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All the chapters are important because they are under MCI curriculum. But the starred marked chapters hold maximum importance as per recent exam trend.

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3 CHAPTER

Tuberculosis of Bone and Joints

TUBERCULOSIS OF SPINE—POTT'S SPINE

The **spine is the most common site of skeletal tuberculosis**, accounting for 50% of cases followed by hip (15%) and knee (10%). **Spina ventosa is tuberculosis of short bones of hand. Tuberculosis of shoulder is dry (no effusion)—caries sicca (dry).**

Tuberculosis with polyarthritis is called as Poncet's disease.

The tubercular spread to spine usually takes place from Lungs > lymph nodes that is usually secondary.

The route of spread is mostly **hematogenous** (through artery and Bateson's plexus). The initial focus of infection usually begins in the cancellous bone of vertebral body near the disc **(paradiscal type)**. According to blood supply of somites—as lower part of upper vertebra and upper part of lower vertebra develop from same mesodermal somites and thus have same blood supply thus spread is paradiscal.

"The Lesions are Paucibacillary"

Most common infective pathology of spine in India is tuberculosis. Acute pyogenic infections of spine are uncommon and mostly caused by ***Staphylococcus aureus.***

Any level of the spine may be involved, the lower thoracic region being the most common; next in decreasing order of frequency are the lumbar, upper dorsal, cervical and sacral region. So dorsolumbar region is the most commonly involved segment. (Remember it is **dorsolumbar region** and **not dorsolumbar junction)**

- **Regional distribution:**
  - Cervical 12%
  - Cervicodorsal junction 0.5%
  - Dorsal 42%
  - Dorsolumbar junction 12%
  - Lumbar 26%
  - Lumbosacral 3%
- 7% patients can have more than one region of spine involved.
- The most common type is infection in paradiscal region and least common is in the posterior area. **The paradiscal type is most common** > central type (central part of vertebral body) > anterior type (anterior surface of vertebral body) > appendiceal type (involving pedicle, lamina, and less commonly transverse process, **2nd least common is spinous process and rarest variety is synovitis of facet joints).**
- The prominence of single spinous process is called as knuckle and this is usually not seen in tubercular spine, prominence of 2–3 spinous process is angular kyphosis which is commonest in tuberculosis because of 2 contiguous vertebra involved with paradiscal destruction and prominence of more than 3 spinous process is called as rounded kyphosis which is usually seen in osteoporotic spine and can be seen in tuberculosis.
- In the thoracic region kyphosis is most marked because of normal kyphotic curvature. **Tuberculosis is the most common cause of kyphosis in males. The deformity being maximum in dorsal spine > lumbar spine > cervical spine.**

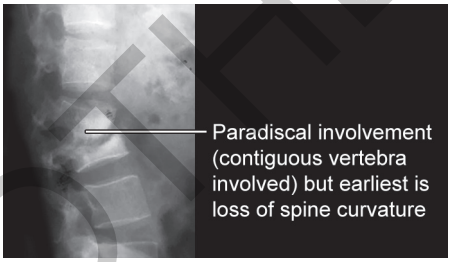


Fig. 3.1: Paradiscal involvement (contiguous vertebra involved) but earliest is loss of spine curvature!

- Tuberculosis is the most common cause of cold abscess.
- **Psoas abscess can give rise to pseudo-hip flexion deformity.** The flexion deformity of hip joint due to spasm of iliopsoas muscle does not show any limitation of rotation of hip joint when tested in the position of flexion deformity. Ipsilateral flexion of hip joint (more than the deformity) relieves pain and extension increases pain (by stretching muscle).

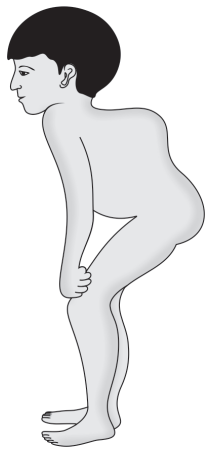


Fig. 3.2: Kyphosis most commonly involves thoracic region

- **Paraplegia occurs most often in upper thoracic region, where kyphosis is most acute, the spinal canal is narrow and spinal cord is relatively large.**
- Early onset paresis is due to inflammatory edema, granulation tissue an abscess, caseous material. It has good prognosis. Late onset: paresis is due to increasing deformity or reactivation of disease, bony sequestrum, stenosis of the vertebral canal, fibrosis or vascular insufficiency and has poor prognosis.
- Sequelae of TB spine is usually bony ankylosis.

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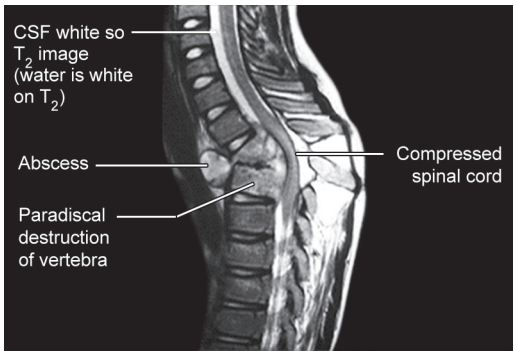


Fig. 3.3: MRI spine (Possibly tuberculosis)

Clinical Features

- **Back pain,** Usually minimal, is the **commonest symptom.** (1st symptom).
- **Tenderness** is the **earliest sign**. Twist tenderness for Anterior elements is more significant as disease is anteriorly involving the vertebral body (paradiscal).
- Paravertebral muscle spasm resulting in stiffness in the affected region is a constant early finding. The spine is held rigid. When picking an object up from floor, there is flexion at hips and knees and the spine is in extension, (Coin test).
- Earliest sign in patient with neurological deficit—**Increased deep tendon reflexes** or clonus or extensor plantar response (twitching of muscles can be seen even earlier).

Radiological Image Features

- **The Earliest X-ray feature is loss of Curvature due to paravertebral spasm.**
- The next radiological feature of spinal tuberculosis is reduction of intervertebral disk space and osteoporosis of two adjacent vertebrae sometimes with fuzziness of the endplates.
- Paraspinal abscess appears as fusiform shadows along vertebral column.
- X-rays can show scalloping effect or aneurysmal appearance or saw tooth appearance due to erosions by abscess or aortic pulsations.
- **Prof Rajsekaran** has described radiographic signs of spine at risk.
- **MRI is one of the best radiological investigation for Pott's Spine (showing soft tissues, cartilage and marrow changes). Remember that radiological picture always lags behind the biological process which is already more progressive.**

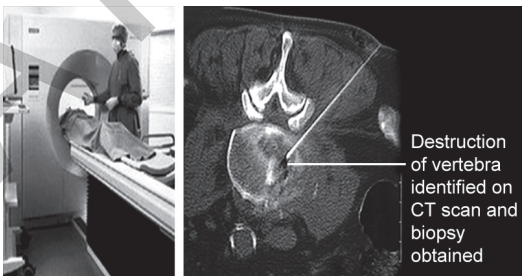


Fig. 3.4: CT guided biopsy

Note: TB usually involves vertebral body and malignancy usually involves posterior elements.

- Disk space collapse is typical of infection; disk preservation is typical of metastatic disease. Metastasis causes vertebral body collapse, but in contrast to TB, the disk space is usually preserved.

CT Guided biopsy through the transpedicular route is a good procedure to obtain tissue from the lesion as Gold standard is always growth of organism on culture medium by biopsy thus it will be more reliable than radiological investigations.

Culture of tuberculosis is by automated radiometric technique – **BACTEC method (Middle Brook media)** gives result in 3 weeks.

Stages of TB Spine with Neural Deficit

- **Stage 1:** Patient has no neural complaint clinician elicits increased reflexes.
- **Stage 2:** Patient has weakness but can walk with support.
- **Stage 3:** Patient is non-ambulatory or has sensory loss <50%.
- **Stage 4:** Patient has bowel/bladder involvement or sensory loss >50%.

Treatment of Pott's Spine

- **Middle path regimen is used in India**
- Patient is treated by antitubercular therapy (ATT), spinal brace and rest. Patient is followed on with complete neural examination and if progress is good then continued on non-operative management but if indications of surgery exist then he needs to be operated.

Stage-wise treatment of Pott's spine

- **Stage 1:** ATT + rest + monthly Neural Examination
- **Stage 2:** ATT + rest + weekly Neural Examination
- **Stage 3:** ATT + rest + daily Neural Examination
- **Stage 4: ATT + Decompression and bone grafting**

ATT: Rifampicin is always a part of all regimens. Minimum duration is 9–12 months in spinal TB and may be given up to 18–24 months depending upon clinical, radiological (MRI) and hematological (ESR) healing (in non-spinal TB the duration of ATT is 6 months–1 year).

Indications of surgery in any disease of spine (These are for all pathologies of spine—trauma, tumor, TB, disc prolapse)

- Bowel bladder involvement.
- Deterioration in neural or clinical status on treatment
- No improvement in neural or clinical status after conservative trial of 3–4 weeks or

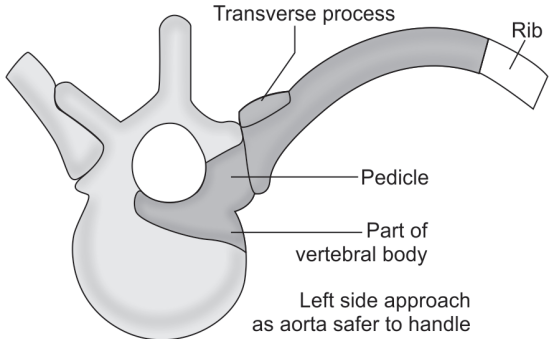


Fig. 3.5: Structures removed in anterolateral decompression

Surgical options for most of the cases are—anterior decompression + bone grafting or anterolateral decompression + bone grafting and both have similar success rates.

- Hong Kong operation is also carried out for Pott's spine.

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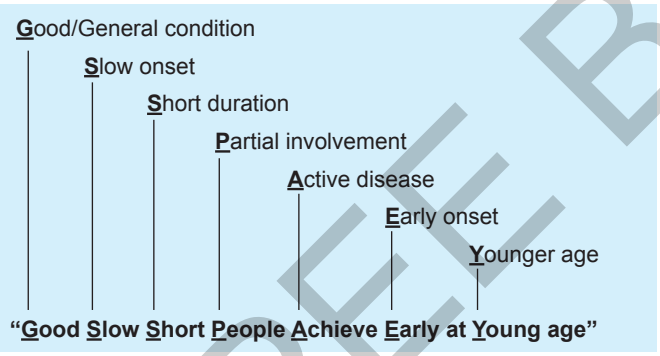
Structures removed in anterolateral decompression are part of rib, one side transverse process, one pedicle and small part of vertebral body (intercostal nerves are exposed).

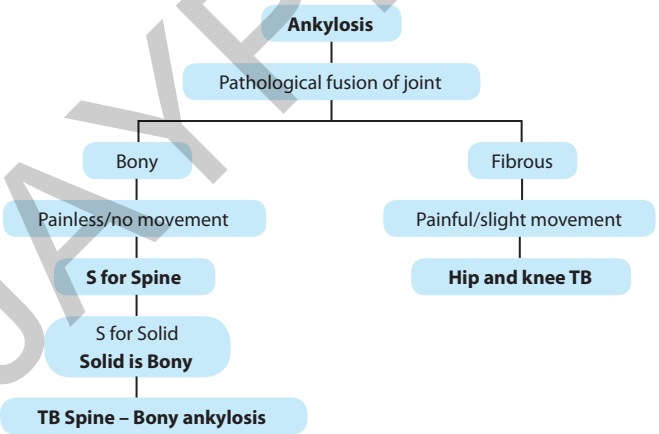
Posterior structures like lamina are never removed in tuberculosis because disease destroys anteriorly and if surgeon destroys posteriorly then there will be instability.

These surgeries are carried out in right lateral position (right side down and left side up) approaching the spine from left side as the vessel handled is aorta on left side which is thick muscular vessel with more resilience to handling pressure as compared to vena cava on right side which is friable to handle.

Prognostic Factor

Feature	Better prognosis	Poor prognosis
Degree of cord involvement	Partial	Complete (grade IV)
Duration of cord involvement	Shorter	Longer (>12 months)
Speed onset	Slow	Rapid
Type	Early onset	Late onset
Age	Younger	Older
General condition	Good	Poor
Vertebral disease	Active	Healed
Kyphotic deformity	<60 degree	>60 degree
Cord on MRI	Normal	Myelomalacia/syrinx (cord damaged)
Preoperative	Wet lesion	Dry lesion





Immunomodulation (Prof SM Tuli)

In case response to ATT is not on the expected ground and it is suspected that patient's immune system is not controlling the disease then immunomodulation is done to enhance the immune response. In immunomodulation the following sets of bacilli are attacked—dormant/resistant/persistent/slow grower/atypical m TB.

Drugs given are:

1. Levamisole
2. BCG
3. DPT

MULTIPLE CHOICE QUESTIONS

1. Good Prognostic Factors for TB spine are: *(PGI Nov 2018)*

A. Young B. Active
C. Early Onset Weakness D. Spinal Cord Changes
E. Rapid Onset

Ans. is 'A' Young; 'B' Active 'C' Early Onset Weakness

2. Which of the following is not true about the management of Pott's paraplegia? *(NEET Dec 2016)*

A. Chemotherapy is the mainstay of conservative management
B. Paraplegia not improving with conservative treatment even after 3–6 weeks is an indication for operative intervention
C. Decompression via anterolateral approach is most preferred
D. Posterior decompression and instrumentation can be used to correct the deformity

Ans. is 'D' Posterior decompression and instrumentation can be used to correct the deformity

3. True about spinal tuberculosis is/are: *(PGI May 2017)*

A. Middle path regimen is used in management
B. Cervical spine is most commonly affected
C. Commonly spread by hematogenous route from lung
D. Acute onset early paraplegia has good prognosis
E. Lower thoracic vertebra is most commonly involved

Ans. is 'A' Middle path regimen is used in management; 'C' Commonly spread by hematogenous route from lung; 'D' Acute onset early paraplegia has good prognosis; and 'E' Lower thoracic vertebra is most commonly involved

4. About TB spine choose the correct statement:

A. Most common in thoracic spine *(PGI Nov 2016)*
B. Long standing paraplegia carries poor prognosis
C. Has hematogenous spread
D. Middle path regime is used for treatment in our country
E. Involves posterior complex commonly

Ans. is 'A' Most common in thoracic spine; 'B' Long standing paraplegia carries poor prognosis; 'C' Has hematogenous spread; 'D' Middle path regime is used for treatment in our country

5. The earliest radiological sign in Pott's disease is:

A. Erosion of vertebral bodies *(APPG 2015)*
B. Collapse and destruction of vertebra
C. Narrowing of intervertebral disc space
D. Paraspinal soft tissue shadow

Ans. is 'C' Narrowing of intervertebral disc space

6. Most common site of TB: *(NEET 2015, 2012)*

A. Spine B. Knee
C. Hip D. Shoulder

Ans. is 'A' Spine

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7. All are true about Pott's spine except: *(PGI Nov 2014)*

A. Thoracic vertebrae T_6-T_8 is most commonly affected site
B. Paradiscal is commonest variety
C. Muscular rigidity and stiffness is common
D. Posterior part of vertebrae is more affected than anterior part
E. Back pain is the commonest presenting symptom

Ans. is 'A' Thoracic vertebrae T_6-T_8 is most commonly affected site (lower thoracic is most common T_9–T_{12}), and 'D' Posterior part of vertebrae is more affected than anterior part

8. A patient with tuberculosis of spine first neurological sign is: *(AIIMS May 2014)*

A. Motor loss B. Sensory loss
C. Increased deep tendon reflexes
D. Bladder involvement

Ans. is 'C' Increased deep tendon reflexes

9. Patient with D_7 D_8 Koch spine with paraplegia, treatment of choice: *(NEET Pattern 2013)*

A. ATT
B. Anterior decompression + ATT
C. Laminectomy
D. Posterior decompression

Ans. is 'B' Anterior decompression + ATT

– Since patient has paraplegia with Dorsal Kochs, Decompression will be performed.

10. Investigation of choice for spinal tuberculosis usually is: *(NEET Pattern 2013)*

A. X-ray B. CT-Scan
C. Open biopsy D. MRI

Ans. is 'D' MRI

11. What causes both destruction of bone and reduction of joint space? *(NEET Dec 2016, AIIMS Nov 2013)*

A. Tuberculosis B. Metastasis
C. Multiple myeloma D. Lymphoma

Ans. is 'A' Tuberculosis

TB in spine involves

– 2 Vertebra (Bone) + Disk (Cartilage)
– Paradiscal
– Anterior (to spinal cord)

Note: Involvement of posterior elements and single vertebra is relatively rare in TB.

12. Caries sicca is seen in: *(DNB, June 2017, NEET Pattern 2013; 2012) (Rohtak 96)*

A. Hip B. Shoulder
C. Knee D. None of the above

Ans. is 'B' Shoulder

13. Poor prognostic indicator of Pott's paraplegia: *(NEET Pattern 2013)*

A. Early onset B. Active disease
C. Healed disease D. Wet lesion

Ans. is 'C' Healed disease

14. All are true about spinal tuberculosis except:

A. Back pain earliest symptom *(NEET Pattern 2013)*
B. Dorsolumbar spine commonest site
C. Exaggerated lumbar lordosis
D. Secondary to lung infection

Ans. is 'C' Exaggerated lumbar lordosis

15. False about Pott's spine: *(NEET Pattern 2015, 2012)*

A. Commonest at dorsolumbar junction
B. Always heals by chemotherapy
C. Back pain is an early symptom
D. There is disk space narrowing on X-ray

Ans. is 'B' Always heals by chemotherapy

16. TB hand: *(NEET Pattern 2012)*

A. Spina ventosa B. Caries sicca
C. Pott's disease D. None

Ans. is 'A' Spina ventosa

17. Most common site of TB: *(NEET Pattern 2012)*

A. Spine B. Knee
C. Hip D. Shoulder

Ans. is 'A' Spine

18. Tuberculosis spine; most common site is: *(NEET Pattern 2012)*

A. Sacral B. Cervical
C. Dorsolumbar D. Lumbosacral

Ans. is 'C' Dorsolumbar

19. Anterolateral decompression is done for: *(NEET Pattern 2012)*

A. Spinal tuberculosis B. Chest TB
C. Hand TB D. Foot TB

Ans. is 'A' Spinal tuberculosis

20. Tuberculosis with polyarthritis is called as: *(NEET Pattern 2012)*

A. Poncet's disease B. Barton's disease
C. Von Gierke disease D. Gordon's disease

Ans. is 'A' Poncet's disease

21. Indication of steroids in Pott's spine: *(NEET Pattern 2012)*

A. Pain B. Deformity
C. Meningitis D. Fever

Ans. is 'C' Meningitis

22. Hong Kong's operation is done for? *(NEET Pattern 2012)*

A. Tuberculosis B. Leprosy
C. Septic arthritis D. Osteomyelitis

Ans. is 'A' Tuberculosis

23. Tuberculosis of spine best diagnostic modality is:

A. Clinical B. X-ray *(MAY AIIMS 2012)*
C. MRI D. CT guided biopsy

Ans. is 'D' CT guided biopsy

24. Tuberculosis in Bone Is due to: *(AIPG 2012)*

A. Paucibacillary and hematogenous
B. Multibacillary and hematogenous
C. Paucibacillary and lymphatic
D. Multibacillary and lymphatic

Ans. is 'A' Paucibacillary and hematogenous

25. A 35-year-old lady with chronic backache. On X-ray she had a D12 collapse. But intervertebral disk space is maintained. All are possible except: *(AIIMS Nov 2010)*

A. Multiple myeloma B. Osteoporosis
C. Metastasis D. Tuberculosis

Ans. is 'D' Tuberculosis

– *Characteristic radiological feature of Pott's spine is obliteration of disk space with destruction of two adjacent vertebrae.*
– This feature differentiate TB spine from other diseases causing vertebral destruction (like metastasis) in which disk space is preserved.

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26. Poor prognostic factors in Pott's paraplegia:
A. Acute onset of paraplegia *(PGI Dec 08, Dec 03, June 2K)*
B. Sudden progression of paraplegia
C. Motor paralysis alone
D. Longstanding paraplegia
E. Paraplegia in children

Ans. is 'A Acute onset of paraplegia; 'B' Sudden progression of paraplegia; 'D' Longstanding paraplegia

27. Earliest feature of spinal tuberculosis is: *(PGI June 2006-04-03, AIIMS May 1995, Orissa 1992, CUPGEE 99)*
A. Gibbus B. Muscle spasm
C. Pain D. Psoas abscess

Ans. is 'C' Pain

28. The most common sequelae of tuberculous spondylitis in an adolescent is: *(AI 2005)*
A. Fibrous ankylosis B. Bony-ankylosis
C. Pathological dislocation D. Chronic osteomyelitis

Ans. is 'B' Bony-ankylosis
– ***The usual outcome of healed tuberculosis in spine is the bony ankylosis and in peripheral joints like Hip and Knee Fibrous ankylosis is seen.***

29. Tuberculosis of the spine commonly affects all of the following parts of the vertebra except: *(AI 2004)*
A. Body B. Lamina
C. Spinous process D. Pedicle

Ans. is 'C' Spinous process
Least common is facet joints and 2nd least common is spinous process.

30. A 46-year-old, known alcoholic, presented with pain in the dorsal spine. On examination there is tenderness at the dorsolumbar junction. Radiograph shows destruction of the 12th dorsal vertebra and L1 vertebra with loss of disk space between D12 - L1 vertebra. The most probable diagnosis is: *(AIIMS Nov 2004)*
A. Metastatic spine disease B. Pott's spine
C. Missed trauma D. Multiple myeloma

Ans. is 'B' Pott's spine

31. In tuberculosis of spine, which one of the following is not a cause for Paraplegia? *(NIMS 2000)*
A. Stretching of spinal cord in gibbus deformity
B. Spinal artery compression
C. Compression by granulation tissue
D. Edema of spinal cord

Ans. is 'B' Spinal artery compression
– Early onset paresis is due to inflammatory edema, granulation tissue, an abscess, caseous material. It has good prognosis. Late onset paresis is due to increasing deformity or reactivation of disease, or bony sequestrum, stenosis of the vertebral canal, fibrosis or vascular insufficiency and has poor prognosis.

32. The 1st sign of TB is: *(NIMS 2K, CUPGEE 95 Bihar 88)*
A. Narrowing of intervertebral space
B. Rarefaction of vertebral bodies
C. Destruction of laminae
D. Fusion of spinous processes

Ans. is 'A' Narrowing of intervertebral space
– The earliest feature is loss of curvature due to paravertebral spasm.
– The next radiological feature of spinal tuberculosis is reduction of intervertebral disk space and osteoporosis of two adjacent vertebrae sometimes with fuzziness of the endplates.

33. Cold abscess in chest wall is most common due to:
A. TB spine B. TB rib *(AIIMS Dec 1998)*
C. TB pelvis D. TB pleura

Ans. is 'A' TB spine

34. Tuberculosis of the spine starts in: *(BHU 98)*
A. Vertebral body B. Nucleus pulposus
C. Annulus fibrosis D. Paravertebral fascia

Ans. is 'A' Vertebral body

35. The most common type of spinal tuberculosis is: *(BHU 98, Bihar 1988) (Kerala 88) (JIPMER 88)*
A. Anterior B. Posterior
C. Central D. Paradiscal

Ans. is 'D' Paradiscal
– The initial focus of tubercular infection usually begins in the cancellous bone of vertebral body near the disk (in most common paradiscal type)

35. Commonest site for tuberculous spondylitis is: *(AI 1998)*
A. T12/L1 B. C6-7
C. L4-5 D. S1-2

Ans. is 'A' T12/L1
– Order of involvement of Pott's spine is dorsal >lumbar> dorsolumbar junction

36. The most common cause of kyphosis in a male is: *(National Board 97)*
A. Congenital B. Tuberculosis
C. Trauma D. Secondaries

Ans. is 'B' Tuberculosis
– Tuberculosis is the most common cause of kyphosis in males. The deformity being maximum in dorsal spine > lumbar spine > cervical spine.

37. The commonest infective lesion of the spine in India is:
A. Pyogenic infection B. Fungal *(AIIMS 96)*
C. TB D. Typhoid

Ans. is 'C' TB
– One fifth of TB population is in India.
– Three percent are suffering from skeletal tuberculosis, of which spinal TB is the most common.

38. The ideal surgical treatment for Pott's paraplegia is: *(UPSC 1997, 88 Tamil Nadu 1994)*
A. Laminectomy and decompression
B. Anterior decompression and bone grafting
C. Anterolateral decompression
D. Costotransversectomy

Ans. is 'B' Anterior decompression and bone grafting
– Surgical options for most of the cases are—anterior decompression + bone grafting or anterolateral decompression + bone grafting are 2 procedures with similar success rates. Here option B is preferred because it also has bone grafting with it.

39. The most common cause of paraplegia of early onset of Tuberculosis of spine is: *(Karnataka 1992)*
A. Spinal artery thrombosis
B. Sudden collapse of vertebra
C. Sequestrum pressing on cord
D. Cold abscess pressing on the cord

Ans. is 'D' Cold abscess pressing on the cord

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– Early onset paresis is due to inflammatory edema, granulation tissue, an abscess, caseous material. It has good prognosis. Late onset paresis is due to increasing deformity or reactivation of disease, or bony sequestrum, stenosis of the vertebral canal, fibrosis or vascular insufficiency and has poor prognosis.

40. Surgical treatment in Pott's spine is indicated if there is: *(PGI 1991)*

A. Progressive loss of function in spite of medical treatment
B. No improvement in motor power in spite of 3 months of treatment
C. There is no improvement in fever in 3 months of treatment
D. Patient who is an adult or middle age

Ans. is 'A' Progressive loss of function in spite of medical treatment; and 'B' No improvement in motor power in spite of 3 months of treatment.

41. Short long bones of hand and foot are commonly infected by the following organism: *(Tamil Nadu 88, Bihar 88)*

A. Pyogenic
B. Tuberculous
C. Fungal
D. All of the above

Ans. is 'B' Tuberculous

– Spina ventosa is the name given to tuberculosis of the phalanges of hand.

42. In bony ankylosis, there is: *(UP 98)*

A. Painless, no movement
B. Painful complete movement
C. Painless complete movement
D. Painful incomplete movement

Ans. is 'A' Painless, no movement

43. A 25-year-old male complaints of pain in lower back region for three months. Has history of slipping of bathroom slippers. Mild weakness of both lower limbs but can walk without support. There is 30% sensory loss and has bladder symptoms. D12-L1 is tender. X-ray shows paradiscal destruction of vertebrae and MRI shows destruction with indentation of thecal sac. Management is:

A. Wait and watch
B. Domiciliary ATT
C. Admit and ATT
D. ATT and Decompression

Ans. is 'D' ATT and Decompression as bladder symptoms are present.

Indications of surgery in any disease of spine

– Deterioration in neural or clinical status on treatment
– No improvement in neural or clinical status after conservative trial of 3–4 weeks or
– Bowel bladder involvement

44. Anterolateral decompression (ALD) and anterior decompression (AD) for Pott's spine all are true except:

A. ALD and AD results are the same
B. ALD position of patient is right lateral
C. ALD laminectomy is always a part
D. ALD part of ribs is removed and spinal nerves exposed.

Ans. is 'C' ALD laminectomy is always a part

– Surgical options for most of the cases are anterior decompression + bone grafting or anterolateral decompression + bone grafting and both have similar success rates.
– Structures removed in Anterolateral decompression are part of rib, intercostal nerves, one side transverse process, one pedicle and small part of vertebral body.
– These surgeries are carried out in right lateral position (right side down and left side up) approaching the spine from left side as the vessel handled is aorta on left side which is thick muscular vessel with more resilience to handling pressure as compared to vena cava which is friable to handle
– Posterior structures like lamina are never removed because disease destroys anteriorly and if surgeon destroys posteriorly then there will be instability.

Table 3.1: Staging of tuberculosis of the joints and its outcome in general.

	Stages	Clinical	Radiology	Usual effective treatment	Expectation
I.	Synovitis (FABER) Apparent lengthening	Movements present >75%	Soft tissue swelling, osteoporosis	Chemotherapy and rarely synovectomy	Retention of near full, mobility
II.	Early arthritis (FADIR +<1 cm shortening)	Movements present 50–75%	In addition to I, moderate diminution of joint space and marginal erosions	Chemotherapy and rarely synovectomy or debridement	Restoration of 50–75% of mobility
III.	Advanced arthritis (FADIR +>1 cm shortening)	Loss of movements of >75% in all directions	In addition to II, marked diminution of joint space and destruction of joint surfaces	Chemotherapy and surgery. Generally arthrodesis,* arthroplasty/excision arthroplasty in lower limbs	Ankylosis
IV.	Advanced arthritis with subluxation/dislocation-wandering acetabulum/ pestle and mortar appearance	Loss of movements of >75% in all directions	In addition to III, joint is disorganized with subluxation/ dislocation	Chemotherapy and surgery. Generally arthrodesis* arthroplasty/excision arthroplasty in lower limbs	Ankylosis*
V.	Aftermath/terminal or gross arthritis	Gross deformity and ankylosis	In addition to IV, grossly deformed articular margins ± degenerative osteoarthrosis	Chemotherapy and surgery. Generally arthrodesis* arthroplasty/excision arthroplasty in lower limbs	Ankylosis*

* Arthrodesis: Surgical fusion of joint. Ankylosis: Pathological fusion of joint.

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TUBERCULOSIS OF HIP: INITIAL FOCUS IN ACETABULUM (MOST COMMON SITE) AND FEMUR (BABCOCK'S TRIANGLE)

- **Stage 1:** Stage of synovitis - **FABER** (Flexion, Abduction and External rotation). Lengthening.
- **Stage 2:** Stage of early arthritis - FADIR + <1 cm shortening (Flexion, Adduction and Internal rotation).
- **Stage 3:** Stage of advanced arthritis - FADIR +>1 cm shortening (Flexion, Adduction and Internal rotation).
- **Stage 4:** Stage of subluxation/dislocation—wandering acetabulum or pestle and mortar appearance.
- **Stage 5:** Stage of sequelae, ankylosis or severe arthritis.

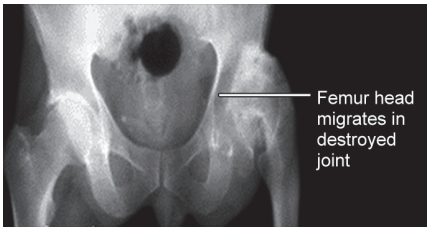


Fig. 3.6: Wandering acetabulum (actually wandering femur head)

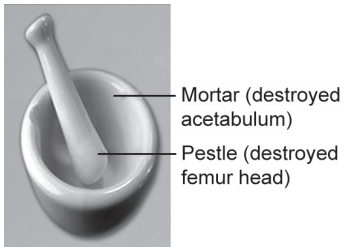


Fig. 3.7: Pestle and Mortar

Note: FABER at Hip seen in synovitis/infection/anterior dislocation/iliotibial band contracture (polio) FADIR at hip seen in arthritis/posterior dislocation

Treatment of Tuberculosis of Hip

A. **Remove: Excision arthroplasty of hip (problems of instability and shortening)**
   - Girdlestone excision arthroplasty. Head and neck of femur are removed.

B. **Fuse: Arthrodesis** causes increased damage to one joint above and one joint below

C. **Replace, e.g. total hip replacement**

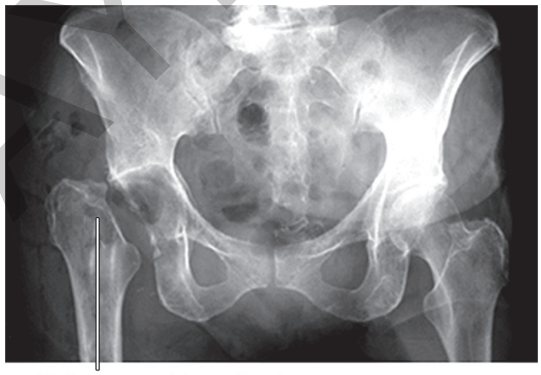


Fig. 3.8: Excision arthroplasty



Fig. 3.9: Arthrodesed hip joints (Cobra plate is used for hip arthrodesis)

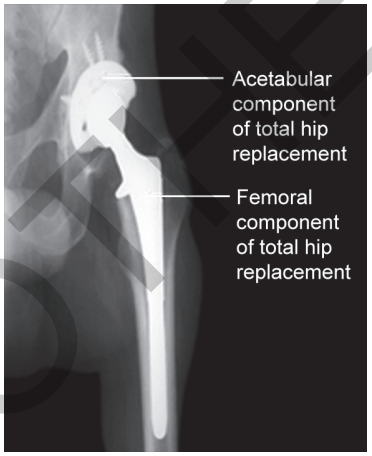


Fig. 3.10: Total hip replacement

Stage 1 and 2 ATT and traction and if required joint debridement or synovectomy.

Stage 3, 4 and 5 ATT and joint replacement/arthrodesis/osteotomy/excision arthroplasty.

MULTIPLE CHOICE QUESTIONS

1. First radiological sign for active tubercular arthritis is: *(NEET DEC 2016)*

A. Localized osteoporosis B. Sclerosis
C. Joint space reduction D. Osteophytes

Ans. is 'A' Localized osteoporosis

2. Deformity of hip joint in case of tubercular synovitis of hip joint is: *(NEET 2015)*

A. Flexion abduction external rotation
B. Flexion adduction external rotation
C. Flexion abduction internal rotation
D. Flexion adduction internal rotation

Ans. is 'A' Flexion abduction external rotation

3. Wandering acetabulum is seen in: *(JIPMER 2014)*

A. Fracture of acetabulum B. Hip dislocation
C. Rheumatoid arthritis D. TB of hip

Ans. 'D' TB of hip

- Wandering acetabulum is seen in tuberculosis of hip, stage 4 when destroyed head dislocates from the acetabulum.

4. Apparent lengthening of limb is seen in which TB hip stage of? *(NEET Pattern 2013)*

A. 1 B. 2
C. 3 D. 4

Ans. is 'A' 1

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5. Girdlestone arthroplasty is carried out for: *(NEET Pattern 2012)*

A. Chronic elbow infections B. Acute elbow infections
C. Chronic hip infections D. Acute hip infections

Ans. is 'C' Chronic hip infections

6. TB Sicca involves: *(NEET Pattern 2012)*

A. Shoulder B. Elbow
C. Hip D. Knee

Ans. is 'A' Shoulder

7. A 30-year-old male HIV positive on antiretroviral therapy has pain in right hip region. Flexion, abduction and external rotation deformity of right hip for 2 months, what is the most likely diagnosis? *(AIPG-2008)*

A. Avascular necrosis B. TB hip
C. Transient synovitis D. Septic arthritis

Ans. is 'B' TB Hip

	TB hip in HIV	AVN hip in HIV
Incidence	More Common	Less Common
Deformity	FABER-stage of synovitis may be prolonged on treatment, then subsequently with onset of arthritis – FADIR	Limitation of abduction and internal rotation so initially position is adduction and external rotation (opposite to movements limited) and than subsequently with onset of arthritis FADIR
	Unilateral (usually)	Bilateral (usually)

TUBERCULOSIS OF KNEE: INITIAL FOCUS IS IN SYNOVIUM!

- Tubercular arthritis is insidious in onset and often monoarticular in involvement. It **is the most common cause of monoarticular arthritis in children.**
- Tubercular arthritis is a **synovial disease**, so peripheral destruction of joint occurs earlier than the central part and movements are lost gradually.
- At times with tubercular arthritis both sides of joint are involved and two foci of tuberculosis will be directly opposite each other **(kissing arthritis).**
- Affected joint will be stiff and soon the night cries develop, because irritation from the process is low grade, muscle spasm protects the part quite satisfactorily during the day, but when the child is asleep, the protective action of muscle is lost and on motion pain is produced.
- **Synovial fluid shows elevated (TLC) lowered sugar level and poor mucin.**
- Tuberculosis of the knee is the classical cause of triple deformity, which includes ***posterior subluxation of tibia, external (lateral) rotation of tibia and flexion of knee (PERF).***
- It can be treated by ATT and joint replacement/arthrodesis (Charnley's method). **Wilkinson joint debridement procedure** is done for tuberculosis of knee early stages.

Tuberculosis
Rheumatoid arthritis
Iliotibial band contracture
Polio
Low clotting power
Excess bleeding (hemophilia)
TRIPLE deformity of knee

Note: Triple deformity can also be seen in rheumatoid arthritis, Iliotibial band contracture, poliomyelitis and hemophilic arthropathy.

MULTIPLE CHOICE QUESTIONS

1. Triple deformity true statements are: *(PGI Nov 2018)*

A. TB Knee
B. Post subluxation of tibia, External rotation of Leg, Flexion of knee
C. Post subluxation of femur, External rotation of Leg, Flexion of knee
D. Post subluxation of tibia, External rotation of Leg, Extension of knee
E. Iliotibial tract is important for mechanism

Ans. is 'A' TB Knee; 'B' Post subluxation of tibia, External rotation of Leg, Flexion of knee; & 'E' Iliotibial tract is important for mechanism

2. A 20-year-old male presents with history of gradual onset pain and swelling in left knee since 6 months. Now since last 1 month patient has started limping while walking and also has flexion deformity of knee. Ultrasonography shows presence of synovial thickening. What is the most probable diagnosis? *(NEET DEC 2016)*

A. Tuberculosis of knee
B. Pigmented villonodular synovitis
C. Synovial sarcoma D. Hemarthrosis

Ans. is 'A' Tuberculosis of knee

3. Which of the following is a feature of triple deformity of the knee joint? *(CET July 16)*

A. Posterior subluxation of tibia
B. Internal rotation of tibia
C. Medial angulation of tibia
D. Recurvatum

Ans. is 'A' Posterior subluxation of tibia

4. Complication of joint TB: *(NEET Pattern 2012)*

A. Fibrous ankylosis B. Bony ankylosis
C. Normal healing D. None

Ans. is 'A' Fibrous ankylosis

5. Treatment of triple deformity is: *(AMU 95)*

A. ATT B. ATT + Immobilization
C. ATT + Immobilization + Debridement
D. ATT + Replacement

Ans. is 'D' ATT + Replacement
– Treatment of triple deformity is replacement/arthrodesis

6. Triple deformity of knee is classically seen in: *(AIIMS Dec 1994)*

A. Fracture patella B. Tuberculosis
C. Rheumatic arthritis D. Rheumatoid arthritis

Ans. is 'B' Tuberculosis

7. The most common cause of monoarthritis in children is: *(Andhra 1989)*

A. Septic arthritis B. Tuberculous arthritis
C. Osteoarthritis D. Rheumatoid arthritis
E. Any of the above

Ans. is 'B' Tuberculous arthritis

Tubercular arthritis is insidious in onset and often monoarticular in involvement. It is the most common cause of monoarticular arthritis in children.

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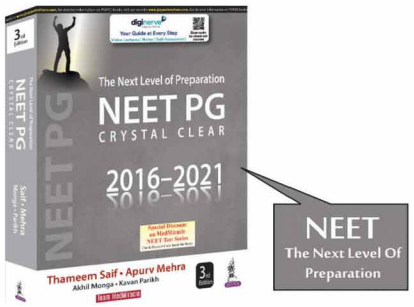


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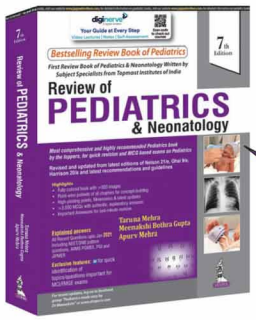
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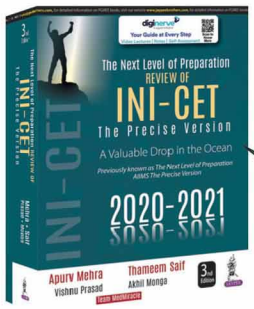
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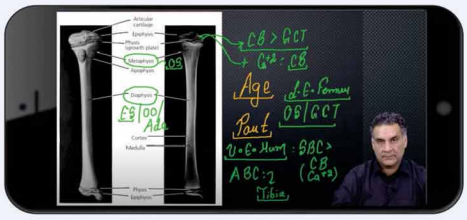
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