

Tuberculosis of Bone & Joint

Dr Zaw Wai Soe
MBBS, MMedSc(Ortho), FRCS(Glasgow), DrMedSc(Ortho)
Diploma in Medical Education
Rector
University of Medicine (1)

20-1-2018

Tuberculosis is one of the oldest
demonstrated diseases of
humankind.

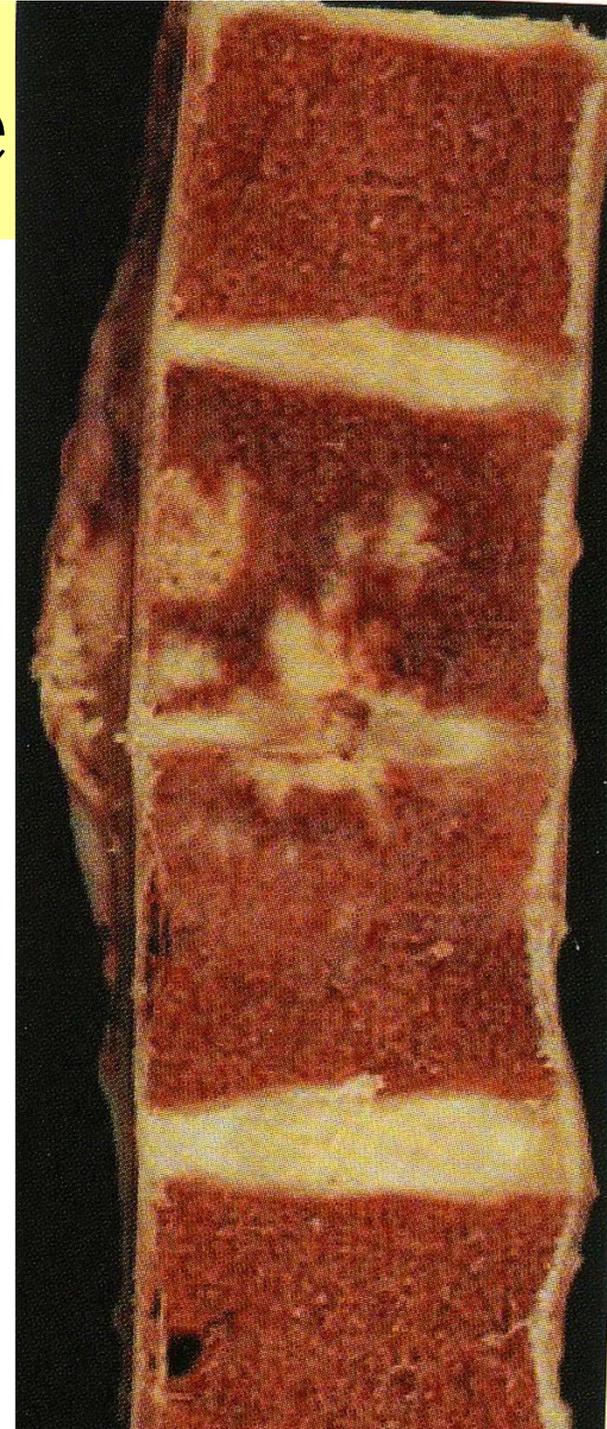
Egyptians & TB

A photograph of an ancient Egyptian mummy, wrapped in yellowish-brown bandages, lying on a wooden surface. The mummy is positioned horizontally, with its head to the left and feet to the right. The background is dark and out of focus, showing some green vertical elements. The text 'Egyptians & TB' is overlaid in white serif font at the top center.

- 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	Number (thousands)	Rate (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% | • Ankle | 2% |
| • Pelvic | 12% | • Shoulder | 2% |
| • Hip & Femur | 10% | • Elbow | 2% |
| • Knee & Tibia | 10% | • Wrist | 2% |
| • Ribs | 7% | • 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

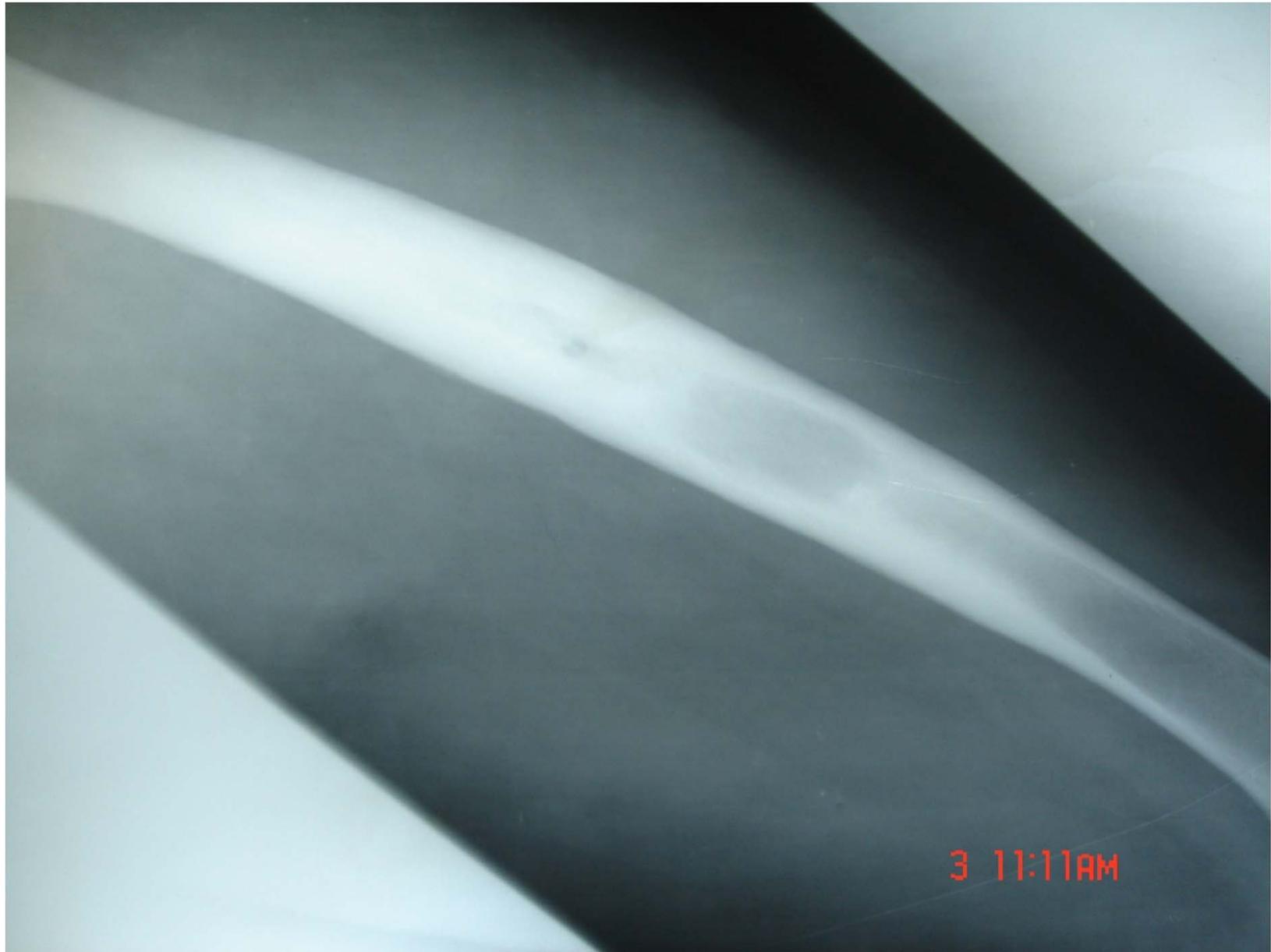
Minimum periosteal reaction

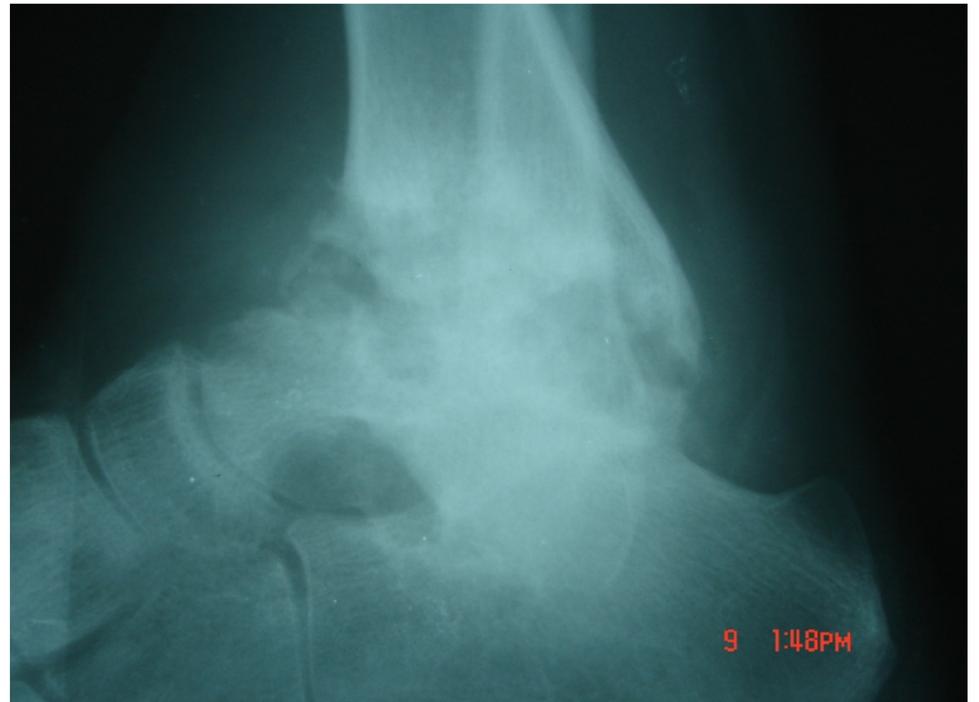
Narrowing of the joint space

Cysts in bone adjacent to a joint

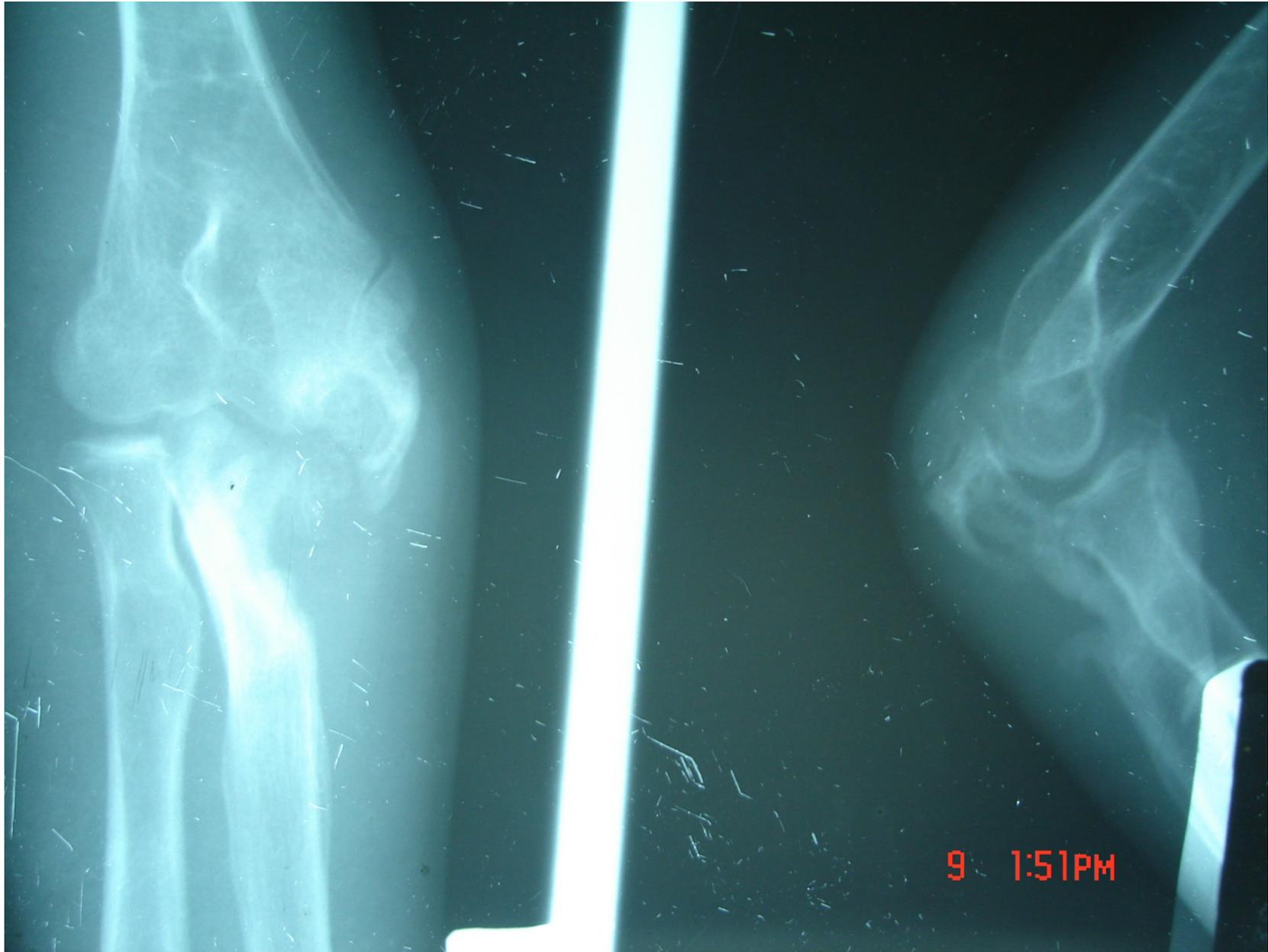
Enlargement of the epiphysis in children

Subchondral erosions involving both sides
of the joint











SPINE X-RAYS

Rarefaction vertebral end plates

2 Adjacent Vertebrae

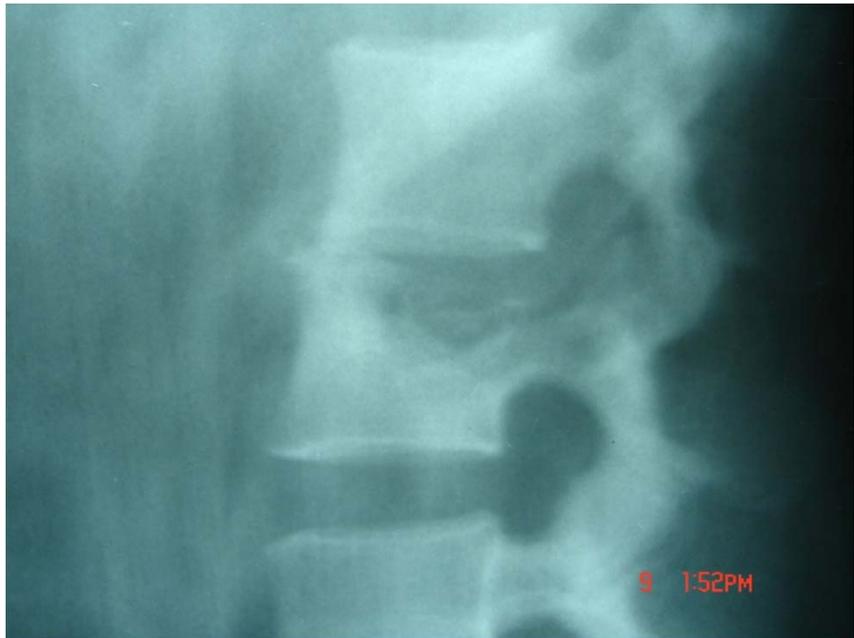
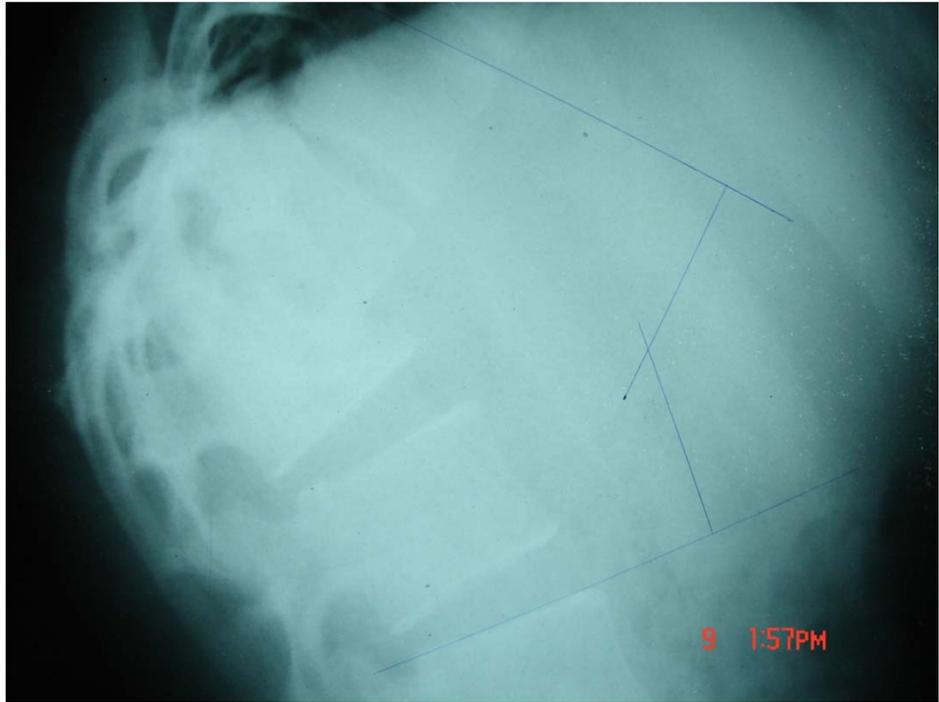
Soft-tissue abscess

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.

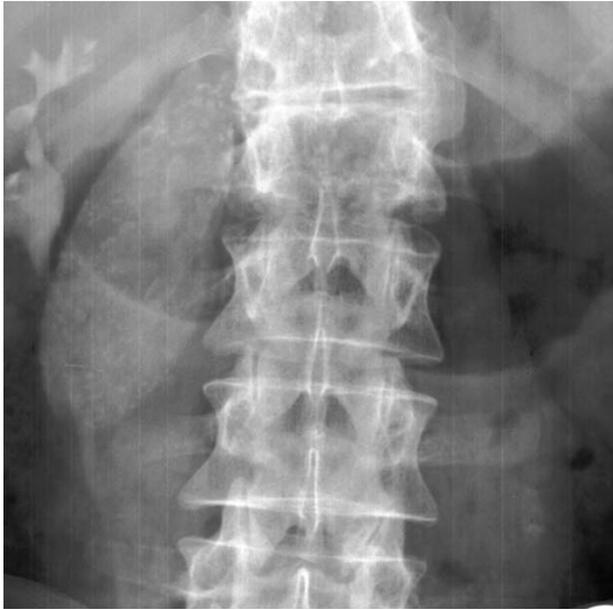


18a.

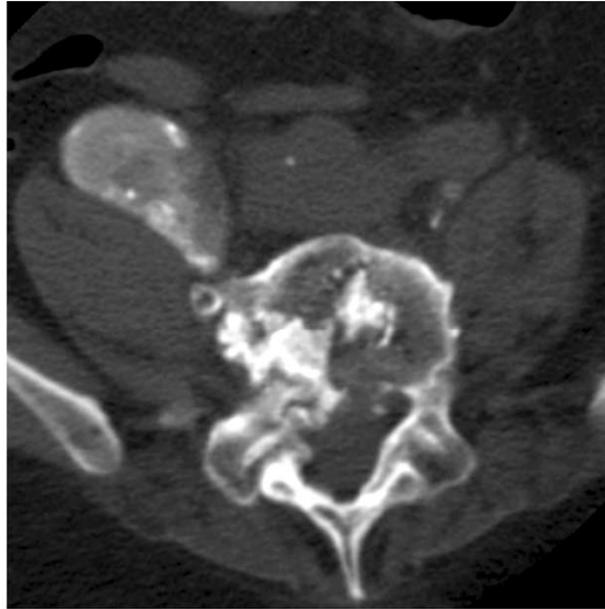


18b.

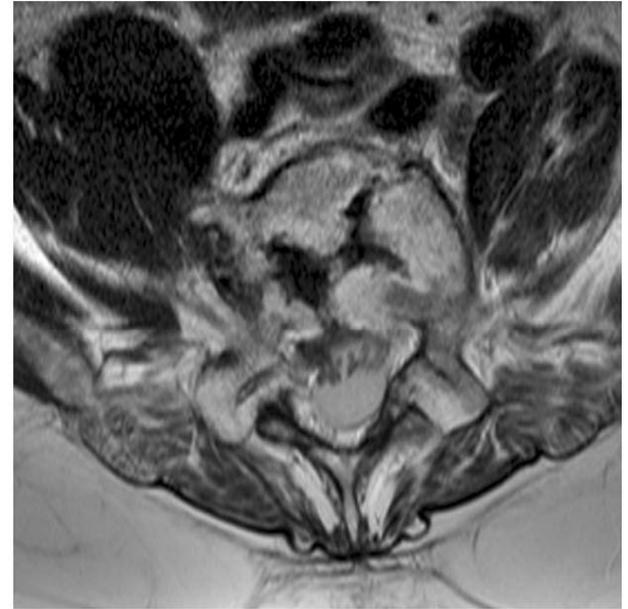
- Pott abscess in a patient with tuberculous spondylitis.
- Radiograph of the thoracic spine demonstrates vertebra plana of D11 with an associated soft-tissue-density mass, the latter finding being consistent with a tuberculous (Pott) abscess.
- Gibbus deformity secondary to tuberculous spondylitis. 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.



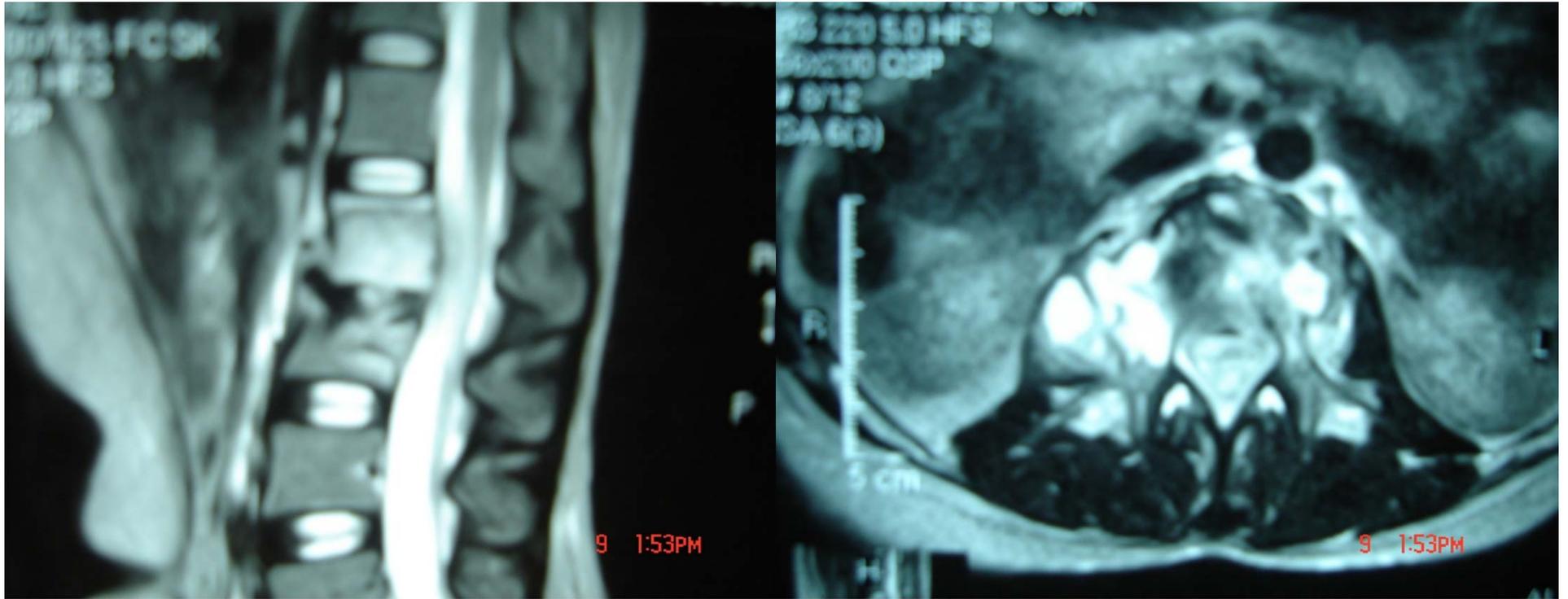
b.



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

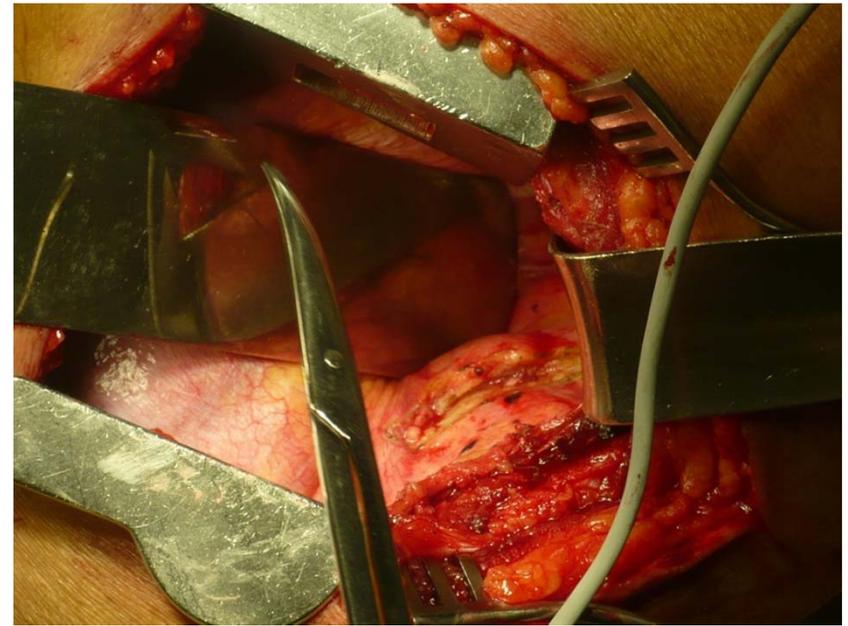
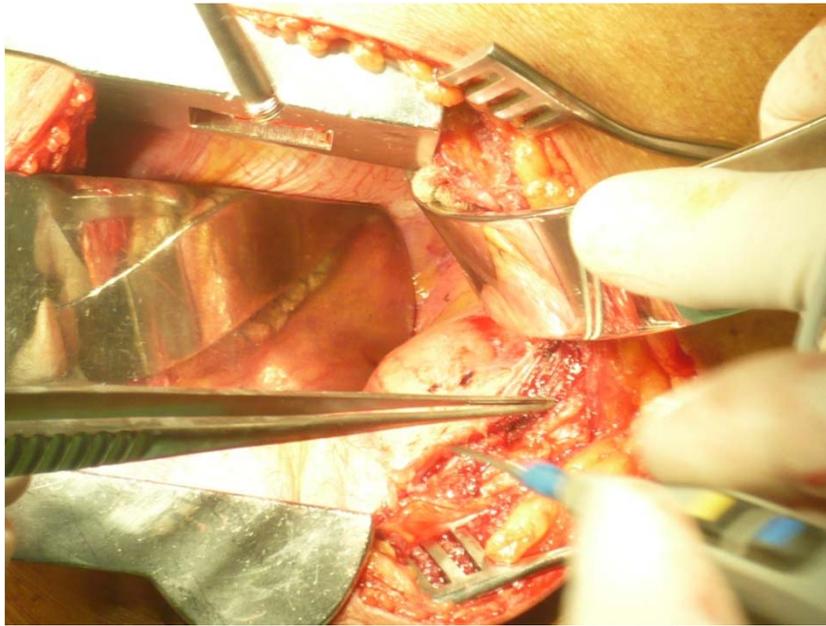
- Neurological Deficit
- Spinal Deformity with Instability
- No Response to Medical Treatment
- Non diagnostic

Causes of Pott's Paraplegia

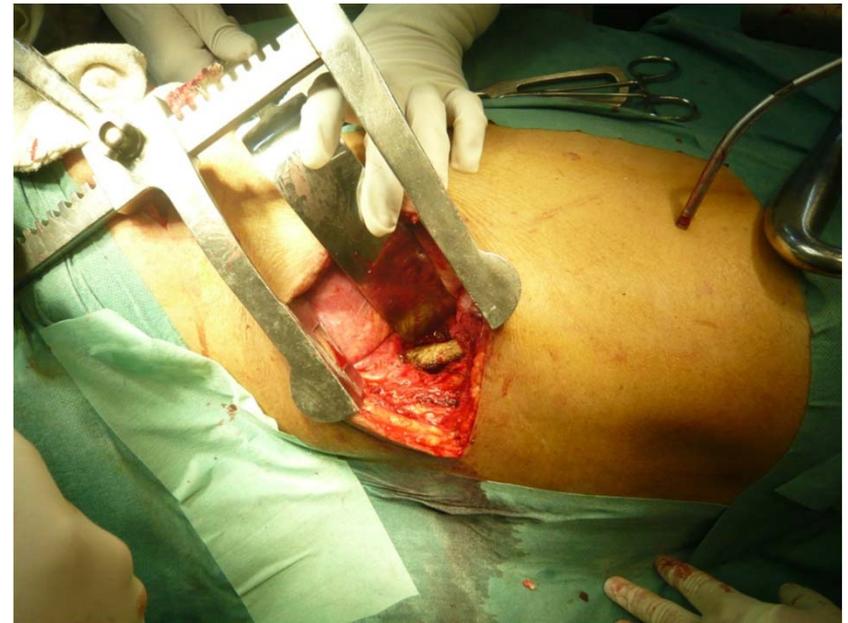
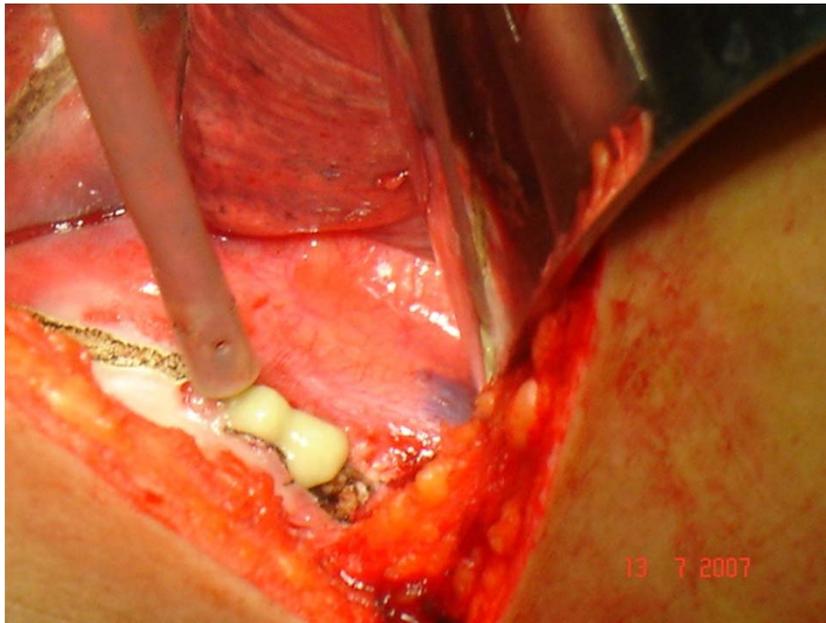
- Inflammatory
- Compression exudate, cartilage and bone
- Constriction due to fibrosis
- Kinking due to severe deformity
- Vascular thrombosis and cord infarct

Management Protocol in Spine Unit YOH

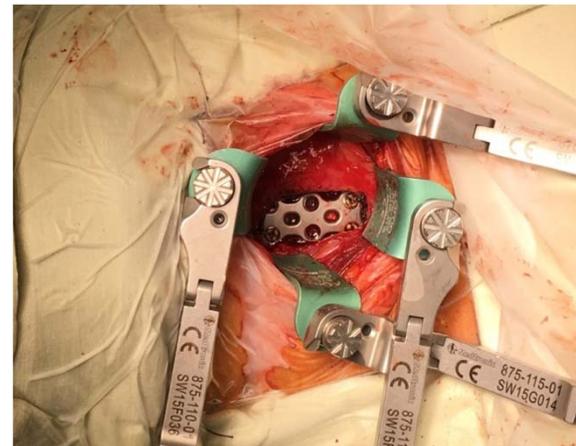
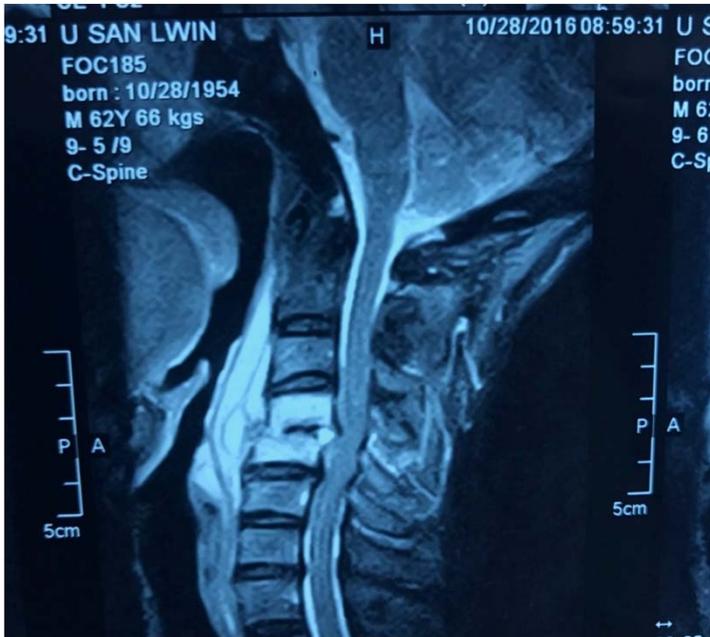
- Anti-TB 12 months 2 + 10
- Partial Paralysis
 - <4 weeks Anti-TB wait for recovery
 - no recovery in 4 weeks Surgery
 - >4 weeks Anti-TB 4 weeks + Surgery
- Complete Paralysis
 - Anti-TB + Surgery



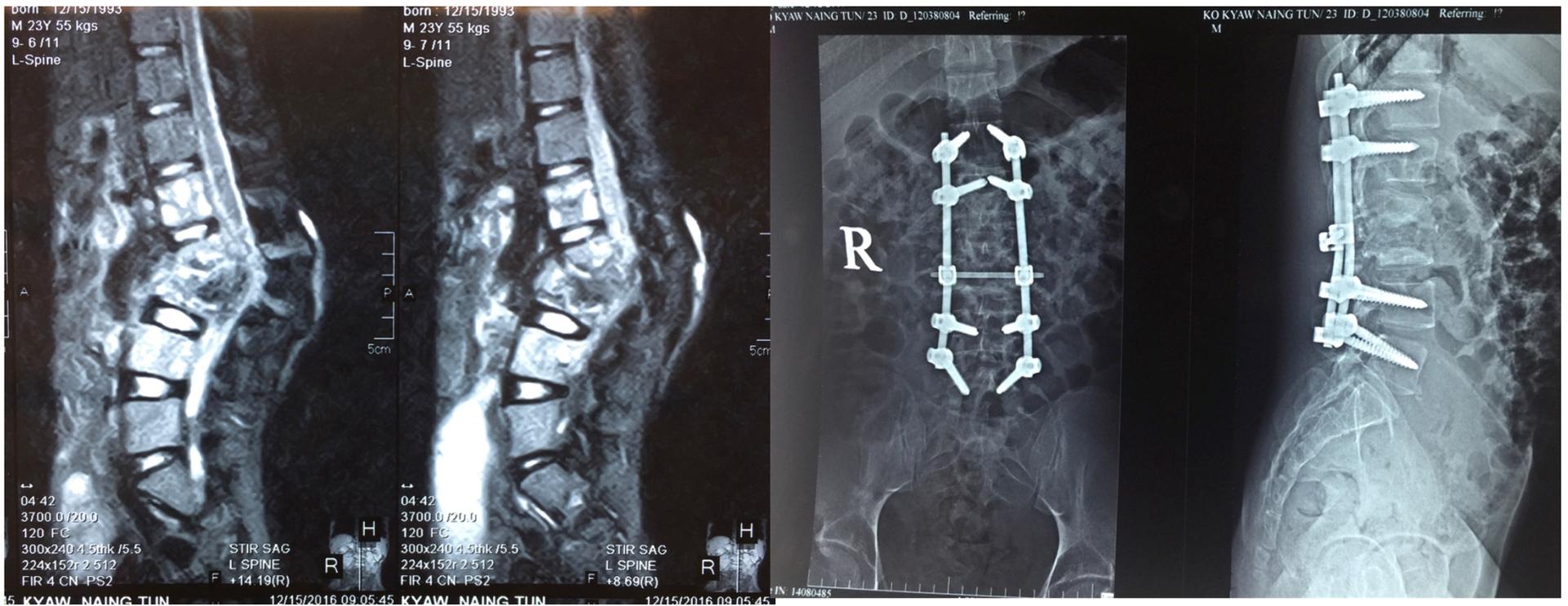
Anterior Clearance & Bone grafting



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