

Exclusively foot & ankle ²⁰
Paragon®



SURGICAL TECHNIQUE GUIDE

Calcaneal Fracture Using the Gorilla® Sinus Tarsi Support Plate

**Gorilla® Calc Fracture
Plating System**

GORILLA®
R3CON PLATING SYSTEM

SURGICAL TECHNIQUE GUIDE:

CALCANEAL FRACTURE

Acknowledgment:

Paragon 28® would like to thank Christopher Zingas, M.D. for his contribution to the development of the surgical technique guide.

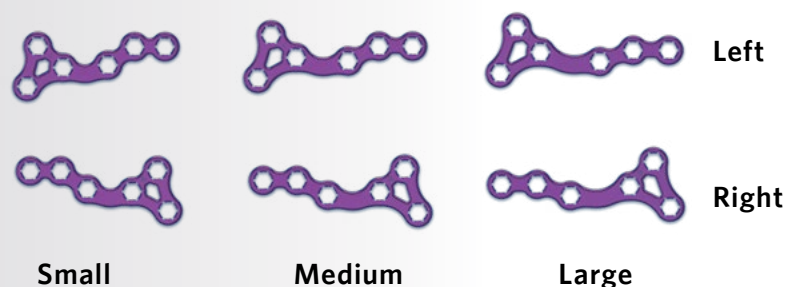
PRODUCT DESCRIPTION

Paragon 28® set out to design the Gorilla® Calc Fracture Plating System to allow for various methods to approach and provide plate fixation for calcaneal fractures. The diversity in plate options allows the surgeon to repair these challenging injuries using either a sinus tarsi or lateral extensile incision. The Gorilla® Calc Fracture Plating System is a part of the Gorilla® R3CON Plating System. All plate holes accommodate 2.7, 3.5 and 4.2 mm locking or non-locking screws. If TUFFNEK® Screw fixation is preferred, refer to the TUFFNEK® Surgical Technique Guide (P50-STG-0001) for proper screw placement technique.

IMPLANT OFFERING

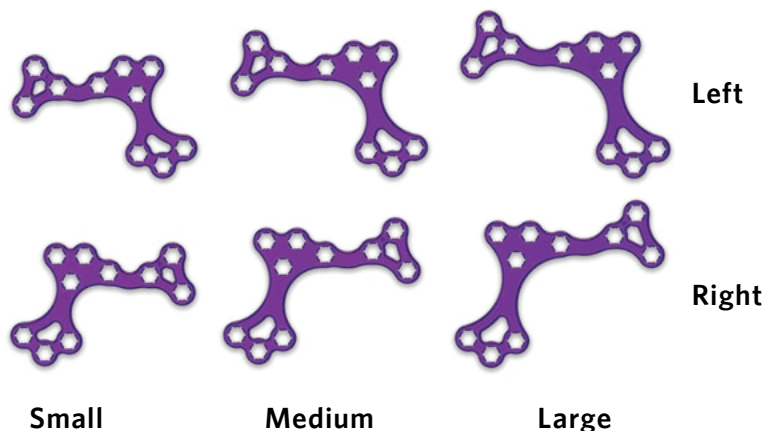
Sinus Tarsi Plate

- Intended for use with a sinus tarsi incision
- Available in 3 sizes
- Right and left specific design
- Minimally invasive and low profile with 1.1 mm thickness
- Made of Titanium Alloy (Ti6Al4V-ELI) for increased strength



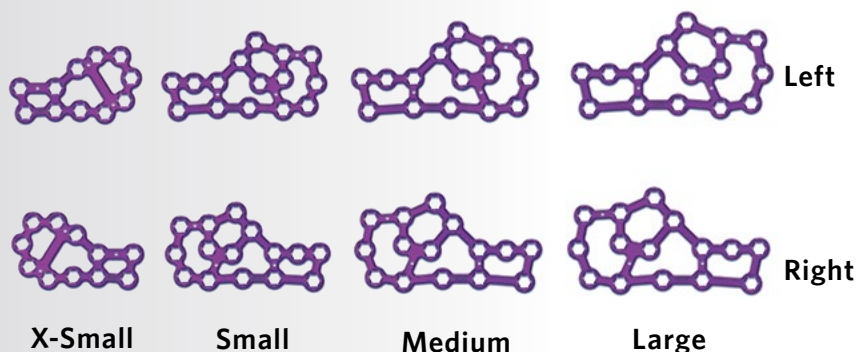
Sinus Tarsi Support Plate

- Intended for use with a sinus tarsi incision
- Available in 3 sizes
- Right and left specific design
- Instrumentation available to assist with incision placement and plate insertion through a sinus tarsi incision
- Minimally invasive and low profile with 1.1 mm thickness
- Made of Titanium Alloy (Ti6Al4V-ELI) for increased strength



Perimeter Plate

- Intended for use with a lateral extensile incision
- Available in 4 sizes
- Right and left specific design
- Low profile with 1.1 mm thickness and up to 15 screw holes with off-axis locking capability for flexibility of screw placement
- Made of CP Grade 4 Titanium for increased malleability



SURGICAL TECHNIQUE GUIDE:

CALCANEAL FRACTURE

R3CON Locking Screws

- Additional 3.5 mm R3CON locking screws are available in the most common lengths to supplement the screw offering in the Gorilla Case.



3.5 mm x 26 mm locking screw



3.5 mm x 28 mm locking screw



3.5 mm x 30 mm locking screw



3.5 mm x 32 mm locking screw

INSTRUMENTS



Ø2.3 mm K-wires



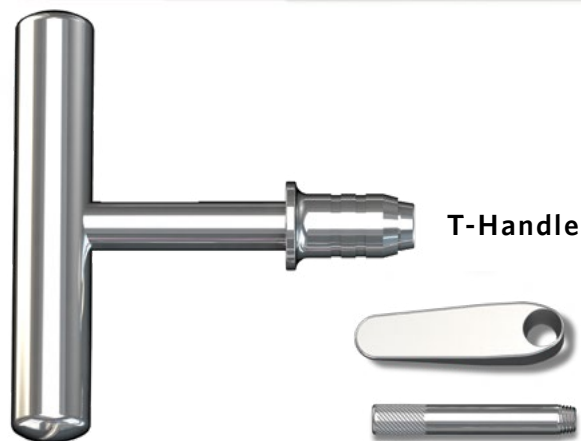
Ø2.9 mm K-wires



Ø4.0 mm Schanz Pins



Ø6.0 mm Schanz Pins



T-Handle



Support Plate Inserter



Drill Guides



Dissection Tool



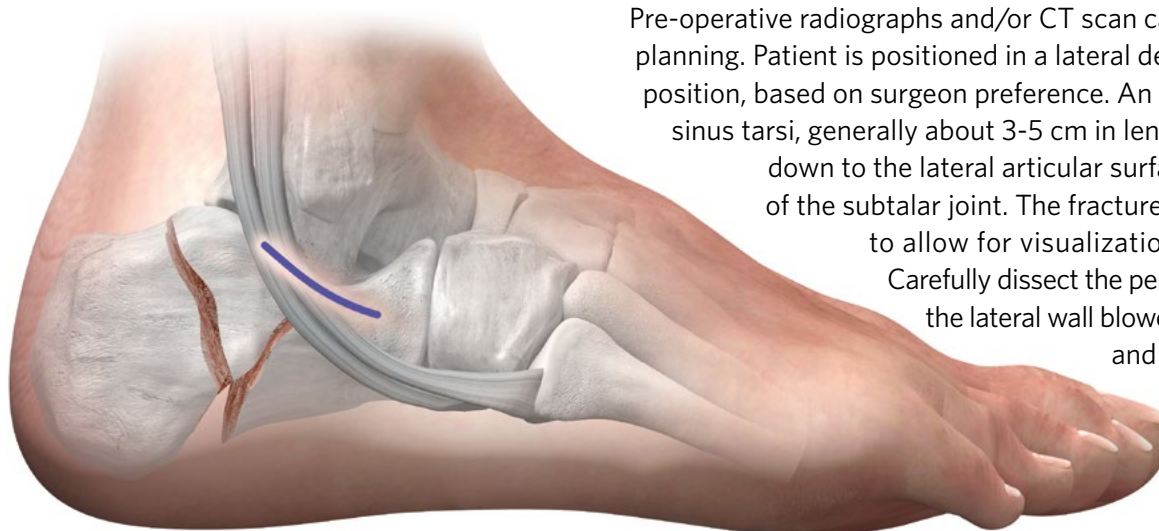
Incision Guide
(Available in Small, Medium, and Large)

SURGICAL TECHNIQUE GUIDE:

CALCANEAL FRACTURE USING THE GORILLA SINUS TARSI SUPPORT PLATE

The surgical technique shown in this guide is for placement of a Gorilla Sinus Tarsi Support Plate. Use of instrumentation specific to this plate type helps facilitate plate insertion while maintaining a minimally invasive approach.

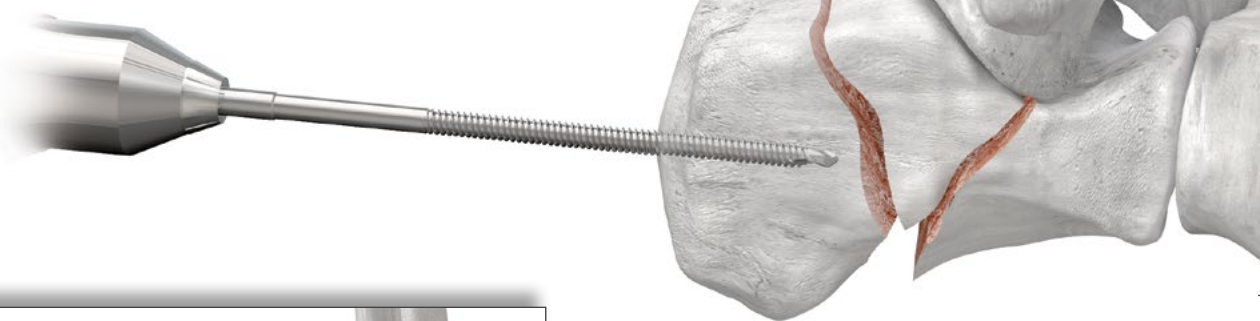
INCISION/EXPOSURE



Pre-operative radiographs and/or CT scan can be used for procedure planning. Patient is positioned in a lateral decubitus, prone or supine position, based on surgeon preference. An incision is made over the sinus tarsi, generally about 3-5 cm in length. Dissection is carried down to the lateral articular surface of the posterior facet of the subtalar joint. The fracture hematoma is evacuated to allow for visualization of the posterior facet. Carefully dissect the peroneal tendons away from the lateral wall blowout. The peroneal tendons and sural nerve are retracted and protected plantarly.

FRACTURE REDUCTION/TEMPORARY FIXATION

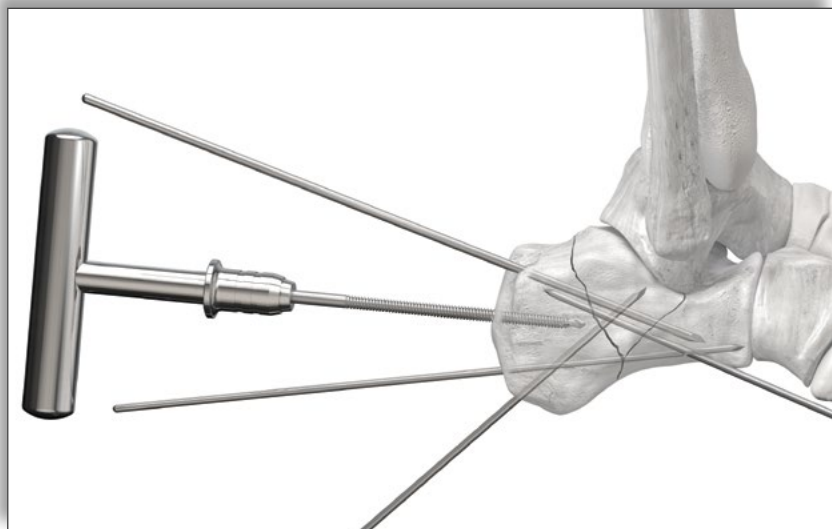
Fracture reduction and temporary fixation can be performed according to surgeon preference. Tools are provided in the Calc Fracture Caddy to assist in calcaneal fracture reduction. The posterior facet of the calcaneus is manipulated until correct placement is appreciated over the sustentaculum tali. This may be done in conjunction with reduction of the calcaneal tuberosity. The 4.0 mm and 6.0 mm Schanz pins can be inserted into the posterior or lateral aspect of the calcaneal tuberosity.



Once inserted, the T-handle can be attached to the Schanz pin to pull the calcaneal tuberosity out of varus, out to length and reduced with respect to the sustentacular fragment.

2.3 mm and 2.9 mm K-wires are used to provide temporary stabilization of the fracture fragments.

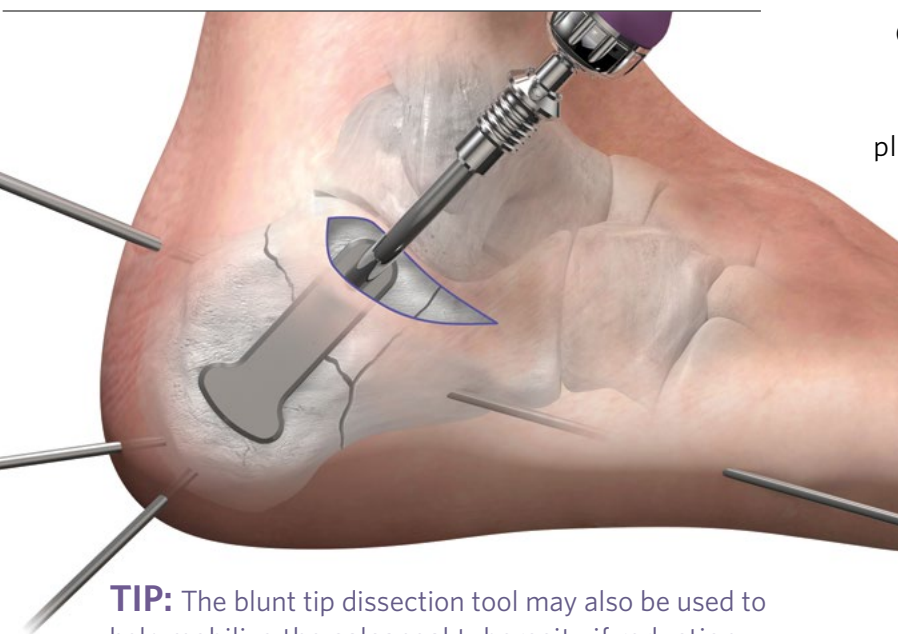
Ensure that Bohler's angle and the critical angle of Gissane have been re-established using fluoroscopy. Proceed with plate selection and placement once proper fracture reduction is achieved.



SURGICAL TECHNIQUE GUIDE:

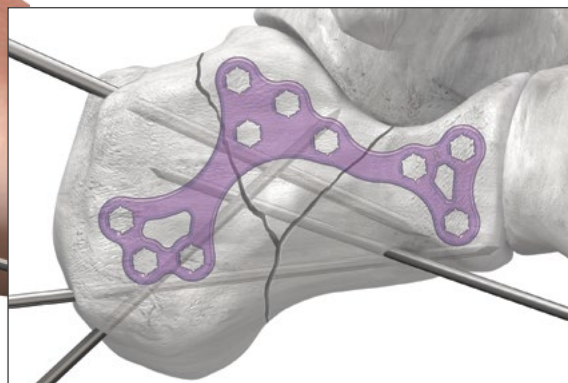
CALCANEAL FRACTURE USING THE GORILLA SINUS TARSI SUPPORT PLATE

PLATE SELECTION AND PLACEMENT



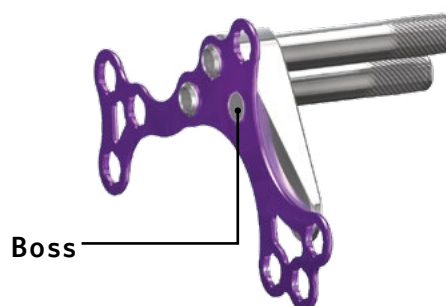
TIP: The blunt tip dissection tool may also be used to help mobilize the calcaneal tuberosity if reduction cannot be performed using the Schanz pins alone, especially in cases where bone healing has started and release of scar tissue along the lateral wall may be required.

Obtain the blunt tip dissection tool. Use the blunt tip dissection tool to separate the soft tissue at the lateral aspect from the bone in the area of plate placement. This tool is designed to help allow for minimally invasive plate insertion of the Sinus Tarsi Support Plate along the lateral calcaneus.

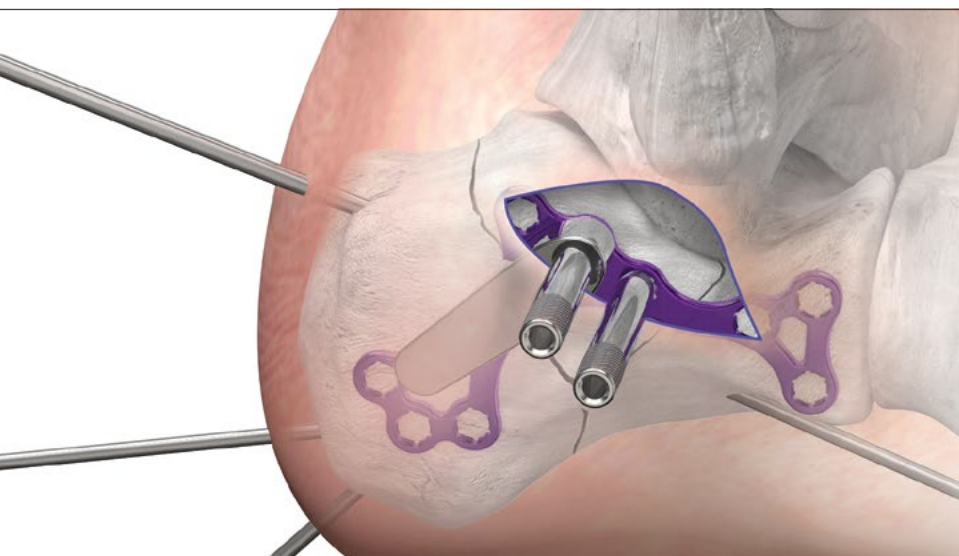


Determine plate size clinically or with fluoroscopy. Plate benders from the Gorilla Case can be used to contour the plate at this time, if necessary.

PERMANENT FIXATION



Place the plate inserter such that the boss extends into the hole below the three-hole cluster and the opening aligns with the central hole of the three hole cluster. Insert the two provided drill guides into the holes, as shown, with the drill guide extending into the central hole and also passing through the plate inserter.



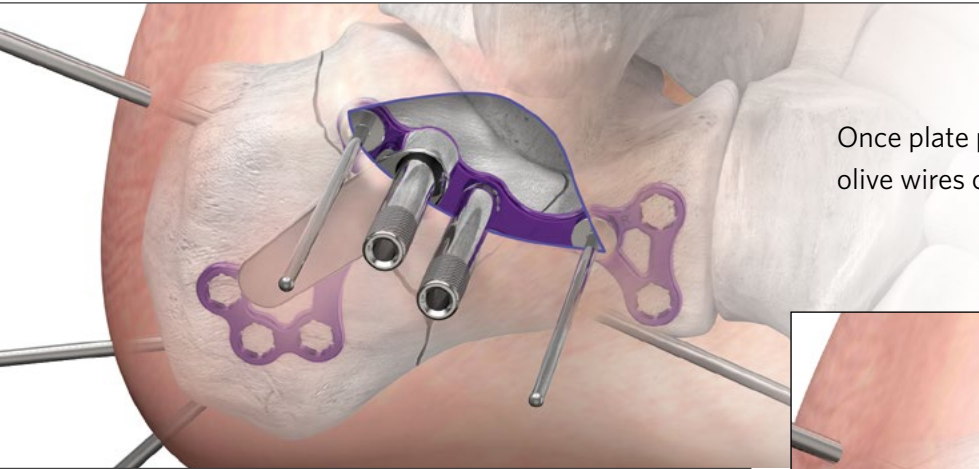
TIP: If bone graft or use of Paragon 28 Beast 100™ Demineralized Bone Matrix or V92™ Cellular Bone Matrix is necessary, insertion of the material can be performed prior to plate placement.

Insert the sinus tarsi support plate through the incision and confirm plate placement and size using fluoroscopy.

SURGICAL TECHNIQUE GUIDE:

CALCANEAL FRACTURE USING THE GORILLA SINUS TARSI SUPPORT PLATE

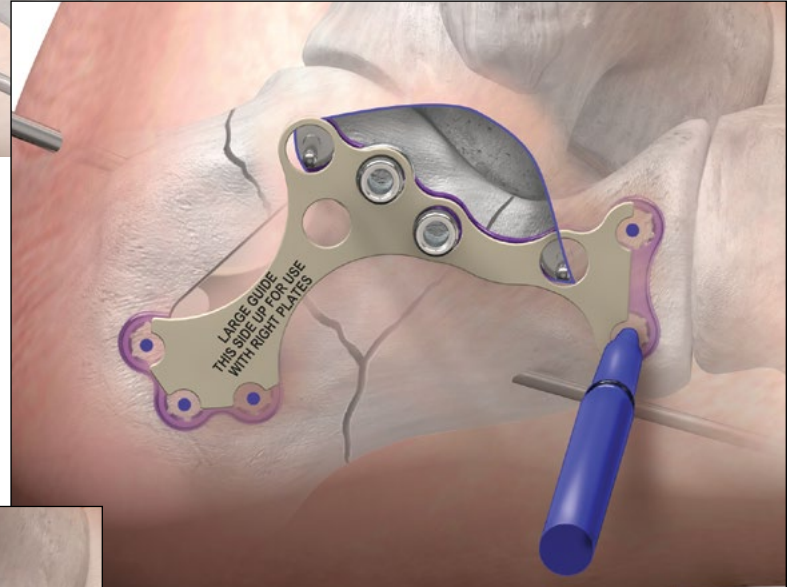
PERMANENT FIXATION



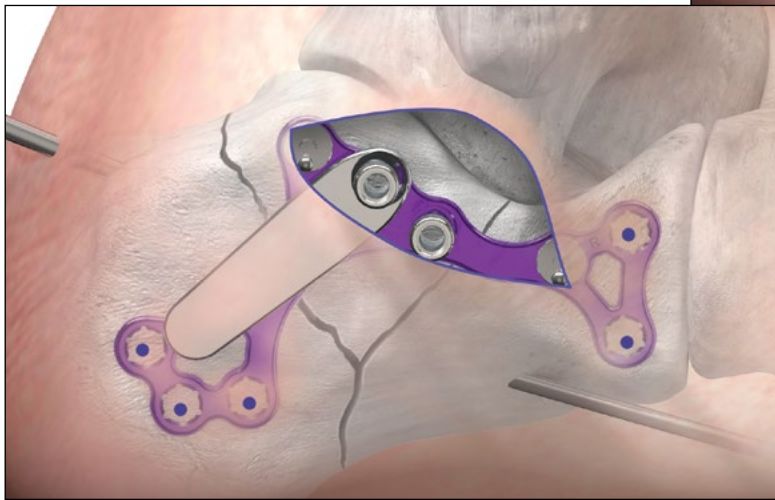
Once plate placement is correct, olive wires can be used to hold plate position.

Obtain the incision guide that matches the chosen plate size. Place the incision guide over the drill holes such that the drill guides go through the same two central proximal holes as the plate.

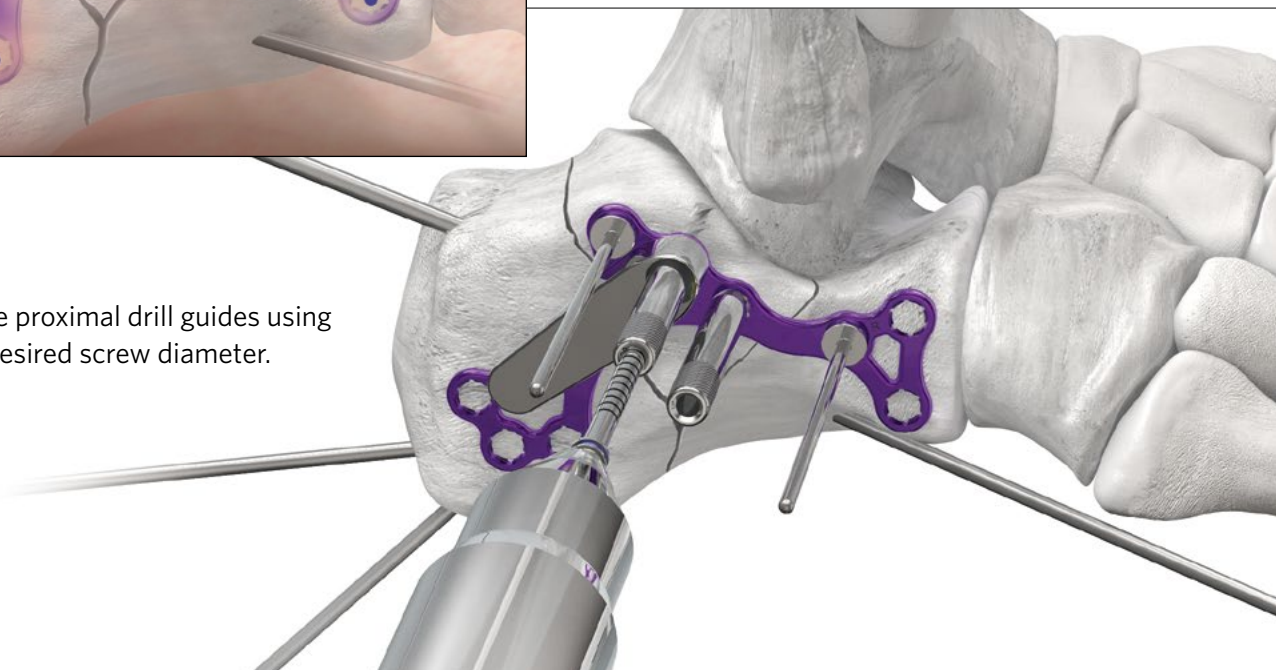
Use the incision guide to mark the hole positions distally and plantarly on the plate.



Alternatively, stab incisions can be made while the incision guide is on to allow for drilling and screw placement in these areas.



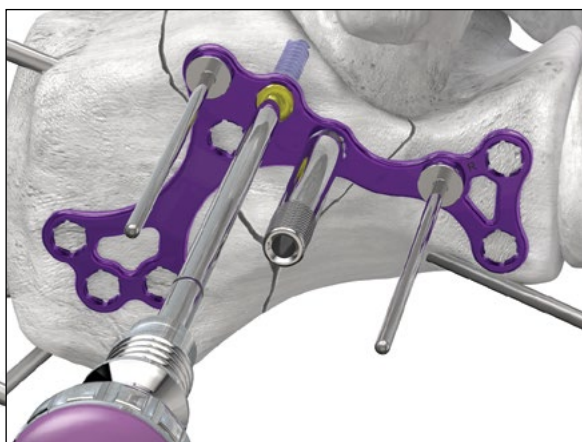
Drill into one of the proximal drill guides using the drill sized for desired screw diameter.



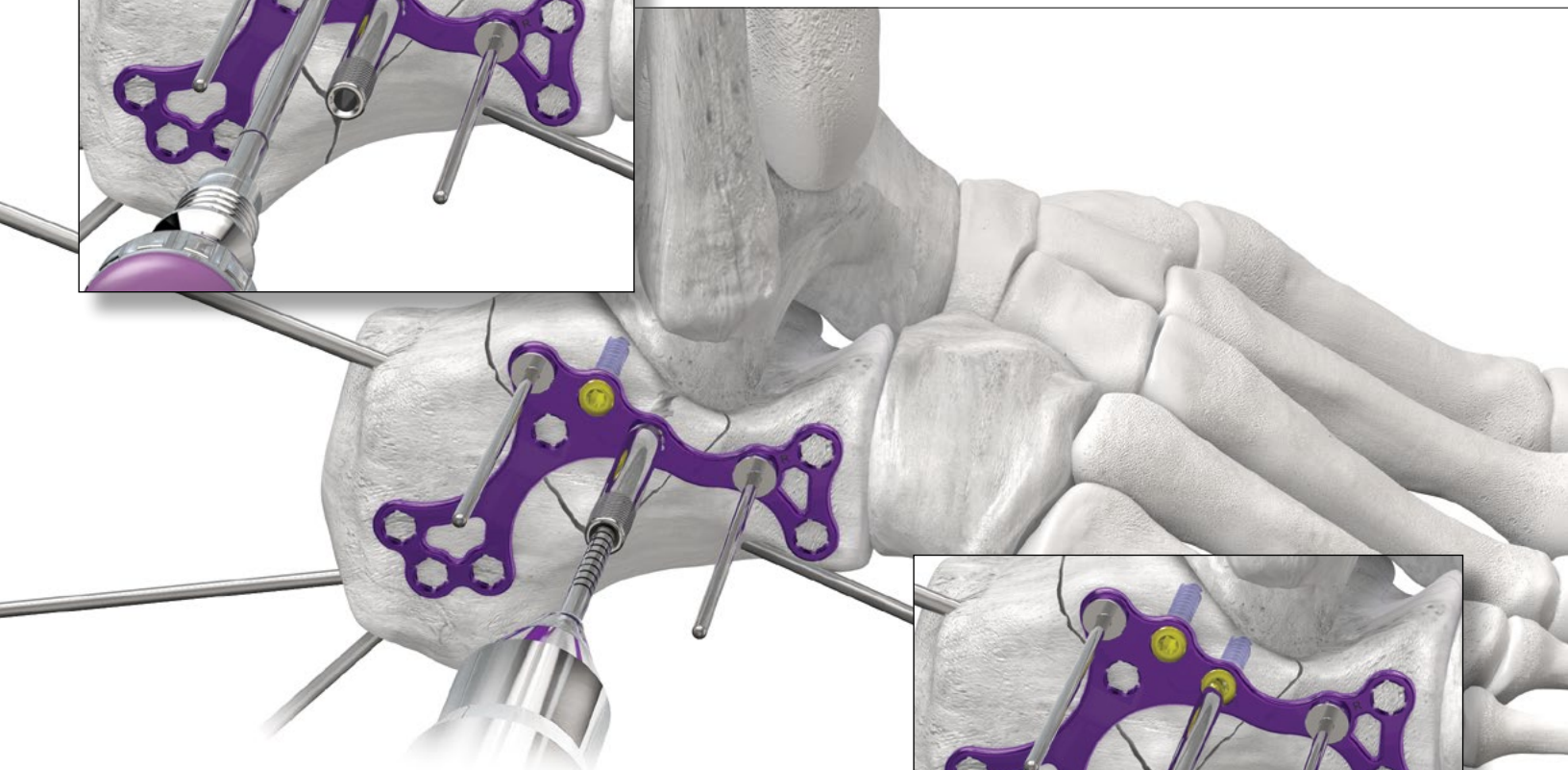
SURGICAL TECHNIQUE GUIDE:

CALCANEAL FRACTURE USING THE GORILLA SINUS TARSI SUPPORT PLATE

PERMANENT FIXATION

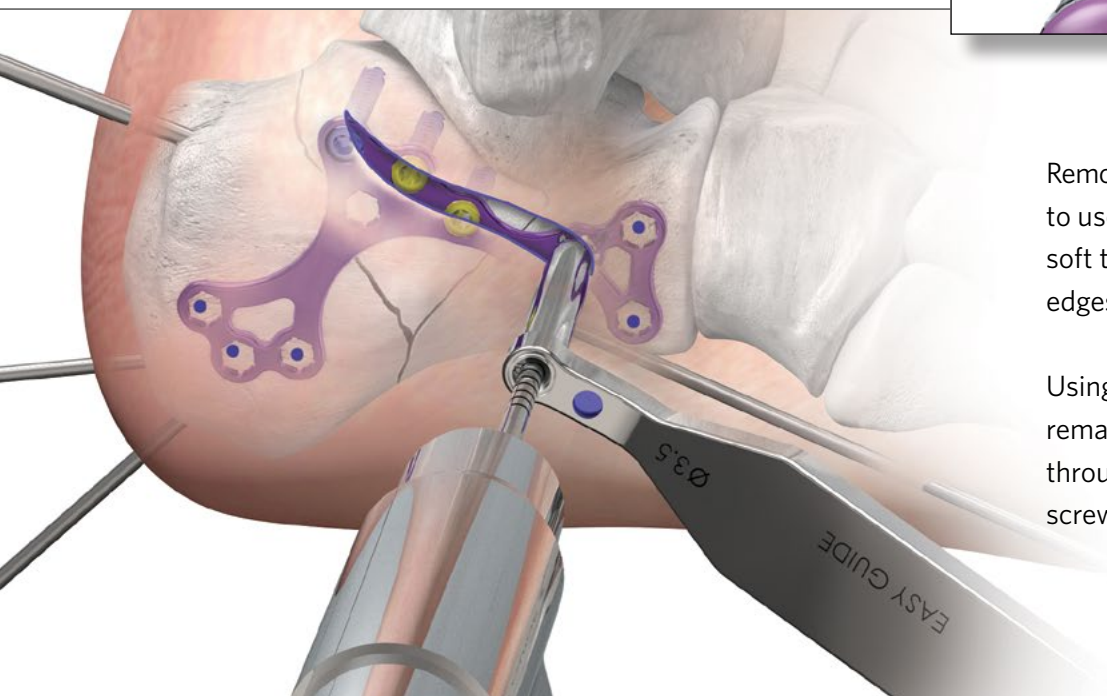
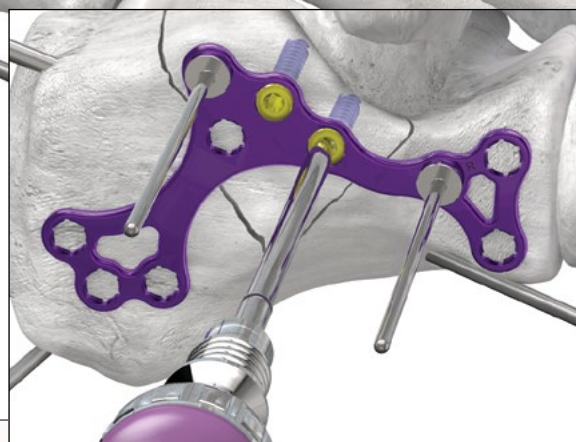


Remove the drill guide and plate inserter, measure screw length and insert the appropriate length screw using a screw driver.



Repeat these steps for the second proximal drill guide.

TIP: A Harris-Beath projection view can be taken during the steps of screw placement to confirm screw length and to ensure the calcaneus is out of varus.

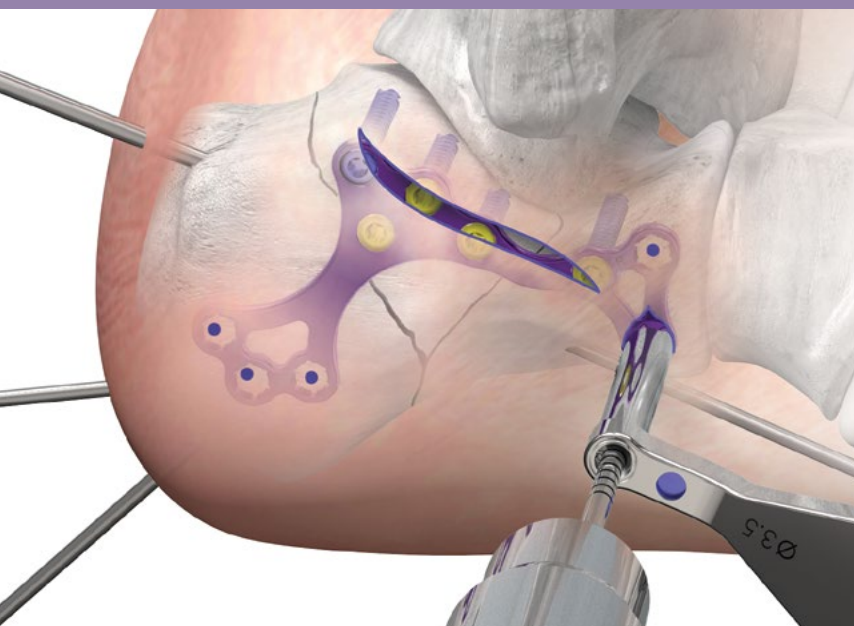


Remove the olive wires. It is recommended to use the Easy Drill Guide to help retract soft tissue while drilling the holes at the edges of the incision.

Using the Easy Drill Guide, drill the remaining holes that are accessible through the main incision and insert screws as described above.

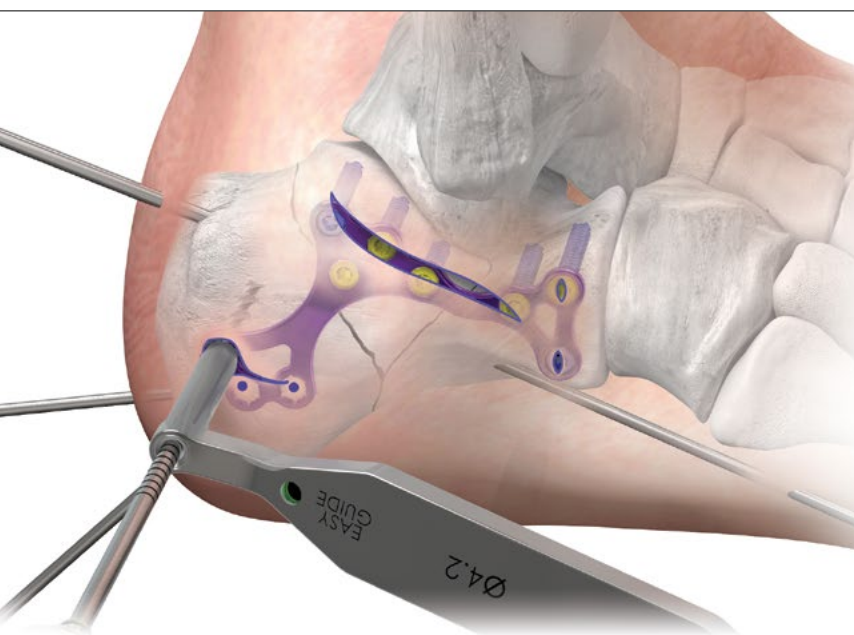
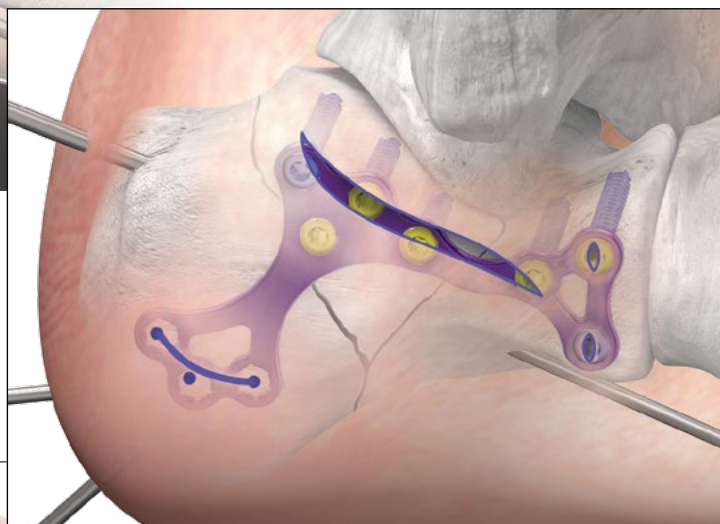
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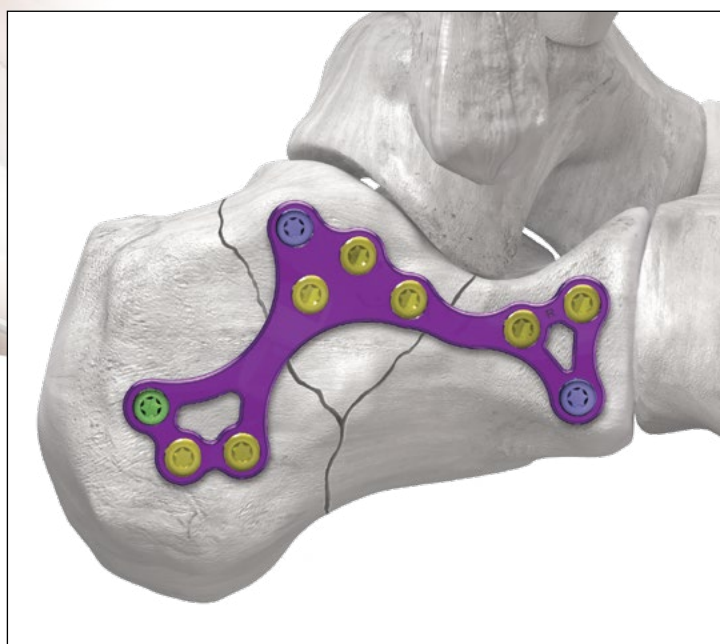


An incision or multiple stab incisions are made in the location of the marked holes distally and plantarily. A series of stab incisions are made over these holes or a single incision is made joining these marks.

TIP: If a single incision is made over the plantar holes, the incision should be straightened out slightly to avoid skin necrosis caused by a flap created by an incision that is too curved.



Place the Easy Drill Guide into one of the remaining distal or plantar holes. Using the drill for the selected screw diameter, drill through the drill guide. Measure screw length using a depth gauge. Insert the appropriate length screw using a screw driver.



Repeat these steps to fill the remaining holes. Confirm implant placement using fluoroscopy.

CLOSURE

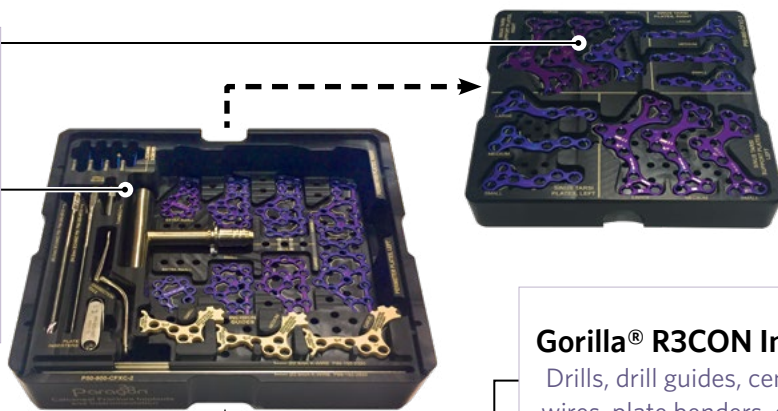
Proceed to incision closure or concomitant procedures at this time.

SURGICAL TECHNIQUE GUIDE:

GORILLA® R3CON PLATING SYSTEM

Gorilla® Calc Fracture Caddy

Calcaneal fracture plates, additional 3.5 mm locking screws and supporting instrumentation including Schanz pins, drill guides, incision guides, dissection tool, T-Handle, Support Plate Inserters and K-wires can be found in the Gorilla® Calc Fracture Caddy.



Additional Gorilla® Caddies

The Gorilla® Case has room for additional Gorilla® Plate Caddies or PRESERVE™ Allograft Caddies that may be needed for additional procedures performed in addition to fixation of a calcaneal fracture.

Gorilla® R3CON Instrument Caddy

Drills, drill guides, centering guides, olive wires, plate benders, drivers, K-wires, and a depth gauge are located in the Gorilla® R3CON Instrument Caddy.



Mini-Monster® Screw Caddy

The Gorilla® Case can accommodate one Mini-Monster® Screw Caddy if another procedure is being performed that would require a headed or headless 2.0 mm, 2.5 mm, 3.0 mm, 3.5 mm, or 4.0 mm cannulated screw.




Gorilla® Case



Gorilla® Screw Optionality

The Gorilla® screw length options for both locking and non-locking screws are as follows:

2.7 mm	1 mm increments, 8-20 mm	
2.7 mm	2 mm increments, 22-40 mm	
3.5 mm	2 mm increments, 10-50 mm	
4.2 mm	2 mm increments, 10-50 mm	
4.2 mm	5 mm increments, 55-70 mm	

Gorilla® R3CON Instruments

The Caspar Compression/Distraction device, osteotomes, baby Bennet retractors, bone reduction clamps, periosteal elevator, cartilage removal device, pin distractor, and handles are located at the bottom of the Gorilla® Case.

SURGICAL TECHNIQUE GUIDE:

GORILLA PLATING SYSTEM - CALCANEAL FRACTURE CADDY, IMPLANTS: _____

Part #	Description	Use
P50-353-3528	Gorilla, R3CON™ Plate Screw, Locking, 3.5 x 28 mm, TiA	Single-use
P50-353-3530	Gorilla, R3CON™ Plate Screw, Locking, 3.5 x 30 mm, TiA	Single-use
P50-353-3532	Gorilla, R3CON™ Plate Screw, Locking, 3.5 x 32 mm, TiA	Single-use
P50-353-3534	Gorilla, R3CON™ Plate Screw, Locking, 3.5 x 34 mm, TiA	Single-use
P53-102-L000	Gorilla, Calcaneal Fracture, Perimeter Plate, Extra Small, Left, Ti	Single-use
P53-102-L001	Gorilla, Calcaneal Fracture, Perimeter Plate, Small, Left, Ti	Single-use
P53-102-L002	Gorilla, Calcaneal Fracture, Perimeter Plate, Medium, Left, Ti	Single-use
P53-102-L003	Gorilla, Calcaneal Fracture, Perimeter Plate, Large, Left, Ti	Single-use
P53-102-L101	Gorilla, Calcaneal Fracture, Sinus Tarsi+Support Plate, Small, Left, TiA	Single-use
P53-102-L102	Gorilla, Calcaneal Fracture, Sinus Tarsi+Support Plate, Medium, Left, TiA	Single-use
P53-102-L103	Gorilla, Calcaneal Fracture, Sinus Tarsi+Support Plate, Large, Left, TiA	Single-use
P53-102-L201	Gorilla, Calcaneal Fracture, Sinus Tarsi Plate, Small, Left, TiA	Single-use
P53-102-L202	Gorilla, Calcaneal Fracture, Sinus Tarsi Plate, Medium, Left, TiA	Single-use
P53-102-L203	Gorilla, Calcaneal Fracture, Sinus Tarsi Plate, Large, Left, TiA	Single-use
P53-102-R000	Gorilla, Calcaneal Fracture, Perimeter Plate, Extra Small, Right, Ti	Single-use
P53-102-R001	Gorilla, Calcaneal Fracture, Perimeter Plate, Small, Right, Ti	Single-use
P53-102-R002	Gorilla, Calcaneal Fracture, Perimeter Plate, Medium, Right, Ti	Single-use
P53-102-R003	Gorilla, Calcaneal Fracture, Perimeter Plate, Large, Right, Ti	Single-use
P53-102-R101	Gorilla, Calcaneal Fracture, Sinus Tarsi+Support Plate, Small, Right, TiA	Single-use
P53-102-R102	Gorilla, Calcaneal Fracture, Sinus Tarsi+Support Plate, Medium, Right, TiA	Single-use
P53-102-R103	Gorilla, Calcaneal Fracture, Sinus Tarsi+Support Plate, Large, Right, TiA	Single-use
P53-102-R201	Gorilla, Calcaneal Fracture, Sinus Tarsi Plate, Small, Right, TiA	Single-use
P53-102-R202	Gorilla, Calcaneal Fracture, Sinus Tarsi Plate, Medium, Right, TiA	Single-use
P53-102-R203	Gorilla, Calcaneal Fracture, Sinus Tarsi Plate, Large, Right, TiA	Single-use

GORILLA PLATING SYSTEM - CALCANEAL FRACTURE CADDY, INSTRUMENTS: _____

Part #	Description	Use
P51-920-1006	Gorilla, Calcaneal Fracture, Dissection Tool, SS	Reusable
P51-920-1007	Gorilla, Calcaneal Fracture, Sinus Tarsi, Support Plate Inserter	Reusable
P51-920-1010	Gorilla, Calcaneal Fracture, Sinus Tarsi, Drill Guide, Locking	Reusable
P51-920-1011	Gorilla, Calcaneal Fracture, Sinus Tarsi, Incision Guide, Small	Reusable
P51-920-1012	Gorilla, Calcaneal Fracture, Sinus Tarsi, Incision Guide, Medium	Reusable
P51-920-1013	Gorilla, Calcaneal Fracture, Sinus Tarsi, Incision Guide, Large	Reusable
P99-000-AOTH	P28, T-Handle, AO Non-ratcheting, Solid, SS	Reusable
P99-300-4013	P28, Schanz Pin, Ø4.0mm, AO Connect, SS	
P99-300-6013	P28, Schanz Pin, Ø6.0mm, AO Connect, SS	
P99-192-2320	P28, K-wire, Ø2.3 x 200mm, Smooth, SS	Single-use
P99-192-2920	P28, K-wire, Ø2.9 x 200mm, Smooth, SS	Single-use

*See the complete Gorilla Plating Surgical Technique Guide (P51-STG-0001) for general instrument information

SURGICAL TECHNIQUE GUIDE: INDICATIONS, CONTRAINDICATIONS, AND WARNINGS

Refer to www.paragon28.com/ifus for the complete and most current instructions for use document.

INDICATIONS FOR USE (GORILLA®)

The Baby Gorilla®/Gorilla® Bone Plates and Bone Screws of the Baby Gorilla®/Gorilla® Plating System are indicated for use in stabilization and fixation of fractures or osteotomies; intra and extra articular fractures, joint depression, and multi-fragmentary fractures; revision procedures, joint fusion and reconstruction of small bones of the toes, feet and ankles including the distal tibia, talus, and calcaneus, as well as the fingers, hands, and wrists. The system can be used in both adult and pediatric patients. Specific examples include:

Forefoot:

- Arthrodesis of the first metatarsalcuneiform joint (Lapidus Fusion)
- Metatarsal or phalangeal fractures and osteotomies
- Lesser metatarsal shortening osteotomies (e.g. Weil)
- Fifth metatarsal fractures (e.g. Jones Fracture)

Mid/Hindfoot:

- LisFranc Arthrodesis and/or Stabilization
- 1st (Lapidus), 2nd, 3rd, 4th, and 5th Tarsometatarsal (TMT) Fusions
- Intercuneiform Fusions
- Navicular-Cuneiform (NC) Fusion
- Talo-Navicular (TN) Fusion
- Calcaneo-Cuboid (CC) Fusion
- Subtalar Fusion
- Medial Column Fusion
- Cuneiform Fracture
- Cuboid Fracture
- Navicular Fracture

In addition, the non-locking, titanium screws and washers are indicated for use in bone reconstruction, osteotomy, arthrodesis, joint fusion, fracture repair and fracture fixation, appropriate for the size of the device.

Ankle:

- Lateral Malleolar Fractures
- Syndesmosis Injuries
- Medial Malleolar Fractures and Osteotomies
- Bi-Malleolar Fractures
- Tri-Malleolar Fractures
- Posterior Malleolar Fractures
- Distal Anterior Tibia Fractures
- Vertical Shear Fractures of the Medial Malleolus
- Pilon Fractures
- Distal Tibia Shaft Fractures
- Distal Fibula Shaft Fractures
- Distal Tibia Periarticular Fractures
- Medial Malleolar Avulsion Fractures
- Lateral Malleolar Avulsion Fractures
- Tibiotalocalcaneal Joint Arthrodesis
- Tibiotalar Joint Arthrodesis
- Tibiocalcaneal Arthrodesis
- Supramalleolar Osteotomy
- Fibular Osteotomy

First metatarsal osteotomies for hallux valgus

correction including:

- Opening base wedge osteotomy
 - Closing base wedge osteotomy
 - Crescentic Osteotomy
 - Proximal Osteotomy (Chevron and Rotational Oblique)
 - Distal Osteotomy (Chevron/Austin)
- ### Arthrodesis of the first metatarsophalangeal joint (MTP) including:
- Primary MTP Fusion due to hallux rigidus and/or hallux valgus
 - Revision MTP Fusion
 - Revision of failed first MTP Arthroplasty implant

Flatfoot:

- Lateral Column Lengthening (Evans Osteotomy)
- Plantar Flexion Opening Wedge Osteotomy of the Medial Cuneiform (Cotton Osteotomy)
- Calcaneal Slide Osteotomy

Charcot:

- Medial column fusion (talus, navicular, cuneiform, metatarsal) for neuropathic osteoarthropathy (Charcot)
- Lateral column fusion (calcaneus, cuboid, metatarsal) for neuropathic osteoarthropathy (Charcot)

CONTRAINDICATIONS

Use of the Baby Gorilla®/Gorilla® Plating System is contraindicated in cases of inflammation, cases of active or suspected sepsis/infection and osteomyelitis; or in patients with certain metabolic diseases.

All applications that are not defined by the indications are contraindicated. In addition, surgical success can be adversely affected by:

- Acute or chronic infections, local or systemic
- Vascular, muscular or neurological pathologies that compromise the concerned extremity
- All concomitant pathologies that could affect the function of the implant
- Osteopathies with reduced bone substance that could affect the function of the implant
- Any mental or neuromuscular disorder that could result in an unacceptable risk of failure at the time of fixation or complications in post-operative treatment
- Known or suspected sensitivity to metal
- Corpulence; an overweight or corpulent patient can strain the implant to such a degree that stabilization or implant failure can occur
- Whenever the use of the implant comes into conflict with the anatomical structures of physiological status

Other medical or surgical pre-conditions that could compromise the potentially beneficial procedure, such as:

- The presence of tumors
- Congenital abnormalities
- Immunosuppressive pathologies
- Increased sedimentation rates that cannot be explained by other pathologies
- Increased leukocyte (WBC) count
- Pronounced left shift in the differential leukocyte count

POTENTIAL COMPLICATIONS AND ADVERSE REACTIONS

In any surgical procedure, the potential for complications and adverse reactions exist. The risks and complications with these implants include:

- Loosening, deformation or fracture of the implant
- Acute post-operative wound infections and late infections with possible sepsis
- Migration, subluxation of the implant with resulting reduction in range of movement
- Fractures resulting from unilateral joint loading
- Thrombosis and embolism
- Wound hematoma and delayed wound healing
- Temporary and protracted functional neurological perturbation
- Tissue reactions as the result of allergy or foreign body reaction to dislodged particles
- Corrosion with localized tissue reaction and pain
- Pain, a feeling of malaise or abnormal sensations due to the implant used
- Bone loss due to stress shielding

All possible complications listed here are not typical of Paragon 28®, Inc. products but are in principle observed with any implant. Promptly inform Paragon 28®, Inc. as soon as complications occur in connection with the implants or surgical instruments used. In the event of premature failure of an implant in which a causal relationship with its geometry, surface quality or mechanical stability is suspected, please provide Paragon 28®, Inc. with the explant(s) in a cleaned, disinfected and sterile condition. Paragon 28®, Inc. cannot accept any other returns of used implants. The surgeon is held liable for complications associated with inadequate asepsis, inadequate preparation of the osseous implant bed in the case of implants, incorrect indication or surgical technique or incorrect patient information and consequent incorrect patient behavior.

WARNINGS AND PRECAUTIONS

- Re-operation to remove or replace implants may be required at any time due to medical reasons or device failure. If corrective action is not taken, complications may occur.
- Use of an undersized plate or screw in areas of high functional stresses may lead to implant fracture and failure.
- Plates and screws, wires, or other appliances of dissimilar metals should not be used together in or near the implant site.
- The implants and guide wires are intended for single use only.
- Instruments, guide wires and screws are to be treated as sharps.
- Do not use other manufacturer's instruments or implants in conjunction with the Baby Gorilla®/Gorilla® Plating System.
- If a stainless steel Gorilla® R3LEASE™ Screw is used, it may only be used standalone.
- The device should only be used in pediatric patients where the growth plates have fused or in which active growth plates will not be crossed by the system implants or instrumentation.

MR SAFETY INFORMATION

The Baby Gorilla®/Gorilla® Plating 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 Baby Gorilla®/Gorilla® Plating System in the MR environment is unknown. Scanning a patient who has this device may result in patient injury.

Gorilla® Calc Fracture Plating System

PATENTED, DESIGNED & EXCLUSIVELY DISTRIBUTED BY




P51-STG-0006 RevE [2024-11-29]

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Patents: www.paragon28.com/patents

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DISCLAIMER

The purpose of the Calc Fracture Plate Surgical Technique Guide is to demonstrate the use of the Calc Fracture Plate in the Gorilla® R3CON Plating System. Although various methods can be employed for this procedure, the fixation options demonstrated were chosen for simplicity of explanation and demonstration of the unique features of our device. Federal law (U.S.A.) restricts this device to sale and use by, or on order of, a physician.

www.Paragon28.com