

*Arthroscopic
Trans-Osseous
Knot-less
Shoulder Anchor*



Signature
ORTHOPAEDICS

ATOK – Arthroscopic Trans-Osseous Knotless Shoulder Anchor

Introduction

The Signature Orthopaedics ATOK anchor is designed to perform a transosseous rotator cuff repair, using a knot-less arthroscopic approach.

The traditional technique to repair a disrupted rotator cuff was via an open surgical approach, securing the disrupted rotator cuff tendon margin using sutures, and then passing those sutures through bone tunnels to be tied over the lateral humeral cortex.

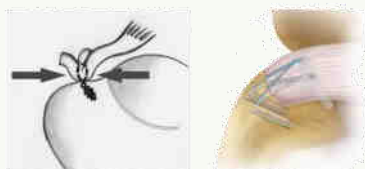
Open trans-osseous



This produces a reliable repair, but with the morbidity and compromised access inherent in the open surgery.

The option to perform the repairs using an arthroscopic approach necessitated a change in the actual repair technique. This generally involves tying the tendon onto antegrade inserted anchors, or more recently with the TOE – Trans-Osseous Equivalent repairs.

Arthroscopic

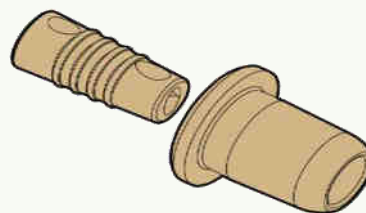


There are a number of compromises that have become apparent, including the challenges of intracorporeal knot tying, reduced tendon vascularity, reduced contact with the cancellous bone and sub-optimal anchor hold in osteoporotic bone.



By combining the advantages of an open transosseous approach (close approximation of the tendon to the cancellous bone and a strong hold on osteoporotic bone) with the benefits of

doing this arthroscopically, the **ATOK anchor** provides the optimal solution.



ATOK Technique Summary

1. Assess rotator cuff tear pattern, and decide on suture placement.
2. Mobilize and debride rotator cuff, and insert the initial repair suture (e.g. horizontal mattress, or Mason Allen).
3. Prepare footprint and create a shallow bony trench.
4. Pass relay suture using **ATOK Transosseous Guide**.
5. Advance repair suture through bone tunnel and out through lateral shoulder muscle and skin.
6. Place additional sutures in tendon and pass transosseously through additional tunnels using same approach.
7. Once all sutures are inserted, place the **ATOK Cannulated Rod** over suture pairs sequentially, passing through skin and muscle and into humeral head cancellous bone.
8. Slide **ATOK Anchor Hub** over **ATOK Cannulated Rod** and advance into lateral humeral cortex using **ATOK Hub insertion/ tensioning device**.
9. Remove guide rod and thread suture through **ATOK plug** and advance towards **ATOK Hub**.
10. Using **ATOK Hub insertion / tensioning device**, apply appropriate tension to suture and advance firmly into hub.
11. Lock plug using **ATOK plug pusher**.
12. Check tendon reduction and suture tension, and adjust as needed. Usually 2 ATOK Anchors are used.
13. If sutures have insufficient tension, reinsert **ATOK Hub insertion / tensioning device**, pull on sutures to loosen the plug, adjust suture tensions, and then re-engage plug.
14. If satisfied with tendon reduction, cut off sutures and repeat anchor insertion with other sutures.

Instrument List

ATOK™ Technique – Detailed Description

Equipment needed:

1. Sutures insertion equipment

1. **Appropriate sutures**
e.g. #2 braided polyester with polyethylene (UHMWPE) core.
2. **Third party suture passing device**
e.g.
 - a. Scorpion™
 - b. Bypass™



2 ATOK Hub and Locking Plug



ATOK Transosseous Guide and Drill
(with flexible clearing wire)

3. ATOK instruments

1. **ATOK Transosseous Guide
(Transosseous Guide plus Capture drill)**
 - to pass the relay suture through the transosseous tunnel.
2. **ATOK Hub inserter / tensioning device**
 - to advance the ATOK Hub into the lateral humeral cortical hole, plus apply tension on sutures to reduce tendon tear.
3. **Flexible Clearing Wire**
 - to clear bone from the end of T/O guide
4. **ATOK Cannulated rod**
 - To protect the sutures, and guide the ATOK Hub into the lateral cortical drill hole.
5. **Suture threader**
6. **Locking Plug pusher**



ATOK Hub inserter / tensioning device

4. Suture cutting device (third party device)

5. Sundry material

- a. Shuttle relay™ or #1 Nylon
- b. Arthroscopic portals

Detailed Surgical Technique

1. Patient Positioning

Place the patient in the beach chair or the lateral decubitus position with the shoulder well adducted.

2. Portal Placement

Portal placement is at the surgeon's discretion, but should be placed to allow optimum examination of the gleno-humeral joint and the subacromial space. Multiple portals may be required, particularly with a complex rotator cuff tear repair.

Although accessory portals are often required to "park" sutures during alternate repairs, when using the ATOK, the sutures can be passed through the definitive transosseous tunnels as they are inserted. This avoids the need to park, retrieve and then untangle previously inserted sutures.

3. Assess Rotator Cuff tear

The rotator cuff tear is mobilized, debrided and characterized. The tension on the repair is assessed, and the likely location of the relatively tension free repair is determined.

4. Suture Insertion

The sutures are inserted into the retracted margin of the disrupted rotator cuff using an appropriate suture passing device.

The suture morphology and bite style is at the surgeon's discretion, but the recommendation is a horizontal mattress with a minimum wide 1cm bite and about 2cm from the tear margin, or alternatively a Mason Allen suture grasp can be utilized.



5. Footprint Preparation

The rotator cuff footprint is defined and scarified. A shallow trench is created into the cancellous bone, at the planned location of tendon re-attachment.

6. Transosseous Suture Insertion

Sutures are passed transosseously as they are inserted, and “parked” in their definitive situation.

The **ATOK Transosseous guide** is inserted through the lateral portal, and the tip of the guide is advanced into the cancellous trench.



The **Capture Drill** is positioned over the skin of the lateral shoulder at an angle of approximately 45 degrees to the top of the shoulder. A stab incision is made in the skin to allow the **Capture Drill** to engage the lateral humeral cortex and create a drill hole in the lateral cortex.

The **Capture Drill** is then advanced into the humeral head to approximate the tip of the **ATOK Transosseous guide**.

7. Relay Suture Passage

The relay suture is then passed down the shaft of the **ATOK Transosseous guide**, and if positioned correctly, passes into the **Capture Drill**, to be retrieved laterally out through the lateral humeral cortex. Insertion of a flexible cleaning rod may be required to facilitate passage of the relay suture.



The **ATOK Transosseous** guide is then carefully removed, ensuring the relay suture remains in place.

The tendon repair sutures are then attached to the relay suture as appropriate, and passed transosseously to exit through the lateral shoulder muscle and skin.



Subsequent tendon repair sutures are inserted as required, and advance transosseously as above.

Once all sutures have been placed and taken transosseously, the ATOK anchors are inserted sequentially ensuring the rotator cuff tear is adequately reduced.

8. Insertion of Cannulated Rod and ATOK Hub

The ATOK Cannulated rod loaded with the ATOK Hub is passed over a set of sutures, and advanced through the lateral humeral hole, and into the cancellous bone.



9. ATOK Hub Insertion

The **ATOK Anchor Hub** is then slid down the cannulated rod, and using the **ATOK Hub Inserter/ tensioning device**, the ATOK Hub is advanced into the lateral humeral drill hole, impacting against the lateral cortex. A light hit with a hammer will ensure adequate seating of the **ATOK Hub**.





10. ATOK Locking Plug Insertion

The **ATOK Cannulated rod** is then withdrawn, and the sutures are threaded through the locking plug.

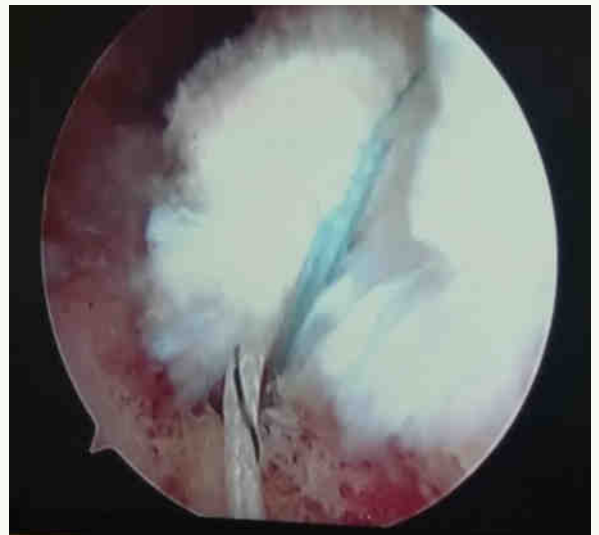
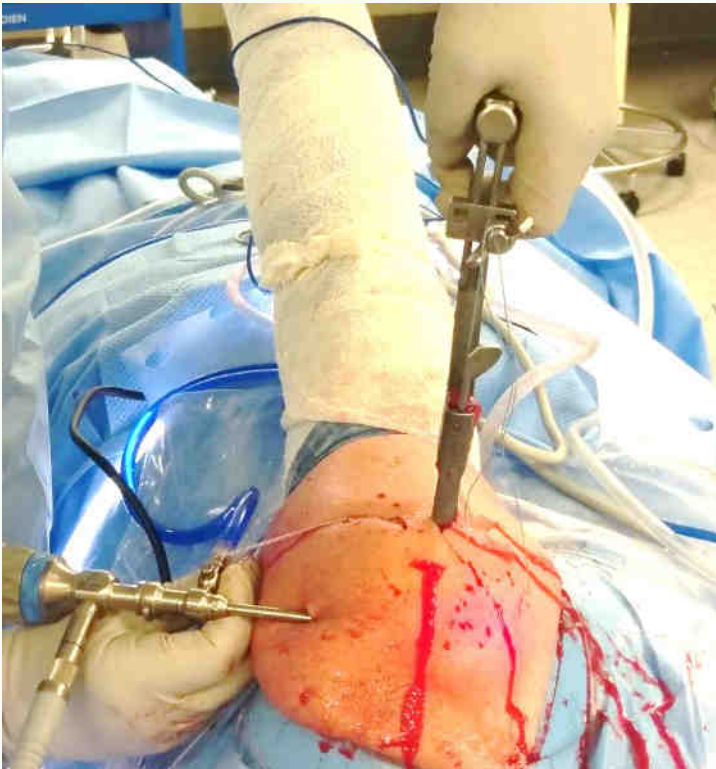


The locking plug is then advanced down the sutures and into the **ATOK Hub inserter / tensioning device** with the **ATOK locking plug pusher**, with moderate tension on the sutures to ensure the device remain lined up with the **ATOK Hub**.

The sutures are then attached to the locking wingnut on the **ATOK Hub inserter / tensioning device** and appropriate tension is applied to reduce the rotator cuff tear as planned. This is monitored by observing arthroscopically.

11. ATOK Locking Plug engagement

Once the appropriate tendon reduction has been confirmed, the **ATOK locking plug** is advanced using the **ATOK locking plug pusher** to lock the suture into the **ATOK Anchor**.

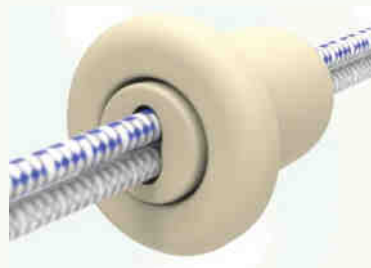


If the tension on the sutures is deemed to be too loose, reapply the **ATOK locking plug pusher** and apply sufficient tension with the **ATOK Hub inserter / tensioning device** to dis-engage the **ATOK Anchor Hub**. Tension is then applied to reduce the tendon repair and the **ATOK Locking Plug** is re-advanced using the **ATOK locking plug pusher**.

When the correct tension on the repair has been confirmed, the suture can then be cut off leaving a short length of suture lateral to the **ATOK anchor** using the **Suture cutting device**.

Subsequent sutures are secured using the same technique. Various combinations of suture configuration can be utilized at the surgeon's discretion.

Wounds are then closed with cutaneous sutures as appropriate. Post-operative immobilization is performed at the surgeon's discretion and protocol.



Additional Instruction

** Note – The optimum or most recent technique may vary from that shown in this guide as the instruments are progressively refined and improved. Prior to performing this technique, review the latest instruments and ensure you are familiar with the optimum surgical technique and the individual components and application — including indications, contraindications, warnings, cautions, and instructions.

Update are available at: www.signatureortho.com.au

Caution: Australian and U.S. Federal law restricts this device to sale by or on the order of a physician.

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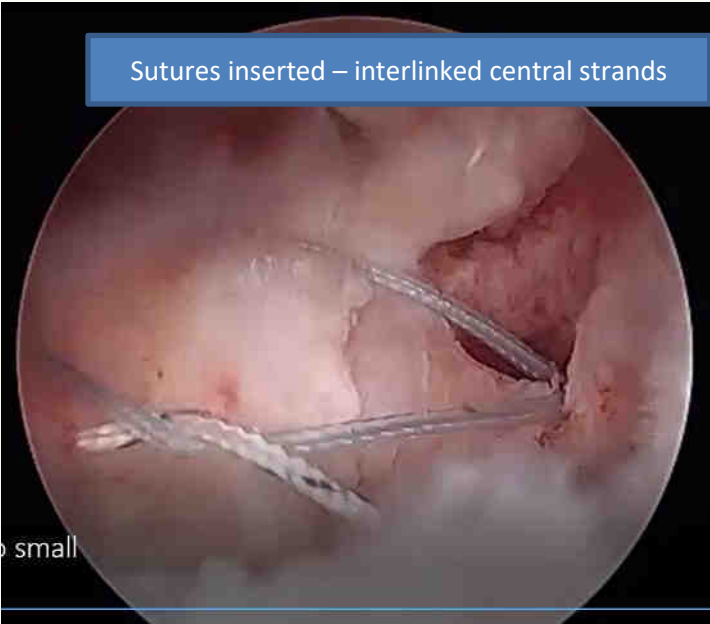
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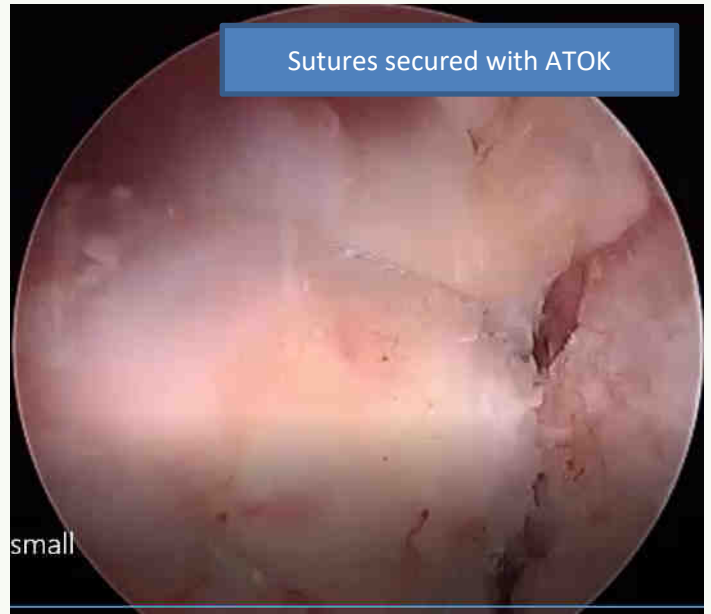
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Sutures inserted – interlinked central strands



Sutures secured with ATOK



ATOK – Arthroscopic Trans-Osseous Knotless Repair

