SHOULDER

Operative Technique

equinoxe

Equinoxe® Scapula Reconstruction System for the Acromion and Scapular Spine

advita ORTHO

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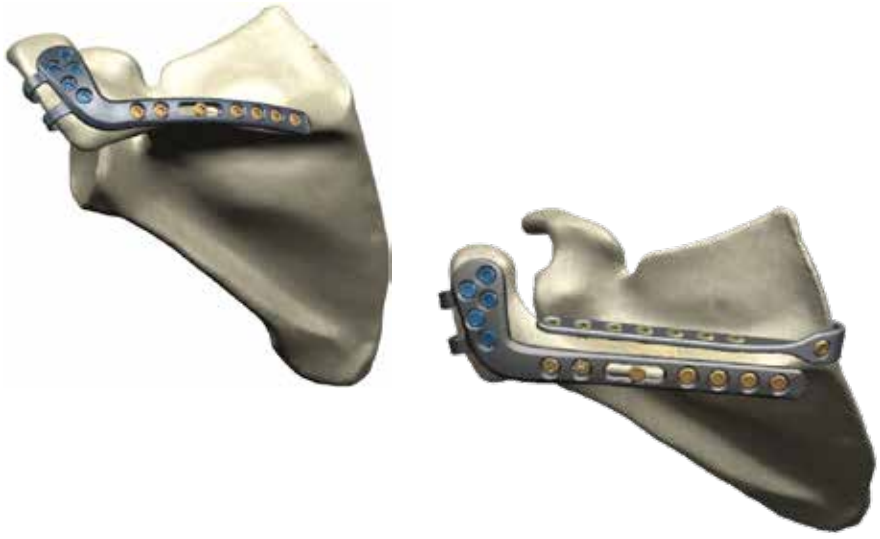


PRE-OPERATIVE PLANNING

PATIENT POSITIONING: OTHER AND PEARLS

Lateral Decubitus

Lateral decubitus position is the most utilitarian exposure that allows for excellent visualization to all aspects of the scapula, including the acromion and scapular spine.

For mobility and positioning, some surgeons reflex the bed while others use a small bolster or beanbag with a stand or mobile arm positioner to support the free-draped arm in a forward flexed and abducted position.

Modified Beach Chair

Place the patient in a supine position with the head of the operating table elevated approximately 30 degrees in a modified beach chair position. A small bolster should be placed laterally behind the involved shoulder just medial to the scapular border. The patient should be moved to the side of the table so the upper extremity can be placed into extension without obstruction by the operating table. Alternatively, a Captain's chair or similar device can be used for proper patient positioning. The patient should be secured to the operating table to minimize any changes in position intraoperatively. The use of a dynamic arm positioning device is up to surgeon preference and may be beneficial.

- When plating to the medial border of the scapula, ensure that preparation and draping includes all posterior aspects of the shoulder up to and including the medial border of the scapula to facilitate medial access. In the lateral decubitus position, the patient's upper arm should be free-draped on a sterile padded stand for intraoperative maneuvering ease. In addition, the down arm can be flexed significantly to allow access to the upper arm and improve radiographic visualization.
- For intraoperative fluoroscopic evaluation of the implant placement, it is important to use a radiolucent table with C-arm axis.
- If the patient is in a lateral position, a floppy forward disposition is favorable to obtaining an AP view of the scapula by shooting through the glenohumeral joint with the gantry 35 degrees to the thorax or perpendicular to the body of the scapula. Prior to draping, a scapula Y-view should be confirmed by shooting down the 35-degree access with the C-arm positioned in a cephalad-caudal direction with respect to the scapula.
- In certain instances, foam positioners or a semi-reclined supine position can be beneficial for lateral decubitis upper-extremity management.

EXPOSURE

Make a posterior incision over the acromion and scapular spine. Elevate the fascia of the trapezius then deltoid, as needed, to expose the site of fracture. Care should be taken to limit muscular detachment. Release the origins of the trapezius and deltoid while preserving the integrity of the muscle sleeve to facilitate final closure.

When dual-plating, the infraspinatus should be exposed by reflecting the muscle inferiorly, while the superspinatus should be exposed by reflecting the muscle superiorly, as needed, for plate application. Care should be taken to protect the suprascapular nerve and artery in the spinoglenoid notch to avoid denervation of the posterior rotator cuff.

Open the rhomboid minor muscle to allow for hook access when placing a Medial Hook Plate around the medial border of the scapula.

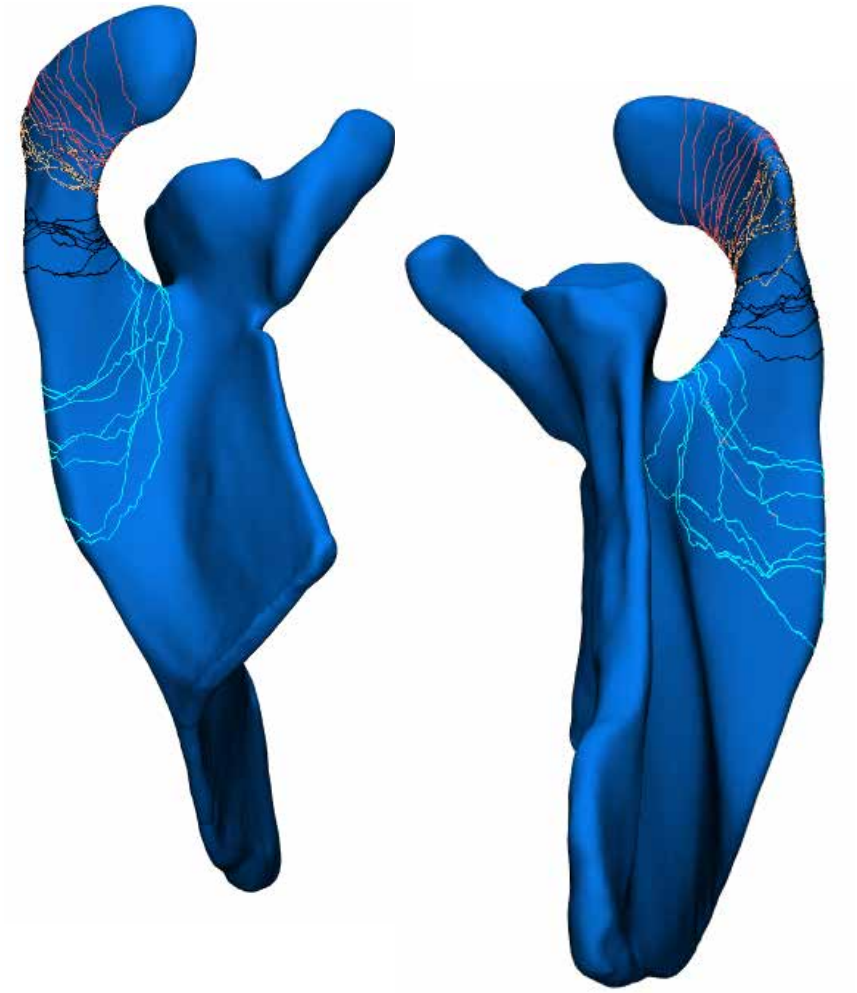
Carefully debride the fracture or nonunion site. Remove fracture callus to mobilize the fracture site and save for grafting, as needed. The fragments are mobilized to permit reduction.

Note: *Complete or anatomic restoration may not be possible or advisable for chronic cases or for patients with poor bone quality. Inferior angulation of the distal fragment may be acceptable in weak or poor bone. Likewise, shortening may be inevitable for maximal bony contact.*

This may result in a shortened moment arm which may provide a mechanical advantage for fracture healing and reduce forces across the fracture or nonunion site.

EQUINOXE® SCAPULA RECONSTRUCTION SYSTEM PRE-PLANNING

FRACTURE IDENTIFICATION



Modified Levy Fracture Classification

FRACTURE IDENTIFICATION

Using the Modified Levy Classification System, the Anterior Hook Plate is designed to treat Levy Type I fractures. Depending on the size of the patient and fracture location, the Lateral Hook Plate may be used.

The Lateral Hook Plate is designed to treat Levy Type IIA and Type IIB fractures. The Medial Hook Plate overlapping with the Lateral Hook Plate is designed to be used for augmenting fixation if the fracture requires further stabilization.*

**Note: It is recommended that a dual-plate construct be used for fractures medial to the Levy Type IIA region.*

It is recommended to get 4 x-ray views to include entire scapula. If x-rays are unclear, consider a CT scan and/or MRI. Take caution for false negatives.

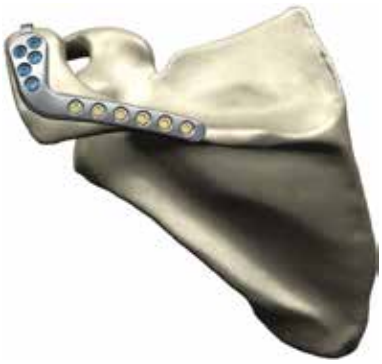


Figure A
Anterior Hook Plate

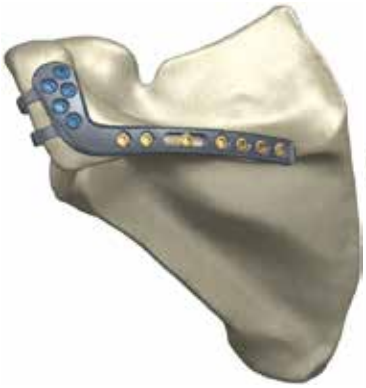


Figure B1
Lateral Hook Plate

Figure B2
Lateral View of Lateral Hook Plate

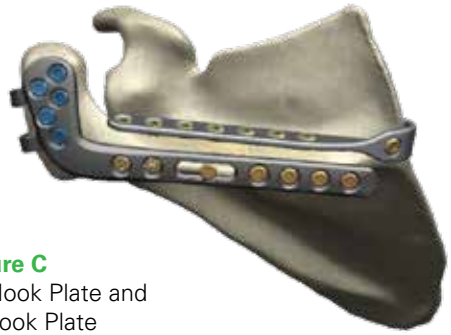
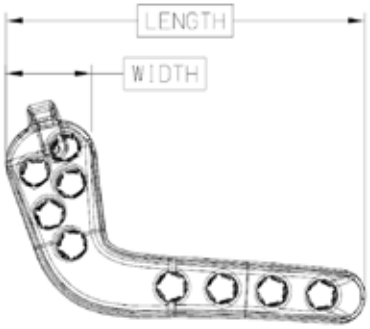


Figure C
Dual Lateral Hook Plate and Medial Hook Plate

Figure D
Dual Lateral Hook Plate and Inferior EPIC Straight Plate

Figure E
Dual Lateral Hook Plate and Superior EPIC Straight Plate

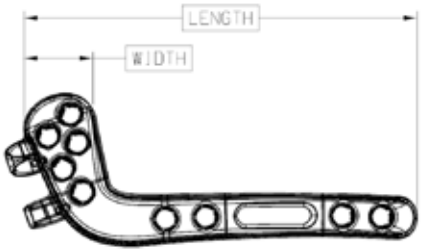
SYSTEM SPECIFICATIONS



ANTERIOR SINGLE HOOK 4 HOLE

	Width (mm)	Length (mm)	Lateral Holes	Medial Holes	Thickness (mm)
4-Hole	17	69	5	4	Lateral – 2.7 Medial – 3.5

2 Plates (Left and Right)



LATERAL DOUBLE HOOK

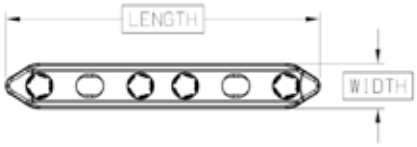
	Width (mm)	Length (mm)	Lateral Holes	Medial Holes	Thickness (mm)
4-Hole	17	93	5	4	Lateral – 2.7 Medial – 3.5
6-Hole	17	112		6	
8-Hole	17	130		8	
10-Hole	17	149		10	

8 Plates (Left and Right)

MEDIAL HOOK

	Width (mm)	Length (mm)	Lateral Holes	Medial Holes	Thickness (mm)
5-Hole	11	78	5	1	2.7
7-Hole	11	97	7		

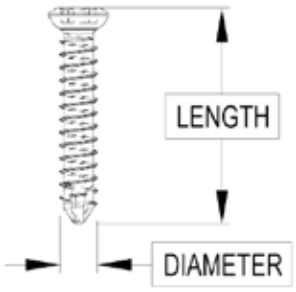
4 Plates (Left and Right)



EPIC STRAIGHT PLATES

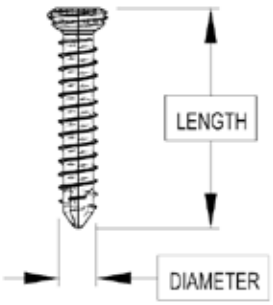
	Width (mm)	Length (mm)	Total Holes	Thickness (mm)
6-Hole	10	70	6	1.75
8-Hole	10	90	6	1.75
10-Hole	10	110	6	1.75
12-Hole	10	130	6	1.75
14-Hole	10	150	6	1.75

5 Plates



EPIC NON-LOCKING SCREWS

Diameter (mm)	Length (mm)
2.7	10
	12
	14
	16
	18
	20
	22
	24
	26
3.5	2
	4
	6
	8
	10
	12
	14
	16
	18
	20
	22
	24
	26
	28
	30
	32
	34
	36
	38
	40
	42
	44
	46



EPIC LOCKING SCREWS

Diameter (mm)	Length (mm)
2.7	10
	12
	14
	16
	18
	20
	22
	24
	26
3.5	10
	12
	14
	16
	18
	20
	22
	24
	26
	28
	30
	32
	34
	36
	38
	40
	42
	44
	46

DETAILED OPERATIVE TECHNIQUE

FRACTURE REDUCTION

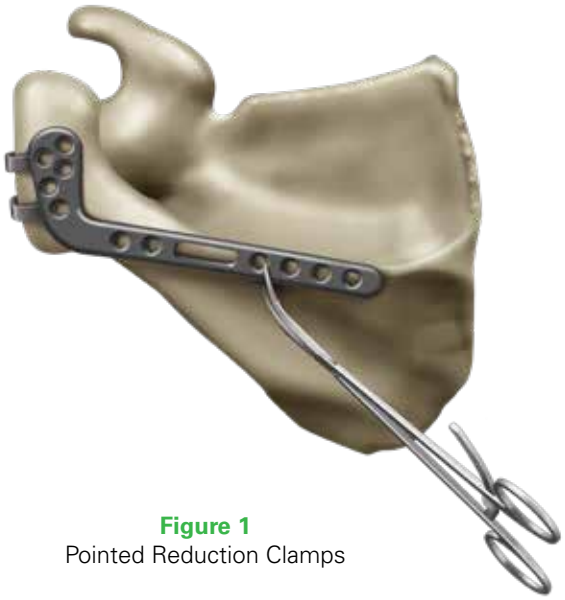


Figure 1
Pointed Reduction Clamps

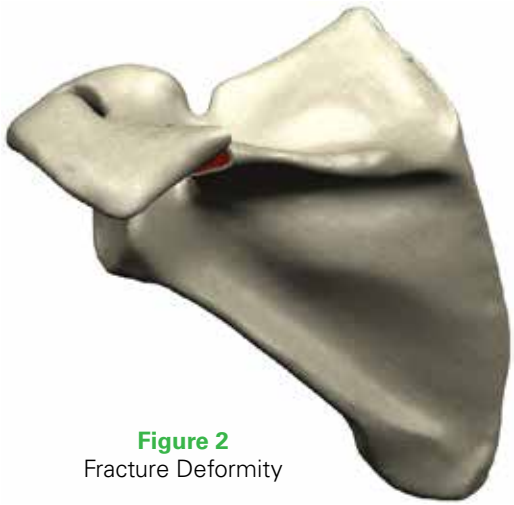


Figure 2
Fracture Deformity

Figure 3
Levering Fracture Deformity

FRACTURE REDUCTION

Prior to plate placement, fracture reduction can be achieved using the **Serrated Reduction Forceps, 1.6mm K-Wires** or **Pointed Reduction Clamps** *(Figure 1)*. To aid in reduction, anchor points can be created on both sides of the fracture line using a drill and Reduction Forceps. It may be beneficial to apply the lateral aspect of the Hook Plate to the lateral fragment in the anatomic position. This will leave the shaft of the lateral plate superior to the rest of the medial scapular spine.

Reduction can be obtained by levering the shaft of the plate down to the spine, correcting the typical deformity common with these fractures *(Figures 2 and 3)*.

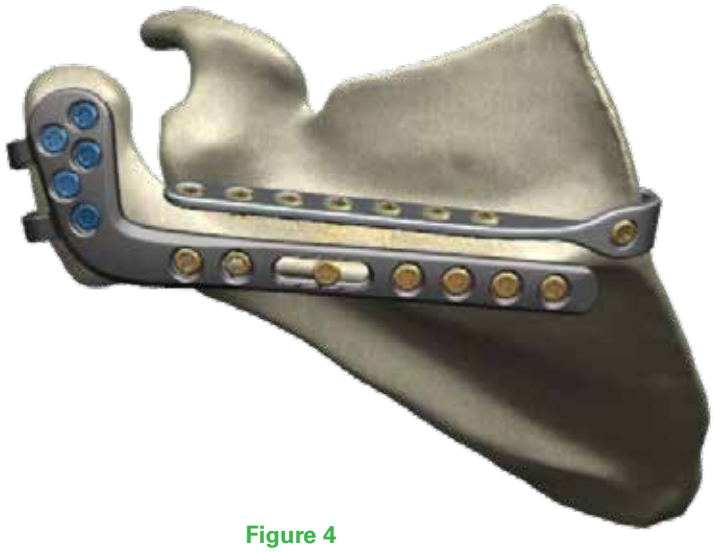


Figure 4
Dual-Plating

When dual plating, it is recommended to proceed with lateral plate placement followed by medial plate placement *(Figure 4)*.

For example, when dual-plating a Levy Type IIB fracture, the lateral plate is applied directly on the spine followed by a medial plate superiorly (orthogonal to the lateral plate) from the medial scapular border onto the infraspinatus or supraspinatus fossa as desired.

Note: *If needed, increase compression across the fracture, prior to applying the plate with a lag screw to tension the superior surface of the spine in a neutralization mode.*

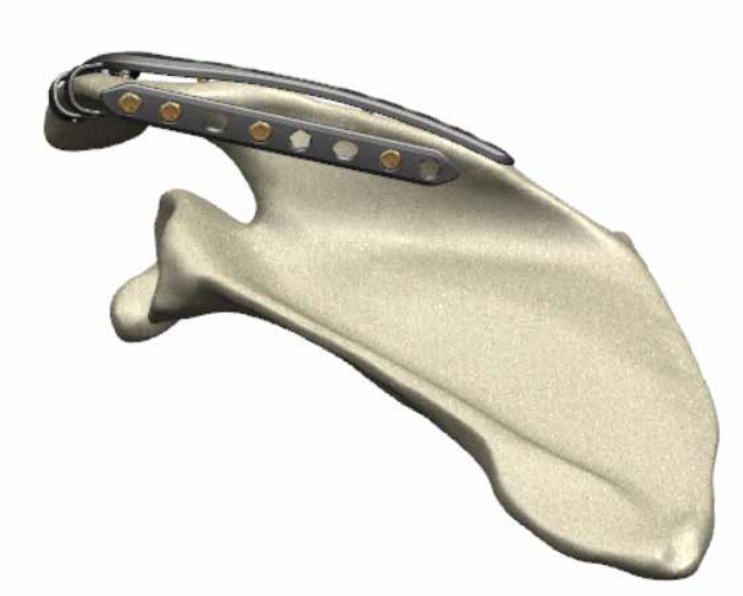


Figure 5
Dual Lateral Hook Plate and Inferior EPIC Straight Plate

Medial Hook and EPIC Straight Plates should be exclusively used in dual-plate configurations, with these plates positioned orthogonally to the primary plate, either within the supraspinatus or infraspinatus fossa. Each dual-plate configuration is based on surgeon preference *(Figure 5)*.

Plate Benders can be used to contour the plate to the patient's anatomy.

Note: *Do not repeatedly or excessively bend plates. Do not reverse bend in the same location.*

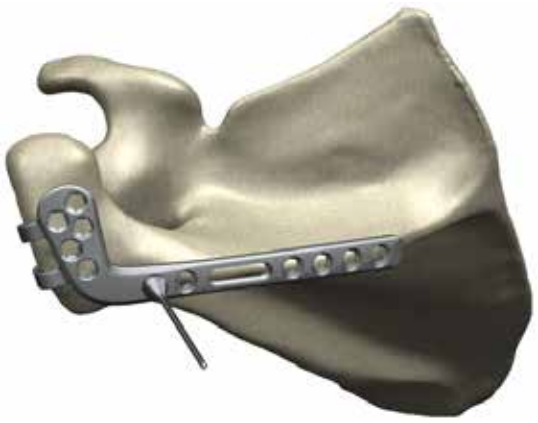


Figure 6
Olive K-Wire

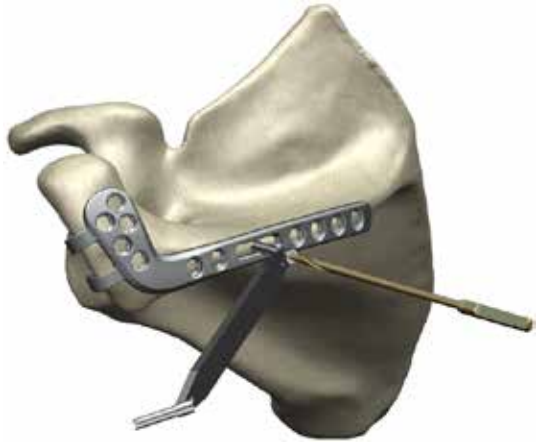


Figure 7
Double-Ended Drill Guide in Oblong Hole

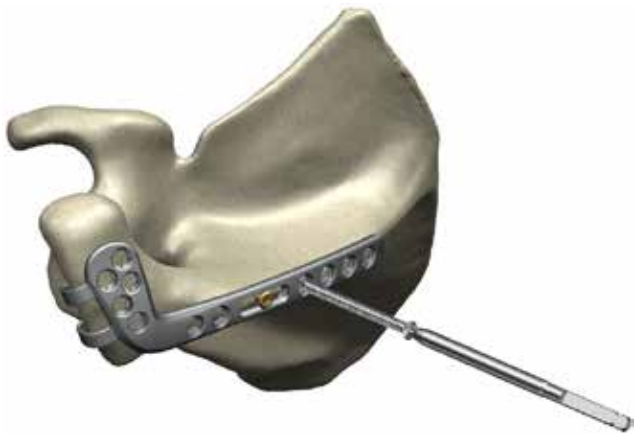


Figure 8
T-15 Ridge Screw Placement

SCREW INSERTION AND HOOK CRIMPING STEPS:
LEVY TYPE I OR TYPE II

The hook plates are applied to both sides of the scapula fracture (proximal and distal to the fracture line) and can be compressed to the bone using an **Olive K-Wire** *(Figures 6 and 7)*.

Prepare the bone for the Non-Locking Screw using the **Compression Screw Drill Guide** or **Double-Ended Drill Guide** with a **2mm** or **2.7mm Drill** in the oblong hole *(Figure 8)*. A **Depth Gauge** is available, if desired.

The oblong compression hole can be used to augment compression at the fracture site following initial reduction using the provided reduction clamps.

DETAILED OPERATIVE TECHNIQUE

SCREW INSERTION AND HOOK CRIMPING STEPS

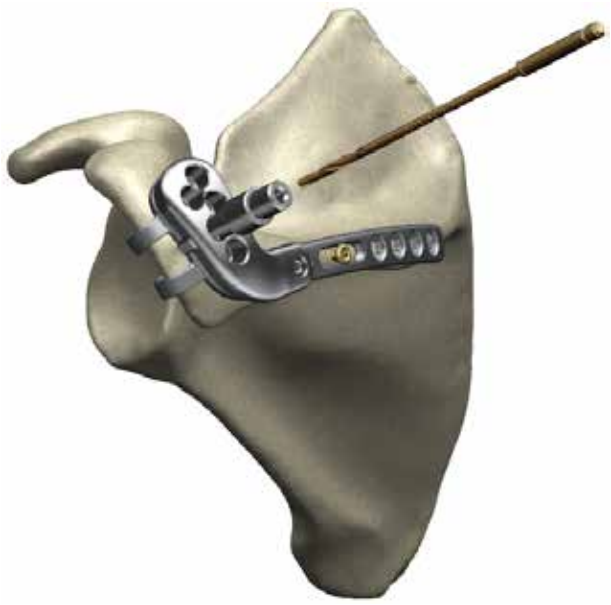


Figure 9
Prepare Bone for Screws

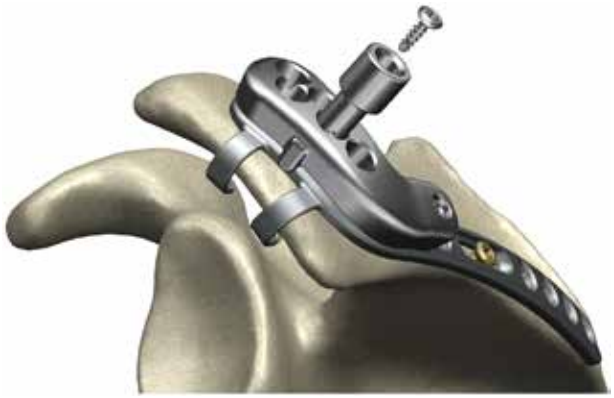


Figure 10
Screw Placement

Figure 11
Crimp Hooks Using Crimper

A combination of 2.7mm and 3.5mm Locking and Non-Locking Screws in several lengths are provided and can be inserted using the **AO Handle** and **T-15 Driver**.

Drill Guides, Screw Guides and **Guide Blocks** for the lateral acromion screws are also available *(Figures 9 and 10)*.

Locking Screws should be used if there is not adequate fixation with Non-Locking Screws.

Following plate and screw fixation to the bone, the hooks should be crimped using the **Crimper** *(Figure 11)*.

After crimping, ensure there is no interference with the subacromial space. Bicortical fixation is recommended in the acromion *(Figure 12)*.

Care should be taken to avoid screws exiting in the spinoglenoid notch which can cause injury or impinge the suprascapular nerve or artery *(Figures 12a and 12b)*.

In the dorsal spine, use unicortical Locking Screws. In the supraspinatus fossae, use bicortical Locking Screws.

FINAL ASSESSMENT

Radiographs should be taken to verify reduction, length, and position of the plates.

Intraoperatively assess the fracture for reduction, stability of fixation, and free motion of the glenohumeral joint without impingement of the subacromial space, suprascapular notch, and subscapular surface.

CLOSURE

Critical to post-op success is a robust repair of the deltoid and trapezius. If necessary, anchor to the plate or bone through drill holes.

POST-OP PROTOCOL

Use an abduction splint postoperatively for 4 to 6 weeks, after which motion may begin as instructed by a physician.

Fracture union typically occurs at 8 to 12 weeks, after which light resistance exercises may be allowed.

At this point, motion can be initiated under the direction of a physiotherapist. Following radiographic and/or clinical confirmation of fracture union, typically at 8 to 12 weeks postoperatively, light resisted exercises are allowed. Full return to activities including unrestricted overhead activities and strengthening may take 4 to 6 months to be reinstituted in this setting, particularly if bone quality is poor, fixation is tenuous, or significantly increased functional demands are anticipated (such as an upper extremity ambulator).

IMPLANT REMOVAL

In the event that the patient must be revised, and the implants must be removed, an AO Handle and drivers are used. Unlock and remove the screws from the plate before removing the plate completely from the bone.

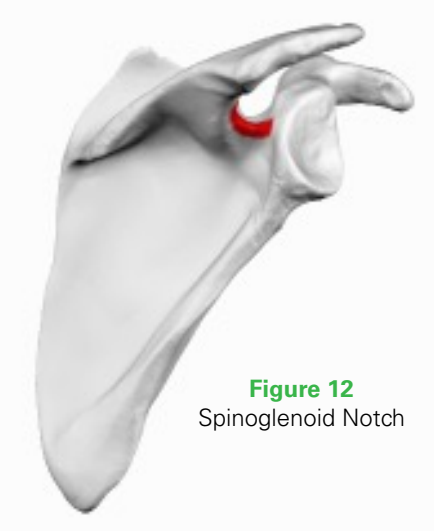


Figure 12
Spinoglenoid Notch

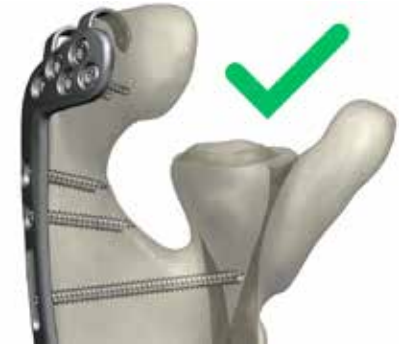


Figure 12a
Correct Placement of Screw

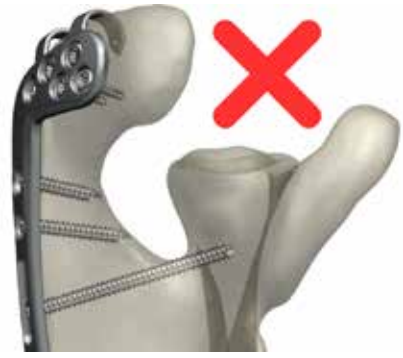


Figure 12b
Incorrect Placement of Screw

INSTRUMENT LISTING

CATALOG NO.	PART DESCRIPTION
377-00-07	Offset Crimper
377-00-02	Slotted Bender
PI-2855	Pointed Reduction Clamps
PI-1569	Serrated Clamps
2100-0200	2.0mm Threaded Olive K wire
2100-2000	EPIC 2.0mm Drill
2100-2700	EPIC 2.7mm Drill
2100-0019	EPIC 2.7mm Locking Drill Guide
377-00-03	Backpack Screw Guide
377-00-04	Guide Block, Left
377-00-05	Guide Block, Right
377-00-06	2.7mm Backpack Drill Guide
2100-0001	EPIC Screw Depth Gauge
1100-0160	EPIC 1.6mm K-Wire
2100-2027	EPIC Double-Ended Drill Guide
2100-0015	EPIC T-15 Driver
1100-0004	EPIC AO Handle
341-07-85	Mini AO Handle

CATALOG NO.	PART DESCRIPTION
2000-3510	Locking Screw, 3.5x10mm
2000-3512	Locking Screw, 3.5x12mm
2000-3514	Locking Screw, 3.5x14mm
2000-3516	Locking Screw, 3.5x16mm
2000-3518	Locking Screw, 3.5x18mm
2000-3520	Locking Screw, 3.5x20mm
2000-3522	Locking Screw, 3.5x22mm
2000-3524	Locking Screw, 3.5x24mm
2000-3526	Locking Screw, 3.5x26mm
2000-3528	Locking Screw, 3.5x28mm
2000-3530	Locking Screw, 3.5x30mm
2000-3532	Locking Screw, 3.5x32mm
2000-3534	Locking Screw, 3.5x34mm
2000-3536	Locking Screw, 3.5x36mm
2000-3538	Locking Screw, 3.5x38mm
2000-3540	Locking Screw, 3.5x40mm
2000-3542	Locking Screw, 3.5x42mm
2000-3544	Locking Screw, 3.5x44mm
2000-3546	Locking Screw, 3.5x46mm
2000-2710	Locking Screw, 2.7x10mm
2000-2712	Locking Screw, 2.7x12mm
2000-2714	Locking Screw, 2.7x14mm
2000-2716	Locking Screw, 2.7x16mm
2000-2718	Locking Screw, 2.7x18mm
2000-2720	Locking Screw, 2.7x20mm
2000-2722	Locking Screw, 2.7x22mm
2000-2724	Locking Screw, 2.7x24mm
2000-2726	Locking Screw, 2.7x26mm
2001-3510-N	Non-Locking Screw, 3.5x10mm
2001-3512-N	Non-Locking Screw, 3.5x12mm
2001-3514-N	Non-Locking Screw, 3.5x14mm
2001-3516-N	Non-Locking Screw, 3.5x16mm
2001-3518-N	Non-Locking Screw, 3.5x18mm
2001-3520-N	Non-Locking Screw, 3.5x20mm
2001-3522-N	Non-Locking Screw, 3.5x22mm
2001-3524-N	Non-Locking Screw, 3.5x24mm
2001-3526-N	Non-Locking Screw, 3.5x26mm
2001-3528-N	Non-Locking Screw, 3.5x28mm
2001-3530-N	Non-Locking Screw, 3.5x30mm
2001-3532-N	Non-Locking Screw, 3.5x32mm
2001-3534-N	Non-Locking Screw, 3.5x34mm
2001-3536-N	Non-Locking Screw, 3.5x36mm
2001-3538-N	Non-Locking Screw, 3.5x38mm
2001-3540-N	Non-Locking Screw, 3.5x40mm
2001-3542-N	Non-Locking Screw, 3.5x42mm
2001-3544-N	Non-Locking Screw, 3.5x44mm
2001-3546-N	Non-Locking Screw, 3.5x46mm
2001-2710-N	Non-Locking Screw, 2.7x10mm
2001-2712-N	Non-Locking Screw, 2.7x12mm
2001-2714-N	Non-Locking Screw, 2.7x14mm
2001-2716-N	Non-Locking Screw, 2.7x16mm
2001-2718-N	Non-Locking Screw, 2.7x18mm
2001-2720-N	Non-Locking Screw, 2.7x20mm
2001-2722-N	Non-Locking Screw, 2.7x22mm
2001-2724-N	Non-Locking Screw, 2.7x24mm
2001-2726-N	Non-Locking Screw, 2.7x26mm

IMPLANT LISTING

CATALOG NO.	PART DESCRIPTION
376-01-04	Anterior Hook Plate, 6mm Hook, 4 hole, Left
376-11-04	Anterior Hook Plate, 6mm Hook, 4 hole, Right
376-02-04	Lateral Hook Plate, 6mm Hook, 4 hole, Left
376-02-06	Lateral Hook Plate, 6mm Hook, 6 hole, Left
376-02-08	Lateral Hook Plate, 6mm Hook, 8 hole, Left
376-02-10	Lateral Hook Plate, 6mm Hook, 10 hole, Left
376-12-04	Lateral Hook Plate, 6mm Hook, 4 hole, Right
376-12-06	Lateral Hook Plate, 6mm Hook, 6 hole, Right
376-12-08	Lateral Hook Plate, 6mm Hook, 8 hole, Right
376-12-10	Lateral Hook Plate, 6mm Hook, 10 hole, Right
376-03-05	Medial Hook Plate, 5 hole, Left
376-03-07	Medial Hook Plate, 7 hole, Left
376-13-05	Medial Hook Plate, 5 hole, Right
376-13-07	Medial Hook Plate, 7 hole, Right
2000-7014	Straight Plate, 6 Hole
2000-7015	Straight Plate, 8 Hole
2000-7016	Straight Plate, 10 Hole
2000-7017	Straight Plate, 12 Hole

NOTES

REFERENCE

Glener J, Vegas A, Schodlbauer DF, Levy JC. Acromion fractures after reverse shoulder arthroplasty occur in predictable clusters. 2024. J Shoulder Elbow Surg 33(5):1150–1156.

These products are manufactured by Exactech, Inc. and distributed by Advita Ortho, LLC.

For additional device information, refer to the manufacturer's Instructions for Use for information including, but not limited to, a device description, indications, contraindications, precautions and warnings. For further product information, please contact Customer Service, Advita Ortho, LLC 2320 NW 66th Court, Gainesville, Florida 32653-1630, USA. (833) 4-ADVITA.

Exactech, as the manufacturer of this device, does not practice medicine and is not responsible for recommending the appropriate surgical technique for use on a particular patient. Because this information does not purport to constitute any diagnostic or therapeutic statement with regard to any individual medical case, each patient must be examined and advised individually, and this document does not replace the need for such examination and/or advice in whole or in part. These guidelines are intended to be solely informational, and each surgeon must evaluate the appropriateness of these guidelines based on his or her personal medical training and experience. Prior to use of this system, the surgeon should refer to the product package insert for information including, but not limited to, comprehensive warnings, precautions, indications for use, contraindications and adverse effects.

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