ST

SURGICAL TECHNIQUE

enovis

EF1 CIRCULAR FRAME

EXTERNAL FIXATION SYSTEM

EXTERNAL FIXATION SYSTEM

TABLE OF CONTENTS

Enovis® is a manufacturer of orthopedic implants and does not practice medicine. This surgical technique was prepared in conjunction with licensed health care professionals. The treating surgeon is responsible for determining the appropriate treatment, technique(s), and product(s) for each individual patient.

See package insert for complete list of potential adverse effects, contraindications, warnings and precautions.

A workshop training is recommended prior to performing your first surgery. All non-sterile devices must be cleaned and sterilized before use.

Multi-component instruments must be disassembled for cleaning. Please refer to the corresponding assembly/disassembly instructions, if applicable. Please remember that the compatibility of different product systems has not been tested unless specified otherwise in the product labeling.

The surgeon must discuss all relevant risks including the finite lifetime of the device with the patient.

INDICATIONS AND CONTRAINDICATIONS

INDICATIONS
EF1 CIRCULAR FRAME

The Enovis EF1 Circular Frame External Fixation System and its components are indicated for open and closed fracture fixation, pseudarthrosis or nonunion of long bones, limb deformities, and correction of segmental or non-segmental bony or soft tissue defects. The Enovis External Fixation System is for use on all long bones, including the:

- Tibia
- Fibula
- Femur
- Humerus
- Radius
- Ulna

The selection of the appropriate type of fixators is left to the discretion of the surgeon according to the type of fracture and the patient's anatomy.

CONTRAINDICATIONS
EF1 CIRCULAR FRAME

- Active Infection
- Fevers and white blood cells
- Obesity
- Mental Illness
- Failure to obtain patient's consent

WARNINGS & PRECAUTIONS

PRE-OPERATIVE

- Proper understanding of the device and technique is essential.
- Patient selection should be in accordance with the listed indications and contraindications for use of the device.
- Components are single use only and are delivered **NON STERILE**.

INTRA-OPERATIVE

- External fixators should be used according to the recommendations provided in the surgical technique.
- Enovis strongly advises against the use of another manufacturer's device with any Enovis external fixator.

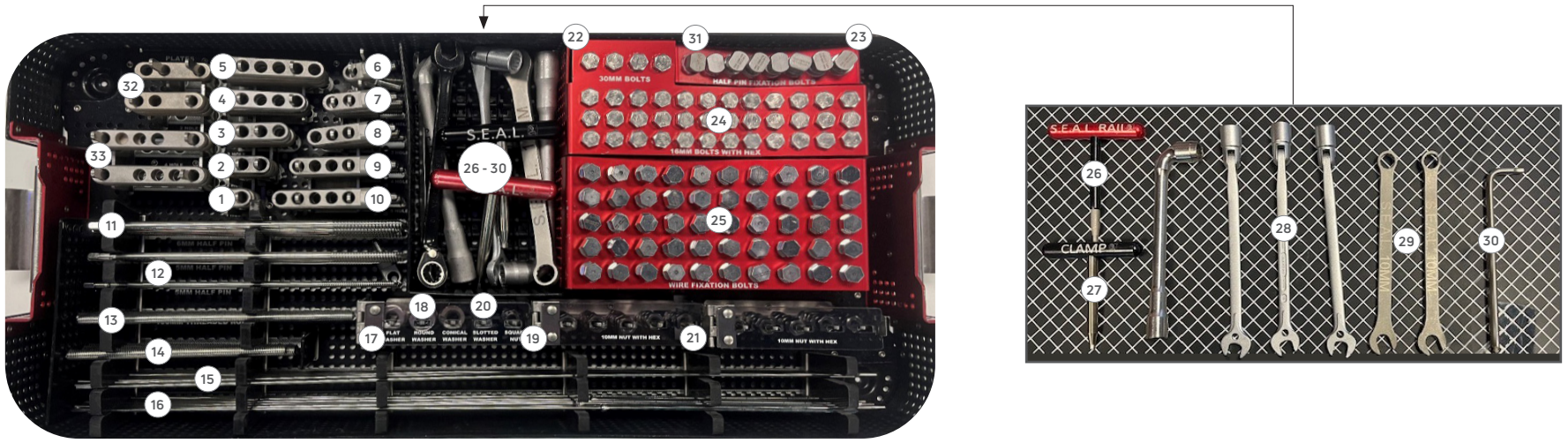
POST-OPERATIVE

Directions and warnings to patients regarding:

- Restricted physical activity.
- Adverse effects.
- Knowing that no metal device will ever be as strong as a healthy bone structure.

The Enovis External Fixation System has not been evaluated for safety and compatibility in the MR environment. It has not been tested for heating, migration, or image artifact in the MR environment. The safety of the Enovis External Fixation System in the MR environment is unknown. Scanning a patient who has this device may result in patient injury.

TRAY OVERHEAD

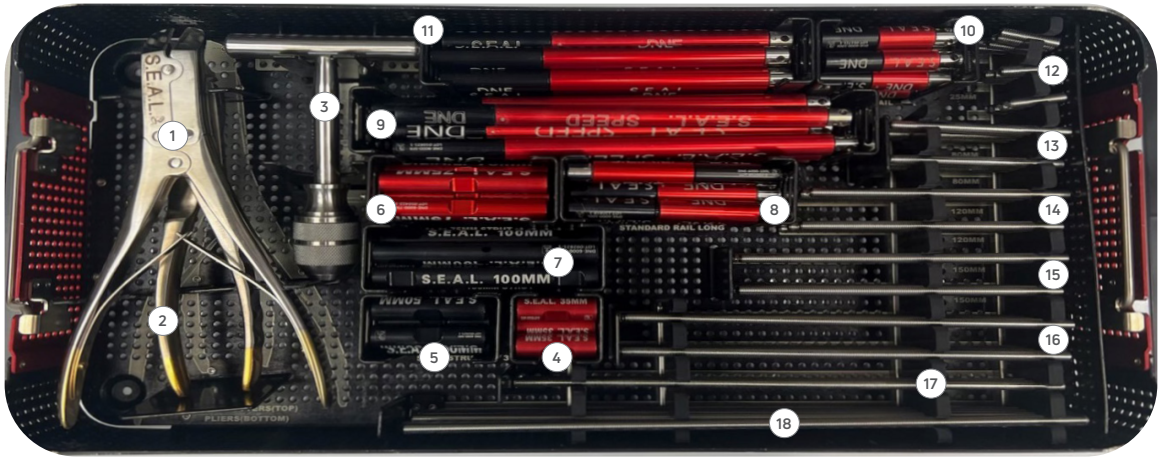


SINGLE LEVEL

#	DESCRIPTION	PART #	QTY
1	1 HOLE FEMALE POST	DNE-1-FP	4
2	2 HOLE FEMALE POST	DNE-2-FP	4
3	3 HOLE FEMALE POST	DNE-3-FP	4
4	4 HOLE FEMALE POST	DNE-4-FP	4
5	5 HOLE FEMALE POST	DNE-5-FP	4
6	1 HOLE MALE POST	DNE-1-MP	4
7	2 HOLE MALE POST	DNE-2-MP	4
8	3 HOLE MALE POST	DNE-3-MP	4
9	4 HOLE MALE POST	DNE-4-MP	4
10	5 HOLE MALE POST	DNE-5-MP	4
11	HALF PIN – 6MM x 180MM WITH 45MM THREAD	DNE-618045	4
12	HALF PIN – 5MM x 180MM WITH 45MM THREAD	DNE-518045	8
13	150MM THREADED ROD	DNE-150-TR	4
14	120MM THREADED ROD	DNE-120-TR	4
15	BAYONET WIRE – 2.0MM x 450MM	DNE-6000-200	14
16	OLIVE WIRE – 2.0MM x 450MM	DNE-6000-201	14
17	FLAT WASHER	DNE-9000-FW	15

#	DESCRIPTION	PART #	QTY
18	ROUND WASHER	DNE-9000-RW	15
19	SQUARE NUT WASHER	DNE-6000-035	4
20	SLOTTED WASHER	DNE-6000-033	8
21	10MM NUT	DNE-6000-036	70
22	30MM BOLT	DNE-30-B	4
23	UNIVERSAL HALF PIN FIXATION BOLT	DNE-1000-HFB	6
24	16MM BOLT	DNE-16-B	36
25	UNIVERSAL WIRE FIXATION BOLT	DNE-1000-WFB	50
26	RED RAIL T-HANDLE	DNE-9000-TH-964	1
27	BLACK CLAMP T-HANDLE	DNE-9000-TH-532	1
28	PIPE WRENCH	DNE-1000-PW	4
29	OPEN END WRENCH	DNE-1000-OE	2
30	ALLEN WRENCH	DNE-1000-AW	1
31	4MM HALF PIN FIXATION BOLT	DNE-4-HFB	2
32	2 HOLE PLATE	DNE-2-PL	2
33	4 HOLE PLATE	DNE-4-PL	4

TRAY OVERHEAD



DOUBLE LEVEL – TOP

#	DESCRIPTION	PART #	QTY
1	WIRE CUTTERS	DNE-9000-WC	1
2	PLIERS	DNE-9000-PLY	1
3	SS CHUCK T-HANDLE	DNE-9000-TH-ST	1
4	35MM STRUT/BLOCK SPACER	DNE-6000-350	8
5	50MM STRUT/BLOCK SPACER	DNE-6000-500	8
6	75MM STRUT/BLOCK SPACER	DNE-6000-750	8
7	100MM STRUT/BLOCK SPACER	DNE-6000-001	8
8	LONG RAIL	DNE-6000-100L	8
9	SPEED FRAME RAIL	DNE-9000-SFR	8
10	SHORT RAIL	DNE-6000-100S	8
11	XL RAIL	DNE-6000-100XL	8
12	25MM THREADED ROD	DNE-25-TR	12
13	80MM THREADED ROD	DNE-80-TR	8
14	120MM THREADED ROD	DNE-120-TR	8
15	150MM THREADED ROD	DNE-150-TR	8
16	200MM THREADED ROD	DNE-200-TR	8
17	250MM THREADED ROD	DNE-250-TR	4
18	300MM THREADED ROD	DNE-300-TR	4

TRAY OVERHEAD

DOUBLE LEVEL – BOTTOM

#	DESCRIPTION	PART #	QTY
1	SQUEEZE TENSIONER	DNE-9000-ST	1
2	150MM STRUT/BLOCK SPACER	DNE-6000-150	9
3	ANGULAR CORRECTION CLAMP	DNE-9000-ACC	12
4	SHORT RAIL HANDLE*	DNE-9000-TH-964S	1
5	RAIL T-HANDLE*	DNE-9000-TH-964	1
6	CLAMP T-HANDLE*	DNE-9000-TH-532	1
7	RUBBER STOPPER	DNE-00-RS	24
8	UNIVERSAL JOINT	DNE-9000-UJ	8

**Stored below caddy.*

EXTERNAL SUPPORTS

All external supports are made from high-strength anodized aluminum. They are offered in a variety of shapes and sizes that allow the surgeon to create a fully customizable construct based on the patient's clinical conditions. All external supports accept 6mm threaded components.

OVAL RINGS

Oval Rings are the building blocks of the external fixation system. They are offered in eight sizes ranging from 120mm to 240mm. They come with a double row intended to line up on the medial and lateral side of the patient as well as a flared slot to connect different assembly elements.

HALF RINGS

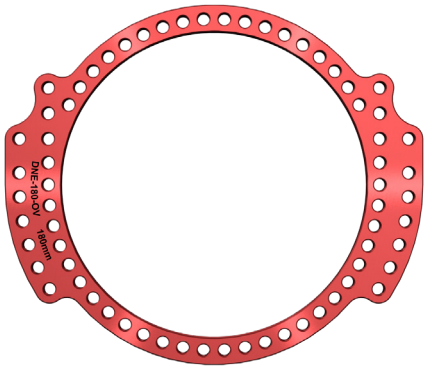
Half Rings come in eight sizes ranging from 120mm to 240mm. They can be used alone, joined together to form a full ring, or connected to other external support elements (ex. foot plates) depending on the requirements of the patient.

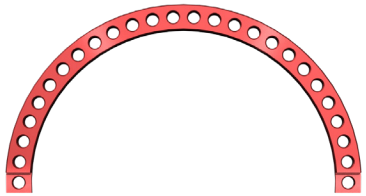
¾ RINGS

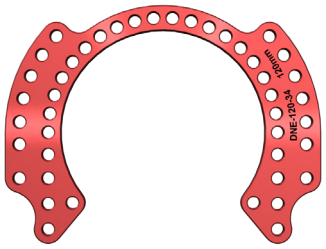
¾ Rings are offered in six sizes ranging from 140mm to 240mm. These partial rings can be useful at the joint level to extend the range of motion possible with the fixator.

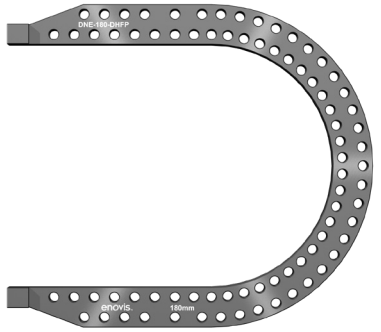
FOOT PLATES

A Foot Plate is a modified half ring with elongated ends. They are available in eight sizes ranging from 120mm to 240mm. They include pocketed fit connection holes at the ends of the plate, which can be used to connect foot plate extensions using a 12mm bolt (DNE-12-B).









RING OFFERINGS

	120MM	140MM	160MM	180MM	200MM	220MM	240MM
OVAL RING DNE-XXX-OV	X	X	X	X	X	X	X
HALF RING DNE-XXX-5	X	X	X	X	X	X	X
¾ RING DNE-XXX-34		X	X	X	X	X	X
DOUBLE HOLE FOOT PLATE DNE-XXX-DHFP		X	X	X	X	X	X
DOUBLE HOLE REVERSE FOOT PLATE DNE-XXX-DRFP			X	X	X		

ASSEMBLY ELEMENTS

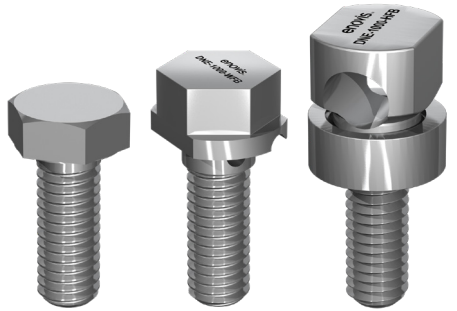
All assembly elements are made from stainless steel. The threaded elements have a standard M6 thread and can be adjusted using a 10mm wrench.

BOLTS, NUTS, AND SPACERS

Bolts are offered in 4 lengths: 12mm, 16mm, 20mm, and 30mm. The primary assembly element is a 10mm nut. Multiple washer types are available for use, including slotted washers, flat washers, and round washers.

WASHER OPTIONS

NUT OPTIONS



BOLT OPTIONS

WIRES, HALF PINS, AND FIXATION ELEMENTS

GENERAL PRINCIPLES OF SEGMENTAL FIXATION

The fundamental mechanical principle of segmental fixation is to achieve stable transcutaneous fixation of bone to permit stabilization or manipulation of those segments as required for the condition being treated.

The basic unit of fixation for a bone segment, as originally described by Ilizarov, is one ring with two crossed tensioned wires. The ring should be perpendicular to the long axis of the bone segment, and ideally the limb is centered within the ring.

WIRES

2.0mm diameter wires are available in two types: bayonet and olive wires. Olive wires provide a stop at the bone interface and serve two main purposes:

1. To enhance stability of fixation by preventing undesirable motion (ex. Bone translation when the wires are placed at a narrow crossing angle).
2. To move a bone segment in a desired direction (ex. Fracture reduction or segment compression).

Both wire styles have a bayonet shaped, eccentric tip which efficiently drills through both cortical and cancellous bone without generating excessive heat.

SMOOTH WIRE

OLIVE WIRE

HALF PINS

Half pins are offered in 4mm, 5mm, and 6mm diameters, each with a total length of 180mm. They are self-drilling and self-tapping and have a standard quick connect end to simplify usage in the operating room.

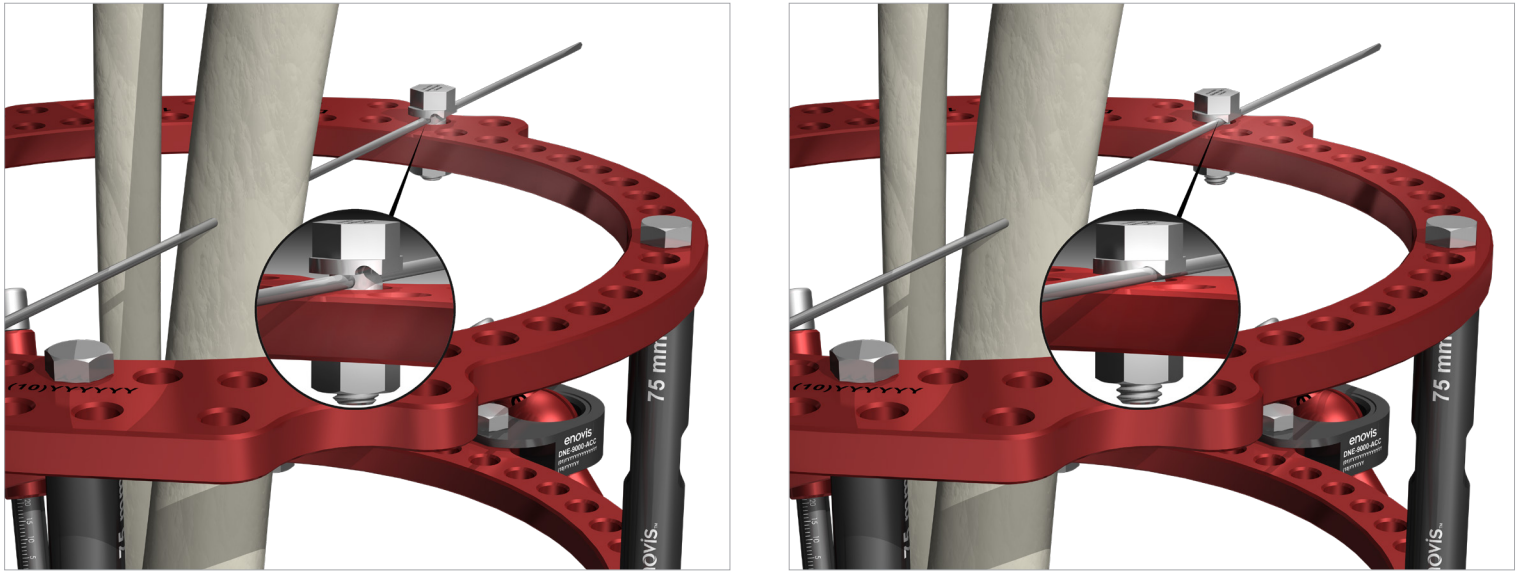
HALF PIN

HALF PIN OPTIONS

PART #	DIAMETER (MM)	TOTAL LENGTH (MM)	THREAD LENGTH
DNE-310025	3	100	25
DNE-410025	4	100	25
DNE-418045	4	180	45
DNE-515045	5	150	45
DNE-518045	5	180	45
DNE-618045	6	180	45

UNIVERSAL WIRE FIXATION BOLT

The universal wire fixation bolt functions as either a slotted wire fixation bolt or a cannulated wire fixation bolt. The 10mm bolt head is slotted, and the neck of the bolt is cannulated to accept a 2.0mm wire. The horizontal grooves on the slot and base of the head serve as an additional design feature that enhances the gripping force on the wire.

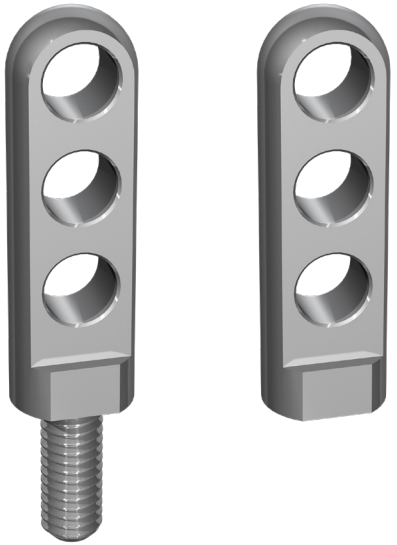


UNIVERSAL FIXATION WIRE PLACEMENT

ASSEMBLY ELEMENTS

POSTS

Posts are available in five sizes, ranging from one hole to five holes. They have a 10mm x 13mm cross section, allowing the surgeon to stabilize the posts with a 10mm wrench. Posts have standard female and male thread bases, allowing them to be secured to an external support by a 12mm bolt or 10mm nut.



MALE & FEMALE POSTS

BIOMECHANICS OF CIRCULAR RING FIXATION

The tensioned circular ring used in circular ring fixation (FIGURE 1) is based on the principles of a bicycle wheel. Tensioning the ring with two wires at 60°-90° to each other creates incredibly strong fixation to bone, even in the case of very poor quality osteoporotic bone.

The plate and screw construct in FIGURE 2 represents a common orthopedic fracture fixation application. In this load bearing construct, compression occurs on the side of the plates and screws. The disadvantage of this fixation method is that it simultaneously produces distraction on the opposite side of the bone (FIGURE 3). In addition, there is very little resistance to bending forward or backwards. The same situation arises when using a uniplanar external fixator on the fracture.

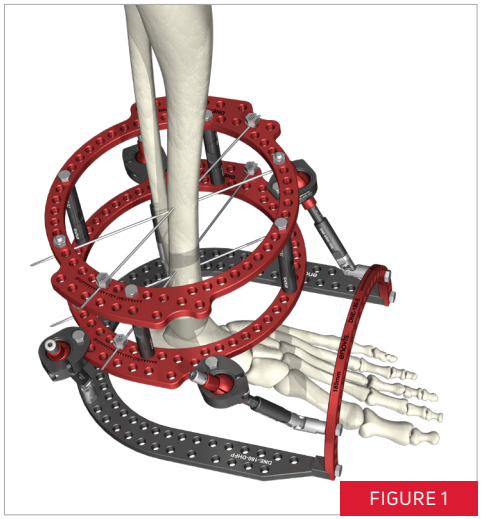


FIGURE 1

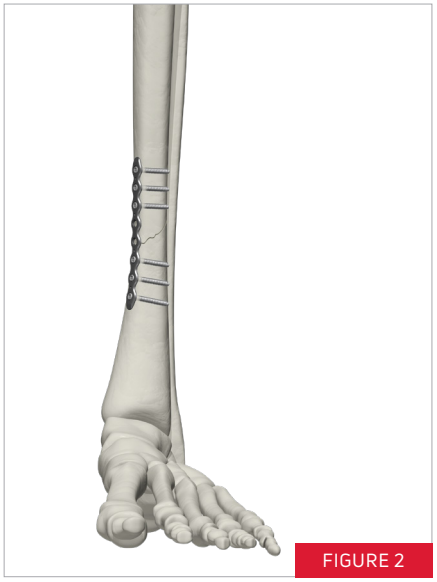


FIGURE 2

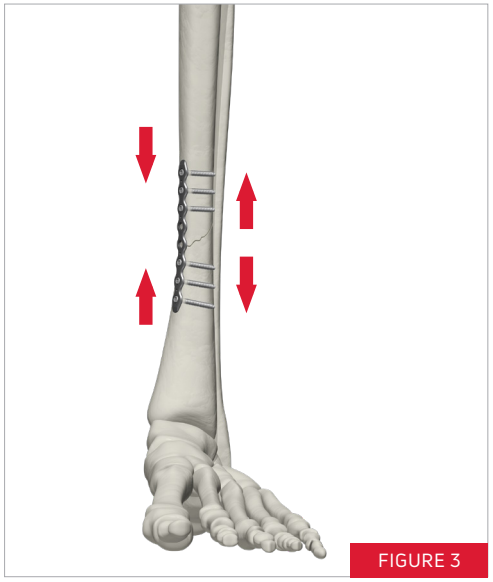


FIGURE 3

BIOMECHANICS OF CIRCULAR RING FIXATION

With circular ring fixation, on the other hand, the applied force goes through the center of the circular rings (FIGURE 4). As such, force is applied to the bone much like the load-sharing forces that would occur with an intramedullary nail.

FIGURE 4

SAFE ZONES

Safe zones (FIGURE 6) are anatomic areas in the limb where blindly placed wires or threaded half pins are unlikely to damage a nerve or vascular structure by either piercing the structure or wrapping the structure in a wire that is spinning while being inserted. Unsafe zones are anatomic areas where a drilled wire has the potential to damage a nerve or vascular structure. FIGURES 6-12 show the different safe zones and suggested wire and half pin placement at different anatomic levels.

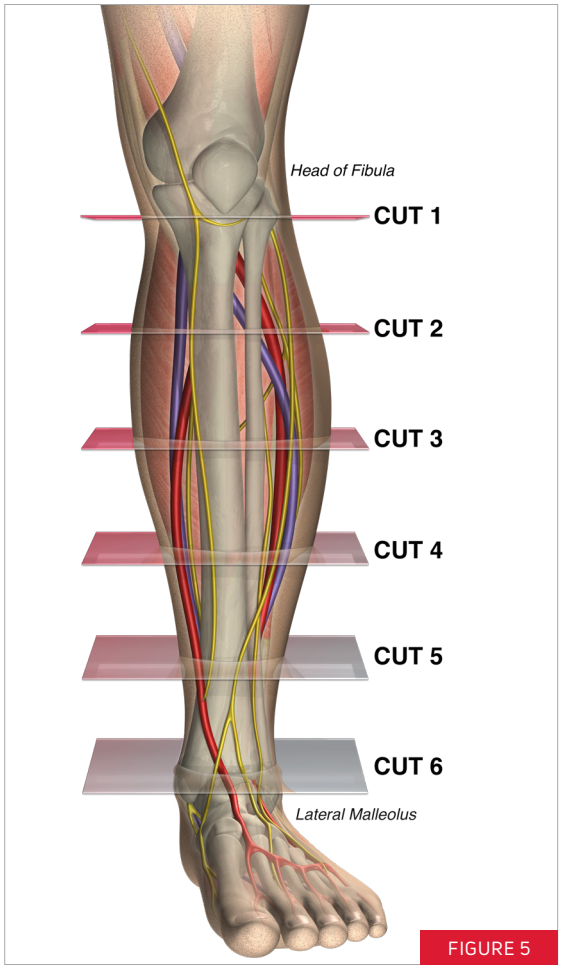


FIGURE 5

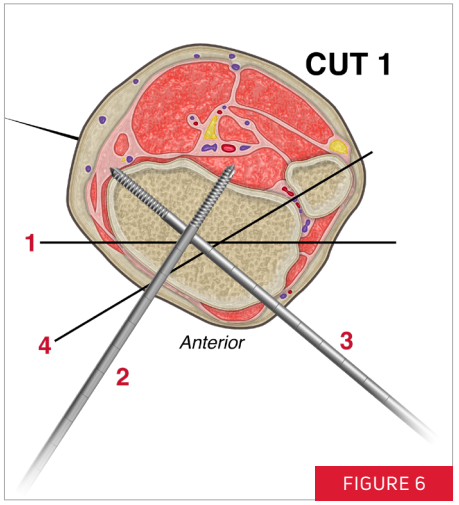


FIGURE 6

EXAMPLE OF HALF PIN PLACEMENT AT LEVEL 1

It is recommended to implement the so-called "Illizarov technique," where the wire is drilled through the bone, and then tap it with a mallet through the soft tissues. This approach takes advantage of the relatively blunt wire tips that, when tapped, have the potential to push nerves or vascular structures to the side, thus avoiding injury to these important structures. This technique will be demonstrated later in the technique guide while showing wire insertion.

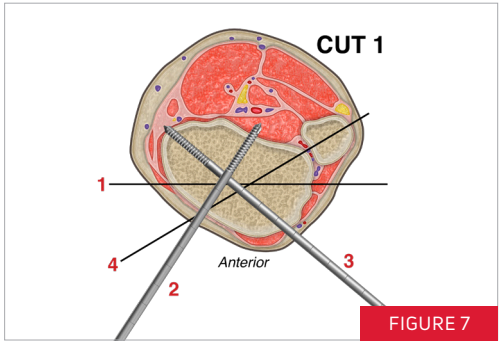


FIGURE 7

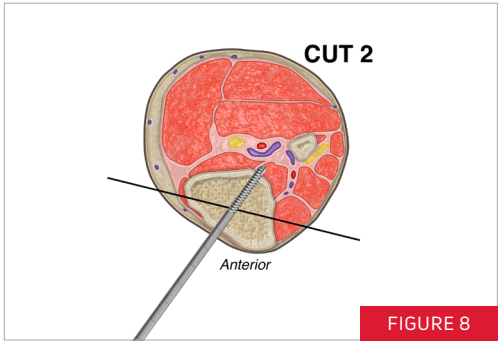


FIGURE 8

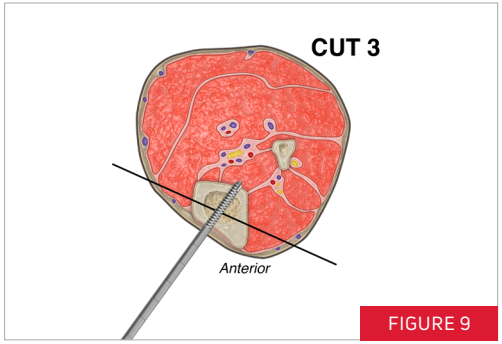


FIGURE 9

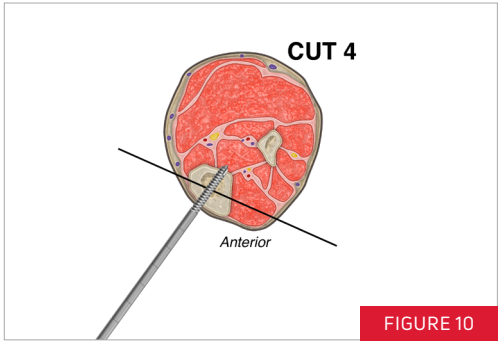


FIGURE 10

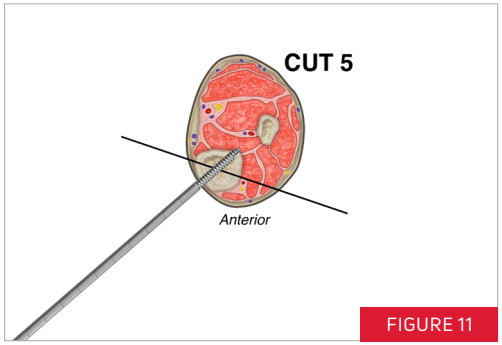


FIGURE 11

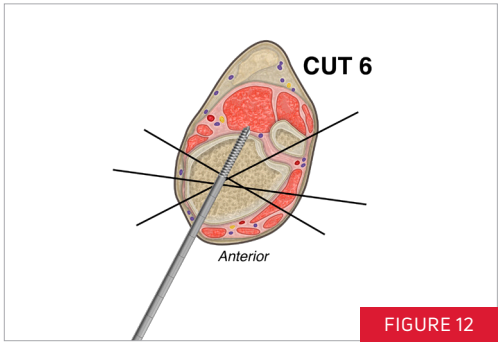


FIGURE 12

FIGURE 13 - FIGURE 16 demonstrate wire placement in the foot. Most wires are only able to capture 3 metatarsals.

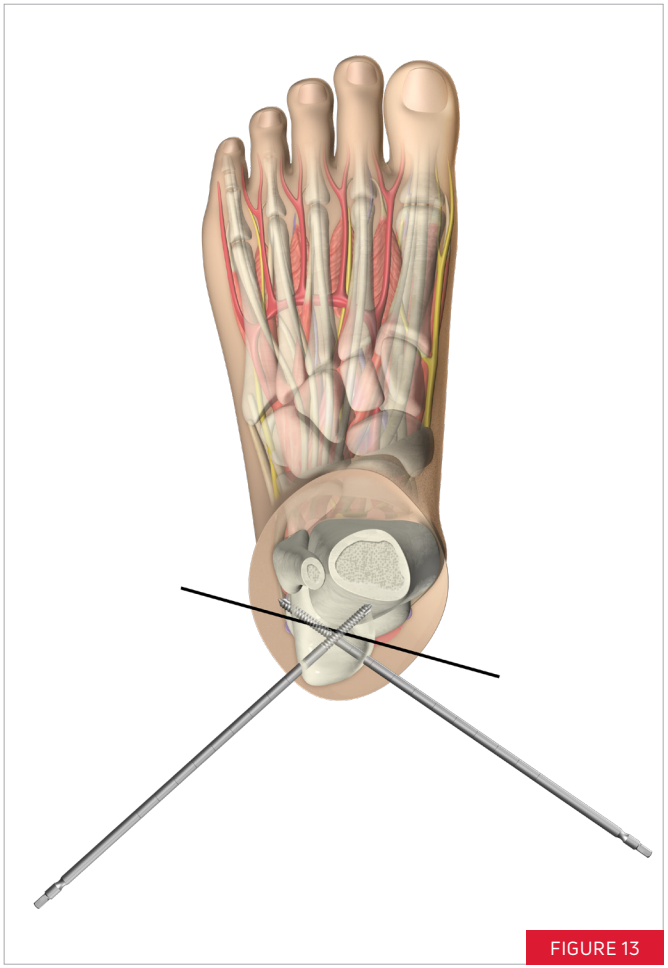


FIGURE 13

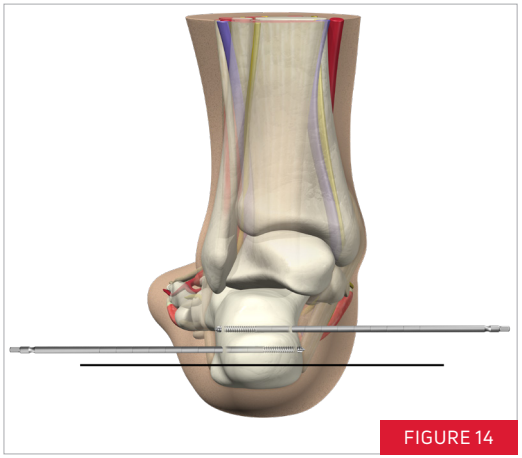


FIGURE 14

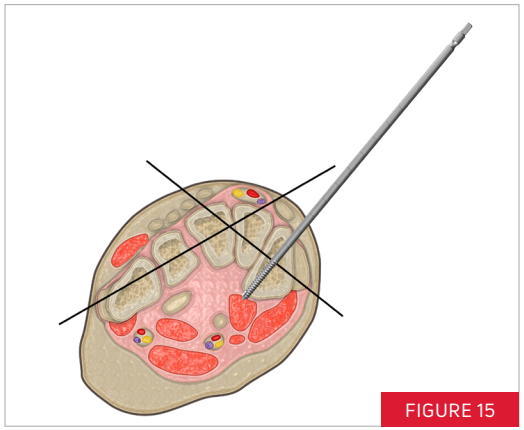


FIGURE 15

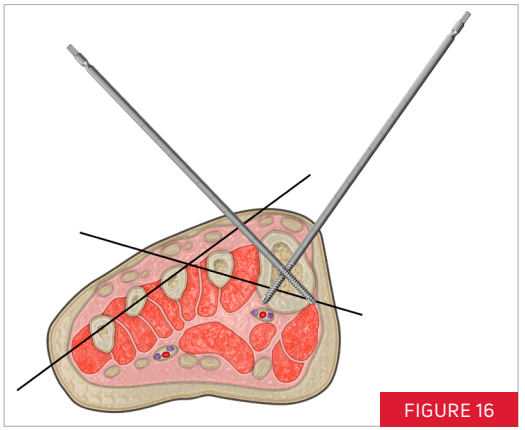


FIGURE 16

WIRE INSERTION: QUICK HIGHLIGHTS

1. Poke the wire down to bone.
2. Use an alcohol-soaked sponge to aid placing the wire at 90˚ to the axis of the bone (FIGURE 17). The alcohol cools the wire and decreases the probability of burning the bone.
3. Use the speed of the drill, not pressure to insert the wire (FIGURE 18).
4. After passing through the second cortex, stop drilling and tap the wire through with a mallet.
5. When using an olive wire, make a sufficient relieving incision to avoid stretching the skin. Tented skin leads to skin necrosis and secondary pin tract infection.

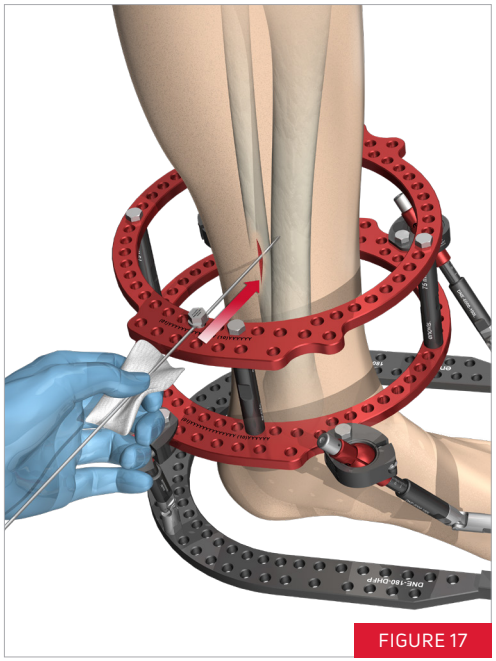


FIGURE 17

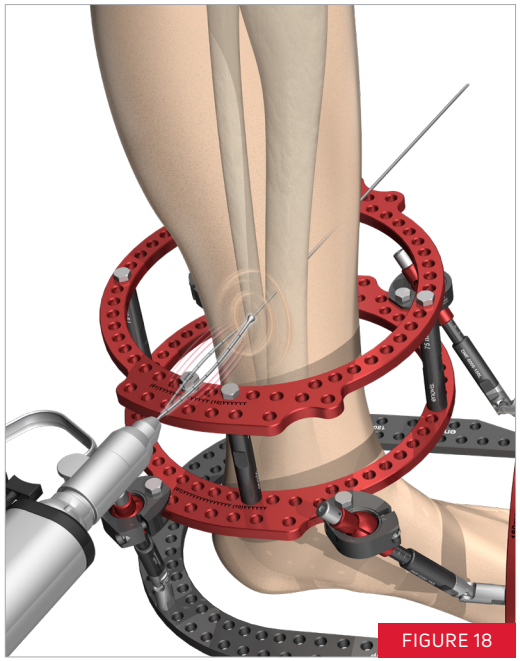


FIGURE 18

WIRE INSERTION: DETAILED OVERVIEW

1. The wire is placed on the surface of the ring and pushed through the skin at the desired level and orientation to the bone surface.
    - a. Many considerations come into play when determining the orientation
        - ii. Cross-sectional anatomy
        - iii. Location of the second wire
        - iv. Long axis of bone segment
    - b. Consult the safe zone diagrams on pages 17-18 for a detailed understanding of anatomical safe zones at their respective levels.
2. The wire should pass straight through the skin along the desired axis of the wire (FIGURE 19).
3. Fluoroscopy may be used to confirm proper orientation of the ring and the wire to the limb. The appropriate size ring, centered on the limb, or an entire pre-constructed frame may serve as a guide to proper orientation.

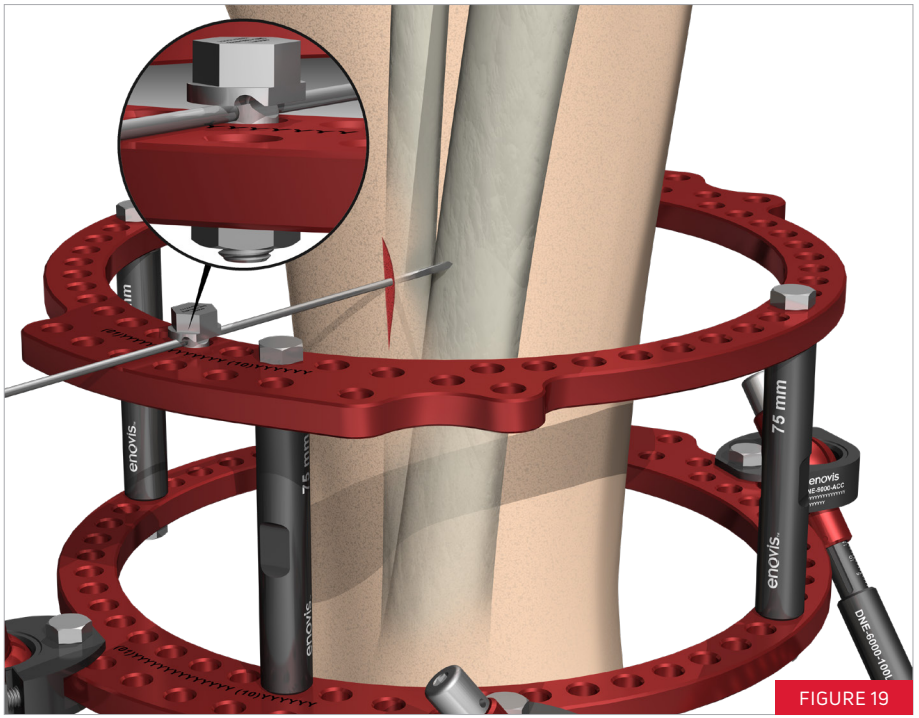


FIGURE 19

4. Insert the wire through the bone using a slow drilling speed. Avoid applying excessive pressure to keep the wire straight. Effort should be made to keep the wire cool during insertion:
    a. Using gauze soaked in alcohol or saline.
    b. By applying interrupted incremental advancement.
    c. Setting a saline drip on the wire itself.
5. Once the wire exits the bone, tap with a mallet to the opposite skin edge. The skin on the opposite side of the limb should be stabilized over the wire prior to exiting the skin.
6. Once the wire has exited the skin, check to see that there is no tension around the wire. If tension is present, withdraw the wire beneath the skin surface and then re-advance. Once satisfied, continue to advance the wire several centimeters beyond the ring to allow fixation and tensioning. An example of this can be seen in FIGURE 20.
7. If an olive wire is used, make a small stab incision along the wire track to allow the olive wire to pass through the skin. Olive wires should be advanced until the olive contacts the bone cortex. This can be accomplished by pushing the wire with a power drill or by pulling the opposite end of the wire with pliers.

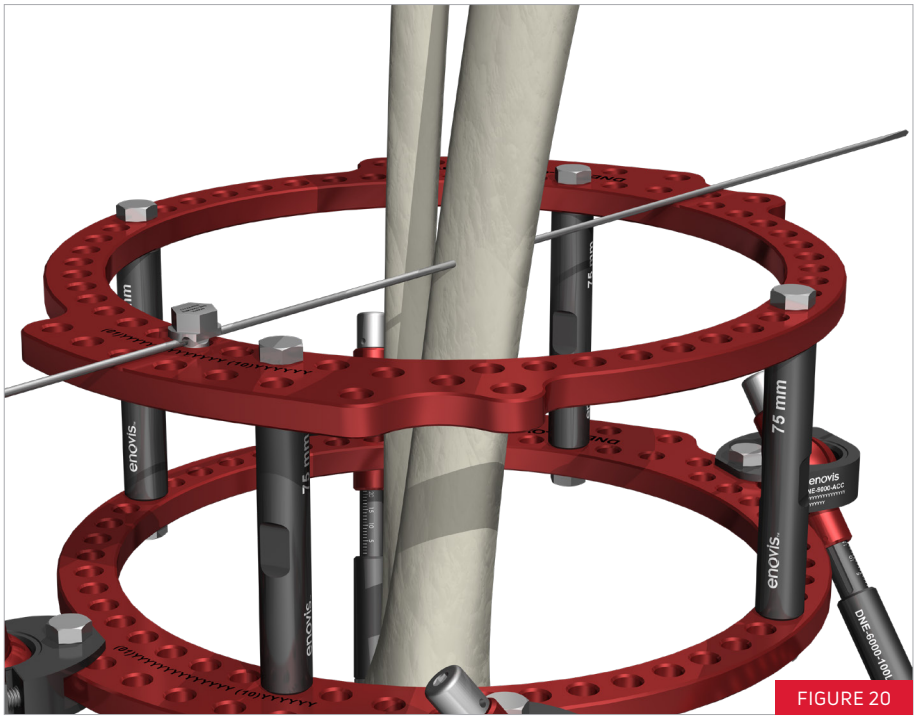


FIGURE 20

SECURING THE WIRE

Secure both ends of the wire to the external support using wire fixation bolts. This must be done with a minimal amount of wire bending.

The wire may bisect a ring hole. In such cases, use the cannulated feature of the wire fixation bolt (FIGURE 21). Slide the bolt over the wire, insert into the proper hole, and secure it to the ring using a 10mm nut. The head of the bolt must not be rotated relative to the axis of the wire to ensure that the wire remains straight. Use a 10mm wrench to hold the head of the bolt while tightening the nut.

The wire may be at the edge of the hole or between two holes. Use the slotted feature of the wire fixation bolt in these situations (FIGURE 22).

When placing a wire through the bone two situations may arise:

1. The wire may be flush on the surface of the ring, or
2. The wire will be a distance away from the plane of the ring.

Situation #2 happens because the axis of the wire is slightly non-perpendicular to the bone segment axis. In these situations, fill the space between the ring and the wire/wire fixation bolt with spacing washers or a male or female post to avoid bending the wire.

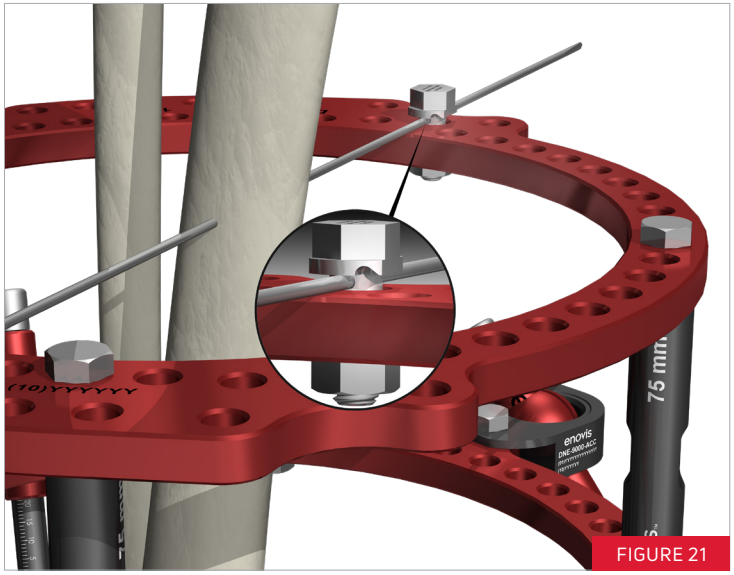


FIGURE 21

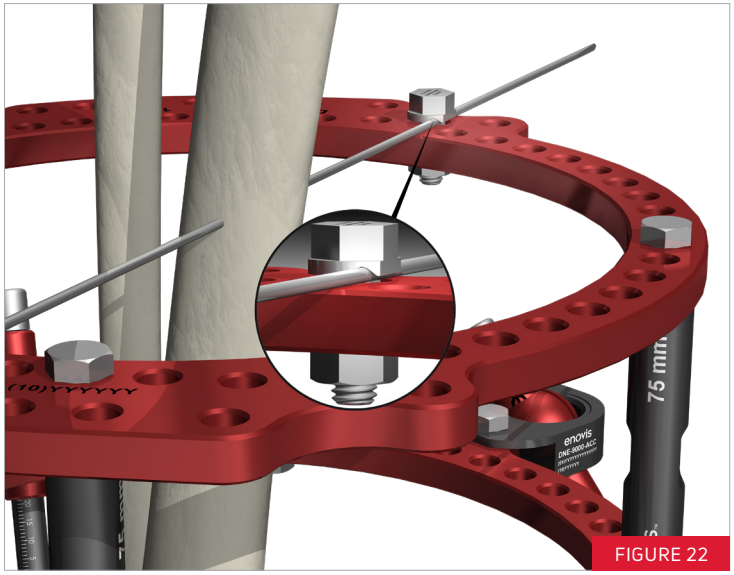
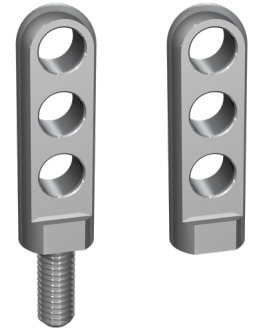


FIGURE 22


MALE & FEMALE POSTS


WASHERS

TENSIONING THE WIRE

To tighten a wire fixation bolt, first decide from which side the wire will be tensioned. Tensioning the wire involves drawing the wire against its fixed end. The amount of tension applied varies with the clinical circumstances and individual surgeons' preferences. Here are the steps to tension a wire:

1. Fully tighten the wire fixation bolt and nut on the side opposite of where the wire will be tensioned from.
2. Fully open the handles and slide the tensioner over the wire.
    a. Ensure the tensioner head captures the wire fixation bolt
    b. Ensure the tensioner is firmly against the external support
3. Squeeze the handles together until the desired amount of tension is generated.
    a. This can be seen by observing the markings on the neck of the tensioner.
    b. The wire tensioner locking bar will hold the tension at a constant level.
4. Securely tighten the nut on the wire fixation bolt.
5. Release the wire tensioner by depressing the locking bar and fully opening the handles. This will disengage the jaws of the wire tensioner and allow it to slide off the wire.
6. Cut and peen the wires to prevent injury.

NOTE: The sequence of wire insertion and tensioning will vary depending upon the specific nature of the disorder, frame application, and the surgeon's preference. In general, it is preferable to insert the most proximal and most distal wires, secure and center the apparatus to these wires, and then complete the wire insertion and tensioning.

Simultaneously tensioning the two wires on the same ring is advisable since sequential tensioning may alter the tension of the initially tensioned wire.

HALF PIN INSERTION

The basic principles of aligning a ring on the limb perpendicular to its long axis remain the same when half pins are used instead of, or in conjunction with, wires. Furthermore, the half pin should be fixed to the ring in a manner which prevents any torque between the half pin and the ring by properly orienting the half pin fixation bolt to the half pin and the ring. The use of half pins in place of wires, as well as their orientation and number are at the discretion of the surgeon.

The following steps outline the recommended half pin insertion and fixation methods:

1. A half pin fixation bolt is inserted into the appropriate hole (FIGURE 23). The half pin fixation bolt can act as a guide for half pin insertion.
    a. For 5mm and 6mm half pins, use the Universal Half Pin Fixation Bolt: DNE-1000-HFB.
    b. For 4mm half pins, use the 4 mm Half Pin Fixation Bolt: DNE-4-HFB.
2. A small incision is made at the location where the half pin will enter the skin.
3. Using a hemostat a track is made through the soft tissue down to bone.
4. The appropriate sized half pin is inserted through the fixation bolt, soft tissue track, and drilled into the first bony cortex (FIGURE 24).
5. Passing the half pin into through the second cortex should be done manually using the T-handle supplied in the set (DNE-9000-TH-ST) (FIGURE 25).
6. The half pin fixation bolt is secured firmly to the external support with a 10mm nut.

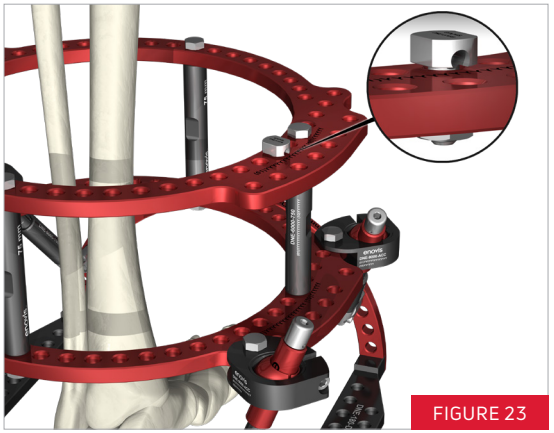


FIGURE 23

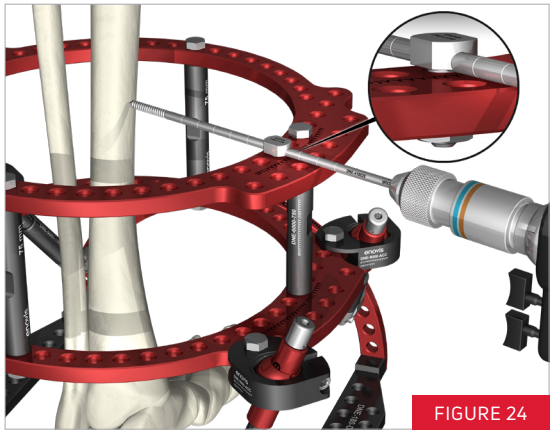


FIGURE 24

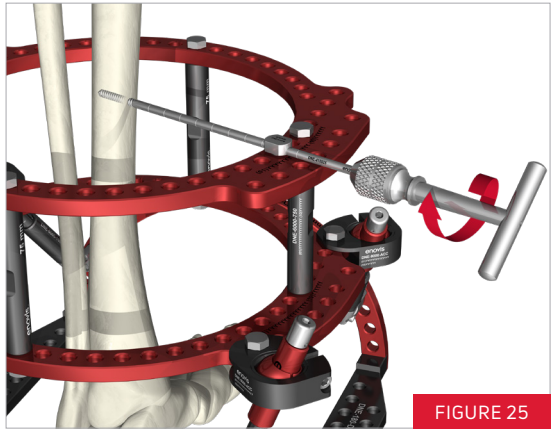


FIGURE 25

HALF PIN ORIENTATION

When more than one half pin is to be secured to an external support, they should be spaced along the bone and around the circumference (ex. One half pin should be on the proximal surface and one on the distal or spaced at a distance using a post).

When half pin orientation is oblique to the plane of the ring, it should be attached using a post. To properly secure a half pin using a post:

1. Select the appropriate sized post based on the distance from the half pin to the surface of the external support.
2. Loosely secure the half pin to the post with a half pin fixation bolt.
3. Loosely attach the post to the hole of the external support using a 16mm bolt.
    a. Securely tighten the half pin to the post.
    b. Next, securely tighten the post to the external support taking care not to bend or torque the half pin.

Half pins require:

- An adequate incision so that skin is not stretched by the pin.
- A drill sleeve for the pilot hole.
- The pilot hole and half pin to be bicortical.
- Use of a hand instrument to place the half pin.
- Slow speed to avoid burning the bone.

THE STATIC CIRCULAR FRAME

For this external fixation application, the surgeon obtains correction at the time of surgery and simply uses the external fixator to maintain that correction post-operatively.

Using the principles of deformity correction, lines have been drawn through the center of the axis of the hindfoot and forefoot in both anterior-posterior and lateral planes. The lines intersect at the apex of the deformity, the so-called CORA (Center of Rotational Axis).

An example of a common charcot foot can be seen in FIGURE 26. A closing wedge osteotomy was performed in both planes. The wedge of bone removed is larger medial and plantar.

FIGURES 27-28 depict a common deformity seen in this type of patient as well as a provisional fixation method to properly identify the CORA.

FIGURE 26

AN EXAMPLE OF A COMMON DIABETIC ULCER IN A PATIENT WITH A CHARCOT FOOT, THIS 56-YEAR-OLD MALE WITH DIABETES HAS A SEVERE VALGUS DEFORMITY SECONDARY TO CHARCOT FOOT ARTHROPATHY.

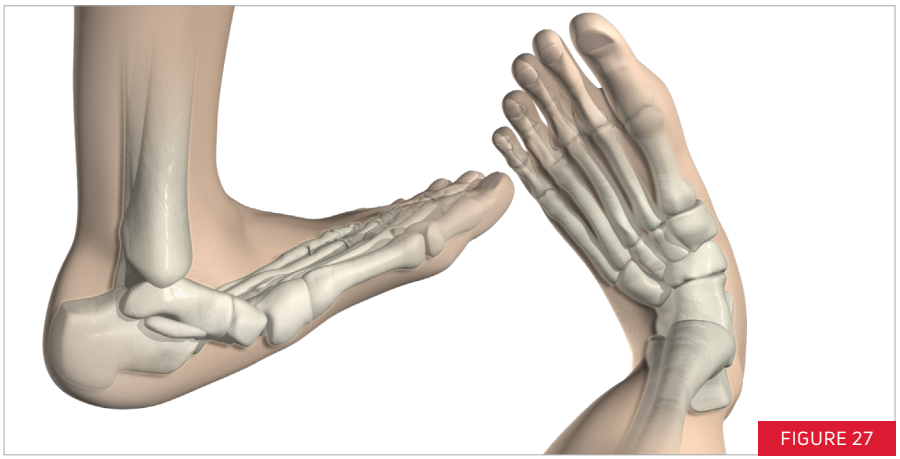


FIGURE 27

A MODEL DEPICTING THE TYPICAL ROCKER DEFORMITY SEEN IN PATIENTS WITH CHARCOT FOOT ARTHROPATHY

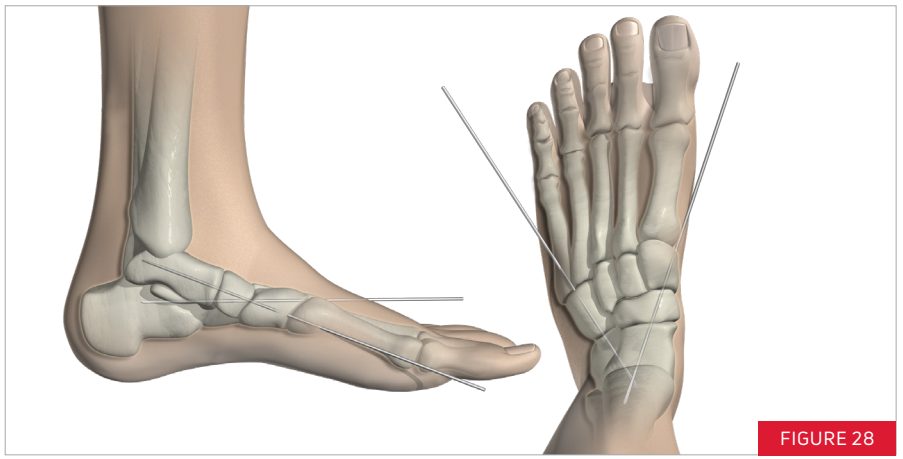


FIGURE 28

PROVISIONAL FIXATION OF THE CORA WITH SMOOTH PINS

APPLYING THE FRAME

1. A pre-built three level circular ring external fixator is placed on the limb.
2. Two olive wires are placed through the heel at a 30˚ angle to each other and parallel to the weightbearing surface of the foot.
3. The wires are tensioned to 90-120kg.
4. Two olive wires are the placed through the metatarsals at a 30˚ angle to each other and parallel to the weightbearing surface of the foot.
5. These wires are tensioned to 90-120kg.
6. Two olive wires are then placed at the level of the proximal ring with the tibia centered in the proximal ring.
7. These wires are drilled through the bone and then tapped with a mallet through the soft tissues to avoid injury to nerves or blood vessels.
8. With the tibia centered within the proximal ring, the wires are tensioned to 120kg and attached to the frame.
9. Two smooth or olive wires are then placed at the level of the middle ring. The wires are drilled through the bone and tapped through the soft tissues to avoid injury to nerves or blood vessels (FIGURE 29).
10. In obese patients, a third redundant smooth wire is placed at the level of the forefoot and at the level of the proximal circular ring.

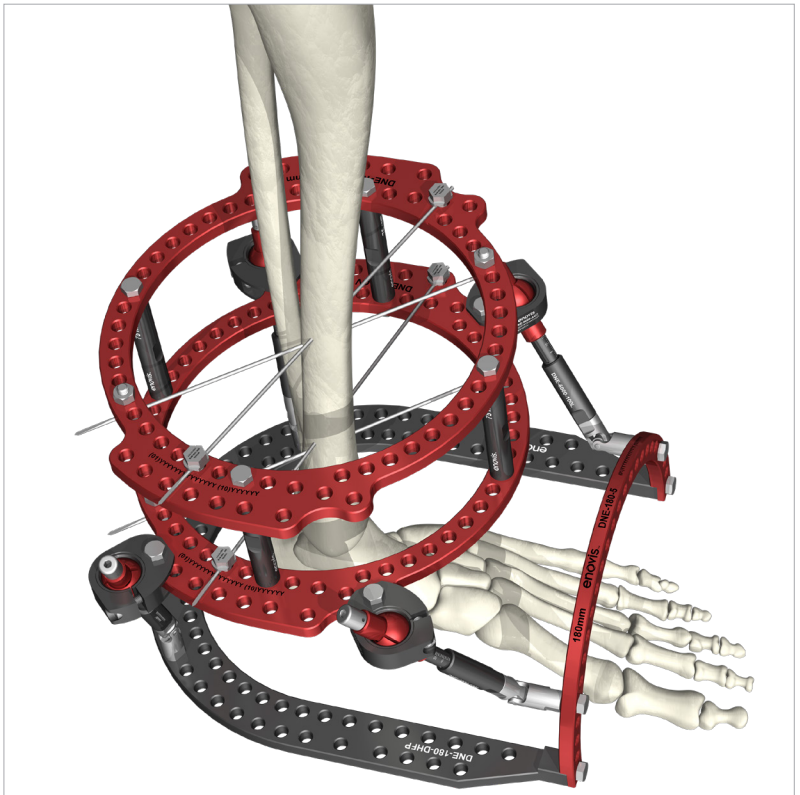


FIGURE 29

THE ANKLE FUSION FRAME

1. When performing an ankle fusion, ideally compression is obtained across the ankle.
2. The tibial mounting block is applied following preparation of the ankle joint for arthrodesis and wound closure.
    a. In the terminology of deformity correction, the tibia and 2-level circular ring construct is referred to as the reference segment.
3. Provisional fixation of the ankle is accomplished with two large smooth wires (FIGURE 30).
4. A closed foot ring is then applied to the foot with a similar technique as used for the static circular ring.
5. Two olive wires are placed through the heel at a 30° angle to each other and parallel to the weightbearing surface (FIGURE 31).

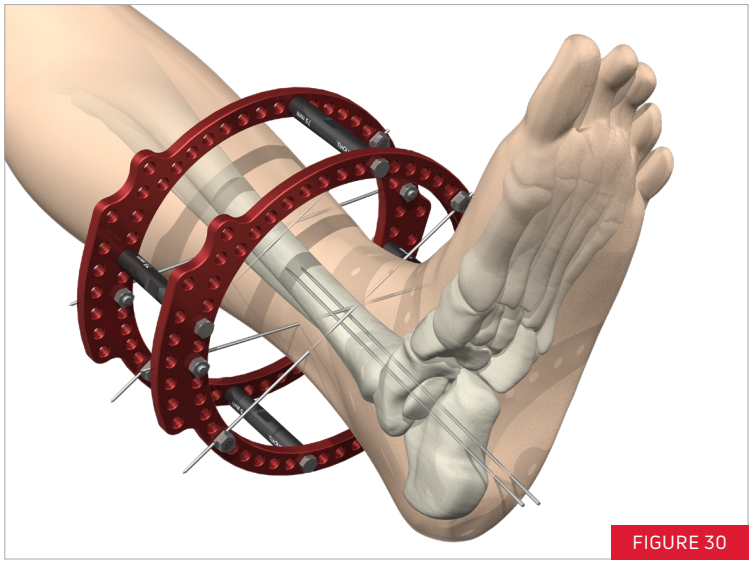


FIGURE 30

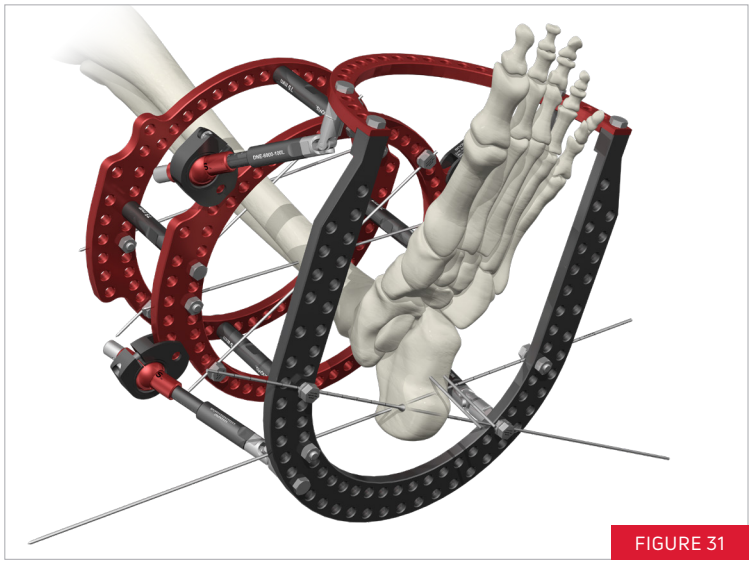


FIGURE 31

6. Place two olive wires through the metatarsals at a 30˚ angle to each other and parallel to the weightbearing surface (FIGURE 32).
    a. This segment is referred to as the moving segment.
7. Attach the closed foot ring, i.e., the moving segment, to the reference segment.
    a. This step can be accomplished by attaching angular correction clamps (DNE-9000-ACC) to the middle oval ring on the tibia.
    b. After the angular clamps are connected, feed the EF1 rail body into the clamp and tighten in place.
8. Compression is achieved with either threaded rods or adjustable struts.
    a. To compress the EF1 rail body, use the Rail T-Handle (DNE-9000-TH-964), insert it into the proximal silver portion of the rail body ,and turn clockwise.
    b. To distract, turn the T-handle counterclockwise.
9. Each quarter turn of the strut compresses or distracts the rail in increments of 0.20mm. Five quarter turns is the equivalent of 1.0mm.

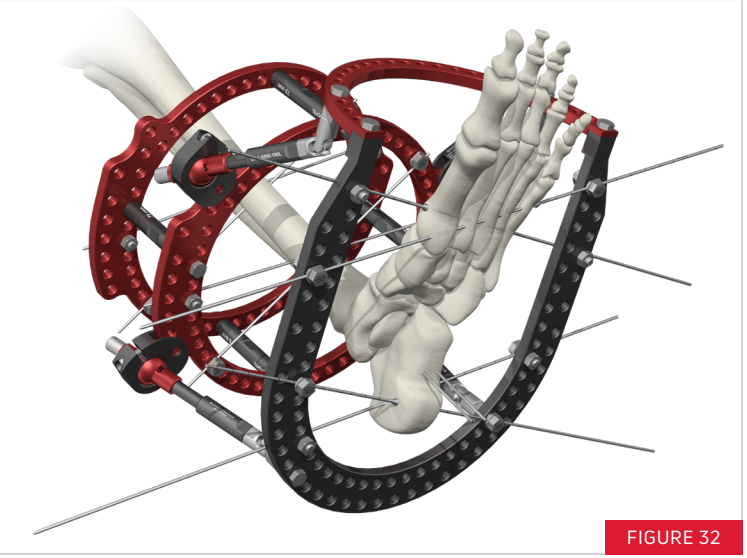


FIGURE 32

EF1 ADJUSTABLE RAIL BODY OPTIONS

PART #	DESCRIPTION	COLLAPSED LENGTH	EXTENDED LENGTH
DNE-6000-100S	RAIL BODY COMPLETE- SHORT	50MM	65MM
DNE-6000-100L	RAIL BODY COMPLETE – LONG	85MM	110MM
DNE-6000-100XL	RAIL BODY COMPLETE – XL	150MM	210MM
DNE-9000-SFR	SPEED FRAME RAIL	200MM	320MM

NOTES

T 800.495.2919 F 877.778.3864

MedShape, Inc.
1575 Northside Dr NW I Suite 440 I Atlanta, GA 30318 I U.S.A.
enovis.com/foot-and-ankle

MKT-FA24-0029 Rev A