

ADVANCES IN FRACTURE MANAGEMENT

With increasing knowledge of fracture healing, there is a trend towards minimally invasive method of fracture fixation. The principle of “Minimally invasive method” is to insert implant for fixation through a small incision and when reduction of the fracture is confirmed under X-ray, fixation is done.

Improvement in the design of implant and fixation device together with better imaging techniques make fracture fixation a much less invasive procedure than before. Not just the operative risk is reduced, but also fracture healing is enhanced.

In the past, large incision is made exposing bare bone for drilling holes for screws to enter. Soft tissue like skin and muscles will be damaged and pressure on the bone directly from the implant will cause restriction in vascular supply. Also, screws are not locked on the plate securely. Nowadays, this conventional plate is not the only choice. The new design of locked screws within the plate results in stronger fixation and theoretically quicker healing.. Yet the insertion of such implant only requires small incision. This reduces damage to the skin and muscles.

Principles

- Locked screws within plate results in stronger fixation: the new plate has its screws locked on the plate but not on the bone. Therefore, they will not tilt under minimal bending force as the conventional plate does. Once the screws are fixed into the bone, they are fixed securely onto the bone and are not easily pulled out.
- Reduces risk of pressure necrosis and infection: the locked screws do not press the plate onto the bone surface to create friction as conventional plates do. This will lead to a reduction in pressure necrosis in bone and damage of periosteal blood supply. With better vascularity, fractured bones heal quicker and risk of infection can be reduced.

Material

- The metal Titanium shows mechanical properties more comparable to that of natural bone: Titanium is better than stainless steel for it is less rigid and more “bone-like”. Its elastic property provides it an ability to adapt its shape to the bone surface.

Advantages

- Useful in patients with osteoporotic bone fractures: osteoporotic bone is easy to break under force exertion and is a great challenge to fix. With the new plate fixation system, screws can be fixed and tightened into the bone directly without making holes in advance.
- Useful in nonunion or delayed union cases: in these cases the bone fragments of the fracture are difficult to fix. With the new plate fixation system, a stronger fixation can be achieved.
- Useful in fractures around a prosthesis (e.g. fractured shaft of femur in a patient with total hip replacement done): in the past, such fractures are difficult to fix as the metal part of the prosthetic joint will hinder screws from entering. However, since precise selection of length is not required in the new plate fixation system, these fractures can be fixed.

- Early movement is allowed, hence quicker rehabilitation, early return to normal life: strong fixation of the new system allows restoration of immediate pain-free mobility of the limb. Early rehabilitation is allowed to minimize further impairment.

The new plate fixation system has been introduced in the Queen Mary Hospital for more than three years. It has been used in over two hundred cases resulting in a decrease in complication rate and quicker healing. With these advances, the problem of the aging skeleton is partially solved.