Deformities

- Part of limb distal to joint deviate to medial side → VARUS
- Part of limb distal to joint deviate to lateral side → VALGUS

CUBITUS VARUS

- In malunited Supracondylar fracture of Humerus
- BAUMAN'S ANGLE : Angle to be observed after fixation

  Normal Angle : 64°- 81°

  > 81° → Patient will have varus deformity

CUBITUS VALGUS

- In Non-union of Lateral condyle of Humerus (Fracture of Necessity)

GENU VARUS

- Causes : Rickets / Osteoarthritis (Medial Compartment OA)
- Normal Physiological deformity in newborn (1-2 months maximum)

GENU VALGUS

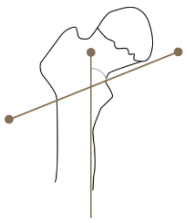
- Causes : Rickets / Osteoarthritis (Lateral Compartment OA)
  - Maximum Valgus : 3½ - 4yrs
  - Normal Valgus : 7½ - 8yr → 6°-8° Valgus

HALLUX VARUS : Medial deviation of Great toe

HALLUX VALGUS : Lateral deviation of Great toe

COXA VARA

- Neck Shaft Angle (NSA)
  - Normal : 120-135° (125°)
  - Coxa vara :
    - ↓ NSA
    - Causes :
      - Neck of femur fracture
      - Shepherd crook deformity (FD)
      - Rickets
  - Coxa Valgus :
    - ↑ NSA
    - Causes :
      - Garden's Type I # NOF (incomplete valgus impacted #)



TREATMENT

- Flexible Deformity → Tractions/Splints
- Fixed Deformity → Surgery by Osteotomy

Active Space

Metabolic Disorders

Active Space

Cells
↓
↑ Osteoclast → Paget's disease
Defective osteoclast → Osteopetrosis

Protein
↓
Genetic → Osteogenesis imperfecta
Nutritional → Scurvy

Minerals
↓
- Rickets → Child
- Osteomalacia → Adult

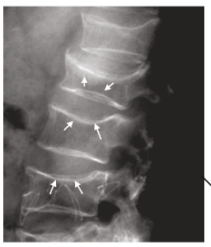
Diagnosis : S. Minerals ↓

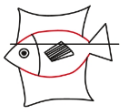
Osteoporosis: Proportionate decrease in all components of bone
Serum mineralisation → Normal

OSTEOPOROSIS

04:13

- Old age with pain (female > male)
- MC Site : Vertebrae (Lumbar) > Neck of femur > Distal Radius
- Minimal Trauma leading to pain → Compression # or impacted #





Biconcave Vertebrae

COD Fish

- TRAUMATIC PRSENTATION → Compression # / Localised #
- NON-TRAUMATIC PRESENTATION → Compression all along vertebra
  ↓
  Cod fish vertebra

SINGH INDEX

- Medial side of bone → Known as Compressive side
- Lateral side of bone → Known as Tensile side
- All the 5 group of trabeculae → Bone is healthy
  - 1° & 2° Compressive Trabeculae
  - 1° & 2° Tensile Trabeculae
  - Tensile Trabeculae on Greater Trochanter

Active Space

DIAGNOSIS

- S.Mineral : Normal
- Gold Standard DEXA SCAN
  - Done on every female >60 yrs of age and Male > 70 years of age
  - Evaluated as T score – It's a comparison of SD of my patient to a healthy, young individual of same gender

→ > -1 → Normal
→ -1 to -2.5 → Osteopenia
→ < -2.5 → Osteoporosis

TREATMENT

A) Decreased Resorption
   I) Bisphosphonate (for 1½ - 2yrs)
   II) Calcitonin (Nasal Spray)
   III) Estrogen
   IV) SERM
B) Promote Formation
   I) Teriparatide : Synthetic PTH
   II) Calcium : Dose 1200-1300mg/day
   III) Calcitriol
C) Strontium Ranelate – DUAL ACTION
D) Danosumab : Blocks RANK Ligand

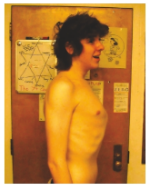
DISEASE AFFECTING MINERALS

13:15

RICKETS (Child) — OSTEOMALACIA (Adults/Adolescents)

RICKETS (Child)
- Bowing of Legs — GENU VARUM
- Knock Knee — GENU VALGUM

CHEST FEATURES



PECTUS CARINATUS

Rachitic Rosary

Harrison Sulcus

d/t Attachment of diaphragm

- Beaded appearance at Costochondral junction
- Painless

X RAY

- FRAYING & SPLAYING of metaphysic
  Wind Swept of Leg → RICKETS
  Wind Swept of Toe → R.A
- Bowing of Leg

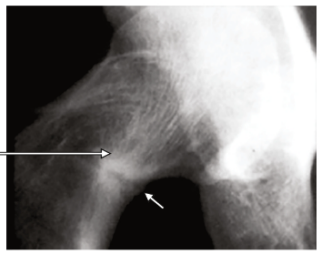
TREATMENT

- Supplementation of Minerals and Mermaid Splint
- Monitoring →
  - Appearance of White line on X Ray
    takes 1-1½ month
  - ALP levels goes down
    takes 1-1½ years to go back normal

OSTEOMALACIA

19:16

- Pain at LOOSER'S ZONES
- Presents with Pseudofractures/Milkman's line
  - Pubic Rami
  - NOF
  - Olecranon
  - Ribs
  - Lateral margin of scapula (Below glenoid)
- Osteopelvis/Protrusio is seen



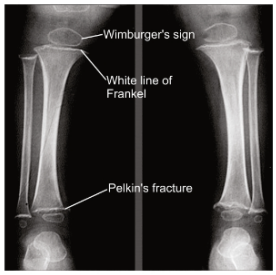
OTTO PELVIS/PROTROSIO ACTABULI

Active Space

SCURVY

21:22

- MC Presentation : bleeding Gum
- Costochondral Prominences – Scorbustic Rosary
  - Sharp
  - Tender



X RAY

- Lack of collagen → Matrix appears back
  ↓
  OSTEOPENIA
- Once internal part of bone is black
- Lateral Projection at Metaphyseal End
  ↓
  PELKIN'S SPUR/FRACTURE

Rx :- Vitamin C Supplementation

- Margin becomes shiny
  ↓
  PENCIL TIP CORTEX
- Shining of Epiphysis
  ↓
  WIMBERGER SIGN
- Shining of Metaphyseal End
  ↓
  WHITE LINE OF FRANKEL
  (d/t failure of resorption of calcified matrix)

OSTEOGENESIS IMPERFECTA

23:43

- Increased tendency for fracture, Blue Sclera
- Recurrent fracture, most commonly of femur
  Fracture healing → Normal
- Genetic problems in Type I collagen (Skeletal Dysplasia)
- Treatment of Bowing of leg → SEEKH KABAB OSTEOTOMY or SOEFIELD MILLER PROCEDURE
- Increase ALP & Sr. mineralization → Normal

PAGET'S DISEASE

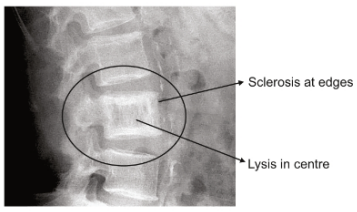
25:56

- Disorder of high bone turnover
- Age > 55years
- Increased osteoclastic activity → increased osteoblastic activity
- M.C involved bone : PELVIS > TIBIA
- In skull → Osteoporosis Circumscripta (Resorption)
  ⇓ compensated
  Cotton Wool Skull
- In vertebra → Picture frame vertebra / Ivory vertebra

Active Space

COMPLICATION

i. Pathological #
ii. Osteosarcoma (<1%)
iii. Cranial Nerve Palsy → II, V, VII, VIII



Ivory Vertebra


Banana Fracture

- Both markers are elevated

OSTEOPETROSIS

29:03

- a.k.a Marble Bone Disease
- ↑Osteoclast, but not working } Marrow is white
- Osteoblast Normal
- Cause inhibit 1° Hematopoesis →Anemia/Pancytopenia
- Both markers are elevated
- In vertebrae - Rugger Jersey Spine

	CALCIUM	PHOSPHATE	ALP	PTH
OSTEOPOROSIS	N	N	N	N
RICKETS	N or ↓	N or ↓	↑	↑
1° HYPER PTH	↑	↓	↑	↑
PAGETS	N	N	↑	N
OSTEOGENESIS IMPERFECTA	N	N	↑	N
OSTEOPETROSIS	N	N	↑	N

CAUSES OF INCREASE IN BONE DENSITY

30:12

In Child
- Caffey Disease
- Osteopetrosis
- Hypervitaminosis A & B
- Osteopoikilosis

In Adult
- AVN
- Paget's
- Flurosis (Dental mottling, Endemic in Bihar) (F^- > 10ppm)
- Myelosclerosis
- Mets
- Renal Osteodystrophy
- Idiopathic skeletal hyperostosis

Active Space

Rugger Jersey Spine

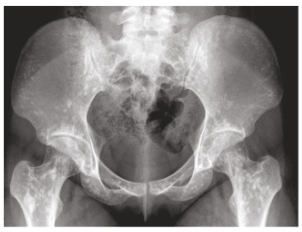
- Causes : 1. Brown's Tumour
  2. Renal Osteodystrophy
  3. Osteopetrosis

Caffey Disease

- Congenital Cortical Hyperosteosis
- Self limiting disease

Osteopoikilosis

- Bone in already formed bone



Osteopoikilosis

Active Space

Trauma Basics and Upper Limb

OPEN FRACTURE

00:10

Active Space

Classification - Gustilo Anderson Classification

I → < 1cm, Clean wound – Mx: Treat like open wound, clean with 3L of fluid

II → > 1cm, Without extensive soft tissue laceration – Clean with 6L of fluid

III → Extensive soft tissue injury – Clean with atleast 9L of fluid

a) Segmental/Communated #

b) Periosteum damaged & Bone outside skin

c) Vascular injury needing surgical repair

GCS (A) – Airway with cervical spine immobilization, (B) Breathing, (C) Circulation, (D) Deformity

- Always take better score

Feature	Response	Score
Best eye response	Open spontaneously	4
	Open to verbal command	3
	Open to pain	2
	No eye opening	1
Best verbal response	Orientated	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No verbal response	1
Best motor response	Obeys commands	6
	Localising pain	5
	Withdrawal from pain	4
	Flexion to pain	3
	Extension to pain	2
Total score = 15	No motor response	1

GREEN STICK FRACTURES

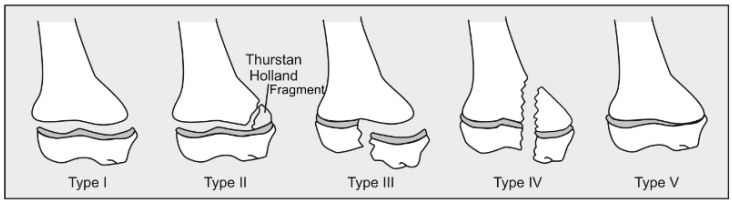
04:25

- Incomplete Transverse # + Periosteum intact
- In children → TORUS # : Buckling of cortex

PHYSIS INJURY

05:22

Salter & Harris Classification



S	A	L	T	ER – Worst prognosis
Injury to physis	Phy + Meta	Layer below physis	Total Injury	Crush

SHOULDER AREA

08:42

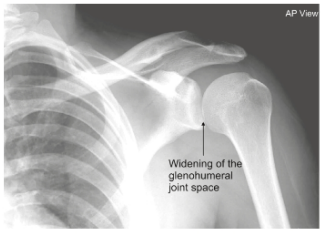
Anterior dislocation of Shoulder

- Abduction + ER
- Contour lost
- Acromion – Lateral most projection
- Hamilton Ruler Test : Scale touching both acromion & lateral epicondyle
- Dugas Test : Patient can't touch opposite shoulder
- Reduction by :
  - COCKER'S METHOD (MC)
    Traction, ER, Adduction, Medial Rotation [TEAM]
  - Stimson's Gravity
  - Hippocratic Manoeuvre

Posterior dislocation of shoulder

- Adduction & IR
- Usually happens when patient is not in alert state of mind – Epilepsy & Electric Shock
- Contour is Normal

Electric Bulb Sign



Empty Glenoid Sign

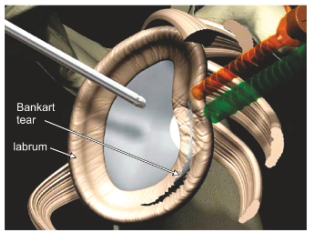
Complication

- MC Acute complication : Axillary Nerve #
  - Motor
  - Sensory
- Deltoid : Difficulty in abduction 15–90° Regimental Badge Sign
- Teres minor : Weakness in ER

Active Space

Active Space

- MC Complication : Recurrence (M.C Anterior dislocation)
- Lesions due to recurrent shoulder dislocation



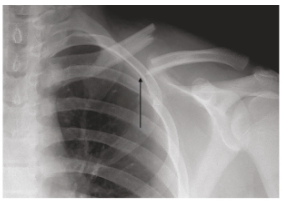
Bankart's Lesion

Hillsach` Lesion

CLAVICLE

17:35

- M/C bone to be fractured in new born
- Medial segment is displaced up due to pull of **Sterno – Cleido – Mastoid**
- Lateral segment is displaced down due to weight of arm
- M/C complication → Malunion
- T/t – Figure of 8/triangular sling
- Subclavian vessel compromise/Thoracic outlet syndrome is checked by Roos test/Adsen test



PROXIMAL HUMERUS

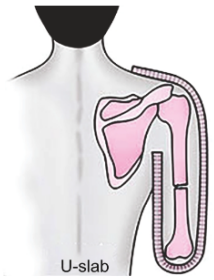
20:00

- Nerve Injury → Axillary nerve

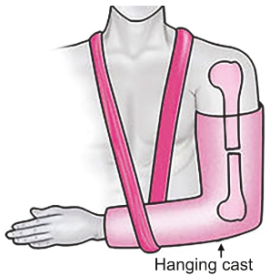
SHAFT OF HUMERUS

20:16

- Radial Nerve Injury →
  - Wrist drop
  - Finger drop
  - Loss of sensation of dorsum of hand
- Conservative management
- Holstein-Lewis fracture
- U-slab, Hanging cast



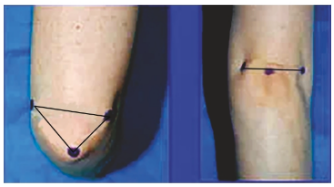
U-slab



Hanging cast

3 POINT BONY RELATIONSHIP

- Medial Epicondyle, Lateral Epicondyle
  Olecranon
- When elbow is → Flexed → Triangle
  → Extended → Straight line
- Triangle is disturbed in → # of lateral
  - → Epicondyle
  - → # of medial epicondyle
  - # of olecranon
  - → Intra-condylar #
- Triangle is reversed in → Posterior dislocation of elbow
  (Olecranon is pulled by triceps)
- Triangle is intact in Supracondylar # of Humerus → **Gunstock deformity (Varus)**

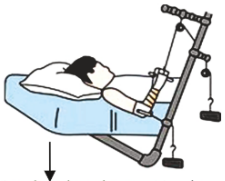


SUPRACONDYLAR HUMERUS

27:20

- Can be flexion type or extension type
  - ↓ Distal part lies in front
  - → ↓ Distal part lies in back (98% cases)
- Gartland's Classification →

  Type - I → Undisplaced < 2mm transplantation
  → Managed conservatively
  Type - II → Partially displaced > 2mm
  → Closed reduction & fixation or conservative
  Type III → Displaced, Unstable
  → Needs open reduction & fixation

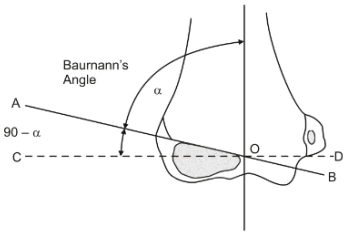


- Dunlop traction - Used in old days

Active Space

Active Space

BAUMANN'S ANGLE



- To assess proper reduction after fracture
- Normal angle → 64-81 degrees
- > 81° varus

COMPLICATIONS

- Nerve : Anterior Interosseous Nerve
  - → Flex the thumb
  - → Flex FDP of Index finger

  } OKEY SIGN
- Branchial Artery #
- Compartment Syndrome
- VIC
- Myositis Ossificans
- M/c complication: Malunion (Gun stock Deformity)

FRACTURE OF LATERAL EPICONDYLE

33:10

- Salter Harris Type II > IV
- Fracture of Necessity
- Non fixation →Non Union

↓

Progressive cubitus vulgus

↓

Tardy Ulnar Nerve Palsy

Fish Tail Deformity

d/t Underdeveloped Trochlea/Necrotic Trochlea

PULLED ELBOW / NURSE MAID'S ELBOW

35:10

- Children
- Elbow pulled at elbow extended & forearm pronated
- Radial head subluxation from annular ligament
- Age group → 2-5yr
- T/t → Flex elbow & Sulpinate forearm
- 3 print bong relationship - Intact

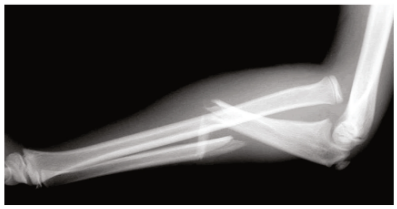
ELBOW DISLOCATION

35:45

- Posterior dislocation
  - 3 point relation reversed
- Hotchkiss Terible Triad
  Elbow dislocation in conjunction with fractures of radial heads & coronoid

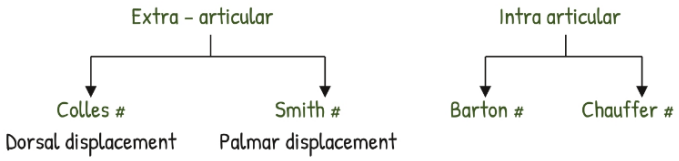
FOREARM

36:55

Monteggia fracture	Galeazzi Fracture
• Fracture of proximal ulna + Dislocation of radial head • Radial head hits PINS → Causing finger drop 	• # Distal 1/3 radius + Sublaxation of distal ulna • Reverse monteggia 

WRIST (Radiocarpal Joint)

38:10



Colles #

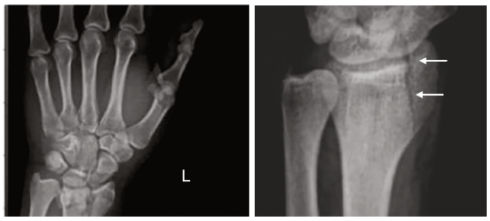
- Lateral displacement & tilt of distal fragment
- Impaction
- Dorsal displacement → Dinner fork deformity
- Supination
- Management → Give traction & maintain length
  ↓
  Plaster in Palmar flexion & Ulnar deviation — Shake Hand Plaster

  M/c complication - Joint stiffness

Active Space

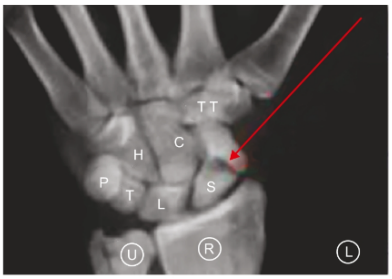
Active Space

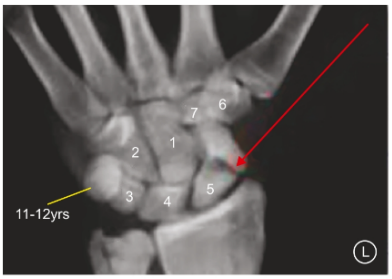
Garden spade deformity → Smith #
Chauffer → Fracture of radial styloid



Barton Chauffeur

CARPAL INJURIES 43:35





Scaphoid & Triquetral → M.C Carpal bone to injury
↓
M.C Site for fracture = Middle Pole
Proximal Pole goes for Avascular Necrosis
C/F : Tenderness in Anatomical Snuff box
Glass holding / Tumbler holding position - Plaster
M.C complication : Non Union > Avascular Necrosis (IOC - MRI)
M.C Carpal to show dislocation → LUNATE

- Terry Thomas Sign
- Peri lunate dislocation →Lunate in position
- Other Carpals dislocate

Kein back's Diesease - Osteochondritis of lunate

METACARPAL 51:33

1st METACARPAL

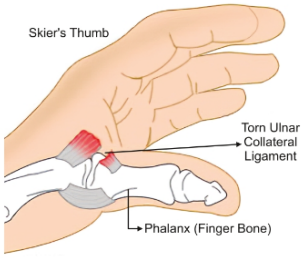
Bennet # : APL displacement
Management : κ wire
Rolando # : Commutated # → Osteoarthritis

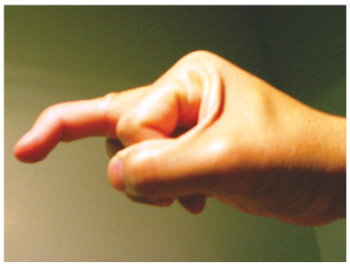
5th METACARPAL

Neck # →BOXER'S FRACTURE
Base of 5th M.C # →Reverse Bennet

LIGAMENT

Skier's Thumb/Gamekeepers Thumb : # to Ulnar collateral ligament of thumb
Mallet Finger
Jersey Finger : # FDP





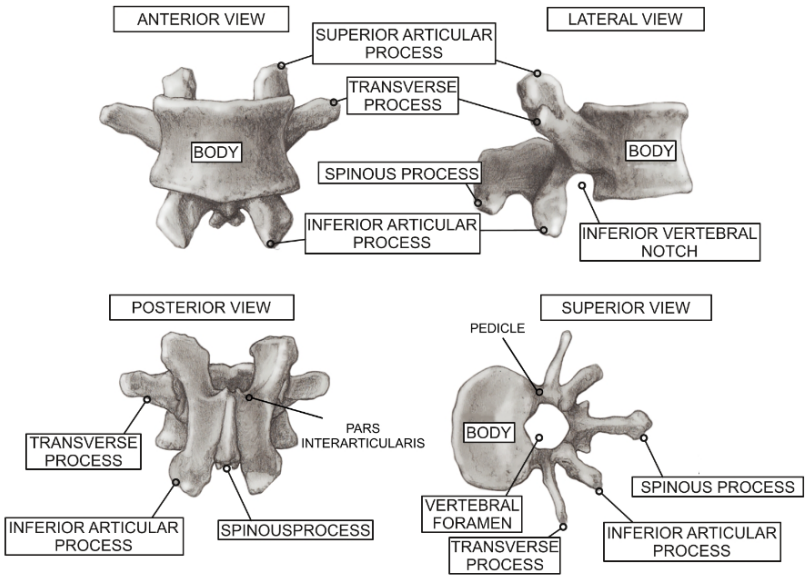
Mallet Finger

Jersey Finger

Active Space

Spine

Active Space



C1 VERTEBRA (ATLAS) 01:00

Occiput
↓ ← Flexion & Extension
C1 → # Jafferson #
↓ ← Lateral Rotation
C2

HANGMAN # 01:45

- Spondylolisthesis of C2 vertebra over C3
- M.C seen in RTA > Hanging

WHIPLASH INJURY / SPRAINED NECK 02:55

- Neck is hyperextended and flexed

CLAY SHOVELERS

03:52

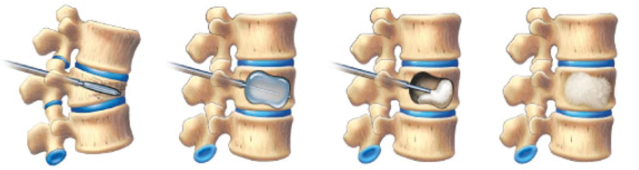
- Avulsion of Spinous Process
- Most commonly C7 > T1

CHANCE

04:00

- aka Seat belt Injury
- Compression over vertebral bodies
  ↓
  Distraction forces passes through in it

Vertebroplasty



Balloon inserted into fractured vertebra | Balloon inflated inside damaged vertebra | Special material injected into fractured vertebra | Special material hardens, stabilizing vertebra

The cement we use PMMA
↓
Poly Methyl Methacrylate

SPONDYLOLISTHESIS

05:20

- Usually involve L4 – L5/ L5 – S1
- Spondylolysis → Break in Pars Inter Articularis
  Scotty dog appearance / Beheaded dog appearance
  Lysis is seen best in Oblique view
- Lysthesis is best seen in Lateral view
- In AP view →Lysthesis → Inverted Napolean Hat Sign
- C/F : Backache ± Radiculopathy

Active Space

Disc Prolapse L4 – L5/L5 –S1

- Types : CENTRAL ⟶ Compression of Spinal Cord/ Corda Equina
  PARACENTRAL (MC) → Compression of travelling root
  LATERAL ⟶ Compression of existing root

Scoliosis

- Lateral Bending of Spine + Rotation of vertebra
- Causes : M.C.C – Congenital – When the bone is not completely formed
  Idiopathic
- Cobb's Angle is used
- Management :
  - Adult → Rissers Cast/Boston's Cast
  - Children → Milwakee Cast
  - Screws used are Pedicle Screw Fixation
  - To relieve the nerve → Laminectomy / Laminotomy

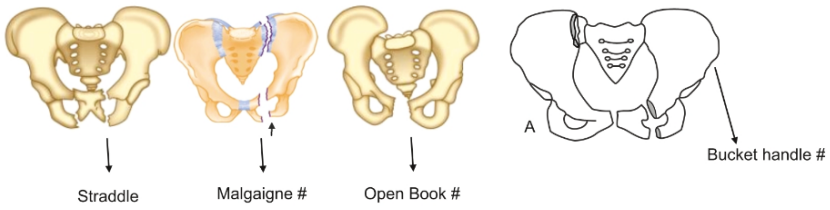
Active Space

Lower Limb

Active Space

PELVIS

00:10



- Max blood loss → 1.5 to 2 L loss

DISLOCATION OF HIP

- MC : Posterior dislocation
  - Mechanism : Dash board injury
  - Attitude : Anterior dislocation : Abduction & ER
    Posterior dislocation : Adduction & IR
    Central dislocation : Adduction / Neutral

	Anterior dislocation	Posterior dislocation	Central dislocation
1. Attitude 2. Head of Femur 3. Injury	ABD + ER Groin # Femoral Vessel	ADD + IR Gluteal Region Sciatic Nv # (Foot drop)	ADD / Neutral On P/R Examination Urethral Injury

- Vascular Sign of Narath : Inability to feel the femoral pulsation
  In Post dislocation of Hip joint

FRACTURE AROUND HIP

Intracapsular (Complication - AVN)
↓
Subcapital
Transcervical
↓
< 45° Rotation
< 1 inch Shortening

NOF

Extracapsular (Complication - Malunion)
↓
Basic cervical
IT
↓
> 45° Rotation
> 1 inch Shortening
↓
Lateral margin of foot touching ground

NOF

- Classification :
  - A. Anatomical Classification
  - B. Pauwel's Classification : > Angle is s/o unstable #
  - C. Garden's Classification : Alignment of Trabeculae
    - I) Incomplete ; Valgus impacted # Trabeculae not aligned
    - II) Complete ; Undisplaced # Trabeculae are aligned

TREATMENT :

Age of Patient

- < 65yrs → Preserve Original Head
  - Early presentation (No AVN) → FIXATION
    - i. If subcapital/Trans Cx → CC screw – CRIF
    - ii. If Basicervical → Pediatrics DHS
  - Late Presentation → Mayer's Pedicle graft
    Muscle used : Quadratus Femoris
- > 65yrs → Replacement Surgery
  - → Hemiarthroplasty
  - → If pre existing arthritis → THR

COMPLICATION

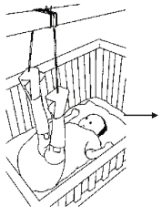
- MCC: AVN > Non Union

FRACTURE OF IT & SHAFT OF FEMOR

20:07

- # IT → Dynamic Hip screw / Femoral Nail
- # Shaft of femur → Intramedullary Nail
- Treatment according to age
  - 0-6 months : Pavlik Harness
  - 6 months-5 yrs : Immediate Spica
  - 5-10 years : Elastic IM Nailing (TENS Nail)
  - > 10 years : Locked IM Nailing

- Gallows Traction (Briant's Traction) in child < 2 years
  < 15-18 years of age



Gallows Traction

Active Space

- # Patella → Undisplaced : Cylindrical cast
  2 Part # : Tension Band Wiring

Chondromalacia of Patella : Theater sign/Cinema Hall Sign

Active Space

ANKLE 23:34

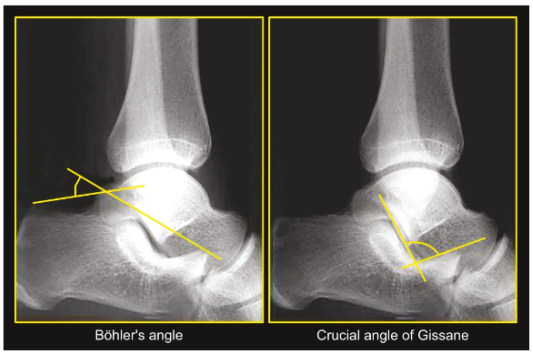
Eponyms

- Potts's # : Bimellolar #
- Cotton # : Trimalleolar #
- Pilon # : Intra - articular
- Masonneuve : # Around ankle with injury around knee area involving prox fibula
  (# Common Peroneal Nerve → Foot drop)
- Aviator's # : # Neck of Talus
- Snow board # : Lateral process of Talus involved
- Shepherd # : Posterior process of Talus involved
- # TALUS → MC Complication : Arthritis > AVN
- Hawkin Sign - Vascular Talus

FRACTURE OF CALCANEUM

- M.C Tarsal to get fractured
- Bohler's Angle → 20-40° → ↓ in intra-articular #
- Gissane Angle → 100-120° → ↓ in intra-articular #

Indications for surgery



- Lisfrank # → Tarsometatarsal #
- Chopart # → Inter tarsal area
- March # → Stress #
  - 2nd Metatarsal
  - Tibia → IOC : MRI


Jone's Fracture

SPORTS # : KNEE/ANKLE

- Cruciates : Ant & Post draw test → Done in 90° flexion
  Lauchman test → Done in 20° flexion
  } MRI / Arthroscopy ↓ T/t : Reconstruction from Hamstrings/Semitendinosus

Collaterals : MCL (M.C to Fracture)

Menisci :
- Recurrent painful locking of knee
- M.C pattern of tear : Vertical
- M.C Muray's Test
  Apley's Grinding Test
- Treatment : Excision of injured fragment

LIGAMENTS OF ANKLE

- Medial Side (Deltoid) → Tibio Talar Ligament
  Tibio Calcanear Ligament
  Tibio Navicular Ligament
- Lateral Side → Talofibular Ligament
  Calcaneofibular Ligament
- Fibrous capsule
- Plantar Calcaneo navicular/Spring Ligament → Maintains medial arch of foot
- Inversion of Ankle →
  - Fracture of 5th MT base – Jones
  - L – ATFL > Calcaneofibular
  - Avulsion of Lateral malleolus
  - Avulsion / Injury substentaculum tali
  - Peroneal tendon injury

MNEMINOC:
FLAAP

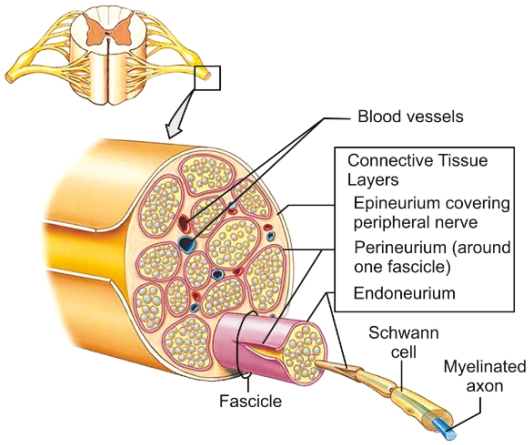
Active Space

Peripheral Nerve Injuries

Active Space

STRUCTURE OF NERVE

00:10



SEDDON CLASSIFICATION

- Neuropraxia → Temporary, Physiological → Splint support if needed
- Axonotemesis → Only axons injured, nerve continuity intact
- Neurotemesis → Axon + All sheaths injured, Always needs surgery

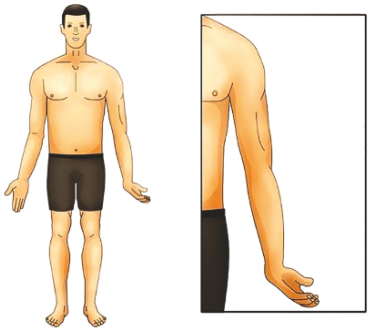
SUNDERLAND CLASSIFICATION

- Type - II & Type - III → Shows progressive Tinel's Sign
- Type IV & V → Shows progressive Tinel's Sign after grafting

ERB'S PALSY

02:43

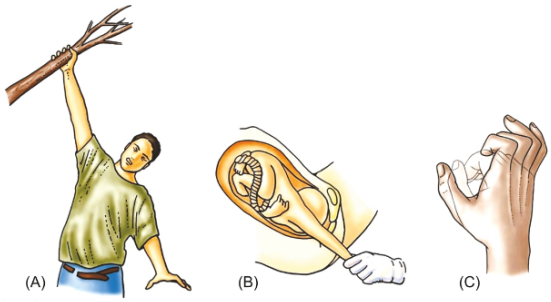
Erb's palsy / Erb Duchenne Palsy



- C5 - C6 injury

KLUMPKE'S PALSY

02:57



- Lower Root injury / C8-T1 #

NERVE

03:46

- Suprascapular Nerve → Supraspinatus → Initiation in Abduction
  Infraspinatus → Weakness in ER
- Long Thoracic Nerve → Winging of Scapula
- Axillary Nerve
- Musculocutaneous Nerve → Sensory : Upper lateral side of forearm
  Motor : Flexion of elbow
- Median Nerve → Pointing Index Sign
  Pen Test → Done for Abductor Pollicis Brevis
- Anterior Interosseous Nerve → Pinching Test as it supplies FDP & FPC
  OK Sign / Killon Nevie Sign
- Ulnar Nerve → For Adductor Pollicis → Book Test
  Failure → Froment Sign
  Produce Claw Hand → Sprint used : Knuckle Bender Splint
- Radial Nerve → # PIN - Injury to Radial Head - # Monteggia
  Wrist drop → Cock up Splint given

ENTRAPMENT NEUROPATHIES

09:31

Carpal Tunnel Syndrome

- Compression of median nerve under Flexor Retinaculum
- Most sensitive test : Durkan Test
- Phalen's Test
- Torniquet Test
- Tinel Sign

Active Space

Thoracic Outlet Syndrome

- Tests done : Adson Test
  Roos Test
- Subclavian vessel compression is tested here
- NOTE: Allen Test – test integrity of Palmar arch

		Nerve Involved
• Clavicle #	→	Subclavian Vessels/ Brachial Plexus
• Shoulder dislocation.	→	Axillary Nerve
• Neck of Humerus		
• Shaft of Humerus	→	Radial Nerve
• Supracondylar Humerus	→	AIN
• Medial Condylar Humerus	→	Ulnar Nerve
• Lateral Condylar Humerus	→	Tardy Ulnar Nerve

Monteggia #	→	PIN
Lunate dislocation	→	Medial Nv
Post. Hip dislocation	→	Sciatic Nv
Neck of Fibula	→	CPN

Active Space

Tumors

CLASSIFICATION

00:10

Active Space

- Enneking's
- For prophylactic fixation of pathologic lesion
  ↓
  Mirel's criteria → Score > 8/12
  ↓
  Do prophylactic fixation

BENIGN TUMORS

01:08

- Diaphyseal
- Benign
- Sclerosis around lesion

- Treatment : NSAIDs
  RFA

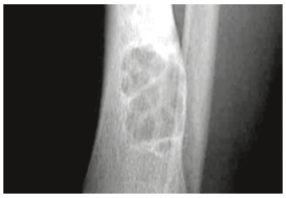
Osteoid osteoma
if size
> 1.5cm → Osteoblastoma
<1.5cm → Osteoid Osteoma

- All parts of bone involved
- Benign lesion
- Bony resorption
- Bending of bone

Fibrous Dysplasia
Treatment : Bisphosphonate

- Metaphyseal
- One cortex involved
- Septations inside

Non ossifying fibroma/
Fibrous cortical defect

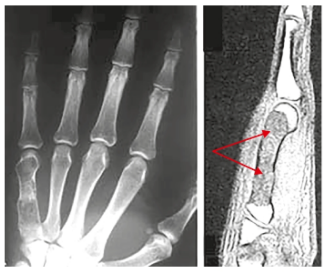


- M.C : Benign bone lesion
- Treatment : Not required
  Curettage & Bone graft

Chondroma

- Tumor of Hyaline cartilage
- M.C Location : Phalenges
- Enchondromas

Olivers : Multiple enchondromatosis
30-35% chance of conversion
Maffaci : Enchondromas with Hemangioma
100% convert to malignancy

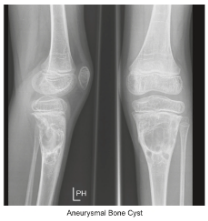


Active Space

Osteochondroma

- Not true tumour → ∴ Grow with skeleton &
  No growth after skeletal maturity
- Always with cartilage cap → Grows < 2cm
  If > 2cm → s/o Malignancy
- Types →
  i) Sessile
  ii) Pedunculated
- T/t : Excision
- Complication :
  - Pathological #
  - Bursitis
  - Malignant transformation
  - False aneurysm
  - Compression of Nerve

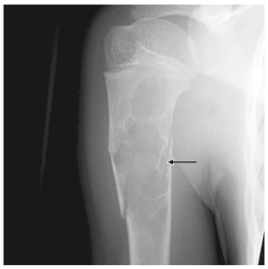
- Metaphyseal Lesion



Aneurysmal Bone Cyst

Fallen Fragment Sign ↓ Unicameral Bone Cyst

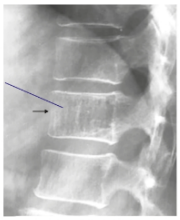
Soap Bubble App ↓ Aneurysmal Bone Cyst


Simple Bone Cyst

Treatment : Aspirate & put Scleroscant Material

Hemangioma

- Corduroy Appearance / Jail Bar Appearance
- CT : Polka dot Appearance
- M.C seen in Spine/Skull/Pelvis
- Developmental anomalies



BENIGN AGGRESSIVE TUMOR

12:49

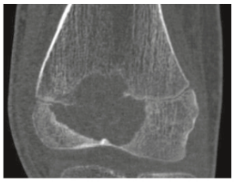
Giant Cell Tumor/Osteoclastoma

- Location : Epiphysis
- Rate of malignancy : <5%
- Treatment : Curettage & Bone grafting
  Or
  Excision & Replacing with another bone


Soap Bubble Sign

Chondroblastoma

- Blastic lesion
- Stippled calcification
- Punctate calcification
- HPE : Chicken wire/ Picket fence calcification

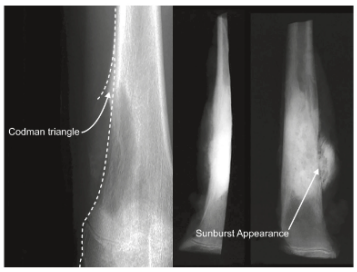


MALIGNANT TUMORS

15:37

Osteosarcoma

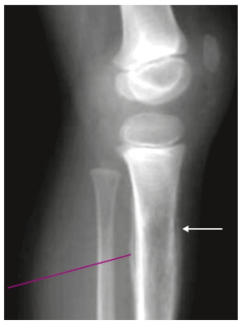
- Metaphyseal malignancy
- Sunbirst Appearance
  Codman's Triangle
- Treatment : Chemotherapy & Radiotherapy
  ↓
  Amputation

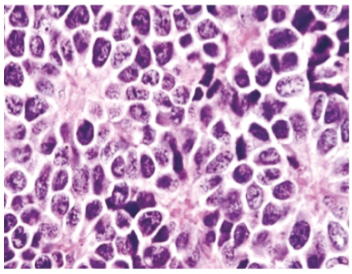


Ewing's Sarcoma

- Neuroectodermal origin
- Translocation T 11:22
- Diaphyseal Tumor /Bulk
- Metadiaphyseal lesion
- 5-25 years
- Lamellated / Onion peel appearance
- No skip lesion

Treatment : Radiation, Chemotherapy
↓
Amputation
↓
Adjuvant Chemotherapy





Pseudo – Rosette Pattern

Poor Prognostic factors of Ewings Sarcoma

i. Distant Metastasis
ii. Male
iii. ↑ LDH / ESR
iv. Anemia

One liners

1. Most common malignant bone tumor → 2°/Metastasis
2. Most common primary malignant bone tumor → Multiple myeloma > Osteosarcoma
3. Most common primary malignant bone tumor of spine
   Multiple myeloma > Chorodoma
4. Most common primary malignant non-hematogenous bone tumor → Osteosarcoma > Chondrosarcoma
   Multiple myeloma originated from blood (plasma cell)
5. Most common benign bone defect – Non-ossifying fibroma > Osteochondroma
6. Most common benign bone tumor – Osteochondroma / Exostosis
7. Most common true benign bone tumor – Osteoid Osteoma
8. M/C source of 1° causing bone mets
   - Males → Prostate > Lung
   - Females → Breast > Lung

Active Space

- Purely Osteoblastic Secondaries comes from
  - Carcinoids
  - Medulloblastoma
  - Prostate

Foot Orthosis

- Sach Foot
- Jaipur Foot (Preferred)

Amputations

- Foot → Lisfranc, Chopart, Pirigoff
- Ankle → Syme, Semiento, Boyd

Active Space

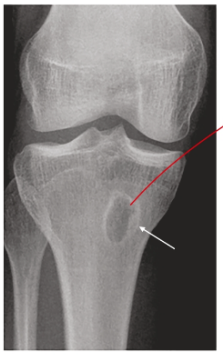
Infections in Orthopaedics

Active Space

- Infection Diagnosis → Aspirate / Bone Biopsy } Send for C & S
- IOC : MRI (Most sensitive)
- Joint infection → Septic Arthritis (M.C in children)
  Tom Smith Arthritis → SA in Hip of 1 year old child
- Bone Infection → Osteomyelitis

OSTEOMYELITIS

03:05



Brodie's Abscess
Localised from subacute osteomyelitis

Chronic Osteomyelitis

- MC Metaphyseal area → due to hair loop blood vessels
- Sequestrum → Dead Bone
- Involucrum → Reactive new bone
- Cloaca → Opening in involucrum
- Sinus → Opening of soft tissue

- Treatment : Antibiotics + Surgery (Sequestrectomy with saucerisation)
  Paprika Sign : Fresh bleeds to stop the sequestrectomy
- Most Common Cause : Staphylococcus Aureus

TB BONE

09:07

- M.C site : Dorsal Vertebra
- M.C Pattern of involvement : Paradiscal involvement
- Other Pattern : Anterior
  Posterior – Facet & Spinous process least common
  Central

- Treatment : ATT
- Complication : Pott's Paraplegia
  ↓
  Treatment : ATT → If deteriorating → Decompression of Spinal cord

TBHIP

I) Stage of Synovitis → ABD + ER
II) Stage of Early Arthritis → ADD + IR → Periarticular Osteopenia
III) Stage of Late Arthritis → ADD + IR (True shortening)
IV) Stage of Advanced Arthritis → Gross shortening → Wandering Acetabulum

- Flexible Hip deformity corrected by Agnes Hunt Traction
- Fixed Flexion deformity → THOMAS TEST done

TB KNEE

- Triple Deformity → Flexion of knee + ER of Tibia + Posterior lateral subluxation of Tibia
- Differential Diagnosis

  T : Tuberculosis
  R : Rheumatoid Arthritis
  I : Iliotibial contracture
  P : Polio
  E : Excessive bleeding disorder → Eg : Hemophilia

- Ankylosis : Pathological fusion of joints
- Carries Sicca : Dry T.B of Shoulder
- Spina Ventosa : T.B Dactylitis

Active Space

Joint Disorders

OSTEOARTHRITIS

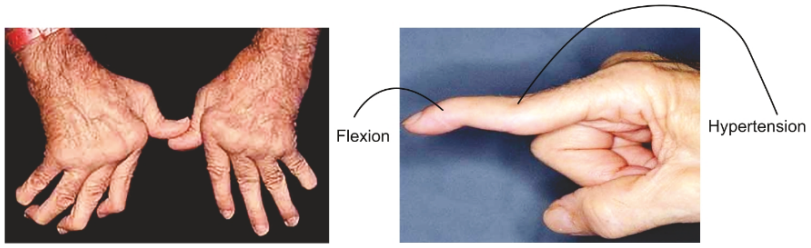
00:10

- Degenerative joint disorder
- M.C presentation : Elderly patient with pain over medial side of knee → Genu varum
- M.C muscle involved : Quadriceps
- It involves cartilage (Medial menisci)
- Joints not involved : Wrist & MCP Joint except 1st MCP
- Hand → Heberdans Node at DIP
  Bouchards Node at PIP
- Treatment : Total knee replacement (or) High Tibial Osteotomy
  Visco supplementation → Hyaluronidase
  Glucosaminase
  Chondoitin Sulphate

RHEUMATOID ARTHRITIS

06:20

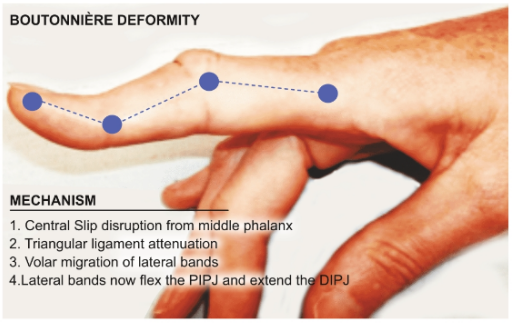
- Autoimmune disorder
- Young female with B/L symmetrical involvement of joint (M.C → Wrist)
- Joints which are not involved → DIP & vertebra except C1 & C2
- Investigation → CBC : Hb - normocytic normochormic
  CRP & ESR ↑
  RA Factor
  Anti-CCP
- Treatment :
  1. NSAIDS
  2. DMAARDs
  3. Steroid
  4. Biological
- 'Z' Deformity



Swan Neck Deformity

Active Space

- Toes → Hallux Rigidus, Vulgus
  Windswept of toes



Active Space

ANKYLOSING SPONDYLITIS 11:57

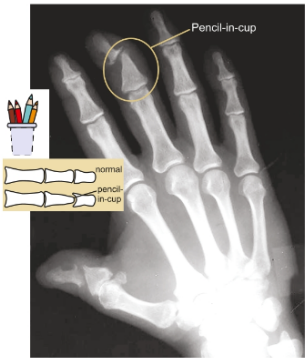
- Disease of Axial Skeleton / SI joint – Essential Criteria
- Hallmark : Enthesitis – Inflammation at the insertion of tendon

Clinical Test :
- Modified Shoebers test
- Ganslen / Pump handle test

Investigation : HLAB27


Bamboo Spine Appearance

PSORIATRIC ARTHROPATHY 15:11



NEUROPATHIC / CHARCOT JOINT 15:38

- M.C Reason : DM
- M.C involve : Intertarsal joint
- 2nd commonest cause :Tabes Dorsalis M.C involve → Knee
- Leprosy → Involve interphalangeal joints

LOOSE BODY IN JOINTS

- Osteocartilaginous
  - Osteochondritis Dessicans
  - M/C cause in Knee joint
- M/C cause of loose body overall
  - Osteoarthritis

Active Space

Pediatric Disorders

MADE LUNG DEFORMITY

00:10

- Distal part of radius fails to grow from ulnar side
- No articulation of radius with ulna

  ∴ Ulna subluxate from dorsal side

  ↓

  Leads to hump on back
- Wrist joint functioning is normal (Normal ROM)

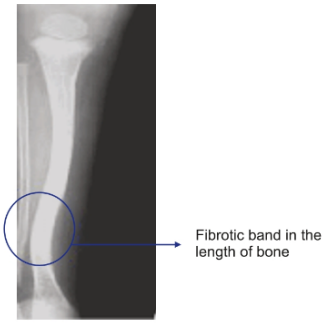
CONGENITAL PSEUDOARTHROSIS

00:39

- Bone has failed to develop
- T/t : Excise the fragment

  ↓

  Rod/Plate/Graft
- M.C Bone involved : Tibia

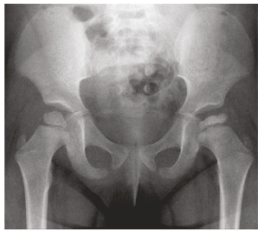


PEDIATRIC HIP CALENDER

01:13

- At birth →CDH/DDH
- 2-5 years → Septic Arthritis
- 4-8 years → Perthe's disease
- 5-12 years → Transit synovitis (Observation Hip)

  (a/w URTI history)



PARTHES DISEASE

- Osteochondritis of femoral head
- Cause : Trauma
- 4-8 years
- M.C in Male
- Usually U/L (B/L in 10-12%)

Active Space

Active Space

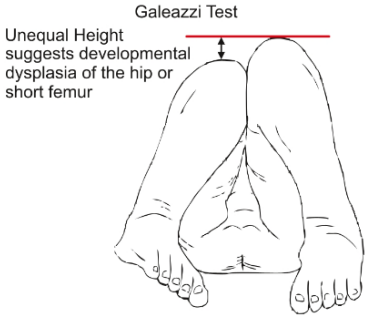
- C/F : Synovitis → ABD & ER
  Necrosis → ADD & ER
  Healing → Painless
- T/t : Splints in Abduction of hip. No weight bearing
- IOC : MRI

SLIPPED CAPITAL FEMORAL EPIPHYSIS → Coxa Vara

- Age : 10–15 years • Males > Females
- d/t weakness of growth plate
  ↓
  Epiphysis remains still
- C/F : Acute SCFE → # Like
  Chronic SCFE → Not able to maintain posture
- Rest of bone displaced Anterolaterally
- Position : Posteromedial position
- Klein's line is drawn
- Trethowan's Sign
- Complication : AVN (d/t treatment also) or Chondrolysis
- MC in Males
- IOC : MRI

CDH

- MC in Females d/t Relaxin (Shallow acetabulum & small femoral head)
- Diagnosis :
  i) Allis Test / Galeazzi Sign
  Posterior dislocation : Add + IR (Shortening)
  ii) Barlow Test : Adduction & Push the Hips gently back
  Most Provocative Test
  iii) Otoloni Test : Reduce the joint back
  iv) Increase in no. of groin folds on dislocated side
  v) Trendelenburg Gait – U/L
  vi) B/L neglected CDH – Waddling gait



Active Space

- Treatment
  - 1 - 6 months → Von Rossen Splint / Pavlik harness
  - 6 - 8 months → Frog leg / Batchelor's Cast
  - 18 months - 3years → OR or Osteotomy - Salter's
  - 3 - 8 years → Osteotomy Salter's, Pemberton's, Chiari

BLOUNT'S DISEASE

14:33

Medial aspect of proximal tibia involved
↓
TIBIA VARA

CTEV

15:01

- Deformities →
  - i. Cavus : 1st metatarsal going to plantar flexion
  - ii. Adduction at Talonavicular joint
  - iii. Inversion of foot at Talocalcaneal joint
  - iv. Varus - d/t Calcaneum deviating medially
  - v. Equinus - at Tibiotalar joint

- Technique used : Ponseti Technique
  Steps of correction → Cavus, Adduction, Varus, Equinus } PARANI SCORING Used for Prognosis

- Complication : Rocker Bottom d/t ill terated CTEV/ Congenital Vertical Talus
- Cavus → Angle between 1st MT & Talus → Meary Angle → Till 4° Alright
  > 4° → Cavus
- Adduction → Normally 5-15° Abduction
  In CTEV → ↓ angle
- Varus → Between Talus & Calcaneum → KITES Angle
- Equinus → Between Tibia & Calcaneum → ↑ Angle

Soft Tissue Disorders

Active Space

ROTATOR CUFF TEARS

00:10

- M.C to # Supraspinatus
- I.O.C : MRI
- Test : Lift off Test

FROZEN SHOULDER

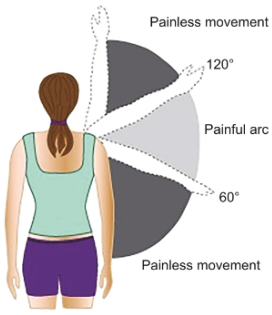
00:44

- Adhesive Capsulitis of Shoulder
- 1st movement restricted : Internal Rotation
- All movements are restricted
  ↓
  Peri-arthritis of shoulder
- Global Restriction of shoulder joint
- Seen in Diabetes Mellitus

PAINFUL ARC SYNDROME

01:57

- Pain during mid-range of Abduction
- M.C culprit :
  - Supraspinatus Tendinitis / Calcification / Partial Tear
  - Subacromial Bursitis
  - # Greater tuberosities



RUPTURE OF BICEPS TENDON

02:42

Papey Sign

Seen in long head of Biceps

Active Space

TENNIS ELBOW *02:55*

- Lateral Epicondylitis – Test done Cozen Test
  M.C affected tendon → ECRB

GOLFERS ELBOW *03:18*

- Medial Epicondylitis

BASEBALL PITCHER'S ELBOW / LITTLE LEAGUER'S ELBOW *03:30*

- Medial epicondyle Apophysitis

JAVELIN THROWER'S ELBOW *03:35*

- Injury to Ulnar Collateral ligament

TRIGGER FINGER *03:50*

- Stenosing Tenosynovitis
- M.C at 1st Annular Pulley

DEQUERVAIN'S TENOSYNOVITIS *04:04*

- APL/EPB inflammation
- Test : Finkelstein Test

DUPUYTREN'S CONTRACTURE *04:31*

- Progressive contracture of Palmar fascia
- M.C Presentation : Garrod's Pad
- Males > Females
- Seen in smokers & alcoholics
- Rx:- Fasciotomy

ACHILLES TENDINITIS *06:00*

- Overusers/Runners
- Haglund's Deformity

COMPLICATIONS

06:43

1. Compartment Syndrome
   - > 30mmHg
   - M.C # related : # diaphysis of Tibia
   - In the U.L : Most Common Muscle involved : FDP
   - M.C involved Nerve : AIN
   - C/F : Pain on passive stretch
   - T/t : Fasciotomy

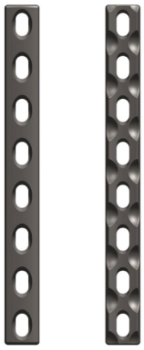
2. Fat Embolism Syndrome
   - M.C in D2-D4
   - Snow Storm Appearance
   - GURDS CRITERIA :
     1. Decrease Pressure of O2
     2. Petechial patches
     3. Respiratory & CNS involvement
     4. Minor Criteria
   - T/t : Heparin & Steroid (Definitive t/t)

3. Osteochondritis
   - Tractional Osteochondritis →
     1. Tibial Tuberosity
     2. Lower pole patella
     3. Calcaneum
     4. 5th MT Base

Active Space

Implants in Orthopaedics

Active Space

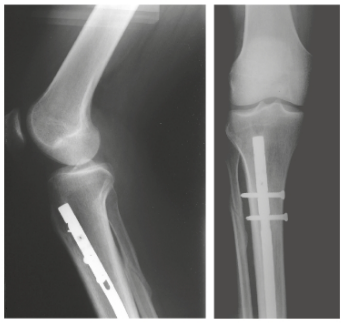


DCP LCDCP

(Holes have threads)

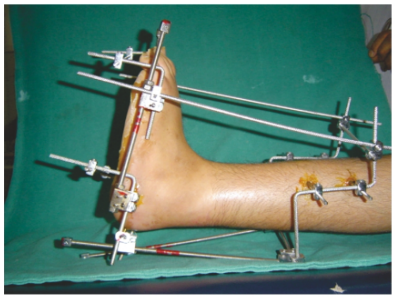
Locking Plate – For Osteoporotic Bone

Dynamic Hip Screw
Use – IT# & NOF #



Intramedullary Nail
TENS : Titanium Elastic Nailing System
Use: # Shaft of Femur, # Tibia

Ilizarov Fixator
- Maximum Stability
- Use: Limb Lengthening Procedures



JESS FIXATOR

Active Space

LRS FIXATOR
(Limb Reconstruction System)

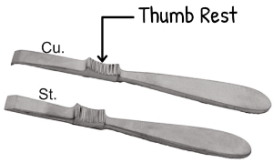
BONE GAUGE

T HANDLE WITH KEY
Use : To put K-wire

PLATE BENDER

PLATE HOLDING FORCEPS

BONE HOLDING FORCEPS



PERIOSTEUM ELEVATOR

CHISEL

OSTEOTOME

Active Space

PATELLA HOLDING FORCEPS

PLIER

MALLET

K WIRES

HOHMANN'S RETRACTOR

DEPTH GAUGE

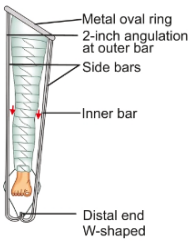
MORRIS RETRACTOR

LANGENBECK RETRACTOR

Splints and Traction

Active Space

SPLINTS	INJURIES
Thomas Splint	# Femur (Shaft)
Dennis Brown Splint	CTEV
Mermaid Splint	Rickets
Cockup Splint	Radial Nerve Palsy
Knuckle Blender Splint	Ulnar or Median Nerve Palsy
Aeroplane Splint	Brachial Plexus Injury
Taylor's Splint	DL Immobilisation
Milwaukee brace	Scoliosis



Thomas Splint

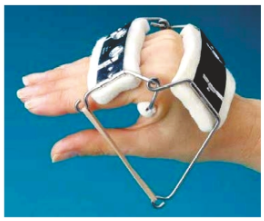

Mermaid Splint


Taylor's Brace


Milwaukee


Aeroplane Splint


Foot drop Splint


Knuckle Bender Splint


Dynamic Cock up Splint


Dennis Brown Splint

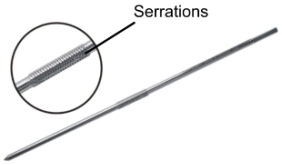
Active Space

SKIN Vs SKELETAL TRACTION

Maximum Weight : 6.7kg

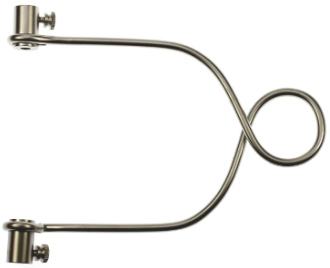
Maximum Weight : 10% of Body Weight

Bucks Traction



Denham Pin

Steimann Pin



Bohler's Stirrup

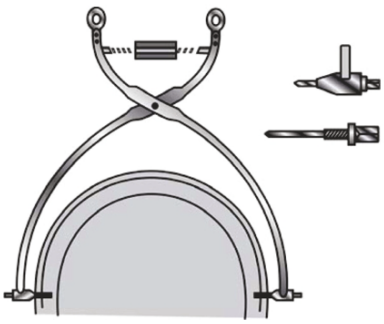
TRACTION IN ORTHO

04:56

- Gallows Traction
- Bryants Traction
- Russel Traction

  } Fracture shaft of femur children < 2 years

- Bucks Traction — Conventional Skin Traction
- Agnes Hunt Traction — Correction of Hip deformity – Fixed flexion deformity
- Well Leg Traction — Correction of Adduction / Abduction deformity
- Dunlop Traction — Supracondylar fracture of Humerus
- Crutchfield — Cervical Injuries



Barton Tongs