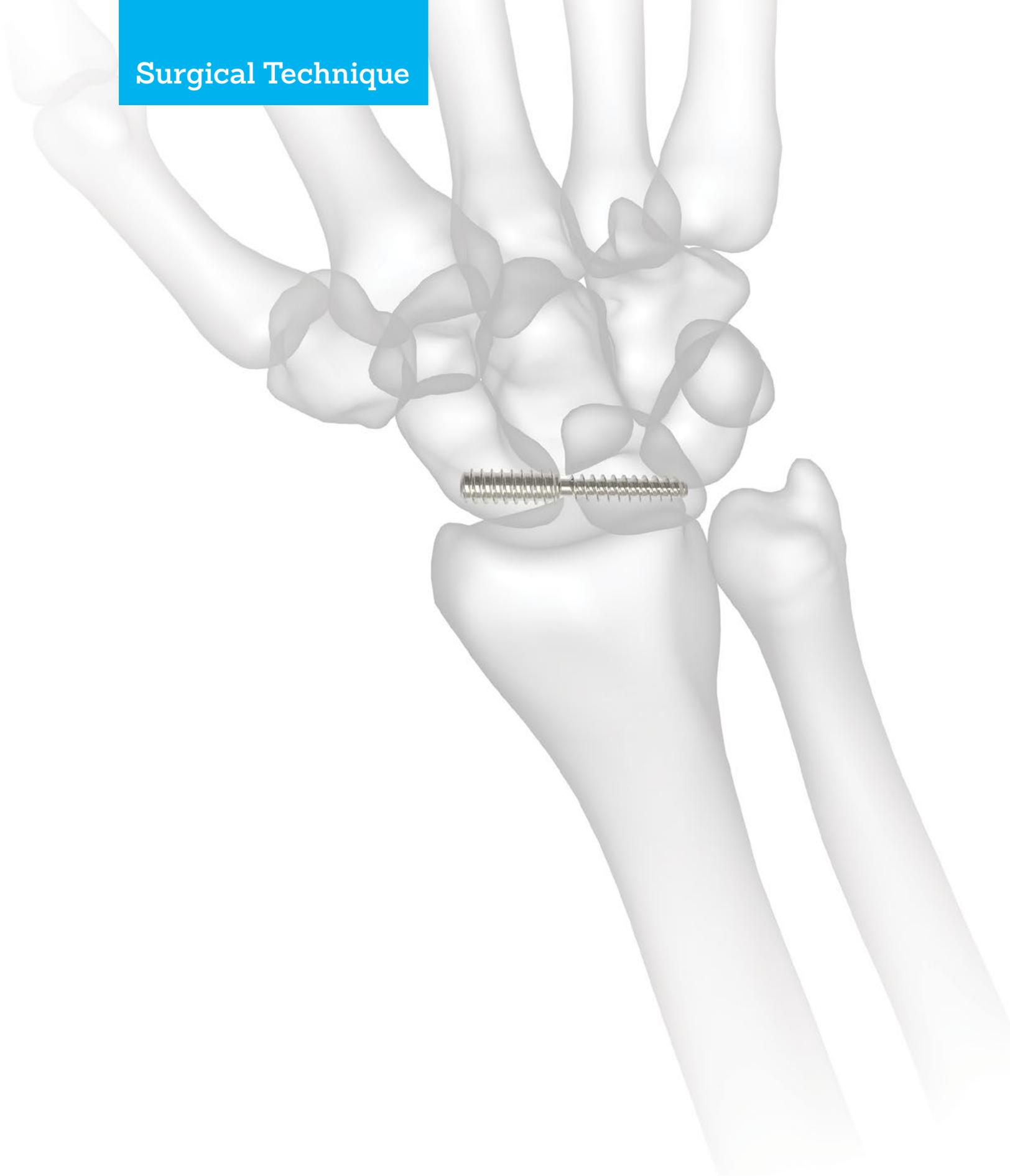


Surgical Technique





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.



SLIC Screw® Design Surgeon
[William B. Geissler, M.D.](#)

SL Targeting Guide
Design Surgeon
[Michael G. McNamara, M.D.](#)

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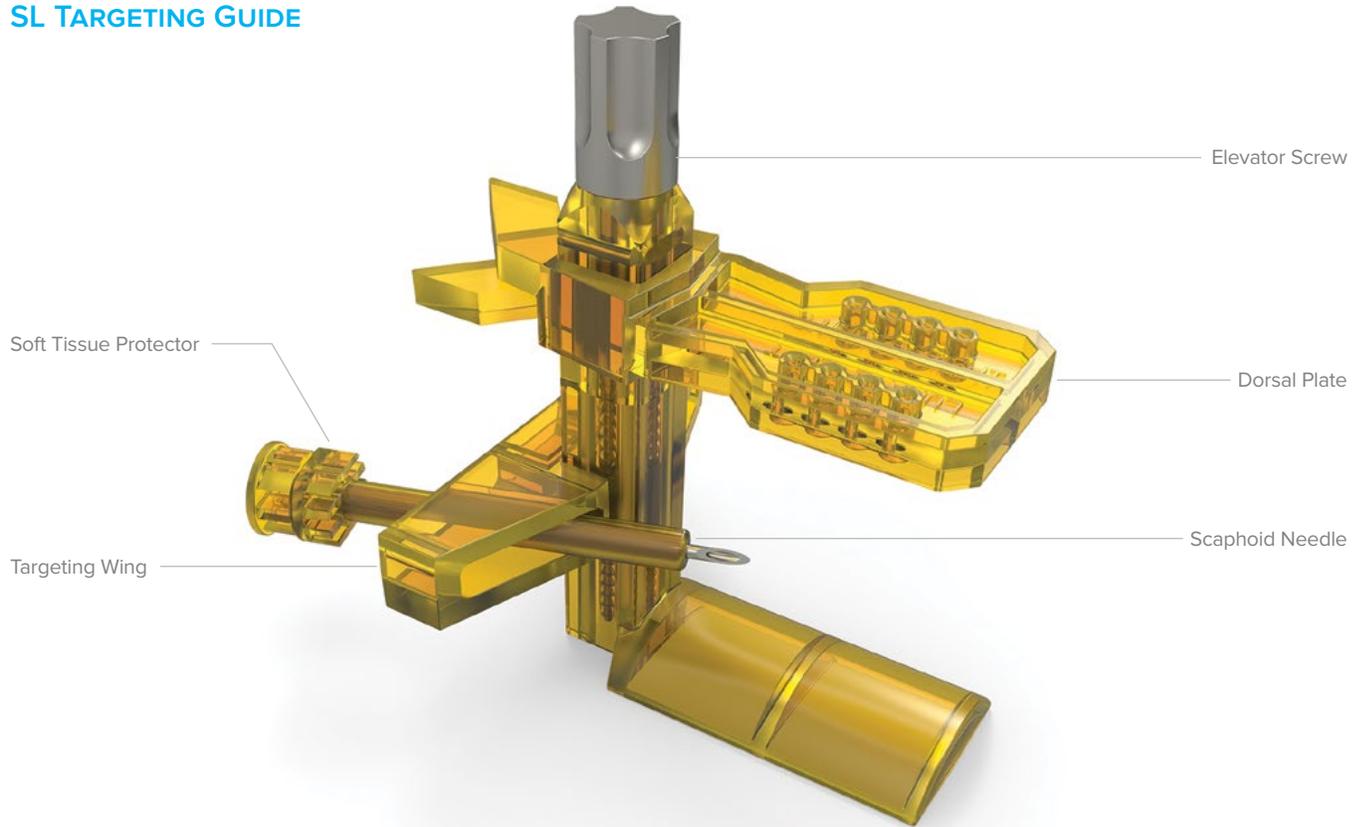


SLIC Screw® System

The Acumed Scapholunate Intercarpal Screw (SLIC Screw) System has a cannulated cylinder-in-cylinder design for adjunct fixation of acute scapholunate instability. Customized instrumentation and a specialized targeting guide are designed to be used in correspondence with K-wires for anatomical reduction of the scaphoid and lunate carpals while allowing simplified targeting of the central third of the scaphoid and lunate in the lateral view.

System Features

SL TARGETING GUIDE



SLIC SCREW



The patented design of the SLIC Screw allows for a 15–22 degree toggle angle and freely rotates, allowing the scaphoid and lunate to move anatomically while the soft tissue heals.

Instrumentation

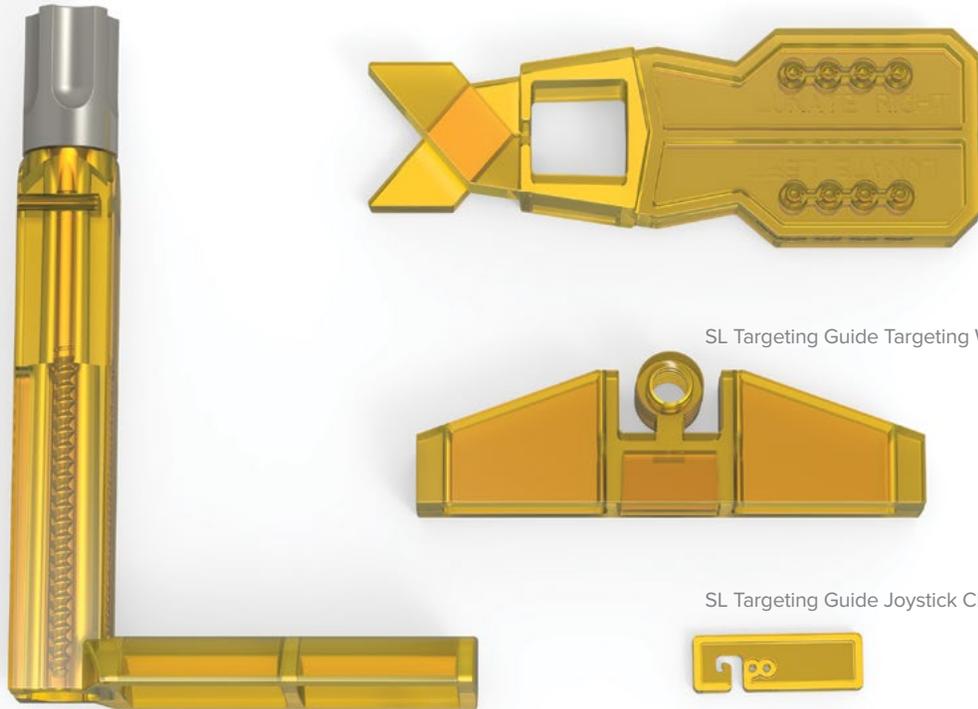
SLIC SCREW PREP PACK REFERENCE CHART

Procedure Pack
46-0004-S

SL Targeting Guide Elevator Assembly (80-1060)*

*This comes pre-assembled with SL Targeting Guide Dorsal Plate

SL Targeting Guide Dorsal Plate (80-1051)



SL Targeting Guide Targeting Wing (80-1052)

SL Targeting Guide Joystick Clip (80-1057)

SL Targeting Guide Soft Tissue Protector Cannula (80-1054)

SL Targeting Guide Scaphoid Needle Assembly (80-1059)



SLIC Screw Soft Tissue Protector (80-0848)

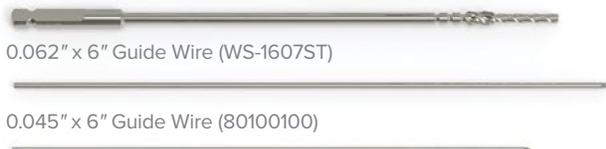
Arthroscopic Probe (30100105)



SLIC Screw Stepped Drill (80-0847)

0.062" x 6" Guide Wire (WS-1607ST)

0.045" x 6" Guide Wire (80100100)



Note: A SLIC Screw Removal System Tray (80-2249 and 80-2250) is available. To order, please contact your local Acumed sales representative.

SLIC SCREW IMPLANT PACK REFERENCE CHART

Specific Instrumentation for Each SLIC Screw

Screw Length	Procedure Pack	Screw Part No.	Driver Part No.	Easyout Part No.
22 mm	46-0005-S	55-0011	80-1162	80-1165
25 mm	46-0006-S	55-0012	80-1163	80-1166
28 mm	46-0007-S	55-0013	80-1164	80-1167

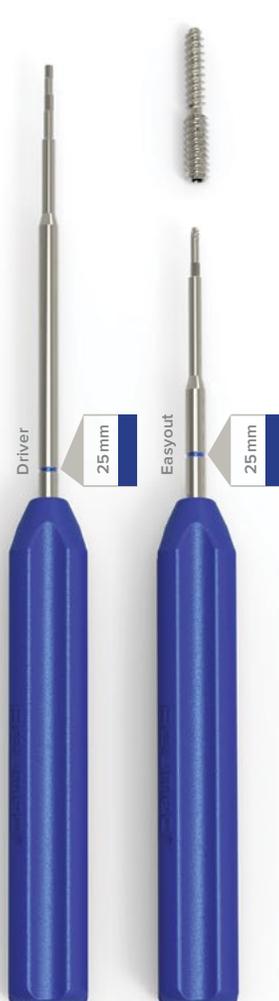
22 mm SLIC Screw Pack

22 mm SLIC Screw 55-0011
 22 mm Driver 80-1162
 22 mm Easyout 80-1165



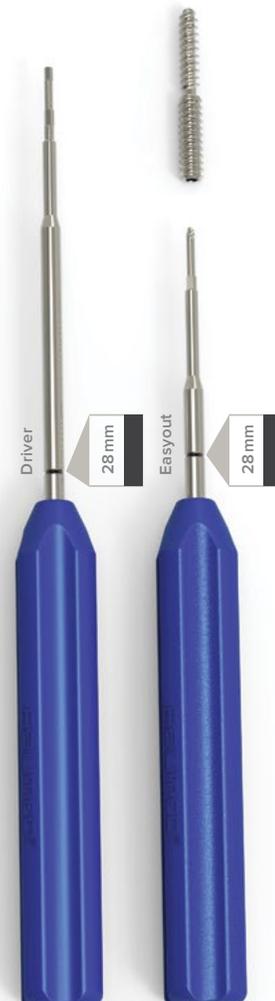
25 mm SLIC Screw Pack

25 mm SLIC Screw 55-0012
 25 mm Driver 80-1163
 25 mm Easyout 80-1166



28 mm SLIC Screw Pack

28 mm SLIC Screw 55-0013
 28 mm Driver 80-1164
 28 mm Easyout 80-1167



Treatment Algorithm

An article published in 2006 by Garcia-Elias et al. through the *Journal of Hand Surgery* presented a scapholunate instability treatment algorithm. Acumed based the SLIC Screw treatment model after this article.¹ The SLIC Screw is recommended for acute injuries and should only be used for stages 1–4 of the algorithm.

STAGING OF SCAPHOLUNATE DISSOCIATIONS	1	2	3	4	5	6
Is there a partial rupture with a normal dorsal SL ligament?	●					
If ruptured, can the dorsal SL ligament be repaired?	●	●				
Is the scaphoid normally aligned (radioscaphoid angle $\leq 45^\circ$)?	●	●	●			
Is the carpal malalignment easily reducible?	●	●	●	●		
Are the cartilages at both RC and MC joints normal?	●	●	●	●	●	

1. Garcia-Elias M, Lluch AL, Stanley JK. "Three-Ligament Tenodesis for the Treatment of Scapholunate Dissociation: Indications and Surgical Technique." *Journal of Hand Surgery Am.* 31.1 (Jan 2006): 125–34.

The SLIC Screw is recommended for acute injuries and should only be used for stages 1–4 of the algorithm.

STAGING OF SCAPHOLUNATE DISSOCIATIONS	1	2	3	4	5	6
SLIC Screw Recommended	●	●	●	●		

STAGE 1: Partial Scapholunate Ligament injury

Patient Presentation

- Partial scapholunate ligament injury
- No dynamic or static gapping present
- No abnormal kinematics, but there is pain
- Associated distal radius fractures and TFCC injuries may be present as well

Treatment Option Using SLIC Screw

- Percutaneous SLIC Screw fixation across the scapholunate interval

Postoperative Rehabilitation Protocol: Per individual surgeon’s discretion. Remove SLIC Screw at 6–9 months.

STAGE 2A: Complete Scapholunate Ligament Injury with Repairable Dorsal Scapholunate Ligament (Acute)

Patient Presentation

- Complete scapholunate ligament disruption
- No dynamic or static gapping present
- No rotator subluxation, but there is pain
- The dorsal ligament is repairable
- Associated distal radius fractures and TFCC injuries may be present as well

Treatment Option Using SLIC Screw

- Open repair of dorsal scapholunate ligament with anchors
- SLIC Screw fixation across the scapholunate interval

Postoperative Rehabilitation Protocol: Per individual surgeon’s discretion. Remove SLIC Screw at 6–9 months.

STAGE 2B: Perilunate Dislocation with Repairable Dorsal Scapholunate Ligament (Acute)**Patient Presentation**

- Perilunate dislocation
- Dislocation of the lunate
- Complete scapholunate ligament disruption
- Radioscaphocapitate ligament ruptured
- Possible lunotriquetral ligament disruption
- Possible scaphoid fracture
- The dorsal scapholunate ligament is repairable

Treatment Option Using SLIC Screw

- Open reduction of bones, followed by repair of dorsal scapholunate ligament with anchors
- SLIC Screw fixation across the scapholunate interval
- Fixation of the lunotriquetral interval may be appropriate as well
- The scaphoid is stabilized in a trans-scaphoid perilunate dislocation and a SLIC Screw may be placed across the lunotriquetral interval

Postoperative Rehabilitation Protocol: Per individual surgeon's discretion. Remove SLIC Screw at 6–9 months.

STAGE 2C: Complete Scapholunate Ligament Injury with Repairable Dorsal Scapholunate Ligament and Reducible Rotatory Scaphoid Subluxation**Patient Presentation**

- Complete scapholunate ligament disruption
- Dynamic and/or static gapping present
- Rotatory subluxation
- The dorsal scapholunate ligament is repairable
- Associated distal radius fractures and TFCC injuries may be present as well

Treatment Option Using SLIC Screw

- Open repair of dorsal scapholunate ligament with anchors
- SLIC Screw fixation across the scapholunate interval and stabilize the scaphoid distally (e.g. ECRL tendon transfer, dorsal capsulodesis, dorsal intercarpal ligament capsulodesis, scaphocapitate pin/screw)

Postoperative Rehabilitation Protocol: Per individual surgeon's discretion. Remove SLIC Screw at 6–9 months.

STAGE 3: Complete Non-repairable Scapholunate Ligament Injury with Normally Aligned Scaphoid**Patient Presentation**

- Complete scapholunate ligament disruption
- No static gapping present
- No carpal malalignment, but there is pain
- The dorsal ligament is not repairable or has limited healing capacity

Treatment Option Using SLIC Screw

- Open procedure to visualize dorsally
- SLIC Screw fixation across the scapholunate interval
- Soft tissue repair that bridges the scapholunate interval (e.g. reverse or modified Mayo capsulodesis, burring scapholunate interval to form neoligamentous tissue at the interval)

Postoperative Rehabilitation Protocol: Per individual surgeon's discretion. Remove SLIC Screw at 6–9 months.

STAGE 4: Complete Non-repairable Scapholunate Ligament Injury with Reducible Rotatory Scaphoid Subluxation

Patient Presentation

- Complete scapholunate ligament disruption and disruption of the secondary stabilizing ligaments (e.g. dorsal intercarpal (DIC), radioscapholunate (RSL), scapho-trapezio-trapezoid (STT), sternoclavicular (SC) ligaments)
- Radioscaphoid angle is greater than 45°
- Lunate is extended (pathologic)
- Static and/or dynamic gapping may be present
- Scaphoid may displace dorsally (scaphoid clunk) during motion, and there is pain
- Dorsal ligament is not repairable or has limited healing capacity
- Rotatory malalignment must be easily reducible, defined as being able to reduce scaphoid using a 0.045" K-wire, and no cartilage damage can be present

Treatment Option Using SLIC Screw

- Open reduction of the scaphoid and lunate dorsally, using k-wire joysticks to reduce the bones
- To be easily reducible, the scaphoid must allow reduction with a 0.045" or 0.054" K-wire
- After reduction, SLIC Screw fixation across the scapholunate interval is performed, along with a soft tissue reconstruction that bridges the scapholunate interval (e.g. reverse or modified Mayo capsulodesis, burring scapholunate interval to form neoligamentous tissue at the interval) and stabilizes the scaphoid distally (e.g. ECRL tendon transfer, dorsal capsulodesis, dorsal intercarpal ligament capsulodesis, scaphocapitate pin/screw)

Postoperative Rehabilitation Protocol: Per individual surgeon's discretion. Remove SLIC Screw at 6–9 months.

THE SLIC SCREW IS NOT RECOMMENDED FOR THE FOLLOWING STAGES:

STAGE 5: Complete Non-repairable Scapholunate Ligament Injury with Irreducible Rotatory Malalignment but Normal Cartilage

Patient Presentation

- Complete scapholunate ligament disruption
- Disruption of the secondary stabilizing ligaments (e.g. DIC, RSL, STT, SC ligaments).
- Radioscaphoid angle is greater than 45°
- Lunate is extended (pathologic)
- Significant static gapping is typically present
- Scaphoid may displace dorsally (scaphoid clunk) during motion, and there is pain
- Dorsal ligament is not repairable or has limited healing capacity
- Rotatory malalignment is not easily reducible, defined as being able to reduce scaphoid using a 0.045" K-wire, and no cartilage damage can be present

Treatment Option Using SLIC Screw

The SLIC Screw is *not* recommended for Stage 5 scapholunate instability. In these cases, soft tissue reconstruction and screws across the scapholunate interval will probably fail.

STAGE 6: Complete Non-repairable Scapholunate Ligament Injury with Irreducible Rotatory Malalignment and Cartilage Degeneration

Patient Presentation

- Complete scapholunate ligament disruption
- Disruption of the secondary stabilizing ligaments (e.g. DIC, RSL, STT, SC ligaments)
- Radioscaphoid angle is greater than 45°
- Lunate is extended (pathologic)
- Static and/or dynamic gapping may be present
- Scaphoid may displace dorsally (scaphoid clunk) during motion, and there is pain
- Dorsal ligament is not repairable or has limited healing capacity
- Rotatory malalignment is not easily reducible, defined as being able to reduce scaphoid using a 0.045" K-wire and cartilage damage can be present

Treatment Option Using SLIC Screw

The SLIC Screw is *not* recommended for Stage 6 scapholunate instability and is contraindicated in the presence of cartilage degeneration on the bone.

Arthroscopic Classification

SLIC Screw System designing surgeon, Dr. William Geissler published a classification system for scapholunate instability in 2013 through the *Journal of Wrist Surgery*. Per the Geissler Arthroscopic Classification, gapping at the scapholunate interval is present in grades II and III.²

GEISSLER ARTHROSCOPIC CLASSIFICATION SYSTEM

Grade	Description	Detail	Management
1	“Attenuation/hemorrhage of interosseous ligament as seen from the radiocarpal joint. No incongruity of carpal alignment in the midcarpal space.”	“There is a loss of the normal concave appearance of the interosseous ligament from the scaphoid and the lunate as the ligament bulges with a convex appearance, as seen with the arthroscope in the radiocarpal space. In the midcarpal space, the scapholunate interval is still tight and congruent. It is thought these are minor wrist sprains and usually will resolve with simple immobilization.”	Immobilization
2	“Attenuation/hemorrhage of interosseous ligament as seen from the radiocarpal joint. Incongruity/step off of carpal alignment is seen in both the radiocarpal and midcarpal spaces. A slight gap (less than width of a probe) between carpals may be present.”	“The interosseous ligament continues to stretch and a convex appearance is seen between the scaphoid and the lunate with the arthroscope in the radiocarpal space. In the midcarpal space, the scapholunate interval is no longer congruent. The scaphoid starts to flex palmarly and its dorsal lip is rotated distal to the level of the lunate.”	Arthroscopic reduction and pinning
3	“Incongruity/step off of carpal alignment is seen in both the radiocarpal and midcarpal spaces. The probe may be passed through the gap between the carpals.”	“The interosseous tear has progressed from a stretch to a tear to a gap is seen between scaphoid and the lunate with the arthroscope in the radiocarpal and midcarpal spaces. This gap can be appreciated from both the radiocarpal and the midcarpal space.”	Arthroscopic/ open reduction and pinning
4	“Incongruity/step off of carpal alignment is seen in both the radiocarpal and midcarpal spaces. Gross instability with manipulation is noted. A 2.7 mm arthroscope may be passed through the gap between carpals.”	“There is complete tear to the SLIL. The arthroscope can be freely translated between the radiocarpal and midcarpal spaces.”	Open reduction and repair

2. Geissler, William B. “Arthroscopic Management of Scapholunate Instability.” *Journal of Wrist Surgery*. 2.2. (May 2013): 129–35.

Technical Objectives of SLIC Screw System

The SLIC Screw is an adjunct to the biological healing of soft tissue repair/reconstructions utilized to treat scapholunate (SL) and lunotriquetral (LT) instability. Utilization of this device should be limited to surgeons well versed in the treatment of intercarpal instability.

The SLIC Screw is contraindicated in the presence of active or latent infection, sepsis, osteoporosis, insufficient quantity and/or quality of bone, presence of cartilage degeneration on the bones, absence of potential for soft tissue healing or soft tissue reconstruction spanning the bones, or with patients who are unwilling or unable to follow post-operative care instructions.

- The soft tissue repair or reconstruction must bridge the scapholunate (SL) interval. In the acute setting, a direct repair of the scapholunate interosseous ligament (SLIL) can be performed with small suture anchors, while in the chronic setting a reverse capsulodesis or tenodesis can be performed.
- When introducing the guide wire, start just distal to the tip of the radial styloid and use fluoroscopy to direct the wire towards the most ulnar proximal corner of the lunate.
- Make sure the guide wire is centered in the scaphoid and lunate in the lateral view. The guide wire should appear as a point or a short line in the lateral view to confirm its central location in the scaphoid and lunate.
- Place the step of the SLIC Screw at the SL interval to allow toggle between the scaphoid and lunate and reduce stresses in the joint.



Pre-Surgical Technique

SOFT TISSUE REPAIR

Prior to the preparation of guide wire insertion, please ensure that scapholunate (SL) soft tissue reconstruction has occurred. There are many different soft tissue procedures. Acumed does not recommend any one soft tissue repair technique but leaves it to the surgeon's discretion. Some examples of soft tissue procedures are: direct repair of SL ligament, reverse (modified Mayo) capsulodesis, burring scapholunate interval, extensor carpi radialis longus (ECRL) tendon transfer, dorsal (Blatt) capsulodesis, dorsal intercarpal ligament capsulodesis, and/or free ligament to SL.

Please skip to the SLIC Screw Surgical Technique or Alternate SLIC Screw Surgical Technique sections if a “freehand” technique is desired for the insertion of the SL Interval Guide Wire.

Scapholunate Instability Alignment

SL Targeting Guide Surgical Technique

MICHAEL G. MCNAMARA, M.D.



PREPARATION

The starting point on the scaphoid is just distal to the tip of the radial styloid on the proximal ridge of the scaphoid. Incise the skin, and then proceed with blunt dissection down to the level of the capsule. Recognize and protect the radial artery, vena comitante, and subcutaneous branch of the dorsal radial cutaneous nerve. A minimal radial styloidectomy may be necessary to access the scaphoid. The scapholunate guide wire is inserted from the radial side of the wrist through the scaphoid into the lunate.

Tips: To identify the entry point for the guide wire, locate the small vascular ridge at the mid-point of the scaphoid between anterior and posterior that is void of cartilage and create the starting point with either a 0.045" or 0.062" (1.14 mm or 1.57 mm) K-wire based on surgeon preference. After placing the SL Targeting Guide on the wrist, insert the needle tip into the shallow pre-drilled hole.

1 PREP PACK

The SLIC Screw Prep Pack will be the first sterile kit used as it contains the SL Targeting Guide assembly, SLIC Screw Stepped Drill (80-0847), SLIC Screw Soft Tissue Protector (80-0848), Arthroscopic Probe (30100105), and 0.045" and 0.062" K-wires (80100100 or WS-1607ST) required to be used prior to the insertion of the SLIC Screw.

From there, depending on the determined screw size in Step 6 of the SLIC Screw Surgical Technique, choose the appropriate SLIC Screw Pack (ex. 22 mm, 25 mm, or 28 mm). Each SLIC Screw Pack includes the instrumentation specific to each screw size.

Note: If it is desired to drill by hand, please contact your Acumed sales representative for a Quick Release Driver Handle (80100125, MS-1210, or MS-3200). This is not included in the SLIC Screw Prep Pack.



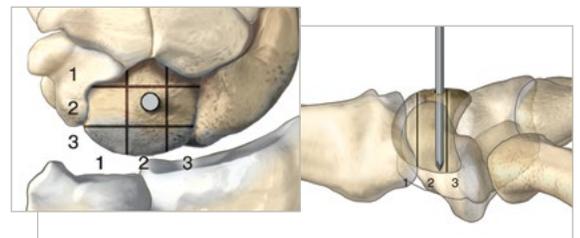
2 DISSECTION

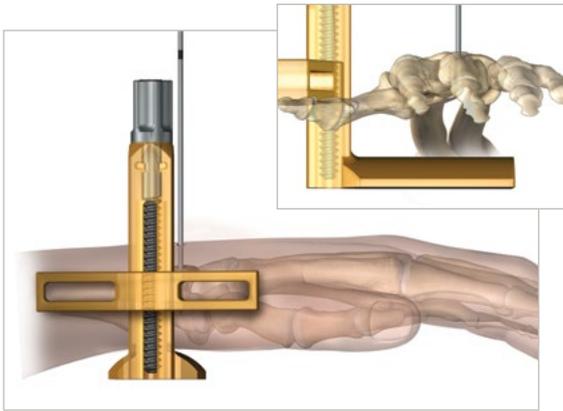
A standard dorsal approach to the wrist is made in the mid line. Blunt dissection is carried down to the level of the fascia to protect the cutaneous nerves. The extensor pollicis longus is released through the third compartment, and the retinaculum through the second and fourth dorsal compartments is opened. The extensor tendons are then dissected medially and laterally, exposing the dorsal capsule. The dorsal capsule is then opened with a radial base flap, exposing the carpus.

3 REDUCTION AND PLACEMENT OF THE SL TARGETING GUIDE

The interval and rotation of the scaphoid and lunate should be anatomically reduced prior to the repair/fixation of the scapholunate (SL) joint. Based on surgeon preference, place a 0.045" or 0.062" (1.14 mm or 1.57 mm) K-wire dorsally into the distal middle third of the lunate under fluoroscopy. Use an angle of approach that will leave the K-wire in a perpendicular orientation to the dorsal aspect of the wrist after the lunate is reduced to anatomical position.

Tip: In the lateral view, place K-wire parallel to the dorsal volar lip of the lunate orientation.



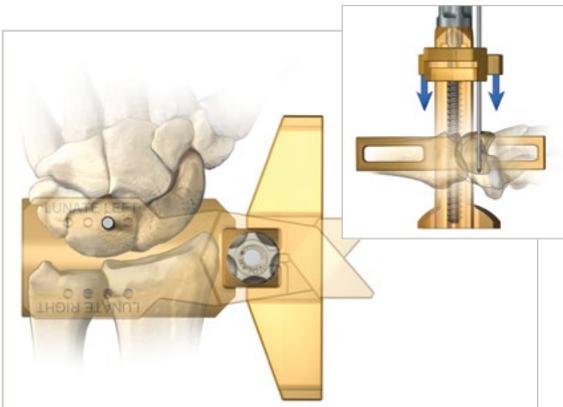


4 ASSEMBLE SL TARGETING GUIDE

The SL Targeting Guide will need to be assembled prior to utilization. Remove the SL Targeting Guide instrumentation from the SLIC Screw Prep Pack. Begin with the SL Targeting Guide Elevator Assembly (80-1060) on the sterile table and remove the SL Targeting Guide Dorsal Plate (80-1051) from the Elevator Assembly. Take the SL Targeting Guide Targeting Wing (80-1052) and thread it onto the screw at the bottom of the Elevator Assembly. Continue to turn the Elevator Screw until the Targeting Wing is about mid way up the Elevator Screw. The SL Targeting Guide is now ready to be positioned on the patient's wrist.

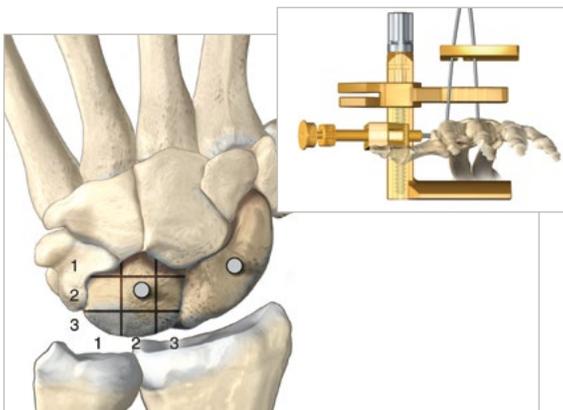
Place the Elevator Assembly under the wrist against the volar surface of the wrist.

Note: The Elevator Assembly will have the most stability if the Elevator Post is flush to the radial side of the wrist.



5 PLACE SL TARGETING GUIDE ON WRIST

Choose the lunate hole on the appropriate side (left or right is labeled) of the SL Targeting Guide Dorsal Plate that allows the Elevator Assembly to sit flush with the radial side of the wrist. Pinch the crossing tabs and slide the Dorsal Plate over the lunate K-wire joystick and the Elevator Post. Slide the Dorsal Plate down until it is flush with the dorsal aspect of the wrist.



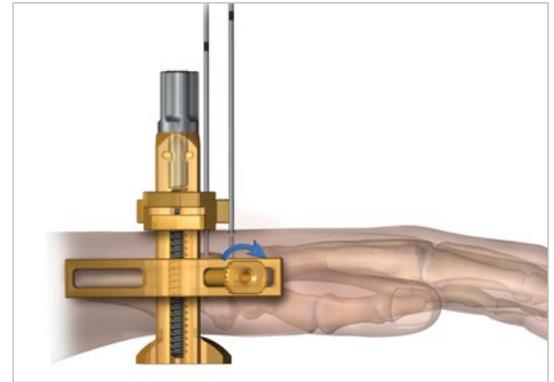
6 DISI CORRECTION

If scapholunate reduction is necessary, place a 0.045" K-wire into the waist of the scaphoid under fluoroscopy. This will be used as the second joystick to reduce the SL interval into its anatomical position. Placement of scaphoid joystick will be based on surgeon preference, as long as it will not be in the path of the SL fixation guide wire. It is often placed from distal to proximal to reduce a flexed scaphoid if needed. Use the supplied SL Targeting Guide Joystick Clip (80-1057) or a pair of Kocher's clamps to bring the joysticks together and hold anatomical reduction of the scaphoid and lunate. The scaphoid should be rotated back into normal rotation without excessive bending in the K-wire.

Note: If excessive bending occurs in the 0.045" K-wire, the scapholunate interval is probably not dynamic or "easily reducible" and a salvage option should be considered instead.

7 PLACING THE GUIDE WIRE ACROSS THE SCAPHOID AND LUNATE

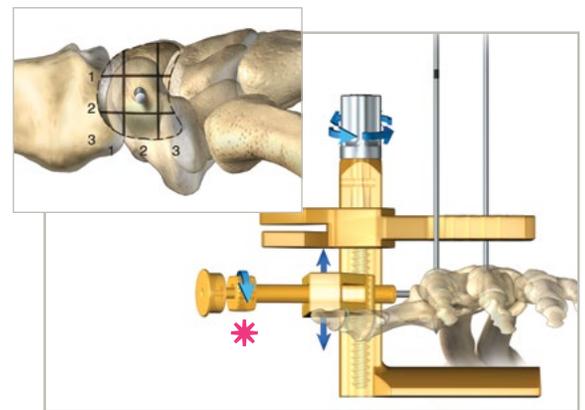
With the guide securely fashioned to the wrist and the SL anatomically reduced; view the wrist under fluoroscopy in the Radial/Ulnar direction. Insert the SL Targeting Guide Soft Tissue Protector Cannula (80-1054) into the appropriate slot in the Targeting Wing by aligning the flat side of the Soft Tissue Protector Cannula with the flat side of the Targeting Wing. Advance the Soft Tissue Protector Cannula into the incision down to the scaphoid capsule or against skin if using percutaneously.



8 LATERAL VIEW ALIGNMENT

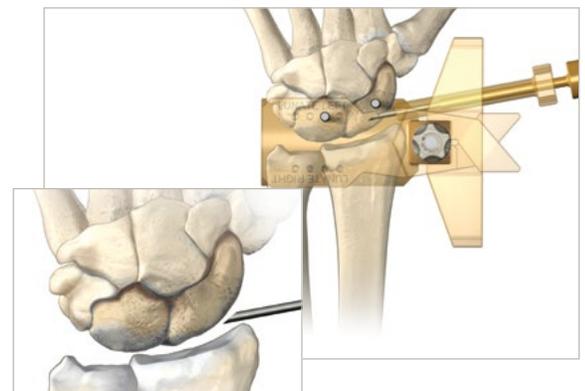
Insert the SL Targeting Guide Scaphoid Needle (80-1059) through the Soft Tissue Protector Cannula. Use the dial at the top of the Elevator Assembly to get the correct lateral position, using the radio-opaque needle under fluoroscopy as a marker. Clockwise turns (see image) move the targeting wing in the dorsal direction and counterclockwise turns move the wing in the volar direction. The correct location in the lateral view will be centered in the middle third of the lunate.

Tip: When the correct trajectory is located, lock the Soft Tissue Protector Cannula into position by rotating it clockwise.



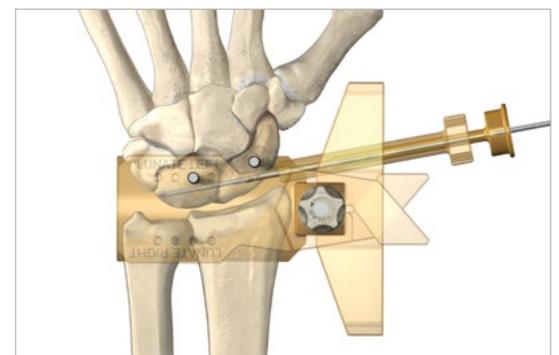
9 PA VIEW ALIGNMENT

Rotate the wrist back to the PA view and use fluoroscopy to align the approach of the guide wire. The guide wire should be placed centrally in the scaphoid and lunate and exit the lunate at the most ulnar proximal corner as shown; it should not pass through the scaphocapitate or lunacapitate joint spaces. Rotate the Scaphoid Needle so the tip is at its most proximal position and then lightly press the Scaphoid Needle into the scaphoid. The Scaphoid Needle in the correct rotation helps to prevent the guide wire from skiving off the scaphoid (see image at right).



10 FINAL CONFIRMATION

Confirm you have the correct trajectory in PA and lateral views and place a 0.045" Guide Wire into the Scaphoid Needle. Advance the guide wire into the scaphoid and lunate, checking under fluoroscopy periodically to ensure the correct path. Continue to advance the guide wire per surgeon's discretion.



Pre-Surgical Technique

SOFT TISSUE REPAIR

Prior to the preparation of guide wire insertion, please ensure that scapholunate (SL) soft tissue reconstruction has occurred. There are many different soft tissue procedures. Acumed does not recommend any one soft tissue repair technique but leaves it to the surgeon's discretion. Some examples of soft tissue procedures are: direct repair of SL ligament, reverse (modified Mayo) capsulodesis, burring scapholunate interval, extensor carpi radialis longus (ECRL) tendon transfer, dorsal (Blatt) capsulodesis, dorsal intercarpal ligament capsulodesis, and/or free ligament to SL.

Scapholunate Instability Device

SLIC Screw Surgical Technique

WILLIAM B. GEISSLER, M.D.

If the SL Targeting Guide has been utilized, skip steps 1–5 and begin with Step 6.

1 PREP PACK

The SLIC Screw Prep Pack will be the first procedure pack used as it contains the SL Targeting Guide assembly, SLIC Screw Stepped Drill (80-0847), SLIC Screw Soft Tissue Protector (80-0848), Arthroscopic Probe (30100105), and 0.045" and 0.062" K-wires (80100100 or WS-1607ST) required to be used prior to the insertion of the SLIC Screw. From there, depending on the determined screw size in Step 6, choose the appropriate SLIC Screw Pack (ex. 22 mm, 25 mm, or 28 mm).

Each SLIC Screw Pack includes the instrumentation specific to the screw size.

Note: If it is desired to drill by hand, please contact your Acumed sales representative for a Quick Release Driver Handle (80100125, MS-1210, or MS-3200). This is not included in the SLIC Screw Prep Pack.

2 DISSECTION

A standard dorsal approach to the wrist is made in the mid line. Blunt dissection is carried down to the level of the fascia to protect the cutaneous nerves. The extensor pollicis longus is released through the third compartment, and the retinaculum through the second and fourth dorsal compartments is opened. The extensor tendons are then dissected medial and lateral exposing the dorsal capsule. The dorsal capsule is then opened with a radial base flap exposing the carpus.

3 REDUCTION

The SL interval should be anatomically reduced prior to introducing the 0.045" Guide Wire for the SLIC Screw. Based on surgeon preference, place a 0.045" or 0.062" (1.14 mm or 1.57 mm) K-wire dorsally in the distal middle third of the lunate under fluoroscopy (Figure 1). Place a K-wire in the scaphoid and use both as joysticks with either the supplied SL Targeting Guide Joystick Clip (80-1057) or a pair of Kocher's clamps to reduce the SL interval and rotate the scaphoid and lunate into their normal position (Figure 2).

Tip: In the acute setting, complete tears of the SL ligament should be repaired. The sutures are placed, the SL interval is reduced and pinned, and the sutures tied.

Tip: Place both K-wires for the lunate and scaphoid in the distal aspect of each carpal bone. This to avoid potential interference with placement of the 0.045" Guide Wire for the SLIC Screw in Step 4.

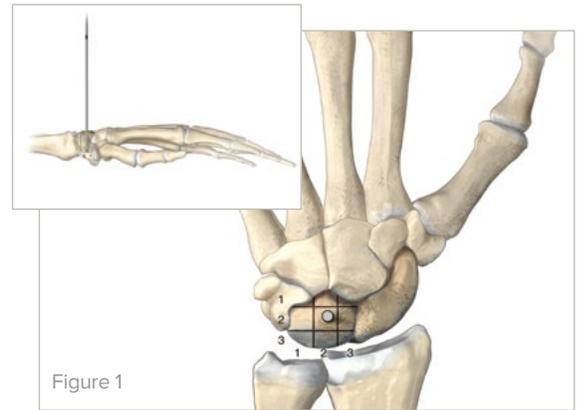


Figure 1

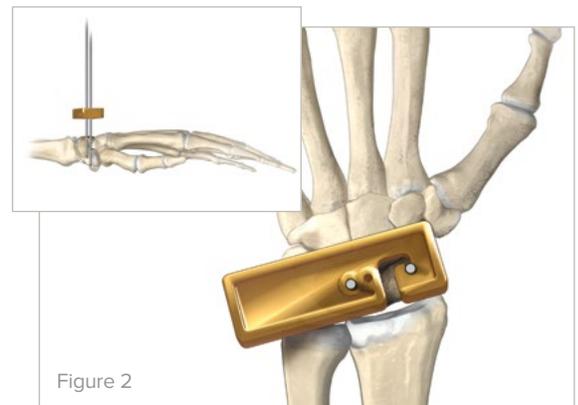


Figure 2

4 PREPARATION AND GUIDE WIRE INTRODUCTION

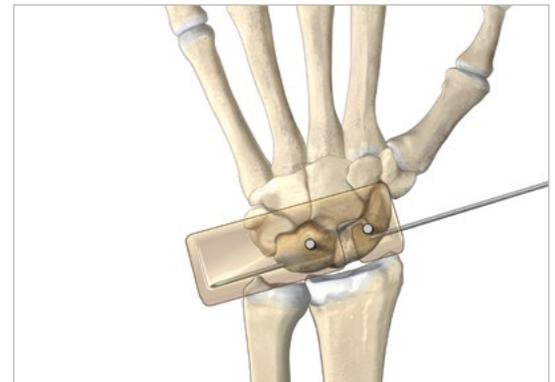
The starting point for the 0.045" Guide Wire that will be used in conjunction with the SLIC Screw is on the scaphoid, just distal to the tip of the radial styloid, located under fluoroscopic guidance. Incise the skin, and then proceed with blunt dissection down to the level of the capsule. The soft tissue protector is inserted to the level of the scaphoid. A minimal radial styloidectomy may be used to access the scaphoid as an option.

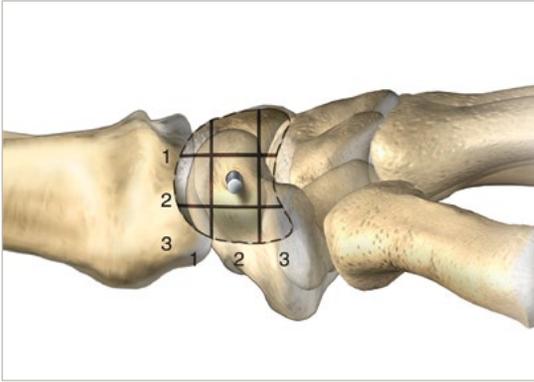
Line up the 0.045" Guide Wire in the scaphoid (posterior-anterior {PA} and lateral view) prior to piercing the scaphoid with the 0.045" Guide Wire. The 0.045" Guide Wire is drilled into the scaphoid and directed toward the most ulnar proximal corner of the lunate under fluoroscopic guidance. Continue advancing the 0.045" Guide Wire until it reaches the ulnar cortex of the lunate.

Tip: Blunt dissection decreases risk of injury to neurovascular structures.

Tip: The 0.045" Guide Wire should be advanced in oscillation mode to decrease risk of injury to the neurovascular structures.

Tip: The 0.045" Guide Wire should be advanced out the ulnar side of the wrist.

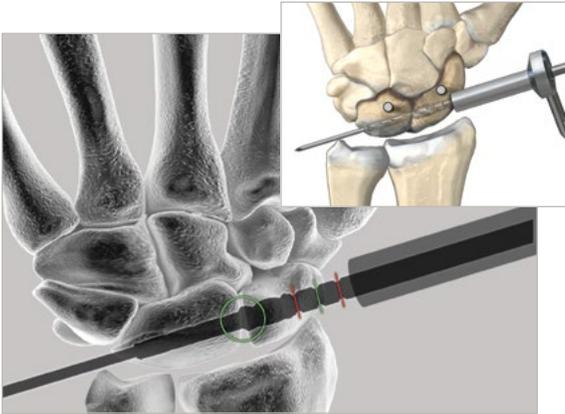




5 CONFIRMATION OF GUIDE WIRE POSITION

Confirm the orientation of the 0.045" Guide Wire in both the PA and lateral views. Make sure the 0.045" Guide Wire is centered in the scaphoid and lunate as seen in the lateral view or just volar of the midline. The correct location in the lateral view will be centered in the middle third of the lunate. Advance the guide wire across the wrist and out through the skin ulnarly. A second guide wire may be placed across the scaphoid and lunate to control rotation as the interval is drilled.

Tip: To ensure precise placement, on the lateral view line up the view so that the 0.045" Guide Wire appears as a point or a short line in the radiograph.



6 DRILL THE SCAPHOID AND LUNATE

The SLIC Screw Stepped Drill is introduced through the Soft Tissue Protector (80-0848) and over the 0.045" Guide Wire down to the scaphoid and into the lunate, checking its position frequently under fluoroscopy. Continue advancing the Stepped Drill until the step of the Stepped Drill reaches the junction of the SL interval as viewed under fluoroscopy.

After the step of the Stepped Drill has reached the SL interval, count the number of grooves (behind the drill flutes) that are completely buried beneath the cortical rim of the scaphoid at the entry site. This is viewed on fluoroscopy and determines the maximum length SLIC Screw that can be inserted.

There are three grooves that correspond to the 22 mm, 25 mm, and 28 mm SLIC Screw lengths, with the leading groove corresponding to the 22 mm SLIC Screw (55-0011), the middle groove corresponding to the 25 mm SLIC Screw (55-0012) and the trailing groove corresponding to the 28 mm SLIC Screw (55-0013).

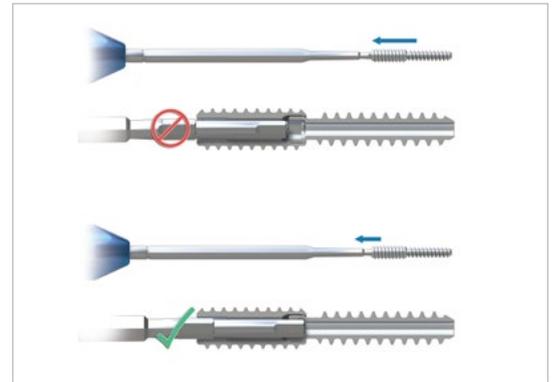
Tip: Do not over-drill the scaphoid portion of the drill into the lunate as this will reduce the SLIC Screw bone purchase in the lunate.

Tip: It is very important to keep the scapholunate interval compressed while drilling across the interval.

7 LOAD SLIC SCREW DEVICE ONTO DRIVER

Based on the grooves in Step 6, choose the maximum length SLIC Screw that will fully seat beneath the cortical rim of the scaphoid. This will allow for easier SLIC Screw removal after biological healing. Load the chosen SLIC Screw onto the appropriate SLIC Screw Driver (80-1162, 80-1163, or 80-1164) for that screw length, making sure the SLIC Screw Driver fully engages the distal portion of the screw. The distal portion of the screw should not rotate freely. Hold the distal portion of the screw on the SLIC Screw Driver as it is placed over the 0.045" Guide Wire and slide down into the Soft Tissue Protector Cannula.

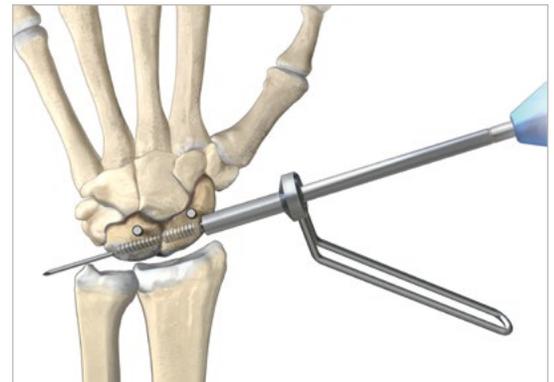
Note: If the driver tip is not fully engaged in both sections of the screw, the screw will not insert properly.



8 INSERT THE SLIC SCREW DEVICE

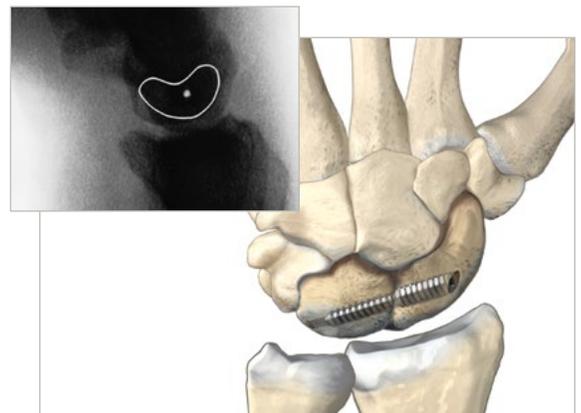
Slowly advance the SLIC Screw device into the scaphoid, always keeping a positive insertion pressure on the SLIC Screw Driver to keep it engaged in the distal screw. Check the position of the screw under fluoroscopy every few turns of the SLIC Screw Driver or as necessary. Continue advancing until the step in the screw reaches the SL interval. Placing the step of the screw at the SL interval will allow toggle between the scaphoid and lunate. The driver and 0.045" Guide Wire can then be removed.

Tip: It is very important to keep the scapholunate interval compressed while advancing the SLIC Screw device across the interval.



9 FINAL CONFIRMATION

Confirm the repair in both the PA and lateral views. Passive range of motion testing can be performed.



10 POST-OPERATIVE PROTOCOL

Acumed recommends the post-operative protocol below, which may be followed based on the surgeon's preference. Following open repair of the scapholunate interosseous ligament and placement of the SLIC Screw across the scapholunate interval, a cast is applied for approximately four weeks, and followed by a removable splint for an additional two weeks. Digital range of motion is started immediately. Range of motion exercises are started at six weeks and a strengthening program initiated at 12 weeks.

REMOVAL WITH DRIVER

Screw removal is recommended at 6–9 months or after biological healing of soft tissue has occurred. After incising and dissecting down to the scaphoid per Step 2, re-insert the 0.045" Guide Wire through the screw. Insert the appropriate size SLIC Screw Driver fully into the screw and back out the screw. Make sure you keep firm pressure on the SLIC Screw Driver during removal to ensure the SLIC Screw Driver is engaged in the distal portion of the screw.

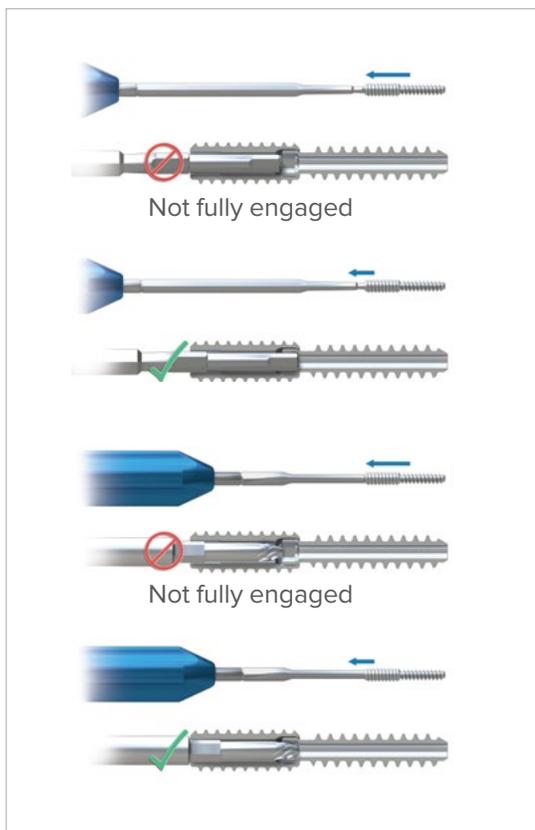
Note: If the 3.2 mm drill is utilized prior to K-wire insertion into the SLIC Screw, do not drill into the SLIC Screw implant. The drill is provided in the SLIC Screw Removal Tray to remove bony ongrowth based on the surgeon's preference.

Tip: Advance the 0.045" Guide Wire through the SLIC Screw and out the ulnar aspect of the wrist.

REMOVAL WITH EASYOUT

Screw removal is recommended at 6–9 months or after biological healing of soft tissue has occurred. If the appropriate size SLIC Screw Driver does not remove the SLIC Screw, choose the appropriate size SLIC Screw Easyout, based on which screw size was used. Make sure the hex is clear and insert the SLIC Screw Easyout fully into the screw by turning one full rotation counter-clockwise and back out the screw. Make sure you keep firm pressure on the SLIC Screw Easyout during removal to ensure the SLIC Screw Easyout is engaged in the lunate portion of the screw. If the Easyout is spinning, tap it with a mallet to move it further into the hex of both the lunate and scaphoid portions.

Note: If the 3.2 mm drill is utilized prior to the Easyout insertion into the SLIC Screw, do not drill into the SLIC screw implant. It is provided in the SLIC Screw Removal Tray to remove bony ongrowth based on the surgeon's preference.



Pre-Surgical Technique

SOFT TISSUE REPAIR

Prior to the preparation of guide wire insertion, please ensure that scapholunate (SL) soft tissue reconstruction has occurred. There are many different soft tissue procedures. Acumed does not recommend any one soft tissue repair technique but leaves it to the surgeon's discretion. Some examples of soft tissue procedures are: direct repair of SL ligament, reverse (modified Mayo) capsulodesis, burring scapholunate interval, extensor carpi radialis longus (ECRL) tendon transfer, dorsal (Blatt) capsulodesis, dorsal intercarpal ligament capsulodesis, and/or free ligament to SL.

Scapholunate Instability Device

Alternate SLIC Screw Surgical Technique

WILLIAM B. GEISLER, M.D.

1 PREP PACK

The SLIC Screw Prep Pack will be the first procedure pack used as it contains the SL Targeting Guide assembly, SLIC Screw Stepped Drill (80-0847), SLIC Screw Soft Tissue Protector (80-0848), Arthroscopic Probe (30100105), and 0.045" and 0.062" K-wires (80100100 or WS-1607ST) required to be used prior to the insertion of the SLIC Screw. From there, depending on the determined screw size in Step 6, choose the appropriate SLIC Screw Pack (ex. 22 mm, 25 mm, or 28 mm). Each SLIC Screw Pack includes the instrumentation specific to the screw size.

For this alternative technique, using 0.045" Double Trocar Guide Wires (WS-1106DT-S) are recommended. These are not included in the SLIC Screw Prep Pack.

Note: If it is desired to drill by hand, please contact your Acumed sales representative for a Quick Release Driver Handle (80100125, MS-1210, or MS-3200). This is not included in the SLIC Screw Prep Pack.

2 DISSECTION

A standard dorsal approach to the wrist is made in the mid line. Blunt dissection is carried down to the level of the fascia to protect the cutaneous nerves. The extensor pollicis longus is released through the third compartment, and the retinaculum through the second and fourth dorsal compartments is opened. The extensor tendons are then dissected medially and laterally, exposing the dorsal capsule. The dorsal capsule is then opened with a radial base flap, exposing the carpus.



3 GUIDE WIRE PREPARATION

Ideal positioning of the 0.045" Double Trocar Guide Wire (WS-1106DT-S) for the SLIC Screw is crucial. There are several alternative techniques available. Based on the surgeon's preference, place a 0.045" or 0.062" (1.14 mm or 1.57 mm) K-wire dorsally in the distal middle third of the lunate and scaphoid under fluoroscopy. Place the dorsal joystick K-wires distally in the carpal bones to avoid where the 0.045" Double Trocar Guide Wire will be later placed for the SLIC Screw.



Figure 1

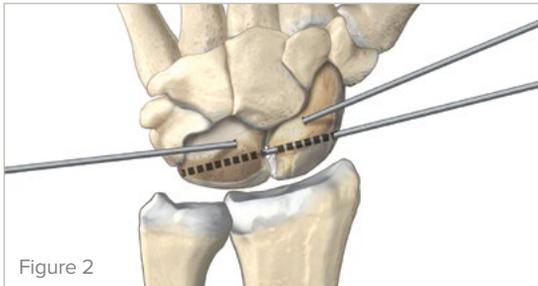


Figure 2



Figure 3



Figure 4

4 REDUCTION AND GUIDE WIRE INTRODUCTION

FIRST ALTERNATIVE TECHNIQUE

The starting point for the 0.045" Double Trocar Guide Wire will be directly into the center of the articulation of the scaphoid to the lunate in the gap between the two bones at the scapholunate interval (Figure 1). The 0.045" Double Trocar Guide Wire is aimed radially through the scaphoid in an oscillation mode to exit the skin on the radial aspect of the wrist (Figure 2).

After confirming the lateral central middle third 0.045" Double Trocar Guide Wire placement in the scaphoid under fluoroscopy, use both dorsal K-wires as joysticks with either the supplied SL Targeting Guide Joystick Clip (80-1057) or a pair of Kocher's clamps to reduce the SL interval and rotate the scaphoid and lunate into their normal position (Figure 3). The 0.045" Double Trocar Guide Wire is then advanced through the lunate, aiming at the proximal ulnar corner under oscillation mode. The wire is then advanced out the skin ulnarly under oscillation mode (Figure 4).

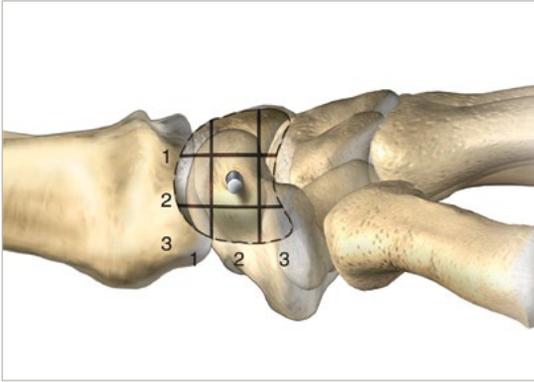
Tip: If using sutures for direct repair of the SL ligament, the sutures are placed, the SL interval is reduced and pinned, and the sutures tied.

SECOND ALTERNATIVE TECHNIQUE

When the scapholunate instability is percutaneously managed by an acute partial tear, an alternative technique is to place the 0.045" Guide Wire (80100100) from the ulnar aspect of the wrist. In this manner, the 0.045" guide wire for the SLIC Screw is started on the proximal ulnar corner of the lunate. The Soft Tissue Protector (80-0848) is inserted to the level of the lunate. The guide wire is placed just distal to the ulnar head located under fluoroscopic guidance (Figure 1). In oscillation mode, the guide wire is then advanced across the scapholunate interval in order to protect the dorsal sensory branch of the ulnar nerve. The guide wire should be aimed so that it will pass just distal to the tip of the radial styloid (Figure 2). The guide wire is advanced out the radial side of the wrist in oscillation mode (Figure 3).

Tip: Blunt dissection decreases the risk of injury to neurovascular structures.

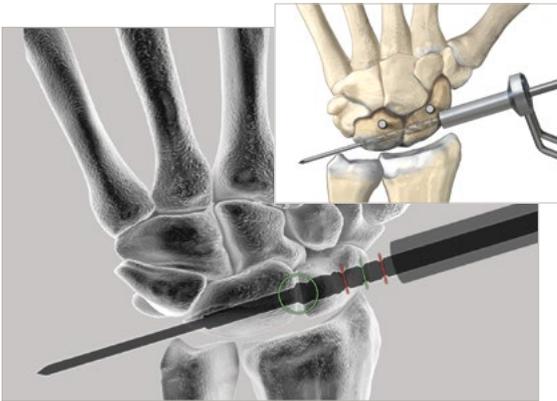




5 CONFIRMATION OF GUIDE WIRE POSITION

Confirm the orientation of the 0.045" Guide Wire in both the posterior-anterior (PA) and lateral views. It is imperative that the 0.045" inch guide wire is centered between the articulation of the scapholunate in the PA view as well in the lateral plane. In the lateral view, the guide wire should be centered in the middle third of the scapholunate or just volar to the mid line.

Tip: To ensure precise placement, on the lateral view line up the view so that the 0.045" Guide Wire appears as a point or a short line in the radiograph.



6 DRILL THE SCAPHOID AND LUNATE

The SLIC Screw Stepped Drill is introduced through the soft tissue protector and over the 0.045" Guide Wire down to the scaphoid and into the lunate, checking its position frequently under fluoroscopy. Continue advancing the Stepped Drill until the step of the Stepped Drill reaches the junction of the SL interval as viewed under fluoroscopy. After the step of the Stepped Drill has reached the SL interval, count the number of grooves (behind the drill flutes) that are completely buried beneath the cortical rim of the scaphoid at the entry site. This is viewed on fluoroscopy and determines the maximum length SLIC Screw that can be inserted. There are three grooves that correspond to the 22 mm, 25 mm, and 28 mm SLIC Screw lengths, with the leading groove corresponding to the 22 mm SLIC Screw (55-0011), the middle groove corresponding to the 25 mm SLIC Screw (55-0012), and the trailing groove corresponding to the 28 mm SLIC Screw (55-0013).

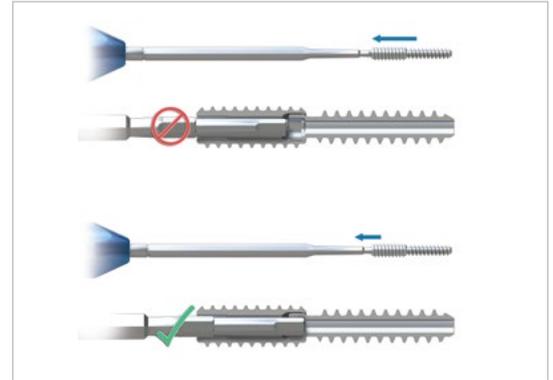
Tip: Do not over-drill the scaphoid portion of the drill into the lunate as this will reduce the SLIC Screw bone purchase in the lunate.

Tip: It is very important to keep the scapholunate interval compressed while drilling across the interval.

7 LOAD SLIC SCREW DEVICE ONTO DRIVER

Based on the grooves in Step 6, choose the maximum length SLIC Screw that will fully seat beneath the cortical rim of the scaphoid. This will allow for easier SLIC Screw removal after biological healing. Load the chosen SLIC Screw onto the appropriate SLIC Screw Driver (80-1162, 80-1163, or 80-1164) for that screw length, making sure the SLIC Screw Driver fully engages the distal portion of the screw. The distal portion of the screw should not rotate freely. Hold the distal portion of the screw on the SLIC Screw Driver as it is placed over the 0.045" Guide Wire and slide down into the Soft Tissue Protector Cannula.

Note: If the driver tip is not fully engaged in both sections of the screw, the screw will not insert properly.



8 INSERT THE SLIC SCREW DEVICE

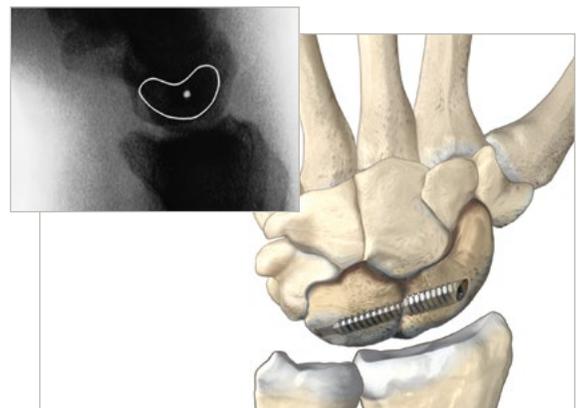
Slowly advance the SLIC Screw device into the scaphoid, always keeping a positive insertion pressure on the SLIC Screw Driver to keep it engaged in the distal screw. Check the position of the screw under fluoroscopy every few turns of the SLIC Screw Driver or as necessary. Continue advancing until the step in the screw reaches the SL interval. Placing the step of the screw at the SL interval will allow toggle between the scaphoid and lunate. The driver and 0.045" Guide Wire can then be removed.

Tip: It is very important to keep the scapholunate interval compressed while advancing the SLIC Screw device across the interval.



9 FINAL CONFIRMATION

Confirm the repair in both the PA and lateral views. Passive range of motion testing can be performed.



10 POST-OPERATIVE PROTOCOL

Acumed recommends the post operative protocol below, which may be followed based on the surgeon's preference. Following open repair of the scapholunate interosseous ligament and placement of the SLIC Screw across the scapholunate interval, a cast is applied for approximately four weeks, and followed by a removable splint for an additional two weeks. Digital range of motion is started immediately. Range of motion exercises are started at six weeks and a strengthening program initiated at 12 weeks.

REMOVAL WITH DRIVER

Screw removal is recommended at 6–9 months or after biological healing of soft tissue has occurred. After incising and dissecting down to the scaphoid per Step 2, re-insert the 0.045" Guide Wire through the screw. Insert the appropriately sized SLIC Screw Driver fully into the screw and back out the screw. Make sure you keep firm pressure on the SLIC Screw Driver during removal to ensure the SLIC Screw Driver is engaged in the distal portion of the screw.

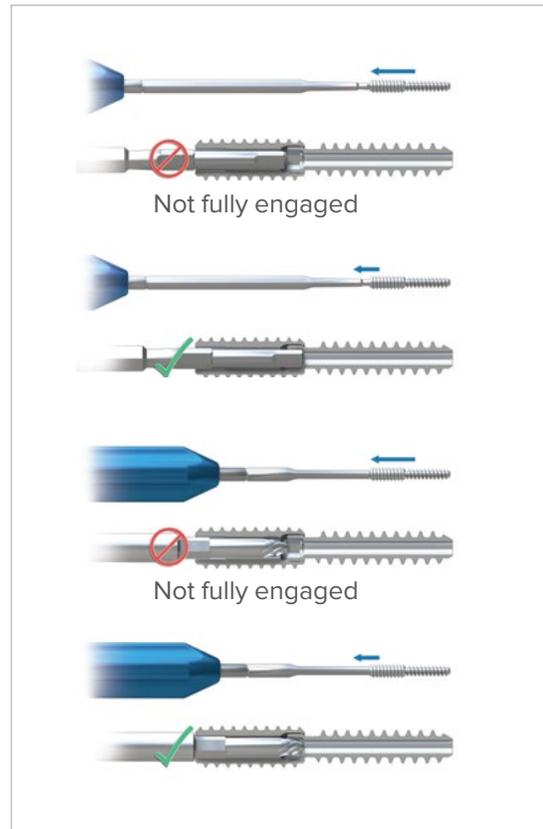
Note: If the 3.2 mm drill is utilized prior to K-wire insertion into the SLIC Screw, do not drill into the SLIC Screw implant. The drill is provided in the SLIC Screw Removal Tray to remove bony ongrowth based on the surgeon's preference.

Tip: Advance the 0.045" Guide Wire through the SLIC Screw and out the ulnar aspect of the wrist.

REMOVAL WITH EASYOUT

Screw removal is recommended at 6–9 months or after biological healing of soft tissue has occurred. If the appropriate size SLIC Screw Driver does not remove the SLIC Screw, choose the appropriate size SLIC Screw Easyout based on which screw size was used. Make sure the hex is clear and insert the SLIC Screw Easyout fully into the screw by turning one full rotation counter-clockwise and back out the screw. Make sure you keep firm pressure on the SLIC Screw Easyout during removal to ensure the SLIC Screw Easyout is engaged in the lunate portion of the screw. If the easyout is spinning, tap it with a mallet to move it further into the hex of both the lunate and scaphoid portions.

Note: If the 3.2 mm drill is utilized prior to the Easyout insertion into the SLIC Screw, do not drill into the SLIC screw implant. It is provided in the SLIC Screw Removal Tray to remove bony ongrowth based on the surgeon's preference.



Ordering Information

SLIC Screw® Prep Pack—Sterile

SLIC Screw Prep Pack	46-0004-S
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SLIC Screw® Procedure Packs—Sterile

22 mm SLIC Screw Pack	46-0005-S
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25 mm SLIC Screw Pack	46-0006-S
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28 mm SLIC Screw Pack	46-0007-S
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Optional Part—Sterile

0.045" Double Trocar Guide Wire	WS-1106DT-S
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Removal Tray—Nonsterile

SLIC Screw Removal Tray Base	80-2249
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SLIC Screw Removal Tray Lid	80-2250
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SLIC Screw 22 mm Easyout	80-1011
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SLIC Screw 25 mm Easyout	80-1012
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SLIC Screw 28 mm Easyout	80-1013
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SLIC Screw 22 mm Driver	80-0844
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SLIC Screw 25 mm Driver	80-0845
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SLIC Screw 28 mm Driver	80-0846
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3.2 mm Drill	MS-DCSB32
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SLIC Screw Soft Tissue Protector	80-0848
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0.045" x 6" ST Guide Wire	80100100
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Quick Release Driver Handle	80100125
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Arthroscopic Probe	30100105
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The Acumed® SLIC Screw® System can be used with the following Acumed systems for the additional instrumentation not included in the sterile procedure packs: Acu-Loc® 2 System, Elbow Plating System, and Innovative Solutions Shoulder Universal System. To order, contact your local Acumed sales representative.

To learn more about the full line of Acumed innovative surgical solutions, please contact your local Acumed sales representative, call 888.627.9957, or visit acumed.net.



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