ORTHOPEDICS

medpgnotes

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ORTHOPEDICS

KEY TO THIS DOCUMENT

Text in normal font – Must read point. Asked in any previous medical entrance examinations

Text in bold font – Point from Harrison's text book of internal medicine 18th edition

Text in italic font – Can be read if you are thorough with above two.

GENERAL ORTHOPEDICS

SKELETAL MATURITY

For growth of bone, which term is most appropriate	Apposition
A newborn is noted to have large head and short limbs. On further examination, short broad fingers, small face and low normal length are noted, trunk appears long and narrow, to confirm diagnosis	Obtain skeletal radiographs
Retardation of skeletal maturity caused by	CRF, hypothyroidism, PEM
Infantile proportion in adult	Morquio disease, Achondroplasia, Hypothyroidism, Constitutional dwarfism
Hyperostosis is associated with	Hypothyroidism, vitamin A intoxication, radiation osteoma

BONE AND FRACTURE

The term orthopedics was coined by	Nicholas Andrey
Major mineral of bone	Hydroxyappatite
Strength of bone	Collagen
Structural support to bone is provided by	Collagen
40 nm gap in between tropocollagen molecule in collagen which serve as the site of bone formation is occupied by	Calcium
Marker of bone formation	Serum alkaline phosphatase, Serum osteocalcin, Serum peptide of type I procollagen
Marker of new bone formation	Alkaline phosphatase
Marker of bone resorption	Urine total free deoxypyridinoline, serum and urine cross linked N telopeptide, serum and urine cross linked c telopeptide
Bone resorption is enhanced by	PGE2
NOT a bone resorption marker	Osteocalcin
Cimey Mader classification for	**Viability of bone**
Osteoclast	Derived from monocyte, Resorption of bone
Osteoclast is derived from	Monocyte
C fos is associated with	**Osteoclastic activity**
Osteoblasts produce	Collagen
Osteoprotogerin is secreted by	**Osteoblast**
Osteoblast give rise to	Osteoblast
Osteocalcin is secreted by	Osteoblast
Osteoblast activity is suppressed by	Corticosteroids
MC cause of bone disease in India	Nutritional deficiency
Normal bone remodeling in response to stress was described by	Wolff
5' nucleotidase activity increased in	Bone disease
Lytic lesion in skull	Multiple myeloma, Metastasis from ca bronchus, Thalassemia

Topical fluoride	Conversion of hydroxyappatite to fluoroappatite by replacing OH ions
Epiphyseal injuries are common in	Children
On 3 phase 99Tm MDP bone scan. bone lesion showing least osteoblastic activity	Fibrous cortical defect
Technitium used for bone scintigraphy	99 TcDPA
Estimation of Rate of newly synthesized osteoid material mineralization estimation can be estimated by	Tetracycline labeling
Wolf's law	*Change in bone density in response to functional forces*
Essential feature in diagnosis of fracture bone	A partial or complete loss of continuity of bone
Most consistent finding of fresh fracture	Crepitus
Pathognomic sign of traumatic fracture	Crepitus
Sure sign of fracture	*Abnormal mobility*
Direct impact on bone will produce	Transverse fracture
Transverse fracture	*Makes an angle of 30* with horizontal line*
Pediatric orthopedics	Comminuted fractures are rare, thick periosteum, soft bone
Compound fracture with 1 cm opening in skin	Grade 1
Most serious complication of compound fracture	Infection
Given most priority in case of fracture	Open fracture, Dislocated fracture
Clinical union of fracture	4 – 12 weeks
Assessment of fracture risk	**FRAX**
Fracture disease can be prevented by	Physiotherapy
Usual treatment of fracture involving articular surface	Arthrodesis, Excision, Skeletal traction, Internal fixation, POP slab
Management of long bone fracture	Intramedullary nailing, Compression plate, External fixation
Operative procedure 'microfracture' is done for	Osteochondral defect of femur
Maximum bleeding	Artery caught between fractured ends of bones
Action of intramedullary K nail	Three point fixation
Open reduction and internal fixation is NOT indicated in	Compound fracture

PATHOLOGICAL FRACTURE

MC cause of pathological fracture	Secondary deposits
Pathological fracture occurs in	Metabolic bone disease, Osteosarcoma, Bone cyst, Radiation, Osteoporosis, Osteomalacia
Commonest cause of pathological fracture is generalized affection	Osteoporosis
NOT a cause of pathological fracture	Anemia, Osteochondroma, Fluorosis
Mirel's criteria is developed for evaluation of	Risk of pathological fracture
Treatment of choice for pathological fracture	Internal fixation

STRESS FRACTURE

Commonest site of March fracture	Involves shaft of 2nd and 3rd metatarsal
Complaints of pain at posteromedial aspect of both legs	Stress fracture

in an army recruit after 6 months training, acute point tenderness and pain aggravated by physical activity	
Fatigue fracture (stress fracture) are commonly seen in	Metacarpal
Usual site of stress fracture	Second metatarsal
March fracture	Fracture of 2nd metatarsal
NOT a very important cause of non union	Stress at fracture site due to muscle spasm
Stress fracture does NOT involve	Tibia
Stress fracture is treated by	Cast immobilization

FRACTURE HEALING

Osteoclast mediated resorption of bone in	**Howship lacunae**
Bone apposition is best in growing bone in	*Epiphysis*
Bone apposition is best in normal adults in	Osteoblastic activity in howship lacuna
Bone apposition is best in fractured bones in	Subperiosteal cambian layer
Structure responsible for production of majority of new bone following fracture	*Periosteum*
MC fracture healing method	*Indirect fracture healing*
Staging of indirect fracture healing by	*Hunter*
Primary bone healing	*No external callus, no hematoma*
Healing by primary intention	*Fixed internally with rigid fixator*
Provisional callus	14 days
Thick and hard bone like callus	8 weeks
Callus is seen in	Bone healing
Fracture healing is characterized by	Callus formation
Healing of fractured bone is affected by	Micromovement, Muscle interposition, Hypoxia, Bone fragments
Factors promoting callus formation	Micromovements between fracture fragments, Appropriate approximation of fragments
Callus induction is hampered in	Hypoxemia, Fractured fragments of bone, Muscle interposition in between fractured fragments, Early mobilization
Initial stage of clinical union of bone is equivalent to	Woven bone
Last step in fracture healing	Remodeling
Most important factor in fracture healing	Immobilization
Time necessary for healing of fracture depends on	Age of patient, location of fracture, type of fracture. Degree of damage to soft tissue
NOT true about bone remodeling	Osteoclastic activity at compression site
Osteoclastic activity at	Tension site
Minimum time to label as non union	*9 months*
MC cause of non union	Inadequate immobilization
Factors facilitating non union	Periosteal injuries, Absence of nerve supply, Chronic infection
Non union of fracture due to avascularity	Fracture neck of femur, scaphoid, patella
Non union is a complication of	Scaphoid fracture
Delayed union of fracture of a bone following a surgical treatment	Infection, Inadequate circulation, Inadequate immobilization
In some old fractures, cartilaginous tissue forms over fractured bone ends within a cavity in between	Delayed union

containing clear fluid	

COMPARTMENT SYNDROME

Normal intramedullary pressure	*10 – 20 mm Hg*
Acute compartment syndrome is commonly caused by	Fracture
Compartment syndrome	Pain on passive stretch is reliable sign, Fasciotomy is earliest management, Interstitial pressure > capillary pressure, Hyperaesthesia
Characteristic feature of acute compartment syndrome	Acute pain on employing the stretch test, Normal pulse, Venous occlusion
Late sign of Compartment syndrome	Absence of distal pulses
Which passive movement cause pain in deep posterior compartment syndrome	Dorsiflexion of foot
NOT relevant in compartment syndrome	Exercise
NOT true about acute compartment syndrome	Normal sensation distally
Compartment syndrome is treated by	Fasciotomy
A patient develops compartment syndrome following manipulation and plaster for fracture both bones of leg. Best treatment	Do operative decompression of fascial compartment

GENETIC AND DEVELOPMENTAL DISORDERS OF BONE

GENERAL FEATURES OF DEVELOPMENTAL DISORDERS OF BONE

Bony dysplasia is due to	Faulty development
Increased Bone density of X ray is seen in	Fracture and collapse of cancellous bone, Increased periosteal thickening of trabeculae, Periosteal reaction, Avascular necrosis, Paget's disease, osteomyelitis
Wormian bone	Osteogenesis imperfecta, Cretinism, Rickets
Wormian bone	*Hypophosphatasia, Down syndrome, Kinky hair disease*
Morquio disease	Spinal kyphosis, Subnormal/normal intelligence, Excessive excretion of keratosulphate in urine, Dwarfism
Phocomelia	Defect in development of long bones
Madelung deformity involve	Wrist
Candle wax appearance	Melorheostosis
Melorrheostosis	**Autosomal recessive**
Windswept deformity	Bruton's disease
Camurati Engelmann disease	**Progressive diaphyseal dysplasia**
Hyperostosis corticalis generalisata	**Von Buchem disease, severe form is sclerosteosis**
Osteopoikilosis	**Spotted bones, autosomal dominant**
Primary hypertrophic osteoarthropathy	**Also known as pachydermaperiostitis, Touraine solente Gole syndrome**
Histological feature of neuropathic	*Presence of osteochondral fragments*

arthropathy	*embedded with the synovium*
Multiple epiphyseal dysplasia is often misdiagnosed as	*Legg Calve Perthe disease*

ACHONDROPLASIA

Achondroplasia	Autosomal dominant, Shortening of limbs
Achondroplasia	Rhizomelic shortening of limbs, trident hand, tomb stone iliac bones
A short statured patient brought with X ray showing flattened vertebra with beak.	Achondroplasia
Trident hand	Achondroplasia
Champagne glass pelvis	Achondroplasia
NOT true about Achondroplasia	Mental retardation
NOT a radiographic features of Achondroplasia	Acral osteolysis

CLEIDOCRANIAL DYSTOSIS

Cleidocranial dysplasia	**RUNX2**
Cleidocranial dystosis	Wide foramen magnum, Absence of clavicles, Coxa vara
A 9 year old child has high arched palate and has shoulders meeting in front of chest	Cleidocranial dystosis
Absent lateral one third of clavicle	Cleidocranial dystosis
Radiological features of cleidocranial dysostosis seen in	Skull, Clavicle, Pelvis

OSTEOGENESIS IMPERFECTA

Osteogenesis imperfecta is due to	Abnormal collagen defect Defective osteoid formation
Osteogenesis imperfecta is due to defect in	Collagen
Osteogenesis imperfecta	Usually green stick fracture, Fracture frequency decreases during puberty, Fracture seen in intrauterine life and during parturition
Osteogenesis imperfecta	Blue sclera, Lax ligament, Osteoporosis
Osteogenesis imperfecta	Deafness, Laxity of joints, Fragile fracture
Osteogenesis imperfecta	Brittle done disease, Autosomal dominant, Associated with otosclerosis, Defect in collagen type I
Bilateral symmetrical idiopathic fractures	*Osteogenesis imperfecta*
Multiple fractures with wormian bone are seen in children of	Osteogenesis imperfecta
Colour of Sclera in Osteogenesis Imperfecta	Blue
Blue sclera is associated with	**Type I, II and III forms of osteogenesis impercta**
Bilateral symmetrical fractures	Osteogenesis imperfecta
NOT true about osteogenesis imperfecta	Impaired healing of fracture
NOT seen in osteogenesis imperfecta	Bilateral hip dislocation, Cataract
Prenatal determination of osteogenesis imperfecta is done by	Abnormal pro alpha chain

OSTEOPETROSIS

Types of osteopetrosis	**Malignant osteopetrosis (autosomal recessive), benign type I and type II osteopetrosis (autosomal dominant), carbonic anhydrase II deficiency (autosomal recessive)**
A 3 year old male presented with progressive anemia, hepatosplenomegaly and osteomyelitis of jaw with pathological fracture, X ray shows chalky white deposits on bone	Osteopetrosis
10 year old child, predisposition to fractures, anemia, hepatosplenomegaly and a diffusely increased radiographic density of bones	Osteopetrosis
Childhood osteopetrosis is characterized by	Multiple fracture, Hepatosplenomegaly
Characteristic of osteopetrosis	Pancytopenia, Compression of cranial nerve, Mandibular osteomyelitis
Marble bone disease	Osteopetrosis
Marble bone or Marble brain disease is associated with	**Type I distal RTA**
Alberg Schonberg disease	Osteopetrosis (type II)
Bone in bone appearance	Osteopetrosis
NOT true about osteopetrosis	Abnormally slow rates of fracture healing
Diagnosis of osteopetrosis	**Increased osteoclast derived TRAP**
Treatment of osteopetrosis	**Bone marrow transplantation**

FRACTURE CLAVICLE AND FRACTURE HUMERUS

FRACTURE CLAVICLE

Clavicle	First bone to ossify, Ossify in membrane, Breaks at junction of medial 2/3rd and lateral 1/3rd
Fracture clavicle due to	Fall on outstretched hand
MC site of fracture clavicle	*Junction of middle and outer third*
Fracture clavicle	Commonly occurs between insertion of coracoclavicular and costoclavicular ligaments, May jeopardize blood supply to overlying skin
Clavicular fracture	Lateral part fracture is more stable, malunion Is common, commonest bone in body to fracture
Common injury to baby	Fracture clavicle
MC bone fractured during birth	Clavicle
Nerve injured in fracture clavicle	Supraclavicular nerve
MC nerve injured in medial cord of brachial plexus	*Medial cord of brachial plexus*
MC vessel injured in fracture clavicle	*Subclavian vessels*
MC complication of fracture clavicle	Malunion
NOT true about fracture clavicle	No treatment is required
NOT true about fracture clavicle	Usually requires careful reduction
X ray view for fracture clavicle	*45* lordotic view*