

Elbow Reconstruction Using Radial Recurrent Artery Flap (A Case Report)

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INTRODUCTION

The elbow defects can raise problems to plastic surgeon. Indeed, this region is characterized by thin and mobile tissues. Its reconstruction must be long-lasting, resistant to movements, to shear forces and to external support. Deep burns and other traumas of the elbow lead to soft tissue necrosis and infection, with exposure of deep structures. Adequate wound coverage of this area requires thin, pliable, and durable tissue, while optimal functional recovery requires early coverage and functional rehabilitation.¹

ELBOW ANATOMY AND FUNCTION

The elbow is one of the largest joints in the body. In conjunction with the shoulder joint and wrist, the elbow gives the arm much of its versatility, as well as structure and durability.

The elbow swings 180 degrees in one direction to extend the forearm, and it also helps turn the forearm at the point where the parallel bones in the forearm—the **radius and ulna**—meet.

Joints are held together by a network of ligaments. Ligaments are made of tough, flexible connective tissue. In addition to their role holding joints together, ligaments can also connect bones and cartilages. The major ligaments that connect the bones of the elbow include the **ulnar collateral ligament, radial collateral ligament, and annular ligament**.

Several major muscles and tendons—fibrous bands that join muscles to bone or muscles to other muscles—meet at the elbow. These include the biceps, triceps, brachioradialis, and extensor carpi radialis longus tendons.

The resting angle of the elbow prevents the arms from hitting the sides of your body as you walk. This is also known as the "carrying angle."

The elbow is frequently used as a fulcrum for seated activities that involve the hands, such as writing or using a keyboard. This would be painful if the skin at the olecranon (the cap end of the ulna) had nerve endings, but the thick, rubbery skin in that area has no sensations.

The elbow can be easily put under stress, as it is a major joint in one of the most active regions of the human body. It is put under extreme pressure as the point of injury or trauma. Because it has fewer planes of movement than the wrist or the shoulder, it can be painful when twisted or hyperextended.⁵

ELBOW DEFECTS

- ✚ Rarely seen during our everyday practice
- ✚ Mainly, we see them after electrical burns and road accidents
- ✚ It's quite impossible to correct them with classic plastic surgery procedures
- ✚ The area is ideal to apply pedicled flaps or free flaps

OUR CASE

Patient G.B., 40 years old

Dg: Electrical burn of third degree in superior limbs. Two procedures of escharectomy and stsg were performed. After these procedures we faced a wide defect with bone exposure in right elbow.

Possible surgical techniques for elbow reconstruction:

- ✚ Posterior interosseous artery flap
- ✚ Flexor carpi ulnaris muscle flap
- ✚ Inferior cubital artery flap
- ✚ Radial forearm flap
- ✚ Radial recurrent artery flap
- ✚ Free flaps¹

Why radial recurrent artery flap?

- The area to cover was quite large
- We felt more comfortable dissecting radial recurrent artery flap
- The donor site was more suitable from the aesthetic point of view
- It was overall the patient decision after we explained to him all the possible techniques

RADIAL RECURRENT ARTERY FLAP

- ✚ Location: Distal half of lateral arm above the elbow
- ✚ Length : 15x8 cm
- ✚ Flap type: Fasciocutaneous
- ✚ Pattern of Circulation: Type B
- ✚ Dominant Pedicle: Radial recurrent artery
- ✚ Origin, radial artery
- ✚ Length, 8 cm
- ✚ Diameter, 1-2mm

The radial recurrent artery courses laterally and then upward along the medial surface of the brachioradialis, in a line between the brachialis and brachioradialis. This branch of

the radial artery arises in the cubital fossa. Above the lateral epicondyle it forms an anastomosis with the radial collateral artery branches of the profunda brachii artery.²

SURGICAL TECHNIQUE

The patient is placed supine on the operating table. A line drawn from the posterior border of the deltoid to the lateral epicondyle is the key landmark for the design of this flap. An elliptical island is centered along the line from the deltoid to the lateral epicondyle. The pedicle is located at the level of the lateral epicondyle. The incision is made along the posterolateral border of the flap and dissection continues through the subcutaneous tissue and the deep fascia.

The deep fascia is elevated and dissected across the brachioradialis and brachialis. The vessels are identified in the fascial septum separating these muscles. The anteromedial incision is then made and the flap elevated. The vascular pedicle radial recurrent vessels are dissected proximally and the superiorly by the radial collateral vessels. The flap is then ready for transposition. The donor site is closed primarily in over two thirds of the surface. The other third is grafted.^{3,4}

Pic1. The elbow defect and the preoperative markings



Pic2. Flap dissection and pedicle exposure



Pic3.Flap elevation and defect closure



Pic 4.After two months



RESULTS

The result was excellent. The patient was happy after some initial appearance complains. The flap and donor site sensibility were fine. Now he can work again because he can move his arm perfectly.

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