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

DEZARTİKLÜZE EDİLMİŞ SOL OMUZ GÜDÜĞÜNÜN VASKÜLARIZE DOKUZUNCU KOSTA OSTEOMİYOKUTANÖZ FLEBLİ 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 desarticulation of his left arm due to electrical injury. Ninth rib was nourished via the vascular interconnections between the thoracodorsal artery and the intercostal arteries 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 easily be applied to this stump without difficulty.

Key Words: Latissimus dorsi, rib, osteomyocutaneous flap


At Ankara Numune State Hospital, stump reconstruction was performed in a 16 years old male patients who had desarticulation 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 desarticulation 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 desarticulation (Figure 1). After physical examination we noticed that the patient did not have enough stump length for prosthesis application. Therefore, we decided to lengthen 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 period 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 musculocutaneous flap was wrapped around the ninth vascularized rib and a sufficient volume of the soft and

ÖZET
Elektrik yangınına bağlı sol kol dezartikülasyonu yapılan 16 yaşında bir oğluda vaskülarize 9. köt ve latissimus dorsi osteomüsükloktan fleple güdük rekonstrüksiyonu ve sonrasında protezin uygun bir şekilde uygulanması, takdim edildi.

Anahtar Kelimeler: Latissimus dorsi, kosta, osteomiyokutanöz flep

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codorsal artery via interconnections between intercostal arteries. It is possible to reconstruct the stump by latus-
simus dorsi osteomyocutaneous flap. In this case, since
the left arm was totally desarticulated and as a result,
there is no humerus for he adaptation of the rib at hu-
mero-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 pro-
vide 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
reconstructed only with muscle and the length of the
tissue obtained, is not suitable for the prosthesis appli-

discussion
Grafting only the site of the desarticulated 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 thora-
bony tissue was obtained for the possible application
of a prosthesis (Figures 5,6,7,8)

Figure 1. Preoperative illustration of the patient without stump.

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

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

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