

RECTUS ABDOMINIS FLAP FOR ORAL AND MAXILLOFACIAL RECONSTRUCTION

RECTUS ABDOMINIS REŽANJ ZA REKONSTRUKCIJE U ORALNOJ I MAKSILOFACIJALNOJ HIRURGIJI

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Abstract

The rectus abdominis flap (rectus abdominis myocutaneous flap) is one of the most popular flap for soft tissue reconstruction of the head and neck regions in Japan.

One hundred twenty-seven patients underwent oral and maxillofacial reconstruction using rectus abdominis flap at the department of maxillofacial surgery, Tokyo Medical and Dental University in Tokyo and Department of Oral and Maxillofacial Surgery, Shizuoka City Hospital in Shizuoka City. There were a little postoperative complications including 2 total necroses, 5 infections, and 3 wound dehiscence. Partial necrosis was observed only in the superficial layer of very small part of skin paddle of 5 cases. They were not related with wound dehiscence and infection.

This flap has many advantages, as follows: 1) The nutrient pedicle is anatomically stable with adequate length and size for anastomosis, 2) The large skin paddle with very rich vascularity can be harvested, 3) The flap can be variously modified for reconstruction sites. 4) Two teams can perform tumor ablation and harvesting flap at the same time. 5) The donor site morbidity is very low.

The principles on this flap including surgical anatomy, technique to elevate the flap, various modifications for reconstruction sites, indication and contraindication, and clinical cases, were introduced.

Key words: Oral and maxillofacial reconstruction, rectus abdominis flap, oral carcinoma

Introduction

In 1979, Holmstrom firstly reported breast reconstruction using free rectus abdominis flap.¹ Taylor et al.,² and Boyd et al.,³ described the clinical technique and vascular anatomy in detail in 1983 and 1984. In 1986, Nakatstuka et al.⁴ reported excellent results of head and neck reconstruction using rectus abdominis flap. And then, this flap has been very popular as a very

Kratak sadržaj

Rectus abdominis miokutani režanj (rectus abdominis režanj) jedan je od najpopularnijih režnjeva u rekonstrukciji mekog tkiva regije glave i vrata u Japanu.

Sto dvadeset sedam pacijenata podvrgnuto je oralnoj maksilofacijalnoj rekonstrukciji korišćenju rectus abdominis režnja na Odeljenju za maksilofacijalnu hirurgiju, Tokio, Medicinskog i stomatološkog fakulteta i Odeljenju oralne i maksilofacijalne hirurgije Šizoka gradske bolnice. Postoperativne komplikacije su bile veoma retke. Kod 2 pacijenta se razvila totalna nekroza, kod 5 infekcija i kod 3 dehicijencija rane. Parcijalna nekroza je nošena samo u površinskom sloju veoma malih delova kutanih isečaka u 5 slučajeva. Međutim, one nisu bile u vezi sa dehiscencijom rane i infekcijom.

Ovaj režanj ima brojne prednosti, naime: 1) nutritivna peteljka je anatomski stabilna, sa adekvatnom dužinom i veličinom za anastomozu, 2) moguće je uzimanje velikog, bogato vaskularizovanog komada kože, 3) režanj se može na različite načine modifikovati i prilagoditi mestu rekonstrukcije, 4) dva tima mogu izvoditi u isto vreme ablaciju tumora i uzimanje režnja, 5) stopa morbiditeta lokalizacije-donatora vrlo je niska.

Usvojeni su i principi u pogledu korišćenja ovog režnja, uključujući hiruršku anatomiju, tehniku elevacije režnja, različite modifikacije za mesta rekonstrukcije, kliničke slučajeve i dr.

Ključne reči: oralna i maksilofacijalna rekonstrukcija, rectus abdominis režanj, oralni karcinom

Uvod

Holmstrom je 1979. prvi saopštio rekonstrukciju dojke slobodnim rectus abdominis režnjem.¹ Taylor i Boyd sa saradnicima^{2,3} su detaljno opisali kliničku tehniku i vaskularnu anatomiju 1983. i 1984. godine. Nakatstuka i sar.⁴ su 1986., prvi saopštili odlične rezultate rekonstrukcije glave i vrata pomoću rectus abdominis režnja. Tada je ovaj režanj

reliable flap.⁵⁻⁷ According to our experiences of 127 cases of rectus abdominis flap, this flap is considered to be one of the most reliable and suitable flaps for oral and maxillofacial soft tissue reconstruction.

In this paper, the principles on this flap 1) Surgical anatomy, 2) Technique to elevate the flap, 3) Various modifications for reconstruction sites, 4) Indication and contraindication, 5) Complications, 6) Cases report, were introduced.

A) Surgical Anatomy

The rectus abdominis myocutaneous flap is nourished by the deep inferior epigastric artery system. This artery arises from the external iliac artery and it ascends under the rectus abdominis muscle. In the paraumbilical region, 4 or 5 large perforators arise and penetrate the rectus abdominis muscle and anterior rectus sheath (Figure 1).

These perforators anastomose with the lower intercostals artery, subcostal artery, lumbar

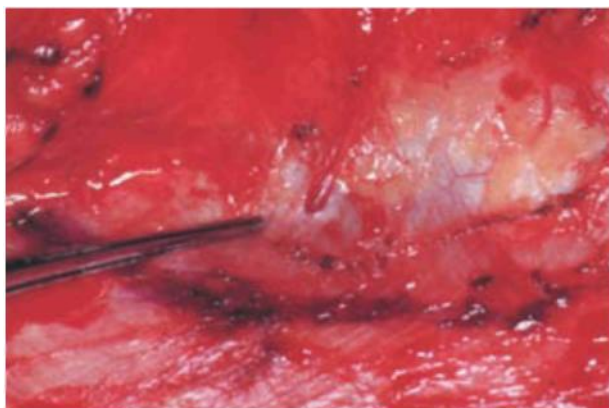


Figure 1. A large perforator is penetrating through the anterior rectus sheath in the paraumbilical region.

Slika 1. Veliki perforator penetrira prednji rectus omotač u paraumbilikalnoj regiji

artery, superficial epigastric artery, superficial and deep circumflex iliac arteries, as well as the external pudendal artery. The extensive abdominal skin can be nourished only by one or two large perforators.

The average length of the vascular pedicle is 13cm. the average diameter of these vessels at the origin is 3.4 mm for the artery, and 2.5 to 4.4 mm for the vein.

B) Designs of flap

As 1 or 2 perforators in the paraumbilical region can nourish large abdominal skin, skin

postao veoma popularan zbog svoje pouzdane vaskularizacije⁵⁻⁷ po našim iskustvima sa 127 slučajeva, *rectus abdominis* miokutani režanj smatra se jednim od najkorisnijih i najpogodnijih reznjeva za oralnu i maksilofacijalnu rekonstrukciju mekog tkiva.

U ovom radu su opisane karakteristike reznja kao što su: 1) hirurška anatomija, 2) tehnika elevacije reznja, 3) različite modifikacije za mesta rekonstrukcije, 4) indikacije i kontraindikacije, 5) komplikacije, 6) klinički slučajevi.

A) Hirurška anatomija

Rectus abdominis miokutani režanj ishranjuje duboki inferiorni epigastrični arterijski sistem. Ova arterija polazi iz eksterne ilijačne arterije i pruža se ascendentno ispod *rectus abdominis* mišića. U paraumbilikalnoj regiji, četiri ili pet velikih perforatora polaze i penetriraju *rectus abdominis* mišić i prednji *rectus* omotač (Slika 1).

Ovi perforatori anastomoziraju sa donjom interkostalnom arterijom, supkostalnom arterijom, lumbalnom arterijom, površinskom epigastričnom arterijom, površinskim i dubokim cirkumfeksnim ilijačnim arterijama, kao i sa spoljašnjom stidnom arterijom. ekstenzivna koža abdomena može se ishraniti samo sa jednim ili dva velika perforatora.

Prosečna dužina vaskularne peteljke je 13 cm. Prosečan prečnik ovih sudova je na početku 3.4 mm za arteriju i 2.5-4.4 mm za venu.

B) Oblici reznja

Kako jedan ili dva perforatora u paraumbilikalnoj regiji mogu da ishranjuju obimnu kožu abdomena, isečak kože („paddle“ - isečak oblika vesla) se može uzeti u različitim pravcima sa bazom u paraumbilikalnoj regiji - vertikalno, koso, transverzalno, kako je prikazano na slici 2.

C) Hirurška tehnika

1) Uzimanje reznja: Hirurška tehnika uzimanja uzorka

Koža se incizira do fascije a kutani isečak podiže iznad fascije spoljašnjeg kosog i *rectus abdominis* mišića, lateralno ka medijalnom. Kutani režanj treba pažljivo podići iznad prednjeg *rectus* omotača od lateralne ivice *rectus* mišića do umbilikusa. Mogu se identifikovati

paddle can be designed in various directions based on paraumbilical region such as vertical, oblique and transverse directions, as shown in Figure 2.

C) Surgical technique

1) Surgical technique of harvesting flap

A skin is incised to the fascia and the skin paddle was elevated carefully over the fascia of the external oblique and rectus abdominis muscle from lateral to medial. And some large perforators, penetrating the rectus sheath can be identified (Figure 1). At lateral border of the rectus abdominis muscle, the anterior rectus sheath is incised vertically and lateral border of the rectus abdominis muscle is exposed. From the lateral border of the rectus muscle, the space between the rectus muscle and the posterior rectus sheath is bluntly dissected with fingers or hemostat by cutting intercostal vessels and nerve. The deep inferior epigastric artery and veins can be easily identified under the rectus muscle and in the preperitoneal areolaral tissue.

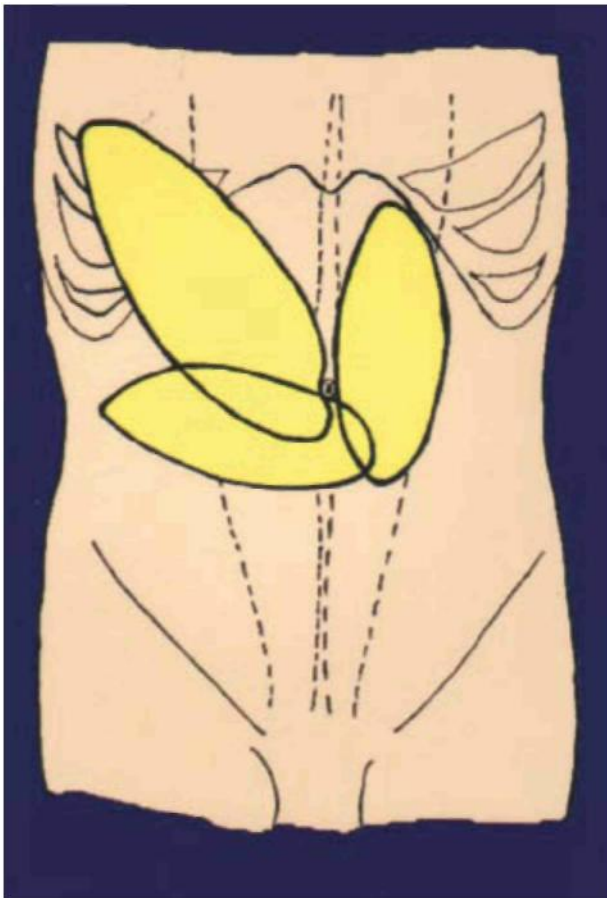


Figure 2. Designs of rectus abdominis flap: Skin paddles are designed based on the paraumbilical region.

Slika 2. Oblici rectus abdominis reznja: kožni isečci (oblika vesla) oblikovani su sa bazom u paraumbilikalnoj regiji.

neki veliki perforatori koji probijaju *rectus* omotač (Slika 1). Na lateralnoj ivici *rectus abdominis* mišića, prednji *rectus* omotač incizira se vertikalno a ekspanira lateralna ivica *rectus abdominis* mišića. Od lateralne ivice mišića, vrši se tupa disekcija (prstima ili hemostatom) prostora između *rectus* mišića i posteriornog *rectus* omotača presecanjem interkostalnih sudova i nerva. Duboka inferiorna epigastrična arterija i vene mogu se lako identifikovati ispod

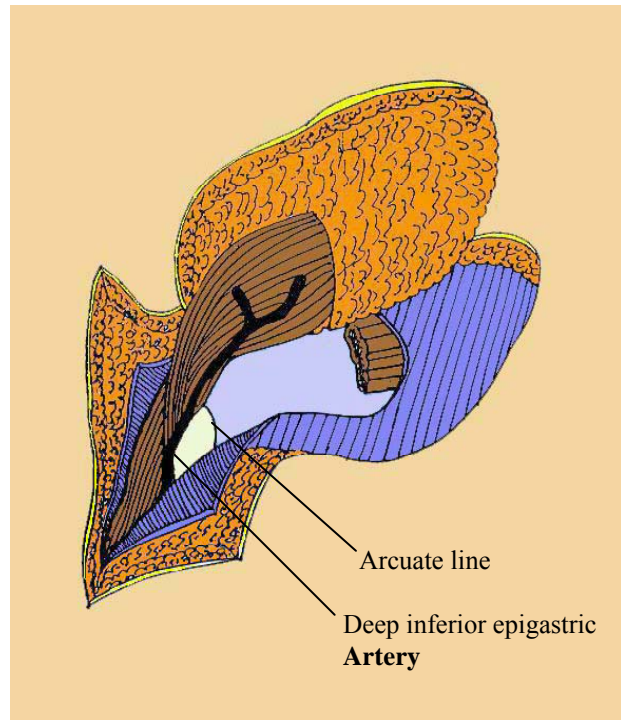


Figure 3. Island rectus abdominis flap is elevated
Slika 3. Ostrvo rectus abdominis reznja je podignuto

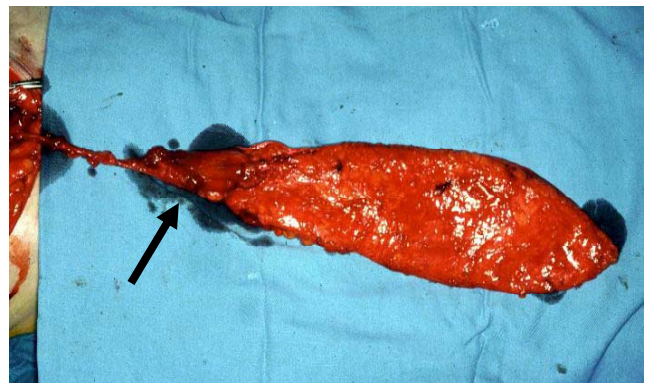


Figure 4. 20 x10 cm sized muscle diminished flap. Very small amount of rectus muscle (Arrow) is preserved only around the large perforator

Slika 4. Redukovani mišićni reznja veličine 20 x 10 cm. Sačuvana je vrlo mala količina *rectus* mišića (strelica) samo oko perforatora

After 2 or 3 large perforators are exposed, the anterior rectus sheath is incised all around as these perforators can be included in the flap. Further incision in the anterior rectus sheath is performed to the origin of nutrient pedicle (external iliac artery and vein) inferiorly. Then the upper part of the rectus muscle, superior to these perforators, is cut and ligated. When the rectus is turned over from the posterior sheath, the inferior epigastric artery can be observed on the posterior surface of the rectus muscle. the lower part of the rectus muscle is cut and ligated carefully not to damage the inferior epigastric artery. Then the deep inferior epigastric vessels is gently dissected to its origin of the medial wall of the external iliac artery. The region below the arcuate line must be carefully handled not to perforate the peritoneum, because the posterior rectus sheath is absent and the extremely fragile peritoneum contacts directly the posterior surface of the rectus muscle. Small branches of the deep inferior vessels should be carefully ligated (Figure 3). Finally, the island flap is harvested by ligation of these vessels at the origin of the external iliac artery and veins.

2) Muscle diminishing^{6,7}

When some of large perforators can be identified at the anterior rectus sheath, one or two large perforators includes the flap. The largest perforators arises slightly lateral to the midline of the rectus muscle near the umbilicus.⁸ Only small anterior rectus sheath around the large perforators is involved in the flap. Then muscle and sheath are carefully separated so as not to break the continuity of the deep inferior epigastric vessels and these perforators. Only a small amount of muscle is preserved around the perforators (Figure 4).

3) Skin thinning

The subdermal vascular plexus of the skin paddle is well documented. A thin flap of *rectus abdominis* flap was firstly reported in 1991⁹ and then many papers on usefulness of this flap were reported.^{5,9}

Although most of subcutaneous fat can be removed, the subdermal vascular plexus have to be preserved. Furthermore, the full thickness of subcutaneous fat should be preserved only around the perforators in the paraumbilical region.

rectus mišića i u pre-peritonealnom areolarnom tkivu.

Pošto se dva ili tri velika perforatora eksponiraju, prednji *rectus* omotač se incizira u okolini ovih perforatora, pošto se oni mogu uključiti u režanj. Dalja incizija prednjeg *rectus* omotača pravi se do ušća arterije za ishranjivanje, spoljašnje ilijačne arterije i vene inferiorno.

Tada se vrši presecanje i podvezivanje gornjeg dela *rectus* omotača, superiorno u odnosu na ove perforatore. kada se *rectus* odvoji od posteriornog omotača, donja epigastrična arterija može se identifikovati na posteriornoj površini *rectus* mišića. Donji deo *rectus* mišića se pažljivo preseca i podvezuje, tako da ne dođe do povrede donje epigastrične arterije. Tada se vrši pažljiva disekcija dubokih inferiornih epigastričnih sudova do početka medijalnog zida spoljašnje ilijačne arterije. Sa regijom ispod lučne linije mora se pažljivo postupati tako da se ne perforira peritoneum, zbog toga što je posteriorni *rectus* omotač odsutan a vrlo osetljivi peritoneum dolazi u direktan kontakt sa posteriornom površinom *rectus* mišića. Male ogranke dubokih inferiornih sudova treba pažljivo podvezati (Slika 3). Konačno, režanj oblika ostrva uzima se ligacijom ovih sudova na početku spoljašnje ilijačne arterije i vena.

2) Redukcija mišića^{6,7}

Kada se neki od velikih perforatora mogu identifikovati na prednjem *rectus* omotaču, jedan ili dva velika perforatora uključuje režanj. Najveći perforator pojavljuje se donekle lateralno u odnosu na središnju liniju *rectus* mišića u blizini nivoa umbilikusa.⁸ Jedino je mali anteriorni *rectus* omotač oko velikih perforatora uključen u režanj. Tada se mišić i omotač pažljivo odvajaju tako da se ne naruši kontinuitet dubokih inferiornih epigastričnih sudova i ovih perforatora. Oko perforatora biva sačuvana samo mala količina mišićnog tkiva (Slika 4).

3) Tanjenje kože

Subdermalni vaskularni pleksus kutanog isečka dobro je dokumentovan. Tanki režanj *rectus abdominis* reznja prvi je put saopšten 1991⁹.

Može se ukloniti više od 2/3 potkožnog masnog tkiva. Ipak, subdermalni vaskularni pleksus mora se sačuvati. Uz to, oko perforatora u paraumbilikalnoj regiji treba sačuvati pun promer potkožnog masnog tkiva i tada su

D) Postoperative care of the donor sites

Patients should be kept in resting position for 3 to 5 days after the operation. And the tight abdominal bandage should be placed at least 2 weeks. drainage tube can removed several days following the operation.

E) Results and case reports

One hundred twenty-seven patients underwent oral and maxillofacial reconstruction using rectus abdominis flap at the department of maxillofacial surgery, Tokyo Medical and Dental University in Tokyo and department of Oral and maxillofacial surgery, Shizuoka City Hospital in Shizuoka City. Postoperative complications were very rare. Two patients developed total necrosis due to arterial and venous thromboses, respectively. But partial necrosis was rarely seen in this series. Partial necrosis were observed only in the superficial layer of very small part of skin paddle of 5 cases. therefore, they were not related with wound dehiscence and infection. Five patients developed infections. And there were 5 wound dehiscence.

As dead space were almost filled with flap, these infections were easily controlled without any subsequent complications.

Two patients developed an abdominal herniation. one of these patients developed infection of the donor site a few days after operation. The infection was controlled easily. However the lower abdominal sheath had sagged gradually. Finally, these two patients were revised at department of digestive surgery.

Three representative cases were presented as follows,

Case 1. Subtotal glossectomy

A 43-year-old man suffered from squamous cell carcinoma of the tongue with the adjacent tissue involvement and cervical lymph nodal metastasis (T3N2bM0). After preoperative chemo-radiotherapy, he underwent subtotal glossectomy including block resection of the mandible and radical neck dissection. These defects were reconstructed simultaneously using Ao reconstruction plate and rectus abdominis flap. A 11x7 cm sized skin paddle with vertical axis from the umbilicus was elevated (Figure 5).

After laryngeal suspension, the tongue defect was covered with heaped up proximal portion of the skin paddle. The rectus muscle was set mainly into the dead space inside and under

saopšteni mnogi radovi o upotrebljivosti ovog reznja. ,

D) Postoperativno zbrinjavanje mesta-donatora

Pacijenti po operaciji treba da miruju 3-5 dana. Čvrst abdominalni zavoj treba držati bar 2 nedelje. Dren se može ukloniti nekoliko dana posle operacije.

E) Rezultati i saopštenja o slučajevima

Sto dvadeset sedam pacijenata podvrgnuto je oralnoj i maksilofacijalnoj rekonstrukciji korišćenjem rectus abdominis reznja na odeljenju za maksilofacijalnu hirurgiju, Tokio Medicinskog i stomatološkog univerziteta u tokiju i odeljenju oralne i maksilofacijalne hirurgije Šizuoka gradske bolnice. Postoperativne komplikacije su bile veoma retke. kod

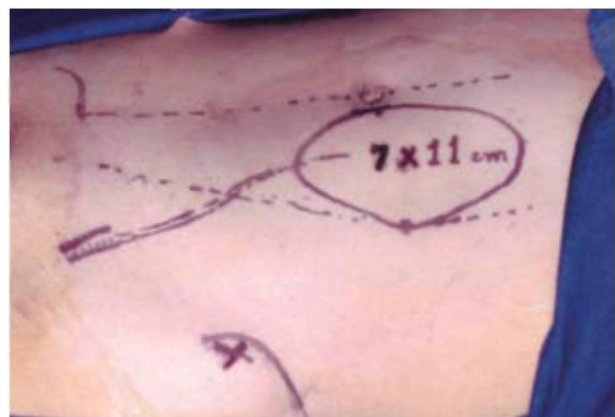


Figure 5. Design of vertically axised skin paddle
Slika 5. Oblik vertikalnog kutanog isečka



Figure 6. Postoperative intra-oral view
Slika 6. Postoperativni intraoralni prikaz



Figure 7. The posterior half of the hard and most of the soft palate will be resected

Slika 7. Planirana resekcija posteriorne polovine tvrdog i većeg dela mekog nepca

the reconstruction plate. the nutrient vessels were anastomosed to the superior thyroid artery and external jugular vein. The postoperative course was uneventful (Figure 6). The patient could take liquid food 2 weeks after the operation, and speech function was also acceptable.

Case 2. Oropharyngeal defect

A 66-year-old man underwent resection of a half hard palate, whole soft palate and the left lateral pharynx due to adenoid cystic carcinoma of the palate (Figure 7).

The defect was reconstructed only with skin component of the rectus abdominis flap. The rectus muscle was positioned in the upper neck region and the skin paddle was pulled through the lateral pharyngeal space inside of the mandible from the submandibular region. In order to prevent the drooping flap, skin paddle was sutured to the remaining maxilla and nasal sep-

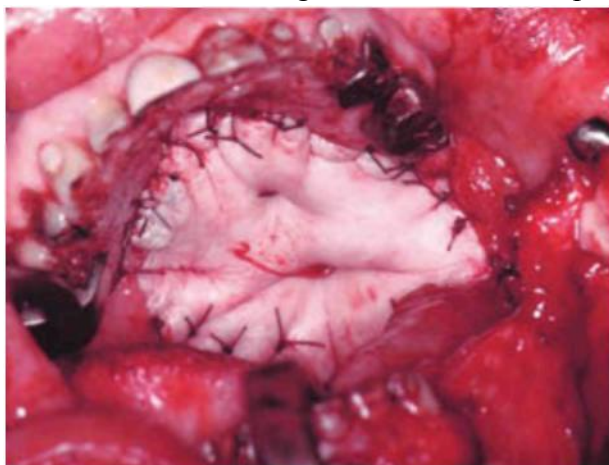


Figure 8. Just after reconstruction using skin component of rectus abdominis flap. The rectus muscle was positioned in the submandibular region Slika 8. Neposredno nakon rekonstrukcije kožnim delom rectus abdominis reznja. Deo rectus abdominis mišića je pozicioniran u submandibularnoj loži

dva pacijenta razvila se totalna nekroza usled arterijske i venske tromboze, ali parcijalna nekroza je retko opažena u ovoj seriji. Parcijalna nekroza je primećena jedino u površinskom sloju veoma malih delova kutanih isečaka kod pet slučajeva. Međutim, one nisu u vezi sa dehiscencijom rane i infekcijom. kod pet pacijenata se razvila infekcija i bilo je pet slučajeva dehiscencijerane.

Kako je mrtav prostor skoro u potpunosti ispunjen reznjem ove infekcije su lako kontrolisane bez daljih komplikacija.

Kod dva pacijenta se razvila abdominalna herniacija. kod jednog od ovih pacijenata infekcija se razvila na mestu uzimanja reznja nekoliko dana nakon operacije. Infekcija je lako kontrolisana. Međutim, donji abdominalni omotač se postepeno savijao. Na kraju, ova dva pacijenta su podvrgnuta ponovnoj intervenciji na Odeljenju digestivne hirurgije. Prikazaćemo vam tri reprezentativna slučaja:

Slučaj 1. Suptotalna glosektomija

Pacijent je četrdesetogodišnji muškarac koji ima skvamocelularni karcinom jezika, uz invaziju susednog tkiva i metastaze u limfne sudove vrata (T3N2bM0). Nakon preoperativne hemio-radioterapije, podvrgnut je suptotalnoj glosektomiji koja obuhvata blok-resekciju mandibule i radikalnu disekciju vrata. ovi su defekti rekonstruisani simultano pomoću AO rekonstruktivne ploče i *rectus abdominis* reznja. Izvodi se elevacija kutanog isečka veličine 11 x 7 cm sa vertikalnom osom od umbilikusa (Slika 5).

Nakon laringealne suspenzije, defekt jezika prekriven je zbijenim proksimalnim delom kutanog isečka. *Rectus* mišić bio je postavljen uglavnom u „mrtvi prostor“ unutar i ispod metalne ploče. Sudovi za ishranjivanje bili su anastomozirani za gornju tiroidnu arteriju i spoljašnju



Figure 9. Six months after primary surgery Slika 9. Šest meseci nakon primarne operacije

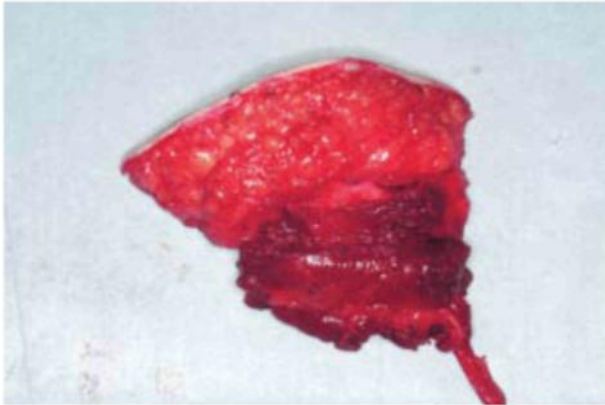


Figure 10. Harvested thick skin paddle
Slika 10. Podignut debeli kožni deo reznja

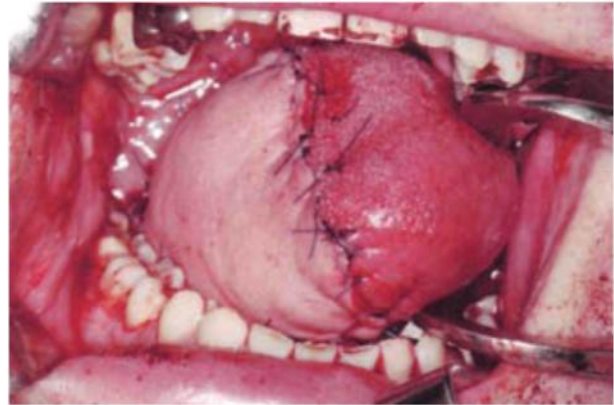


Figure 12. Just after reconstruction
Slika 12. Neposredno nakon rekonstrukcije

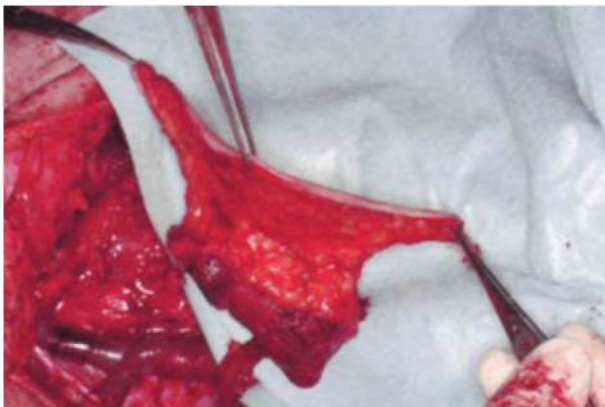


Figure 11. Skin paddle after skin thinning except around the main perforator
Slika 11. Kožni deo posle tanjenja kožnog dela reznja, izuzev oko glavnog perforatora



Figure 13. Two years after reconstruction
Slika 13. Dve godine nakon rekonstrukcije

tum. In addition, nasal airway was inserted bilaterally to keep air way space and was filled the space with flap volume as well as possible to diminish insufficient nasopharyngeal closure (Figure 8). The post operative course was uneventful (Figure 9). The patient could communicate well with a slight nasality and swallow well.

Case 3. Hemiglossectomy (thin flap)

A 56-year-old man was referred to our clinic with carcinoma of the tongue (T3N2bM0). After preoperative chemo-radiotherapy, the patient underwent modified radical neck dissection, hemiglossectomy and oral reconstruction using rectus abdominis flap. Although the radial forearm flap was usually indicated for these defects, the unreliable vascularity of hand was suspected by preoperative Allen's Test. Therefore, these defects were reconstructed using rectus abdominis flap with skin thinning and muscle diminishing.

jugularnu venu. postoperativni tok bio je uredan (Slika 6). Pacijent je 2 nedelje po operaciji mogao da uzima samo tečnu hranu. Međutim, funkcija govora nije bila zadovoljavajuća.

Slučaj 2. Orofaringealni defekt

Muškarac star 66 godina podvrgnut je resekciji polovine tvrdog nepca, celog mekog nepca i unilateralnog levog farinksa zbog adenoidnog cističnog karcinoma nepca (Slika 7).

Defekt tvrdog nepca, mekog nepca i lateralnog farinksa rekonstruisan je samo kutanom komponentom *rectus abdominis* reznja. *Rectus* mišić je pozicioniran u gornju regiju vrata a kutani isečak je provučen kroz lateralni faringealni prostor unutar mandibule od submandibularne regije do orofaringealne šupljine. Da bi se sprečilo opuštanje reznja, kutani isečak je ušiven za preostalu maksilu i nazalnu septu. Uz to, nazalni disajni put ubačen je bilateralno da zadrži disajni prostor ispunjen volumenom reznja kao i da smanji nedovoljno nazofaringealno zatvaranje (Slika 8). Postoperativni tok bio je uredan (Slika 9). Pacijent je mogao dobro da

Most of subcutaneous fat were removed except the surrounding tissue of the perforators (Figure 10 - 12). The postoperative course was uneventful. And a postoperative function in speech was also excellent and considered to be almost the same as that of radial forearm flap (Figure 13).

Discussion

Rectus abdominis faps are applied in patients with relatively large soft tissue defect.

More than 20 years ago, the pectoralis major flap was mainly used for such a kind of defect at our department. However, in our experience of pectoralis major faps, partial necrosis of the skin paddle sometimes occurred. The unreliable vascularity of this flap had been a big problem for us.

Baek et al.,¹⁰ reported 2 total necroses (7%) and 9 partial necrosis (29%), and 18 orocutaneous fistula (32%) in 31 cases of intraoral reconstruction using pectoralis major flap.¹⁰

Shah et al.¹¹ also reported 63% of complication including 3% total necrosis and 29% of partial necrosis in head and neck reconstruction using pectoralis major flap.

In 1986, Nakatstuka et al first reported excellent results of head and neck reconstruction using rectus abdominis flap.⁴ Then our flap choice shifted from pectoralis major flap to the rectus abdominis flap. And postoperative complications have been remarkably decreased.

Defects after total or subtotal glossectomy seem to be one of the best indication for rectus abdominis flap.

Far higher level of reconstructed tongue are required for postoperative speech and swallowing function. However, a flattened reconstructed tongue are often observed about 6 months postoperatively in most reconstructions with various myocutaneous flap, such as pectoralis major flap, rectus abdominis flap, latissimus dorsi flap, etc. The height of reconstruction tongue comes down gradually due to drooping flap. Suspension technique may be helpful to preserve the position of reconstruction site. the anterior rectus sheath is sutured and fixed to the adjacent hard tissue against flap drooping.

komunicira (uz blagu nazalnost glasa) i da dobro guta.

Slučaj 3. Hemiglosektomija (tanki režanj)

Muškarac star 56 godina upućen je našoj klinici zbog karcinoma jezika (T3N2bM0). Nakon preoperativne hemio-radioterapije, pacijent je podvrgnut radikalnoj disekciji vrata, hemiglosektomiji i oralnoj rekonstrukciji pomoću rectus abdominis reznja. Mada je radijalni režanj podlaktice obično indikovano kod ovih defekata, preoperativni Allenov test detektovao je nepouzdanu vaskularizaciju šake. zbog toga su ovi defekti bili rekonstruisani pomoću istanjenog rectus abdominis sa redukcijom mišića. Veći deo supkutanog masnog tkiva bio je uklonjen izuzev oko perforatora (Slika 10 - 12). postoperativni tok bio je uredan. postoperativna funkcija bila je takođe odlična i smatrana skoro istom kao funkcija kod radijalnog podlaktičnog reznja (Slika 13).

Diskusija

Rectus abdominis reznjevi primenjeni su kod pacijenata sa relativno velikim defektom mekog tkiva.

Pectoralis major miokutani režanj uglavnom se koristi na našem odeljenju za slične defekte već više od 20 godina. Međutim, prema našim iskustvima sa pectoralis major reznjevima sa delimična nekroza kožnog dela reznja se ponekad pojavljuje. Različitost u vaskularizaciji ovih reznjeva predstavljaju veliki problem.

Baek i sar. ustanovili su, koristeći pectoralis major režanj, 2 totalne nekroze (7%), 9 parcijalnih nekroza (29%), i 18 orokutanih fistula (32%) u 31 slučaju intraoralne rekonstrukcije.¹⁰ Shah i sar.¹¹ su koristeći pectoralis major režanj takođe ustanovili 63% komplikacija uključujući 3% totalnih nekroza i 29% parcijalnih nekroza u rekonstrukciji glave i vrata.

Nakatstuka i sar. su 1986. god. prvi saopštili odlične rezultate u rekonstrukciji glave i vrata koristeći rectus abdominis režanj.⁴ Stoga se naš izbor sa pectoralis major reznja preusmerio na rectus abdominis režanj. Postoperativne komplikacije su značajno smanjene.

The postoperative atrophy of fap is one of the additional reasons for fattened tongue. Denervation atrophy occurs more severely in the muscle than in the skin. For prevention of these reconstructed sites atrophy, we reconstruct these tongue defects mainly using skin component of the rectus abdominis fap. If the rectus muscle was positioned in the submandibular region, intraoral defects could be reconstructed only using skin component. For reasons of these above facts, rectus abdominis fap was preferred to pectoralis major faps at our departments. overcorrection were also strongly recommended.

According to my knowledge, latissimus dorsi fap is usually applied for these soft tissue defects in Europe. However, this procedure requires two times of positioning change. And two teams approaches, including for tumor ablation and harvesting fap, can not be performed at the same time. It must be extremely time consuming. In rectus abdominis fap reconstructions, all these procedures can be done in a supine position by two teams simultaneously.

The maximum size of skin paddle of our experiences of rectus abdominis fap was 23x10 cm. The size of skin paddle must be sufficient in most of defects of head and neck regions.

Of the major disadvantages of rectus abdominis fap, the thickness of fap must be considered to be too bulky in obese patients. However, skin thinning technique, as shown before, solves this problem to some extent. The pliability of rectus abdominis fap is not superior to that of radial forearm fap. But they were relatively acceptable. The vascular pedicle (the average length :13cm) is also long enough for access to most of oral and maxillofacial regions. Each component of rectus abdominis fap is anatomically very stable and it is very simple to harvest these faps. The donor site morbidity is also very low. Our indications of rectus abdominis faps in oral and maxillofacial regions are as follows:

- 1) defects after total and subtotal glossectomy,
- 2) large defect of the hard and soft palate,
- 3) larger soft tissue defects of intra and extraoral region,
- 4) an alternative fap of radial forearm fap in patients with abnormal vascularity of the hand,
- 5) skull base linings, etc.

As a contraindication, we don't apply it for a young lady, who will be pregnant in the future.

Of hard tissue reconstruction, scapula is mainly applied at our clinic. However, vascularized bone fap is relatively invasive for elderly patients due to a long operating time and requirement of postoperative rehabilitation. For cases after mandibular resection, combination of titanium reconstruction plate and rectus

Defekti nakon totalne ili subtotalne glosektomije čini se da predstavljaju jedan od najboljih pokazatelja za rectus abdominis režanj. Mnogo viši nivo rekonstrukcije jezika potreban je za postoperativne funkcije govora i gutanja.

Međutim, jezik poravnjan rekonstrukcijom obično zahteva šestomesečni postoperativni period u većini rekonstrukcija sa različitim mukutanim režnjem, kao što je pectoralis major režanj, rectus abdominis režanj, latissimus dorsi režanj, itd. Visina rekonstrukcije jezika snižava se postepeno usled opuštanja režnja. Tehnika suspenzije može biti korisna za zaštitu pozicije rekonstruisane strane. prednji rectus omotač je sašiven i pričvršćen za susedno čvrsto tkivo radi sprečavanja opuštanja režnja.

Postoperativna denervaciona atrofija režnja jedan je od dodatnih razloga za gladak jezik. Denervaciona atrofija češće nastaje na mišićima nego na koži. U cilju prevencije atrofije ovih rekonstruisanih delova, ove defekte jezika uglavnom rekonstruišemo koristeći kutanu komponentu. Kada bi se rectus mišić nalazio u submandibularnoj regiji, intraoral ni defekti bi mogli biti rekonstruisani samo korišćenjem komponente kože. Usled gore pomenutih činjenica, rectus abdominis režanj je na našem odeljenju zastupljeniji od pectoralis major režnja. Ponovne korekcije se takođe preporučuju.

Prema sopstvenim saznanjima, latissimus dorsi miokutani režanj se često aplikuje u Evropi za defekte mekog tkiva. Međutim, ova procedura zahteva dvostruki tim. Uz to, dva tima ne mogu istovremeno da izvode ablaciju tumora i uzimanje režnja. Ono mora biti završeno tačno na vreme. U rekonstrukciji rectus abdominis režnja, svi ovi postupci mogu biti izvedeni u ležećem položaju, simultano sa dva tima.

Maksimalna veličina kutanog isečka rectus abdominis režnja prema našim iskustvima bila je 23 x10 cm. Veličina kutanog isečka mora biti dovoljna kod većine defekata regije glave i predela vrata. Jedan od najvećih nedostataka rectus abdominis režnja jeste to što je režanj predebeo kod gojaznih osoba. Međutim, tehnika "ta-njenja" kože, kako je opisana gore, u izvesnoj meri rešava ovaj problem. Adaptibilnost rectus abdominis režnja nije fleksibilnija od režnja podlaktice. Ali su one relativno prihvatljive. Vaskularna peteljka (prosečne dužine 13 cm) takođe je dovoljno duga za za aplikaciju u oralnoj i maksilofacijalnoj regiji. Svaka od komponenti rectus abdominis režnja je anatomski veoma stabilna i veoma je jednostavno proizvesti ove režnjeve. Morbiditet mesta donatora vrlo je nizak.

Naše indikacije rectus abdominis režnjeva u oralnoj i maksilofacijalnoj regiji su sledeće: 1) defekti nakon totalne i subtotalne glosektomije, 2) veći defekti tvrdog i mekog nepca, 3) veći defekti mekog tkiva intraoralne i ekstraoralne regije, 4) indikacije za režnjem radijalne podlaktice kod pacijenata sa abnormalnom vaskularnošću šake, 5) oblaganje baze lobanje, itd.

abdominis flap is very useful for these patients. The metal reconstruction plate can be covered completely with very richly vascularized soft tissue, so that postoperative infection following an exposure of the metal significantly decrease.

In conclusion, the rectus abdominis flap has many advantages, such as very rich vascularity, possibilities of various modifications, very low postoperative complications, etc. Rectus abdominis flap is considered to be one of the most suitable flaps for oral and maxillofacial reconstruction.

Kao kontraindikacija, režanj ne aplikujemo kod mladih ženskih osoba koje u budućnosti očekuju trudnoću

U pogledu rekonstrukcije čvrstih tkiva, uglavnom se koriste lopatica i fbula. Ipak, vaskularizovani koštani režanj relativno je invazivan za starije pacijente usled duge operacije i zahteva postoperativne rehabilitacije. Za slučajeve nakon mandibularne resekcije, kombinacija titanijumske rekonstrukcione pločice i rectus abdominis reznja vrlo je dobra indikacija kod ovih pacijenata. Ove metalne rekonstrukcione pločice mogu se potpuno pokriti vrlo bogato vaskularizovanim mekim tkivom, tako da ova procedura može značajno da smanjuje mogućnost postoperativnih infekcija usled izlaganja metalne pločice.

Može se zaključiti da rectus abdominis režanj ima mnoge prednosti, kao što je bogata vaskularizacija, mogućnost raznih modifikacija, veoma malo postoperativnih komplikacija, itd. Rectus abdominis režanj se smatra jednim od najpogodnijih reznjeva u oralnoj i maksilofacijalnoj rekonstrukciji.

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