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## Late-onset Anterolateral Thigh Free Flap Failure in Buccal Carcinoma Reconstruction

### ABSTRACT

**Objective:** To report a case of late-onset anterolateral thigh free flap failure in reconstruction of a defect from excision of buccal carcinoma.

#### Methods:

**Design:** Case Report  
**Setting:** Tertiary Government Training Hospital  
**Patient:** One

**Results:** A 57-year-old man with well-differentiated buccal squamous cell carcinoma underwent wide excision with segmental mandibulectomy, bilateral neck dissection and anterolateral thigh free flap reconstruction. Complete failure of the anterolateral thigh free flap was documented on the 29th post-operative day.

**Conclusion:** Late-onset flap failure is mainly non-vascular in etiology. However, flap failure is more likely multifactorial. Frequent follow-up after hospital discharge is recommended to monitor flap viability.

**Keywords:** *free flap, anterolateral thigh flap, flap failure, microvascular surgery, head and neck reconstruction*

**Free tissue transfer** has become the gold standard in reconstruction of many head and neck defects.<sup>1</sup> Success rates are more than 90%.<sup>2-3</sup> However, failures and complications still occur. Late-onset flap failure is defined as failure occurring 7 days post-operatively or on follow-up visits after hospital discharge.<sup>4</sup>

We present a case of a 57-year-old man with a complete, late-onset anterolateral thigh (ALT) free flap failure in reconstructing the defect from excision of a buccal carcinoma.

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**CASE REPORT**

A 57-year-old man was seen at the outpatient department with an enlarging left buccal mass for six months which started as ulcers, now accompanied by pain and occasional bleeding. (Figure 1) He did not complain of dysphagia, dyspnea, trismus or weight loss. He was a 37-pack-year smoker and consumed 1 bottle of beer 3-4 times per week. He did not have hypertension, diabetes mellitus or radiation exposure and denied any heredofamilial diseases such as cancer.

Physical examination showed an ulcerated mass over the buccal mucosa extending to adjacent structures such as the left soft palate, retromolar trigone and mandibular alveolar ridge. A 1 x 1cm level 1B lymph node was palpable on the left. Contrast computerized tomography scan of the oral cavity showed the buccal mass encasing the ramus of the left mandible with osteolytic changes and necrotic changes in the left masticator space. Biopsy revealed well-differentiated squamous cell carcinoma. Chest radiograph and liver ultrasonogram were unremarkable. He was staged T4aN1M0, Stage IVA based on the American Joint Committee on Cancer (AJCC) Staging, 7<sup>th</sup> edition for oral cavity cancer.

He underwent tracheostomy, modified radical neck dissection on the left, selective neck dissection (levels I-III) on the right, wide excision with segmental mandibulectomy from left body to left ascending ramus via lip-split approach, and reconstruction using ALT flap under general anesthesia. (Figures 2 and 3)

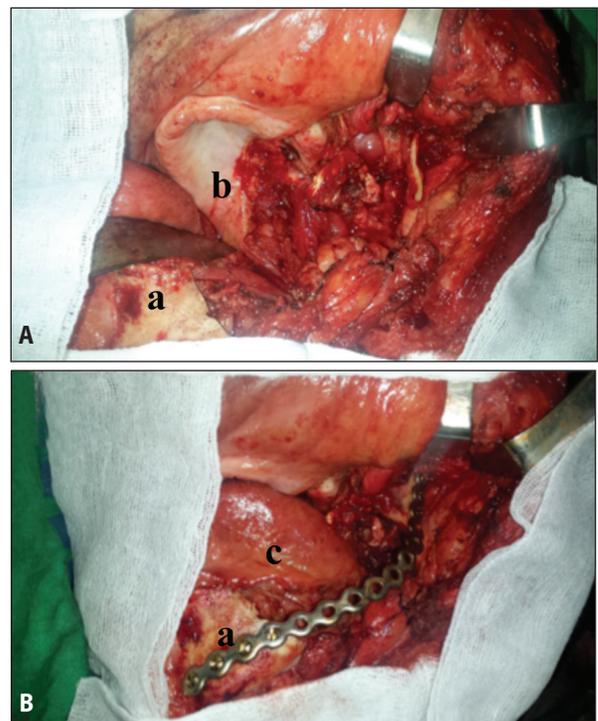
The left ALT fasciocutaneous flap measuring 18 x 6 cm was harvested by elevating the medial portion down to the subfascial layer by cutting the tensor fascia above the rectus femoris muscle. Two musculocutaneous perforators passing through the vastus lateralis and emerging from the pedicle, the descending branch of the lateral circumflex femoral artery (LCFA) and 2 venae comitantes, were identified and dissected. The lateral portion of the flap was cut to complete dissection of the flap. Recipient vessels in the neck were first identified before dividing the pedicle and harvesting the ALT flap.

Partial flap inset with horizontal mattress suturing using absorbable polygalactin suture was done. Using an operating microscope, microvascular anastomosis was done to reestablish perfusion of the flap using nylon 9-0 sutures. The descending branch of the LCFA was anastomosed to the left facial artery and the venae comitantes were anastomosed to tributaries of the left external jugular vein. After anastomosis, there was immediate perfusion of the flap evidenced by presence of bright-red bleeding of the flap edges. Complete flap inset, lip and neck closure and primary closure of the donor site were done. Blood loss was 1500 mL and 2 units of fresh whole blood were transfused. Surgery lasted 17.25 hours.

Flap monitoring using visual inspection and pin prick was done



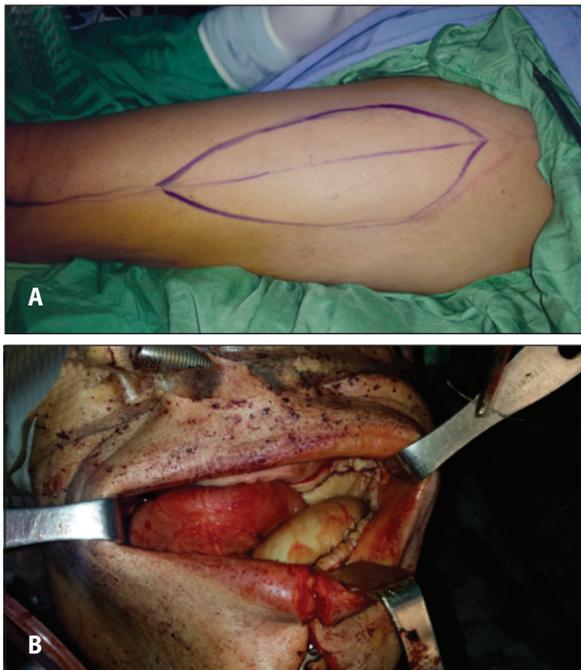
**Figure 1.** Squamous cell carcinoma of left buccal mucosa with extension to the lower alveolar ridge, hard and soft palate, and retromolar trigone



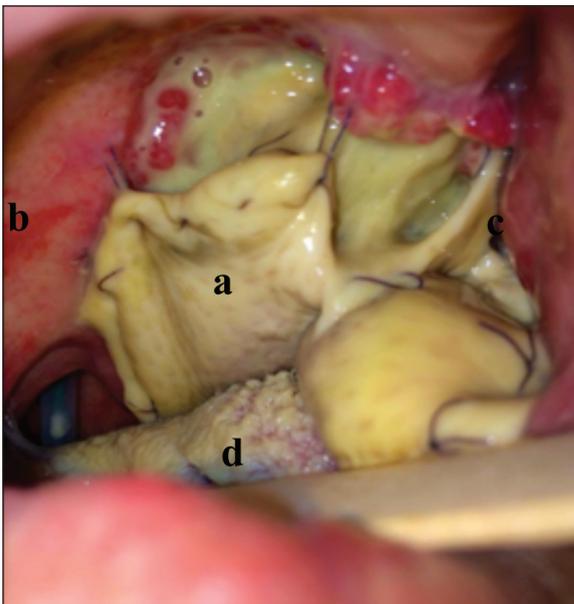
**Figure 2. A.** Actual defect after excision of mass; and **B.** mandibular reconstruction using titanium plates and screws; **a.** Body of mandible; **b.** hard palate; and **c.** tongue

hourly for the first 48 hours, every 4 hours from the 3<sup>rd</sup> to 5<sup>th</sup> post-operative days, and once daily thereafter while admitted. There were no post-operative complications and he was decannulated after 1 week. He was discharged after 10-hospital days without flap dehiscence or discoloration such as bluish or pale flap color.

Follow-up was on a weekly basis. On the 17<sup>th</sup> post-operative day, minimal salivary discharge was noticed from the neck incision site. Conservative management with acetic acid gargle thrice a day was started. Partial dehiscence of the flap was noted on the 24<sup>th</sup> post-operative day and removal of necrotic tissue and resuturing were done.



**Figure 3.** A. Left ALT flap design measuring 18 x 6 cm; and B. flap inset



**Figure 4.** Complete flap necrosis on 29th post-operative day. a. ALT flap, b. hard and soft palate, c. buccal mucosa, and d. tongue.

Complete flap failure was seen on the 29<sup>th</sup> post-operative day and removal was done under local anesthesia. (Figure 4) Granulation and mucosa formation was seen on the bed of the recipient site without plate exposure. The neck fistula spontaneously closed and no additional surgery was done. Adjuvant chemotherapy and radiation were advised but he was not able to comply. Recurrence in the buccal area was seen a year after surgery.

## DISCUSSION

The ALT flap is an extremely versatile flap for head and neck reconstruction providing excellent tissue quality and quantity as well as low donor site morbidity.<sup>5</sup> The large tissue defect created after removal of buccal carcinoma in our patient was the main reason for choosing an ALT flap over other available free flaps.

Vascular occlusion remains the primary reason for flap loss with venous thrombosis being more common than arterial occlusion and majority of flap failures occur within the first 48 hours.<sup>1</sup> Rarely do flaps fail in the late post-operative period. It is not well understood why free flaps can fail after 7 post-operative days.<sup>4</sup>

Wax and Rosenthal reported median time of necrosis at 21 (range 7-90) days.<sup>4</sup> However, none of the 13 patients reported had an ALT free flap. Flap necrosis in our patient was within range but was longer compared to the median time on the 29<sup>th</sup> post-operative day.

Late flap failures were most often due to infection or mechanical stress around anastomosis rather than technical or vascular etiology.<sup>1,4,6</sup> In head and neck reconstruction, wound infection is usually caused by fistula formation or wound dehiscence 4 or 5 days after surgery.<sup>6</sup> Kubo *et al.* found that disruption of anastomosed vessels can occur with high frequency after infection ranging from 3-14 days post-operatively and salivary fistula formation is one of the causes of infection reported.<sup>7</sup>

Small intraoral dehiscence exposes the vascular pedicle of the flap and can cause saliva to leak into the neck where the anastomosis site is located. Saliva carries potential pathogens which may not be part of the normal oral flora.<sup>7</sup> Wound infection causes edema and necrosis promoting thrombus formation.<sup>6</sup> It is one of the possible causes of flap failure in our patient. However, Huang *et al.* showed that postoperative salivary fistulas do not appear to be strongly associated with flap failure in head and neck reconstruction.<sup>8</sup>

The condition and quality of the recipient site also play a large role in flap survival. Young demonstrated that neovascularization develops within 7 to 10 days.<sup>9</sup> However, the flap edges lose contact with skin edges and base of recipient site once fistula or wound dehiscence occurs, delaying revascularization.<sup>6</sup> Thus, wound infection due to salivary fistula may damage anastomosed vessels and delay revascularization leading to flap failure.<sup>6-7</sup>

Blood loss and transfusion may indirectly contribute to flap failure of our patient. Although flap survival was not significantly different comparing patients who were transfused and not transfused with blood, wound dehiscence was significantly increased in patients with transfusion. Fistula formation and wound infection tended to be higher in transfused patients.<sup>10</sup> The blood loss of our patient was 1500mL, which was 3 times more than their findings(499.41+/-163.64),<sup>10</sup> requiring blood transfusion. Animal studies indicate that transfusion



triggers release of inflammatory cytokines such as interleukin-8 which impair wound healing.<sup>11</sup> This may have affected normal wound healing of our patient causing fistula formation and poor revascularization of the ALT flap.

Our patient presented with late-onset ALT fasciocutaneous free flap failure on the 29<sup>th</sup> post-operative day. Wound dehiscence causing salivary fistula may be the cause of flap failure. It may have damaged the anastomosed vessels and delayed revascularization of the flap. Blood loss and transfusion may also have contributed to poor wound healing. Possibly, free flap failure in this case was multifactorial and not due to a single cause.

In conclusion, late-onset flap failures are mostly non-vascular in origin. The presence of a salivary fistula should alert surgeons to the possibility of flap failure. Extensive pre-operative planning, meticulous intraoperative dissection and hemostasis, and timely intervention are necessary to prevent and minimize free flap loss. It is also important to reiterate the importance of frequent follow-up to monitor flap viability and status even after hospital discharge, among patients who undergo free flap reconstruction.

#### REFERENCES

1. Novakovic D, Patel RS, Goldstein DP, Gullane PJ. Salvage of failed free flaps used in head and neck reconstruction. *Head Neck Oncol.* 2009 Aug 21; 1:33. DOI: 10.1186/1758-3284-1-33; PMID: 19698095 PMCID: PMC2749848.
2. Klosterman T, Siu E, Tatum S. Free flap reconstruction experience and outcomes at a low-volume institution over 20 years. *Otolaryngol Head Neck Surg.* 2015 May;152(5):832-7. DOI: 10.1177/0194599815573726; PMID: 25953911.
3. Disa JJ, Hu QY, Hidalgo DA. Retrospective review of 400 consecutive free flap reconstructions for oncologic surgical defects. *Ann Surg Oncol.* 1997 Dec;4(8):663-9. PMID: 9416415.
4. Wax MK, Rosenthal E. Etiology of late free flap failures occurring after hospital discharge. *Laryngoscope.* 2007 Nov;117(11):1961-3. DOI:10.1097/MLG.0b013e31812e017a; PMID: 17828052.
5. Park CW, Miles BA. The expanding role of the anterolateral thigh free flap in head and neck reconstruction. *Curr Opin Head Neck Surg.* 2011 Aug;19(4):263-8. DOI: 10.1097/MOO.0b013e328347f845; PMID: 21900855.
6. Kadota H, Sakuraba M, Kimata Y, Yano T, Hayashi R. Analysis of thrombosis on postoperative day 5 or later after microvascular reconstruction for head and neck cancers. *Head Neck.* 2009 May;31(5):635-41. DOI:10.1002/hed.21021; PMID: 19260134.
7. Kubo T, Matsuda K, Kiya K, Hosokawa K. Behavior of anastomosed vessels and transferred flaps after anastomosed site infection in head and neck microsurgical reconstruction. *Microsurgery.* 2016 Nov; 36(8): 658-663. DOI:10.1002/micr.30025; PMID: 26790991.
8. Huang RY, Sercarz JA, Smith J, Blackwell KE. Effect of salivary fistulas on free flap failure: a laboratory and clinical investigation. *Laryngoscope.* 2005 Mar;115(3):517-21. DOI: 10.1097/01.mlg.0000157827.92884.c5; PMID: 15744169.
9. Young CM. The revascularization of pedicle skin flaps in pigs: a functional and morphologic study. *Plast Reconstr Surg.* 1982 Oct;70(4):455-64. PMID: 6287512.
10. Puram SV, Yarlagadda BB, Sethi R, Muralidhar V, Chambers KJ, Emerick KS, et al. Transfusion in head and neck free flap patients: practice patterns and a comparative analysis by flap type. *Otolaryngol Head Neck Surg.* 2015 Mar;152(3):449-57. DOI:10.1177/0194599814567107; PMID: 25628368.
11. Okano T, Ohwada S, Sato Y, Sato M, Toyama Y, Nakanose Y, et al. Blood transfusions impair anastomotic wound healing, reduce luminol-dependent chemiluminescence, and increase interleukin-8. *Hepatogastroenterology.* 2001 Nov-Dec;48(42):1669-74. PMID: 11813598.