The Role of Fat Transfer in Secondary Cleft Lip Patients

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ABSTRACT

**Background:** Fat transfer is used as tissue filler for contour defects and for esthetic purposes. There are a number of different techniques for fat harvesting, processing, and injection. The potential is to extract adipose-derived stem cells. The advantages of these stem cells include the ability to continue to proliferate after transplantation, the ability to promote neovascularization, and their multipotent differentiation capacity.

Major advances have been made in cleft care in the past 50 years. The cleft lip and nose deformity can be transformed to a minimal variation of normal. Despite careful planning to achieve the best result in the primary cleft repair, secondary cleft deformities are common. Adequate correction of secondary cleft lip and nasal deformities begins with accurate diagnosis of the problem, followed by determination of the underlying anatomic cause. Treatment must address the anatomic of soft tissue, muscle, cartilage, and the underlying skeleton and the deficiency, distortion or excess of each. Deficiency in cleft lip can be augmented by using microfat grafting.

**Methods:** 20 patients with secondary cleft lip deformities including unilateral and bilateral cases were included in this study. This was done in Faculty of Medicine Cairo University and Specialized Pediatric Hospital Cairo University between September 2014 and September 2016 with follow-up by photos after 1 and 6 months after operation. The microfat is harvested from the abdomen and/or thighs to collect reasonable amount of fat to correct deficient lips using 3mm suction cannula and 10 gauge syringe. This is done after infiltration of wetting solution to the area where fat is harvested. The fat is left to settle for few minutes to separate the oil layer and blood then fat column is transferred to 3cc syringe and injection of fat using 0.5mm cannula to the deficient areas (upper lip, philtrum, nasal base and vermilion). Fullness is reached and injection of fat by 30% more than desired is done. This is done for cases that do not require surgical correction.

**Results:** Patient’s ages varied from 4 to 20 years old.

In 18 patients the symmetry and results are very good compared to their previous conditions and the patients were satisfied with their appearance after fat grafting, the other 2 patients were not satisfied. No complications were recorded.

**Conclusion:** Structural fat grafting is considered safe and an effective way to improve symmetry also, it enhances facial proportions in patients with cleft lip with higher degree of patient satisfaction, few complications, and durable results, fat grafting offers many advantages in cleft lip revision.

**Key Words:** Secondary cleft lip – Fat transfer – Deficient lip volume.

INTRODUCTION

Improving facial aesthetic appearance is becoming increasingly the motivation for individuals with cleft lip and nose deformity as they desire to increase self-confidence, self-esteem, and social interactions [1]. Secondary corrective facial surgery efforts are made to achieve psychological and social well-being for the patient as well as his or her family [2].

Secondary correction of cleft lip deformity requires proper assessment of the deformity and good planning to achieve good outcome. One of the most common secondary deformities is the deficient volume of upper lip. It was reported that initial results are satisfactory for most cases but there are a significant number of patients who require surgical management of the lip deformity that develop secondary to growth changes. Revision lip surgery is needed for both unilateral and bilateral cleft lip [3].

The fullness and shape of the upper lip is important aesthetically and the deficient volume of upper lip is considered an unpleasing for cleft lip patients. Many techniques are used to correct the deformity of upper lip volume or tissue deficiency as Abbe flap from the lower lip to correct upper lip tightness or dermal fat grafting to increase the upper lip volume [4].

Structural fat grafting is reported to be a safe and effective way to improve symmetry and enhance facial esthetics. Fat transfer is used as tissue filler for contour defects and for esthetic purposes [5].

This work report our experience with autologous fat transfer to the deficient upper lip as a secondary corrective procedure in patients with repaired cleft lip.
MATERIAL AND METHODS

20 patients with secondary cleft lip deformities, 5 unilateral and 15 bilateral cases were included in this study. This was done in Faculty of Medicine Cairo University and specialized Pediatric Hospital Cairo University between September 2014 and September 2016 with follow-up by photos after 1 and 6 months after operation.

Their age ranged from 4 to 20 years with average of 12 years. They were 18 females and 2 males. All patients with deficient upper lip volume and inadequate lateral projection were selected. The patients were assessed pre-operatively, and were examined for symmetry of the upper lip, volume deficiency, associated nose deformity and preoperative photography. The patients had accepted maxillary-mandibular relation.

Lateral lip projection was assessed using photograph of the lateral view. A line passing from the lower lip extends upwards towards the columella and the other line passes from the most projecting point of the upper lip downwards and the distance between two lines was shown pre-operatively. As it is the difference between the upper and lower lip. Also, this is done on lateral view photography after 1 and 6 months postoperatively Fig. (1).

Technique:

Patients were operated upon under both general and local anesthesia. Marking of the deficient part of the upper lip is done.

Infiltration of wetting solution (of ringer lactate 1 liter + 1:200000 adrenaline) to the donor area where fat is harvested. The microfat is harvested from the abdomen and/or thighs to collect reasonable amount of fat to correct deficient lips using 3mm suction cannula and 10 gauge syringe. The fat is left to settle for few minutes to separate the oil layer and blood then fat column is subjected to multiple passes between two 3cc syringes (3 to 4 times) and then injected using 0.5mm cannula to the deficient areas (upper lip, philtrum, nasal base and vermilion). Fullness is reached and about 30% extra volume is injected. The volume injected was between 10-15cc of fat to the upper lip according to deficiency. The lip was covered using steri-strips only.

Post-operative oral antibiotics and anti-edema drugs were given for a week. Patients were followed after 1 week, 1 month and 6 months to evaluate fat absorption, esthetic outcome and satisfaction as judged by the surgeon and patient.

RESULTS

All patients had uneventful post-operative recovery period without any complications, the donor sites (abdomen and thighs) had minor bruises that subsided within 10 days post-operative.

After 6 months follow-up 17 patients were satisfied but 3 patients required repeated fat transfer to the lip.

The improvement in upper lip projection is shown on photography of lateral view pre-operatively and after 6 months post-operatively (Fig. 2), the nasolabial angle also was improved (Fig. 3).

Fig. (1): Assessment of the difference between upper lip and lower lip pre-operatively.

Fig. (2): The difference between upper and lower lip before (A) and after (B) fat transfer.
Fig. (3): Nasolabial angle before and after fat transfer.

Fig. (4): Frontal and lateral views before (A) and after (B) fat transfer.

Fig. (5): Frontal and lateral views before (A) and after (B) fat transfer.
DISCUSSION

The lip is one of the aesthetic units of the face, lip should be harmonious with other face units, the ideal lip is characterized by 1- Fullness and adequate volume, 2- Balance between upper and lower lip and 3- Vermilion border is well defined [6].

The esthetics of the upper lip projection is about 2mm beyond the lower lip with a balanced Cupid’s bow and central tubercle and this is measured by using the “profile line. This line is tangent to the soft tissue chin and to the most anterior point of either the lower or the upper lip [7]. There are different factors that affect lip appearance and balance as the skeletal components (maxilla relation to mandible) and soft tissue contour [8].

By using soft tissue profile measurement the cleft patients appear less convex and flattened than normal individuals. Soft tissue thickness overlying maxilla changes during mixed dentition and the upper lip becomes thinned by the malposed skeletal components in cleft patients [9].

The characteristic flat upper lip in cleft lip deformity together with the short columella in addition to scars from previous operations is a life mark for cleft patients; this is caused by the soft tissue hypoplasia that leads to incompatible nasolabial angle, and this was shown in lateral view photos of our patients and also, a deficient skeletal component may be present in those patients that requires orthodontic management of the alveolar dental arch [10].

Cleft lip repair requires secondary correction no matter what primary surgery was done. In secondary cleft lip deformities the deficiency in upper lip volume is common. Many procedures are used to improve the discrepancy between the upper and lower lip of cleft lip deformities [4].

Correction of the secondary cleft lip deformity by many techniques have been described if there are focal deficiencies, notching or mal-alignment of the vermilion, Z-plasty or advancement of the vermilion can be done. Other deformities can be corrected by upper lip rearrangement. But if there is insufficient tissue of the upper lip, tissue replacement can be used to augment the upper lip to reach a functional and esthetic result. In these cases the lower lip has been used to augment the upper lip deficiency in secondary cleft lip deformities by the Abbe flap and its modifications as it improves upper lip volume and tightness in addition it replaces like with like. Other methods were described such as the tempero-parelial fascia, mastoid fascia, composite flaps and dermofat grafts [4].

The present study was designed to determine the effect of autologous fat transfer to the deficient upper lip volume in secondary cleft lip deformities. Those patients have acceptable maxillary-mandibular relation and have no tightness of upper lip so that, improvement of the soft tissue volume and lip contour will be beneficial. Fat transfer with possible stem cells content can also improves appearance of scars.

The role of fat grafting is to add volume but it cannot replace surgery to add tissues in case of tight upper lip as if fat is used in tight upper lip rapid absorption will result.

The results of this study show that fat is an efficient tissue filler, as it has many advantages: Easy harvesting, multiple donor sites, minimal morbidity of donor site, simple technique, not time consuming, safe and pliable [11,12].

The autologous fat used should overcorrect the volume deficiency of upper lip as fat reabsorption is unpredictable. The fat transfer is a good alternative for other traditional techniques for secondary lip deformities in cleft patients suffering from volume deficiency. It can be easily done using local anesthesia and multiple procedures are easy to perform to reach satisfactory results [13,14].

Conclusion:

Volume enhancement of the upper lip in secondary cleft lip deformities using autologous fat is considered a reliable, safe, effective way to improve symmetry and enhance facial proportions in patients with cleft lip. Given the high degree of patient satisfaction, few complications, and durable results, fat grafting offers many advantages in cleft lip revision.

REFERENCES

