific

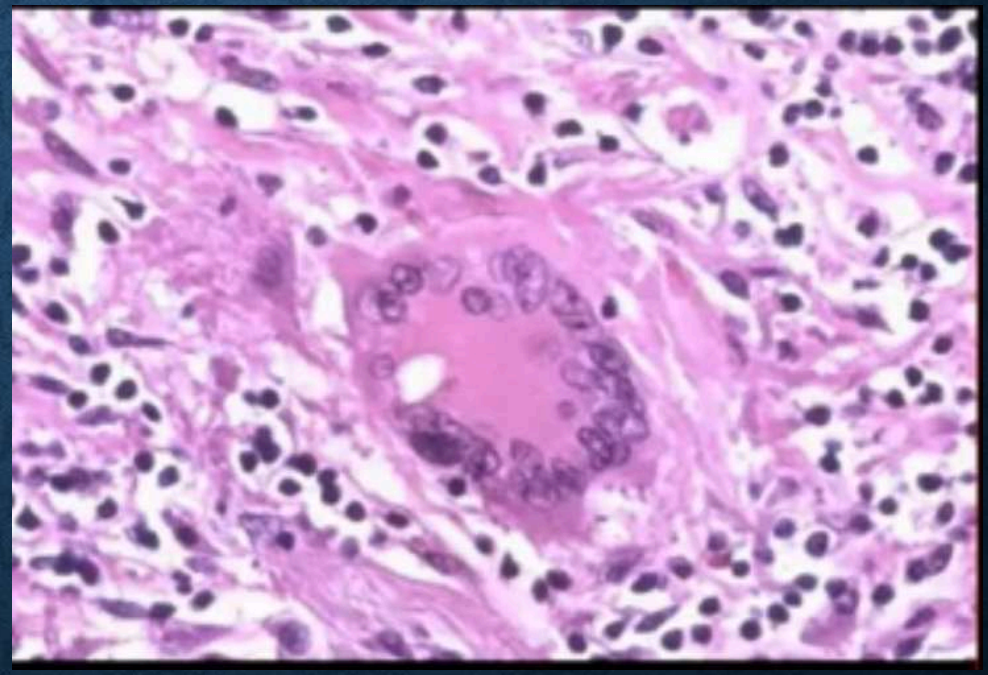
Early changes- Bony edema, fluid collection



# TISSUE BIOPSY

- Histopathology
- AFB staining
- PCR, RT PCR
- Culture and sensitivity

- Arthroscopic synovial biopsy
- Open synovial biopsy



# MANTOUX TEST

- High false positive in endemic areas

# AFB POSITIVITY

- Synovial fluid - <10%
- Synovial tissue- <20%
- Osseous - <10%

# SYNOVIAL BIOPSY - PCR

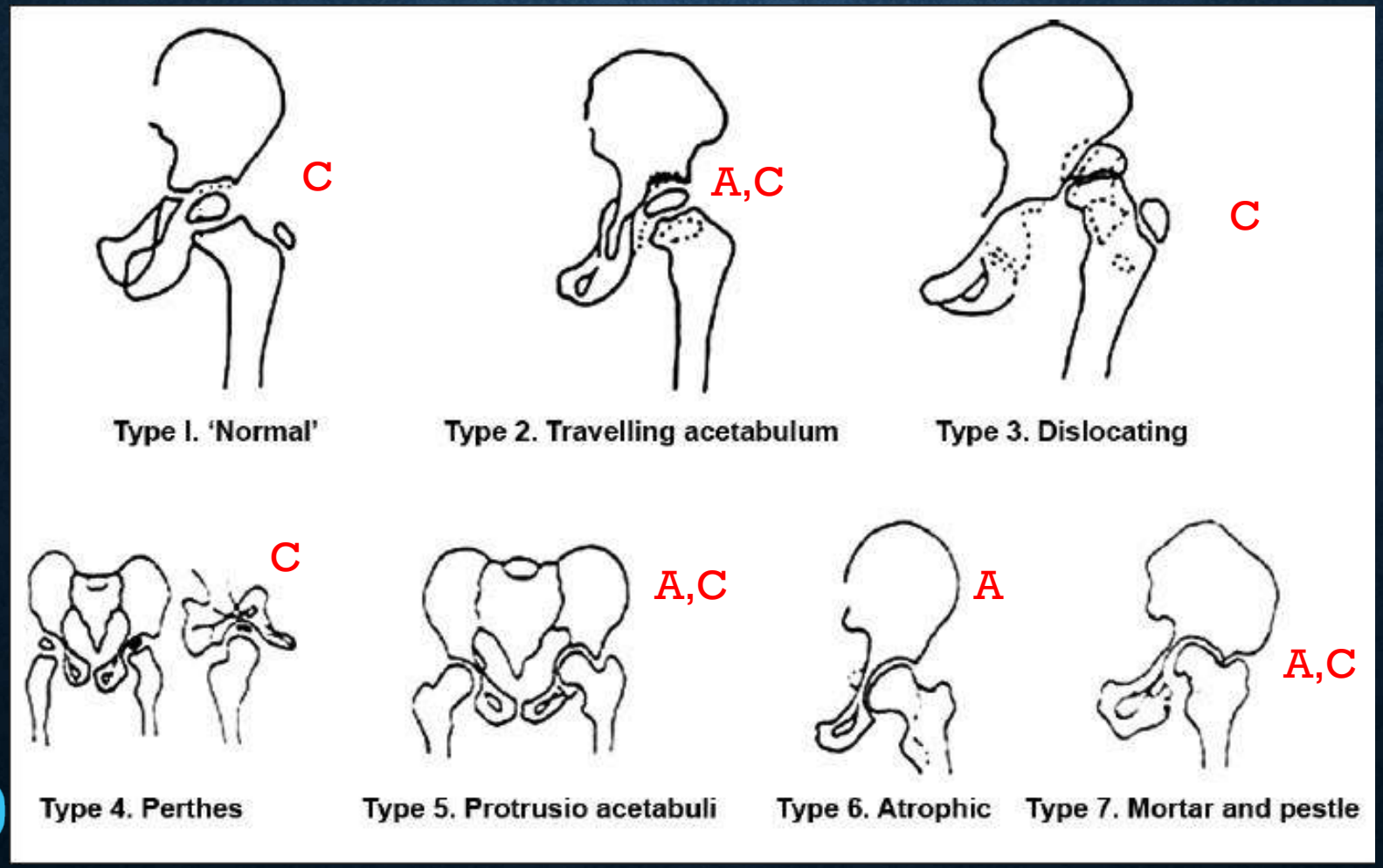
- Positive PCR confirms TB
- Negative PCR does not exclude TB

- More significant if taken from clinically inflamed area

**CLINICAL PEARL**

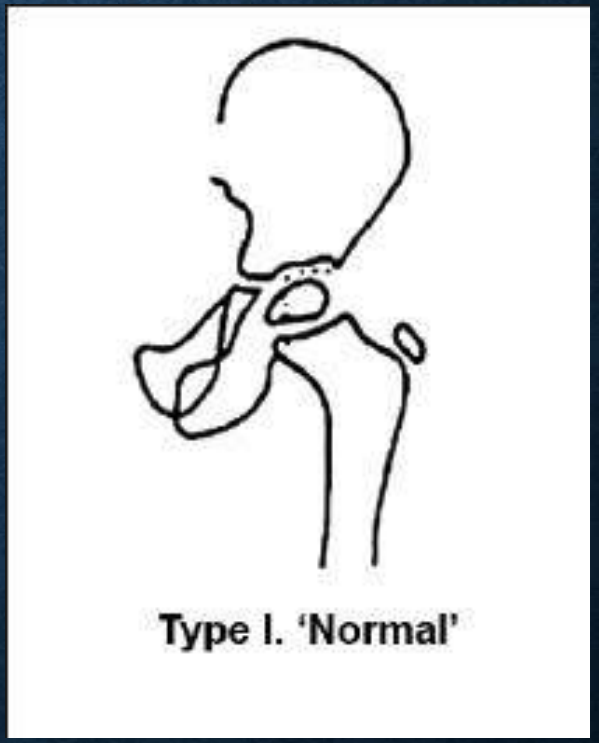
Failure to clinch diagnosis by non invasive technique mandates TISSUE DIAGNOSIS

# CLASSIFICATION OF RADIOLOGICAL APPEARANCE BY SHANMUGASUNDARAM



# NORMAL TYPE

- Minimal disease
- Only synovial disease
- No subchondral bone involvement



Type I. 'Normal'

# WANDERING ACETABULUM

Destruction of bony acetabulum

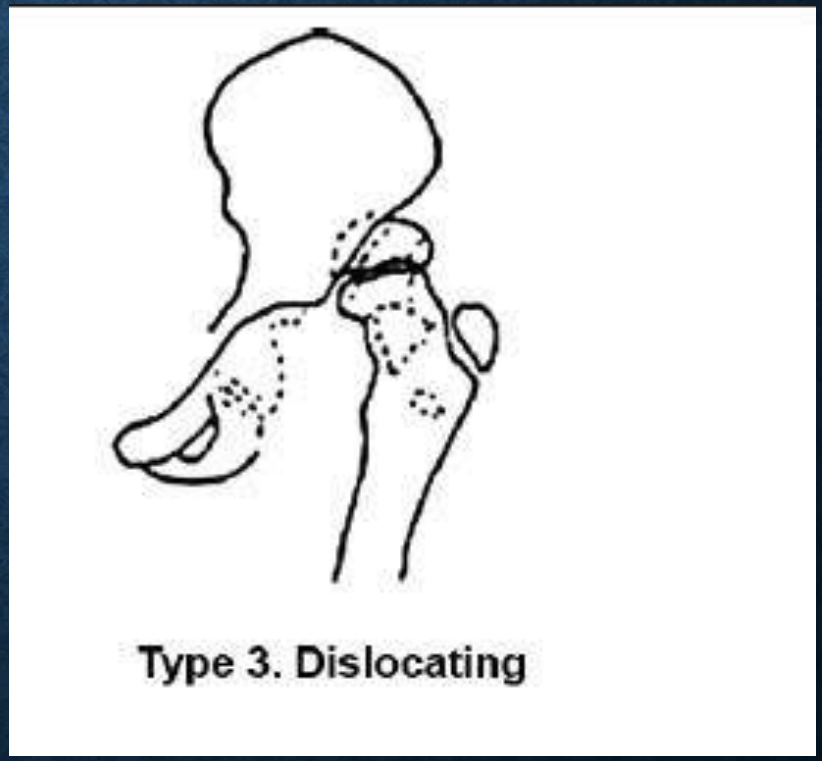
Weight bearing part is eroded

Femoral head migrates proximally

# DISLOCATING TYPE

Partially dislocating head with constant adductor and flexor spasm

Capsule weakened or ruptured by chronic inflammation



Type 3. Dislocating

# PERTHES TYPE

Presence of thromboembolic phenomena

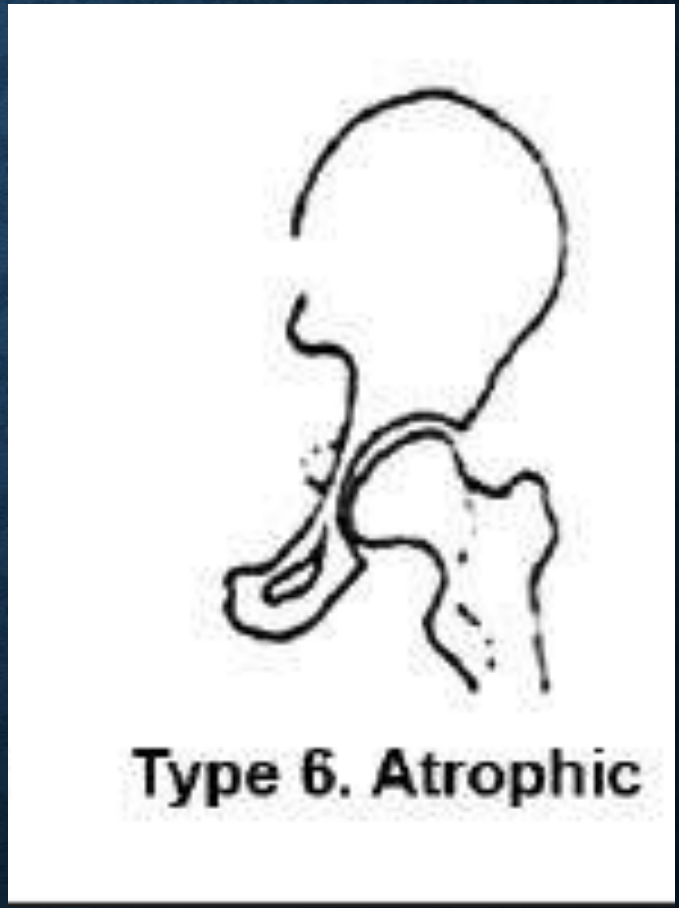
Supero-lateral disease and head destruction

Presence of cysts and acetabular osteopenia

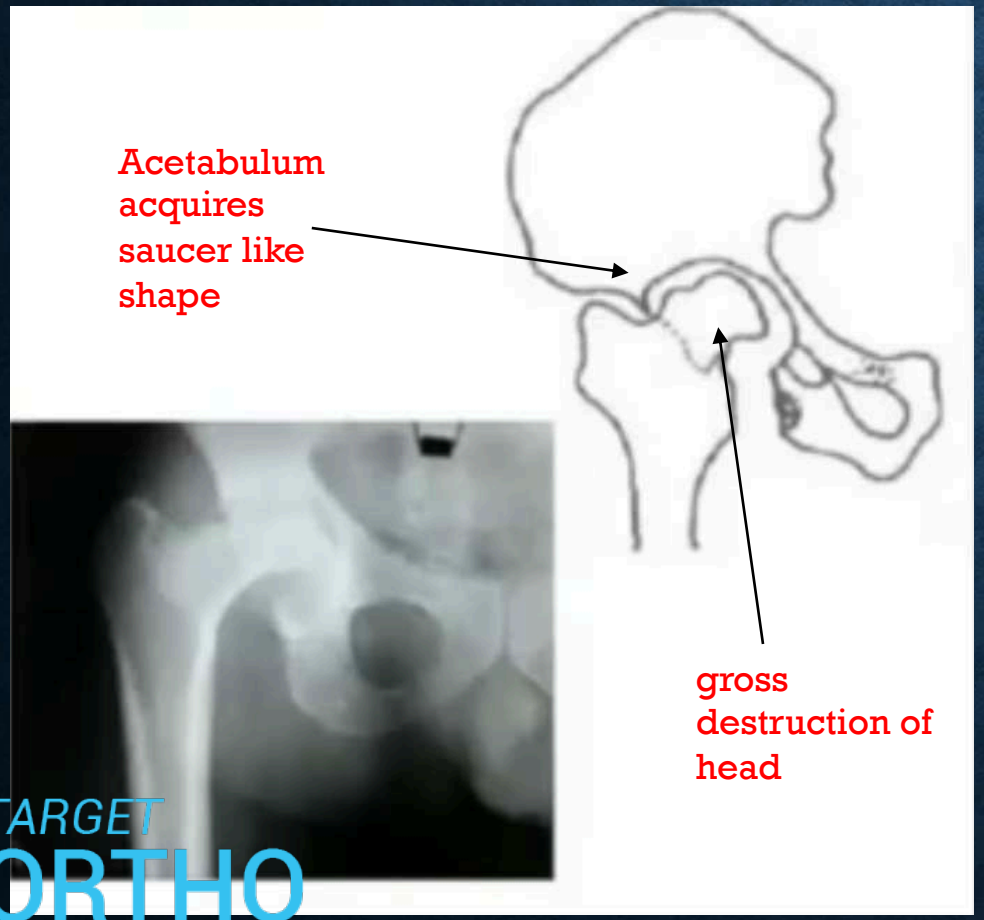
# PROTRUSIO ACETABULI TYPE


# ATROPHIC TYPE

Stage of destruction, the disease burns out due to minimal infection



# MORTAR AND PESTLE TYPE




Original Article

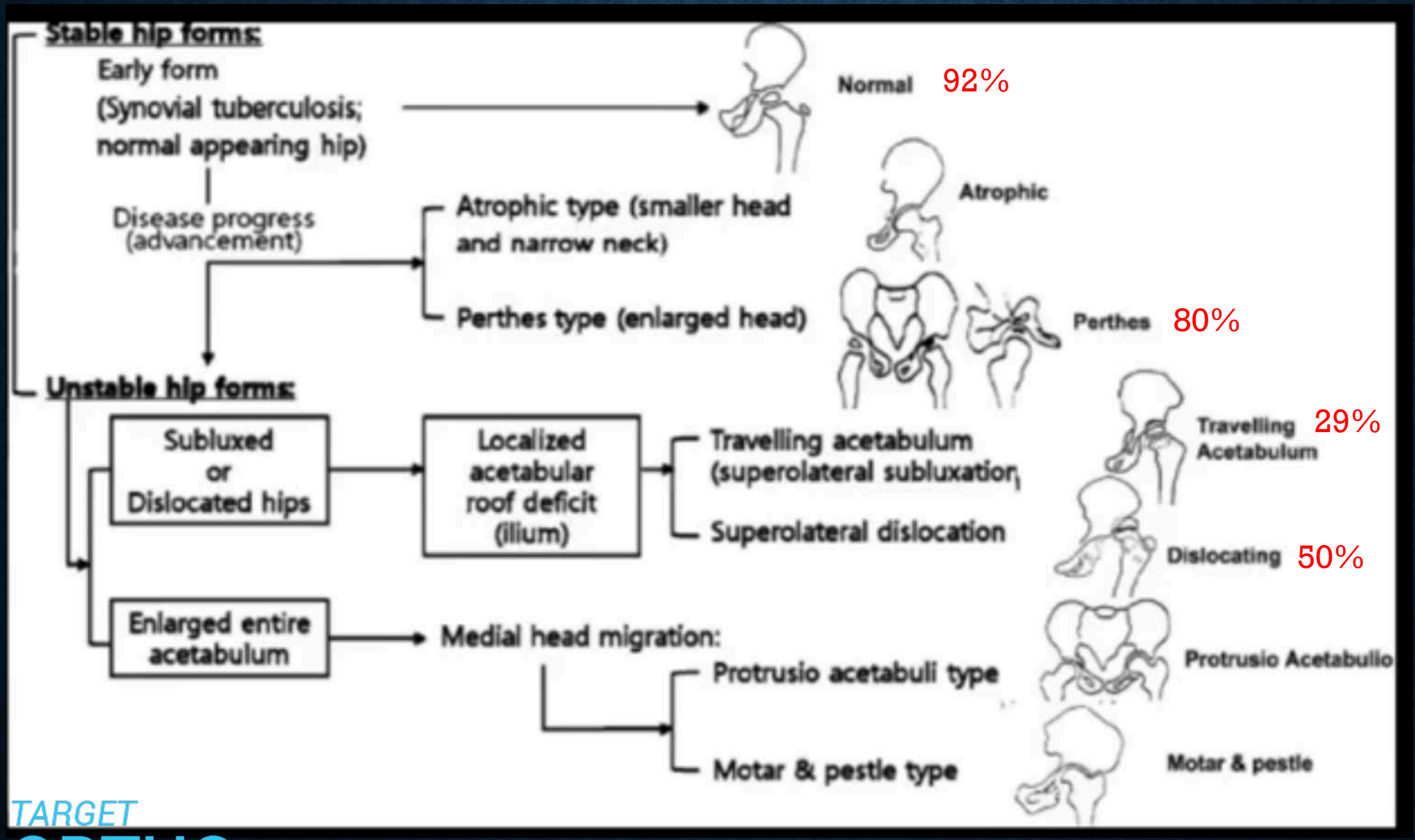
# Tuberculosis of the hip in children
## A retrospective analysis of 27 patients

*Anil Agarwal, Tarun Suri, Inderesheur Verma, Shashi Kant Kumar, Neeraj Gupta, Abbas Shaharyar*

Table 1: Modified Shanmugasundaram radiological types for pediatric hip tuberculosis

| Type | Radiology |
|---|---|
| Normal type | Joint space is normal. There may be cysts or cavities in the femoral head, neck or acetabulum, but there is no gross destruction of subchondral bone |
| Travelling acetabulum | The acetabular roof is affected and there is proximal migration of the femoral head |
| Dislocating type | Hip gets dislocated or subluxated |
| Perthes type | The hip is sclerotic. Distinction from true Perthes disease may be extremely difficult |
| Protrusio acetabuli | The medial acetabulum is diseased and eroded |
| Atrophic type | Decreased joint space. Probably the result of subchondral erosion |
| Mortar and pestle | There is destruction of either femoral head or acetabulum or both leading gross mismatch between the articular surfaces |
| Unclassified* | Trirradiate: Primary focus near acetabular floor. Involvement of nonweight bearing lower acetabulum |
| | Pseudarthrosis coxae: Loss of cervicocephalic articulation due to destroyed femoral head and sometimes neck |
| | Ankylosed: Fibrous or bony ankylosis |

*Note: Common patterns observed in unclassified category. However, due to limitation of small sample size validations of the type 5 – unclassified was not done. It is clinical observation



# TREATMENT

# TRADITIONAL MEASURES

- Patient of TB hip was kept in a Hip Spica for 1 and ½ years

Complication – FRAME KNEE

*Distal femoral growth plate is non functional* → *Premature fusion* → Produces marked Shortening and limitation of movements → **FRAME KNEE**

# OPTIONS

- ANTI TB DRUGS — Given in all stages
- TRACTION — Given in all stages
- GRADUAL MOBILIZATION
- SURGICAL TREATMENT

# TRACTION

- Relieves muscle spasm
- Prevents or corrects deformity
- Maintains the joint space
- Keeps joint surfaces apart

# SYNOVITIS STAGE

**Conservative**

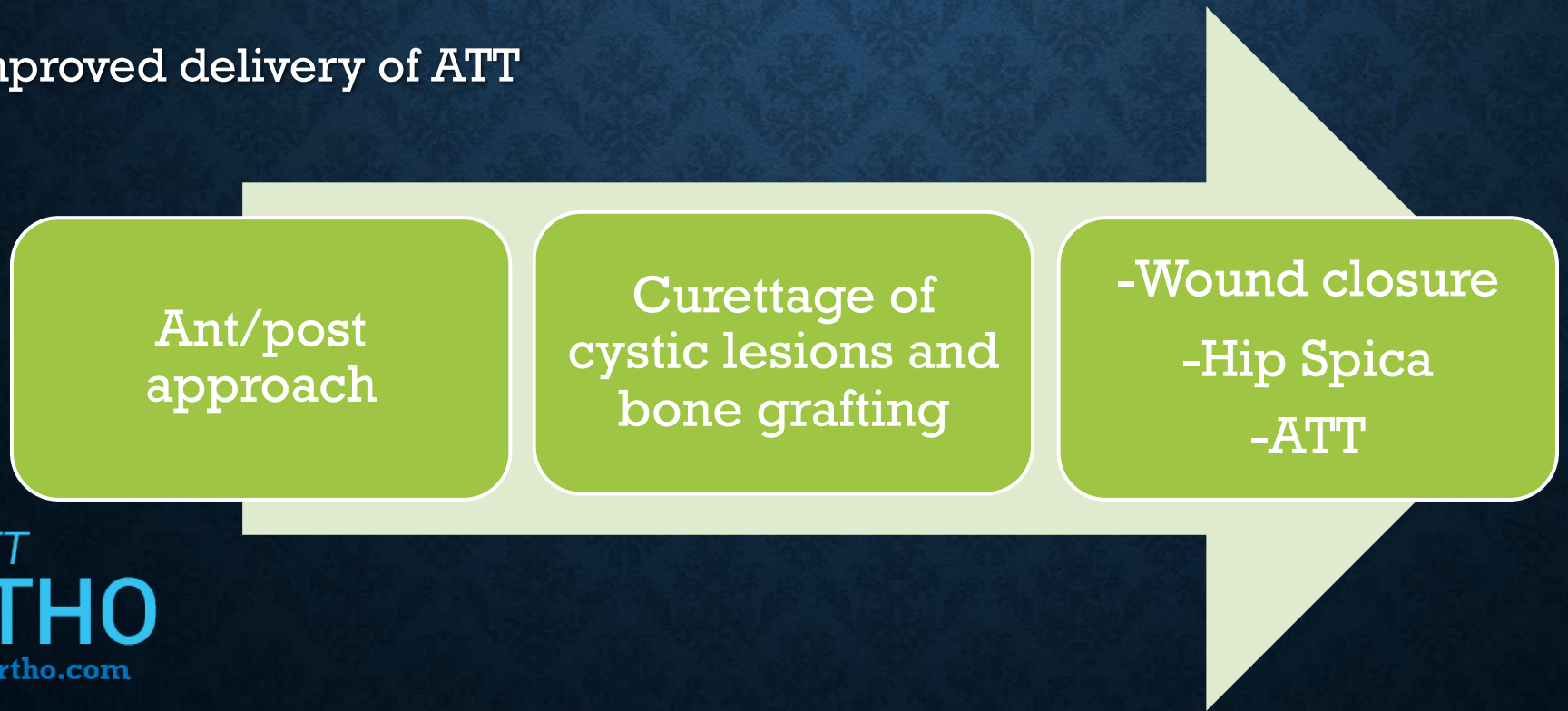
1. ATT
2. Traction, rest followed by mobilization
3. Surgical intervention rarely required

# EARLY ARTHRITIS

1. ATT
2. Traction
3. Synovectomy + Joint debridement

# JOINT DEBRIDEMENT AND SYNOVECTOMY

- Histopathological confirmation of disease
- Decrease disease burden
- Better vascularity
- Improved delivery of ATT



# COMPLICATIONS

AVN femoral head

Slippage of proximal femoral epiphysis children

Femoral neck and acetabulum #

# ADVANCED ARTHRITIS

1. ATT
2. Traction
3. Arthrolysis – improves ROM

Useful if restriction is due to FIBROUS ANKYLOSIS
Remove all pathological and fibrous tissue
Sub total synovectomy
Leave posterior capsule undisturbed to preserve blood supply
Post op- Skeletal traction and ROM as soon as possible

# ADVANCED ARTHRITIS WITH SUBLUXATION/DISLOCATION

- EXCISION ARTHROPLASTY
- ARTHRODESIS
- HIP REPLACEMENT

SANDHU ET AL

ATT + TRACTION – 98% healing in children

Unsound ankylosis – upper femoral corrective osteotomy

# EXCISION ARTHROPLASTY

- Control of infection and deformity correction
- Safe in active or healed diasese after skeletal maturity

Mobile, painless hip
Unstable and short

- Post op traction for 3 months – minimizes shortening and instability

| Pros | Cons |
|---|---|
| All floor activities , squatting, sitting cross legged | Requires walking stick outdoors |
| Can manage as one time operation | Trendelenburg sign positive remains |
| | 2cm shortening added post op |

# GIRDLESTONE ARTHROPLASTY

# ARTHRODESIS

Done >18 yrs

PAINLESS
FIXED HIP

**Best position of fusion –**

Flexion → children 10 degree (1 deg every year)
→ adults 30 degree

5-10 degree external rotation

Neutral add, abd

# ARTHRODESIS

# ARTHRODESIS

| PROS | CONS |
| --- | --- |
| Normal chair sitting and commode activities possible | Post op degenerative changes in<br>Spine<br>C/L Hip<br>I/L Knee |
| One time operation | Difficulties in -<br>• Floor activities<br>• Sexual activities |
| No instability | |

# ARTHRODESIS

## INTRA-ARTICULAR FUSION

- Watson jones trans articular nail arthrodesis
- Double plating technique of Muller
- Cobra plate arthrodesis
- IM arthrodesis of Onji
- Central dislocation and internal compression of Charnley

## PAN ARTICULAR FUSION

## EXTRA-ARTICULAR FUSION

Adduction deformity

**ISCHIOFEMORAL OSTEOTOMY**

**BRITTAINS EXTRA ARTICULAR FUSION**

Abduction deformity

**ILIOFEMORAL OSTEOTOMY**

**ABBOTT LUCAS 2 STAGE HIP FUSION**

# INTRA ARTICULAR ARTHRODESIS

- Antero-lateral incision
- Excise the diseased capsule
- Remove cartilage, subchondral bone down to cancellous bone
- Place bone grafts all around the joint line
- Hold with Steinmann pins + Hip Spica

6-8 weeks remove pins

# ABBOTT LUCAS 2 STAGE HIP FUSION

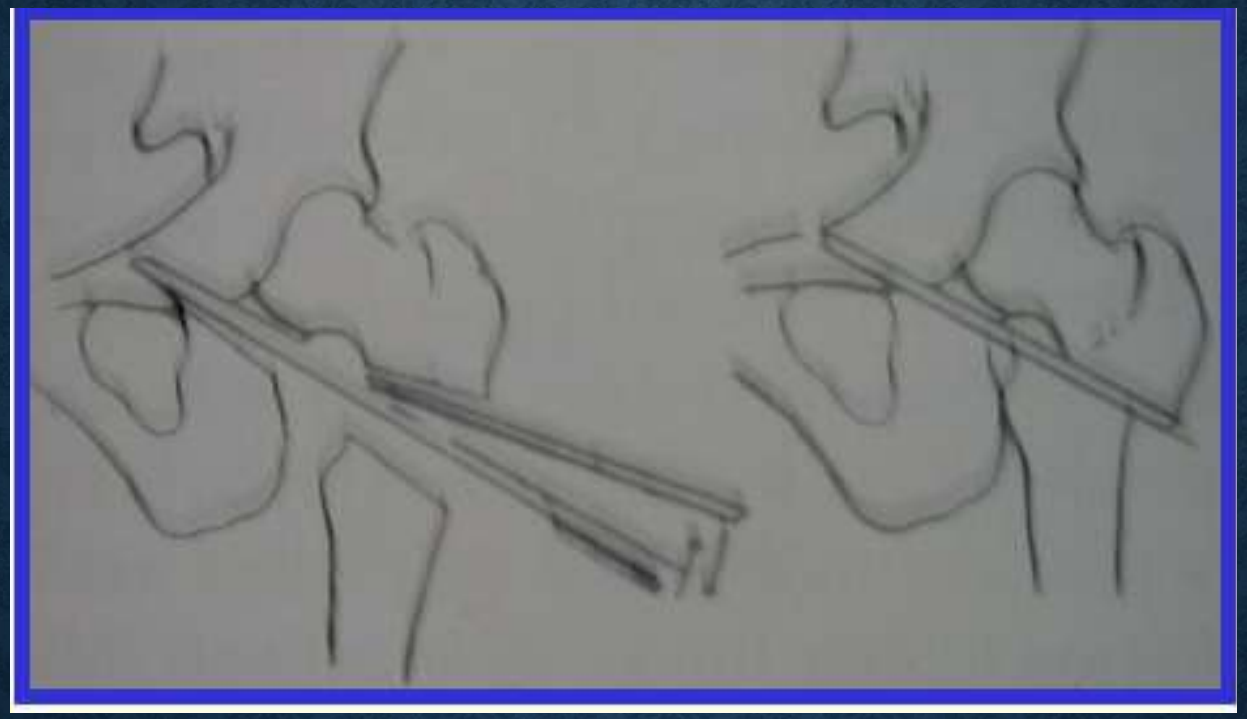
- Can be done in a active infection
- ATT cover is mandatory

# ABBOTT LUCAS 2 STAGE HIP FUSION


**1st stage**
Anterior smith Peterson approach
Remove capsule, debride joint
Remove femoral neck stump and denude GT
Debride GT and acetabulum to bleeding cancellous bone
Place GT into acetabulum in wide abduction
Avg – 45 deg abduction

**2nd stage**
4-8 weeks later, Osteotomy done 5cm below LT through lower end of old incision
Distal fragment is usually displaced slightly medially to allow part of proximal fragment to fit medullary canal of distal fragment
Apply hip spica , remove after consolidation

# BRITTAINS EXTRA ARTICULAR FUSION



HIP SPICA CAST
No internal fixation done

Expose the proximal femur
Laterally, stay away from capsule

Perform a sub trochanteric osteotomy
Angling upwards towards the Ischium

With a curette , fashion a hole in the Ischium
Drive a tibia graft across osteotomy site into Ischium
Angling upward slightly

# CORRECTIVE OSTEOTOMY

- IF BONY ANKYLOSIS HAS HAPPENED IN UNACCEPTABLE POSITION

# HIP REPLACEMENT

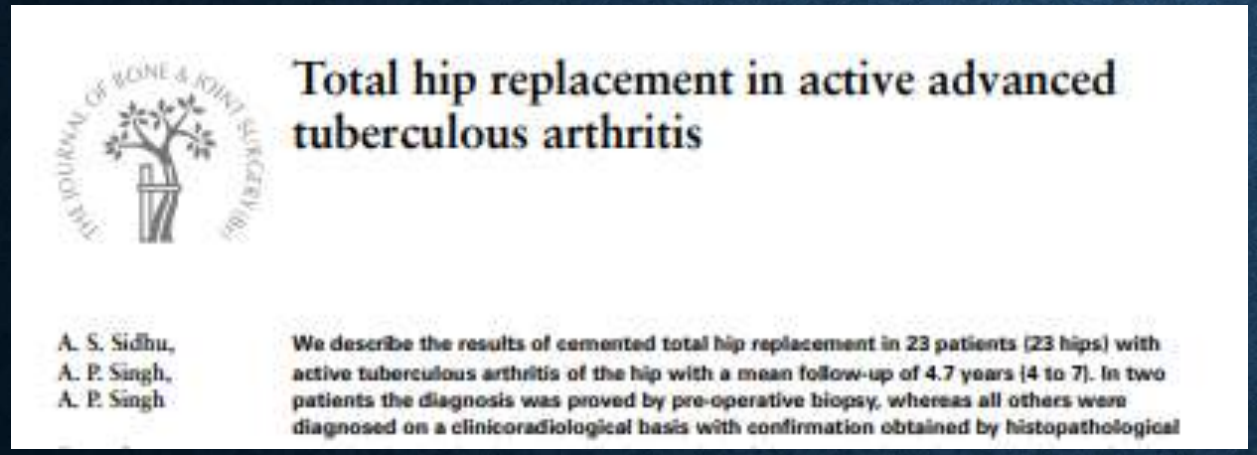
- **THA in healed TB is an accepted procedure**
- **Usually after 1 year of healing**

- **Controversial, THA in active infection**

**Could cause Reactivation of TB and implant loosening**

# THA IN ACTIVE TUBERCULOSIS

***"THA in active infection is a safe procedure with peri operative chemotherapy"***



Total hip replacement in active advanced tuberculous arthritis

A. S. Sidhu,
A. P. Singh,
A. P. Singh

We describe the results of cemented total hip replacement in 23 patients (23 hips) with active tuberculous arthritis of the hip with a mean follow-up of 4.7 years (4 to 7). In two patients the diagnosis was proved by pre-operative biopsy, whereas all others were diagnosed on a clinicoradiological basis with confirmation obtained by histopathological

Perioperative ATT
3 months pre op and 15 months post op

International Orthopaedics (SICOT) (2010) 34:1111–1114
DOI 10.1007/s00264-009-0854-6

ORIGINAL PAPER

Total hip arthroplasty for active tuberculosis of the hip

Yuan Li · Huimin Wang

Perioperative ATT
2 weeks pre op and 12 months post op

# THANK YOU