INTRODUCTION

• Pathology of the long head of the biceps tendon (LHB) is a well-established source of shoulder pain.
• Can be due to inflammatory or degenerative tendinitis, chronic tendinopathy, partial tearing, subluxation, or dislocation of the LHB.
• Non-operative treatment such as physical therapy, activity modifications, anti-inflammatory medications or steroid injections can be effective.
• In cases refractory to conservative measures, arthroscopic biceps tenodesis has been shown to be safe and effective.

• The purpose of this study is to present an arthroscopic, knotless, suprapectoral biceps tenodesis technique, known as the Loop ‘N Tack and review the clinical outcomes in a cohort of patients with a minimum 2 years of follow-up.

METHODS

RESULTS

Inclusion Criteria

• Underwent Loop ‘N Tack biceps tenodesis
• Minimum 2 years of follow-up

Exclusion Criteria

• Concomitant procedures
• Worker’s compensation
• American Shoulder and Elbow Surgeons (ASES) Score
• Visual Analog Pain Scale (VAS)
• University of California, Los Angeles Shoulder Score (UCLA)
• Single Assessment Numeric Evaluation (SANE)

Additional Interventions/Symptoms defined as:

• Rupture of tenodesis, resulting in “Popeye” deformity
• Biceps cramping pain
• Persistent anterior shoulder “groove” pain

Statistical Analysis

• Outcome scores compared using Mann Whitney U test with p-value <0.05 deemed statistically significant

Loop ‘N Tack Surgical Technique Continued

• BT is cut at its insertion (Fig 6)
• Free end of suture is anchored at the most distally visualized portion of the intra-articular bicipital groove (Fig 7)
• The tendon is translated distally an average of 30mm using this technique (Fig 7B)

Possible surgical complications include:

• Humeral head microfracture
• Persistent anterior shoulder “groove” pain
• Biceps cramping pain

Outcome scores compared using Mann Whitney U test with p-value <0.05 deemed statistically significant

<table>
<thead>
<tr>
<th>Loop ‘N Tack Surgical Technique</th>
<th>Surgical procedure</th>
<th>Rotator cuff repair</th>
<th>Postoperative</th>
<th>28 (47.9)</th>
<th>6 (10.2)</th>
<th>12 (20.3)</th>
<th>2 (3.4)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Subscapularis repair</td>
<td>6 (10.2)</td>
<td>3 (5.0)</td>
<td>33 (55.9)</td>
<td>27 (45.9)</td>
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<td></td>
<td>Labrum repair</td>
<td>2 (3.4)</td>
<td>66.7</td>
<td>100</td>
<td>100</td>
<td>&lt;0.001</td>
<td></td>
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<tr>
<td></td>
<td>Labrum debridement</td>
<td>6 (10.2)</td>
<td>7 (10)</td>
<td>6 (10.2)</td>
<td>6 (10.2)</td>
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<tr>
<td></td>
<td>SLAP repair</td>
<td>3 (5.0)</td>
<td>6 (10.2)</td>
<td>6 (10.2)</td>
<td>6 (10.2)</td>
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<tr>
<td></td>
<td>Acromioplasty</td>
<td>33 (55.9)</td>
<td>66.7</td>
<td>100</td>
<td>100</td>
<td>&lt;0.001</td>
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</table>

Table 1: Demographic Data

<table>
<thead>
<tr>
<th>Patient characteristic</th>
<th>n (%)</th>
<th>unless otherwise noted</th>
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<tbody>
<tr>
<td>Age, mean ± SD, y</td>
<td>51.6 ± 9.8</td>
<td></td>
</tr>
<tr>
<td>Male sex</td>
<td>34 (57.6%)</td>
<td></td>
</tr>
<tr>
<td>Dominant arm</td>
<td>41 (69.4%)</td>
<td></td>
</tr>
<tr>
<td>Tobacco users</td>
<td>18 (30.5%)</td>
<td></td>
</tr>
<tr>
<td>Worker’s Compensation</td>
<td>10 (16.9%)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Concomitant Surgical Procedures

<table>
<thead>
<tr>
<th>Table 3: Outcome Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASES</td>
</tr>
<tr>
<td>Preoperative</td>
</tr>
<tr>
<td>Postoperative</td>
</tr>
<tr>
<td>VAS</td>
</tr>
<tr>
<td>Preoperative</td>
</tr>
<tr>
<td>Postoperative</td>
</tr>
<tr>
<td>SANE</td>
</tr>
<tr>
<td>Postoperative</td>
</tr>
<tr>
<td>UCLA</td>
</tr>
<tr>
<td>Postoperative</td>
</tr>
</tbody>
</table>

Table 4: Group subanalysis

<table>
<thead>
<tr>
<th>Number of Patients (%)</th>
<th>38 (61.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASES</td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>41.5 ± 15.0</td>
</tr>
<tr>
<td>Postoperative</td>
<td>91.6 ± 13.3</td>
</tr>
<tr>
<td>VAS</td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>6.8 ± 2.0</td>
</tr>
<tr>
<td>Postoperative</td>
<td>1.0 ± 1.5</td>
</tr>
<tr>
<td>SANE</td>
<td></td>
</tr>
<tr>
<td>Postoperative</td>
<td>94.8 ± 10.2</td>
</tr>
<tr>
<td>UCLA</td>
<td></td>
</tr>
<tr>
<td>Postoperative</td>
<td>32.6 ± 3.8</td>
</tr>
</tbody>
</table>

Table 5: Group subanalysis, Worker’s compensation

<table>
<thead>
<tr>
<th>Table 6: Additional Interventions/Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional interventions/symptoms (%)</td>
</tr>
<tr>
<td>Reoperations Overall</td>
</tr>
<tr>
<td>Reoperations for LHB-related pathology</td>
</tr>
<tr>
<td>“Popeye” deformity</td>
</tr>
<tr>
<td>Anterior shoulder “groove” pain</td>
</tr>
<tr>
<td>Biceps cramping pain</td>
</tr>
</tbody>
</table>

DISCUSSION

Complete follow-up evaluations were performed in 59 of 68 patients (87%). Average follow-up was 43 months. 88% of patients had at least 1 additional procedure at the time of LHB tenodesis (Table 2). 54 out of 59 patients had a good/excellent outcome with UCLA > 27 and ASES > 70. 98% of patients reported that they were satisfied overall with this procedure. There was a 1 reoperation due to a recurrent rotator cuff tear, and the LHB tenodesis was noted to be intact at the time of revision rotator cuff repair.

Overall, there was a significant improvement in shoulder pain with a mean post-op VAS = 1.1. We had no instances of postoperative “groove” pain, which we believe is related to our ability to relieve tension on the LHB with the Loop ‘N Tack tenodesis, while essentially eliminating all motion of the LHB within the bicipital groove.

There are several limitations of this study including its retrospective nature, the participation of a single surgeon, and that final follow-up surveys were conducted via phone interview. To minimize the risk of bias, all phone interviews were completed by RAD. Additionally, all patients who reported pain were brought in for clinical evaluation. Lastly, there were confounding variables in the patient outcomes, as 88% had concomitant pathology addressed at the time of LHB tenodesis.

CONCLUSION

The Loop ‘N Tack tenodesis is our preferred technique because of the technical ease of the procedure, the ability to relieve tension on the LHB within the groove, and the minimal risk of complications. This technique results in a high rate of patient satisfaction, significant improvement in shoulder outcome scores, a low incidence of postoperative pain, with no reoperations for biceps-related pathology.

REFERENCES