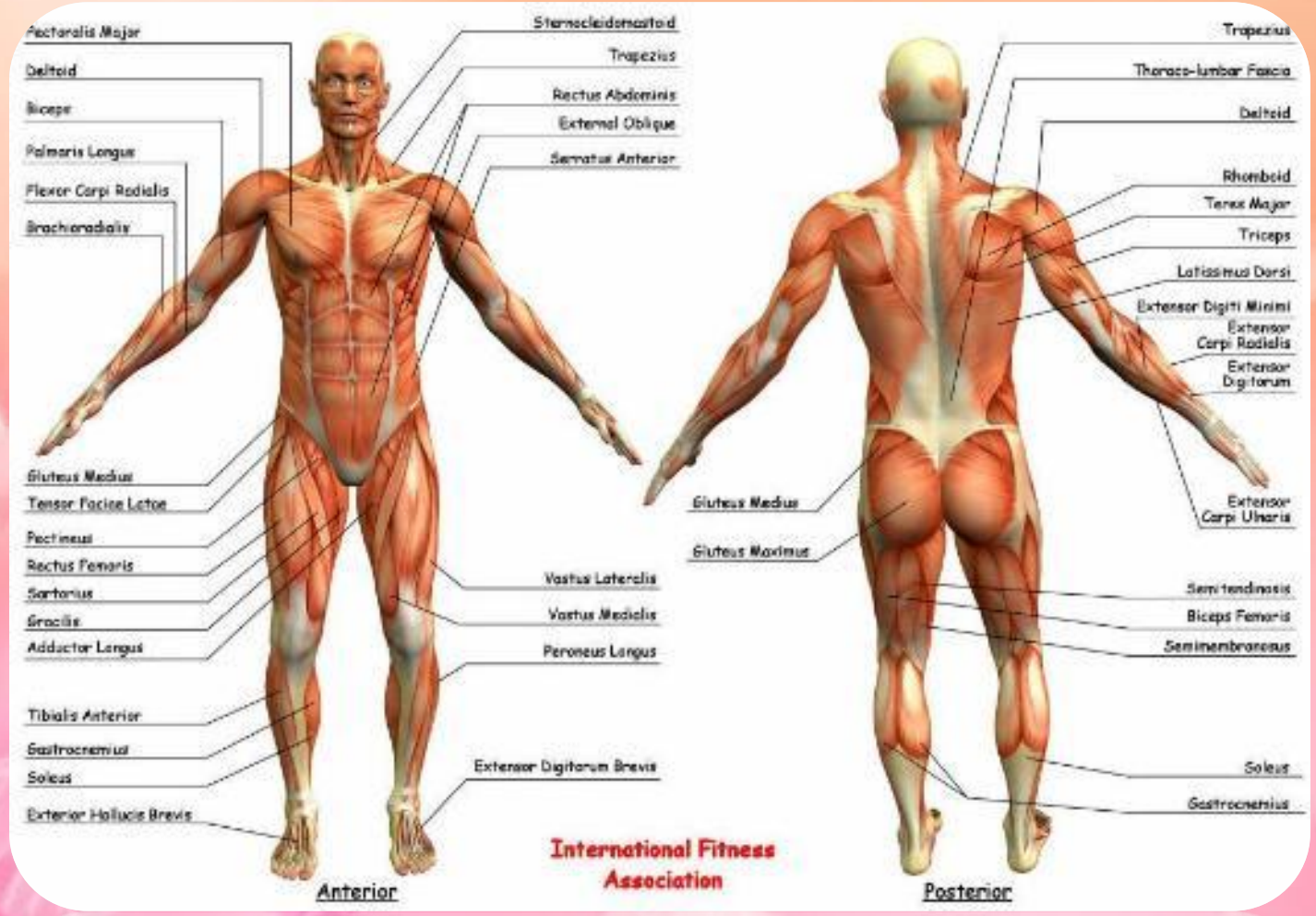
Musculoskeletal

S Y S T E M

Musculoskeletal



- **Sistem organ yang membuat manusia mampu untuk bergerak dengan menggunakan sistem muscular dan skeletal**

Sistem Muskuloskeletal

Skeletal

Muscular

Joints, ligaments and tendons

Skeletal

Tulang

Struktur

Fungsi

BONES

- Tulang yang memberikan bentuk tubuh
- Tulang mendukung tubuh kita
- Bayi memiliki lebih dari 300 tulang dan dewasa memiliki 206 tulang

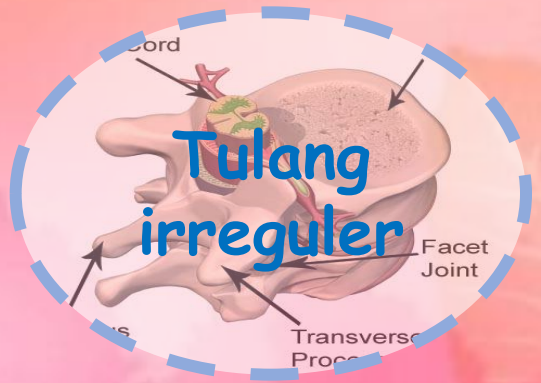
Jenis tulang

Dibawah kulit, ada 5 jenis tulang dalam tubuh manusia. Mereka adalah . . .

Tulang Panjang

Tulang Pendek

Tulang datar



Tulang irreguler

Tulang Sesamoid

- Includes having a body which is longer than it is wide.
- They are usually somewhat curved for strength.

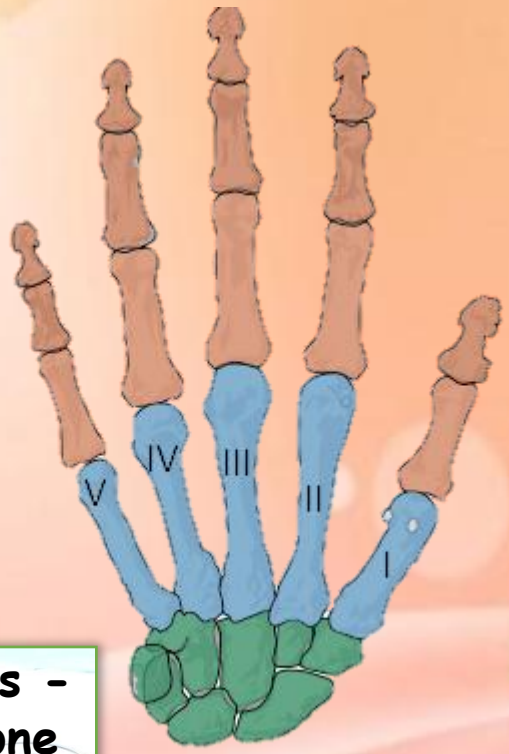
The femur - a long bone

Tulang Panjang

Tibia

Fibula

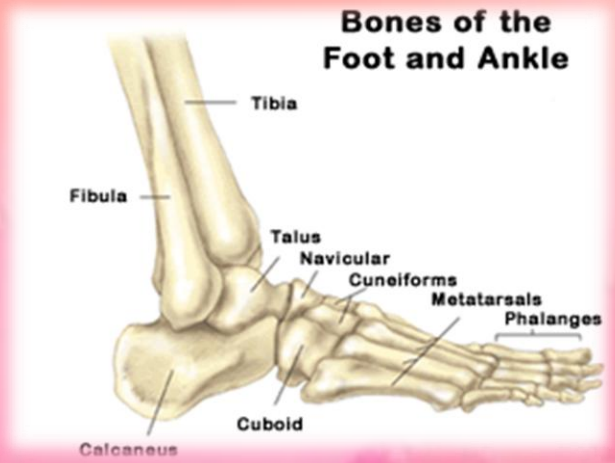
Yang termasuk didalam tulang panjang : femur, tibia, fibula, humerus, ulna and radius



The carpals - a short bone

Tulang pendek

- Roughly cube-shaped and have approximately equal length and width
- Providing support and stability with little movement.



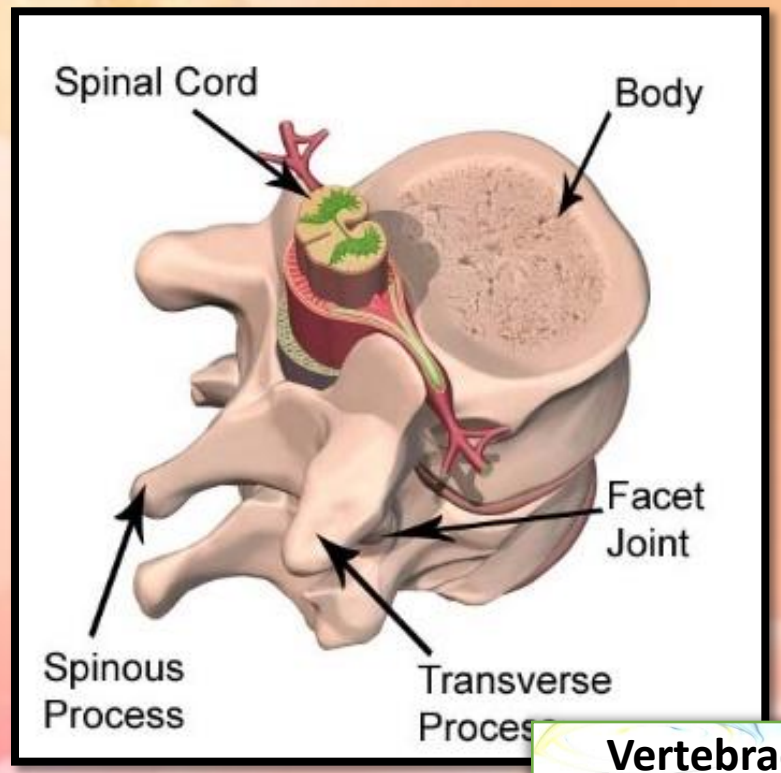
Yang termasuk : ankle and wrist bones

The scapula - a flat bone

Tulang datar

- a thin shape/structure and provide considerable mechanical protection and extensive surfaces for muscle attachments.

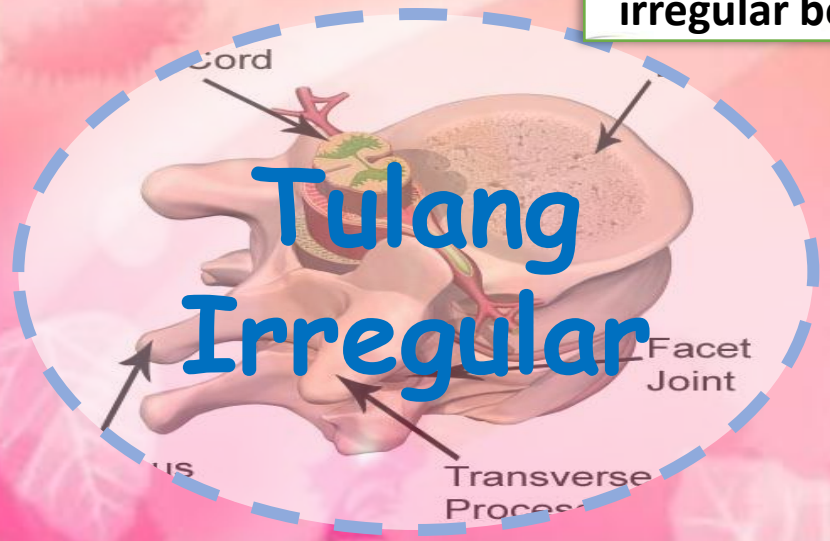
Yang termasuk didalamnya : cranium (skull), the ilium (pelvis), sternum and the rib cage

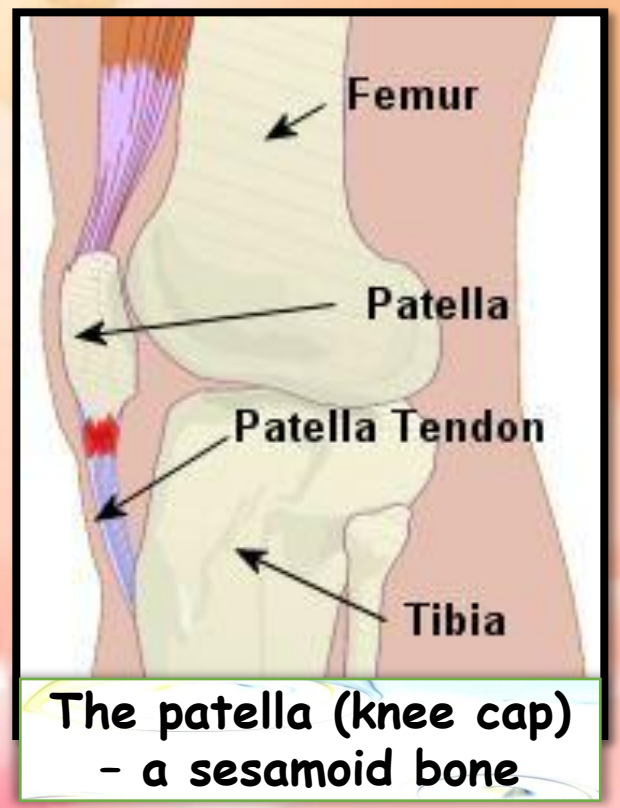


Vertebrae - irregular bones

- Bones in the body which do not fall into any other category, due to their non-uniform shape.
- Consist of cancellous bone, with a thin outer layer of compact bone.

Yang termasuk: Vertebrae, Sacrum and Mandible (lower jaw).





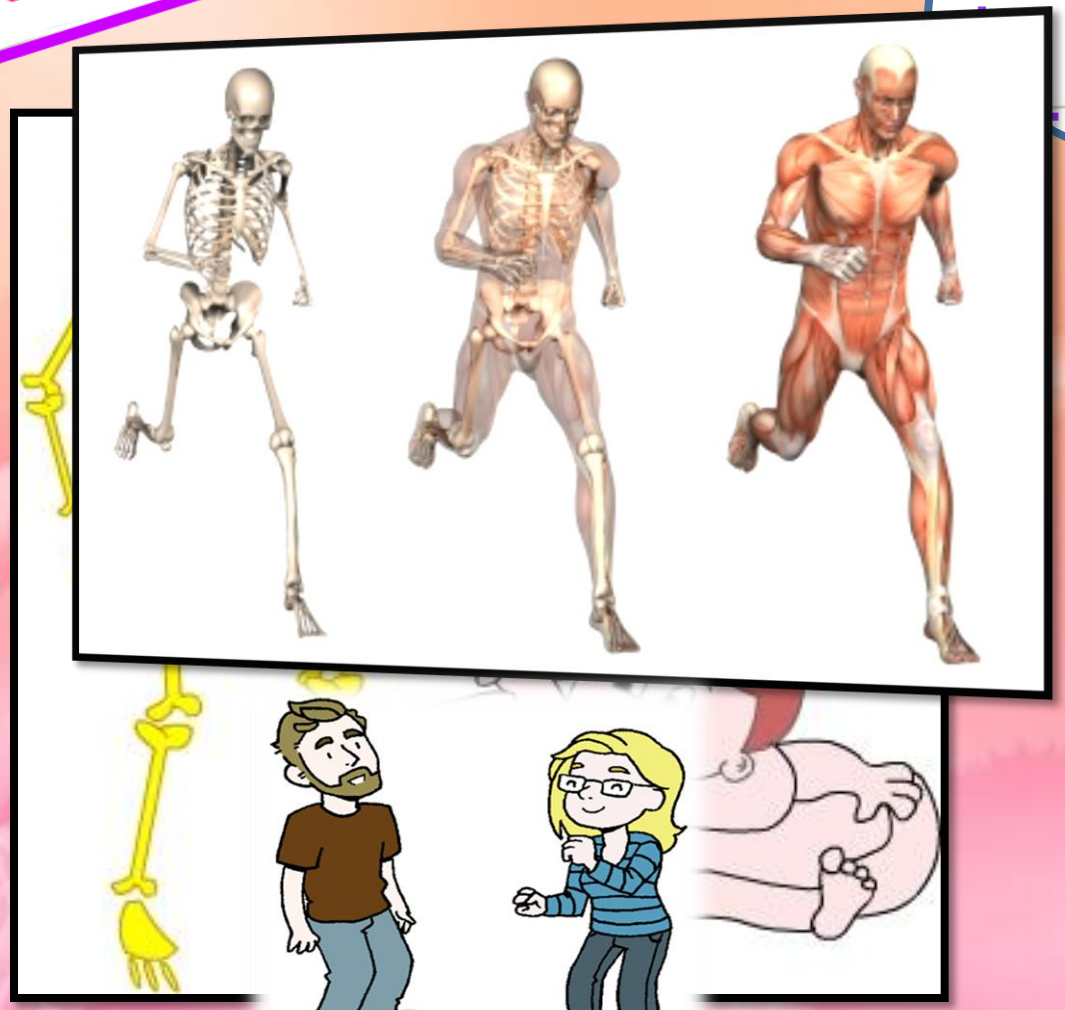
The patella (knee cap) – a sesamoid bone

- Short or irregular bones, imbedded in a tendon.
- It passes over a joint which serves to protect the tendon.

Tulang Sesamoid

Yang termasuk : the patellae (kneecaps).

FUNCTIONS



What do you think we

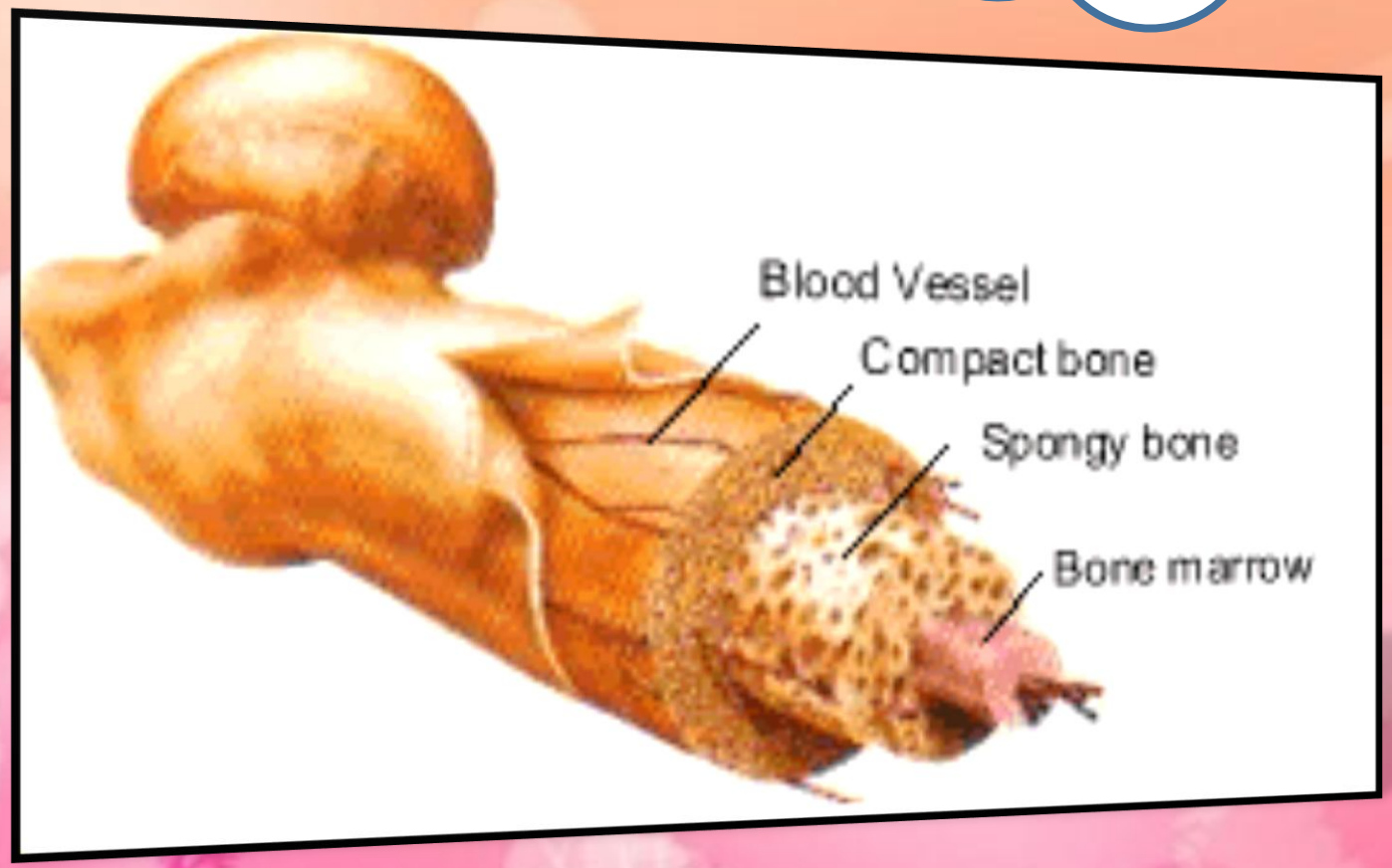
- Bones provide the framework for the body.

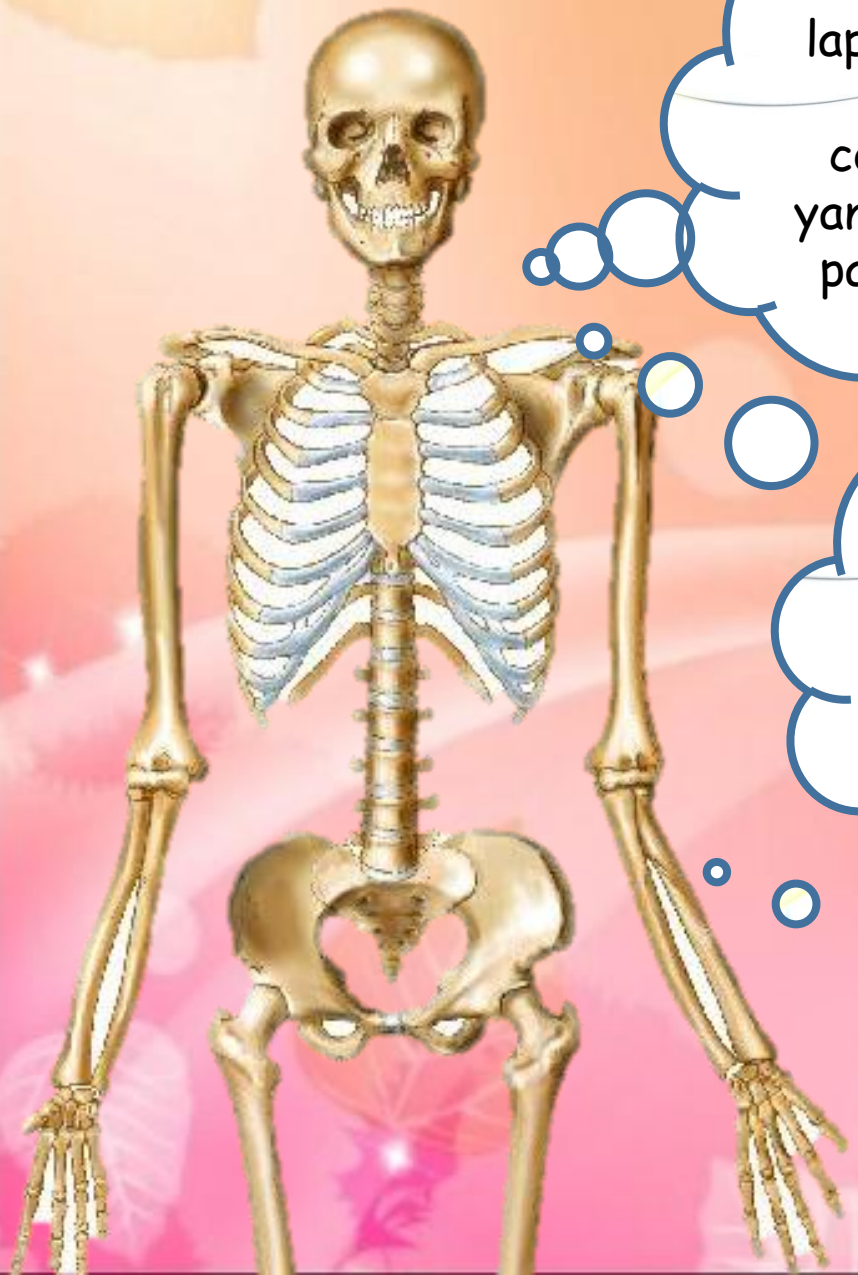
- Bones protect the body organs.

- Bone helps the body move in different directions and different ways

STRUCTURE

What is your bone made of?

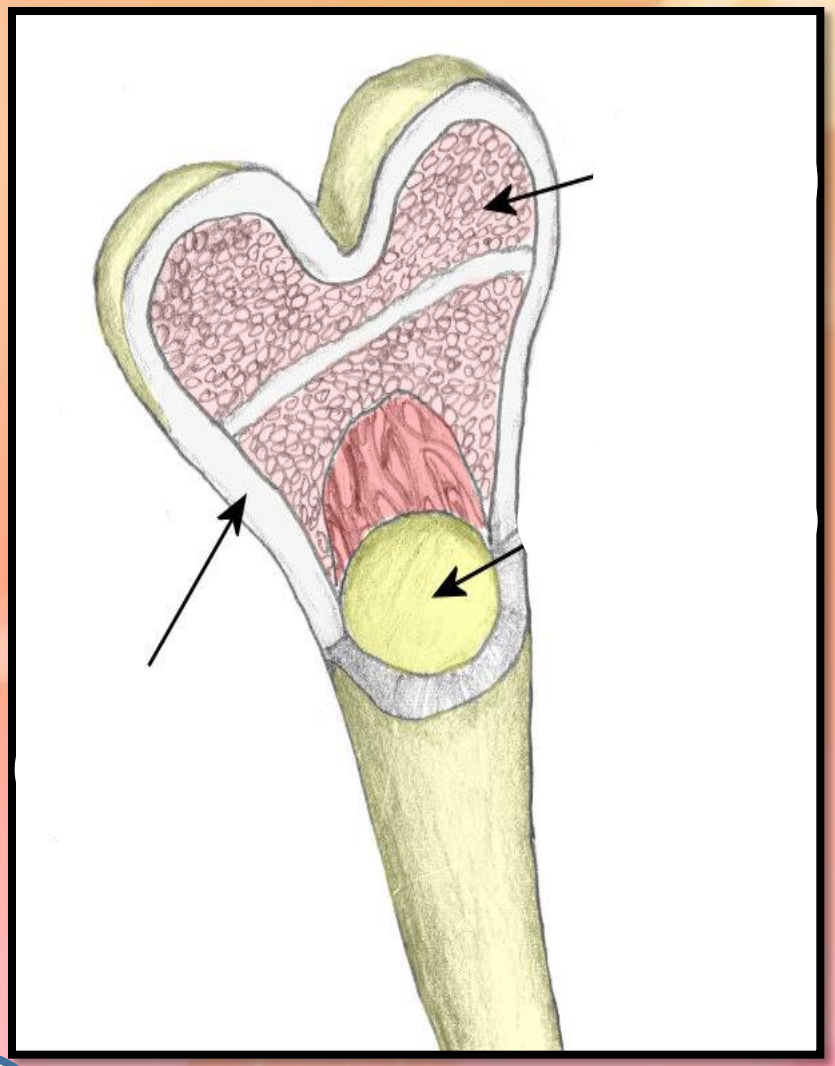




Tulang memiliki lapisan luar yang keras atau compact bone, yang sangat kuat, padat dan solid

Didalam terdapat lapisan spongy bone, yang seperti sarang lebah, ringan dan sedikit fleksibel.

Di tengah, terdapat beberapa tulang berbentuk jeli seperti bone marrow, dimana darah diproduksi di sini

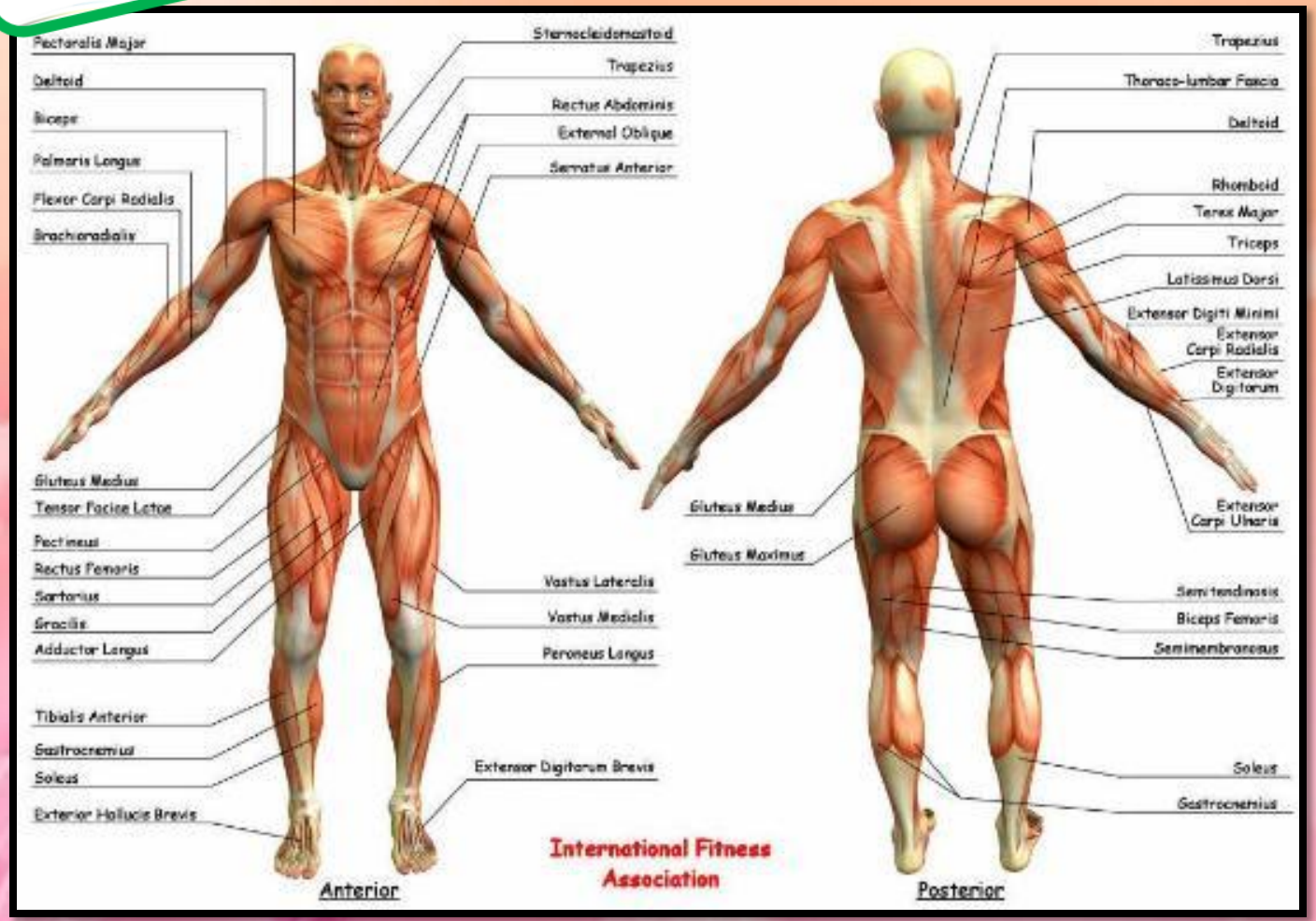


Muscular

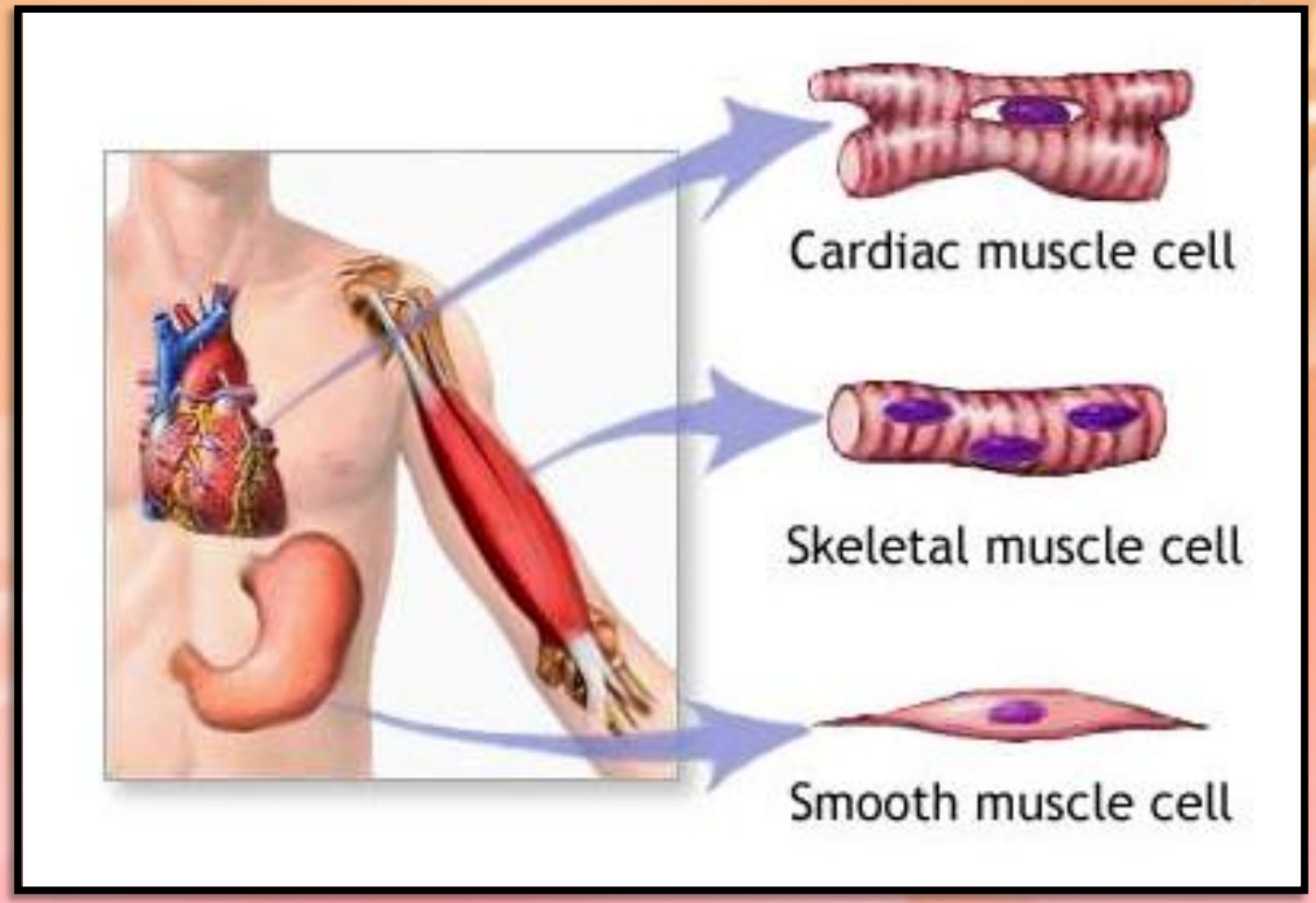
MUSCLES

Otot juga dibutuhkan untuk pergerakan. Massa otot solid, jaringan elastis yang mendorong tulang kita ketika bergerak

TYPES


Pectoralis Major
Deltoid
Biceps
Palmaris Longus
Flexor Carpi Radialis
Brachioradialis
Sternocleidomastoid
Trapezius
Rectus Abdominis
External Oblique
Serratus Anterior
Gluteus Medius
Tensor Fasciae Latae
Pectineus
Rectus Femoris
Sartorius
Gracilis
Adductor Longus
Vastus Lateralis
Vastus Medialis
Peroneus Longus
Tibialis Anterior
Gastrocnemius
Soleus
Extensor Hallucis Brevis
Extensor Digitorum Brevis
Anterior
International Fitness Association
Trapezius
Thoraco-lumbar Fascia
Deltoid
Rhomboid
Teres Major
Triceps
Latissimus Dorsi
Extensor Digiti Minimi
Extensor Carpi Radialis
Extensor Digitorum
Extensor Carpi Ulnaris
Gluteus Medius
Gluteus Maximus
Semitendinosis
Biceps Femoris
Semimembranosus
Soleus
Gastrocnemius
Posterior

TYPES



Smooth

Cardiac

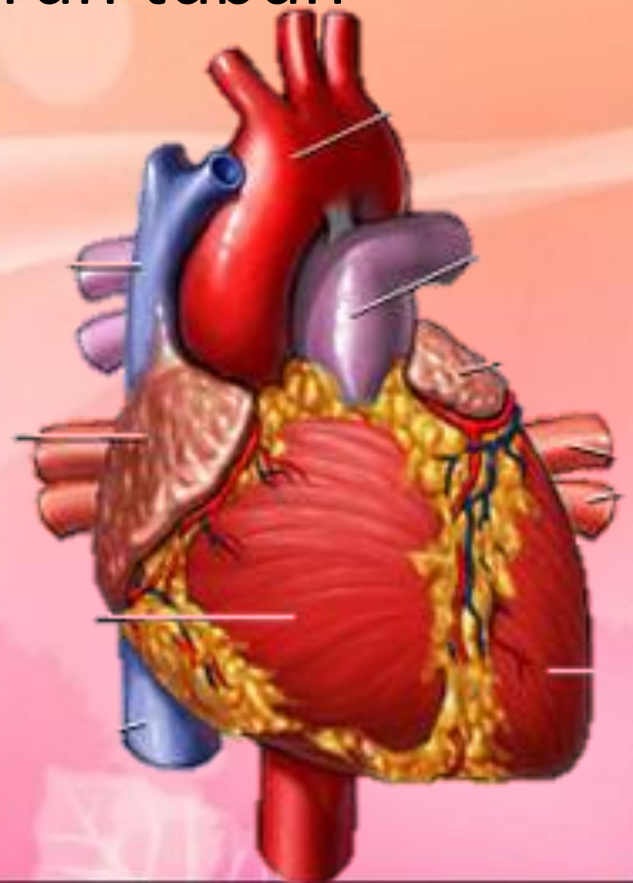
Skeletal

- Terlibat dalam pergerakan involunter seperti otot mata
- Tidak ada striasi dan memiliki sel yang digambarkan berbentuk spindel.

Yang termasuk : stomach and bladder

Smooth Muscle

- Membuat lapisan jantung yang tebal dan dalam.
- Memungkinkan otot jantung untuk dipompa secara terus menerus tanpa pernah beristirahat.
- Meningkatkan sirkulasi yang diperlukan untuk menopang seluruh tubuh



Cardiac Muscle

- Disebut otot lurik
- bagian dari sistem muskuloskeletal, yang menghubungkan otot dan tulang untuk gerakan tubuh.
- Terikat pada kedua ujung tulang oleh tendon.

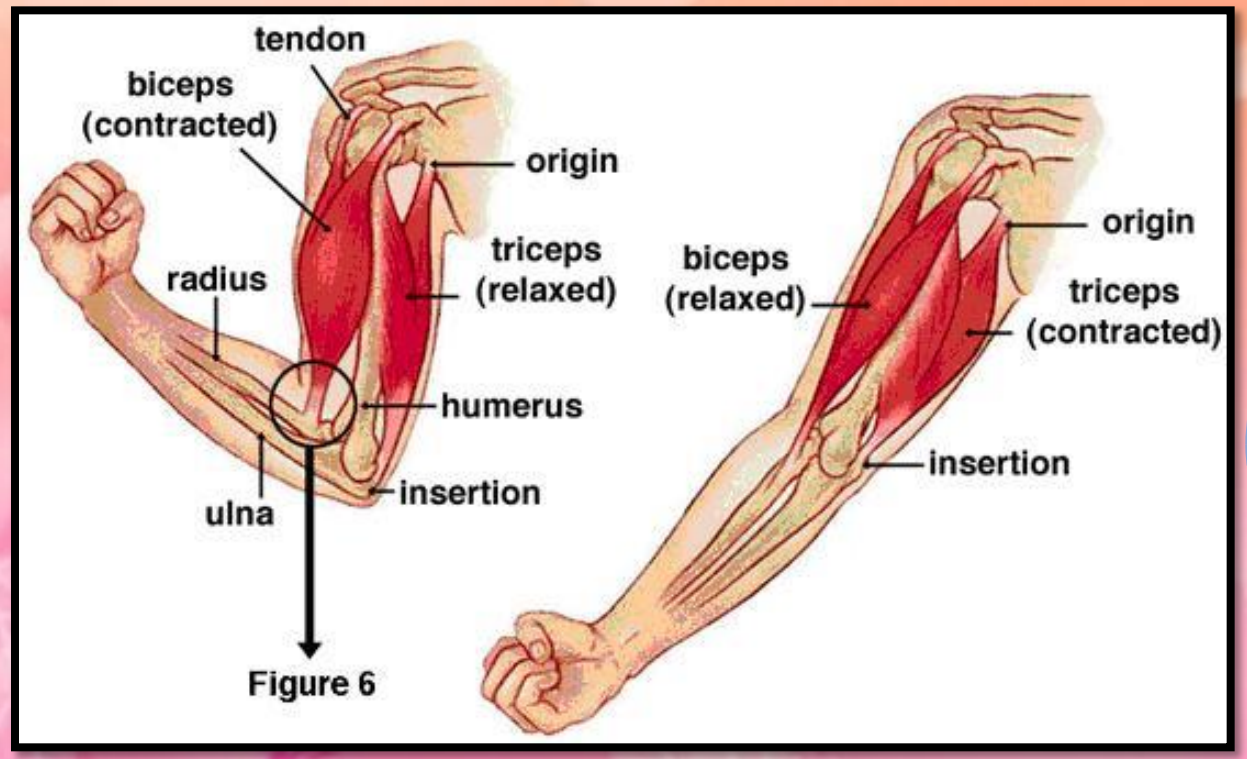


Figure 6

Skeletal Muscle

Joints, ligaments and tendons

Joints

Ligaments

Tendons

Back

GLIDING JOINTS

HOW JOINTS WORK

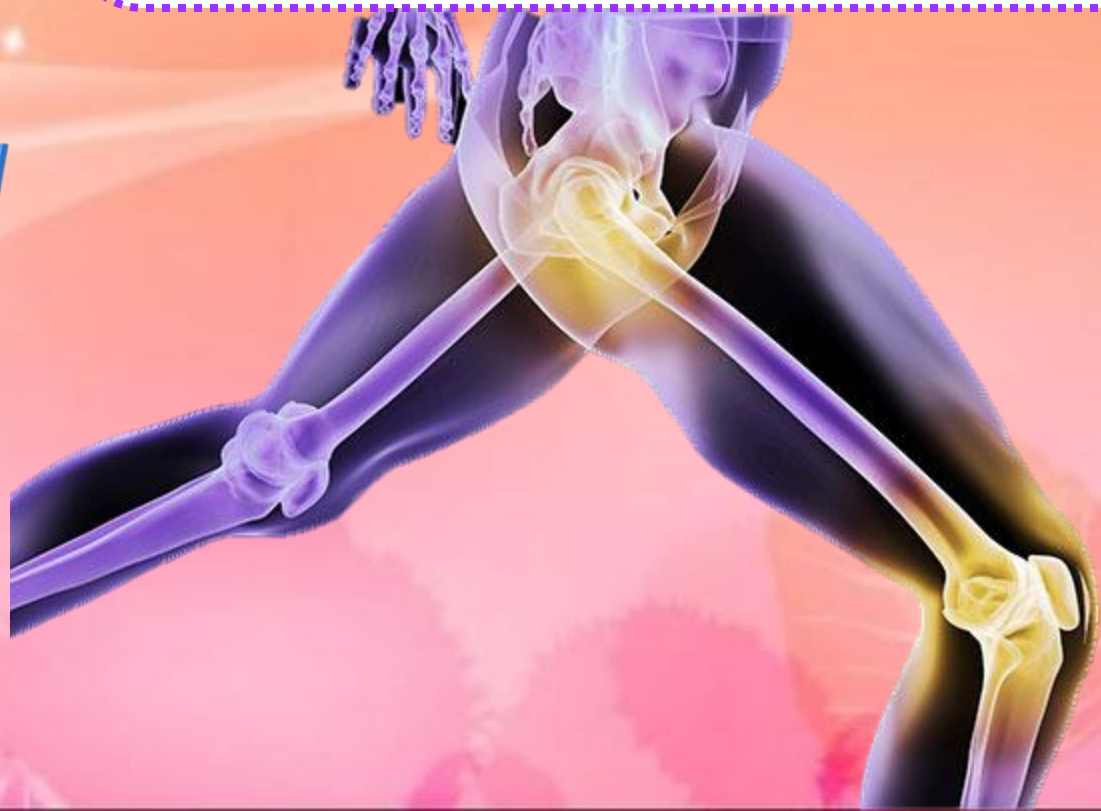
HINGE JOINTS

- Terletak di antara cThe ones between the carpals of the wrist, are found where bones meet as flat surfaces
- Allow for the bones to glide past one [illegible]any

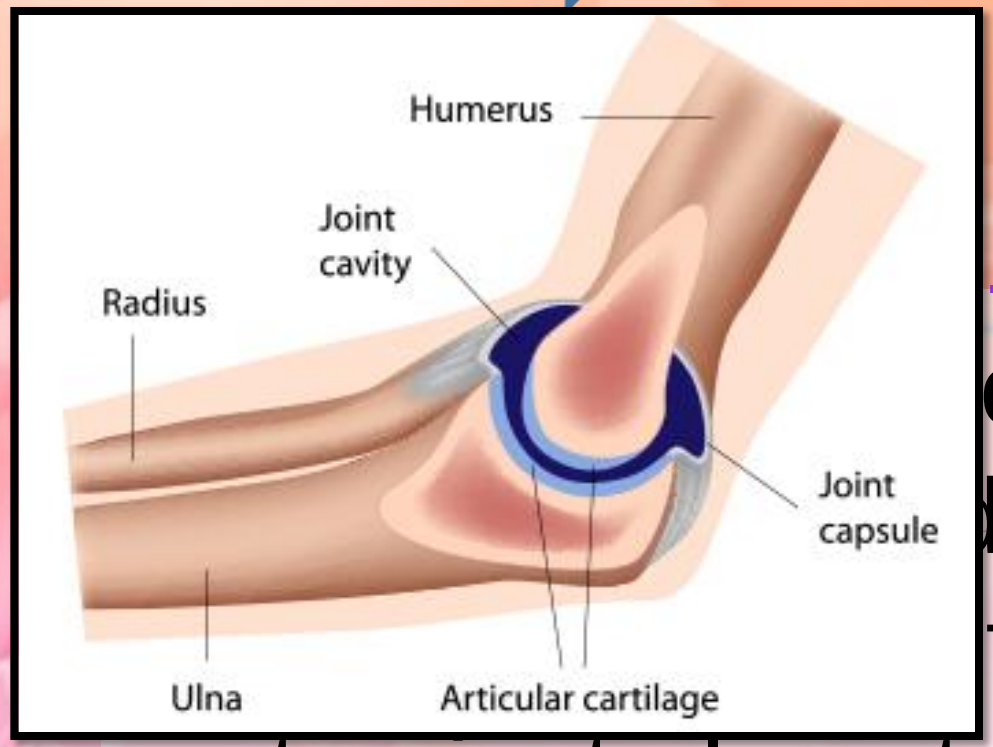
SHOULDER and HIP Joint

Joints

- Are where two or more bones meet; They allow you to move.



SADDLE JOINTS

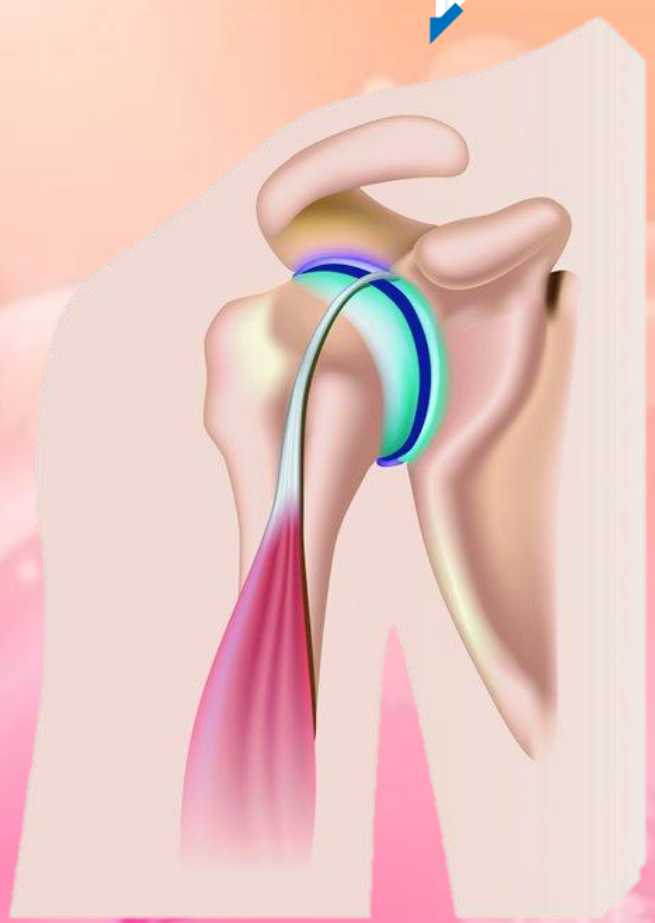


- Such as the elbow and knee, limit movement in only one direction so that the angle between bones can increase or decrease at the joint.

e between the first
l trapezium
mit
tion by allo
ones
to pivot along two axes.

HINGE JOINTS

SHOUDER and HIP Joint

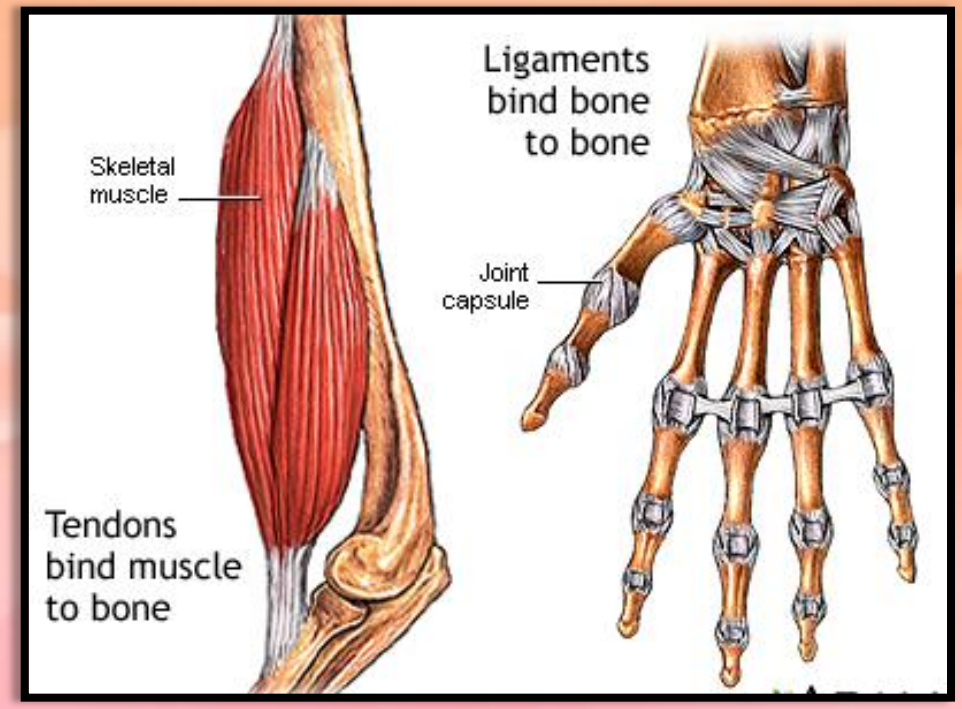


- Form the only ball and socket joints in the body.
- Have the freest range of motion of any joint in the body – they are the only joints that can move in a full circle and rotate around their axis.

Functional Classification of Joints

Type	Description	Examples
Synarthrosis	Immovable joint	Skull sutures Epiphyseal plates Joint between first rib and manubrium of sternum
Amphiarthrosis	Slightly movable joint	Vertebral joints Joint of the symphysis pubis
Diarthrosis	Freely movable joint	Joints of the extremities Shoulder joints Hip joints

Fibrous connective tissue which attaches muscle to bone.

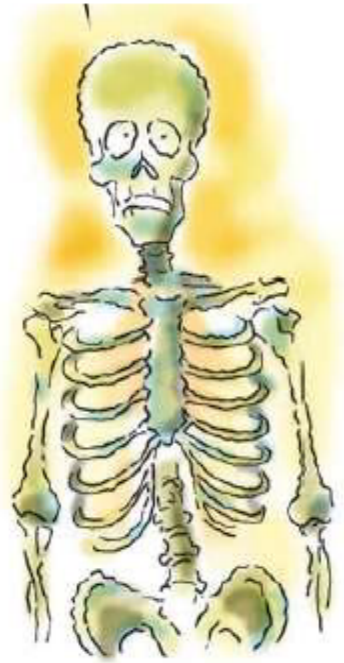


Fibrous connective tissue which attaches bone to bone

Test	Purpose	Nursing Interventions
Arthrocentesis	Obtain synovial fluid from a joint for diagnosis or to remove excess fluid.	After the procedure, apply a compression dressing and tell the patient to report any bleeding and leakage of fluid.

Test	Purpose	Nursing Interventions
Arthroscopy	✓ Used to perform surgery and diagnose diseases of the patella, meniscus, and synovial and extrasynovial membranes. ✓ Fluid may be drained from the joint and tissue removed for biopsy.	✓ If general anesthesia is used, tell the patient not to eat or drink fluids after midnight prior to the procedure. ✓ Following the procedure, assess for bleeding and swelling, apply ice to the area if prescribed, and instruct patient to avoid excessive use of the joint for 2 to 3 days.

Test	Purpose	Nursing Interventions
Bone density (BD) ▪ Dual energy x-ray absorptiometry (DEXA) ▪ Quantitative ultrasound (QUS) ▪ Bone mineral density (BMD) ▪ Bone absorptiometry	✓ Evaluate bone mineral density and to evaluate degree of osteoporosis. DEXA can calculate the size and thickness of bone. ✓ Normal Value: 1 standard deviation below peak bone mass.	✓ Instruct patient to remove all metal objects from the area to be scanned.



Test	Purpose	Nursing Interventions
Bone scan (Nuclear medicine scans)	✓ Uptake is increased in osteomyelitis, osteoporosis, cancers of the bone, and in some fractures. ✓ Uptake is decreased in avascular necrosis.	✓ No special preparation is needed; tell patient to increase oral fluids after the test to aid in excretion of the radioisotope.

Test	Purpose	Nursing Interventions
Computed tomography (CT) scan—long bones and joints, spine	✓ Provides a three dimensional picture used to evaluate musculoskeletal trauma and bony abnormalities. ✓ CT of the spine can identify tumors, cysts, vascular malformations, and herniated intervertebral disk.	✓ If contrast dye is used, assess for allergy to iodine, seafood, or x-ray dye. ✓ Assess medications: oral hypoglycemic agents are contraindicated for use with iodinated contrast. ✓ Have spine x-rays available. If scheduling myelogram and spine CT, patient should have myelogram first.

Test	Purpose	Nursing Interventions
Computed tomography (CT) scan—long bones and joints, spine		✓ If long-bone and joint CT, nuclear medicine tests to locate "hot spots" should be done before CT. ✓ After the test, if contrast dye was used, monitor for delayed allergic reaction (rash, itching, headache, vomiting) and instruct patient to increase fluid intake.

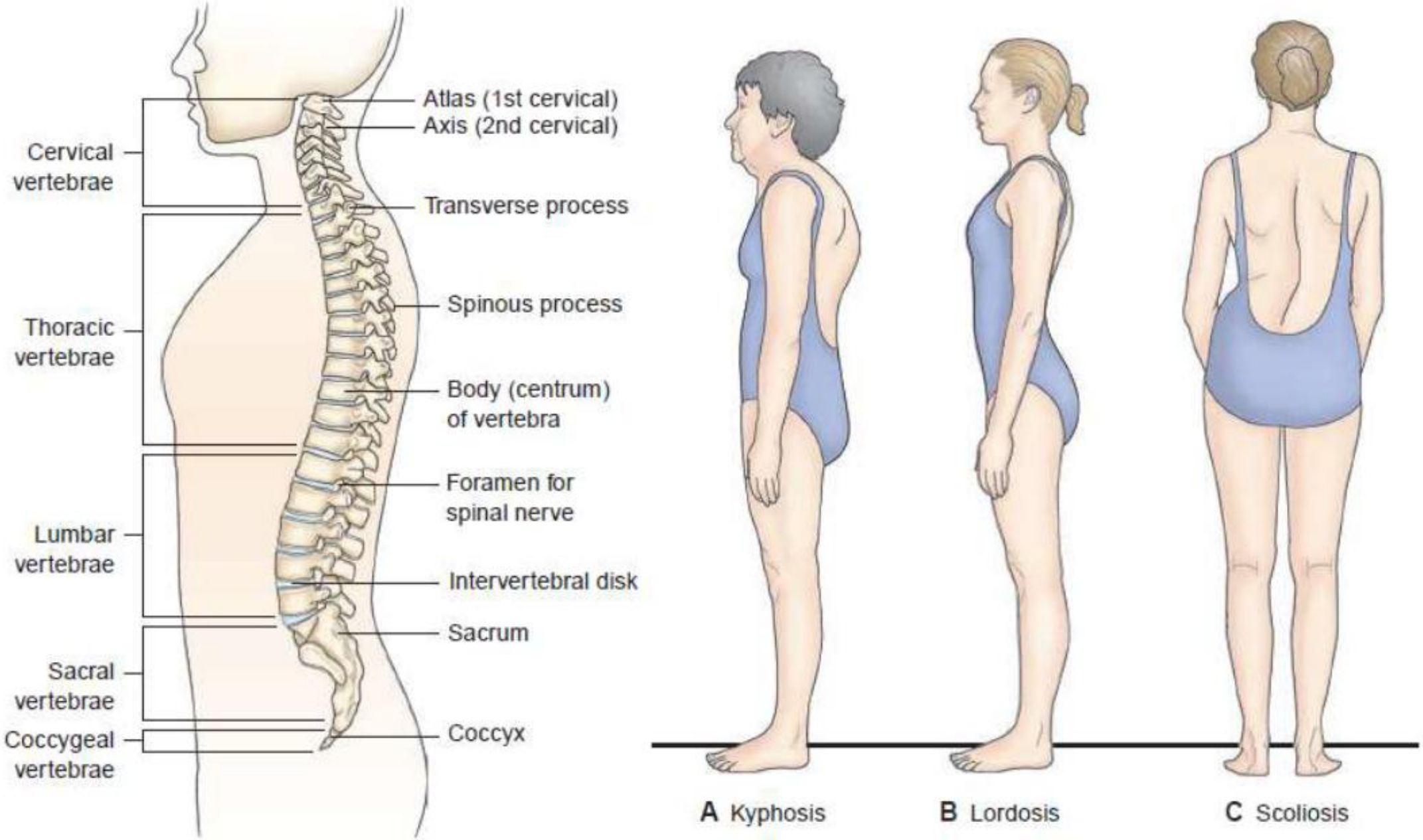
Test	Purpose	Nursing Interventions
Skeletal x-ray	✓ Identify and evaluate bone density and structure.	✓ Ask women if they are pregnant; x-rays should be avoided during the first trimester. ✓ No special preparation is needed for skeletal x-rays.

Test	Purpose	Normal Value
Alkaline phosphatase (ALP)	Identify bone diseases. Increased in bone cancer, Paget's disease, healing fractures, rheumatoid arthritis, osteoporosis.	42–136 unit/L ALP1 20–130 unit/L ALP2 *(increases slightly with aging)*
Calcium (Ca)	Monitor calcium levels and detect calcium imbalances. Decreased with lack of calcium and vitamin D intake, and malabsorption from the gastrointestinal tract. Increased in bone cancer and multiple fractures.	4.5–5.5 mEq/L or 9–11 mg/dL (serum)

Test	Purpose	Normal Value
Phosphorus (P), phosphate (PO4)	To assess phosphorus levels. Increased with bone tumors and healing fractures.	1.7–2.6 mEq/L or 2.5–4.5 mg/dL
Rheumatoid factor (RF)	To diagnose rheumatoid arthritis (RA) (positive for RA at > 1:80). Also increased in lupus erythematosus and scleroderma.	< 1:20 titer

Test	Purpose	Normal Value
Uric acid	Diagnose and monitor the treatment of gout. Panic level considered > 12 mg/dL.	Male: 3.5–8.0 mg/dL Female: 2.8–6.8 mg/dL
Human leukocyte antigen	Diagnose diseases such as juvenile RA or ankylosing spondylitis..	Match or no match; no normal values (HLA)
Creatine kinase (CK)	Diagnose muscle trauma or disease. Increased in muscular dystrophy and traumatic injuries (specifically, CPK-MM isoenzyme).	94%–100%

Category	What to Ask	Rationale
Physical Examination	Inspect, palpate, and observe range of motion (ROM) of affected areas.	Altered gait, tone, size, shape, posture, contractures, deformities, ROM, pain, and effects on ADLs can be determined.
	Assess color, warmth, circulation, and movement of affected areas.	Nerve function, sensation, movement, weakness, and the potential development of compartment syndrome can be determined.
	Palpate all pulses below involved area.	Alterations may indicate altered vascular integrity of affected area or demonstrate developing compartment syndrome.


Atlas (1st cervical)
Axis (2nd cervical)
Cervical vertebrae
Transverse process
Spinous process
Thoracic vertebrae
Body (centrum) of vertebra
Foramen for spinal nerve
Lumbar vertebrae
Intervertebral disk
Sacrum
Sacral vertebrae
Coccygeal vertebrae
Coccyx
A Kyphosis
B Lordosis
C Scoliosis

MUSCLE GRADING SCALE

Scale	Assessment Description
0	(No visible) contraction; paralysis
1	Can feel contraction of muscle but there is no movement of limb
2	Passive ROM
3	Full ROM against gravity
4	Full ROM against some resistance
5	Full ROM against full resistance

NEUROVASCULAR ASSESSMENT

Monitor	Report
Color	Pallor, cyanosis, redness, or discoloration
Temperature	Unusual coolness or warmth
Pain	Pain that is worse on passive motion; pain that no longer responds to analgesics
Movement	Alterations in movement
Sensation	Alterations in feeling; tingling or paresthesias
Pulses	Diminished or absent distal pulses
Capillary refill	Nail bed that does not blanch in 3–5 seconds


...Terima
Kasih ...