Reconstruction of the Desarticulized Left Arm Stump with Vascularized Ninth Rib Osteomyocutaneous Flap (A case report and review of the literature)

DEZARTİKÜLİZE EDİLMİŞ SOL OMUZ GÜDÜĞÜNÜN VASKÜLARİZE DOKUZUNCU KOSTA OSTEOMİYOKUTANÖZ FLEBİ İLE REKONSTRÜKSİYONU (VAKA TAKDİMİ)

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SUMMARY

The reconstruction of the stump with vascularized ninth rib was done in a 16 years old patient who had desarticulization of his left arm due to electrical injury. Ninth rib was nourished via the vascular interconnections between the thoracodorsal artery and the intercostal anteries supplying the rib. In this way, rib is vascularized and the resorption chances are greatly reduced. The length of the stump obtained is 10 cm and prosthesis can easilly be applied to this stump without difficulty.

Key Words: Latissimus dorsi, rib, osteomyocutaneous flap

Turkiye Klinikleri J Med Sci 1996,16:93-96

ÖZET

Elektrik yanığına bağlı sol kol dezartikülasyonu yapılan 16 yaşında bir olguda vaskülarize 9. kot ve latissimus dorsi osteomüskülokütan fleple güdük rekonstrüksiyonu ve sonrasında protezin uygun bir şekilde uygulanması, takdim edildi.

Anahtar Kelimeler: Latissimus dorsi, kosta, osteomiyokutanöz flep

At Ankara Numune State Hospital, stump reconstruction was performed in a 16 years old male patients who had desarticulization of his left arm due to high voltage electrical injury in April 1994. This reconstruction was performed with ninth rib and latissimus dorsi muscle as an osteomusculocutaneous flap. By this technique, a stump length of 10 cm was obtained to make prosthesis application possible.

CASE REPORT

The patient, 16 years old boy, had a high voltage electrical injury while climbing to electric post. At a peripheral hospital, amputation and desarticulazation at the shoulder joint had been done to his left arm and the patient referred to our hospital for the coverage of the skin defect at the site of the desarticulaztion (Figure 1). After physical examination we noticed that the patient did not have enough stump length for prosthesis application. Therefore, we decided to lenghthen the stump for proper application of the prosthesis by the ninth rib vascularized latissimus dorsi osteomyocutaneous flap.

It is well known that eighth, ninth and tenth ribs also have blood supply by thoracodorsal artery through latissimus dorsi muscle (1,2,6). From this principle, latissimus dorsi musculocutaneous flap with a 10x6 cm skin island and ninth rib was elevated from the left thoracic wall (Figure 2). During the dissection, the anastomotic branches of thoracodorsal artery to the ninth intercostal artery was preserved and the ninth rib was elevated with thoracodorsal artery pedicle (Figure 3). Since, the periost of the ninth rib was also preserved, vascularization of the bone was maintained. The flap was elevated and adapted to its new position at the acromial process of the scapula as it is shown in the diagram (Figure 4). With this procedure, latissimus dorsi myocutaneous flap was wrapped around the ninth vascularized rib and a sufficient volume of the soft and

Geliş Tarihi: 21.11.1995

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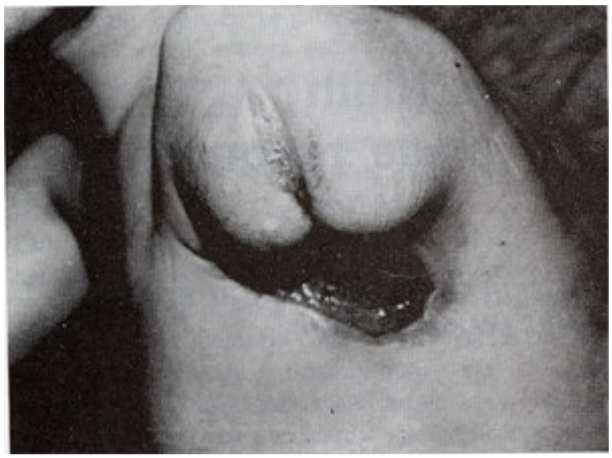


Figure 1. Preoperative illustration of the patient without stump.

Figure 2. Flap design at the back of the patient.

bony tissue was obtanied for the possible application of a prosthesis (Figures 5,6,7,8)

DISCUSSION

Grafting only the site of the desarticulized arm is not sufficient and functional for this case. After review of the literature we observed that the eighth, ninth and tenth (1,2,6) ribs also have blood supply from the thoracodorsal artery via interconnections between intercostal arteries. It is possible to reconstruct the stump by latissimus dorsi osteomyocutaneous flap. In this case, since the left arm was totally desarticulized and as a result, there is no humerus for he adaptation of the rib at humero-acromical joint. For this reason, the rib was adapted to the acromial process of the scapula in this patient. The ninth rib, attached to the scapula, moves with the shoulder movements. The aim here, is to provide an adequate stump length for adaptation of the prosthesis.

In the literature there are variety of techniques for stump reconstruction. Steinau (3) reported a technique in which the tissue expander was used. In this technique stump reconstruction takes time due to the expansion process.

Other alternatives such as the use of pectoralis major muscle flaps (4) for shoulder reconstruction is possible but in this technique the shoulder could be

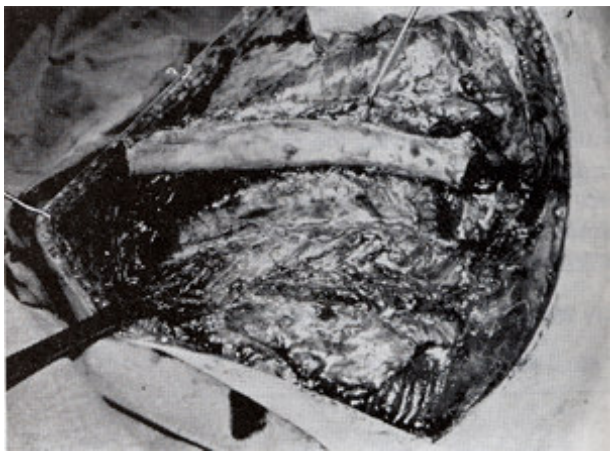
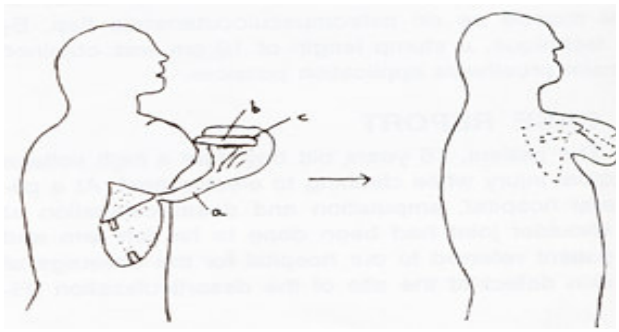


Figure 3. Elevated rib with attachments to the latissimus dorsi myocutaneous flap, vascularized thoracodorsal and intercostal arteries.



reconstructed only with muscle and the length of the tissue obtained, is not suitable for the prosthesis appli-

Figure 4. The flap elevation and its adaptation to its new position (a) thoracodorsal artery, (b) ninth rib, (c) intercostal vascular interconnections, (d) myocutaneous latissimus dorsi flap wrapped around the ninth rib.

cation.

There is also microsurgical approach for stump reconstruction, as reported by Sherag et al (5). In this technique, conclusions are good but facilities for microsurgery may not be available in every department. We believe that, our technique is more practical, time saving and less expensive.

The technique that we present here, is a one stage procedure, the risk of flap necrosis is minimal, the reconstructed stump length is long enough (10 cm), it is adequate for the adaptation of the prosthesis, and finally bone was not resorbed as shown by the x-ray taken six months after the surgery (Figure 6).

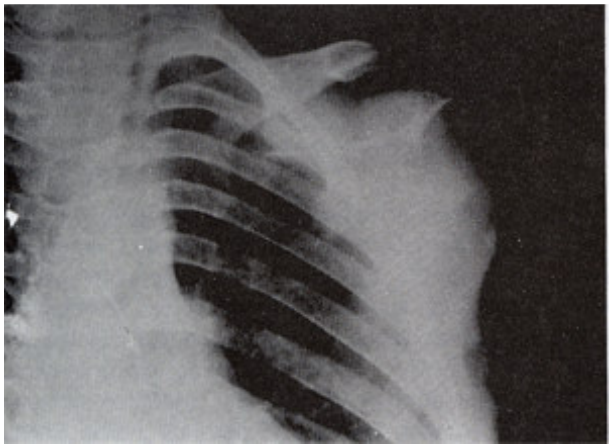


Figure 5. Preoperative X-ray of the patient.

Figure 6. Postoperative, sixth month X-ray of the patient.

Figure 7. Postoperative illustration of the patient showing the stump.

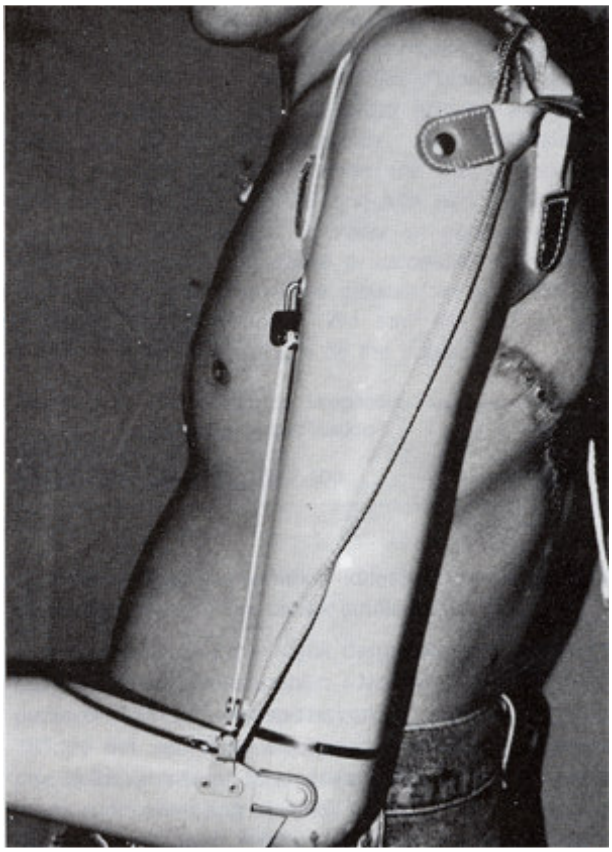


Figure 8. Prosthesis applied to the stump after reconstruction.

REFERENCES

1. Bostwick J, Scheflan M, Nahai F. The reverse latissimus dorsi muscle and musculocutaneous flap: Anatomical and clinical considerations. Plast Reconstr Surg 1980;65:395.
2. Maruyama Y, Urita Y, Ohnishi K. Rib-latissimus dorsi osteomyocutaneous flap in reconstruction of a mandibular defect. British Journal of Plastic Surgery 1985;38,234-7.
3. Steinau HU, Askenazy L, Biemer E, et al. Bilateral armverlust bei starkstromverbrennung im Kindesalter: Stumpfkonstruction durch Gewebeexpansion and fibula transfer. Chirurg 1991;62:426-9.
4. Stevenson T, Randall J, et al. Shoulder reconstruction following disarticulation for ruptured mycotic aneurysm. Plast Reconstr Surgery 1984;74:423.
5. Shenaq S, Krouskop T, et al. Salvage of amputation stumps by secondary reconstruction utilizing microsurgical free-tissue transfer. Plast Reconstr Surgery 1987;79: 861.
6. Vavylov VN, Kalakutsky NV, et al. Reconstruction of very short humeral stumps. Annals of plastic Surgery 1994;32: 2.