CLINICAL STUDY

A Protocol for Management of the Hairs Problem in Oral Cavity Reconstruction by Submental Flap

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Abstract

Background Submental flap is a useful aid in maxillofacial reconstruction. For intraoral usage the hairs in male patients will create some problems.

Materials and Methods In a retrospective study, patients in whom submental flap had been used for reconstruction of orofacial region between 2007 and 2013, in the Mashhad University, Ghaem Hospital, were included. The ways in which the problem of hairs was solved in male patients were evaluated.

Results There were 42 patients in whom submental flap was used for orofacial reconstruction. Sixty percent were males. Three ways had been used for management of intraoral hairs: radiotherapy (9 patients), second surgery (2 patients) and flap de-epithelialization (13 patients).

Conclusion Deepithelialized variant of submental flap is the best option when submental flap is used for oral cavity reconstruction in male patients. Flap thickness, age, race and postoperative radiotherapy can have strong influence on this strategy.

Keywords Submental flap · Oral reconstruction · Intraoral hair

Introduction

Submental flap is a useful aid in maxillofacial reconstruction. It is an axial pattern flap from the upper neck with skin characteristics very similar to the face [1]. For intraoral reconstruction the hairs in male patients will create some problems. Hairs transferred to the oral cavity, entrap food and produce bad odor, irritates the tongue and creates an unpleasant feel for the patient. Saliva pooling, intermittent dysphagia, gagging and unacceptable nausea are the other reported late complications of hairy myocutaneous flaps [2–4]. Intraoral paratrachosis can evolve into malnutrition and produce a decrease in quality of the life [5]. Wound hygiene maintenance also becomes difficult and is not desirable for early detection of a potential tumor relapse [6]. Intraoral ectopic hair transfer by myocutaneous flaps in male patients has been reported after pedicle pectoralis major and platysma myocutaneous flaps as well as radial forearm, rectus abdominis and fibula free flaps [7, 8]. Hairy submental flap in male patient has different density, texture and pigmentation of the hairs in comparison with the above mentioned myocutaneous flaps. In this article with focus on this problem in submental flap, some solutions are presented.

Materials and Methods

In a retrospective study, patients in whom submental flap had been used for reconstruction of orofacial region between 2007 and 2013, in the Mashhad University, Ghaem Hospital, were included. All procedures were approved by the Institutional Ethics Committee (Number 920844). The ways in which the problem of hairs was solved in male patients were evaluated.

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Fig. 1 The effect of radiotherapy on the hairs transferred with submental flap. **a** Before radiotherapy, **b** six month after radiotherapy

Results

There were 42 patients in whom submental flap was used for orofacial reconstruction. 60 % were males. Only in 5 patients this flap had been used for reconstruction of through and through facial defect and in the majority of the patients in our series, this flap had been used solely for intraoral reconstruction.

Three ways had been used for management of intraoral hairs: radiotherapy, second surgery and flap de-epithelialization.

In nine male patients who needed radiotherapy after surgery (because of the malignant mucosal lesions), this technique (radiotherapy) had been also used for management of the transferred hairs in oral cavity as well as the main role for controlling the local recurrence of disease (Fig. 1).

In two patients with verrucous carcinoma of hard palate and alveolar process, second surgery had been used to eliminate the hairs.

One patient was male but below the puberty age. In this patient osteomyocutaneous submental flap was used for maxillary reconstruction (Fig. 2).

In the remaining male patients (52 %), flap de-epithelialization during the surgery was used for omitting unwanted hairs. This strategy had been used for male patients with intraoral small-medium soft tissue avulsion in gunshot or benign intraosseous lesions with soft tissue invasion (Fig. 3).

Discussion

In female patients the transferred skin for facial reconstruction is slightly whiter than the surrounding skin. In male patients hairy submental flap is used for facial

Fig. 2 Hairless skin of submentum is transferred by submental flap to the maxilla without any intervention in a young male teenager

reconstruction, if the hair bearing flap replaces the esthetic units that inherently are devoid of the hairs such as periorbital, perinasal or medial cheek and infraorbital regions, then laser epilation for hair reduction is the method of choice [9].

Submental flap is ideal for reconstruction of perioral and bearded area; because of similarity in color and texture, however the beard pattern may be different in reconstructed area (Fig. 4).

Intraoral transfer of submental flap in female patients has no problem with the hairs. The transferred tissue is devoid of hairs. In some old women, there are few scanty hairs in submentum. These hairs can be removed mechanically by the patient, herself, in front of the mirror.

Submental flap for intraoral reconstruction in male patients in some ethnics such as Chinese and east Asian people has no hairs genetically, so there is no need to any strategy for hair management. These patients and children below the pubertal age, all fall in a distinct group without the need to have any plan about the problem of hairs.

Fig. 3 Flap de-epithelialization, **a** Post-operative photograph, **b** Photograph taken 3 month after operation

Fig. 4 Submental flap is ideal for reconstruction of beards in male patients

In the male patients in whom hairy submental flap is used for oral reconstruction and need radiotherapy, the side effect of radiation on hair follicles solves the problem spontaneously without the need for further intervention [10]. It may be necessary to consider 10 min appointment to remove the grown hairs in the episode between the flap transfer and beginning of radiotherapy with a hemostat. Alternative method that could be considered in this group is de-epithelialization of submental flap before transfer to the oral cavity. Secondary epithelialization is rapid and does not postpone subsequent radiotherapy. This variant of submental flap is neither muscle flap nor myocutaneous ones but a myodermal flap.

In the literature, second surgery 40 days (6 weeks) post operation has been recommended to remove the hairs from submental flap. Disadvantage of this strategy is the need for second surgery. Second surgery to eliminate intraoral hairs yet is not recommended by us because in the best conditions it is a delayed de-epithelialization. In our work this method was the first experience of the authors with hairy submental flaps but do not advise it, yet.

Thin submental flap, reflects the thickness of submentum in non-pedicle side in cross-section. If the amount of subcutaneous fat is negligible, and when the epidermis is removed by sharp dissection what remains is a thin platysma muscle that is less suitable for secondary epithelialization compared with myodermal flaps (Fig. 5). If a thin hairy submental flap is used in oral cavity reconstruction, then we rely on radiotherapy or laser hair depilation for eliminating the hairs, according to the nature of resected lesion.

Flap de-epithelialization is the most recommended way to prevent the hair growth with myocutaneous submental flap in oral cavity reconstruction [11]. In this technique, the skin containing hairs is removed from the flap at dermal level by sharp dissection in the plane just below the hair follicles, before flap transfer. This hairy skin is finally discarded.

If skin laxity determined in submental region by pinch test is estimated to be less than desired, then sharp dissection below the hair follicles should be done in the beginning of flap elevation while the overlying skin is preserved [12]. This is the sole indication for submental flap de-epithelialization in young female patients to prevent donor site morbidity.

Skin is not necessary for intraoral reconstruction with myocutaneous flaps [13]. Healing by secondary intention during 3 weeks period will cover the raw surface of submental flap by mucosa [14].

Limitations of this method are: increasing nutritional demands of the flap and excessive wound contracture so this technique should not be used to reconstruct large soft tissue defects and convex type defects such as hemiglossectomy [15].

Epithelialized–deepithelialized variant is useful for management of through and through cheek/lip defects, in male patients. The hairy skin covers the outer layer and de-epithelialized part is used for intraoral reconstruction, as inner lining (Fig. 6). The same defect in female patients is best managed by bipaddled (folded) variant of submental flap [16].

Fig. 5 **a** Thin submental flap with small quantity subcutaneous fat is not suitable for de-epithelialization, **b** appropriate thickness of submental flap for de-epithelialization

Fig. 6 De-epithelialized – epithelialized variant of submental flap for reconstruction of through and through lower lip defect and mandibular alveolar processes, in male patient with heavy beard. **a** Before surgery, **b** two month after surgery

Laser epilation of intraoral hair has also been described using carbon dioxide, long pulsed Nd:YAG lasers and long-pulse alexandrite lasers but for hair depilation in intraoral flaps with scanty hairs [17]. There was no indication for laser epilation for management of intraoral hairs in our series. Two negative factors for laser application in this situation are the need for multiple appointments and the fact that Laser handpieces are too bulky for intraoral usage especially in patients with limitation in mouth opening [18]. Kaune et al. [19] in six hairy submental flaps used for intraoral reconstruction without postoperative radiotherapy concluded that laser is the first line treatment. They used mean 3 number of sessions with one month interval, under general anesthesia. One patient showed no benefit, having exclusively white hairs. Our preferred technique (de-epithelialization) has the benefits of: First, It is preventive for post-operative intraoral hair growth instead of therapeutic means and second: it is an ideal reconstruction that replaces like with like with induction of nearly normal mucosa that is better for wearing denture. Skin in oral cavity has disadvantages of less flexibility, desquamation and continued secretion of sebaceous glands.

Table 1 Suggested protocol for management of hairs in intraoral reconstruction transferred by submental flap

Nature of the lesion	Submental flap thickness	Method for management the hairs
Malignant	Thin	Radiotherapy
	Thick	De-epithelialization
Benign	Thin	Laser
	Thick	De-epithelialization

Based on the results of this study we proposed the following protocol for management of the hairs problem in oral cavity reconstruction by submental flap (Table 1). The same protocol is true for pharyngoesophageal reconstruction [20].

Conclusion

Deepithelialized variant of submental flap is the best option when submental flap is used for oral cavity reconstruction in male patients. Flap thickness, age, race and the need for

postoperative radiotherapy can have strong influence on this strategy.

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Compliance with Ethical Standards

Conflict of interest None.

Ethical Approval This study was on human participants, and all procedures were approved by the Institutional Ethics Committee (Number 920844).

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