J Shoulder Elbow Surg (2012) 21, 61-65

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

Patient acceptance of long head of biceps brachii tenotomy

Samuel J. Duff, MBBS(Hons), BSc (Physio)*, Peter T. Campbell, MBBS(Hons), FRACS (Ortho)

Western Orthopaedic, Subiaco, WA, Australia

Hypothesis: Long head of biceps brachii tenotomy is well accepted by patients and the procedure has comparable outcomes in younger manually active and older sedentary populations.
Materials and methods: A total of 117 individuals at least 12 months after tenotomy of the long head of biceps brachii attended for review. Typical of clinical practice, in only one patient was the tenotomy performed in isolation. Interviews, clinical examination, and strength testing were performed to determine the rates of (1) cosmetic deformity, (2) cramping pain in the biceps muscle, (3) weakness, and (4) patient satisfaction.
Results: There was no significant difference between the younger manually active and the older sedentary groups in measures of cramping, weakness, or deformity, and 95% of patients were satisfied or very satisfied with the outcome of their surgery. Three percent of patients were concerned with deformity but none requested correction. Objective testing found no statistical difference in elbow flexion or forearm supination strength between the operated-on and nonoperated-on sides. Nineteen percent of patients reported cramping sensations.
Discussion: This study demonstrated similar rates of adverse effects to previous tenotomy studies in cramping sensations, strength deficits, and cosmetic deformity. It demonstrated that results are similar in older sedentary and younger manually active patients and are comparable to the alternative, tenodesis.
Conclusions: Biceps tenotomy is well accepted by most patients with good overall results. Some adverse effects occur but appear to be mild and of little concern to patients. The procedure is tolerated in manually active populations.
Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Long head; biceps brachii; tenotomy; strength; cramping; cosmetic deformity

The tendon of the long head of biceps brachii is an important source of refractory anterior shoulder pain, which is amendable to surgical intervention. The muscle is a strong elbow flexor and forearm supinator.[10] It is susceptible to pathology because it occupies a vulnerable position within the shoulder joint and it suffers a medial displacement force across the lesser tuberosity during activity.[6] The tendon is often observed to have evidence of pathology during arthroscopic evaluation. A study of patients with rotator cuff tears found 76% had long head of biceps pathology.[5] In addition, the synovial sheath of the tendon is an extension of the lining of the glenohumeral joint, enabling inflammatory conditions of the shoulder to readily affect the tendon.[13]

Ethics approval was not required for this study.

*Reprint requests: Samuel J. Duff, MBBS(Hons), BSc (Physio), c/o Peter Campbell, Western Orthopaedic, Suite 213, 25 McCourt St, Subiaco, WA 6008, Australia.

E-mail address: sammyduff@hotmail.com (S.J. Duff).

1058-2746/$ - see front matter © 2012 Journal of Shoulder and Elbow Surgery Board of Trustees.
doi:10.1016/j.jse.2011.01.014

Surgical approaches to pathology of the long head of biceps brachii tendon include tenodesis and tenotomy. Both procedures remove the tendon from its vulnerable position in the anterior aspect of the glenohumeral joint. Tenotomy divides the tendon and excises the remaining intraarticular portion. Tenodesis fixes the tendon to the proximal humerus in an attempt to maintain the length—tension relationship of the long head. Tenodesis is usually performed as an open operation and is therefore likely to be associated with greater morbidity. Both operations are seldom performed in isolation, being much more commonly performed as a component of a more extensive shoulder surgery. This makes investigating tenotomy in isolation difficult. This is why we have limited clinical outcomes specifically related to the long head of biceps tenotomy.

Advocates for tenodesis argue that it avoids the potential adverse outcomes of decreased strength, cramping pain, and cosmetic deformity that can be associated with tenotomy. Our clinical experience had suggested lower than reported incidences of significant adverse outcomes after tenotomy and also suggested those that occurred were generally mild and of little concern to the patient. These observations have been reinforced by results from various studies.[4,7,8,14]

Tenotomy studies performed to date have typically involved older patients with relatively low demands placed on the biceps brachii. This study furthers the existing evidence by examining the tolerance of the procedure in younger manually active as well as older sedentary individuals and by objectively evaluating the strength loss in biceps brachii function.

We hypothesized that tenotomy is well accepted by patients in our population and culture and is accompanied by relatively few adverse effects in both younger manually active and older sedentary individuals. This study aimed to determine the rates of adverse complications and their impact on patient functioning and quality of life. The conclusions made are limited to those outcomes associated with the tenotomy component of the operation, in particular the presence of a Popeye deformity, cramping sensations, or diminished strength. The results will be used to direct future surgical approaches in managing refractory shoulder pain.

Methods

Surgical indications and technique

The decision to tenotomize was based on preoperative imaging or intraoperative arthroscopic examination, or both. Magnetic resonance imaging features considered to be indications for tenotomy were tendon subluxation, dislocation, or splitting. In addition, the tendon was inspected intraoperatively for evidence of pathologic change, including intraarticular wear, splitting, abrasions involving greater than half the tendon width, dislocation, subluxation, and superior labrum anterior to posterior (SLAP) type lesions in those aged older than 50 years. These findings were considered indications for tenotomy.

The long head tendon is divided at its proximal origin flush with the superior labrum and allowed to retract from the joint cavity. All patients were informed of the possible adverse effects of tenotomy preoperatively.

Patient selection

Participants were consecutive patients who could attend follow-up from a database of previous patients who had undergone a long head of biceps brachii tenotomy as a component of more extensive shoulder surgery. Other procedures performed included but were not limited to rotator cuff repair, subacromial decompression, and acromioclavicular joint excisions in various combinations. Very few patients have this procedure in isolation. Patients were assessed at a minimum of 12 months postoperatively and were contacted by phone to arrange a single appointment. A total of 117 individuals attended follow-up, representing 127 shoulders for assessment. Patients had to be able to come to the follow-up center in Perth, Western Australia for inclusion in the study. This department provides services for patients up to 3000 km away, which influenced the ability of some patients to come to the follow-up clinical examination. There were no refusals to attend other than for reasons of travel distance.

Patients were asked to describe their current employment duties and daily activities and were classified into a manually active or sedentary/office based group. The examining physiotherapist (S.J.D.) was not involved in the surgical interventions, and the assessments were performed independent of the operating surgeon (P.T.C.).

Assessment

All patients were assessed by a single physiotherapist (S.J.D.). The assessment involved an interview, visual inspection for deformity, and a strength assessment. The subjective aspect of the review consisted of an interview to determine at greater than 12 months postoperatively (1) the presence of any deformity and if present whether this was of concern to the patient, (2) the presence and severity of muscle weakness, and (3) the presence and severity of cramping pain in the biceps region at the time of review. The objective aspect of the examination involved determining (1) the presence of a deformity in the form of a Popeye sign. The physiotherapist observed the arm in a relaxed and contracted state. If a noticeable drop in height of the superolateral aspect of the biceps brachii muscle belly was identified, the patient was recorded as having a positive Popeye sign. (2) The isometric strength of elbow flexion and forearm supination, in 90° of elbow flexion, was measured using an IsoBex isometric muscle strength analyzer (Medical Device Solutions AG, Burgdorf, Switzerland).

Patients were asked to perform a sustained maximum isometric contraction over 3 seconds with the mean force calculated by the IsoBex. The IsoBex averages 10 measurements per second over the 3-second period to calculate the mean contraction force. Once a force of greater than 10 N is exerted, there is a 1-second delay, and then measurement occurs over the next 3 seconds. This aims to capture the maximum exerted force. The IsoBex has an accuracy of better than $\pm$ 2 N with a capacity of 400 N.