



Contributing effect of lymphatic disruption in trapdoor deformity in nasolabial flaps—superiorly based vs. inferiorly based flap: A case report

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Abstract

The nasolabial flap is well suited for reconstruction of the lower third of the nose. In one-stage reconstruction used as transposition flap, complications can be caused by blunting of the normal concavity of the nasofacial sulcus, but also by trapdoor formation. Various theories have attempted to explain this phenomenon of bulging tissue occurring in transposition flaps. The contributing effect of lymphatic dysfunction is not clear. In our case performed after excision of basal cell carcinoma, both lower thirds of the nose of a 77-year-old patient were reconstructed with a nasolabial transposition flap using an inferior base on one and a superior base on the other side. A follow-up showed greater trapdoor deformity on the superiorly based transposition flap. Assuming that the inferiorly based flap has better drainage than the superiorly based due to intact vertical lymphatics, our case suggests that lymphatic disruption may significantly contribute to the development of trapdoor deformity.

Level of Evidence: Level V, risk/prognostic study.

Keywords Trapdoor deformity · Lymphatic dysfunction · Nasolabial flap · Nasal reconstruction · Transposition flap

Introduction

The nasolabial flap has been extensively used for nasal alar reconstruction and is viewed by many as the procedure of choice for this defect [1]. The rich vascularity and free anastomoses of arterial supply and venous drainage make superior, inferior, medial, and lateral pedicles possible [2]. Reconstruction can be accomplished as either an interpolated or a one-stage transposition flap. Drawbacks of the transposition flap are blunting of the normal concavity of the nasofacial sulcus and

the tendency to trapdoor formation. Koranda and Webster describe the trapdoor effect as an elevated and bulging deformity of tissue within the semicircular confines of a U-, C-, or V-shaped scar [3]. There are various theories such as excessive fat under tissue flaps, lymphatic obstruction, scar hypertrophy, scar contraction, beveled wound edges, and oversized flaps [3–7]; however, the pathophysiology of this phenomenon is still unknown.

Case report

A 77-year-old male patient with biopsy-proven bilateral basal cell carcinoma involving both nasal alae presented at our hospital. After tumor resection, both defects were covered with a one-stage nasolabial transposition flap. On the right side, an inferiorly based flap was constructed with the final scar of donor site closure lying at the nose/cheek junction, and on the left side, a superiorly based flap was created in

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Fig. 1 On the right, flap design: inferiorly based flap. A single asterisk indicates a superiorly based flap. On the left, immediate postoperative result



which the final scar of donor site closure lies in the nasolabial sulcus (Fig. 1). Postoperative photos were used to assess the final cosmetic results of the reconstruction. Flaps were designed according to suggestions aimed at preventing pincushioning. Flap thickness was thinned to the deep dermal layer leaving minimal subcutaneous fat being equal on both sides and preserving the subdermal plexus. Both flaps were designed to be slightly smaller, and the inset was under a slight degree of tension after wide peripheral undermining. A follow-up showed only minimal pincushioning on the right side, and significantly, more trapdoor deformity on the side, where a superiorly based transposition flap had been constructed (Fig. 2).

Discussion

The contributing effect of lymphatic dysfunction in trapdoor deformity is not clear. The term scar lymphedema was first used in a case series by Van Duyn, who hypothesized a lymphatic etiology for the trapdoor deformity [7]. In his report, the presence of postoperative

edema surrounding a scar is differentiated from scar lymphedema based on the location of the swelling, wherein lymphedema is seen to affect only the “upstream” side of a healed incision (such as the circumscribed central area of a U-shaped scar) and nonspecific edema will surround the entire scar. One study determined that undrained lymphatic fluid contributes to the pathogenesis of pincushioning [6]. Although use of an inferiorly based flap should allow dependent drainage of the flap through intact lymphatics within the model of scar lymphedema, trapdooring has been shown to occur around curvilinear incisions with both superior and inferior based flaps [3]. However, these investigations did not have the opportunity to compare both conditions in one patient, as was possible in our case. Our case suggests that the damage to lymphatics may significantly contribute to the development of trapdoor deformity besides other factors. It can be presumed that in the superiorly based flap lymph transport capacity is more reduced because of destroyed vertical lymphatics and lymphatic fluid is more likely to be trapped, thus leading to fluid accumulation. In contrast, the inferiorly based flap permits better drainage.

Fig. 2 14 months postoperative

Although a single case report can only be descriptive, our finding suggests that the trapping of lymphatic fluid may play an important role in the phenomenon of pincushioning. However, further studies are needed to provide information regarding the pathophysiology of trapdoor deformity and its major causative factors.

Compliance with ethical standards

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Conflict of interest Christoph Tasch, Marit Zwierzina, Elisabeth Pechriggl, Alexander Haim, Evi Morandi, and Monika Lanthaler declare that they have no conflict of interest.

Ethical approval For this kind of article format, consent is not required.

Informed consent Patient provided written consent before his inclusion in this study.

Patient consent Patients provided written consent for the use of their images.

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