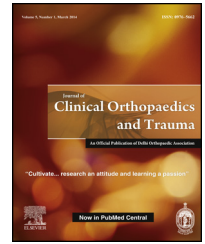


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Quiz

Quiz

- Which muscle is primarily responsible for the subluxation of first metacarpal in Fig. 1?
 - Extensor pollicis longus
 - Extensor pollicis brevis
 - Abductor pollicis longus
 - Abductor pollicis brevis
- Which type of bearing surfaces in total hip arthroplasty is associated with Aseptic Lymphocyte-dominated Vasculitis Associated Lesions (ALVAL)?
 - Metal on UHMWPE
 - Metal-on-metal
 - Ceramic on UHMWPE
 - Ceramic on ceramic
- Which one of the following statement is false about Floor Reaction Orthosis?
 - It is based on Newton's third law
 - It accentuates knee extension in midstance
 - It limits ankle dorsiflexion in single support
 - It improves gait in fixed flexion of hip & knee
- Which one of the following substance works as initiator of polymerization in bone cement?
 - Dibenzoyl peroxide
 - Zirconium dioxide
 - 2,5-dimethylhexane-2,5-hydroperoxide
 - Barium sulphate
- Which adverse effect is seen to be associated with the use of non-circumferential porous coating of femoral stem in total hip arthroplasty?
 - Increased rate of stress shielding
 - Increased rate of distal osteolysis and late femoral loosening
 - Increased rate of thigh pain
 - Increased rate of infection

Answers and explanations

- C – *Abductor pollicis longus*

Fig. 1 denotes partial intra-articular fracture of base of the first metacarpal that is also known as Bennett's fracture. It was first described by Bennett EH in 1882 as he presented five pathologic specimens of healed fracture of the palmar

articular surface of the base of the first metacarpal.¹ Bennett's fracture is actually a fracture-subluxation. This injury-pattern is caused by axial loading of first metacarpal in partially flexed position. The small volar-ulnar fragment is of variable size and is known as Bennett's fragment and is pyramidal in shape. It is held in place by the anterior oblique ligament which connects it to the trapezium. The rest of the metacarpal base subluxates radially, proximally, and dorsally. Fig. 2 shows displacement of Bennett's fracture that is primarily caused by the action of abductor pollicis longus and adductor pollicis resulting in flexion, supination, and proximal migration.

The goals of treatment are to: (1) restore stability of the CMC joint by rejoining the Bennett fragment (attachment of



Fig. 1 – Posteroanterior view of the thumb in skeletally mature individual.

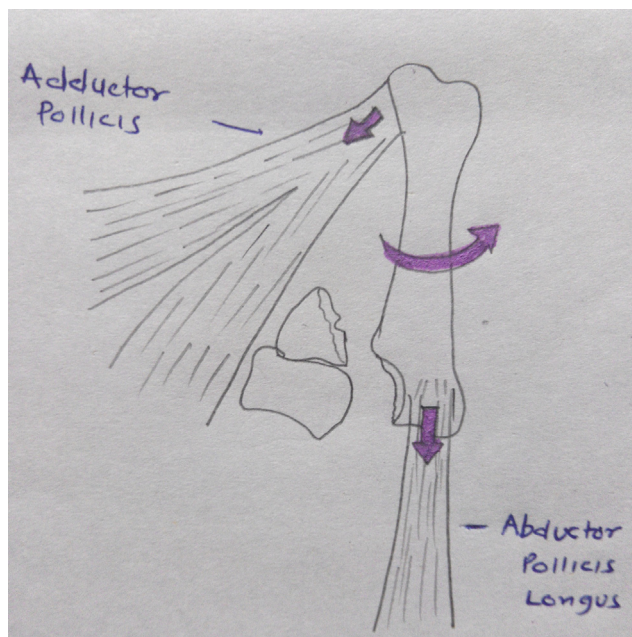


Fig. 2 – Diagrammatic representation of Bennett's fracture showing the roles of adductor pollicis and abductor pollicis longus in the fracture displacement.

the anterior oblique ligament) to the thumb metacarpal and (2) restore articular congruity of the thumb metacarpal base.

Axial rotation is limited by the joint capsule, ligaments, extrinsic tendons, and geometry of the joint surfaces.² Joint stability is maintained by five ligaments: the anterior (volar) and posterior oblique ligaments, the anterior and posterior intermetacarpal ligaments, and the dorsal radial ligament. Joint compressive forces are high during simple pinch and grasp. Thus, significant loss of joint congruency, either secondary to an unreduced intra-articular fracture or from disruption of the soft tissue stabilizers, leads to post-traumatic arthritis. Bennett's fracture-subluxation is reduced under suitable anaesthesia by extending and pronating the thumb metacarpal while longitudinal traction and downward pressure are applied to the metacarpal base.

References

1. Bennett EH. Fractures of the metacarpal bones. *Dublin Med Sci J.* 1882; 73:72–75.
2. Edmunds JO. Traumatic dislocations and instability of the trapeziometacarpal joint of the thumb. *Hand Clinics.* 2006; 22(3):365–392.

2. B – Metal-on-metal

Joint replacements started with components using metal-on-metal (MOM) articulations. However, these components had a high failure rate and were deemed unsatisfactory. The early MOM prostheses gave way to polyethylene and ceramic based components. But lately, improvements in manufacturing and composition lead to the emergence of a second generation of

MOM implants that have improved wear properties. The metal components of these second generation MOM prostheses are alloys of cobalt, chromium, molybdenum or nickel.

Wear particles from second generation implants are smaller than those associated with first generation implants. The smaller size of particles and higher surface area of MOM debris particles facilitates their diffusion into surrounding tissues. A rare and novel complication has been described in association with these MOM bearings that is Aseptic lymphocyte-dominated vasculitis associated lesion (ALVAL).^{1,2} It has been postulated to be a local delayed-type metal hypersensitivity reaction leading to early prosthetic failure. It is hypothesized that metal ions are released due to normal wear and these metal ions combine with native proteins to form haptens that elicit a type IV hypersensitivity response.

Patients usually present around 2–3 years after surgery with complaints of hip or thigh pain, discomfort, palpable fullness. Plain radiographs reveal peri-implant lucency and osteolysis. MRI can further reveal soft tissue mass, effusions, capsular thickening and contrast enhancement. The characteristic histological features are a diffuse and perivascular infiltrate of plasma cells, T and B lymphocytes. Fibrin exudation, accumulation of macrophages with inclusion bodies and eosinophilic infiltrate will also be seen. This unique perivascular inflammatory infiltrate, in fact, is specifically referred to in the name of the syndrome (“vasculitis-associated lesion”).

References

1. Nich C, Hamadouche M. Cup loosening after cemented Metasul® total hip replacement: a retrieval analysis. *Int Orthop.* 2011; 35(7):965–970.
2. Watters TS, Cardona DM, Menon KS, Vinson EN, Bolognesi MP, Dodd LG. Aseptic lymphocyte-dominated vasculitis-associated lesion: a clinicopathologic review of an under-recognized cause of prosthetic failure. *Am J Clin Pathol.* 2010; 134:886–893.

3. D – It improves gait in fixed flexion of hip & knee

The thermoplastic molded ankle-foot orthosis are frequently prescribed. There are 4 main types of below-knee orthotics:

1. UCBL (University of California Biomechanics Laboratory) – in-shoe plastic slipper
2. Leaf spring AFO – single piece short leg brace with ankle in 5° to 10° dorsiflexion
3. Rigid AFO – similar to leaf spring type, except that ankle section is modelled in neutral position and is left rigid
4. Floor-reaction AFO – orthosis with a ventral shell

The first floor reaction AFO (FRAFO) was designed by Al Masunis. A conventional FRO is a rigid type of AFO, and includes a ventral shell and a rigid footplate. The biomechanical mechanism of an FRO is to create a knee-extensor moment during midstance and terminal stance, by shifting of the ground reaction force forward. The FRO limits ankle dorsiflexion in single support and consequently improves knee extension. As the leg passes forward over the foot, a lack of ankle joint dorsiflexion will prevent forward migration of the

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