International Surgery Journal
Shah PR et al. Int Surg J. 2018 Mar;5(3):843-845
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20180449

Original Research Article

Modified Mc-Gregor's fan flap for lower lip reconstruction: a two years institutional experience

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Received: 29 January 2018
Accepted: 03 February 2018

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ABSTRACT

Background: Aim of the study was to evaluate the modified fan flaps done during the past two years with regard to applicability, reliability, functional perspective and complications.
Methods: All the cases of lower lip defects which were reconstructed using modified Mc Gregor's fan flaps were included and followed up prospectively at periodic intervals up to 2 years. The indications, applicability to defect size, postoperative aesthetic and functional results and drawbacks were noted.
Results: Total 21 modified fan flaps were done during this period. All were done for squamous cell carcinoma affecting lower lip. All the flaps survived, four patients had marginal mucosal loss of neovermilion which healed by secondary intention, 1 case of Bilateral modified Gilles fan flap developed little microstomia, 1 flap with bilateral fan flap had dehiscence of suture line leading to significant morbidity which later had to be closed by secondary resuturing.
Conclusions: The modified Mc-Gregors fan flaps are safe and reliable flap for lower lip reconstruction in terms of acceptability and function.

Keywords: Fan flaps, Lower lip

INTRODUCTION

Lips have important aesthetic and functional roles in the body which make their satisfactory reconstruction a surgical challenge to head and neck surgeons. Lip reconstruction requires after tumour resection, post trauma and many other reasons.

Most of the development in cheiloplasty (lip reconstruction) occurred in the last 200 years with innervated flaps being described only within the last 25-years. Fan-shaped orbicularis oris musculocutaneous flap has been the mainstay of lip reconstructions with modifications being added periodically.[1]

Lip is a very common primary site for squamous cell carcinoma all over the world.[2] Author use the Modified Mc Gregor's fan flaps frequently when confronted with suitable lower lip defects.[3] This is an attempt to evaluate 21 cases of such flaps done in the centre over the past two years. As this flap technique is old and less practiced, but if properly done can result in good cosmesis and less morbidity.

METHODS

Fan flaps done during the period of January 2015 to December 2016 were prospectively followed. The site of lesions on the lower lip, condition of the remnant buccal mucosa, post excisional defect size and oral

circumference skin laxity were evaluated as was the postoperative course of all the patients. A critical analysis was made of the merits and demerits of the modified fan flap.

Once the desired lip excision marking has been done (ab), the marking for making the skin incisions inferiorly on the chin side should be done in such a way that the height of defect (a'b') equals the width of defect i.e. ab = a'b'. The full thickness cut from b' is extended laterally on the cheek skin similar to as in the normal gillies flap. The skin on the a'b'margin is deepithilisation for a distance of approximately 5mm and the mucosal side is sutured to the deepithilisation portion forming a neo-vermilion.[4] Then suturing is done starting from the vermilion in 3 layers: mucosa, muscle (orbicularis oris to oris) and skin. The sutures used are vicryl 4-0 round body for mucosal and muscle suturing and nylon 5-0 for skin suturing. Care is taken in very meticulous suturing so that they do not give way in future.

All the cases were evaluated postoperatively based on criteria like (1) mouth opening (2) oral competence (3) feeding problems (5) cosmesis (6) speech (7) flap bulk (8) donor site morbidity and (9) social acceptance.

RESULTS

Between January 2015 to December 2016, 27 patients underwent fan flap reconstruction for freshly created lower lip defects out of which only 21 patients could be followed up. The age ranged from 43 to 69 years. 14 patients were male and 7 females.

Figure 1: A case of modified Mc-Gregor's flap bilaterally.

All patients had squamous cell carcinoma of lower lip, 12 had well differentiated and 9 had moderately differentiated carcinoma. None showed evidences of premalignant changes or submucous fibrosis or second primaries in the rest of the oral cavity.

All lesions were in the mid or lateral 1/3 of the lower lip. Excision was done with 1cm margin. Commissure was not involved in any of these cases. Post-excisional defects ranged from one-half to nearly whole length of lower lip barring the commissures.

If the resection involved sacrificing the commissure, author would use other forms of reconstruction in such cases like the Nasolabial flap instead of the modified gragor's flap. All patients had good marginal clearance on histopathologic examination. Nevertheless, they were on periodic follow-up for signs of recurrences.

Among the 21 cases, 4 patients underwent bilateral fan flaps and 17 patients unilateral fan flaps. All the flaps survived, four patients had marginal mucosal loss of neovermilion which healed by secondary intention, 1 case of Bilateral modified fan flap developed little microstomia, 1 flap with bilateral fan flap had dehiscence of suture line leading to significant morbidity which later had to be closed by secondary resuturing.

Three patients did not have very good lip pout the reason for which was inadequate deepithilisation of the skin to create the neovermilion. Two patients had malalignment of the vermilion the reason for which was smaller length (a'b') of the flap skin as compared to lip defect (ab). All the patients have adequate mouth opening and oral competence with normal feeding and speech and no donor site morbidity.

DISCUSSION

Lips are essential organs for normal life, playing a significant role in consumption, continence, communication and cosmesis. Such delicate aesthetic and functional requirements pose exceptional demands on reconstructive techniques.

Requirements of an ideal reconstructive option would be (1) matching skin cover (2) oral lining (3) vermilion colour match (4) labial sulcus depth (5) commissure definition (6) adequate stomal diameter (7) competent oral sphincter (8) sensations maintained and (9) respect of aesthetic units.[5]

Lip reconstruction is not a new concept. The fan flap that Gilles popularized in 1920 was a denervating reconstruction that gave form but no function.[5] In 1974, the Karapandzic principle was introduced, modifying the former into an innervated orbicularis oris myocutaneous flap.[6] Both these reconstructions led to microstomia which became progressively severe with enlarging defects and the second disadvantage was the distortion of the commissure.

McGregor suggested a rectangular modification of the Gilles' flaps in 1983 with the aim of full thickness lip defects even up to entire lip which did not produce microstomia.[3] He had described lip shave and vermilion

reconstruction with a ventral tongue flap with his fan flap. The addition of a tongue flap adds yet another stage to the reconstruction adding to the morbidity.[4] In an attempt to obviate the need for a tongue flap which might be more suited in a Western setting, author have employed modification of McGregor's fan flap by suturing the flap's mucosa to the deepithilised cut skin margin which forms the neovermilion and gives a very satisfactory vermilion reconstruction.[3,7]

Though this modification of the McGregor's fan flap does not preserve the motor and sensory innervations to the flap, the patient does not have any significant complaints because of the same. The cosmesis along with the vermilion reconstruction is excellent as the tissue used for reconstruction is part of buccal mucosa and very close substitute. The suture lines are confined to and masked by the nasolabial and mental creases. Preservation of buccal sulcus is yet another merit of fan flaps.[8,9] Though other innervated composite tissue transfers have been described by Nakajima T, Yoshimura T, Kami T et al., the fan flaps still enjoy more popularity worldwide owing to their reliability and simplicity.[9,10]

This modified fan flap should be avoided in patients with extensive submucous fibrosis as the buccal mucosa would not be pliable and would lead to distortion of neovermilion. Also, this flap cannot be used in cases where marginal mandibulectomy has to be done leading to loss of buccal sulcus.

CONCLUSION

Author conclude that the modified Mc-Gegors fan flap is an excellent reconstructive option for large lower lip defects as it produces near normal lip with excellent colour match and neovermilion and nice lip pout without causing microstomia and commissure distortion. Classical Gilles and Karapandzic flaps cause progressive microstomia and commissure distorsion.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Shah PR, Patel MK. Modified Mc-Gregor's fan flap for lower lip reconstruction: a two years institutional experience. Int Surg J 2018;5:843-5.