



# Intra-Articular Tenodesis of the Long Head of the Biceps Tendon

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Pathologic changes of the proximal intra-articular part of the long head of the biceps tendon (LHBT) are a well-known source for shoulder pain due to inflammatory changes, injuries, or instability. In most cases concomitant injuries such as rotator cuff injuries affect the biceps tendon and a special attention must be brought to those structures. Therefore, a precise intra-articular evaluation of the origin and the course of the LHBT should be performed to locate pathologic changes and diagnose instability. Arthroscopic intra-articular tenodesis of the LHBT is a safe and reproducible technique to address injuries to the proximal part of the biceps tendon. It does not add additional surgical approaches for the fixation in comparison to a subpectoral technique. Additionally, the fixation point at the top of the bicipital groove is far away from neuro-vascular structures and therefore less complication affected.

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**KEYWORDS** tenodesis, intra-articular, LHBT

## Introduction

In many cases, the intra-articular part of the long head of the biceps tendon (LHBT) is the origin of shoulder pain due to instability within the bicipital groove, inflammatory changes, or an injury of the biceps origin involving the superoanterior and posterior part of the labrum. At the beginning of 19th century, Gilcreest<sup>1</sup> first described a tenodesis as a treatment to address these pathologies with good results. Additionally, some patients with severe shoulder pain related to the LHBT often experienced relief of pain after a spontaneous rupture of the biceps tendon. Therefore, we started to perform an arthroscopic tenotomy of the LHBT in patients with pathological changes of the intra-articular part of the biceps tendon and in patients with biceps instability, followed by an intra-articular refixation.

A potential advantage of the arthroscopic intra-articular biceps tenodesis compared with an open technique is avoiding additional risk to the bicipital groove and the surrounding

structures. Voss et al<sup>2</sup> demonstrated the proximity of the neuro-vascular structures to the subpectoral tenodesis site. Therefore, complications and complication management can be reduced due a safe intra-articular fixation zone. Additionally, a more cosmetic result can be achieved without adding an extra incision.

Given these findings, the goal of the arthroscopic intra-articular tenodesis is to remove the pathologic or instable part of the biceps tendon to reduce the pain stimuli and preserve the physiological shape of the upper arm.

## Indication and Contraindication for a Tenodesis

Prior to a surgical procedure, a conservative treatment should be considered when pathologic changes of the LHBT are diagnosed.<sup>3</sup> Exceptional cases include instability pathologies or the presence of a concomitant repairable rotator cuff tear.<sup>4</sup> If conservative treatment fails an operative procedures should be considered. In view of a cosmetic appealing postoperative result a tenodesis is considered. The [Table](#) illustrates the indications and contraindications for a tenodesis of the LHBT according to Voss et al.<sup>2</sup>

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**Table** Indications and Contraindications for Arthroscopic Intra-articular Tenodesis of the Long Head of the Biceps Tendon (LHBT)<sup>2</sup>

Indication	Contraindication
<ul style="list-style-type: none"> <li>• SLAP lesions in elderly patients</li> <li>• Biceps instability</li> <li>• Symptomatic intra-articular partial tears of the LHBT</li> <li>• Chronic atrophic changes in the course of the LHBT</li> <li>• Painful and conservative therapy-resistant tenosynovitis</li> <li>• Additional treatment during rotator cuff repair, especially during repair of the subscapularis tendon</li> <li>• Painful and hyperthrophic LHBT with secondary impingement</li> </ul>	<ul style="list-style-type: none"> <li>• Severe osteoporotic bone</li> <li>• Tumors or cysts in the area of the tenodesis site</li> <li>• Implants in the area of the tenodesis</li> </ul>

SLAP, superoanterior and posterior part of the labrum.

## Author's Preferred Surgical Technique

The patient is brought in a beach-chair position and the anatomical landmarks and arthroscopic accesses are marked (Fig. 1). A posterior standard portal is then established and a diagnostic arthroscopic view of the shoulder joint is performed to identify any additional pathologies.

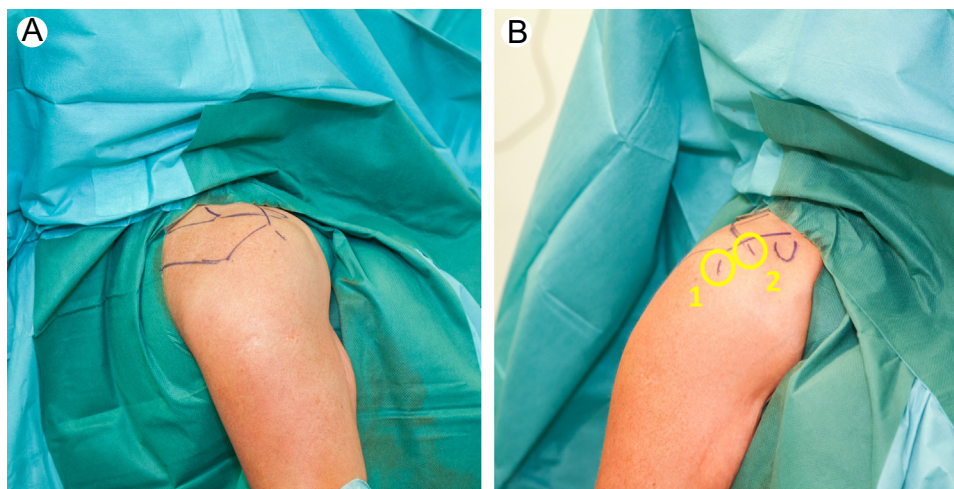
If the indication for a tenodesis has been verified a second antero-superior working portal is established. A hook probe is then inserted and the course of the LHBT is examined. A special attention is brought to the insertion of the LHBT and physiological variations of the insertion, such as Bufford complex or cord-like MGHL should be considered. Subsequently the pulley system is examined in external and internal rotation to identify antero-medial and postero-lateral pulley lesions as well as subscapularis and supraspinatus lesions (Fig. 2).

In order to perform the tenodesis of the LHBT a third antero-lateral working portal right in front of the supraspinatus tendon is established. To tenotomize the tendon an arthroscopic thermal device or an arthroscopic cutter is used to detach the tendon right at biceps-labral complex.

The surgeon should take care of a precise cut to prevent any further irritations with the remaining stump. Using the clamp the tendon is brought outside and shortened unless it has the final length to be fixed at the top of the bicipital groove (Fig. 3).

Using a continuous loop of a high strength suture and with a needle (FiberLoop, Arthrex GmbH, Germany) the remaining tendon is sutured. The surgeon should take care of the remaining tendon overlap. This could potential influence the tenodesis itself and therefore it is recommended to reduce the proximal tendon edges until a smooth and torpedo-like fixation is obtained (Fig. 4).

Under arthroscopic view a 3-mm drill is used to prepare the bone tunnel at the top of the groove. Depending on a tendon size a 6-8 mm cannulated drill is used to set the final bone tunnel (Fig. 5). The suture ends are then brought on a bio-absorbable 6-mm tenodesis screw (BioComposite SwiveLock, Arthrex GmbH, Germany) and the final construct is brought back into the joint. Using a few slight hammer blows the tendon and the screw are brought into position turned in manually (Fig. 6). At this point it is important to check the depth of screw, as an overlap can cause irritation with less stability. Subsequently the remaining pathologies can be addressed.



**Figure 1** (A) Illustration of anatomical landmarks and (B) arthroscopic portals to perform an arthroscopic biceps tenodesis (1 = antero-lateral arthroscopic portal; 2 = antero-superior arthroscopic portal). (Color version of figure is available online.)

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