

INTRODUCTION TO JOINT SURGERY

A joint is an articulation between two or more bones, a bone and a cartilage or between cartilages.

A true joint is made of articular surfaces (usually marginal or fibrocartilage), synovial tissue and fluid and supporting ligaments

Anatomy of major joints in the body:

Gleno-humeral joint (Shoulder joint):

- Has no major ligaments
- Muscle around the joint stabilizes it
- Relatively unstable due to the shape of the glenoid cavity and the humeral head
- Contain very thin joint capsule
- Common diseases affecting the joint include osteochondrosis, contracture infraspinatus and fracture of humeral head

Elbow (humero-radial joint):

- Stable to some extent due to anconeal process
- The joint is stabilized by lateral and collateral ligaments from the humeral epicondyle to the head of the radius
- Articulation is between the head of the radius and the medial humeral condyle, while the ulna articulate with the medial humeral condyle
- Common disorders of this joint include fragmented coronoid process, un-united anconeal process and osteochondritis dissecans of the humeral condyle

Radial- carpal- ulna joint:

- It forms a complex joint with metacarpal and carpo-metacarpal joints
- It has poorly developed collateral ligaments in small animals and joint stability depends mainly on tendinous support
- Has moderately thick joint capsule
- Common problem in this joint include fractures and osteoarthritis

Hip joint (coxo-femoral joint):

- Most naturally stable joint
- Joint is formed by the articulation of the acetabulum and the head of the femur
- Has well developed joint capsule and round ligament
- Possess massive muscle support
- Common problem of this joint include luxation, hip dysplasia, avulsion fracture

Stifle joint (femoro-tibial):

- Formed by the articulation of the epicondyle of the femur, crest of the tibia and the patella
- Stability of the joint depends on the ability of the menisci to adapt femoral condyles to the head of tibia and patella
- Collateral ligament and patellar ligaments are well developed
- The quadriceps muscles, sartorius, gastrocnemius, plays important role in the stability of the joint
- Synovial and fibrous capsules are well developed
- Common injury of this joint include patellar luxation, cruciate ligament rupture

Hock joint:

- It is a composite joint comprising of tibio-tarsal, fibulo-tarsal, inter-tarsal and tarso-metatarsal joints
- Has relatively good stability due to malleoli
- Has a strong collateral ligament
- Very little movement is present in the inter-tarsal joint

CLASSIFICATION OF COMMON JOINT INJURIES

- Fracture involving joint surfaces e.g. condylar fracture of the humerus, avulsion fracture of femoral head, fracture of the rim of the acetabulum and glenoid cavity.
- Degenerative disorders of the joint articular surfaces e.g. osteochondritis, osteoarthritis.
- Torn joint capsule
- Torn joint ligaments with luxation or sub-luxation
- Sprains
- Rupture or laceration of ligaments.

Common Causes of Joint Injuries

- Trauma (direct or indirect forces)
- Weight of the animal
- Hereditary predisposition
- Excessive use or prolonged stress
- Nutrition (overnutrition or deficiency)
- Infection e.g. Mycoplasma, Histoplasma, Corona virus
- Immune reaction e.g. Rheumatoid arthritis, Systemic lupus erythromatosus
- Idiopathic polyarthritides

Investigating Joint Disorders: Points to Note

- Careful interview to determine the cause of injury, the predisposing factors and the time of onset of clinical signs should precede every investigation.
- Limbs palpation and observation of gait are much more rewarding than radiography.
- Examine the gait for evidence of weight bearing.
- Palpate the joint proximal and distal to the affected joint.
- Move the joint through the full range of motion to check for luxation.
- Check for proprioceptive reflexes such as patella reflex, anterior drawer reflex e.t.c.
- Obtain lateral and antero-posterior radiographs of the joint for anatomic evaluation.
- Biopsy of joint effusion can be taken for cytology and bacterial culture.
- Other diagnostic methods such as computed tomography, ultrasonography and magnetic resonance imaging may be employed in difficult cases

Management of joint injury

Immobilization of joints:

- Indications for joint immobilization include luxation, joint swelling, and sprain.
- Remember that articular cartilage will degenerate due to lack of nutrition.
- Immobilization that resulted in hemarthrosis will cause joint stiffness due to fibrosis and contracture.
- Try to avoid immobilizing joint. If imperative limit immobilization to three weeks.

Types of Immobilization used

- Shoulder joint: Sling bandage, wood coaptation splint.
- Elbow joint: Thomas splint, wood coaptation splint.
- Radio-carpal joint: Robert Jones, Plaster cast, Mason meta splint.
- Hip: Figure 8 slings.
- Stifle: Thomas splint, wood coaptation splint.
- Hock: Thomas splint, Plaster cast, wood coaptation splint, Robert Jones dressing.

Arthrodesis

This refers to the surgical fusion of joint to prevent movement.

Indications:

- Irreparable fractures of joint.
- Irreparable luxations of joint

- Neurologic injury causing paresis of limbs e.g. radial nerve paralysis

Most commonly fused joints:

- Radio-carpal
- Tarso-metatarsal
- Intertarsal
- Hock
- Elbow and stifle
- Shoulder

Fixation Devices Commonly Used For Joints

- Radio-carpal: crossed pins or bone plates
- Tarso-metatarsal: Tension band wire
- Intertarsal: Tension band wire
- Hock: Large cancellous lag screw, bone plate or tension band wire
- Elbow and stifle: Bone plate and crossed pins
- Shoulder: Bone plate, cancellous lag screw.

Principles of Technique

- Make sure all joint cartilages are removed
- Ensure that joints are aligned at normal angle
- Provide rigid internal fixation
- Use bone graft to pack all non- congruent surfaces and to stimulate early callus formation.
- External splint or cast can be used for 4-6 weeks

Arthrotomy

This refers to surgical incision into joint capsule. The following point should be considered when planning for an arthrotomy.

- Approach that does not disrupt tendons or ligaments is preferred i.e. myotomy preferred over tenotomy or desmotomy.
- Incise fibrous and synovial capsule in same line.
- Plan incision carefully to avoid injury to articular injury and to allow for placement of suture.
- Avoid injuries such as scratches and gouges in articular cartilage.
- Flush joint with saline to clear out debris and blood.
- Do not allow non- absorbable suture to penetrate synovium where it can rub on joint capsule.
- Always use absorbable suture where a continuous suture line is placed.
- Use a size 2/0 or 3/0 catgut, dexon or monofilament when there is no stress or size 0 nylon when there is stress.