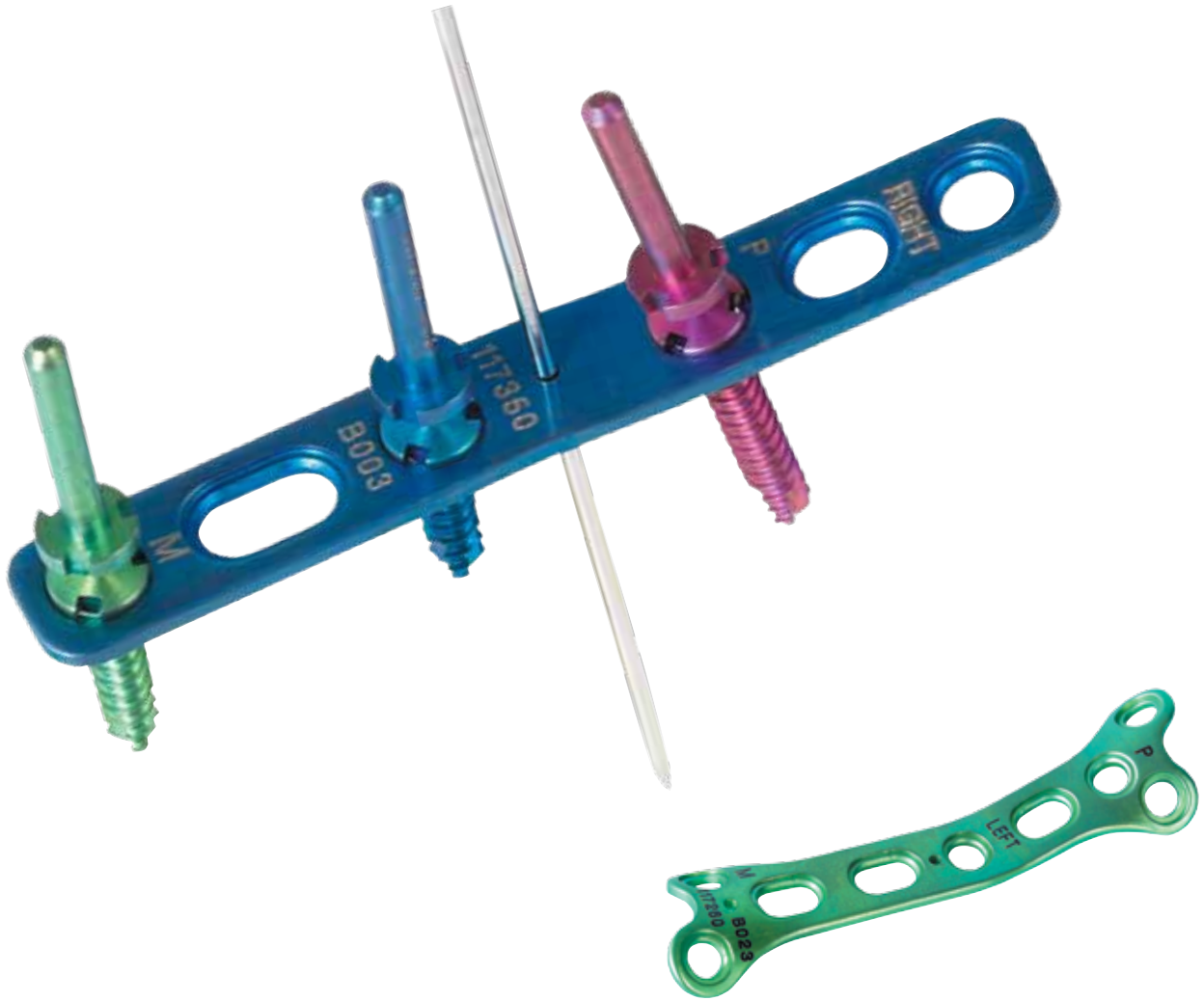


HALLU[®]-FIX

M.T.P. ARTHODESIS HALLU -FIX SYSTEM



SURGICAL TECHNIQUE

**LOWER
EXTREMITY
SOLUTIONS**

 **INTEGRA[™]**
Extremity Reconstruction

HALLU[®]-FIX

M . T . P . a r t h r o d e s i s

Surgical Technique



As the manufacturer of this device, Integra does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and using the appropriate techniques for implanting the device in each patient.

Indications •

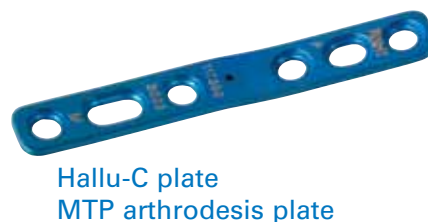
- Hallux rigidus
- Severe hallux valgus (Im angle > 20° and HV angle > 40°)
- Deformity from rheumatoid arthritis
- Post traumatic arthritis
- Neuromuscular instability
 - Hallu[®]-S plate (only) : revision of Keller procedure, failed arthroplasty, failed fusion.

Contraindications •

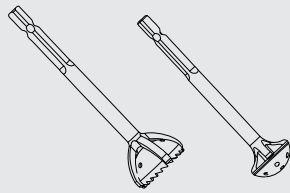
- Limited skin coverage
- Severe osteoporosis
- Infection

Description •

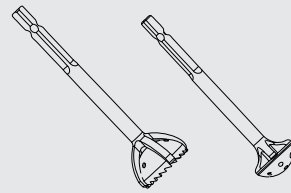
- The first COMPREHENSIVE system for MTP arthrodesis providing:
 - ANATOMICAL ADAPTATION
 - ACCURACY
 - VERSATILITY
 - REPRODUCIBILITY



PREPARE



129 714ND • 129 716ND Metatarsal Reamer
129 724ND • 129 726ND Phalangeal Reamer



129 718ND • 129 720ND Metatarsal Reamer
129 728ND • 129 730ND Phalangeal Reamer

Surgical Site Preparation •

The foot is washed, prepped and draped in the normal sterile fashion.
The surgery is done under tourniquet to avoid bleeding.

Step 1 • Incision

- 1-1** A dorsal longitudinal incision is commonly used. This enables correct exposure of the metatarso-phalangeal joint. The incision is centered just medial to the extensor hallucis longus, and deepened to the joint capsule, through the subcutaneous tissues. The joint capsule is released and retractors are placed to expose the base of the proximal phalanx and metatarsal head.

Step 2 • Preparation of the Joint Surface with the HALLU-REAM SYSTEM

- 2-1** The amount of the bone resection depends upon the desired length of the 1st metatarsal. (Note: some revision cases will not require extensive resection.) A power saw may be used to resect the base of the proximal phalanx and the articular surface of the 1st metatarsal head. A cut, resecting a small wafer of bone, perpendicular to the axis of the proximal phalanx is made just distal to the articular surface. A similar cut is made in the metatarsal head perpendicular to the long axis of the metatarsal shaft.

These cuts are made in order to decompress the joint, allowing the use of the reamers. Osteophytes should be carefully removed. Medial exostosis of the 1st metatarsal bone may also be resected.



PREPARE



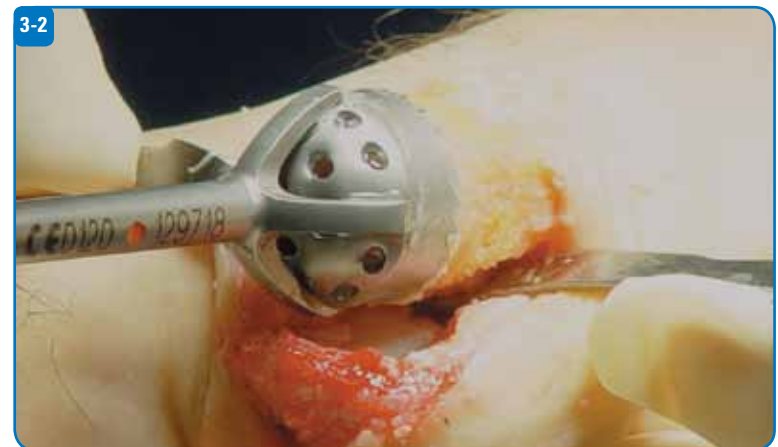
115 216ND
K-wire

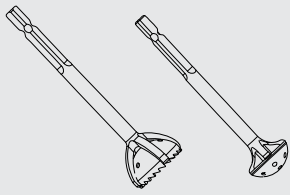


129 710ND
Quick Coupling Device

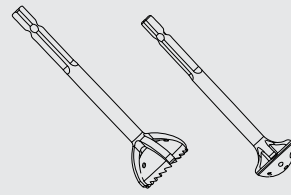
Step 3 • Metatarsal Preparation

- 3-1** The phalanx is plantar flexed to gain access to the metatarsal head. A 1.6 mm K-wire (ref: 115 216ND) is then introduced into the center of the metatarsal head and driven in a proximal direction along the axis of the diaphysis. The appropriate size of cannulated metatarsal reamer is selected by placing a reamer in front of the articular surface of the metatarsal head. If sizing is doubtful, it is advisable to begin by using the largest size reamer, and then downsizing to match the diameter of the metatarsal head.
- 3-2** Using the Quick coupling device (ref: 129 710ND) the Hallu-Ream reamer is then engaged over the 1.6 mm K-wire, and the metatarsal head is reamed. The 2 in 1 metatarsal reamer is bell shaped to allow barrel reaming and articular preparation in one step.
- 3-3** The metatarsal metaphysis is reduced to a cylinder of constant diameter, while the metatarsal head surface is reamed to a convex cup-shaped surface. The metatarsal reamer is removed. The K-wire can be held to elevate the metatarsal head to enable the removal of the bone on the plantar aspect. Excess bone is removed with an osteotome or a rongeur. Debris and bone fragments are cleaned and irrigated.





129 714ND • 129 716ND Metatarsal Reamer
129 724ND • 129 726ND Phalangeal Reamer



129 718ND • 129 720ND Metatarsal Reamer
129 728ND • 129 730ND Phalangeal Reamer

Step 4 • Phalangeal Preparation

4-1 The proximal phalanx is plantar flexed. A Hohman retractor usually helps to expose the phalanx. A 1.6 mm K-wire (ref: 115 216ND) is placed in the center of the prepared base of the proximal phalanx and driven in a distal direction along the axis of the hallux.

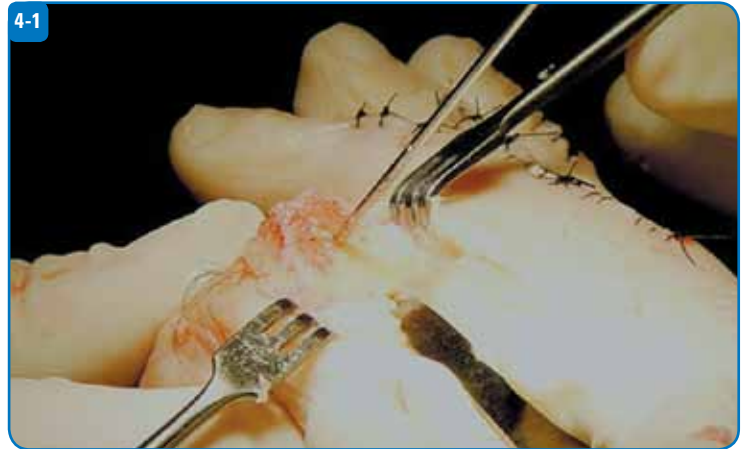
4-2 Care is taken not to penetrate the interphalangeal joint. Reaming must begin by using the smallest size of phalangeal reamer (size 14 mm) in order to avoid any excessive reaming. The metatarsal head should be protected when reaming. The reamer is placed on the 1.6 mm K-wire, and the surface of the phalanx is reamed, creating a concave cup-shaped surface.

If necessary, due to the diameter of the articular surface of the phalanx, superior sizes of the phalangeal reamers can be used until the dimensions match the size used for the metatarsal reamer. When an additional bone graft is required, bone debris in the reamer can be used after the reaming process is complete.

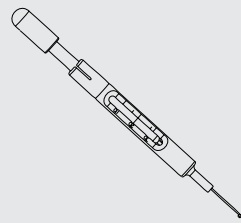
Warning: The same size metatarsal and phalangeal reamers must be used to obtain congruent surfaces. (Example: if metatarsal reaming has been achieved with a 18 mm reamer, the largest and last reamer to be used for the phalanx should also be an 18 mm)

4-3 The reamer and K-wire are then removed. The cup shaped surfaces can be aligned in any desired position. It is then possible to rotate the surfaces, change the dorsi flexion, plantar flexion and valgus angles. A temporary K-wire is introduced from the phalanx to the metatarsal to stabilize the joint in the adequate position for final arthrodesis.

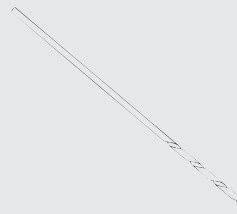
Bone graft can then be placed into the joint.



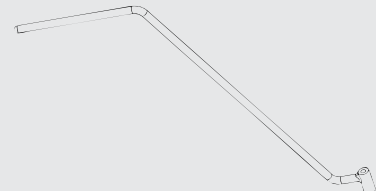
PREPARE



129 736ND
Depth gauge



119 618ND
Drill



129 734ND
Drill Guide

Step 5 • HALLU-FIX Plate Fixation

- 5-1** The selection of the appropriate size of the Hallu-C or Hallu-S plate (4, 5 or 6 holes) is done by positioning a plate on the dorsal aspect of the bone surfaces and assessing its dimensions. The plate has 2 marks on its dorsal aspect: P stands for Phalanx and M stands for Metatarsal. This orientation is mandatory.

The small central hole should be positioned over the center of the metatarsal head. In case of Revision (Hallu-S plate), the positioning hole is used as “landmark” to create the center of the joint.

- 5-2** The Hallu-Fix plates both have a 10° lateral angulation (10° valgus) as well as a 10° dorsal flexion. The Hallu-C plate can be bent by using 2 benders (ref: 129 731ND & 129 732ND), right & left, to match the degree of dorsal flexion required by the case or by the activity of the patient

WARNING :

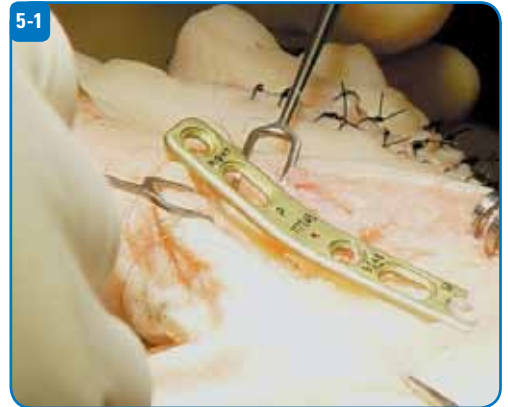
- Do not bend the Hallu-S plate.
- The plates should not be bent and rebent again.

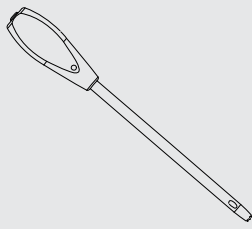
- 5-3** Once the correct size and type of plate has been chosen, and adequate alignment achieved, a 1 mm K-wire is inserted through the central hole of the plate in the metatarsal head for temporary stabilization.

The K-wire allows for rotation of the plate in order to obtain the ideal position.

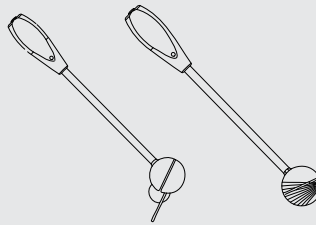
- 5-4** The 1.9 mm drill (ref: 119 618ND), with the drill guide (ref: 129 734ND), is used to prepare the holes in the dorsal cortex of the bone through the holes of the plate. The depth gauge (ref: 129 736ND) measures the adequate length of the screw. Two types of screws are available: standard 2.7 mm (length 12 to 28 mm) or fat boys 3.0 mm (length 12 to 18 mm). Bone quality will dictate the screw diameter to be used. Screws are color coded for easy identification.

- 5-5** The selected snap-off screw is engaged into the cannulated screwdriver (ref: 129 733ND) or into a power instrument. When the head of the screw comes in contact with the plate, the barrel of the screw automatically snaps off.





129 733ND
Cannulated screwdriver



129 731ND • 129 732ND
Plate bender

Step 5 • HALLU-FIX Plate Fixation (continued)

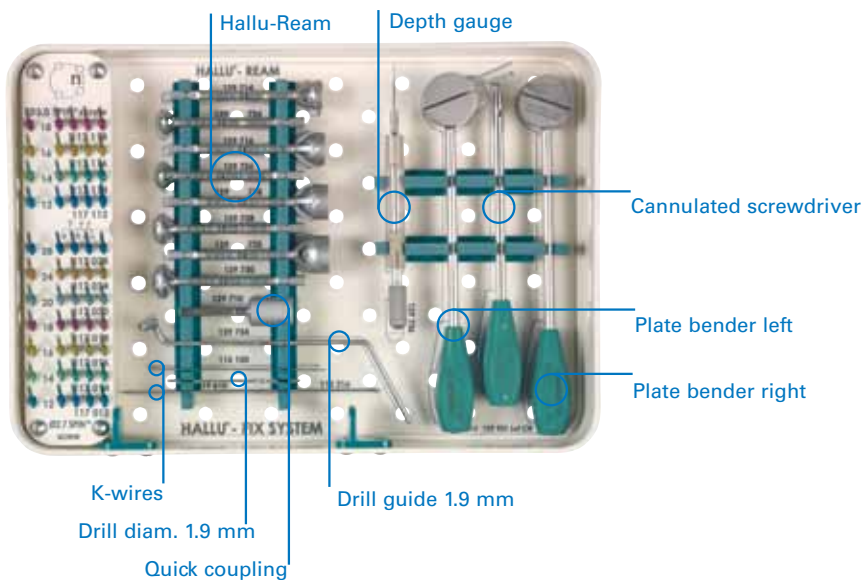
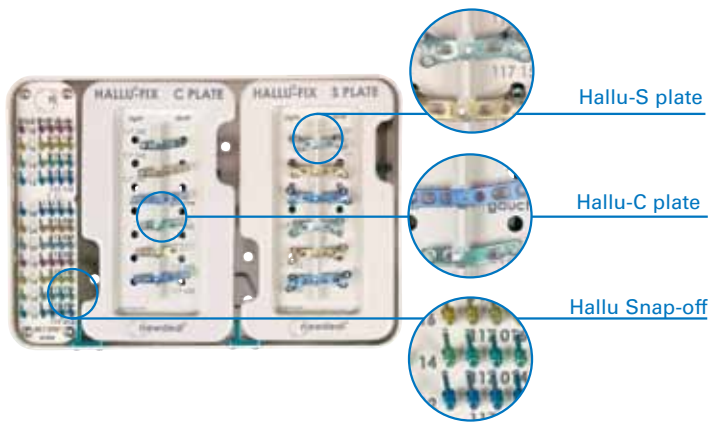
- 5-6** The screw can be tightened down with the screwdriver from the Hallu-Fix system. The oblong holes allow for angled and compressive screw fixation. The central K-wire can be removed when solid fixation of the plate is achieved. When all the screws have been inserted on the plate, they are tightened along the dorsal aspect of the plate.

Note: a final additional screw can be directed across the plantar aspect of the joint.

- 5-7** Closure is then performed in the normal and routine fashion.



HALLU-FIX Arthodesis Set



HALLU[®]-FIX

M.T.P. ARTHODESIS HALLU -FIX SYSTEM

HALLU-C Plate

CATALOG NUMBER	DESCRIPTION	SIZE	HOLES	COLOR	DIAM.	RIGHT/LEFT
117 340ND	• SIZE 1 • 4 HOLES • GREEN	• 40 MM •				RIGHT
117 345ND	• SIZE 2 • 5 HOLES • YELLOW	• 45 MM •				RIGHT
117 350ND	• SIZE 3 • 6 HOLES • BLUE	• 50 MM •				RIGHT
117 440ND	• SIZE 1 • 4 HOLES • GREEN	• 40 MM •				LEFT
117 445ND	• SIZE 2 • 5 HOLES • YELLOW	• 45 MM •				LEFT
117 450ND	• SIZE 3 • 6 HOLES • BLUE	• 50 MM •				LEFT

HALLU-S Plate

CATALOG NUMBER	DESCRIPTION	SIZE	COLOR	DIAM.	RIGHT/LEFT
117 150ND	• SIZE 1 • GREEN	• 50 MM •			RIGHT
117 155ND	• SIZE 2 • YELLOW	• 55 MM •			RIGHT
117 160ND	• SIZE 3 • BLUE	• 60 MM •			RIGHT
117 250ND	• SIZE 1 • GREEN	• 50 MM •			LEFT
117 255ND	• SIZE 2 • YELLOW	• 55 MM •			LEFT
117 260ND	• SIZE 3 • BLUE	• 60 MM •			LEFT

HALLU-REAM

CATALOG NUMBER	DESCRIPTION	DIAM.
129 714ND	• METATARSAL REAMER •	DIAM. 14 MM
129 716ND	• METATARSAL REAMER •	DIAM. 16 MM
129 718ND	• METATARSAL REAMER •	DIAM. 18 MM
129 720ND	• METATARSAL REAMER •	DIAM. 20 MM
129 724ND	• PHALANGEAL REAMER •	DIAM. 14 MM
129 726ND	• PHALANGEAL REAMER •	DIAM. 16 MM
129 728ND	• PHALANGEAL REAMER •	DIAM. 18 MM
129 730ND	• PHALANGEAL REAMER •	DIAM. 20 MM

ASSOCIATED INSTRUMENTS

CATALOG NUMBER	DESCRIPTION	CATALOG NUMBER	DESCRIPTION
115 100ND	K-WIRE DIAM. 1.0 MM - LENGTH 100 MM	129 733ND	CANNULATED SCREWDRIVER
115 216ND	K-WIRE DIAM. 1.6MM - LENGTH 150MM - 2 SHARP TIPS	129 734ND	DRILL GUIDE 1.9 MM
119 618ND	DRILL DIAM. 1.9 MM	129 736ND	DEPTH GAUGE
129 731ND	HALLU-C PLATE BENDER LEFT	129 930ND	STERILIZATION CONTAINER
129 732ND	HALLU-C PLATE BENDER RIGHT		

HALLU-SNAP-OFF

CATALOG NUMBER	DESCRIPTION	DIAM.	SNAP-OFF SCREW	LENGTH
STANDARD		DIAM. 2.7 MM		
117 012ND	• SNAP-OFF SCREW •			LENGTH 12 MM
117 014ND	• SNAP-OFF SCREW •			LENGTH 14 MM
117 016ND	• SNAP-OFF SCREW •			LENGTH 16 MM
117 018ND	• SNAP-OFF SCREW •			LENGTH 18 MM
117 020ND	• SNAP-OFF SCREW •			LENGTH 20 MM
117 024ND	• SNAP-OFF SCREW •			LENGTH 24 MM
117 028ND	• SNAP-OFF SCREW •			LENGTH 28 MM
FAT BOYS		DIAM. 3.0 MM		
117 112ND	• SNAP-OFF SCREW •			LENGTH 12 MM
117 114ND	• SNAP-OFF SCREW •			LENGTH 14 MM
117 116ND	• SNAP-OFF SCREW •			LENGTH 16 MM
117 118ND	• SNAP-OFF SCREW •			LENGTH 18 MM

Sterile HALLU-SNAP-OFF

CATALOG NUMBER	DESCRIPTION	DIAM.	SNAP-OFF SCREW	LENGTH
STANDARD		DIAM. 2.7 MM		
117 012SND	• SNAP-OFF SCREW •			LENGTH 12 MM
117 014SND	• SNAP-OFF SCREW •			LENGTH 14 MM
117 016SND	• SNAP-OFF SCREW •			LENGTH 16 MM
117 018SND	• SNAP-OFF SCREW •			LENGTH 18 MM
117 020SND	• SNAP-OFF SCREW •			LENGTH 20 MM
117 024SND	• SNAP-OFF SCREW •			LENGTH 24 MM
117 028SND	• SNAP-OFF SCREW •			LENGTH 28 MM
FAT BOYS		DIAM. 3.0 MM		
117 112SND	• SNAP-OFF SCREW •			LENGTH 12 MM
117 114SND	• SNAP-OFF SCREW •			LENGTH 14 MM
117 116SND	• SNAP-OFF SCREW •			LENGTH 16 MM
117 118SND	• SNAP-OFF SCREW •			LENGTH 18 MM

INTEGRA™
Extremity Reconstruction

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