acumed®

Calcaneal Plating System

Surgical Technique

Acumed® is a global leader of innovative orthopaedic and medical solutions.

We are dedicated to developing products, service methods, and approaches that improve patient care.

Acumed® Calcaneal Plating System

Calcaneal fractures are the most common tarsal bone fractures and they can be challenging to treat. The extensile lateral incision, today's most common approach, often results in nearly 30% of patients developing wound complications.[1]

With the expertise of Greg A. Horton, MD and Steven A. Herbst, MD, Acumed has developed a family of calcaneal plates specifically designed for a minimally invasive approach using a sinus tarsi incision, a technique which may reduce the chance of wound complications when compared to extensile lateral surgeries.[1] While this kind of incision is not new, its use for calcaneal fractures in conjunction with the Acumed® MINI-Calc® Plates is a step forward in the treatment of calcaneal fractures.

The Acumed Calcaneal Plating System is composed of several MINI-Calc® and lateral wall plates to meet a variety of procedural needs. Designed to minimize soft tissue irritation while still providing a durable construct, the Calcaneal Plates are low-profile and target the best quality bone in the calcaneus.

	Definition
Warning	Indicates critical information about a potential serious outcome to the patient or the user.
Caution	Indicates instructions that must be followed in order to ensure the proper use of the device.
Note	Indicates information requiring special attention.

Table of Contents

Calcaneal Plating System Features

MINI-CALC® PLATES

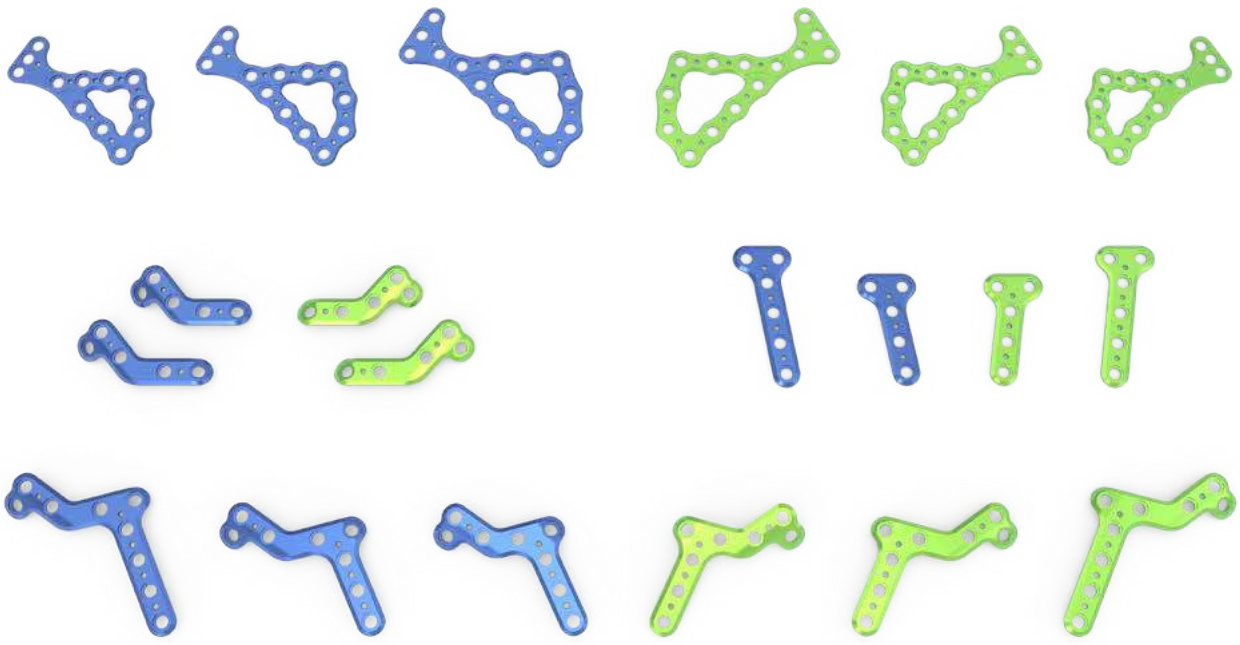
Acumed® MINI-Calc® Plates offer a variety of plate configurations in a low-profile design and can be utilized through a sinus tarsi approach for a minimally invasive treatment of calcaneal fractures.

- **Approach-Specific Design:** Acumed MINI-Calc Plates are specifically designed to be inserted through a sinus tarsi incision. This 5.0 cm incision provides direct visibility of the subtalar articular surface to aid in anatomic reduction of the fracture.
- **Fragment-Specific Options:** The Calcaneal Plating System offers a variety of plates to accommodate different fracture types. Whether comminution is present in the anterior process, through the posterior facet, in the posterior tuberosity, or any combination, multiple plates are available to treat these fracture patterns.
- **Low-profile:** The MINI-Calc Plates are 1.25 mm thick (.050") are designed to minimize soft tissue irritation concerns.

In addition, Acumed MINI-Calc Plates are compatible with the Lower Extremity Modular System allowing surgeons to easily customize plates and instrumentation for each case.

PERFORMANCE

Acumed MINI-Calc Plates are designed to meet the complex demands of calcaneal fracture surgery.



Instrumentation and Screws

INSTRUMENTATION TO AID IN CALCANEAL FRACTURE REDUCTION:

- Steinmann pins
- Large Inge Retractor
- Periosteal elevator
- Series of Hohmann retractors
- Reduction clamps
- Freer Elevator

SCREW OPTIONS:

- Up to 65 mm lengths for large patients
- 2.7 mm hex, 3.0 mm Hexalobe, 3.5 mm hex or Hexalobe and 4.0 mm diameter screws available
- Modular system design allows you to take what you need to the case. If you have a calcaneal fracture with an associated ankle fracture, the Lower Extremity Modular System will support both platters for your case.

SCREW CONFIGURATIONS:

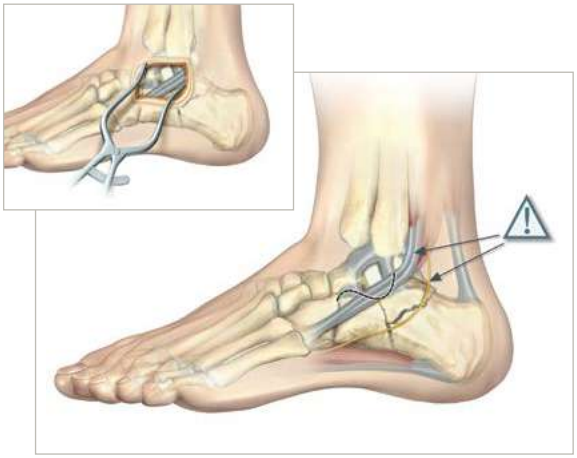
There are two configurations on the placement of the anterior-most screws depending on the patient's size and fracture pattern. A long bicortical screw and a short unicortical screw provide the stability necessary for fixing the anterior process. For optimal outcomes, place in one of the configurations as shown.

Anterior Process Calcaneal Plate Technique

STEVEN A. HERBST, M.D.

1 PATIENT POSITIONING

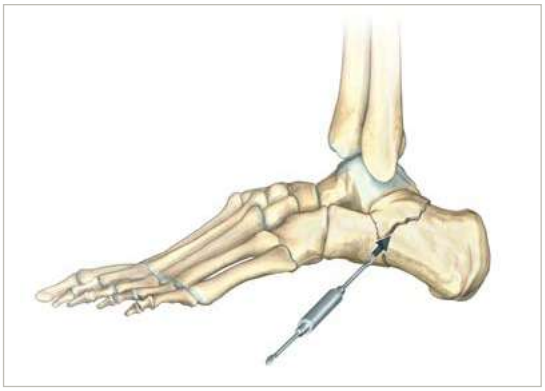
- Obtain lateral and axial views of calcaneus, as well as CT views of the sagittal and coronal planes; compare to opposite extremity.
- Place patient in a lateral position with the operative extremity facing up.



2 EXPOSURE AND APPROACH

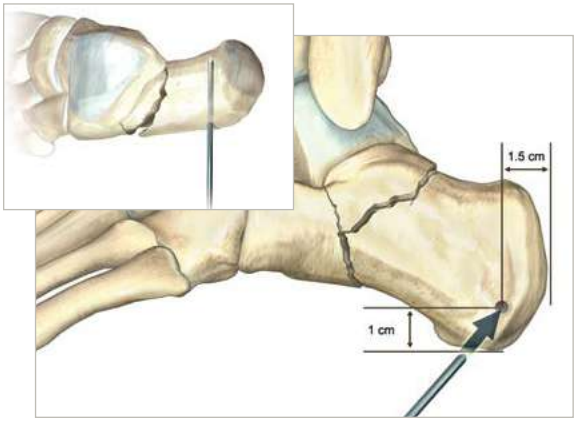
- Make a slightly S-shaped incision from base of the lateral malleolus to the calcaneocuboid joint. Carry dissection down to the subtalar joint.
- Retract peroneal tendons plantarly.

Caution: Avoid peroneal tendon and sural nerve during dissection.



3 REDUCTION OF ARTICULAR SURFACE

- Use K-wires and Freer elevator to reduce posterior facet fragment to the sustentaculum tali.
- Ensure the Angle of Gissane is approximately 100° or equal to the opposite side.

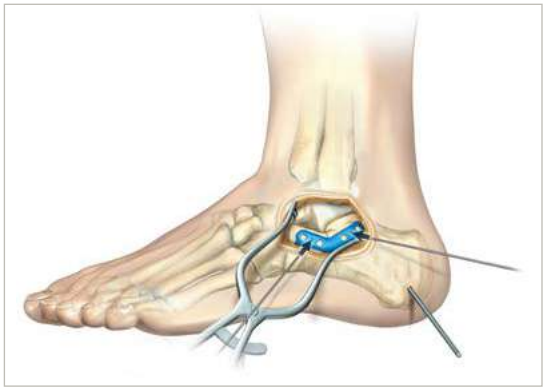


4 REDUCTION OF POSTERIOR TUBEROSITY

- Place Steinmann Pin lateral-to-medial in the approximate location shown.
- Pull tuberosity out of varus and back to length using the Steinmann Pin.
- Ensure Bohler's Angle is between 25°–40°.
- Verify reduction under fluoroscopy.

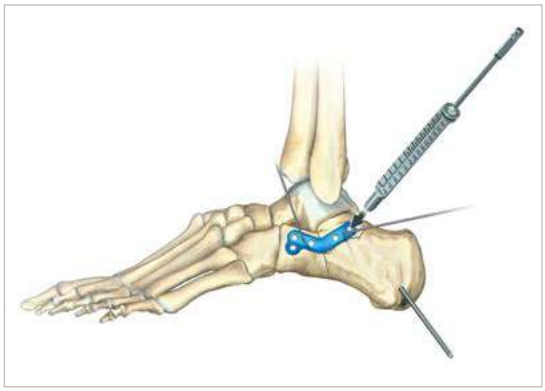
5 PLATE INSERTION AND INITIAL FIXATION

- Insert plate through incision and confirm position under fluoroscopy.
- Use K-wires or plate tacks to provisionally fix the plate to the bone.



6 SCREW INSERTION

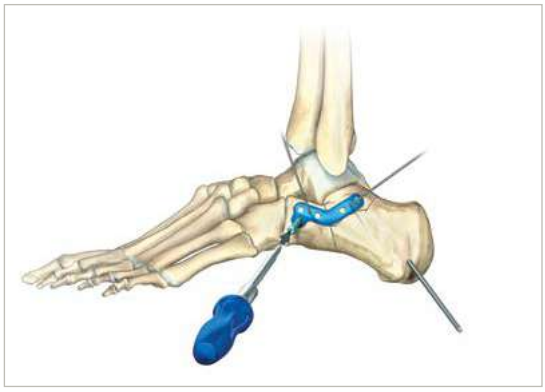
- Thread locking drill guide into plate – for Hexalobe Screws use 80-0384 – for hex screws use 80-0622.
- Drill and measure for screws buttressing the posterior facet.
- Use drill 80-0386 or 80-0318 for 2.7 mm hex and 3.0 mm Hexalobe Screws. Use 80-0387 for 3.5 mm hex or Hexalobe Screws.



7 ANTERIOR PROCESS SCREW INSERTION

- Drill, measure, and insert screws on the anterior process.

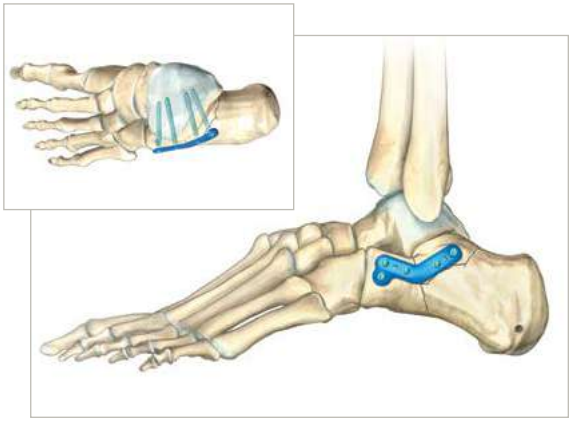
Caution: Anterior screws may collide at lengths longer than 10 mm.



8 WOUND CLOSURE AND POSTOPERATIVE PROTOCOL

- Verify reduction and screw placement under fluoroscopy.
- Close wound in layers.

When X-rays indicate adequate healing, full weight-bearing is allowed, based on surgeon judgment.

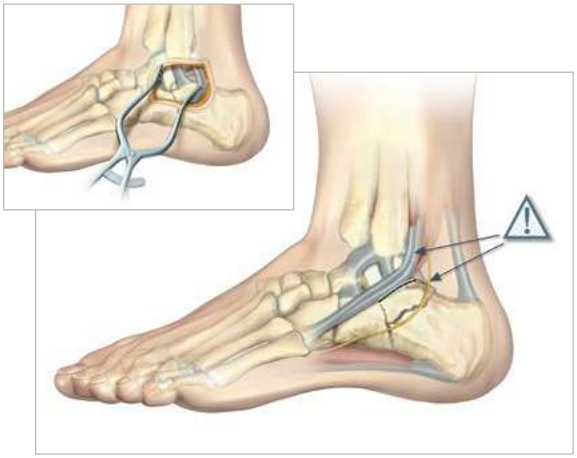


Posterior Tuberosity Calcaneal Plate Technique

STEVEN A. HERBST, M.D.

1 PATIENT POSITIONING

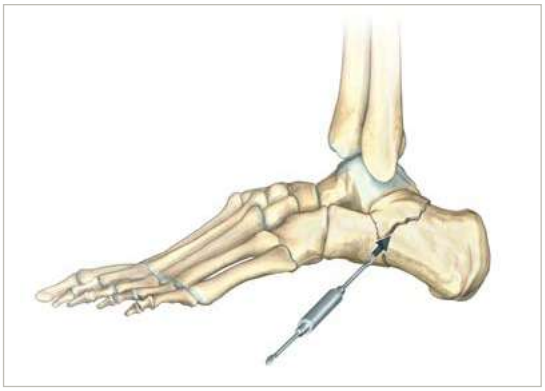
- Obtain lateral and axial views of calcaneus, as well as CT views of the sagittal and coronal planes; compare to opposite extremity.
- Place patient in a lateral position with the operative extremity facing up.



2 EXPOSURE AND APPROACH

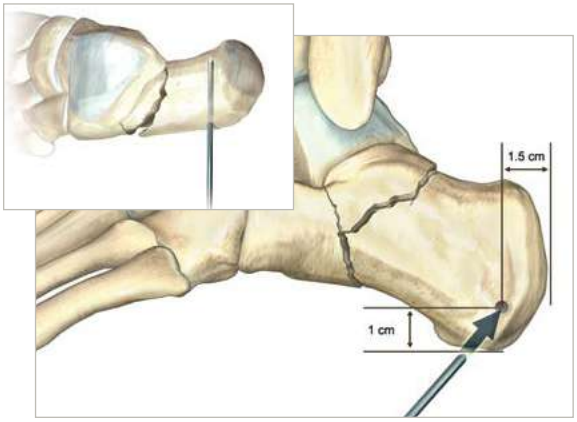
- Make incision directly inferior from the lateral malleolus and extend posterior approximately 3.0 cm. Carry dissection down to the calcaneus.

Caution: Avoid peroneal tendon and sural nerve during dissection.



3 REDUCTION OF ARTICULAR SURFACE

- Use K-wires and Freer elevator to reduce posterior facet fragment to the sustentaculum tali.
- Ensure the Angle of Gissane is approximately 100° or equal to the opposite side.

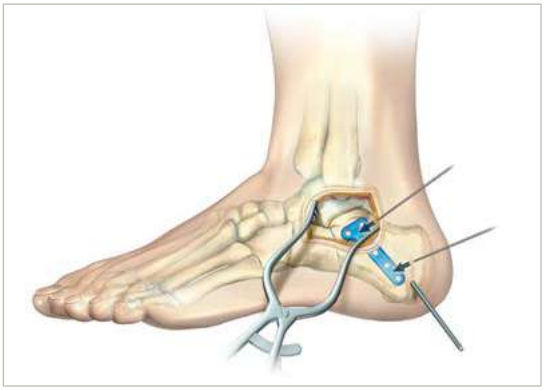


4 REDUCTION OF POSTERIOR TUBEROSITY

- Place Steinmann Pin lateral-to-medial in the approximate location shown.
- Pull tuberosity out of varus and back to length using the Steinmann Pin.
- Ensure Bohler's Angle is between 25°–40°.
- Verify reduction under fluoroscopy.

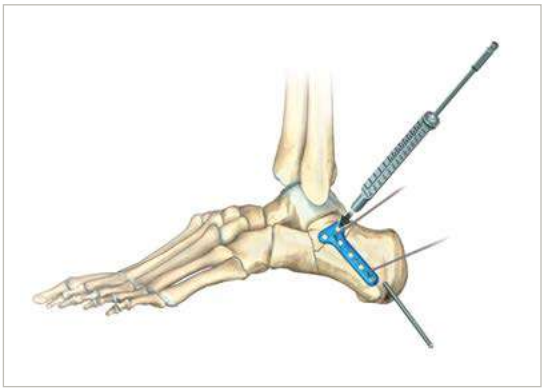
5 PLATE INSERTION AND INITIAL FIXATION

- Insert plate through incision and ensure position under fluoroscopy.
- Use K-wires or plate tacks to provisionally fix the plate to the bone.



6 SCREW INSERTION

- Thread locking drill guide into plate – for hex screws use 80-0384 – for Hexalobe Screws use 80-0622 or 80-0668.
- Drill and measure for screws buttressing the posterior facet.
- Use drill 80-0386 or 80-0318 for 2.7 mm hex and 3.0 mm Hexalobe Screws. Use 80-0387 for 3.5 mm hex or Hexalobe Screws.



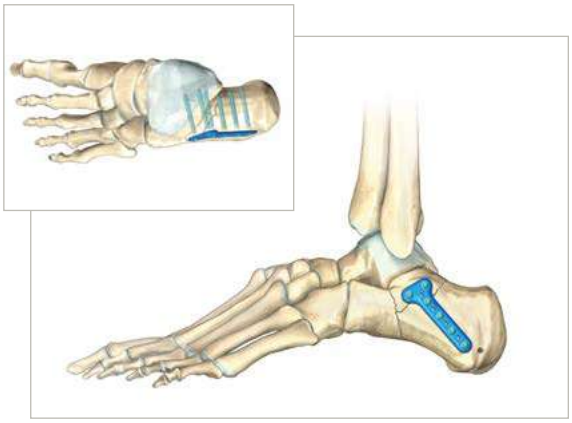
7 POSTERIOR TUBEROSITY SCREW INSERTION

- Use fluoroscopy to locate posterior screw holes percutaneously using a K-wire to verify location.
- Make stab incision over hole, drill, measure, and insert screws.

8 WOUND CLOSURE AND POSTOPERATIVE PROTOCOL

- Verify reduction and screw placement under fluoroscopy.
- Close wound in layers.

When X-rays indicate adequate healing, full weight-bearing is allowed, based on surgeon judgment.

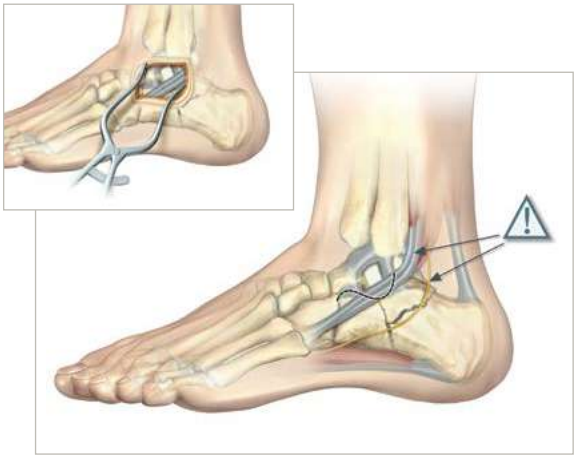


Combo Calcaneal Plate Technique

STEVEN A. HERBST, M.D.

1 PATIENT POSITIONING

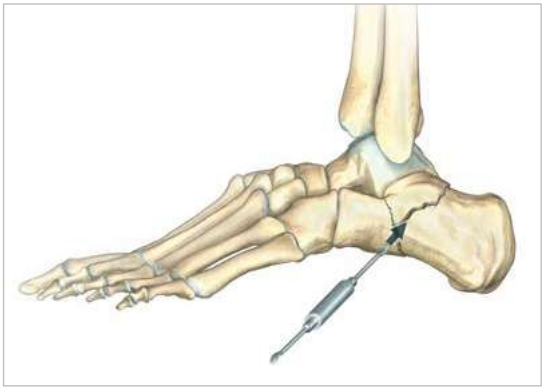
- Obtain lateral and axial views of calcaneus, as well as CT views of the sagittal and coronal planes; compare to opposite extremity.
- Place patient in a lateral position with the operative extremity facing up.



2 EXPOSURE AND APPROACH

- Make a slightly S-shaped incision from base of the lateral malleolus to the calcaneocuboid joint. Carry dissection down to the subtalar joint.
- Retract peroneal tendons plantarly.

Caution: Avoid peroneal tendon and sural nerve during dissection.

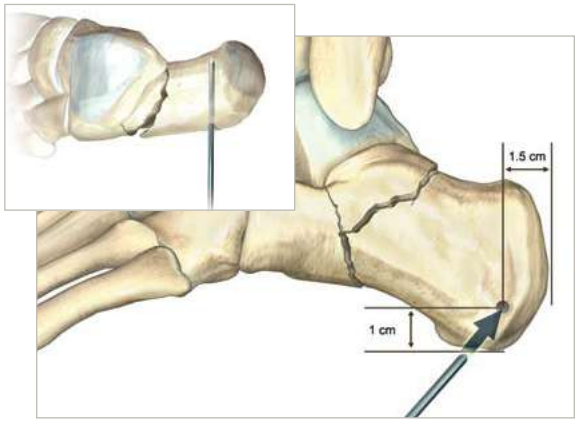


3 REDUCTION OF ARTICULAR SURFACE

- Use K-wires and Freer elevator to reduce posterior facet fragment to the sustentaculum tali.
- Ensure the Angle of Gissane is approximately 100° or equal to the opposite side.

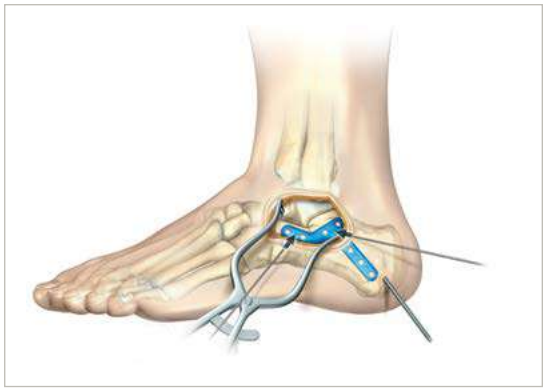
4 REDUCTION OF POSTERIOR TUBEROSITY

- Place Steinmann Pin lateral-to-medial in the approximate location shown.
- Pull tuberosity out of varus and back to length using the Steinmann Pin.
- Ensure Bohler's Angle is between 25°–40°.
- Verify reduction under fluoroscopy.



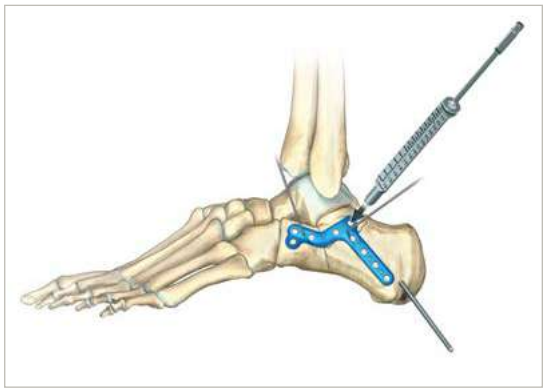
5 PLATE INSERTION AND INITIAL FIXATION

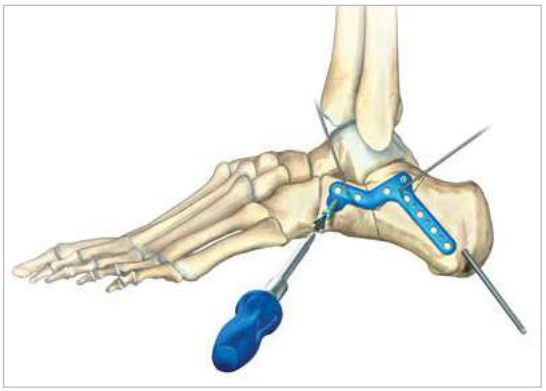
- Insert plate through incision and ensure position under fluoroscopy.
- Use K-wires or plate tacks to provisionally fix the plate to the bone.



6 SCREW INSERTION

- Thread locking drill guide (80-0384, 2.3 mm Hexalobe Drill Guide 80-0622 or 80-0385, 2.8 mm Hexalobe Drill guide 80-0668) into plate.
- Drill and measure for screws buttressing the posterior facet.
- Use drill 80-0386 or 80-0318 for 2.7 mm hex and 3.0 mm Hexalobe Screws. Use 80-0387 for 3.5 mm hex or Hexalobe Screws.





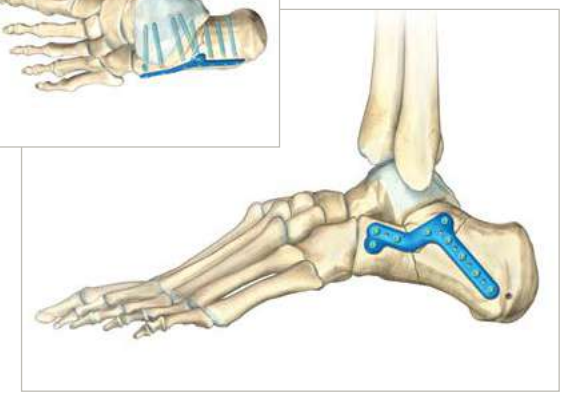
7 ANTERIOR PROCESS SCREW INSERTION

- Drill, measure, and insert screws on the anterior process.

Caution: Anterior screws may collide at lengths longer than 10 mm.

8 POSTERIOR TUBEROSITY SCREW INSERTION

- Use fluoroscopy to locate posterior screw holes percutaneously using a K-wire to verify location.
- Make stab incision over hole, drill, measure, and insert screws.



9 WOUND CLOSURE AND POSTOPERATIVE PROTOCOL

- Verify reduction and screw placement under fluoroscopy.
- Close wound in layers.

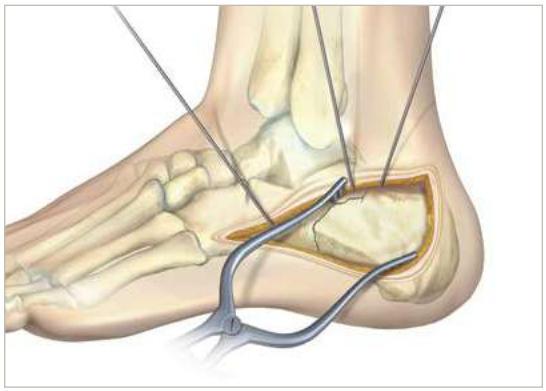
When X-rays indicate adequate healing, full weight-bearing is allowed, based on surgeon judgment.

Lateral Wall Calcaneal Plate Technique

Doug N. Beaman, M.D.

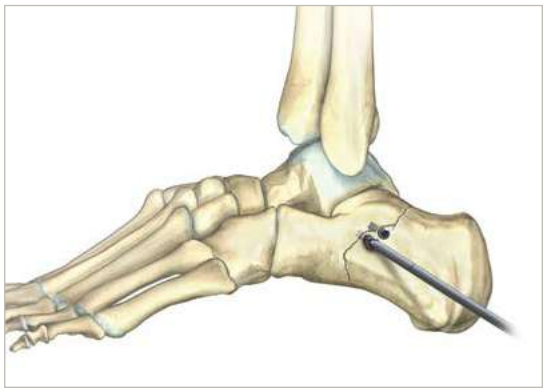
1 EXPOSURE

The recommended surgical approach is lateral right-angled extensile approach (meticulous soft tissue handling is critical). Only use blunt retractors and use K-wire retraction once the full thickness lateral flap has been created. Reduction of the fracture typically involves the use of joysticks or Schanz screws placed into the calcaneal tuberosity to provide traction and manipulation of the tubor out of its angulated and translated position. The components of the calcaneus fracture, both extra-articular and intra-articular, are realigned and then held provisionally with multiple K-wires.



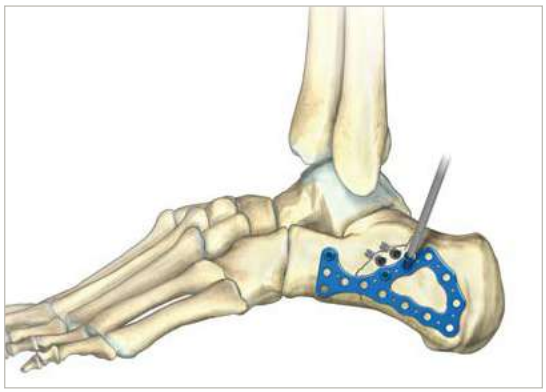
2 POSTERIOR FACET SCREW PLACEMENT

The use of subchondral screws placed under the posterior facet is recommended to secure the posterior facet intra-articular portion of the calcaneus fracture. Typically, these are 2.7 mm hex or 3.5 mm hex or Hexalobe Cortical Screws placed in an interfragmentary lag fashion. It is crucial that the screws remain extra-articular (do not penetrate the posterior facet). Careful evaluation, radiographically and clinically, should be used to confirm the subchondral screws do not penetrate the posterior facet.



3 PLATE POSITIONING

The plate is applied to the lateral wall with the distal end placed just proximal (5–10 mm) to the calcaneocuboid joint in the anterior process. This can be adjusted based on fracture patterns. The triangular portion of the plate that supports the posterior facet typically sits just inferior to the interfragmentary screws. The plate should extend posteriorly enough to allow multiple screw engagement into the tuberosity. It is recommended three screws be placed into the tuberosity segment. The plate should be positioned and then held provisionally with K-wires. Both radiographic imaging and direct clinical inspection can confirm satisfactory position of the plate.



4 SCREW INSERTION

Screw placement is typically performed from the anterior process and extends posteriorly. 2.7 mm hex or 3.5 mm hex or Hexalobe Screws are used depending on surgeon preference. Initial screws should be place in a nonlocking mode to secure the bone to the plate. Screws are then placed through the plate from the distal to proximal direction into the sustentaculum with the most posterior screws directed into the tuberosity. Locking screws are generally placed after the plate has been secured with multiple nonlocking screws. Additional screws may be placed as needed to supplement the plate fixation.

5 CLOSURE AND POST-OP PROTOCOL

- Verify reduction and screw placement under fluoroscopy.
- Close wound in layers.

When X-rays indicate adequate healing, full weight-bearing is allowed, based on surgeon judgment.

Ordering Information

4.0 mm Cancellous (Hex) Screws

4.0 mm x 12 mm Cancellous (Hex) Screw	CA-4120	4.0 mm x 28 mm Cancellous (Hex) Screw	CA-4280
4.0 mm x 14 mm Cancellous (Hex) Screw	CA-4140	4.0 mm x 30 mm Cancellous (Hex) Screw	CA-4300
4.0 mm x 16 mm Cancellous (Hex) Screw	CA-4160	4.0 mm x 35 mm Cancellous (Hex) Screw	CA-4350
4.0 mm x 18 mm Cancellous (Hex) Screw	CA-4180	4.0 mm x 40 mm Cancellous (Hex) Screw	CA-4400
4.0 mm x 20 mm Cancellous (Hex) Screw	CA-4200	4.0 mm x 45 mm Cancellous (Hex) Screw	CA-4450
4.0 mm x 22 mm Cancellous (Hex) Screw	CA-4220	4.0 mm x 50 mm Cancellous (Hex) Screw	CA-4500
4.0 mm x 24 mm Cancellous (Hex) Screw	CA-4240	4.0 mm x 55 mm Cancellous (Hex) Screw	CA-4550
4.0 mm x 26 mm Cancellous (Hex) Screw	CA-4260	4.0 mm x 60 mm Cancellous (Hex) Screw	CA-4600

Ordering Information

3.5 mm Locking Hexalobe Screws

3.5 mm x 8 mm Locking Hexalobe Screw	30-0232
3.5 mm x 10 mm Locking Hexalobe Screw	30-0233
3.5 mm x 12 mm Locking Hexalobe Screw	30-0234
3.5 mm x 14 mm Locking Hexalobe Screw	30-0235
3.5 mm x 16 mm Locking Hexalobe Screw	30-0236
3.5 mm x 18 mm Locking Hexalobe Screw	30-0237
3.5 mm x 20 mm Locking Hexalobe Screw	30-0238
3.5 mm x 22 mm Locking Hexalobe Screw	30-0239
3.5 mm x 24 mm Locking Hexalobe Screw	30-0240
3.5 mm x 26 mm Locking Hexalobe Screw	30-0241
3.5 mm x 28 mm Locking Hexalobe Screw	30-0242
3.5 mm x 30 mm Locking Hexalobe Screw	30-0243
3.5 mm x 32 mm Locking Hexalobe Screw	30-0244
3.5 mm x 34 mm Locking Hexalobe Screw	30-0245
3.5 mm x 36 mm Locking Hexalobe Screw	30-0246
3.5 mm x 38 mm Locking Hexalobe Screw	30-0247
3.5 mm x 40 mm Locking Hexalobe Screw	30-0248
3.5 mm x 45 mm Locking Hexalobe Screw	30-0249
3.5 mm x 50 mm Locking Hexalobe Screw	30-0250
3.5 mm x 55 mm Locking Hexalobe Screw	30-0251
3.5 mm x 60 mm Locking Hexalobe Screw	30-0252

3.5 mm Nonlocking Hexalobe Screws

3.5 mm x 8 mm Nonlocking Hexalobe Screw	30-0255
3.5 mm x 10 mm Nonlocking Hexalobe Screw	30-0256
3.5 mm x 12 mm Nonlocking Hexalobe Screw	30-0257
3.5 mm x 14 mm Nonlocking Hexalobe Screw	30-0258
3.5 mm x 16 mm Nonlocking Hexalobe Screw	30-0259
3.5 mm x 18 mm Nonlocking Hexalobe Screw	30-0260
3.5 mm x 20 mm Nonlocking Hexalobe Screw	30-0261
3.5 mm x 22 mm Nonlocking Hexalobe Screw	30-0262
3.5 mm x 24 mm Nonlocking Hexalobe Screw	30-0263
3.5 mm x 26 mm Nonlocking Hexalobe Screw	30-0264
3.5 mm x 28 mm Nonlocking Hexalobe Screw	30-0265
3.5 mm x 30 mm Nonlocking Hexalobe Screw	30-0266
3.5 mm x 32 mm Nonlocking Hexalobe Screw	30-0267
3.5 mm x 34 mm Nonlocking Hexalobe Screw	30-0268
3.5 mm x 36 mm Nonlocking Hexalobe Screw	30-0269
3.5 mm x 38 mm Nonlocking Hexalobe Screw	30-0270
3.5 mm x 40 mm Nonlocking Hexalobe Screw	30-0271
3.5 mm x 45 mm Nonlocking Hexalobe Screw	30-0272
3.5 mm x 50 mm Nonlocking Hexalobe Screw	30-0273
3.5 mm x 55 mm Nonlocking Hexalobe Screw	30-0274
3.5 mm x 60 mm Nonlocking Hexalobe Screw	30-0275
3.5 mm x 65 mm Nonlocking Hexalobe Screw	30-0276

Ordering Information

3.0 mm Locking Hexalobe Screws

3.0 mm x 8 mm Locking Hexalobe Screw	30-0278
3.0 mm x 10 mm Locking Hexalobe Screw	30-0279
3.0 mm x 12 mm Locking Hexalobe Screw	30-0280
3.0 mm x 14 mm Locking Hexalobe Screw	30-0281
3.0 mm x 16 mm Locking Hexalobe Screw	30-0282
3.0 mm x 18 mm Locking Hexalobe Screw	30-0283
3.0 mm x 20 mm Locking Hexalobe Screw	30-0284
3.0 mm x 22 mm Locking Hexalobe Screw	30-0285
3.0 mm x 24 mm Locking Hexalobe Screw	30-0286
3.0 mm x 26 mm Locking Hexalobe Screw	30-0287
3.0 mm x 28 mm Locking Hexalobe Screw	30-0288
3.0 mm x 30 mm Locking Hexalobe Screw	30-0289
3.0 mm x 32 mm Locking Hexalobe Screw	30-0290
3.0 mm x 34 mm Locking Hexalobe Screw	30-0291
3.0 mm x 36 mm Locking Hexalobe Screw	30-0292
3.0 mm x 38 mm Locking Hexalobe Screw	30-0293
3.0 mm x 40 mm Locking Hexalobe Screw	30-0294
3.0 mm x 45 mm Locking Hexalobe Screw	30-0295
3.0 mm x 50 mm Locking Hexalobe Screw	30-0296

3.0 mm Nonlocking Hexalobe Screws

3.0 mm x 8 mm Nonlocking Hexalobe Screw	30-0301
3.0 mm x 10 mm Nonlocking Hexalobe Screw	30-0302
3.0 mm x 12 mm Nonlocking Hexalobe Screw	30-0303
3.0 mm x 14 mm Nonlocking Hexalobe Screw	30-0304
3.0 mm x 16 mm Nonlocking Hexalobe Screw	30-0305
3.0 mm x 18 mm Nonlocking Hexalobe Screw	30-0306
3.0 mm x 20 mm Nonlocking Hexalobe Screw	30-0307
3.0 mm x 22 mm Nonlocking Hexalobe Screw	30-0308
3.0 mm x 24 mm Nonlocking Hexalobe Screw	30-0309
3.0 mm x 26 mm Nonlocking Hexalobe Screw	30-0310
3.0 mm x 28 mm Nonlocking Hexalobe Screw	30-0311
3.0 mm x 30 mm Nonlocking Hexalobe Screw	30-0312
3.0 mm x 32 mm Nonlocking Hexalobe Screw	30-0313
3.0 mm x 34 mm Nonlocking Hexalobe Screw	30-0314
3.0 mm x 36 mm Nonlocking Hexalobe Screw	30-0315
3.0 mm x 38 mm Nonlocking Hexalobe Screw	30-0316
3.0 mm x 40 mm Nonlocking Hexalobe Screw	30-0317
3.0 mm x 45 mm Nonlocking Hexalobe Screw	30-0318
3.0 mm x 50 mm Nonlocking Hexalobe Screw	30-0319
3.0 mm x 55 mm Nonlocking Hexalobe Screw	30-0320

Ordering Information

Calcaneal Plating System*

Locking Calcaneal Plate, Small, Left	70-0022
Locking Calcaneal Plate, Small, Right	70-0023
Locking Calcaneal Plate, Medium, Left	70-0024
Locking Calcaneal Plate, Medium, Right	70-0025
Locking Calcaneal Plate, Large, Left	70-0026
Locking Calcaneal Plate, Large, Right	70-0027
Anterior Process Calcaneal Plate, Medium, Left	70-0386
Anterior Process Calcaneal Plate, Medium, Right	70-0387
Anterior Process Calcaneal Plate, Large, Left	70-0388
Anterior Process Calcaneal Plate, Large, Right	70-0389
Posterior Tuberosity Calcaneal Plate, 5 Hole, Left	70-0394
Posterior Tuberosity Calcaneal Plate, 5 Hole, Right	70-0395
Posterior Tuberosity Calcaneal Plate, 6 Hole, Left	70-0396
Posterior Tuberosity Calcaneal Plate, 6 Hole, Right	70-0397
Combo Calcaneal Plate, Medium, 8 Hole, Left	70-0400
Combo Calcaneal Plate, Medium, 8 Hole, Right	70-0401
Combo Calcaneal Plate, Large, 8 Hole, Left	70-0404
Combo Calcaneal Plate, Large, 8 Hole, Right	70-0405
Combo Calcaneal Plate, Large, 9 Hole, Left	70-0406
Combo Calcaneal Plate, Large, 9 Hole, Right	70-0407

Instrumentation

4.0 mm Steinmann Pin, Smooth	35-0002
5.0 mm Steinmann Pin, Smooth	35-0003

Tray Component

Calcaneal Plating System Tray	80-0744
Lower Extremity Tray Lid	80-0431

*Plates are also available sterile-packed. Add -S to product number for sterile-packed product.

To learn more about the full line of Acumed® innovative surgical solutions, including the Calcaneal Plating System, please contact your local Acumed® Sales Representative or call 888-627-9957.

References

1. Schepers, T. (2011). “The sinus tarsi approach in displaced intra-articular calcaneal fractures: a systematic review.” International Orthopaedics: 1-7.

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