How to do it? / Nasıl Yapılır?

Functional and aesthetic recontouring of free flap reconstructions of the head and neck region with microdebrider

Baş boyun bölgesinin serbest flep rekonstrüksiyonlarının mikrodebrider yardımıyla işlevsel ve estetik yeniden biçimlendirilmesi

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Free flaps have become standard of care for reconstruction of the head and neck defects following surgery. The bulkiness of the free flap reconstruction may cause aesthetically and functionally suboptimal results. Recontouring of the flaps with a microdebrider thinning the excessive subcutaneous fatty tissue provides an easy and safe solution to problems. In this article, we describe the recontouring technique with microdebrider in the light of aesthetic and functional examples.

Key Words: Aesthetic; functional; head and neck surgery; microdebrider; reconstruction.

Baş ve boyun cerrahisi sonrası oluşan defektlerin rekonstrüksiyonunda serbest fleplerin kullanımı standart bir yöntem haline gelmiştir. Serbest rekonstrüksiyon fleplerinin kalın olması estetik ve işlevsel açıdan bazen optimal sonuçları karşılamamaktadır. Mikrodebrider yardımıyla fleplerin fazla yağ dokusunun inceltilerek yeniden biçimlendirilmesi, bu soruna basit ve güvenli bir çözüm sağlamaktadır. Bu makalede işlevsel ve estetik örnekler ışığında mikrodebrider ile yeniden biçimlendirilme tekniği tanımlandı.

Anahtar Sözcükler: Estetik; işlevsel; baş ve boyun cerrahisi; mikrodebrider; rekonstrüksiyon.

Introduction of free revascularized flaps have revolutionized reconstruction of the head and neck area allowing more radical oncologic operations with excellent aesthetic and functional recovery.[1-3] Even though there are often several options, the reconstructive surgeon is limited by the characteristics of the specific donor areas. In overweight patients, the bulkiness of the flap used can lead to aesthetically and functionally suboptimal results such as airway compromise, or interference with swallowing functions, necessitating secondary corrective procedures. One way to reduce the excess volume of these flaps is to remove the excess subcutaneous fat.[4-12] Although primary debulking at the time of microvascular tissue transfer is described it

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has not gained popularity because of the fear of damaging perforating vessels that feed the skin islands of these flaps.[4,5] Allowing a certain time period between the microvascular transfer and recontouring ensures capillary revascularization between the skin island of the flap and skin or mucosa of the recipient area.[6] The muscle component of myocutaneous flaps becomes atrophied during this time period, allowing better judgment of the necessary size reduction.

Traditionally recontouring involves incising one side of the flap and surgically removing the fatty tissue. Minimally invasive methods are also becoming available for recontouring of flaps. Liposuction is one of the methods that can achieve this goal.[7,9] Recontouring with a microdebrider is another, and perhaps more familiar option to the head and neck surgeon who has an otolaryngology background,[10,12] In this article we describe the technique and give two examples one for aesthetic and one for functional purposes.

SURGICAL TECHNIQUE

The tip of the endoscopic microdebrider consists of an outer windowed sheath surrounding an inner rotating or oscillating hollow blade, which is connected to continuous suction (Figure 1). Once operated the tissue is sucked in and excised by the blade. This continuous debridement in small quantities reduces the resistance of the tissue and allows precise movements. The procedure can be performed under general or local anesthesia, depending on the site of the flap and the character of the patient. Through a skin incision of 5-10 mm on the edge of the flap distant to the pedicle, the microdebrider is introduced into the subcutaneous fatty layer. No dissection is necessary before the introduction of the microdebrider. The device creates its own path as it is advanced. The oscillating mode allows better control than the rotation mode. The surgeon uses his/her non-dominant hand externally, to guide the tip of the microdebrider to the desired area of volume reduction. It is important to use the microdebrider with the cutting tip downwards. When the tip is pointed with the cutting edges in the direction of the skin, it is possible to damage the subdermal layer and cause skin necrosis. To prevent depression, bleeding and skin necrosis, a 3-4 mm layer of subcutaneous fat should be preserved. Care should be taken not to damage the vascular anastomosis or the neovascularization between the flap and recipient tissue. The thickness of the flap can be very accurately shaped with this technique. Once the recontouring of the flap is complete the insertion site is closed with one suture. No packing is necessary. The procedure can be performed as day surgery.

Case 1– Functional recontouring of revascularized myocutaneous rectus abdominus free flap used for total tongue reconstruction to improve airway patency.

A 34-year-old female was diagnosed with recurrent base of tongue tumor four months after concurrent cisplatin-based chemoradiotherapy. The recurrent tumor was removed with a pull through total glossectomy with bilateral supraomohyoid neck dissection. The larynx was preserved. The tongue was reconstructed with a free myocutaneous rectus abdominis flap. The flap was secured to the buccal mucosa and the mandible after removing the inferior alveolar process. This procedure ensured that the flap remained in the oral cavity and did not sag into the neck. The larynx was suspended with non-absorbable sutures placed from the hyoid to the mandible to prevent aspiration. The patient received a tracheotomy to ensure perioperative airway patency. Early attempts to close the tracheotomy proved unsuccessful due to the bulk of the flap in the pharynx (Figure 2).

After allowing 12 weeks for muscle atrophy, the flap was still too bulky for decannulation. Recontouring of the pharyngeal portion of

Figure 1. *Tip of the microdebrider. Rotating inner sheath in outer sheath with suction device.*

the flap was performed 12 weeks after initial surgery. The procedure was done under general anesthesia. A small stab incision was placed at the anterolateral side of the flap-mucosa junction. The microdebrider (Smith&Nephew, Dyonics Powermax Elite) was introduced through this incision and advanced with minimal volume reduction towards the base of tongue. The extent of the volume reduction of the pharyngeal portion of the flap was determined by palpation (Figure 3). The incision was closed with 3/0 nylon suture. One week after the debulking the tracheotomy was successfully closed.

Case 2– Aesthetic recontouring of a revascularized bilaminar fasciocutaneous radial forearm free flap used for reconstruction of the upper lip.

A 56-year-old woman was referred to our clinic with a recurrent squamous cell carcinoma of the upper lip after previous surgery and adjuvant radiotherapy. A wide surgical excision of the left upper lip and lateral commissure was performed. The reconstruction with a double-layered free radial forearm flap took place as a second stage procedure, one week after the initial resection when the histopathology report showed the borders of the removed tissue specimen to be free of tumor. The tendon of the palmaris longus muscle, which had been harvested with the flap, was used as a firmament between the two borders of the lip defect and the flap was folded around it. The flap remained vital during the postoperative period. Twelve weeks later, a recontouring procedure was performed under general anesthesia, to optimize aesthetic appearance. Through a small stab incision on the edge of the flap distal to the pedicle, the microdebrider was introduced to the subcutaneous layer and excessive fat was removed from the part of the flap forming the upper lip (Figure 4). The lower lip reconstruction was revised with a wedge excision. The flap remained vital after debulking. The patient was discharged the same day. Subsequently, the flap fold was tattooed with red ink to optimize the impression of a vermillion (Figure 5). After surgery the circumference of the mouth was reduced, but the patient could still wear her dentures. The functional and cosmetic result of her upper lip was satisfactory to the patient.

DISCUSSION

The best reconstruction is when the tissue transferred has just the right size to repair the defect created by the resection However it is not easy to determine the necessary amount of tissue transfer. Acute injury reactions triggered by the surgery cause tissue edema. The free revascularized flap atrophies because of lack of neural stimulation. Thus the reconstructed area changes character in the

Figure 2. *Six weeks after reconstruction of the whole tongue with a musculocutaneous free rectus abdominus flap. Removal of the tracheotomy cannula was not possible due to excessive flap volume.*

Figure 3. *Microdebrider inserted via a small incision at the edge of the flap. Excessive tissue is removed. Immediate volume reduction is visible.*

Figure 4. *Recontouring with microdebrider of the reconstructed upper lip.*

postoperative period. To prevent inadequate reconstruction, frequently too-bulky flaps are transferred to the recipient site, expecting these to atrophy over time.

Although primary debulking after the harvesting and before the placement of the flap is described,[4,5] it does not address the issue of necessary recontouring after the reconstructed site settles. Delayed recontouring allows the surgeon to assess the amount of excess tissue more accurately, after the edema of the surgery subsides and muscle components of the free flaps atrophy. With the introduction of minimally invasive techniques in surgery, it has become possible to perform recontouring through small incisions that limits disruption of newly formed capillary network between the flap and the recipient tissue.

Figure 5. *Result after recontouring of the upper lip and wedge excision of the lower left lip. The flap fold was tattooed with red ink to optimize the impression of a vermillion.*

Liposuction is one of these minimally invasive techniques that have been used with success,[7-9] In this technique, the suction device enters the skin through a small stab incision on the edge of the flap and the excess tissue is removed by rapid back-and-forth tunneling movements under high-pressure vacuum. In the authors' opinion the rapid movements necessary limits the accuracy of the recontouring. Furthermore fibrotic tissues cannot be removed by liposuction.

Microdebrider is another device that can be used in minimally invasive fashion to recontour flaps[10-12] Rapid movements of the tip are not necessary and the tip can be guided by palpation, which can make the deliberate debulking of only the desired areas more likely. As in the first reported case the bulk of the transferred flap is desired in the oral cavity and not in the pharynx. The pharyngeal potion of the flap can be selectively recontoured with ease. The whole procedure takes less than half an hour and can be performed as day-surgery. Microdebrider is a device frequently used for endoscopic paranasal sinus operations and is readily available in any otorhinolaryngology clinic.

Conclusion

Secondary recontouring of flap reconstructions of the head and neck area, after the size of the flap is settled, can be easily performed, in a minimally invasive fashion, with the help of a microdebrider. The procedure allows accurate volume reduction in the desired areas and can be performed as day-surgery.

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