

CASE REPORT

Bicipital Augmentation

Nikolas V. Chugay, DO; Joseph Racanelli, DO; John Hsu, DO; Paul N. Chugay, MD

Introduction: This article describes the surgical procedure used to implant a bicipital prosthesis with little injury to surrounding anatomic structures into the arm of a 32-year-old man who desired greater upper body symmetry.

Materials and Methods: The solid silicone implant used in this procedure was initially developed for reconstruction of the upper extremity after traumatic injury to the region of the biceps or excessive resection of a tumor from the area. A custom bicipital implant is inserted below the fascia into a submuscular pocket. Meticulous hemostasis is achieved by electrocautery to prevent postoperative complications. The biceps muscle is then reapproximated with 3-0 Vicryl sutures, with the knots buried very deep. Afterward, the bicipital fascia is repaired with 4-0 Vicryl suture.

Results: Aesthetically pleasing and dramatic results can be obtained from this procedure.

Discussion: Bicipital augmentation surgery is a relatively straightforward procedure that affords great results. The vast majority of dissection during the procedure is blunt with natural tissue planes, thus preventing any damage to vital structures in the upper arm. Regarding potential complications that may be encountered, one should be mindful of the location of the lateral antibrachial cutaneous nerve to avoid loss of sensation in the lateral aspect of the forearm. Prudent dissection of the pocket for the implant is essential for optimal cosmesis and to prevent implant malposition. Multilayer closure with absorbable monofilament suture has proven beneficial in avoiding hypertrophic postoperative scars.

Increased media exposure to a wide array of cosmetic surgical procedures has boosted public awareness and acceptance of cosmetic surgery as a whole. Reality, documentary, and "makeover" programs have all helped eliminate certain taboos previously associated with such procedures. As a

direct result of this phenomenon, men have expressed greater interest in cosmetic surgery. Previously believed to be disinterested in matters of appearance and beauty, men are undergoing cosmetic surgical procedures at an exponential rate. In keeping with this trend, Dr Chugay and colleagues have pioneered the use of a bicipital prosthesis for aesthetic augmentation of the biceps muscles. We describe a case wherein we insert a silicone prosthesis below the biceps muscle to provide greater definition and fullness in the region of the biceps.

Case History

A 32-year-old man presented to our office with a desire to augment his biceps. He had been a recreational bodybuilder since the age of 17 and had been unhappy with the size of his biceps for as long as he could remember. After years of strength and fitness training, he had attained considerable size and muscularity throughout his entire body. His biceps, however, had not grown in proportion to the rest of his physique, and he believed that there was substantial asymmetry in his upper body. He had exhausted every option in an effort to naturally stimulate growth in his biceps. Extreme exercise routines, expensive dietary supplements, and even a course of anabolic steroids had all proven futile in providing sufficient growth.

The patient had no notable medical history and had never undergone any surgical procedures. He had taken no medications, had no drug allergies, and denied the use of drugs or alcohol.

Materials and Methods

The bicipital implant (AART Corp, Las Vegas, Nev) used in this patient was initially developed for reconstruction of the upper extremity after traumatic injury to the region of the biceps or excessive resection of a tumor from the same area. The implant is made of soft, solid silicone that is customized to each individual patient's needs. Currently, implants are manufactured

Received for publication October 20, 2005.

From the Chugay Cosmetic Surgery Institute, Long Beach, Calif.

Corresponding author: Nikolas V. Chugay, DO, Director of Surgery, Chugay Cosmetic Surgery Institute, 4210 Atlantic Ave, Long Beach, CA 90807 (e-mail: drchugs@hotmail.com).



Figures 1 and 2. (Left) The 3-0 nylon stay sutures placed for retraction of the pocket. (Right) Spatula dissector used to undermine the tissues that will create the pocket.

in small, medium, and large sizes that are further customized in the office to suit each patient. This implant is then inserted below the fascia into a submuscular pocket, giving the patient more definition and increased fullness in the region where there was a deficiency.

Anatomic Considerations

The proposed procedure is ideal in its approach to biceps augmentation in that there is relative sparing of injury to anatomic structures.

Lateral Antebrachial Cutaneous Nerve

The lateral antebrachial cutaneous nerve is a continuation of the musculocutaneous nerve and serves as one of the primary sources of sensory innervation to the skin of the forearm in the lateral aspect. Of the nerves that can be damaged during the course of this procedure, this nerve is the most likely to be injured because of its proximity to the plane of dissection before implant placement.

Medial Antebrachial Cutaneous Nerve

The medial antebrachial cutaneous nerve is derived from the medial cord of the brachial plexus and serves as a major contributor of sensory nerves of the medial aspect of the forearm.

Cephalic Vein

The cephalic vein is a major superficial vein of the upper extremity along with the basilic vein, which courses in a more medial aspect of the arm. The cephalic vein crosses superficial to the musculocutaneous nerve and ascends in the groove along the lateral border of the biceps brachii.

Basilic Vein

The basilic vein also plays a major role in the superficial venous drainage of the upper extremity. It runs upward along the medial border of the biceps brachii; perforates the deep fascia slightly below the middle of the arm; and, ascending on the medial side of



Figures 3 and 4. (Left) The prosthesis in a basin of betadine before insertion. (Right) The prosthesis being inserted into the pocket that has been created.

the brachial artery to the lower border of the teres major, continues onward as the axillary vein.

Brachial Artery

The brachial artery (a continuation of the axillary artery) commences at the lower margin of the tendon of the teres major, and, passing down the arm, ends about 1 cm below the bend of the elbow, where it divides into the radial and ulnar arteries. At first, the brachial artery lies medial to the humerus; however, it gradually moves in front of the bone as it runs down the arm, and at the bend of the elbow it lies midway between its 2 epicondyles. The brachial artery is the major supplier of blood flow to the upper extremities. Because this artery is superficial throughout its entire extent, being covered in front by the integument and the superficial and deep fascia, great care should be taken to preserve its integrity.

Surgical Procedure

The biceps contour is marked out with a surgical marking pen, taking special care to also mark the apex

of the biceps. A marking is then made in the axillary region for the initial incision in the axilla. The incision is made in the axillary region with a number 15 blade, and the skin is dissected out by sharp and blunt dissection. With gentle digital pressure, the tissues are elevated over the upper-arm region over the biceps until the bicipital fascia is exposed. The bicipital fascia is then incised with a number 15 blade, and 3-0 nylon stay sutures are placed on each side into the fascia for retraction (Figure 1). A pocket is dissected in the subfascial plane, exposing the biceps muscle fibers (Figure 2). The muscle fibers are gently spread in a longitudinal fashion with a curved hemostat, and a pocket is dissected underneath the biceps muscle digitally with a spatula dissector. A custom bicipital implant (AART Corp) is placed into the submuscular plane (Figures 3 and 4). Meticulous hemostasis is achieved by electrocautery to prevent postoperative complications. The biceps muscle is then reapproximated with 3-0 Vicryl sutures, with the knots buried very deep. Afterward, the bicipital fascia is repaired



Figure 5. *Right biceps. Preoperative photograph.*

with 4-0 Vicryl suture. 3-0 Vicryl suture is used to approximate the skin margins, and then the skin is finally closed with 4-0 Monocryl suture by subcuticular closure. Light pressure dressings are applied. The same procedure is repeated on the contralateral side. The patient is then returned to the recovery room and monitored before discharge home.

The patient is instructed postoperatively to limit the use of the upper extremities and to avoid exertion or any heavy lifting. After about 2 weeks, the patient is instructed to begin range-of-motion exercises and light activity. After 1 month, the patient is allowed to engage in full activity with no restrictions.

Complications

The potential complications for the procedure include infection, seroma development, bleeding, implant extrusion, asymmetry, scarring, muscle damage, nerve damage, and malposition of the implant. In our experience, the most common complication has been hypertrophic scarring. Our use of multilayer wound closure, elimination of tension on the wound edges, and absorbable monofilament suture material for the skin edges has drastically decreased the incidence of scarring. There have been 2 cases where the patients complained of numbness over the distribution of the lateral antebrachial cutaneous nerve; however, these complaints were transient, and the patients' sensation returned to normal after about 6 weeks. We have experienced 1 case of asymmetry, which was the direct result of overdissection of the implant pocket on the



Figure 6. *Right biceps. Postoperative photograph.*

involved side. This was easily corrected via revision of the pocket. We have yet to experience any infection, permanent muscle or nerve damage, or implant extrusion.

Results

As can be seen from the pre- and postoperative pictures (Figures 5 and 6), aesthetically pleasing and dramatic results can be obtained from this procedure. Because this procedure was developed in 2004, experience has been limited to a total of 12 patients. The operation is a relatively straightforward procedure that affords great results. Prudent dissection of the pocket for the implant is essential for optimal cosmesis and to prevent implant malposition. The vast majority of dissection during the procedure is blunt with natural tissue planes, thus preventing any damage to vital structures in the upper arm. Regarding potential complications that may be encountered, one should be mindful of the location of the lateral antebrachial cutaneous nerve to avoid loss of sensation in the lateral aspect of the forearm. Multilayer closure with absorbable monofilament suture has proven beneficial in avoiding hypertrophic postoperative scars.

Reference

1. Gray H. *Anatomy of the Human Body*. Philadelphia, Pa: Lea & Febiger; 1918.