

# **Tuberculosis of Bone & Joint**

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Tuberculosis is one of the oldest  
demonstrated diseases of  
humankind.

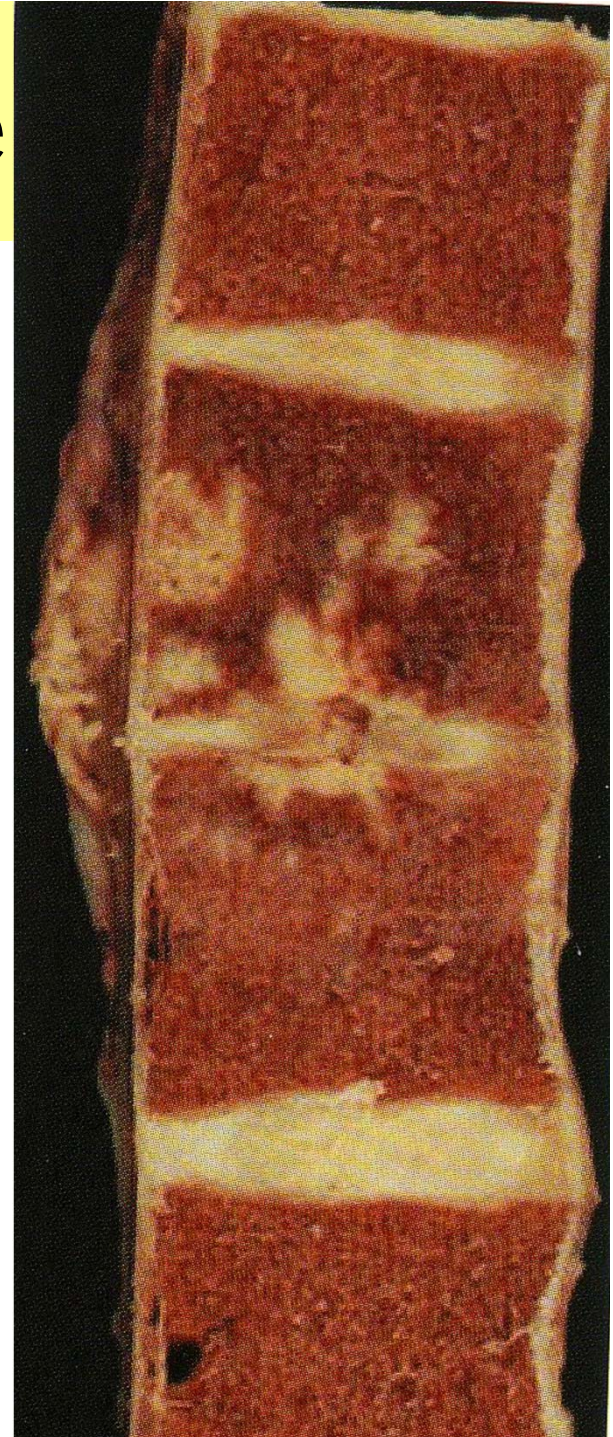
# Egyptians & TB

- Spinal tuberculosis has existed for at least 5000 years.
- Mummified remains from northern Egypt dating from 3400 B.C.



# Pott's Spine

- Percival Pott described spinal tuberculosis in 1779.
- Association between tuberculous thoracic spine and paraplegia.



# GLOBAL BURDEN

- 10.4 million new cases of TB worldwide were detected
- TB is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/AIDS. In 2016, there were an estimated 1.3 million TB deaths among HIV-negative people (down from 1.7 million in 2000) and an additional 374 000 deaths among HIV-positive people.

# Developed Countries

- By the beginning of the twentieth century, tuberculosis was the leading cause of death.
- Since the advent of antituberculous drugs and improved public health measures, spinal tuberculosis has become rare.

# TB in Myanmar

- Myanmar is among 20 countries globally with the highest burden of TB

## Myanmar

Population 2016

53 million

Estimates of TB burden*, 2016	Rate	
	Number (thousands)	(per 100 000 population)
Mortality (excludes HIV+TB)	25 (16–35)	47 (30–66)
Mortality (HIV+TB only)	4.9 (3.5–6.6)	9.3 (6.7–12)
Incidence (includes HIV+TB)	191 (141–249)	361 (266–471)
Incidence (HIV+TB only)	18 (13–24)	34 (25–45)
Incidence (MDR/RR-TB)**	13 (8.8–18)	25 (17–34)

*3-5% of TB infection involved in  
Musculoskeletal system.*

# NO BONE IS IMMUNE TO TUBERCULOSIS

- Spine 50%
- Pelvic 12%
- Hip & Femur 10%
- Knee & Tibia 10%
- Ribs 7%

- Ankle 2%
- Shoulder 2%
- Elbow 2%
- Wrist 2%
- Multiple 3%

# Now we are in era of resistance

- Most staphylococci are now resistant to penicillin.
- MRSA – methicillin-resistant *Staphylococcus aureus*
- VRE – vancomycin-resistant enterococci

# Now we are in era of resistance

- **MDR-TB**
- **XDR TB** (Extensively drug-resistant)
- **XXDR TB / TDR TB** (extremely drug resistant TB)

# **Diagnosis of Tuberculosis in Bones and Joints**

# CLINICAL

- Localized PAIN
- Associated with FEVER and
- WEIGHT LOSS

# CLINICAL

- Mechanical Pain vs Pathological Pain
- Pain even at Rest
- Night Pain / Night Cry
- Pain not relieved by painkillers
- Recurring Pain

# CLINICAL

A cold abscess (swelling without inflammation) is strongly suggestive of musculoskeletal tuberculosis.

# CLINICAL

Must be evaluated for the possibility of other involved sites, including the lungs, intestinal tract, and kidneys.

1/3 of the patients have history of Pulmonary TB.

# **PLAIN RADIOGRAPH**

**NO SPECIFIC  
PATHOGNOMONIC  
RADIOGRAPHIC FEATURES**

# X-RAYS

Osteopenia,

Soft-tissue swelling

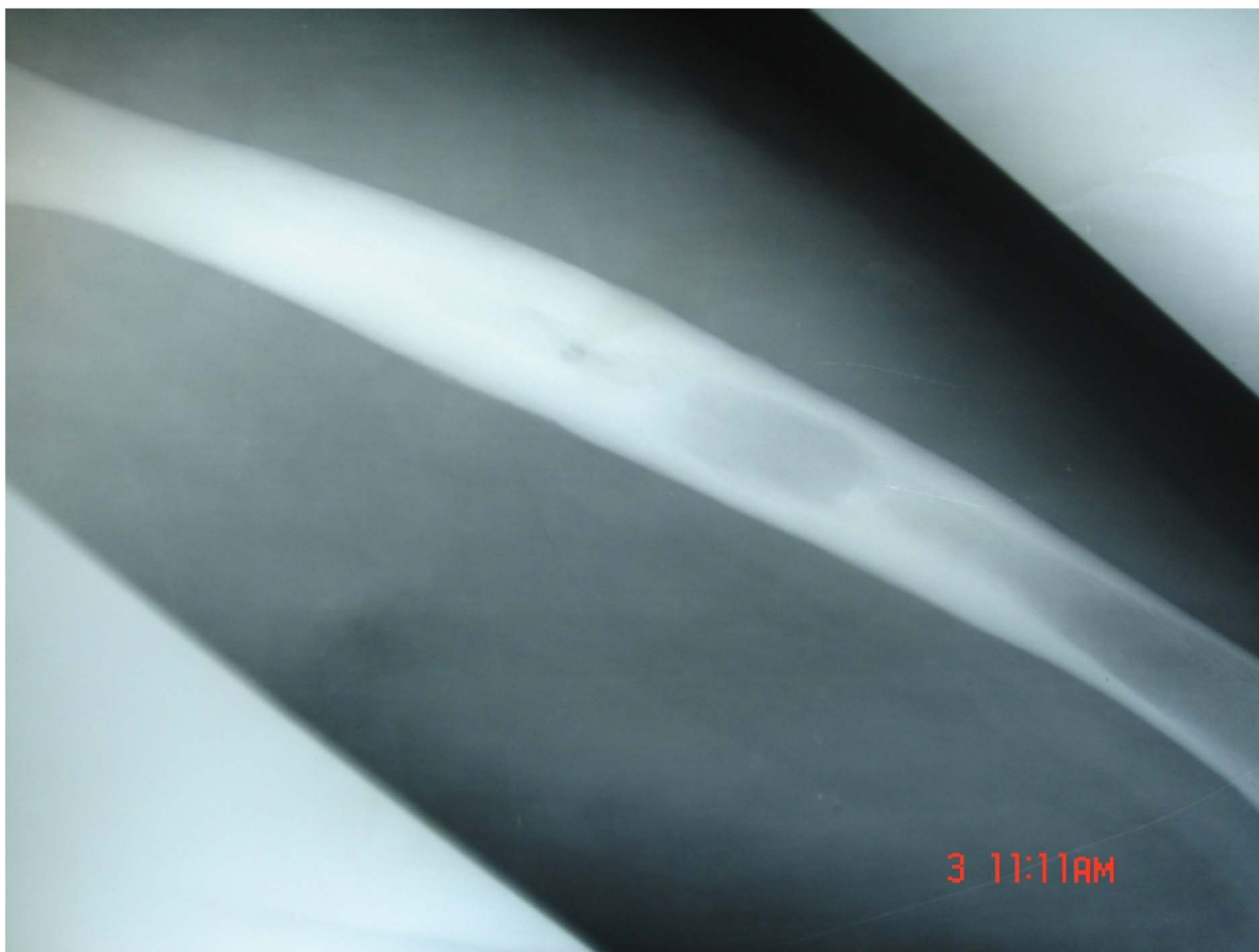
Minimum periosteal reaction

Narrowing of the joint space

Cysts in bone adjacent to a joint

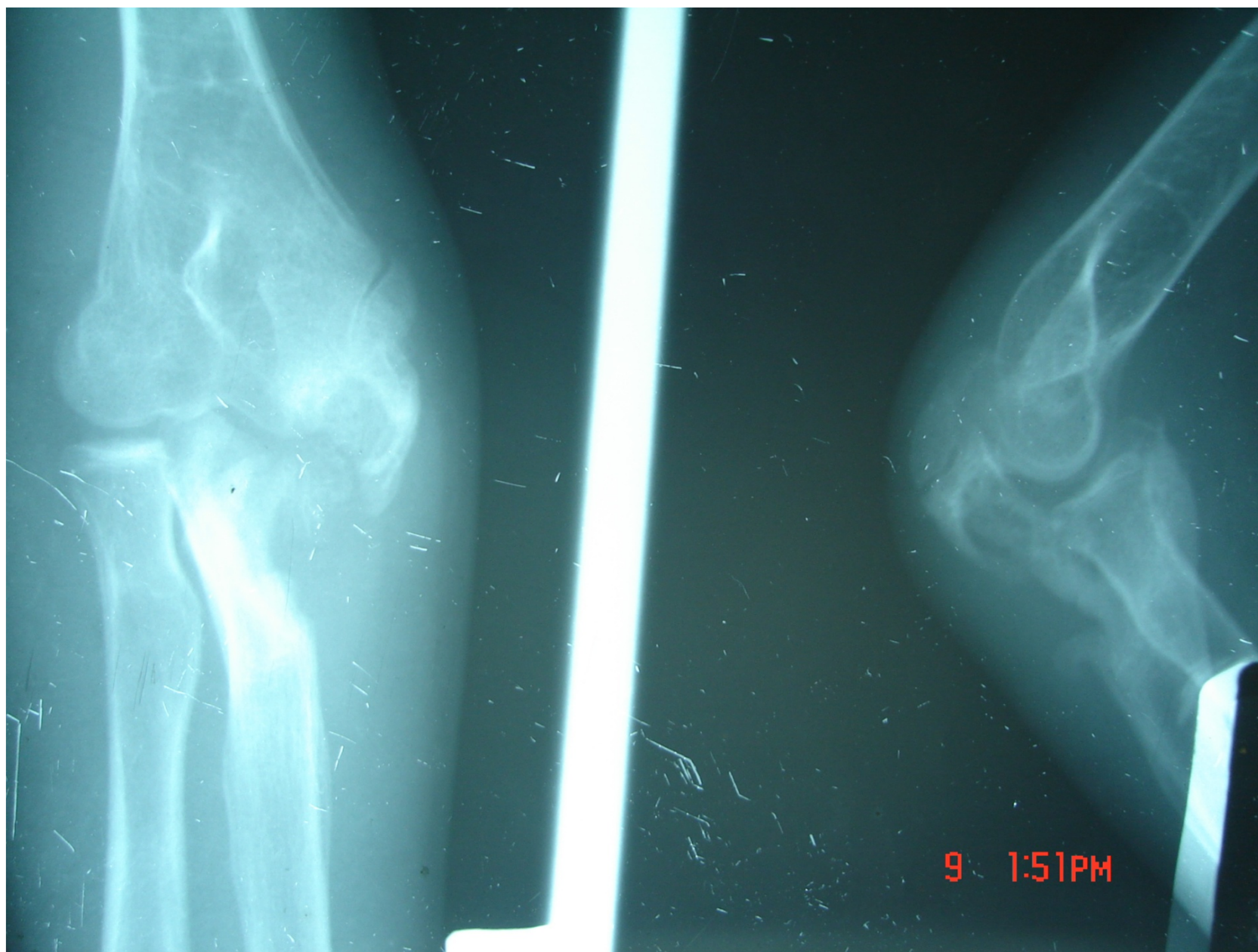
Enlargement of the epiphysis in children

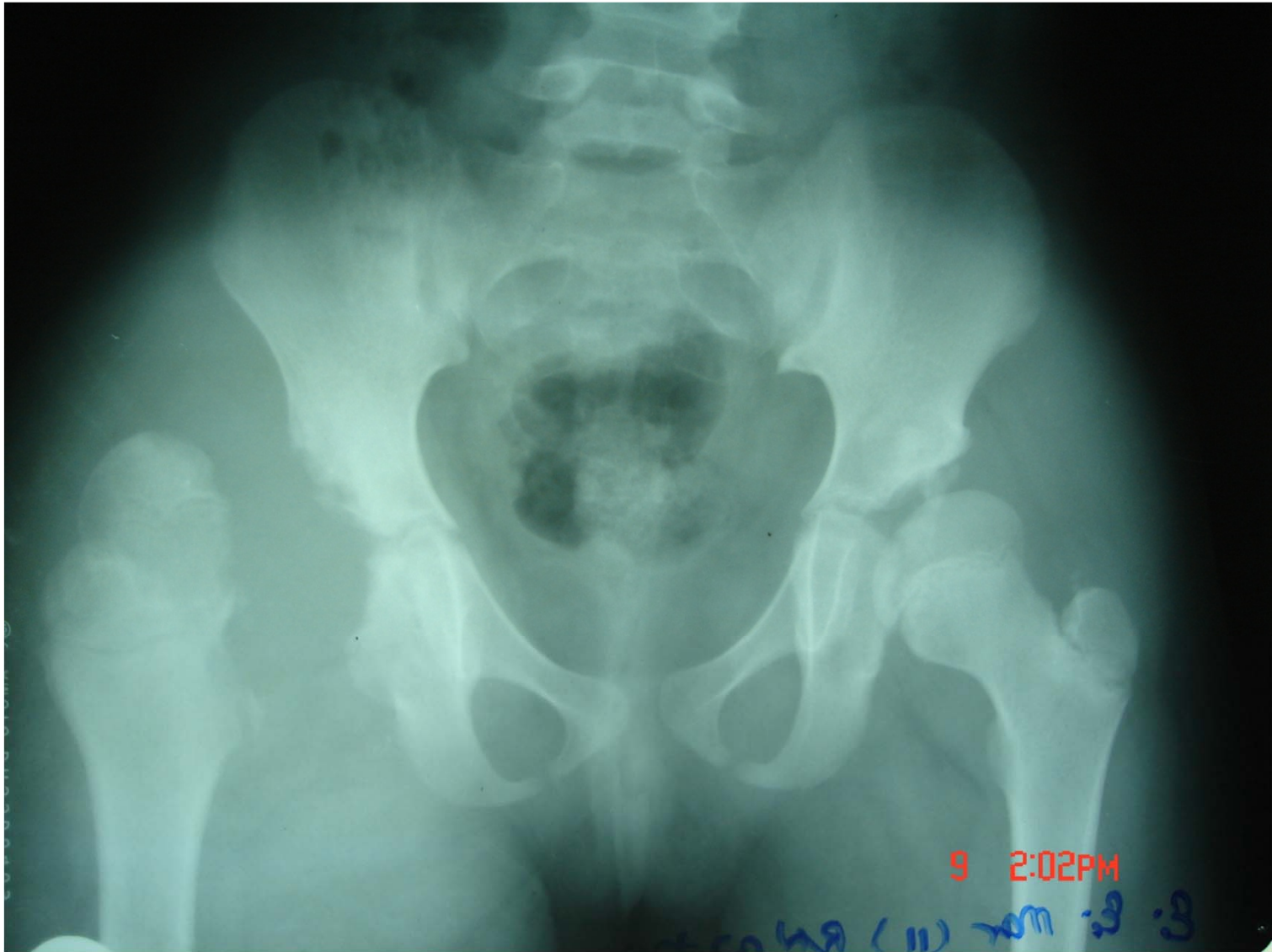
Subchondral erosions involving both sides  
of the joint











# SPINE X-RAYS

Rarefaction vertebral end plates

2 Adjacent Vertebrae

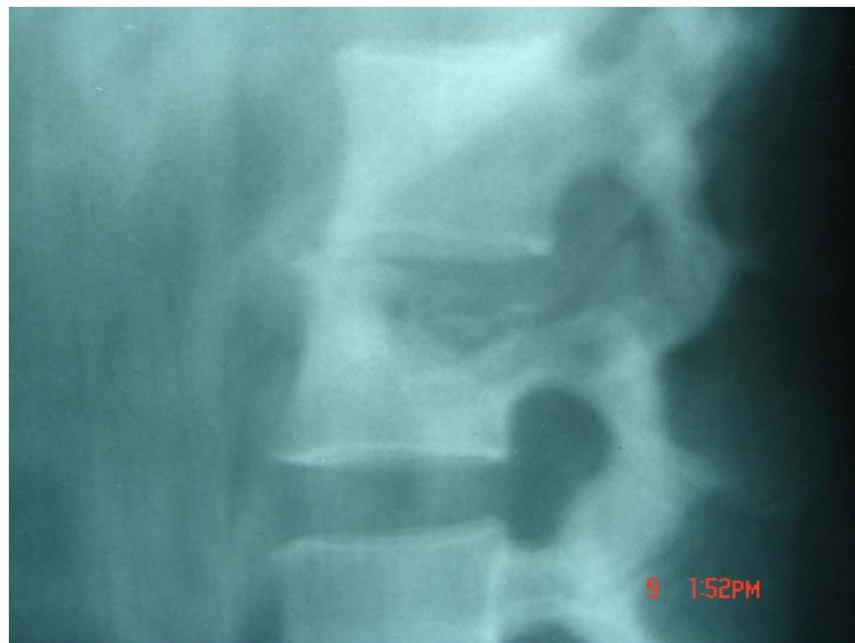
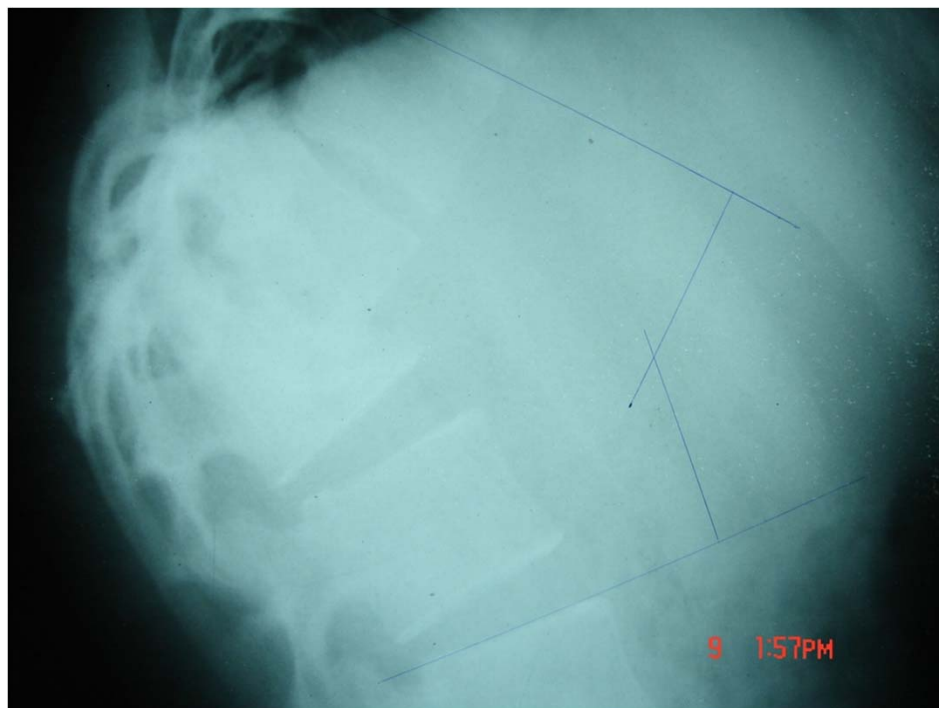
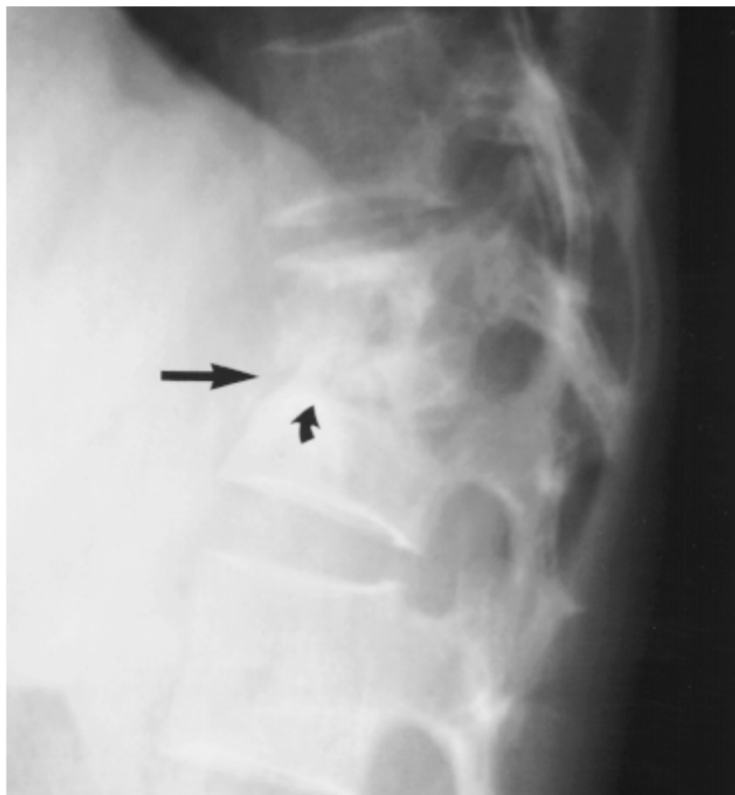
Soft-tissue abscess

Loss of disc height

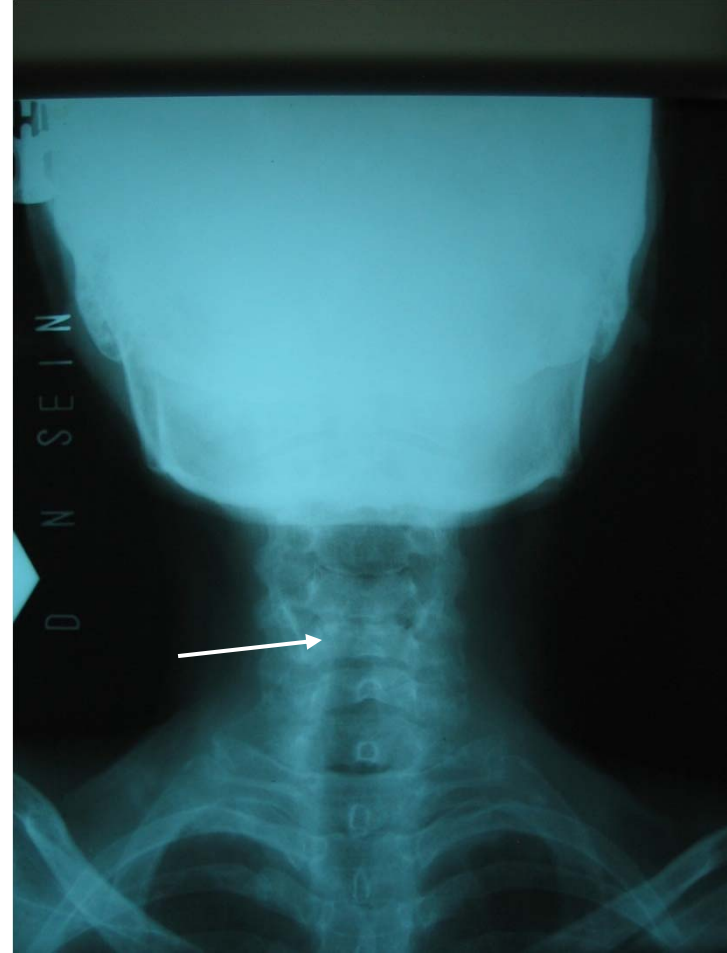
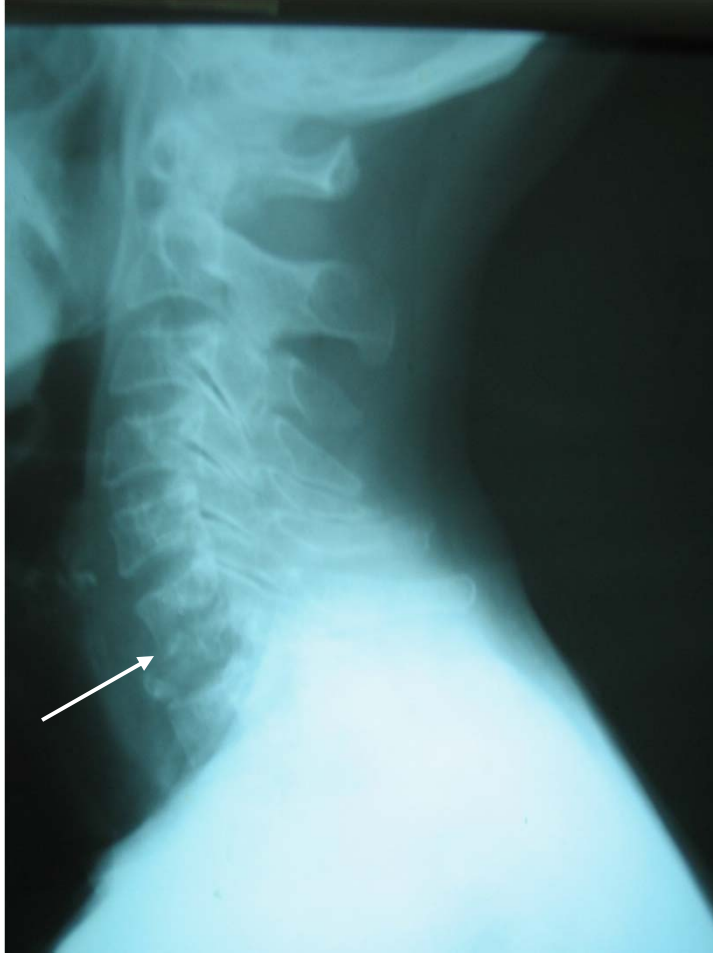
Osseous destruction

New-bone formation





## C6 & C7 Tuberculosis



# CT

- Better bony detail
- Better assessment of soft tissue
- Detects early lesions

# MRI

- MRI is the standard for evaluating disk space infection and osteomyelitis of the spine and is most effective for demonstrating the extension of disease into soft tissues

MRI is most effective for demonstrating neural compression



17.

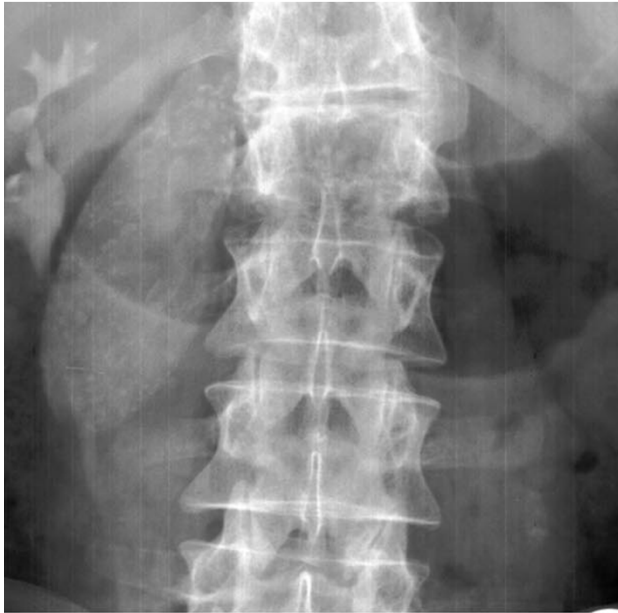


18a.

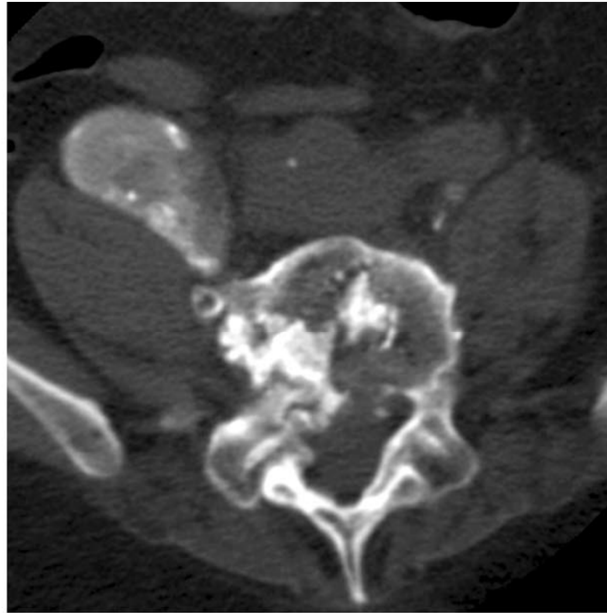


18b.

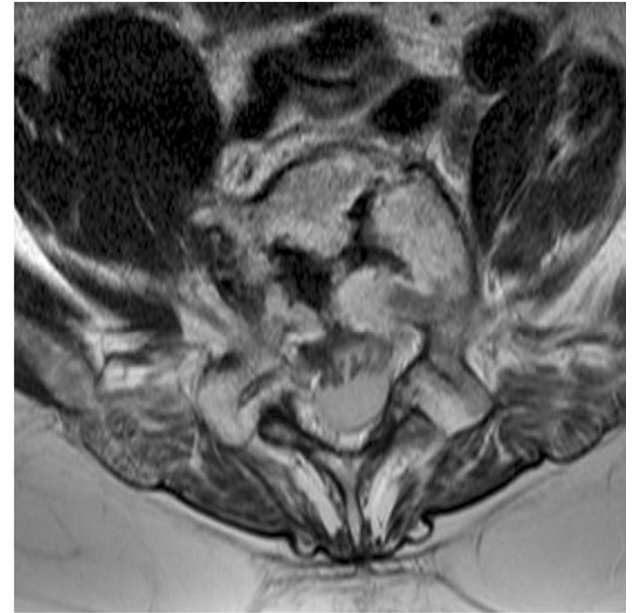
- Pott abscess in a patient with tuberculous spondylitis.
- Radiograph of the thoracic spine demonstrates vertebra plana of D11 with an associated soft-tissue-density mass, the latter finding being consistent with a tuberculous (Pott) abscess.
- Gibbus deformity secondary to tuberculous spondylitis. Sagittal T1-weighted (**a**) and T2-weighted (**b**) MR images show vertebral collapse with high signal intensity in the adjacent vertebral bodies.
- The vertebral collapse has resulted in a gibbus deformity and spinal cord compression.



**a.**



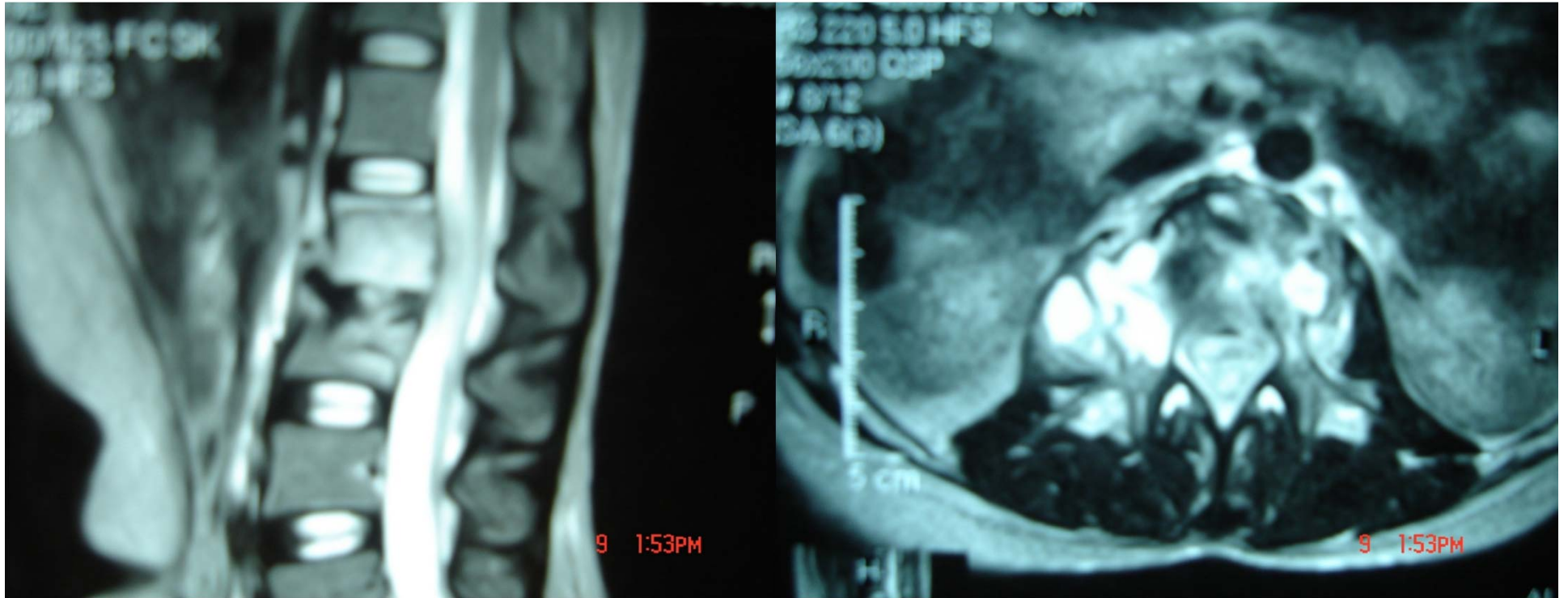
**b.**



**c.**

**Calcified psoas abscess in a patient with tuberculous spondylitis.**

- (a) Radiograph shows a partially calcified right paravertebral soft-tissue mass, with expansion and bowing of the right psoas shadow and displacement of the right kidney.
- (b) CT scan shows vertebral destruction and a calcified right psoas abscess. (c) Axial T2-weighted MR image demonstrates the calcified abscess with low signal intensity, along with associated vertebral destruction.



MRI of L3 TB

# OTHERS

- BONE SCAN

- SKIN TEST

- SEROLOGICAL TEST

- CULTURE

# BIOPSY

- Where tuberculosis is highly prevalent
- Where the disease is not prevalent
- Where strains are resistant to multiple drugs

# MANAGEMENT

- General Treatment
- Chemotherapy
- Local Treatment
- Follow Up

# **Medical Treatment of Musculoskeletal Tuberculosis**

- General Build-up
- High Dose + Daily + Long Duration
- Be Careful With Side Effects
- Indication for Surgery

# General Management

- General Treatment

Nutrition

Vitamins

Haematenics

# Current Recommendation for Adult Musculoskeletal TB

- INH
- RIFAMPICIN
- PYRAZINAMIDE
- ETHAMBUTOL /  
STREPTOMYCIN

X 2 MONTHS

- INH
- RIFAMPICIN
- PYRAZINAMIDE

X 8 – 10 MONTHS

# **SURGERY**

- to drain and clear the lesion
- to manage the complications
- to treat end results of the disease (deformity, ankylosis)
- to enhance the effectiveness of chemotherapy
- to confirm the diagnosis

# FOLLOW UP

- Monitoring
  - Clinical
    - temperature chart
    - weight chart
  - Laboratory
    - ESR
    - Hb %
  - X rays

# Conservative Vs Surgery

- Orthodox conservative treatment was unsatisfactory with an overall success rate of only 30 - 44% having functional capacity. (*Albee 1911 – 1930; Hibbs 1912 - 1928*)
- Relapsed rate of up to 50% of case even after the surgery.
- Comprehensive clinical judgment with combination of chemotherapy and timely surgery should be the rule.

## Ambulatory Vs non-ambulatory treatment

- *Rest* was considered to be fundamental in treatment by Sir Robert Jones (1863) & Huge Owen Thomas (1879).
- *Initial rest and immobilization with stay in hospital during first 6 - 8 weeks* of chemotherapy is essential for early clinical response as well as prevention of aggressive destruction.

# Timing of Surgery

- The enthusiasm for surgical intervention in TB was advocated since 1970s & 1980s.  
*(Bailey 1972; Wilkinson 1989; Tuli 1993)*
- Once significant local symptoms with evidenced destructive process, early surgery is recommended for *enhancement of tissue healing and restoration of locomotor functions.*

# OSTEOARTICULAR TB

- SYNOVITIS ( Effusion – Monoarticular )
- ARTHRITIS ( Swelling – Lengthening )
- DESTRUCTIVE ( Deformed – Shortening )
- FIBROUS ANKYLOSIS ( Stiffness – Loss  
of Mobility )

# **SPLINTAGE & REST**

- to overcome muscle spasm
- to prevent collapse of the articular cartilage
- to correct deformities

# **SURGERY**

- Arthrotomy ( Arthroscopic/ Open)
- Debridement ( Removal Debris)
- Arthrodesis ( Joint Fusion )
- Arthroplasty ( Joint Replacement )

# TB Spine

# Indications for Surgery

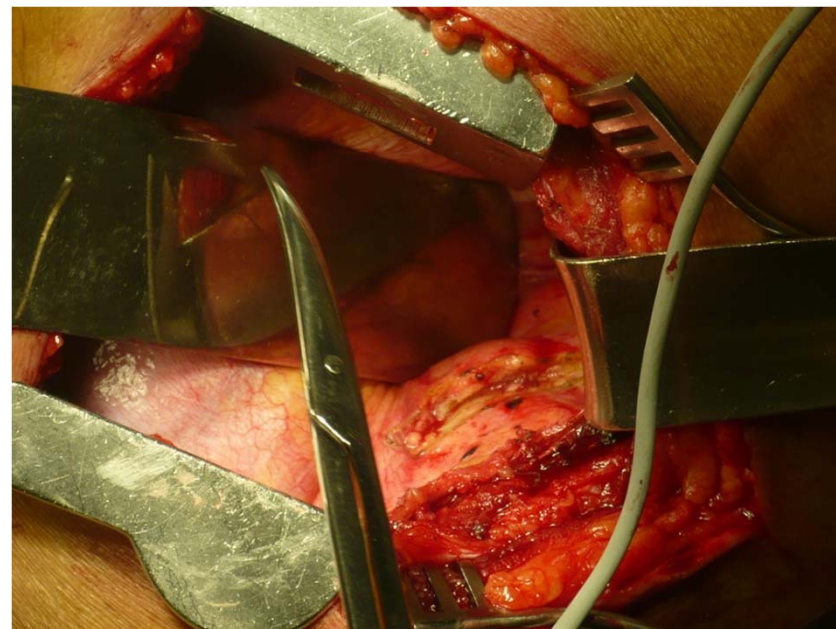
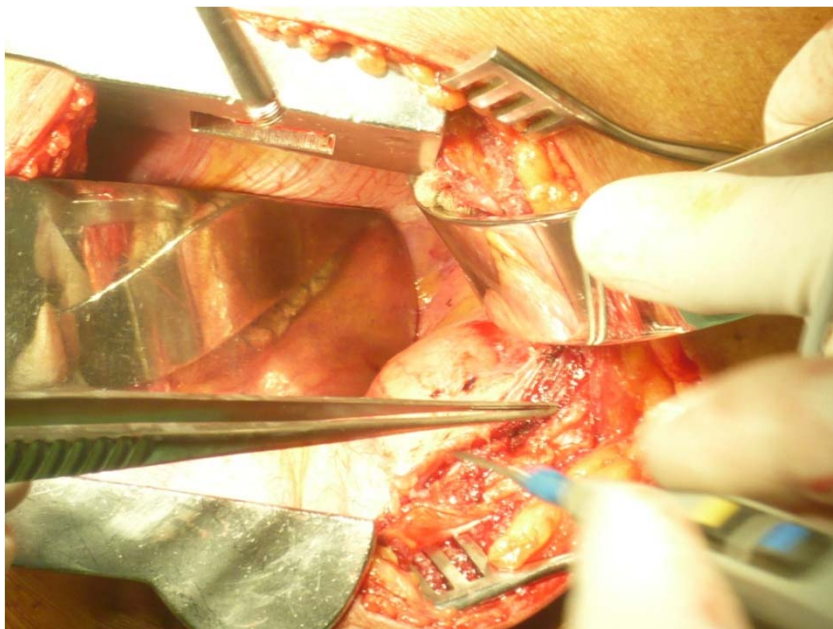
- Neurological Deficit
- Spinal Deformity with Instability
- No Response to Medical Treatment
- Non diagnostic

# Causes of Pott's Paraplegia

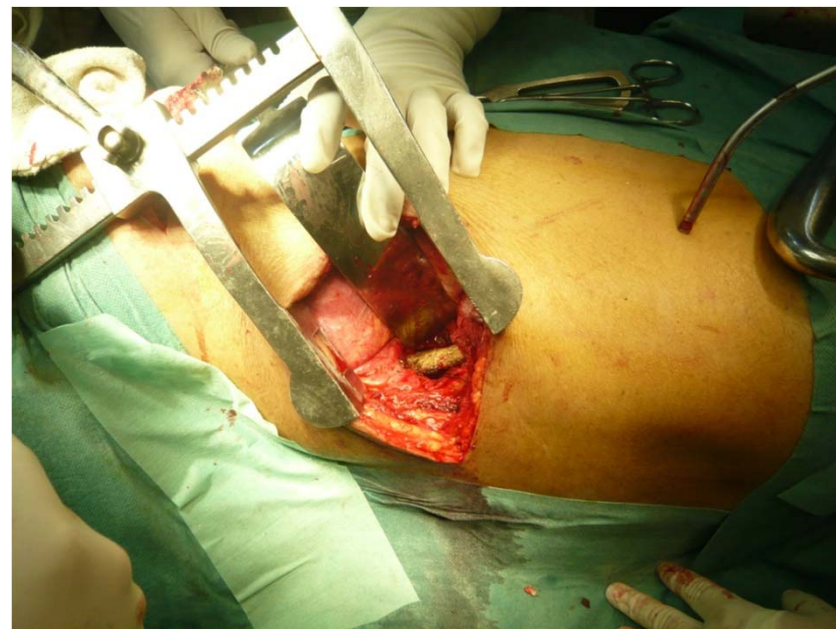
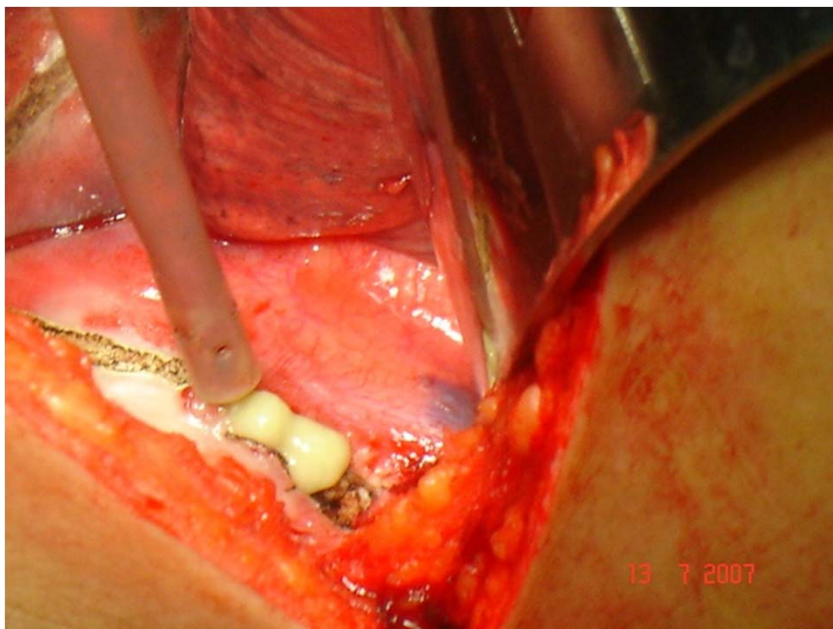
- Inflammatory
- Compression                      exudate, cartilage and bone
- Constriction due to fibrosis
- Kinking due to severe deformity
- Vascular thrombosis and cord infarct

# Management Protocol in Spine Unit YOH

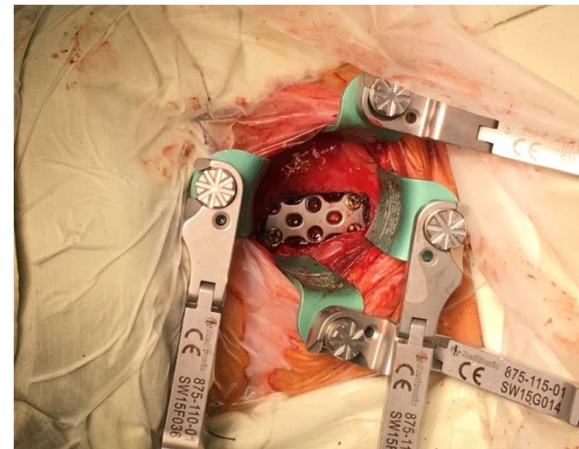
- Anti-TB 12 months 2 + 10
- Partial Paralysis
  - <4 weeks Anti-TB wait for recovery
  - no recovery in 4 weeks Surgery
  - >4 weeks Anti-TB 4 weeks + Surgery
- Complete Paralysis
  - Anti-TB + Surgery



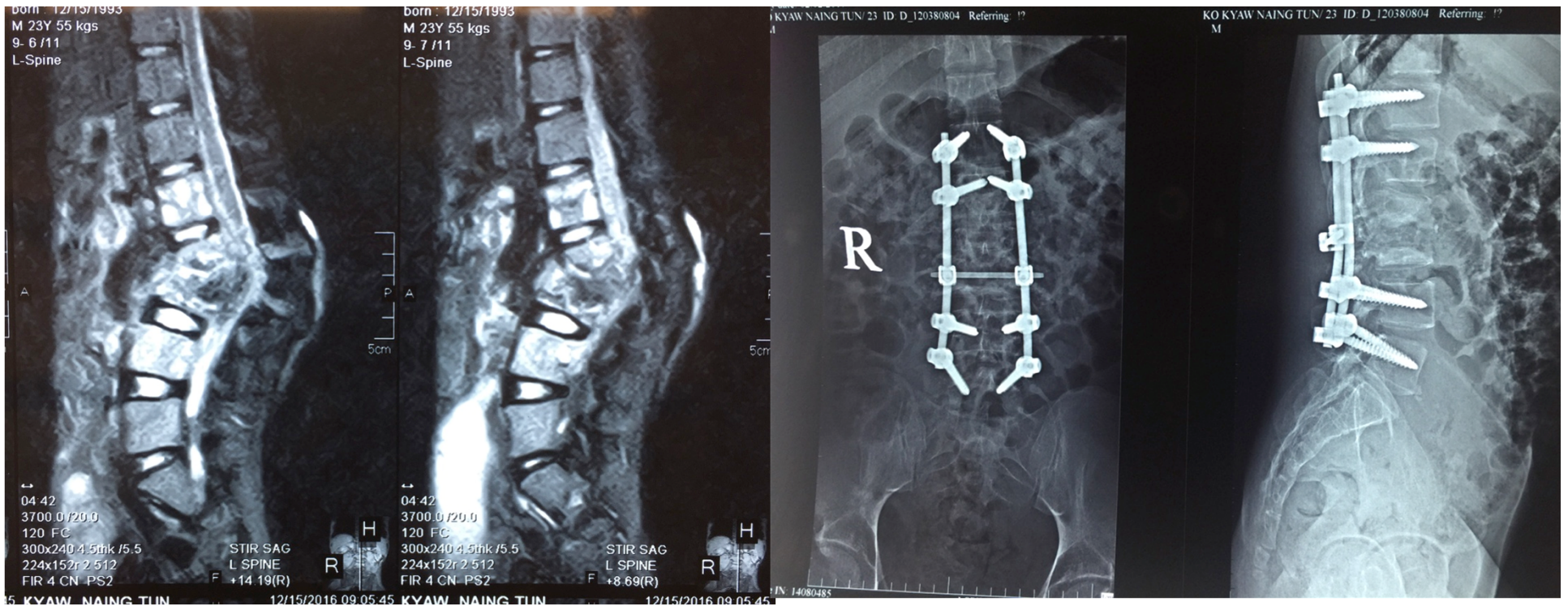
Anterior Clearance & Bone grafting



# TB of cervical spine



# TB of lumbar spine



# TB Spine operated in YOH

Year	AC	ALD
2001	3	1
2002	15	4
2003	11	2
2004	8	-
2005	13	
2006	15	2
2007	20	1
2008	18	
2009	22	
2010	24	2
Total	149	12



# TB spine operated in Spine unit YOH

Year	Lumbar	Thoracic	Cervical	Total
2013	17	13	2	32
2014	5	20	3	28
2015	9	32	2	43
2016	28	59	5	92
2017	57	81	17	155



*THANK YOU*