

# The Orthofix Hybrid Fixation System



# SAFE CORRIDORS FOR X-WIRE INSERTION









## **X-WIRE INSERTION**

- Choose appropriate ring.
- Full circumference rings may be made by joining 1/3 and 2/3 rings together with locking screws.



- Reference anatomically safe corridors on cross-section of limb.
- Insert wire closest to the joint first.
- Insert a two-hole securing pin into appropriate hole in ring.
- Introduce tip of X-Wire with lateral olive through the two-hole securing pin.
- Push wire through soft tissues and drill through bone, while assistant maintains ring parallel to joint with limb centered within it. Avoid joint capsule.
- When wire has exited far cortex, stop drilling and ensure wire is parallel to ring and joint line.
- Continue to advance wire by tapping it with mallet, until lateral olive is against securing pin.

*NB: Wire may be drilled above, below or through the ring, for best position relative to fracture and joint capsule.* 



- Loosen all screws of three-hole wire clamp slider unit.
- Orient clamp in same direction as securing pin.
- Introduce wire into appropriate hole in slider unit.



*First wire may be inserted free-hand. Use a X-Wire without olive and attach it to ring using a three-hole wire clamp slider unit at each end.* 

• Tighten both slider units to ring, then tighten wire clamp screw on one end of wire.



- Insert parallel wire next through second hole in securing pin, using wire guide.
- Disconnect the slider unit temporarily from the ring and then insert it over both wires.
- Tighten slider unit on to ring fully, using 3 mm Allen wrench.
- Position limb in center of ring.



- To tension wires, open handle of wire tensioning device to fullest extent.
- Fully insert wire through the device sliding it up against face of slider unit.
- Tension wire to minimum of 1200 N, in two stages if necessary.
- Tighten wire clamp screws with 5 mm Allen wrench.
- Cut and/or bend wire and apply wire cover.

NB: Where X-Wires without olive have been used in conjunction with three-hole wire clamp slider units at each end, apply tensioning device to end of wire which has not yet been tightened in its slider unit and tension as above.



- Insert crossing wires at widest angle neurovascular structures will permit (usually between 50°-70°).
- For optimal ring stability wires should cross in the center of the tibia.
- Insert the securing pin into the ring, upside-down relative to the first securing pin to prevent wires from intersecting in bone.



### **DIAPHYSEAL SCREW INSERTION**

- Reduce fracture further by manipulation of ring and limb.
- Attach fixator to ring using the coupling with ball-joint, and lock with 3 mm Allen wrench.
- Position fixator parallel to long axis of bone with cams and all locking nuts accessible for tightening. Make sure fixator body is neither fully closed nor fully open.
- Clamp acts as its own template for screw insertion. Insert bone screws in standard manner (See Manual 1, "Orthofix External Fixation: Basic Considerations"). Where two screws are inserted, use clamp seats 1 and 5; where three are inserted, use seats 1, 3 and 5.



- Confirm fracture reduction.
- Lock micromovement locking nut, central body locking nut and ball-joints of the fixator with the 6 mm Allen wrench.
- Use torque wrench for final locking of ball-joints only.



- Reinforcement bars may be added to increase stability.
- Insert post through ring and attach bar using a supplementary screw holder clamp.
- Attach opposite end of bar to bone screw using another supplementary screw holder clamp.
- As healing progresses, remove reinforcement bars to increase load sharing at the fracture site.



## **DIAPHYSEAL SCREW INSERTION**

- Attach diaphyseal ring using three reduction units (antero-laterally, postero-laterally and postero-medially).
- All rings in one frame should be the same size.
- The telescopic and micrometric mechanisms of the reduction units should be partially open and spaced evenly around the circumference of the rings.
- Ensure that reduction units are perpendicular to the rings with the telescopic bodies oriented in the same way.
- Tighten all cams and locking screws.



- A Sheffield Clamp is attached to the diaphyseal ring antero-medially using 10 mm spanner.
- The rings should always be orientated so that the Sheffield Clamp is mounted on the 2/3 component, when a full ring is being used.
- Confirm fracture reduction.



- Clamp can be rotated to establish ideal position for diaphyseal screws.
- Clamp cover locking screws should face anteriorly.
- Clamp acts as its own template for screw insertion.
- Using a trocar, identify desired bone screw orientation and tighten rotational locking screw with 6 mm wrench.





• Where two screws are inserted, use clamp seats 1 and 5; where three are inserted, use seats 1, 3 and 5.



- An additional screw may be inserted at 45°-90° to the first group using a single screw clamp attached to the diaphyseal ring.
- Where this screw is used, only two screws would normally be inserted through the Sheffield Clamp.
- This clamp can rotate for optimal screw placement.



- Final fracture reduction can be made using the distraction and ball-joint facilities of the three reduction units, after loosening the cams and locking screws.
- After reduction, ensure that all cams and locking screws are fully tightened.
- The micrometric mechanism may be used for post-operative length correction of the fracture.



• Standard frame may be preconstructed before inserting the X-Wires.

The Orthofix Quality System has been certified to be in compliance with the requirements of:
Medical Devices Directive 93/42/EEC, Annex II - (Full Quality System)
International Standards ISO 13485 / ISO 9001 for external fixator devices, implants for osteosynthesis and related instruments.



See "Orthofix External Fixation System" instruction leaflet (PQ EXF) prior to use.

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