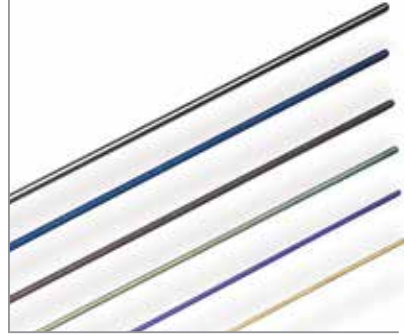


WIN Flexible Nail System

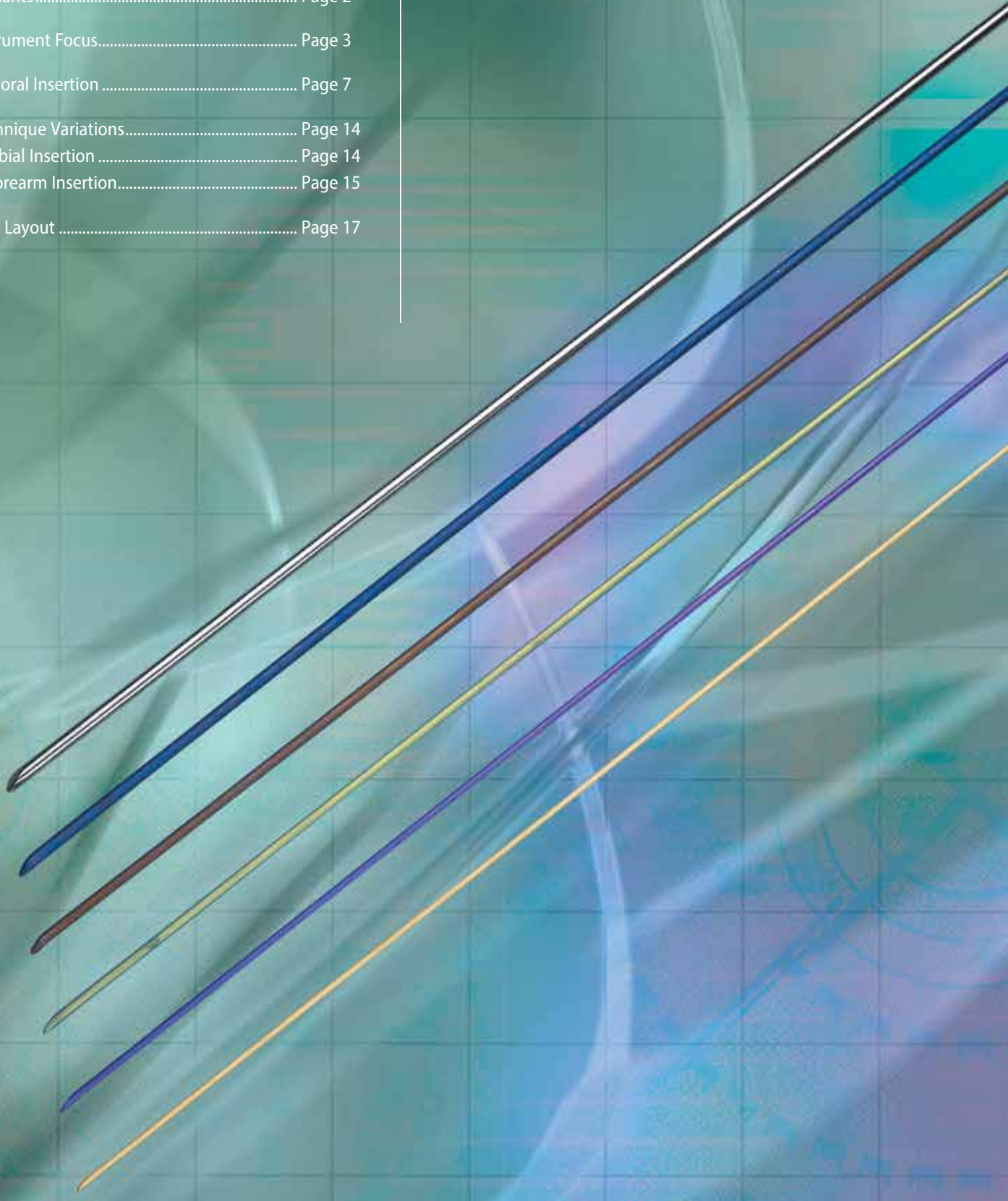
Surgical Technique



BIOMET

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Indications and Contraindications

WIN Nail System (Pediatric)

WIN Nails are to be used for treatment of long-bone fractures including non-comminuted and comminuted mid-shaft fractures, subtrochanteric fractures, distal third fractures, combination fractures of the shaft and neck, intertrochanteric fractures, combination intertrochanteric and subtrochanteric fractures. Not for sale in Canada.

CONTRAINDICATIONS

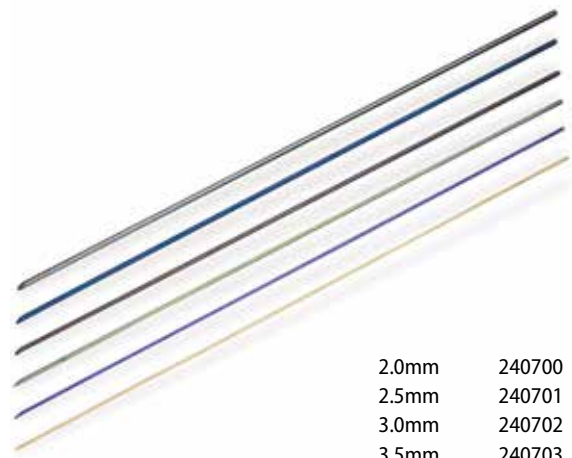
1. Infection.
2. Patient conditions including blood supply limitations, and insufficient quantity or quality of bone.
3. Patients with mental or neurologic conditions who are unwilling or incapable of following postoperative care instructions.
4. Foreign body sensitivity. Where material sensitivity is suspected, testing is to be completed prior to implantation of the device.

This material represents the surgical technique utilized by David Weisman, M.D. Biomet does not practice medicine. The treating surgeon is responsible for determining the appropriate treatment, technique(s), and product(s) for each individual patient.



Implants

WIN Nail Coloring Scheme



2.0mm	240700
2.5mm	240701
3.0mm	240702
3.5mm	240703
4.0mm	240704
4.5mm	240705

Instrument Focus

Pre-Drilling Instruments



Low Profile Drill Guide 2.5mm / 3.0mm 466142
 Low Profile Drill Guide 3.5mm / 4.0mm 466146



Soft Tissue Guide	466112
2.5mm Drill Guide	466132
3.0mm Drill Guide	466135
3.5mm Drill Guide	466133
4.0mm Drill Guide	466136
4.5mm Drill Guide	466134
5.0mm Drill Guide	466137
2.5mm Drill Bit	466118
3.0mm Drill Bit	466119
3.5mm Drill Bit	466120
4.0mm Drill Bit	466121
4.5mm Drill Bit	466122
5.0mm Drill Bit	466123

Instrument Focus

Nail Insertion



WINserter 466110



WINserter Spanning Wrench 466184



WINserter Spanning Wrench Further Tightening
The WINserter

Nail Removal - Utilizing The Vice Grips



Needle Nose Vice Grips 466171
Slap Hammer 466173



Slap Hammer 466173
Slap Hammer Adapter 466175
WINserter 466110

Bending The Nail



WIN Nail Bender (2 in Tray) 430031

Fracture Reduction



Radiolucent F-Bar 466182

Malleting



Mallet 430030

Tamping To Specific Depths



Nail Tamp 0.0mm Offset 466186
Nail Tamp 1.5cm Offset 466188

Instrument Focus (Continued)

Cutting The Nail



WIN Nail Cutter 466114



Low Profile Nail Cutter 13180

Femoral Insertion

Step 1: Patient Preparation

Position the patient in a supine position on a radiolucent table or on a traction table using a traction boot (Figure 1 & 2).



Figure 1

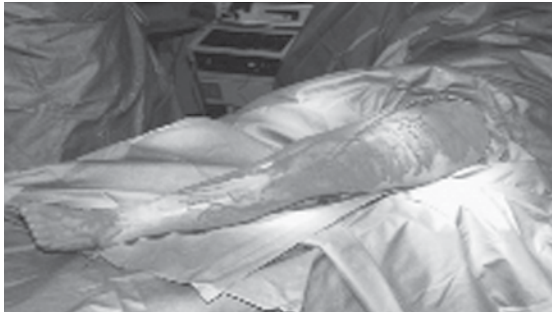


Figure 2

Step 2: Skin Marking And Identification Of Insertion Site

A line is made on the skin directly over the physis (Figure 3) and a second line is drawn proximal directly over the insertion site (Figure 4), at the metaphyseal-diaphyseal junction.

The third line connecting these two transverse lines is made directly over the medial and the lateral aspects of the distal femur (Figure 5).



Figure 3



Figure 4



Figure 5

Femoral Insertion (Continued)

Step 3: Incision

The incision is made to the level of the cortex. The incision is made in layers and the cortex identified (Figure 6).

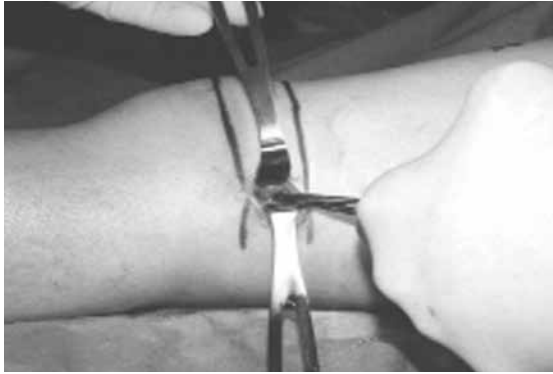


Figure 6

Step 4: Opening The Insertion Site

A drill 0.5mm larger than the size of the intended WIN Nail is chosen. The drill guide is loaded in the soft tissue sleeve and the assembly is placed at the proposed insertion site and position is confirmed radiographically (Figure 7). The cortex is drilled and the drill angled to create an oblique entry (Figure 8).



Figure 7



Figure 8

Step 5: Contour The Nail

The tip of the nail (approximately 2cm long) can be bent to the appropriate amount of angulation desired using the bender or the drill sleeve. To aid in gaining access to the proximal fragment, the contoured face on the tip of the nail faces away from the direction of the bend (Figure 9).

The remainder of the nail is contoured using the bender to introduce a bow along the length of the nail. The bow height apex, measured from a perpendicular line created between the ends of the nail and the bow's apex should be three times the diameter of the canal isthmus (Figure 10).

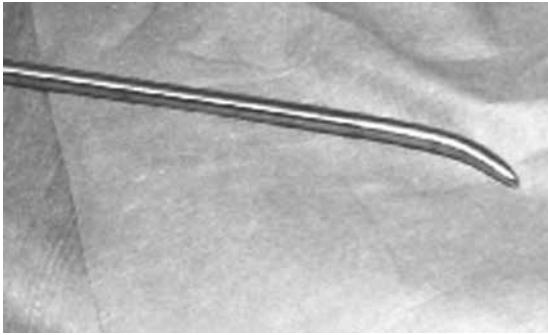


Figure 9



Figure 10

Step 6: Insert The Nail

After contouring, the nail is loaded into the inserter/remover. The tip of the nail is first directed to the central portion of the canal with the arc of the nail curving proximally towards the fracture site. The inserter is angled to allow the nail to follow the intramedullary canal (Figure 11 & 12).



Figure 11



Figure 12

Femoral Insertion (Continued)

Step 7: Reducing The Fracture

Once the nail reaches the fracture site, the fracture is reduced (Figure 13) using the F-Bar to aid the reduction, if required. Once the fracture fragments are aligned, the nail is passed across the fracture site (Figure 14). The bent tip of the nail should face laterally for the lateral nail insertion and medially for the medial nail insertion. The laterally inserted nail should be about the greater trochanteric physis when fully inserted. The medially inserted nail should be advanced to just above the lesser trochanter (Figure 15). If added stability is needed for a more proximal fracture, the greater trochanteric physis may be crossed.



Figure 13

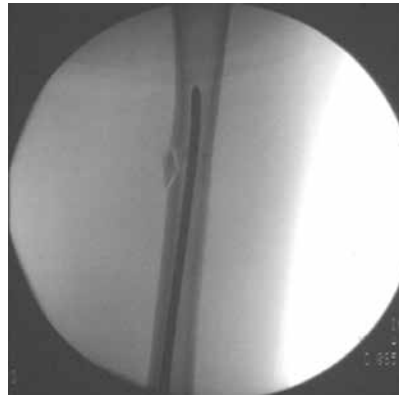


Figure 14

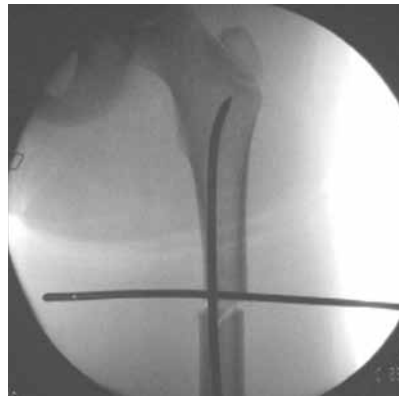


Figure 15

Step 8: Placing The Second Nail

The second nail is inserted in a similar manner as the first. Be sure to use nails of the same diameter to avoid varus/valgus deformities as a result of unbalanced forces. As the nail begins distally and advances to the isthmus, the tip of the nail should be turned in an anterior or posterior direction to assure that the second nail does not spiral up the already placed first nail (Figures 16-19). Once the isthmus is passed, the tip of the nail should be turned back to a medial or lateral direction and pointed towards its final placement location (Figure 20).



Figure 16

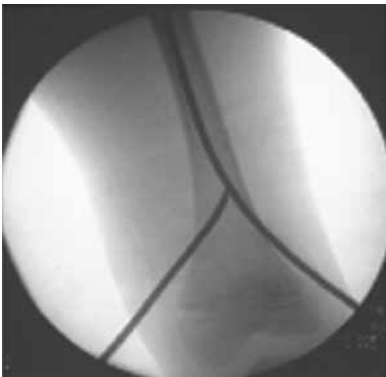


Figure 17

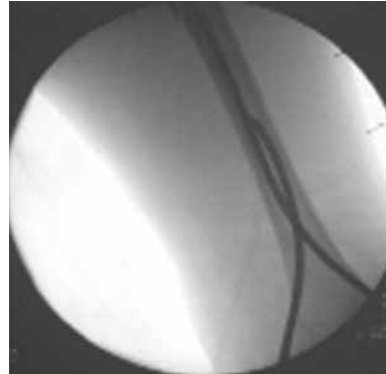


Figure 18

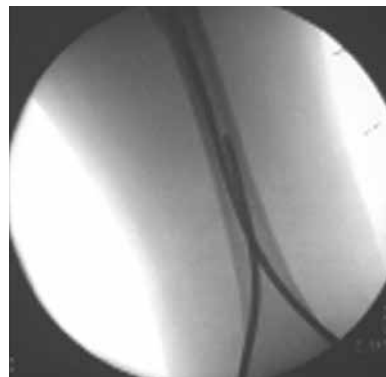


Figure 19

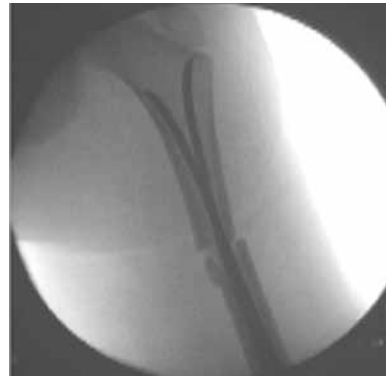


Figure 20

Femoral Insertion (Continued)

Step 9: Bending And Cutting The Nail

There are two options for cutting the nail and positioning it for removal later. The technique utilized most frequently is to cut the nails down, leaving 1cm of nail exposed, and bent perpendicularly to the long axis, for easy removal and rotational stability. Another option is to leave the nail flush with the insertion hole angle, and utilize the cutter to leave 1cm remaining, again for removal purposes.



Figure 21



Figure 22



Figure 23



Figure 24

Step 10:

Visualize the fracture again. If less than 5° of deflection from varus or valgus forces are noted on the stress views, then no casting is necessary. If more than 5° of deflection is noted then a single leg spica cast is applied.

Postoperative Care:

No physical therapy is required. The patient is instructed in weight bearing as tolerated but will not begin weight bearing until the patient regains their quad function. Therefore, they are instructed on quadricep and straight leg raising exercises. Once they are able to straight leg raise they can bear weight on the extremity. It usually takes approximately four weeks.

Nail Removal:

Once the fracture has healed, nails can be removed. The removal usually occurs by four to six months post-insertion. The nails are grasped by the end of the inserter/remover, struck with a mallet and backed out. The slap hammer adapter may be used in conjunction with the inserter/remover. Vice Grip pliers can be used with or without the slap hammer.

Nail Removal - Utilizing the Vice Grips



Needle Nose Vice Grips 466171
Slap Hammer 466173

Nail Removal - Utilizing the WINserter



Slap Hammer 466173
Slap Hammer Adapter 466175
WINserter 466110

Technique Variations

Variations On The Femoral Technique For Tibial Insertions

Step 2: Skin Marking And Identification Of Insertion Site

A proximal insertion site behind the tibial tubercle is used medially and laterally and guided by appropriate lateral insertion position.

Step 4: Opening The Insertion Site

Be sure that the point of the drill is not too anterior so that it stays out of the tibial tubercle physis. Also, due to the triangular nature of the proximal tibia, an insertion site which is too anterior will make passage of the nail difficult. In this case, the nail will need to be driven posterior before it will enter the canal. Therefore, an anterior starting point is to be avoided.



Pre Op Reduction



Post Op Reduction



12 Weeks Post Op

Variations On The Femoral Technique For Forearm Insertions

Radial Insertion

Step 2: Skin Marking And Identification Of Insertion Site

A skin mark is made at the physis. A second mark is made at the insertion point metaphyseal / diaphyseal junction. The position of each mark is confirmed by fluoroscopy directly overlying the radial border.

Step 3: Incision

An incision is made connecting the two marks. Blunt dissection protects the soft tissues and the prominence of the distal radial metaphysis is visualized.

Step 6: Nail Insertion

The nail should be inserted just proximal to the Radial Styloid and directed towards it. This will allow the bow of the nail to recreate the natural bow of the radius.

Ulnar Insertion

Step 2: Skin Marking And Identification Of Insertion Site

A small stab wound is made over the olecranon and an entry hole is made through the olecranon cortex.

Step 5: Contour The Nail

No nail contouring is necessary.

Step 6: Insert The Nail

The nail is placed through the ulnar canal to the level of the fracture. The fracture is reduced, the nail inserted across the fracture site and brought to the distal ulna.

Technique Variations (Continued)

Surgeon Tip

Issue To Consider With The Forearm -

Which bone should be treated first?

It is preferable to do the radius first, because of the additional mobility afforded by not having a fixed ulna, it is easier to recreate the radial bow. It is often necessary to do an open reduction for one of the fractures. It is simpler to open reduce the ulna after the radius is treated since the ulna is subcutaneous. One advantage to doing the ulna first is that the radius can sometimes reduce once ulnar length is restored.



Pre Op Reduction



Post Op Reduction

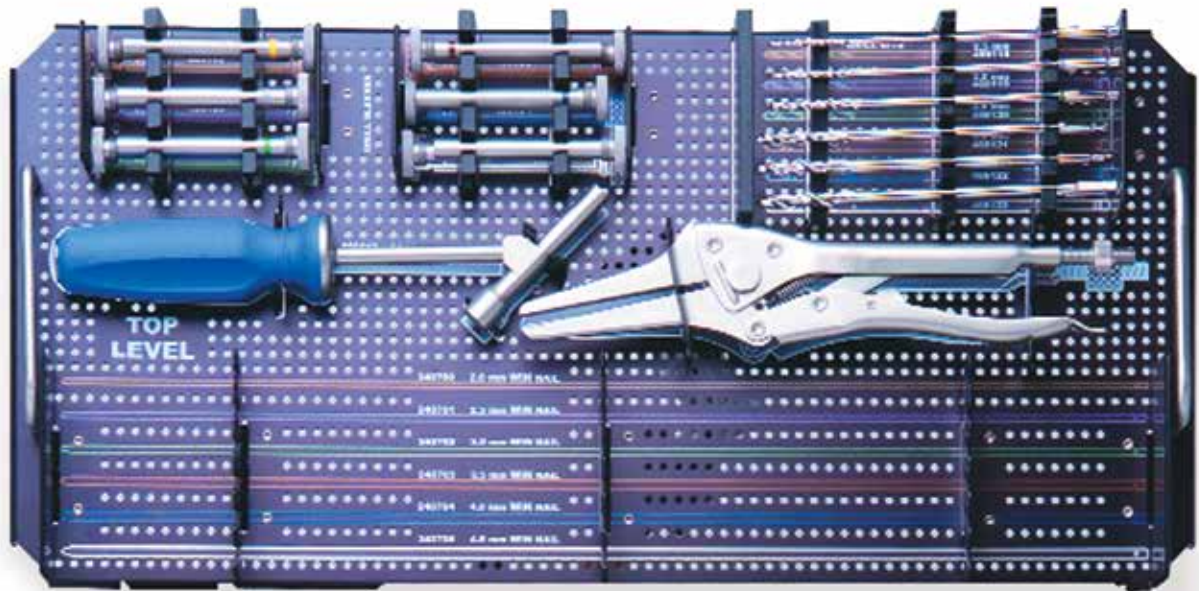


Post Op Nails Removed. Full Healing Demonstrated

Tray Layout

Top Tray

Part #	Description
466112	Soft Tissue Guide
466171	Needle Nose Vice Grips
466118	Side Cutting Drill Bit, 2.5mm
466119	Side Cutting Drill Bit, 3.0mm
466120	Side Cutting Drill Bit, 3.5mm
466121	Side Cutting Drill Bit, 4.0mm
466122	Side Cutting Drill Bit, 4.5mm
466123	Side Cutting Drill Bit, 5.0mm
466132	2.5mm Drill Guide
466135	3.0mm Drill Guide
466133	3.5mm Drill Guide
466136	4.0mm Drill Guide
466134	4.5mm Drill Guide
466137	5.0mm Drill Guide



Tray Layout (Continued)

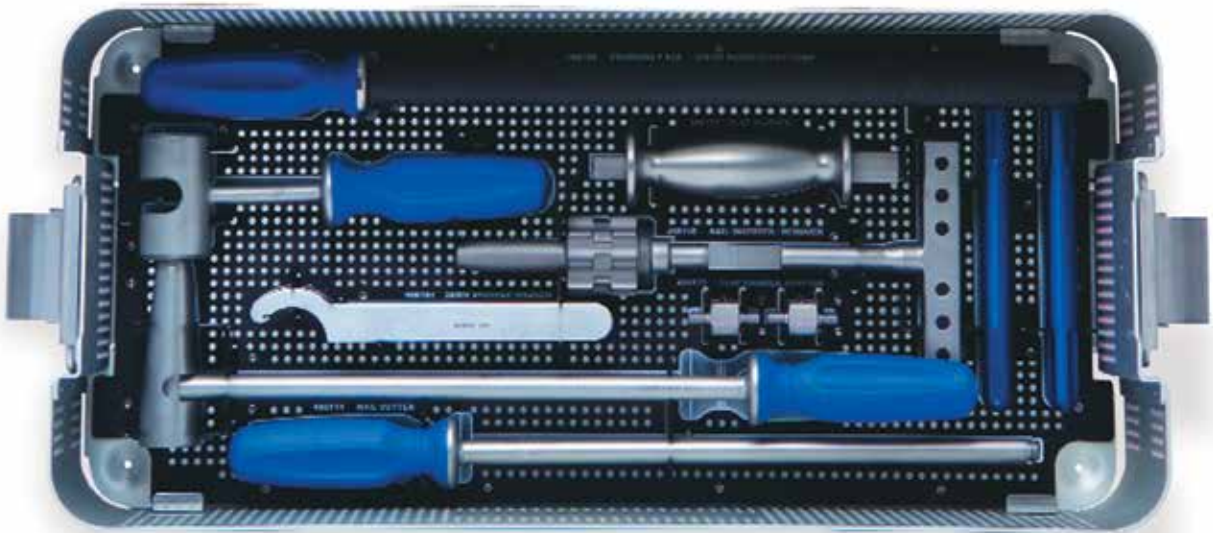
Middle Tray

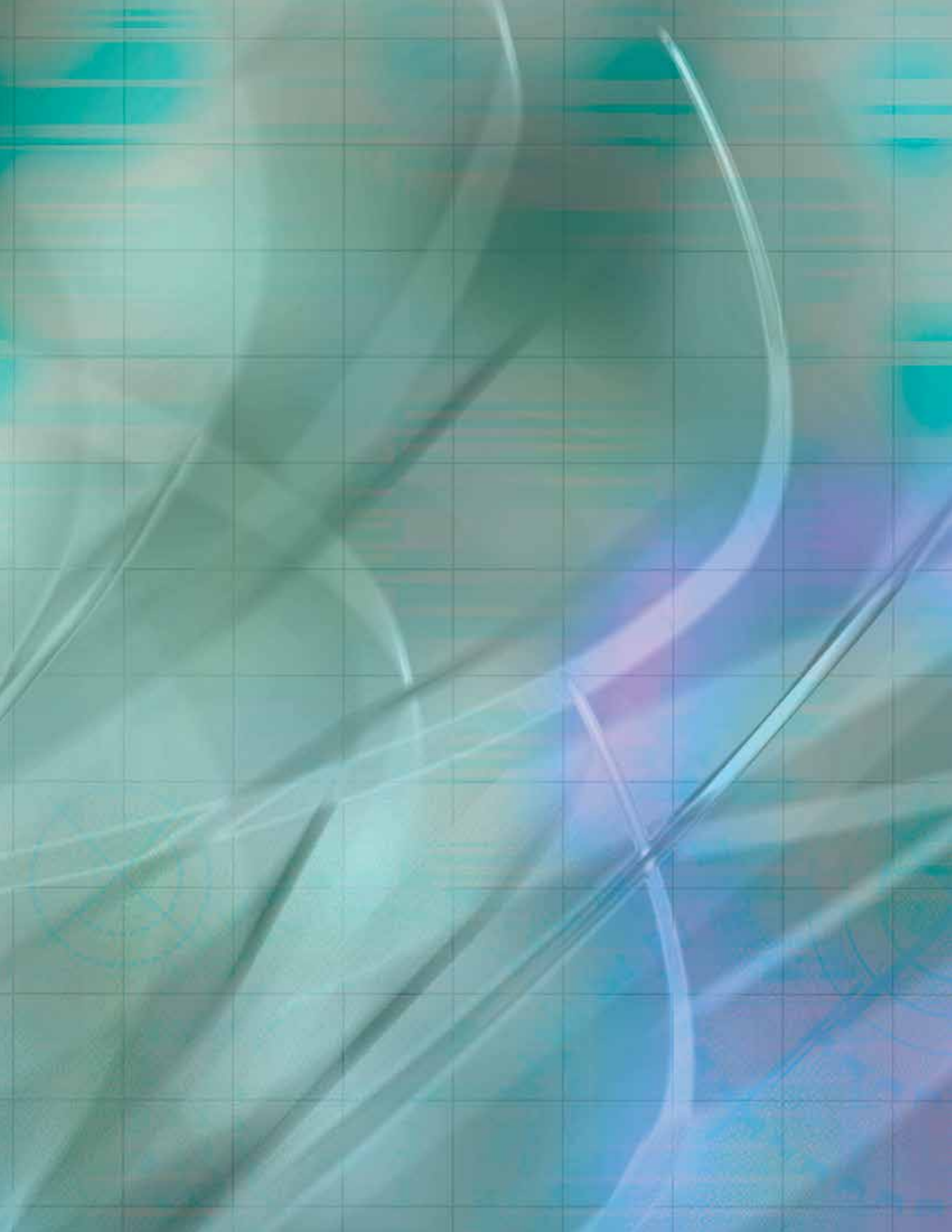
Part #	Description
466142	Low Profile Soft Tissue Guide 2.5mm / 3.0mm
466146	Low Profile Soft Tissue Guide 3.5mm / 4.0mm
13180	Low Profile Nail Cutters
430031	WIN Nail Bender
466186	Nail Tamp - 0.0mm Offset
466188	Nail Tamp - 1.5cm Offset



Bottom Tray

Part #	Description
466110	WINserter Nail Inserter / Remover
466114	WIN Nail Cutter
466173	Slap Hammer
466175	Slap Hammer Adapter
466182	Radiolucent F-Bar
466184	35mm Spanner Wrench
430030	Mallet





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Legal Manufacturer
Biomet Trauma
56 East Bell Drive
P.O. Box 587
Warsaw, Indiana 46581
USA

www.biomet.com



Authorised Representative
Biomet UK Ltd.
Waterton Industrial Estate
Bridgend, South Wales
CF31 3XA
UK

CE0086