

Orthopedic Introduction

Orthopedic surgery or orthopedics (BE: orthopaedics) is the branch of surgery concerned with acute, chronic, traumatic and recurrent injuries and other disorders of the locomotor system, its muscular and bone parts. Apart from the mechanical considerations, it is also concerned with the pathology, genetics, intrinsic, extrinsic and biomechanical factors involved.

Product profile

➤ What are Orthopaedic implants?

Whenever there is a fracture to the bone, implants are used to facilitate the union of the bone and to assist in healing of the bone. However they are not substitute to the bone and cannot bear the weight of the body effectively like the bone. Implants are made up of stainless steel of 316L grade certified for use in human body.

Trauma and Bio-Fixation range:

➤ What are DCP plates?

Plates are the devices, which are fixed on the bone to facilitate union of bone. DCP is Dynamic Compression plate. The holes of the plates are oval shaped to provide compression. These plates are available in three sizes: Broad, Narrow & Small.

Broad and Narrow DCP plates are used for larger bones, such as tibia and femur. Small DCP is used for smaller bones like Radius, Ulna and Humerus 4.5 mm cortical screws are used in broad and narrow DCP plate and 3.5mm cortical screws are used in small DCP plate. Available from 4 holes to 12 holes.

➤ **What are LC DCP plates?**

These plates are alike DCP plates, but the posterior side of the LC DCP is undercut along the holes. It provides 40% inclination of the screws which is helpful in oblique fractures. Normal DCP plate allows 25% inclination of the screws. Because of the undercuts the surface contact with the plate is limited and the blood supply is not affected.

➤ **What are types of DHS plates?**

DHS plates are available in various angles from 120° to 145° with 5 differences. The length of the plate depends upon the number of holes invariably from 2 holes to 16 holes.

➤ **What is the use of DHS plates? (Dynamic Hip Screw)**

DHS plates are used for Hip fractures (in the subtrochanteric region of the femur bone). This plate is available in the angles of 120°, 125°, 130°, 135°, 140° and 145° and in sizes from 4 holes to 12 holes. And the same DHS screw is used.

➤ **What is DCS plate? (Dynamic Condylar Screw)**

This plate is used for the condylar fractures in the femur. The angle of the plate is 95° and the same DHS screw is used. It is available from 4 holes to 12 holes.

➤ **What is DHS screw?**

DHS screw is used as a top screw to DHS plate. It is passed through the barrel of the DHS plate. The thread is fixed in the femoral head at the center of the subtrochanteric

region. The small screw locks the other end after the plate is fixed and the reduction is achieved. It is available in the length from 50mm – 110mm with 5mm difference.

➤ **Where can the Bio-fixation plates be used?**

It can be used for weak & porous bones

➤ **What are the various Bio-fixation plates and their uses?**

The various plates are:-

- Small Bio-fixation plate (4 to 16 holes) for radius ulna plate
- Narrow fixation plate (4 to 16 holes) for tibia bone
- Broad fixation plate (4 to 16 holes) for femur bone
- Y Plates (4 to 7 holes) meant for lower tibia fracture,
- T –Buttress Plate, Cobra Plate (4 to 12 holes) meant for upper tibial fracture.
- Distal femur plate (4 to 14 holes) for lower end femur fracture
- Proximal Humerus plate (4 to 12 holes) for fracture in humerus bone.

➤ **What are the types of Screws?**

- Cortical Screws (3.5, 4.5 mm) used in Broad and narrow plating.
- Cortical screws – 3.5mm length is (10mm to 40mm) (2mm difference)
- 4.5mm length is (12mm to 70mm) (used in plating)
- Cancellous screws (4 mm) with short threaded and fully threaded (10mm to 60mm.)
- Cancellous screws (6.5 mm) with 16mm, 32mm, and fully threaded (25mm to 110mm)
- Cannulated Cancellous screws (4mm) with short threaded and fully threaded
- Cannulated Cancellous screws (6.5mm) 16mm, 32mm, and fully threaded

- Malleolar Screw 4.5mm (25mm – 100mm) (5mm difference) used in fixation of bone fragments.
- Cancellous Screws are used in CC Surgeries, plating and in interlocking.
- Self Tapping Bolt: 3.5mm length is (16mm to 50mm) (2mm difference), 4.5mm length is (18mm to 70mm) (used in inter locking nailing)
- PFN screws – 6.5 & 8 mm used in Proximal Femur Nails from 50 to 110mm
- Bio-fixation screw – 4mm for fracture of radius ulna & 5mm for Narrow, Broad.

➤ **What are Cortical screws?**

Cortical screws are available in 14/ 20 TPI (Thread per inch). They are non-self tapping, hence tapping is required before insertion. They are available in two size's (3.5mm & 4.5mm) and length varies from 12 to 70 mm in step of 2mm. Cortical screw are widely used in plating. They are also known as cortex screws.

➤ **What are Cancellous screws?**

Cancellous screws have a thin core and a wide and deep thread. It gives the screw considerable increased holding power in fine trabecular bone. They are fully or partially threaded having thread size 4mm & 6.5mm.

Fully threaded screws are used in metaphyseal and epiphyseal areas of bone.

Partially threaded screws are used as Lag screws.

➤ **What are Malleolar screws?**

Malleolar screws have the same thread profile like cortical screws but with a trephine tip. They are used for the fixation of medical malleolus. They are partially threaded and are ideal for fixation of bone fragment.

➤ **What are sizes of DHS Screws?**

It is available in the length from 50mm – 110mm with 5mm difference.

NAILING:-

➤ **What is interlocking?**

Interlocking is known as Intra medullary nailing system where in the nail is implanted in the medullar cavity of the bone. The nail has slots in it through which the bolt is passed and locking is achieved. It helps in bringing the fractured segment closer. The advantage of interlocking is it minimizes the blood loss.

➤ **What are Interlocking Nails?**

These are the gun drilled nails, which are implanted in the intra medullar cavity of the bone. The nail has slots in it through which the bolt is passed and locking is interlocking is it minimizes the blood loss.

➤ **What are types of interlocking nails?**

There are various types of interlocking nails:

- Tibia
- Compression Tibia
- Femur
- Recon
- Proximal Femur Nail,
- Supracondylar
- Humerus Nail.

➤ **Tibia Nail:-**

Used for fracture in the tibia bone below the knee

Size: Dia : 8,9,10, 11 mm Length: 26cm - 40cm (1cm diffn)

➤ **Compression Tibia:-**

Used for fracture in the upper bend of tibial bone below the knee

Size: Dia: 8, 9, 10 mm Length: 26cm - 40cm (1cm diffn)

➤ **Recon Nail (Right/ Left):-**

When there is a cross fracture in the femoral neck bone recon nail is used.

Size: Dia: 9, 10, 11 mm. Length: 34cm - 42cm (Left and right) (2cm Diffn)

➤ **Supracondylar Nail:-**

Used for the femoral bone in case of multiple fractures.

Size: Dia : 10,11,12 mm Length:18cm - 28cm (2cm diffn)

➤ **Humerus Nail:-**

Used for the humerus bone in the arm.

Size: Dia: 6.5, 7, 8 mm Length:18cm - 28cm (2cm diffn)

➤ **Proximal femur Nail:-**

Used for Subtrochanteric fracture

Size: Dia: 9, 10, 11,12 mm Length: 22cm - 28cm(2cm diffn)

➤ **What are Square Nails?**

Square Nails are used for fractures related to radius and ulna.

Radius ulna are the bones of the forearm, square nails are inserted in the medullar cavity of radius and ulna.

➤ **What are K. Nails?**

K nails are the simplest type of intra medulla nails; they are implanted in the medullar cavity of the bone. The only basic difference between interlocking nails and K- nails is that the bolts cannot lock the K-nail. In short it is the cheapest option available to the non-affording patient.

PROSTHESIS:

➤ **What is Austin Moore Prosthesis?**

Austin Moore Prosthesis is used when the femoral head is broken; this prosthesis consists of a round solid ball with a tail having holes. The broken femoral head is taken out and is replaced by AMP. The tail rests in the femoral cavity. The size of the AMP depends upon the diameter of the femoral head.

➤ **When is Austin Moore used?**

The AMP is used when the femoral head is broken or fractured and cannot be united.

➤ **What is the Bipolar prosthesis?**

Bipolar prosthesis is used when the femoral head is broken from its neck. Bipolar Prosthesis consists of stem, modular ball, and bipolar head. It provides better mobility than the conventional Austin Moore prosthesis because it provides additional movement

between stem and head. The stem is fixed in the femoral cavity with the help of bone cement.

➤ **What is Total Hip prosthesis?**

Total Hip Prosthesis is used when the acetabular cavity is damaged. Artificial acetabular cup is fixed in the broken cavity. Total Hip Prosthesis consists of Acetabular cup, stem, and modular ball.

➤ **What is cemented Hip prosthesis?**

In this type artificial Acetabular cup is fixed in the broken Acetabular cavity with the help of bone cement. The stem is cemented in the femoral cavity.

➤ **Fixed Bipolar for femur neck fracture 37 – 55 mm. (2mm Diff)**

INSTRUMENTS:

➤ **What are Orthopaedic instruments?**

There are various orthopaedic instruments used to insert implants for healing fractures. There are various kinds of instruments such as Zig, Bolts, Curved Bone, Awl, Triple Reamer, Tap, etc. these are all used in surgeries.

➤ **What are Orthopaedic instrument sets?**

Interlocking sets: Tibia, Femur, Supracondylar, Recon, Humerus, Small fragment instrument set, Basic Instrument set, Plating set, DHS Instrument set, Condylar Plate Instrument set, Cannulated Cancellous Screw set, Ilizarov Set.

➤ **What are the types of External Fixators?**

Various type of external fixators are: Clamps, Rods, Schanz screws, Steinmen Pins and Illazarov method.

➤ **What is flexible reamer?**

Reamers are used for reaming the medullar cavity before insertion of the nail. Reaming increases the medullar cavity so as to help the insertion of nail. Inflexible reamer, the reamer shaft is flexible and is passed over the guide wire with replaceable tips of different diameters at its end

➤ **What are K wires?**

K wires are the S.S wires of various diameters used for reduction and for holding the small fractured segment. It is pointed on both the ends. Sometimes it is used as a guide to direct a screw.

➤ **What are Guide wires?**

Guide wires are used in interlocking nailing system. Their main application is to guide the passage of the nail in the medullar cavity.

➤ **What are Stienmen pins?**

Stienmen pins are used as external fixators.

➤ **What are Schanz pins?**

Schanz pins are external fixators, its pointed end is inserted in the bone, its thread provide better grip in the bone. The other end is passed through the clamps and the clamps are attached to each other with the help of rods and the bone union is achieved.

Sterilization:

➤ **What is Sterilization?**

Sterilization is a process in which the implant is sterilized so that after the implant is induced in the body it will be free from any infections.

➤ **What is gamma radiation?**

Gamma radiation is the process of Sterilization in which the implant are exposed to gamma rays and it eradicates the bacteria to keep free from infection in different types of viruses.

➤ **How are the implants sterilized?**

Sterilization is done by 2 ways.

1. Gamma radiation
2. E.T.O

➤ **What is E.T.O sterilization?**

In this procedure implants are sterilized by using Ethylene Trioxide.

➤ **What Orthopedics products do you Sterile & ETO?**

BARC:

Nail & Austin moore Prosthesis

ETO:

- Fixed bipolar
- All femoral stem
- Acetubular cup
- Bipolar head
- Modular balls

All the other items are for Autoclave sterilization.