Arthroscopy: The Journal of Arthroscopic and Related Surgery

Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

--Manuscript Draft--

Manuscript Number:	ARTH-20-1185R1
Article Type:	Technical Note
Corresponding Author:	Alan Masaichi Hirahara, MD FRCSC Private Practice Sacramento, CA UNITED STATES
First Author:	Wyatt Andersen, MSHS, ATC
Order of Authors:	Wyatt Andersen, MSHS, ATC
	Matheus Barcelos, MD
	Maurício de Paiva Raffaelli, MD
	Alan M. Hirahara, MD, FRCSC
Abstract:	When the long head of the biceps tendon is diseased, tenodesis is an appropriate treatment strategy. The specific technique employed is dependent on visualization, fixation method and hardware, and tenodesis location. For suprapectoral tenodesis techniques, those that fix the tendon within or below the bicipital groove can be challenging due to the transverse humeral ligament covering the groove. To accurately identify the biceps tendon in this area, the ligament often requires resection. Ultrasound provides surgeons with a safe and non-invasive tool to visualize the biceps tendon as it exits the bicipital groove, negating the need for de-roofing and other pitfalls associated with traditional techniques. This Technical Note describes an ultrasound-guided suprapectoral biceps tenodesis procedure.

Separate Title Page

Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

Wyatt J. Andersen, MSHS, ATC[a], Matheus Barcelos, MD[b], Maurício de Paiva Raffaelli, MD[c], Alan M. Hirahara, MD, FRCSC[d]

a – First Author

2801 K St., #330, Sacramento, CA 95816, USA

Email: wyatt.andersen@yahoo.com

b – Second Author

Assistant Physician of the Internship in Shoulder and Elbow Surgery

Institute of the Shoulder and the Elbow, Núcleo Avançado de Estudos em Orthopedia e Neurocirurgia (NÆON)

Avenida Ibirapuera 2144, Indianópolis, São Paulo, Brazil 04029-000

Email: mtribeiro09@gmail.com

c – Third Author

Medical Director

Institute of the Shoulder and the Elbow, Núcleo Avançado de Estudos em Orthopedia e Neurocirurgia (NÆON)

Avenida Ibirapuera 2144, Indianópolis, São Paulo, Brazil 04029-000

Email: mauricioraffaelli@naeon.org.br

d – Fourth & Corresponding Author

Private Practice

2801 K St., #330, Sacramento, CA 95816, USA

Email: ahirahara@sacortho.net

Tel: +1-916-732-3000

Conflicts of Interest:

WJA has no conflicts or disclosures to report. MB has no conflicts or disclosures to report. MR has no conflicts or disclosures to report. AMH receives support from Arthrex Inc. as a consultant, royalties, and for research and from LifeNet Health Inc. as a consultant. AMH also has stock options in and serves as a medical advisor for Clarius Mobile Health.

Classifications: Level 1: Shoulder; Level 2: Proximal Biceps

Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

Abstract:

When the long head of the biceps tendon is diseased, tenodesis is an appropriate treatment strategy. The specific technique employed is dependent on visualization, fixation method and hardware, and tenodesis location. For suprapectoral tenodesis techniques, those that fix the tendon within or below the bicipital groove can be challenging due to the transverse humeral ligament covering the groove. To accurately identify the biceps tendon in this area, the ligament often requires resection. Ultrasound provides surgeons with a safe and non-invasive tool to visualize the biceps tendon as it exits the bicipital groove, negating the need for de-roofing and other pitfalls associated with traditional techniques. This Technical Note describes an ultrasound-guided suprapectoral biceps tenodesis procedure.

Introduction:

Numerous biceps tenodesis procedures have been described in the literature and can vary based on method of visualization, tenodesis location with respect to the bicipital groove and pectoralis major, and hardware.[1-4] Techniques that fix the long head of the biceps tendon (LHBT) at any position above the pectoralis major are typically performed arthroscopically while a subpectoral tenodesis is an open or mini-open procedure.[1-4] For arthroscopic procedures performed suprapectoral, exposing the location in or below the groove can be challenging. The tissue layer overlying the bicipital groove (transverse humeral ligament) makes exposure of the tendon within the groove the greatest challenge using arthroscopy. For a suprapectoral tenodesis, the surgeon must visualize the biceps tendon arthroscopically in the joint and tag the transverse humeral ligament at the top of the groove. In the subacromial space, this tag suture is used as the reference point to start unroofing the biceps, taking down the transverse humeral ligament and exposing the biceps within the groove.

Intraoperative use of ultrasound avoids these pitfalls. Ultrasound allows surgeons to accurately identify the LHBT as it exits the bicipital groove instead of going through the joint and de-roofing the tissue layer above the groove. Ultrasound is an inexpensive, non-irradiating, and non-invasive modality that can be easily used to visualize soft tissue structures in real-time. Presented is a Technical Note of a ~~novel,~~n ultrasound-guided suprapectoral tenodesis of the LHBT (Video 1, Table 1).

Surgical Technique:

The authors prefer to place the patient in a beach chair position, but the lateral decubitus position can also be used. A diagnostic arthroscopy is performed to evaluate the LHBT and other intra-articular pathologies (Figure 1). If a tenodesis is to be performed, the LHBT is tagged with a suture, using a 90° SutureLasso (Arthrex Inc., Naples FL) and a FiberStick (Arthrex Inc., Naples FL) (Figure 2). The suture is passed directly in front of the anterior cannula—this will act as a landmark when tensioning later in the procedure. The LHBT is then tenotomized (Figure 3). Other pathologies are addressed as needed.

A linear ultrasound probe (M-Turbo, FUJIFILM Sonosite, Inc., Bothell WA) is preferred for this procedure and is prepared by placing it in a sterile cover and using sterile ultrasound gel. With the probe in short axis to the LHBT, the bicipital groove is identified where the LHBT can be found resting (Figure 4A/B). With the groove in view, placement of the portals and tenodesis would be too proximal. The probe can be scanned distally to bring the pectoralis major into view as it crosses over the LHBT (Figure 5). This area is too distal for portal and tenodesis placement. The LHBT can be identified in short axis with the tendon centered in the image just as the tendon exits the distal end of the bicipital groove and still above the pectoralis major (Figure 6). With this area identified, the medial and lateral suprapectoral portals (SPM & SPL, respectively) are created approximately 1 centimeter medial and lateral to the center of the probe (Figure 7). Once the skin incisions are made, a closed, curved Kelly clamp is inserted into the portals; pushed down to bone; oriented toward the opposing portal; and then opened and spread to create a space to work under the deltoid and above the biceps tendon. This is done through both portals (Figure 8).

A 30° arthroscope is placed in the SPL portal and instrumentation is placed in the SPM portal. Instrumentation is specifically placed in the SPM portal and oriented lateral so as to avoid neurovascular complications of the medial structures of the proximal arm (axillary nerve, musculocutaneous nerve, or brachial artery) if the instrumentation were to pass point or plunge. Since the site of tenodesis is not within a contained cavity, the arthroscope is used with a pump (50 mmHg) to control bleeding. A shaver and ablation wand are used to clear the tissue between the deltoid and LHBT, as well as the deltoid and the anterior humerus stopping at the superior border of the pectoralis major. Care is taken as the ascending branch of the anterior humeral circumflex artery runs lateral to the biceps tendon and often needs to be cauterized. The ablation wand is used when cleaning the tissue around the biceps and anterior to the humerus in preparing the bone and tendon for tenodesis. The biceps tendon is mobilized medially and held to the side with an 18 gauge spinal needle (Figure 9). A 7.5 mm Pilot Headed Reamer (Arthrex Inc., Naples FL) is used to create a socket for the tenodesis below the groove and above the pectoralis major (Figure 10). The reamer should be angled perpendicular to the bone surface and along the course that the LHBT runs anatomically. As the biceps can potentially be subluxated medially, drilling a hole where the LHBT sits for a given patient may not represent the proper location for a tenodesis. The spinal needle is removed and the stay suture in the proximal biceps is pulled (Figure 11). The LHBT will return to its anatomic location just distal to the bicipital groove and will need to be tensioned appropriately. The stay suture should be pulled so that it reaches the anterior cannula where it was originally tagged to achieve proper tension and length; pulling the suture proximal to this landmark will cause over tensioning and anchoring the LHBT with the stay suture distal to the cannula will result in inadequate tension. A 7.0 x 19.5 mm Forked Tip BioComposite SwiveLock Tenodesis screw (Arthrex Inc., Naples FL) is used to fix the tendon

into the socket (Figure 12 & 13). One end of the stay suture is pulled to detach it from the proximal tendon, which will now be located in the groove, extra-articular. The residual tendon superior to the tenodesis can be left in place or resected as desired. This completes the ultrasound-guided suprapectoral biceps tenodesis (Figure 14).

Discussion:

Technical aspects of biceps tenodesis procedures can vary significantly based on attachment location, open versus arthroscopic visualization, and suture fixation methods ~~[ref]~~.[1-4] Tenodesis procedures can be broadly categorized into two main types: suprapectoral and subpectoral. The former can be further subcategorized depending on the location of the fixation with respect to the bicipital groove: above, within, or below the groove. The multitude of techniques have generally produced good to excellent clinical results,[5-7] and the specific technique employed largely depends on surgeon preference.

For arthroscopically performed suprapectoral tenodesis techniques, accurate visualization of the LHBT when fixing within or below the bicipital groove is a challenge. To see the LHBT properly, surgeons must resect the transverse humeral ligament that covers the bicipital groove. This deroofing procedure carries risk and can prove to be technically difficult. To combat this challenge, ultrasound is used to easily identify the LHBT as it exits the groove, negating the need for deroofing (Table 2).

Appropriate portal placement is an important factor for the safety of tenodesis procedures. Portals placed too superior or inferior to the site of tenodesis would require angulation of the

instrumentation. Particularly when drilling a socket, perpendicularity to the bone surface is imperative to prevent skiving or plunging. Ultrasound allows surgeons to intraoperative and non-invasively mark the appropriate portal locations to ensure instrumentation will be directed perpendicular to the bone surface which is unreliable when performed blindly.

When a biceps tenodesis is performed blindly with no way to visualize the LHBT prior to creating an incision, procedural risk is elevated when attempting to find the LHBT arthroscopically. In cases of a medially subluxated LHBT, locating the tendon can prove even more challenging. Surgeons must subsequently search through the tissue of the upper arm to find the LHBT. This creates the potential for medial or lateral plunging into the surrounding neurovascular structures like the musculocutaneous or axillary nerves, as well as the cephalic or brachial arteries and veins. Being able to quickly and easily identify the LHBT before creating incisions and inserting instrumentation helps to avoid these potential complications.

To combat the challenges associated with traditional suprapectoral LHBT tenodesis procedures, we developed the described ultrasound-guided technique. Use of ultrasound intraoperatively avoids unnecessary risks, can cut down on surgical time, and can limit potential iatrogenic damage. The benefits of this procedure make this the preferred technique for suprapectoral biceps tendon tenodesis.

References:

1. Forsythe B, Zuke WA, Puzzitiello RN, Romeo AA. Arthroscopic suprapectoral biceps tenodesis with tenodesis screw. *Arthrosc Tech.* 2018;7(5):e417-e422.
2. Gifford A, Tauro T, Haunschild E, Okoroha K, Cole BJ. Mini-open subpectoral biceps tenodesis using all-suture anchor. *Arthrosc Tech*. 2020;9(4):e445-e451.
3. Kim H, Lee K, Jang IT, Shin DC. Arthroscopic suprapectoral biceps tenodesis: the "double secure loop technique" using an all-suture anchor and an arthroscopic suture passer. *Arthrosc Tech*. 2019;8(12):e1511-e1515.
4. Lacheta L, Imhoff AB, Siebenlist S, Scheiderer B. Subpectoral biceps tenodesis: all-suture anchor onlay technique. *Arthrosc Tech.* 2020;9(5):e651-e655.
5. Gombera MM, Kahlenberg CA, Nair R, Saltzman MD, Terry MA. All-arthroscopic suprapectoral versus open subpectoral tenodesis of the long head of the biceps brachii. *Am J Sports Med*. 2015;43(5):1077-1083.
6. Green JM, Getelman MH, Snyder SJ, Burns JP. All-arthroscopic suprapectoral versus open subpectoral tenodesis of the long head of the biceps brachii without the use of interference screws. *Arthroscopy*. 2017;33(1):19-25.
7. Van Deurzen DFP, Gurnani N, Alta TDW, Willems JH, Onstenk R, van den Bekerom MPJ. Suprapectoral versus subpectoral tenodesis for long head biceps brachii tendinopathy: a systematic review and meta-analysis. *Orthop Traumatol Surg Res.* 2020;106(4):693-700.

Figure Legend:

Figure 1: Through an arthroscopic view via the posterior portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position, the long head of the biceps tendon can be seen. Tenodesis is indicated for this tendon as it is frayed and demonstrates obvious signs of disease.

Figure 2: Through an arthroscopic view via the posterior portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position, a 90° straight SutureLasso (Arthrex Inc., Naples FL) can be seen placed through the midsubstance of the long head of the biceps tendon (star). A FiberStick (Arthrex Inc.) is subsequently passed through the SutureLasso and is used to tag the proximal tendon. The tendon is tagged directly in front of the cannula, which will allow for the proper tensioning of the biceps when the tenodesis is fixed in place.

Figure 3: Through an arthroscopic view via the posterior portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position, the long head of the biceps tendon can be seen being tenotomized. The tenotomy is performed proximal to the tagged portion of the tendon at the insertion to the labrum (star).

Figure 4: (A) An external view of the linear ultrasound probe (M-Turbo, FUJIFILM Sonosite, Inc., Bothell WA) -placed on the anterior aspect of the right shoulder with the patient in a beach chair position, in short axis for the long head of the biceps tendon. The ultrasound is used to first

identify the bicipital groove, where the long head of the biceps rests. (B) An ultrasound image of the long head of the biceps tendon in short axis (star), resting in the bicipital groove. With the bicipital groove in view, placement of the portals and tenodesis in this location would be too proximal. The ultrasound probe can be scanned distally to identify the appropriate region for the suprapectoral tenodesis.

Figure 5: An ultrasound view of the long head of the biceps tendon in short axis (star) and resting on the humerus. The pec major can be seen to the right of and crossing over the biceps tendon. This area would be too distal for the placement of the portals and tenodesis.

Figure 6: An ultrasound view of the long head of the biceps tendon in short axis (star) and resting on the humerus. Neither the bicipital groove nor the pec major tendon can be seen in this view, indicating this location to be appropriate for portal placement and subsequent tenodesis.

Figure 7: An external view of the right shoulder in preparation for tenodesis with the patient in a beach chair position. The appropriate location for the portals and subsequent tenodesis have been identified using the linear ultrasound probe. Markings for portal placement (star) are made approximately 1 centimeter medial and lateral to the center of the probe when the biceps tendon is centered on the monitor. The markings denote the location of the medial and lateral suprapectoral portals.

Figure 8: An external view of the right shoulder with the patient in a beach chair position. The medial and lateral suprapectoral portals have been created based on the optimal location identified via ultrasound. In preparation for tenodesis, a closed, curved Kelly clamp is first inserted and pushed down to bone. The Kelly clamp is subsequently oriented towards the opposing portal, and then opened and spread to create a working space under the deltoid and above the biceps and humerus. The Kelly clamp is in the lateral suprapectoral portal in the image; however, this should be done through both portals.

Figure 9: An arthroscopic view through the lateral suprapectoral portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position. With tissue cleared and the bone bed prepared (star), the long head of the biceps tendon is mobilized and held medially using an 18 gauge spinal needle, placed percutaneously superior to the medial suprapectoral portal.

Figure 10: An arthroscopic view through the lateral suprapectoral portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position. The long head of the biceps tendon has been mobilized medially and held in place with an 18 gauge spinal needle. Through the medial suprapectoral portal, a 7.5 millimeter Pilot Headed Reamer (Arthrex Inc., Naples FL) is angled perpendicular to the bone surface and used to drill a socket into the anterior humerus at the location identified and prepared for tenodesis (star). This location should be along the anatomic course of the long head of the biceps tendon, be distal to the bicipital groove, and remain above the pectoralis major.

Figure 11: An arthroscopic view through the lateral suprapectoral portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position. With the socket created (star), the spinal needle can be removed, and the original stay suture can be pulled. The stay suture should be pulled so that it reaches the anterior cannula where the tendon was originally tagged. These two acts return the biceps to its normal position and sets the biceps tendon and muscle to the appropriate tension and length.

Figure 12: An arthroscopic view through the lateral suprapectoral portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position. Through the medial suprapectoral portal, the Forked Tip BioComposite SwiveLock Tenodesis screw (Arthrex Inc., Naples FL) is used to capture and set the biceps tendon into the socket.

Figure 13: An arthroscopic view through the lateral suprapectoral portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position. Through the medial suprapectoral portal, the 7.0 millimeter Forked Tip BioComposite ~~SwiveLock~~ Tenodesis screw (Arthrex Inc., Naples FL) can be seen securing the biceps tendon into the socket.

Figure 14: An arthroscopic view through the lateral suprapectoral portal of the right shoulder using a 30° arthroscope with the patient in a beach chair position. The 7.0 millimeter Forked Tip BioComposite ~~SwiveLock~~ Tenodesis screw (Arthrex Inc., Naples FL) can be seen secured in place and flush with the humerus. The stay suture is removed from the proximal tendon. The

227 residual tendon superior to the screw may be left in place or resected as desired. This completes
228 the ultrasound-guided suprapectoral biceps tenodesis procedure.
229

230 Tables

231 Table 1. Pearls & Pitfalls

Pearls	Pitfalls
Use ultrasound to find distal edge of bicipital groove and superior border of pectoralis major to identify safe and appropriate location for tenodesis.	Without ultrasound, medially plunging may damage the neurovascular structures adjacent.
Place 18-gauge spinal needle percutaneously and superior to medial suprapectoral portal to hold and protect the biceps tendon to the side while drilling.	Without ultrasound, the musculocutaneous nerve may be mistaken for a medially subluxated LHBT and tenodesed inappropriately.
Place instrumentation through medial suprapectoral portal and arthroscope through lateral suprapectoral portal.	Placing instrumentation through lateral suprapectoral portal risks significant complications if instrumentation were to pass point or plunge medially.
Pull tagged end of LHBT to anterior cannula where originally tagged to set tension and length.	Under or over pulling tagged end of LHBT can cause a length-tension mismatch for tendon and muscle.

232

233 LHBT, Long head of biceps tendon

234

235 Table 2. Advantages & Limitations

Advantages	Limitations
Use of ultrasound intraoperatively allows for accurate, non-invasive identification of LHBT as it exits bicipital groove.	Ultrasound requires some proficiency.
Ultrasound avoids need to resect transverse humeral ligament.	If LHBT is significantly frayed or compromised, the tendon may not be able to hold suture tag.
Ultrasound can quickly identify a medially subluxated LHBT, reducing operative time.	
Using anterior cannula as reference point for suture tagging of LHBT enables easy and correct tensioning of tendon and muscle.	

236

237 LHBT, Long head of biceps tendon

Video Legend:

The long head of the biceps tendon is arthroscopically evaluated to determine the need for tenodesis. If tenodesis is to be performed, the tendon is first tagged with a suture. A 90 degree SutureLasso is placed through the midsubstance of the tendon and a FiberStick is passed. The tendon is tagged directly in front of the cannula to facilitate proper tensioning of the biceps during fixation. Once tagged, the biceps tendon is tenotomized. A linear ultrasound probe is used to identify the biceps tendon in short axis and its location with respect to the bicipital groove and pec major. Starting proximal, we can see the biceps tendon seated in the bicipital groove. As the transducer is moved distally, the groove disappears. Continuing distal with the probe, the pec major comes into view superficial to the biceps tendon. Returning proximally the bicipital groove reappears. The location for the portals and subsequent tenodesis is below the groove and above the pec major. The portals are made approximately 1 centimeter medial and lateral to the center of the probe, which is centered over the biceps tendon. The probe can be reapplied to ensure the markings are in the correct position. With the medial and lateral suprapec portals created, a closed, curved Kelly clamp is inserted, pushed down to bone, oriented towards the opposing portal, and then opened and spread to create a working space under the deltoid and above the biceps tendon. This is done through both portals. A shaver and ablation wand can be used to clear tissue for better visualization—caution should be exercised for two arteries. The anterior circumflex artery that runs along the superior border of the pec should be avoided, and the ascending branch of this artery that rises lateral to the biceps should be addressed as it often requires cauterization. The biceps tendon is mobilized medially and held to the side with a spinal needle. A 7.5 millimeter Pilot Headed Reamer angled perpendicular to the bone surface is used to create a socket along the anatomic course of the biceps and distal to the groove but above the

pec major. The spinal needle is removed, and the original stay suture is pulled so it matches up to the anterior cannula where the tendon was originally tagged. This returns the biceps to the normal position and sets the tendon and muscle to the appropriate tension and length. A 7.0 millimeter Forked Tip BioComposite SwiveLock Tenodesis screw is used to fix the tendon into the socket. The stay suture can be removed from the proximal tendon, and the anchor can be seen flush with the humerus completing the ultrasound-guided suprapec biceps tenodesis procedure.

Figure 1 - Arthroscope - Diseased Biceps Tendon

Click here to access/download;Figure(s) in separate file(s);Figure 1 - Arthroscope - Diseased Biceps Tendon.tif

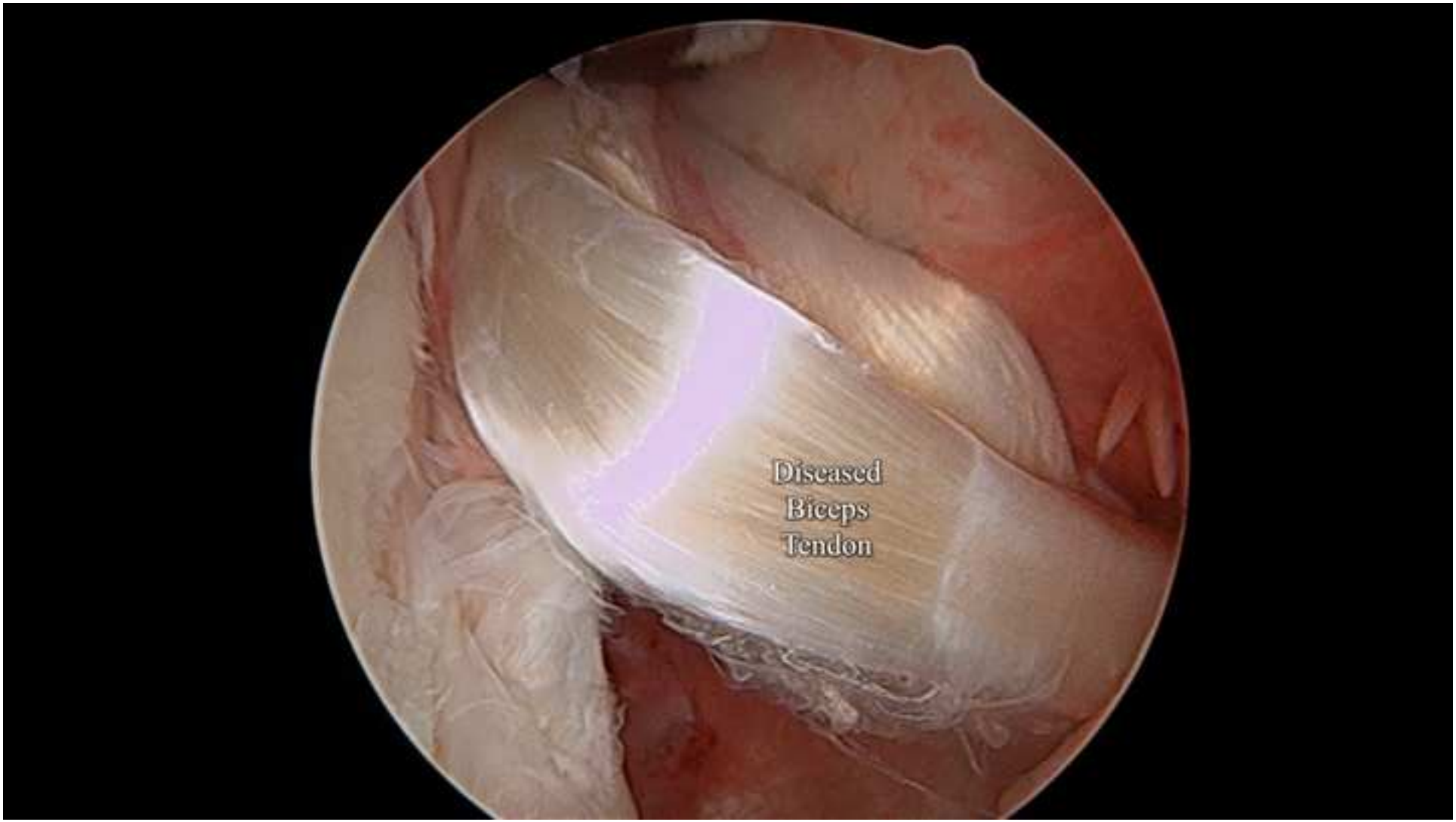


Figure 2 - Arthroscope - SutureLasso and FiberStick

Click here to access/download;Figure(s) in separate file(s);Figure 2 - Arthroscope - SutureLasso and FiberStick.tif

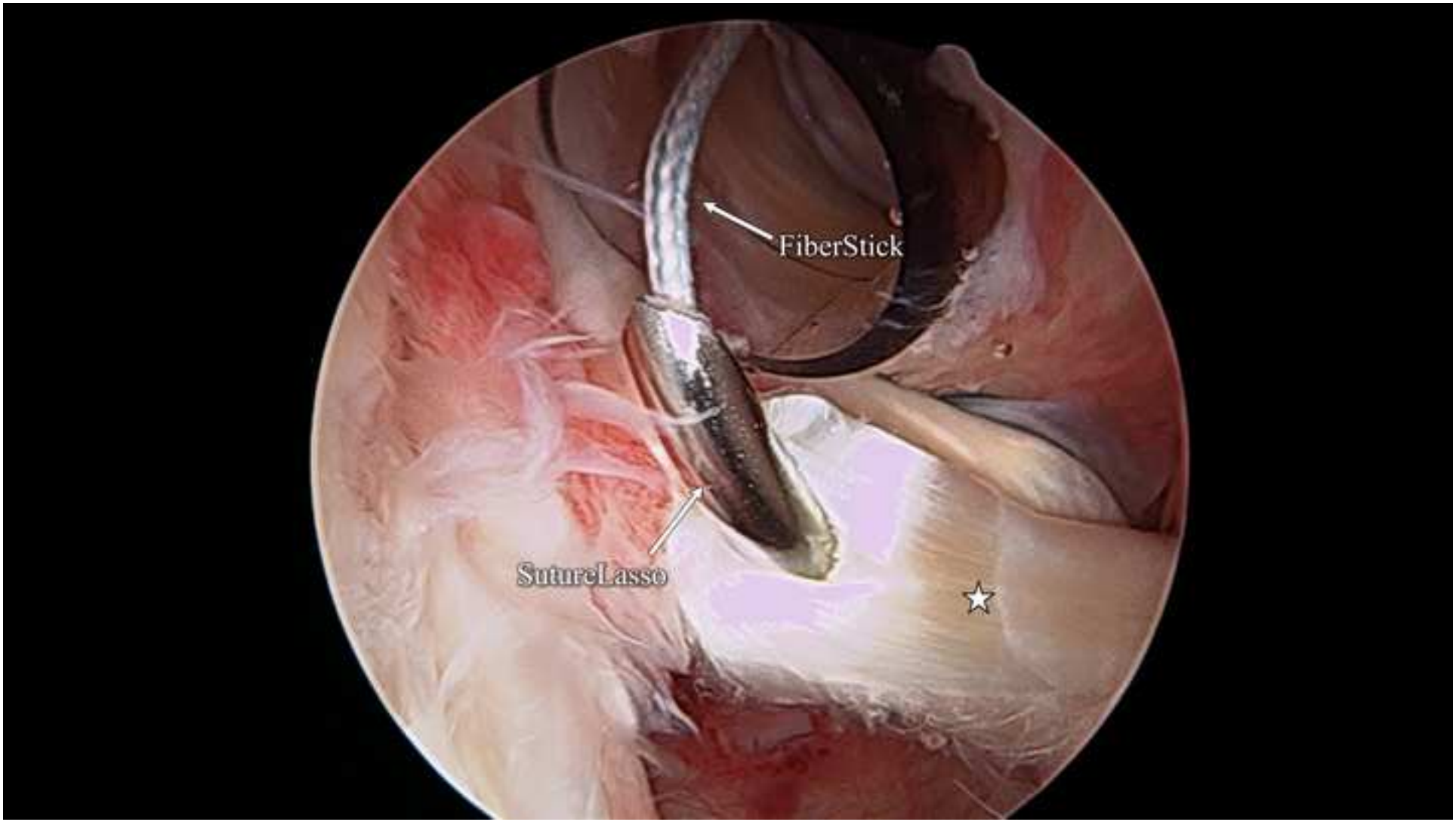


Figure 3 - Arthroscope - Tenotomized Tendon

Click here to access/download;Figure(s) in separate file(s);Figure 3 - Arthroscope - Tenotomized Tendon.tif

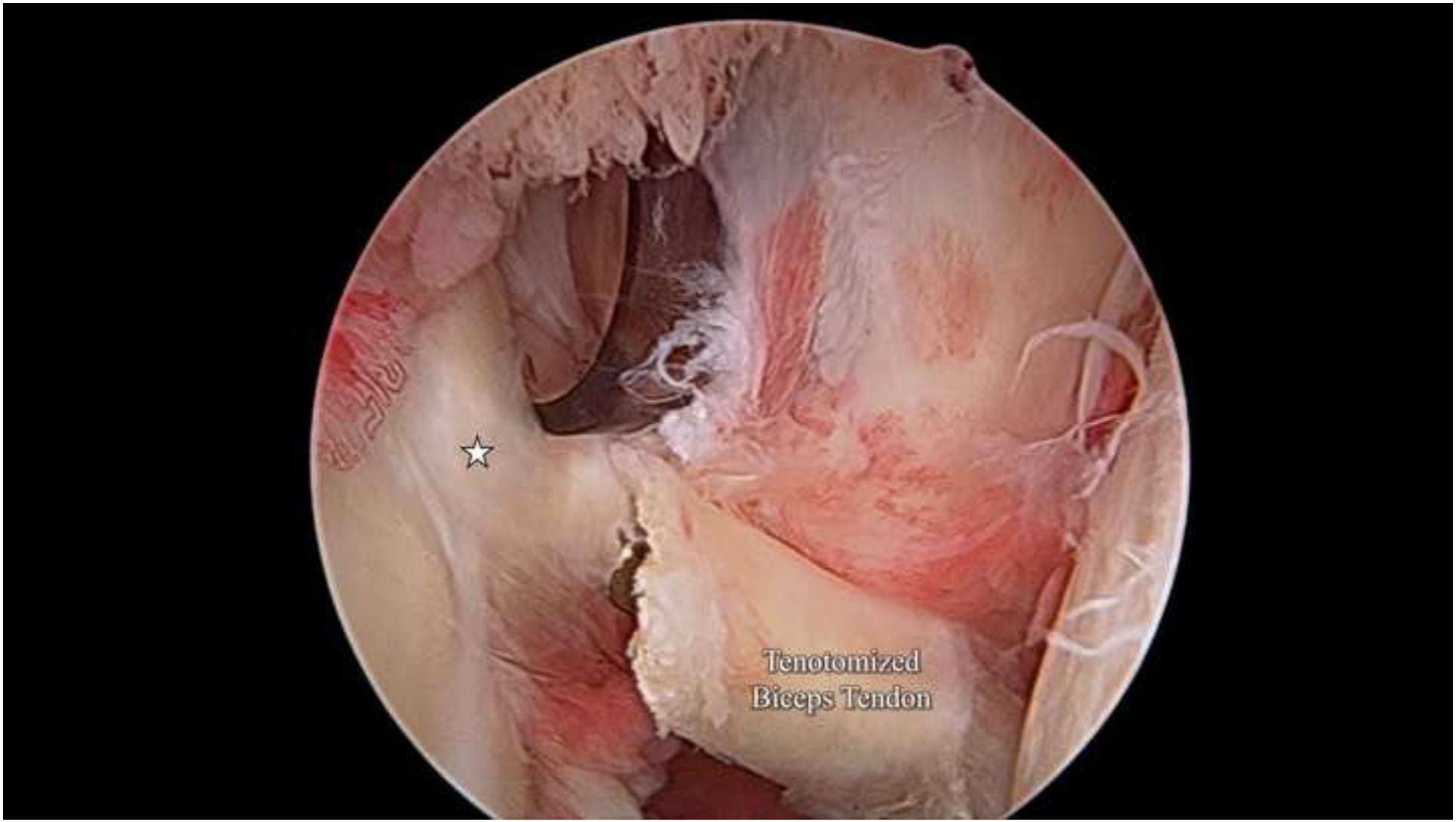


Figure 4A - External - Ultrasound Starting Point

Click here to access/download;Figure(s) in separate file(s);Figure 4A - External - Ultrasound Starting Point.tif

Figure 4B - Ultrasound - LHBT and Groove

Click here to access/download;Figure(s) in separate file(s);Figure 4B - Ultrasound - LHBT and Groove.tif

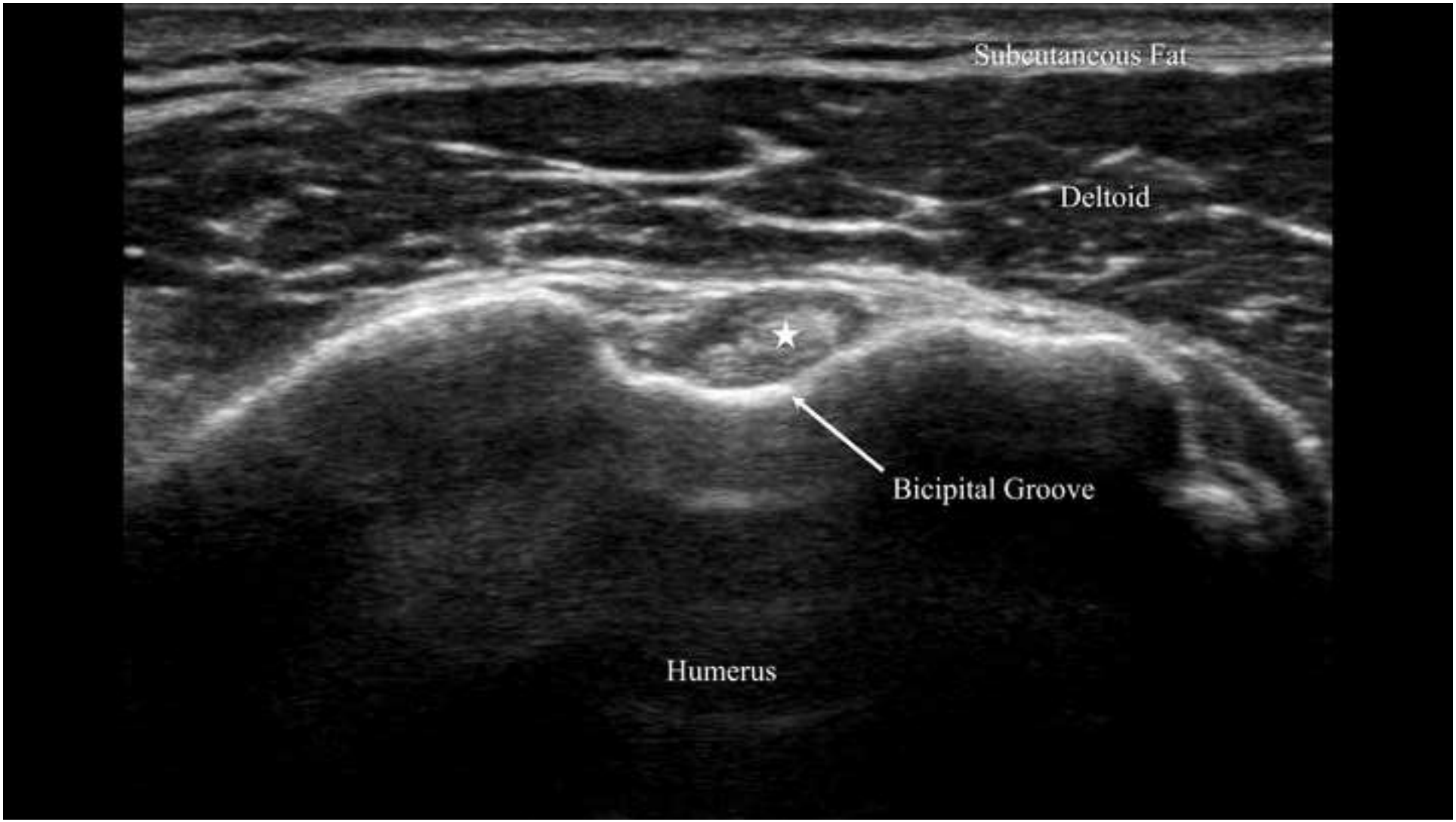


Figure 5 - Ultrasound - LHBT and Pec Major

Click here to access/download;Figure(s) in separate file(s);Figure 5 - Ultrasound - LHBT and Pec Major.tif

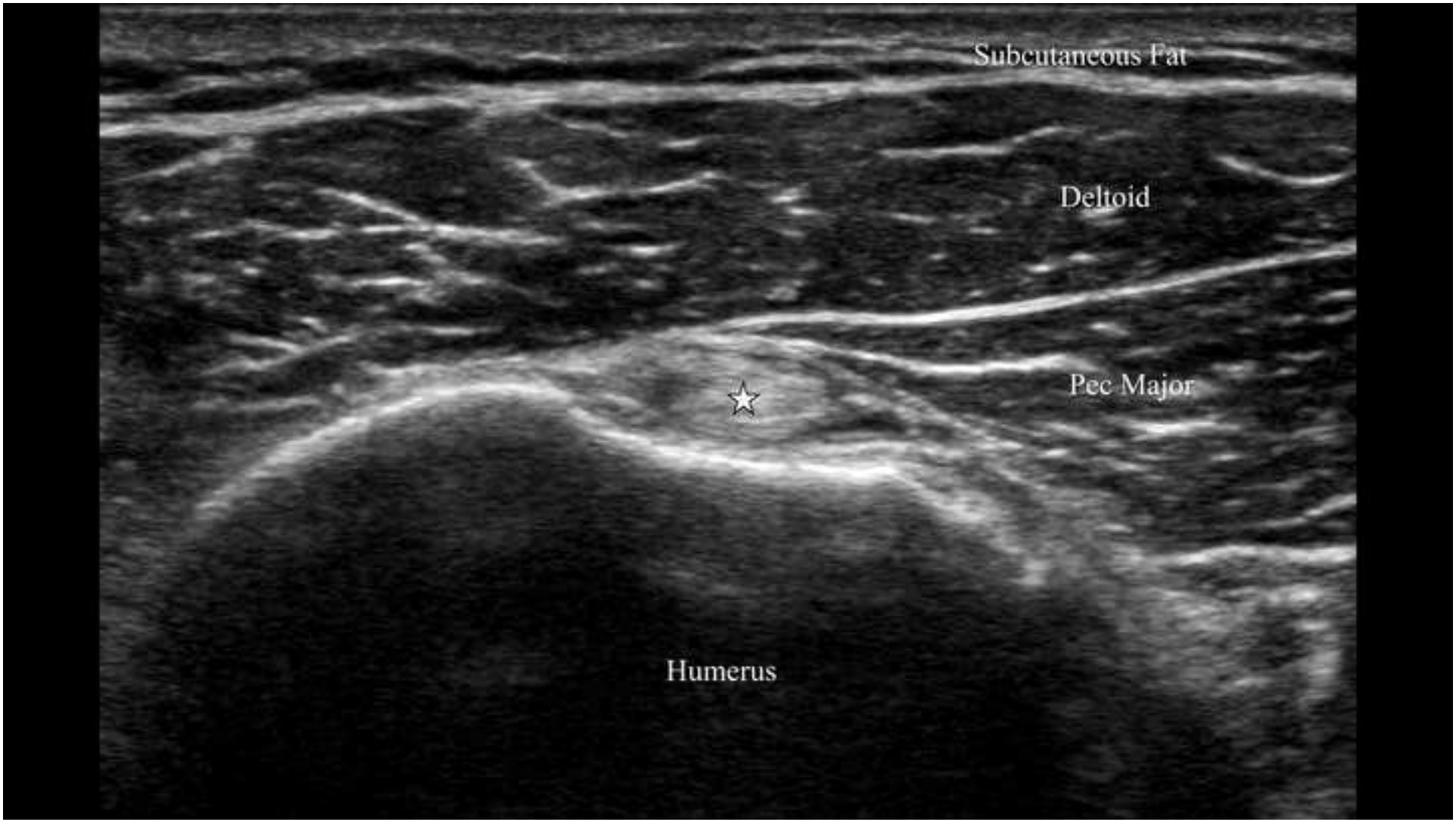


Figure 6 - Ultrasound - LHBT and No Groove

Click here to access/download;Figure(s) in separate file(s);Figure 6 - Ultrasound - LHBT and No Groove.tif

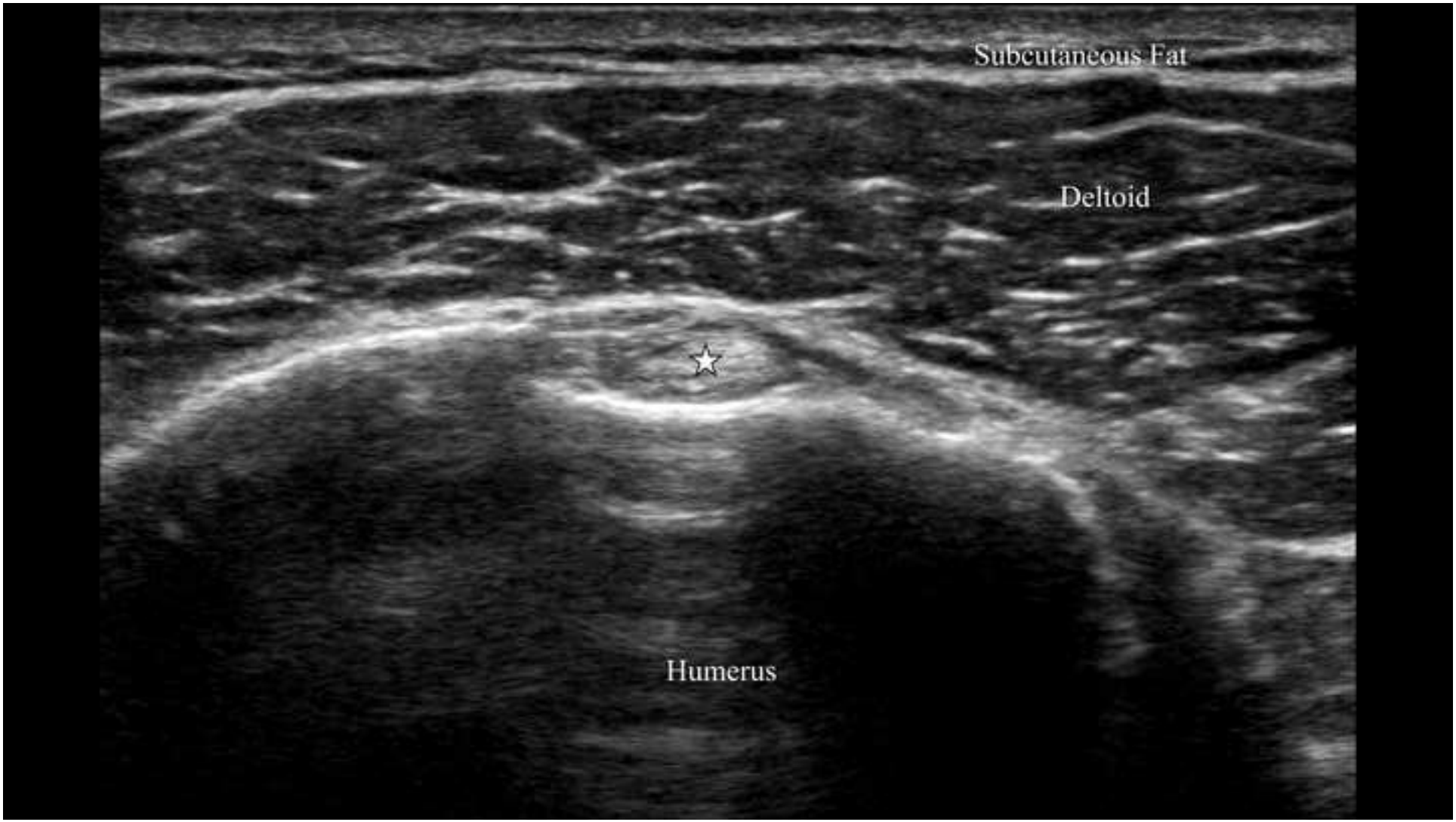


Figure 7 - External - Portal Markings

Click here to access/download;Figure(s) in separate file(s);Figure 7 - External - Portal Markings.tif

Figure 8 - External - Kelly Clamp

Click here to access/download;Figure(s) in separate file(s);Figure 8 - External - Kelly Clamp.tif

Figure 9 - Arthroscope - Spinal Needle and Bone Bed

Click here to access/download;Figure(s) in separate file(s);Figure 9 - Arthroscope - Spinal Needle and Bone Bed.tif

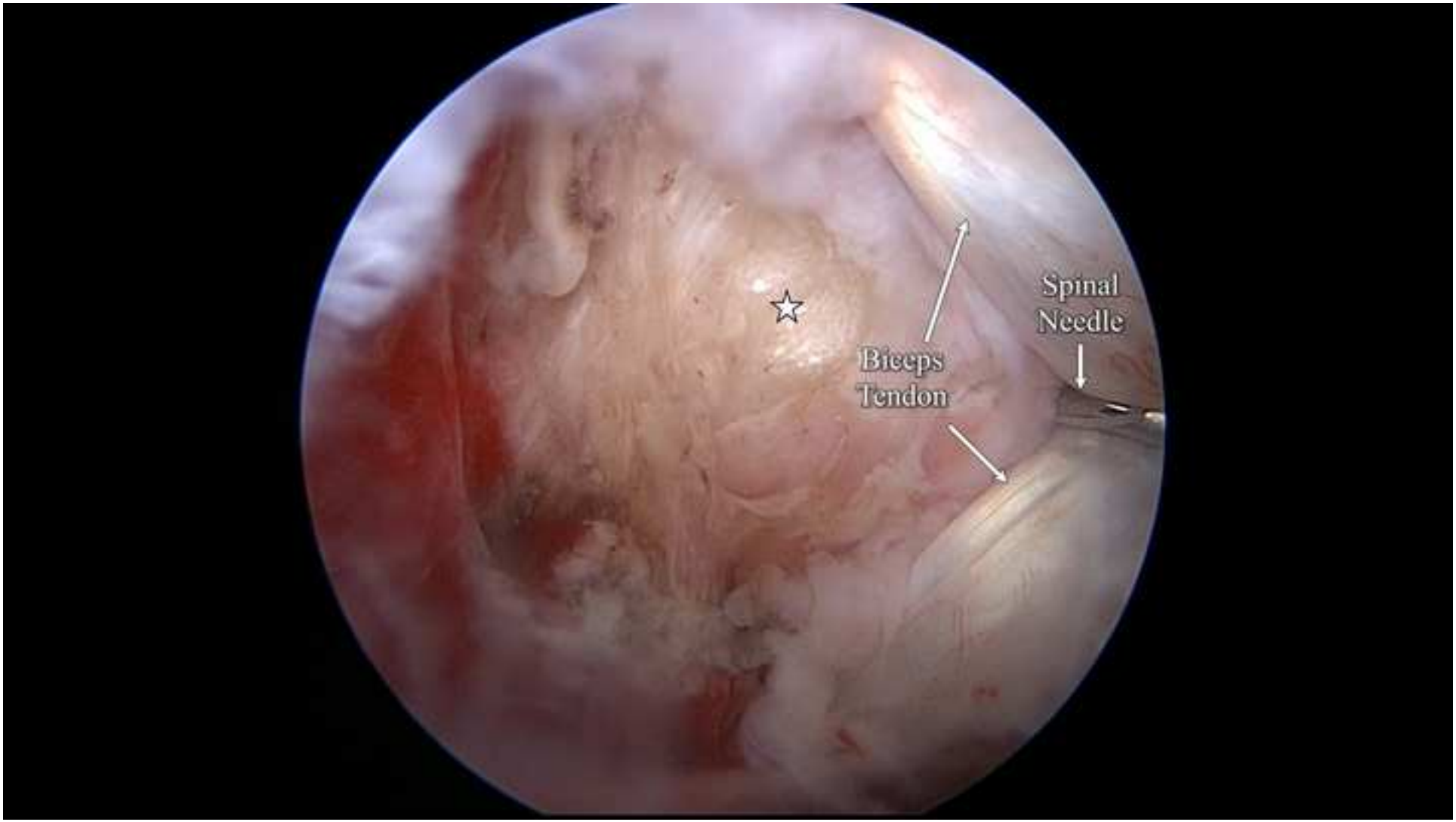


Figure 10 - Arthroscope - Pilot Headed Reamer

Click here to access/download;Figure(s) in separate file(s);Figure 10 - Arthroscope - Pilot Headed Reamer.tif

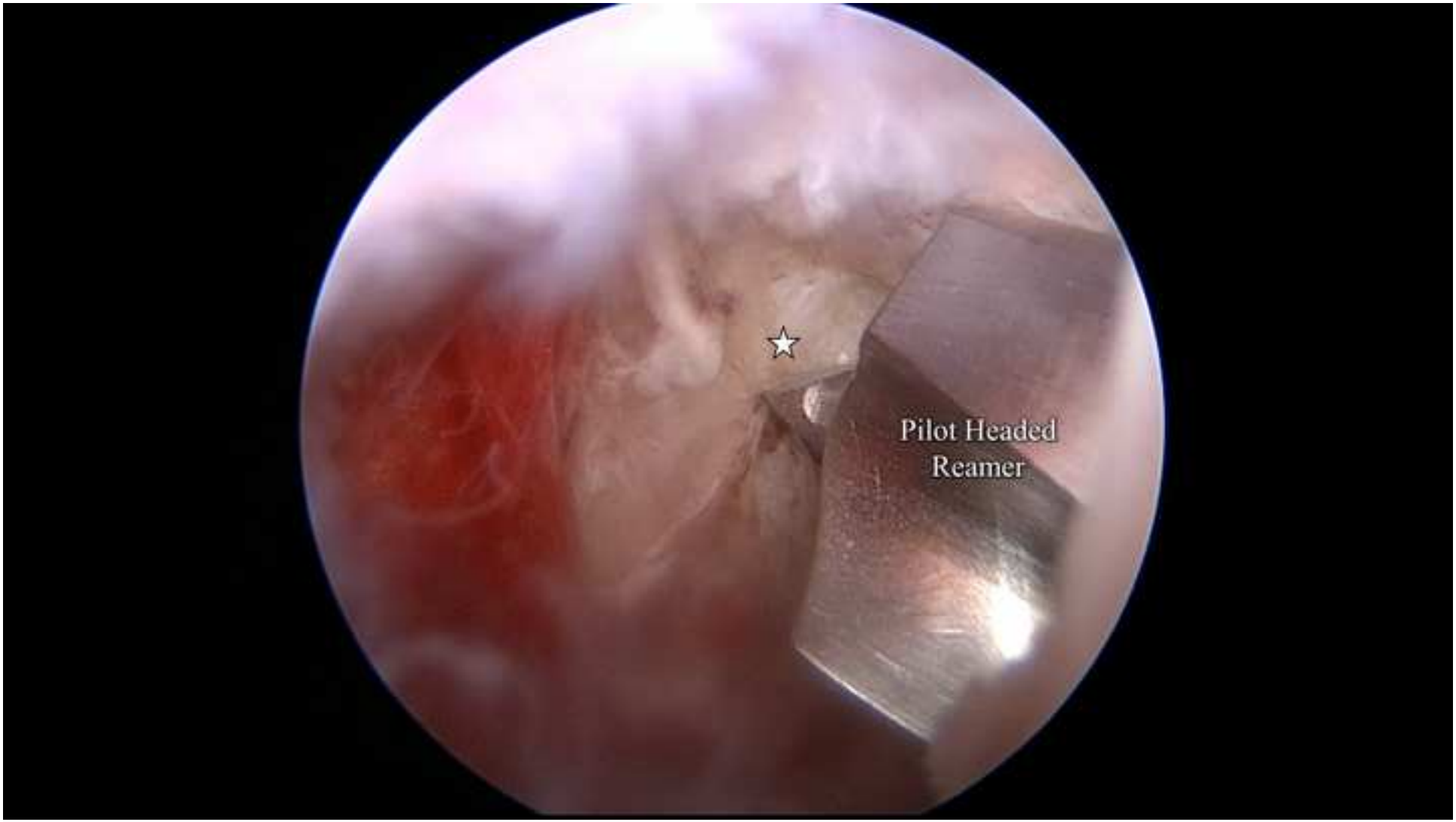


Figure 11 - Arthroscope - Biceps Tendon Over Socket

Click here to access/download;Figure(s) in separate file(s);Figure 11 - Arthroscope - Biceps Tendon Over Socket.tif

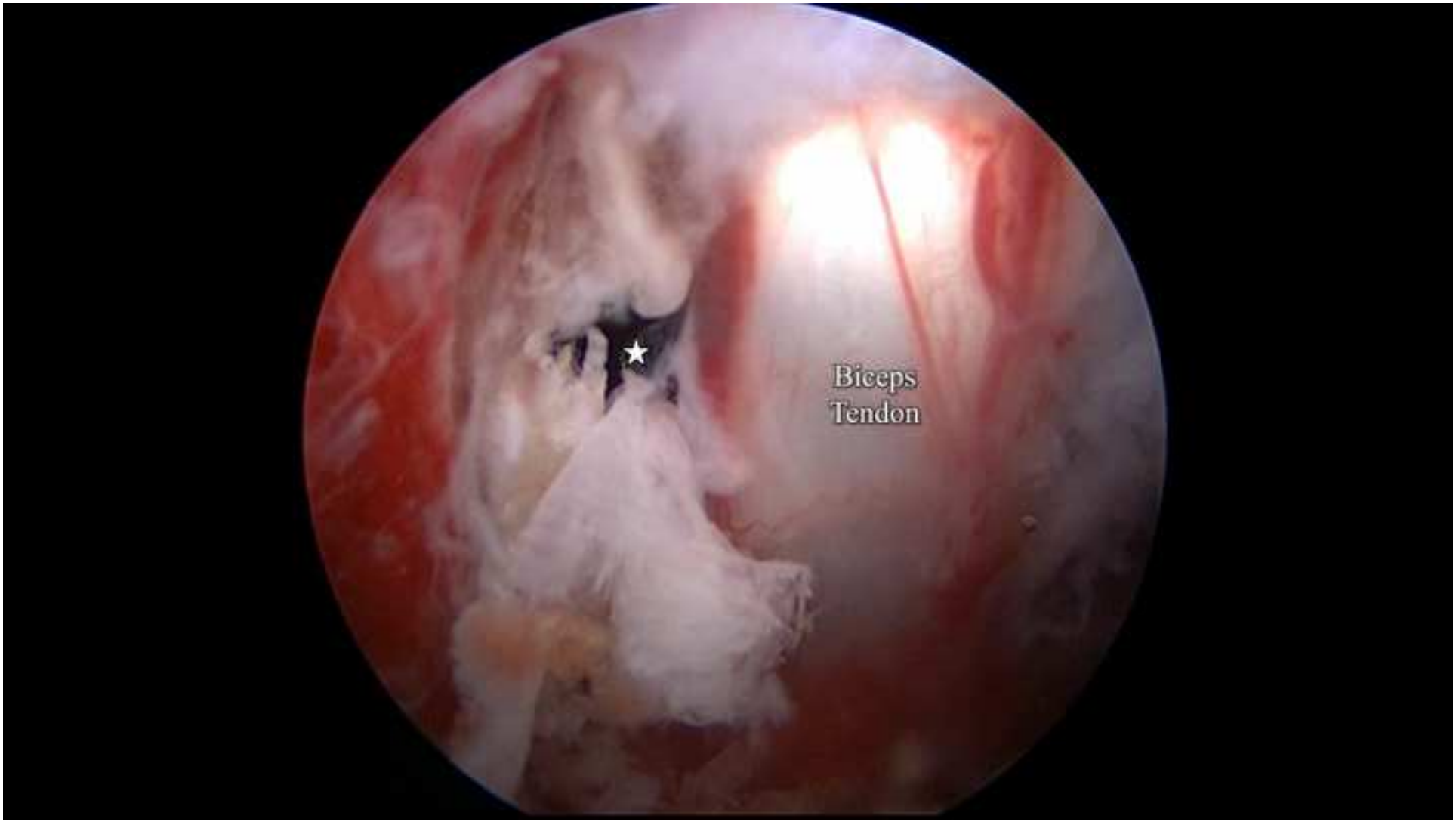


Figure 12 - Arthroscope - Forked Tip on Tendon

Click here to access/download;Figure(s) in separate file(s);Figure 12 - Arthroscope - Forked Tip on Tendon.tif

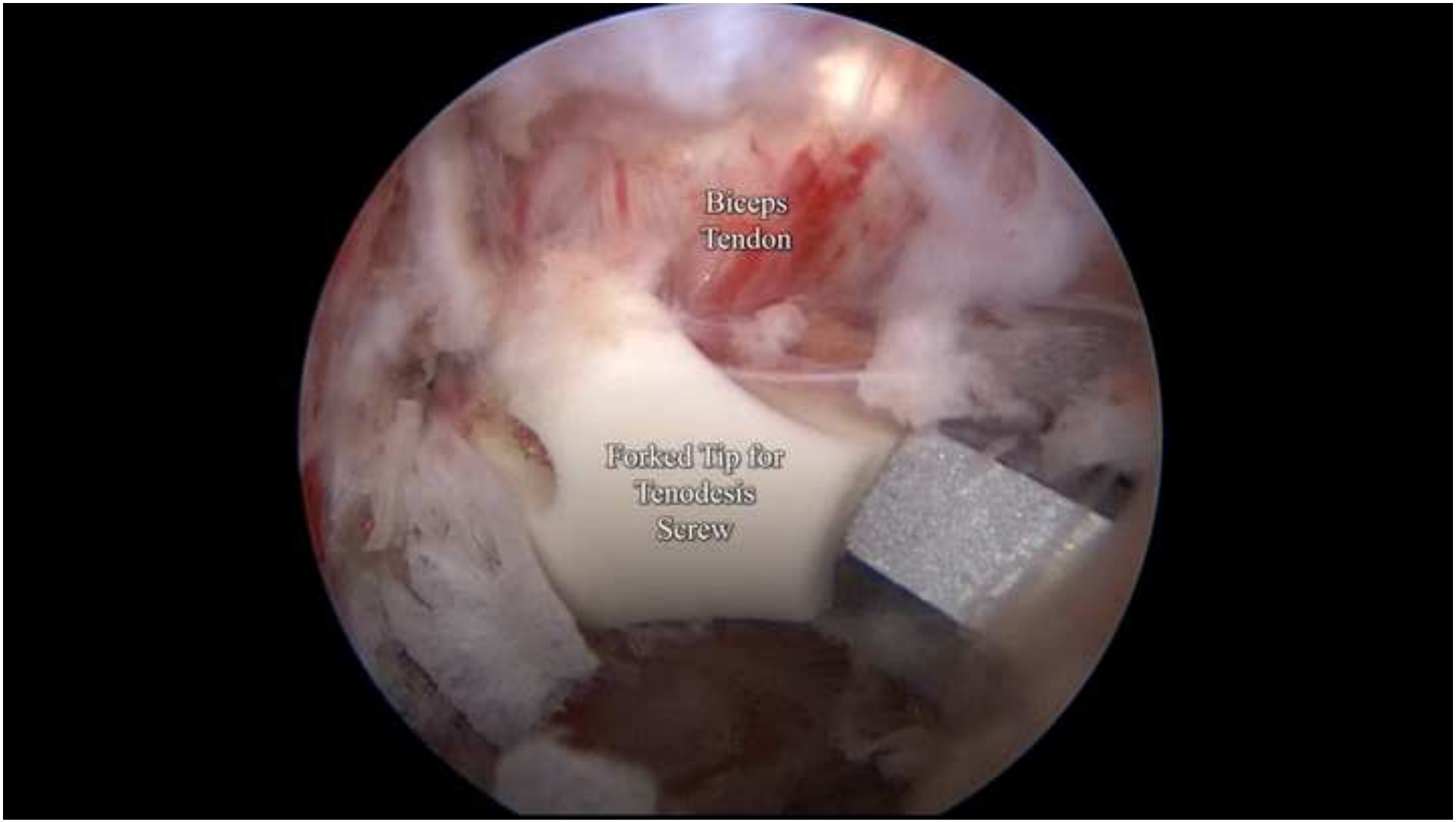
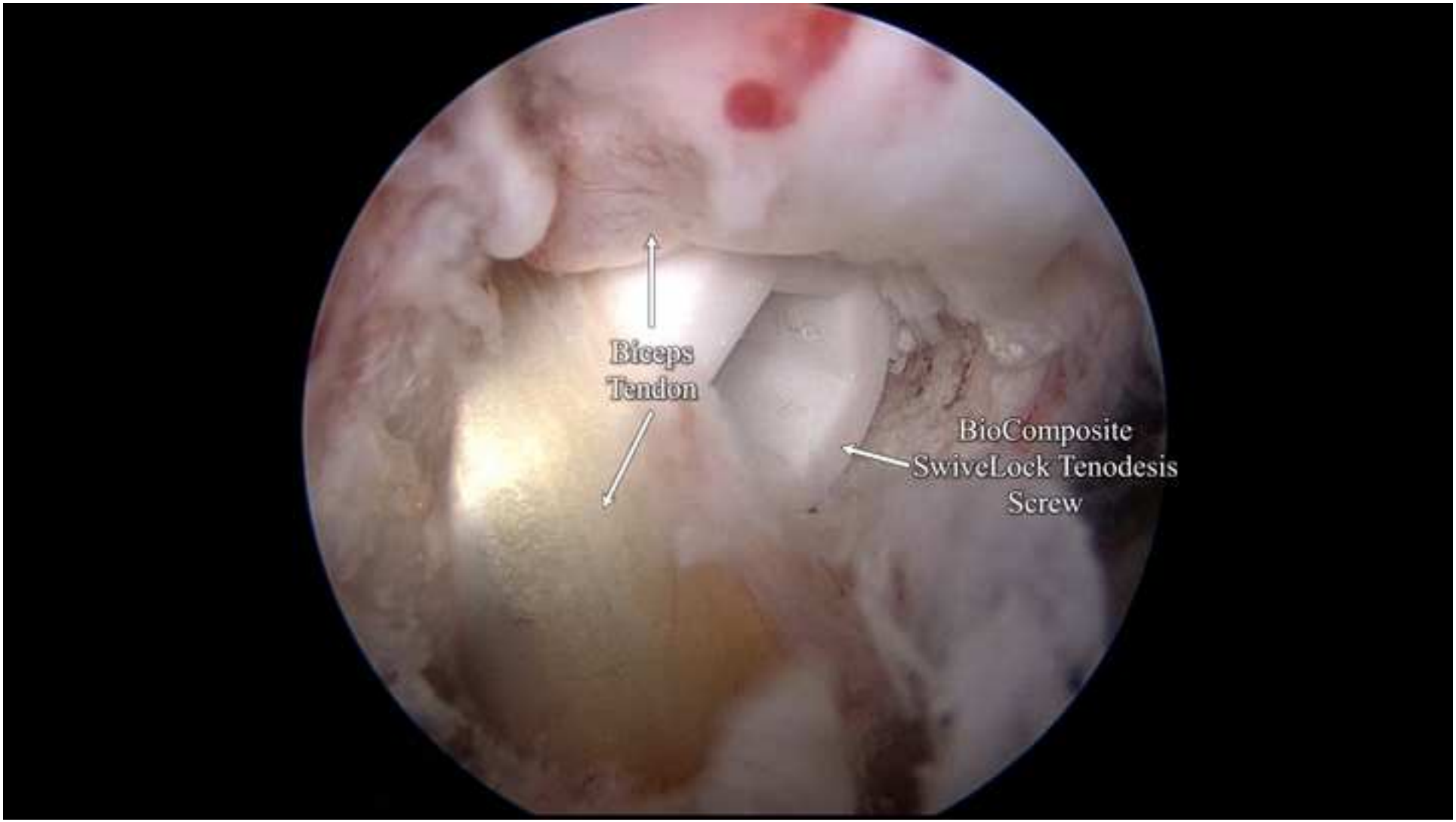


Figure 13 - Arthroscope - Tenodesis Screw

Click here to access/download;Figure(s) in separate file(s);Figure 13 - Arthroscope - Tenodesis Screw.tif

Figure 14 - Arthroscope - Tenodesis Complete

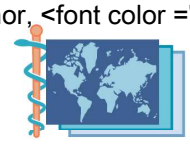
Click here to access/download;Figure(s) in separate file(s);Figure 14 - Arthroscope - Tenodesis Complete.tif



Click here to access/download

Video Clips

Biceps Tenodesis - Submission.mp4



ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Wyatt
2. Surname (Last Name): Andersen
3. Date: 19-June-2020

4. Are you the corresponding author? ☐ Yes ☑ No

Corresponding Author's Name: Alan M. Hirahara, MD, FRCSC

5. Manuscript Title: Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Mr. Andersen has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Matheus
2. Surname (Last Name): Barcelos
3. Date: 19-June-2020

4. Are you the corresponding author? ☐ Yes ☑ No

Corresponding Author's Name: Alan M. Hirahara, MD, FRCSC

5. Manuscript Title: Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. Barcelos has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Mauricio
2. Surname (Last Name): de Paiva Raffaelli
3. Date: 19-June-2020

4. Are you the corresponding author? ☐ Yes ☑ No

Corresponding Author's Name: Alan M. Hirahara, MD, FRCSC

5. Manuscript Title: Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. de Paiva Raffaelli has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Alan
2. Surname (Last Name): Hirahara
3. Date: 19-June-2020

4. Are you the corresponding author? ☑ Yes ☐ No

5. Manuscript Title: Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☑ Yes ☐ No

If yes, please fill out the appropriate information below.

Name of Entity	Grant?	Personal Fees?	Non-Financial Support?	Other?	Comments
Arthrex, Inc.	☐	☑	☐	☐	Royalties, Consultant, Research Support
Clarius Mobile Health	☐	☑	☐	☑	Medical Advisor, Stock Options
LifeNet Health, Inc.	☐	☑	☐	☐	Consultant

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☑ Yes ☐ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

If yes, please fill out the appropriate information below. If you have more than one entity press the "ADD" button to add a row. Excess rows can be removed by pressing the "X" button.

Patent?	Pending?	Issued?	Licensed?	Royalties?	Licensee?	Comments	
TENSIONABLE CONTRUCTS WITH MULTI-LIMB LOCKING MECHANISM THROUGH SINGLE SPLICE AND METHODS OF TISSUE REPAIR	☑	☐	☐	☐	Arthrex, Inc.	United States	
SUTURE ANCHOR AND METHODS OF KNOTLESS TISSUE FIXATION	☑	☐	☐	☐	Arthrex, Inc.	European Patent Convention	
TENSIONABLE CONTRUCTS WITH MULTI-LIMB LOCKING MECHANISM THROUGH SINGLE SPLICE	☑	☐	☐	☐	Arthrex, Inc.	Japan	
TENSIONABLE CONTRUCTS WITH MULTI-LIMB LOCKING MECHANISM THROUGH SINGLE SPLICE	☑	☐	☐	☐	Arthrex, Inc.	European Patent Convention	
SUTURE ANCHOR AND METHODS OF KNOTLESS TISSUE FIXATION	☐	☑	☑	☐	Arthrex, Inc.	United States	
SUTURE ANCHOR AND METHODS OF KNOTLESS TISSUE FIXATION	☐	☑	☑	☐	Arthrex, Inc.	United States	
MEASURING TOOL USING SUTURE AND SUTURE ANCHOR	☐	☑	☑	☐	Arthrex, Inc.	United States	
MEASURING TOOL USING SUTURE AND SUTURE ANCHOR	☐	☑	☑	☐	Arthrex, Inc.	United States	
JOINT KINEMATIC RECONSTRUCTION TECHNIQUES	☑	☐	☐	☐	Arthrex, Inc.	United States	
JOINT KINEMATIC RECONSTRUCTION TECHNIQUES	☑	☐	☐	☐	Arthrex, Inc.	United States	

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. Hirahara reports personal fees from Arthrex, Inc., personal fees and other from Clarius Mobile Health, personal fees from LifeNet Health, Inc., outside the submitted work; In addition, Dr. Hirahara has a patent TENSIONABLE CONTRUCTS WITH MULTI-LIMB LOCKING MECHANISM THROUGH SINGLE SPLICE AND METHODS OF TISSUE REPAIR pending to Arthrex, Inc., a patent SUTURE ANCHOR AND METHODS OF KNOTLESS TISSUE FIXATION pending to Arthrex, Inc., a patent TENSIONABLE CONTRUCTS WITH MULTI-LIMB LOCKING MECHANISM THROUGH SINGLE SPLICE pending to Arthrex, Inc., a patent TENSIONABLE CONTRUCTS WITH MULTI-LIMB LOCKING MECHANISM THROUGH SINGLE SPLICE pending to Arthrex, Inc., a patent SUTURE ANCHOR AND METHODS OF KNOTLESS TISSUE FIXATION licensed to Arthrex, Inc., a patent SUTURE ANCHOR AND METHODS OF KNOTLESS TISSUE FIXATION licensed to Arthrex, Inc., a patent MEASURING TOOL USING SUTURE AND SUTURE ANCHOR licensed to Arthrex, Inc., a patent MEASURING TOOL USING SUTURE AND SUTURE ANCHOR licensed to Arthrex, Inc., a patent JOINT KINEMATIC RECONSTRUCTION TECHNIQUES pending to Arthrex, Inc., and a patent JOINT KINEMATIC RECONSTRUCTION TECHNIQUES pending to Arthrex, Inc..

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

Dear Editor,

Please consider these Revision Notes for the submission titled, Ultrasound-guided Suprapectoral Tenodesis of the Long Head of the Biceps Brachii.

The Classifications have been added to the Separate Title Page.

The term “new” was removed from the manuscript at line 32.

The manufacturer of the ultrasound unit and the specific brand used in the technique are mentioned at lines 44 and 159-160.

The patient positioning was added to the figure legends where appropriate at lines 143, 148, 155, 160, 176-177, 183, 192, 197, 206, 213, 218, and 223.

The term “SwiveLock” was removed from figures 13 & 14 as requested at lines 219 and 224.

Recent references were added to line 88.

Additionally, we would like to note that the first author, Wyatt Andersen, earned his MSHS since the original submission. We would kindly request to have these credentials included in the eventual publication.

This manuscript is original, has not been published previously, and has been read and approved by all authors.

First Author: Wyatt J. Andersen, MSHS, ATC
Second Author: Matheus Barcelos, MD
Third Author: Mauricio de Paiva Raffaelli, MD

Fourth & Corresponding Author: Alan M. Hirahara, MD, FRCSC
Address: 2801 K St., #330, Sacramento, CA 95816, USA
Tel wk: +1-916-732-3000
Tel cel: +1-916-595-7417
Fax: +1-916-732-3022
Email: ahirahara@sacortho.net

Thank you for your consideration.

Alan M. Hirahara, MD, FRCSC