

Autologous Fat Grafting in Management of Patients with Progressive Hemifacial Atrophy

Jainath Reddappa*, Smitha Segu, K.T. Ramesha and Peddi Manjunath

Department of Plastic Surgery, Bangalore Medical College and Research Institute, Bangalore, India

Abstract: **Background:** Progressive hemi facial atrophy or Romberg disease is a rare neurocutaneous syndrome characterized by slow progressive atrophy on one side of face involving skin, subcutaneous and connective tissue. Various methods have been described for soft tissue augmentation in patients with progressive hemi facial atrophy. Autologous fat, dermofat, fascial grafts have been used for grade 1,2 and 3 atrophy. Free flaps, cartilage and bone grafts are described for grade 3 and 4 atrophy.

Aims and objectives: To study efficacy of autologous fat graft in patients with grade 1, 2 and 3 hemi facial atrophy. Strategies to reduce fat absorption and to calculate approximate amount of fat required required by facial mask template.

Observations: It is a prospective study conducted in Department of plastic surgery, Bangalore Medical college and Research Institute, Bangalore in 10 patients with grade 2 and 3 Progressive hemi facial atrophy. All patients with stable non-progressive atrophy were graded for severity of disease and face-mask templates were prepared by prosthodontists to know approximate amount of fat required for injection. Fat was aspirated by low-pressure small suction cannulas manually and infiltrated at multiple points and in multiple planes after sedimentation and separation of fat. Five of the patients with grade 2 and 3 of patients with grade 3 atrophy were satisfied with symmetric face and with emotional betterment. Two patients needed repeat fat grafting after 2 years of follow-up.

Conclusion: Autologous fat grafting is a simple and safe method for augmentation of soft tissue in patients with grade 1, 2 and 3 Progressive hemi facial atrophy. Aspiration of fat with low-pressure small cannulas and infiltrating in multiple planes improves fat survival. Preparing face-mask templates gives an idea of approximate volume of fat required.

Keywords: Progressive hemifacial atrophy, Autologous fat grafting, Face-mask templates, Strategies for decreased fat absorption.

1. INTRODUCTION

Progressive hemifacial atrophy often referred to as Rombergs disease or Parry Romberg syndrome, is a pathological process involving progressive wasting of skin, subcutaneous fat, muscle and occasionally bones of the face. Caleb Hillier Parry [1] in 1825 was the first to describe the condition in a 28 years old woman and Moritz Heinrich Romberg in 1846 described the disease in detail. In 1875 Eulenburg emphasized the acquired nature of the disease and coined the term "Progressive hemifacial atrophy".

Vast majority of cases are sporadic and familial cases exhibit no clear mode of transmission. Women are affected 1.5 times more than the men. The disease usually begins between the ages of 5 and 15 years and progression of the atrophy often lasts for 2 to 10 years and then enters into a stable phase or "burn out" phase [2]. The disease is unilateral in 95 percent of patients with no predilection for either side. Advanced disease can spread to contralateral face, skull, neck, or upper extremity [3]. The possible causes of this syndrome include trigeminal neuritis, a chronic autoimmune

neurovasculitis, a chronic infestation with neurotropic virus (eg. Herpes) and an increased sympathetic activity triggering facial atrophy [4].

Clinically there is regional atrophy of skin, subcutaneous tissue and musculature. The earliest signs include the subcutaneous wasting in the malar or lateral mental areas, but may begin in the brow and para median region [5]. When the onset is before the 2nd decade of life underneath bone and cartilage may be involved. When the disease is periorbital, it can be associated with ophthalmic manifestations like papillary disturbance, exudative retinopathy and optic nerve dysfunction.

Improving the volume and contour of faces having tissue atrophy offers great psychological and emotional improvement of patients.

The objective of this study was to know the efficacy of fat grafting [6] in patients with progressive hemifacial atrophy, to calculate the approximate requirement of fat for injection by face-mask templates and strategies to reduce fat absorption.

2. PATIENTS AND METHODS

A prospective study of 10 patients with hemi facial atrophy who were treated with autologous fat grafting

*Address correspondence to this author at the Department of Plastic Surgery, Bangalore Medical College and Research Institute, Bangalore, India; E-mail: drjainathr@gmail.com

between August 2011 and March 2015 in this institute were included in the study. The mean age of the patients was 25 years (range 18 to 35 years). Seven of the 10 were females and 3 were male patients. All patients had unilateral atrophy in our study. All patients with hemi facial atrophy were admitted and evaluated for severity of disease. Cases were graded according to severity of facial atrophy into 4 grades based on a classification by Guerrerosantos (Table 1).

Table1: Classification Proposed for Parry-Romberg Syndrome (Guerrerosantos et al. [7])

Grade 1:	Very mild depression in the face, occurring in acute phase of disease
Grade 2:	Reduced thickness of the soft tissue of the face, with no bone or cartilage involvement
Grade 3:	Soft tissue of the face is thinner than in Grade 2 + initial bone and cartilage involvement
Grade 4:	Most severe type of facial depression and the skin is quite close to bone with bone involvement.

Six patients were of grade 2 (Figures 2 and 5), and 4 were of grade 3 (Figures 3 and 4). All the patients with regular follow-up and clinical examination had a stable phase of disease with no progression of the disease at least for past 1 year.

The average volume of requirement of fat for injection was calculated by formation of face-mask templates with the help of prosthodontists in all patients.

Autologous fat was taken by lipo aspiration with small 2 to 3 mm cannulas from the periumbilical region, thigh or buttock regions by low-pressure suction syringes done manually. The aspirated fat was separated by sedimentation and injected at multiple points and through multiple planes (Figure 1) to increase the contact surface of fat cells with blood supply.

The average fat volume injected in buccal areas was 20ml and in zygomatic areas was 15ml. Adhesive plasters were applied at the edges of injected areas, for the fat to not get displaced. Plasters were removed after 3 days.

3. RESULTS

Five of the patients with grade 2 atrophy (Figures 2 and 5) and 3 of patients with grade 3 hemifacial atrophy (Figures 3 and 4) who underwent fat grafting were satisfied with symmetrical face and correction of contour deformity, and had improvement in psychological and emotional factors. One patient had ecchymosis

and another had induration (Figure 6) postoperatively which resolved with time without any intervention. Patients were asked for a follow up of 24 months and clinically evaluated with photographs. One patient with grade 2 atrophy and one with grade 3 atrophy underwent a secondary fat grafting after a period of 24 months.

4. DISCUSSION

The treatment of true Rombergs disease is symptomatic. Surgeons have been searching for ideal method to augment the soft tissue. Ideally the substitute should look and feel like the original tissue intended to be replaced. The procedure should be easy to perform, with minimal donor site morbidity.

Many tissues and flaps have been described for the soft tissue augmentation in hemifacial atrophy patients. Fascial and dermal grafts have been described for filling the defects [8]. Synthetic prosthesis were tried but had the risk of extrusion. Injectable silicone was tried with limited studies. Omentum, Deltpectoral, Scapular and microvascular free flaps [9] have been described for severe grade 3 and 4 atrophy cases. Onlay grafting with autogenous bone grafts has been done for skeletal augmentation.

The first scientific study on survival of fat graft was published in 1950 by Peer and reported a survival rate of 50%. In 1990 Coleman reported positive experiences with autologous fat grafting over 1000 patients with follow-up of 8 years [10]. Various hormones or cytokines have been added to the fat (eg: Insulin or insulin like growth factor) in the hope that it will give better take.

In our study 80% of patients had a satisfactory outcome with symmetric face. Aspiration of fat with low pressures by using suction cannulas of 2-3mm manually and infiltration of fat at multiple points and in multiple planes increased the fat survival. Preparation of facemask templates was useful for calculation of approximate fat requirements for injection.

5. CONCLUSION

Autologous fat grafting is a simple and safe method for augmentation of soft tissues in patients with hemifacial atrophy of grade 1, 2 and 3 as compared to tedious dermal grafts or surgical flaps. Autologous fat being a natural tissue is preferred over synthetic prosthesis or fillers for facial augmentation. Aspiration



Figure 1: Technique of fat grafting.

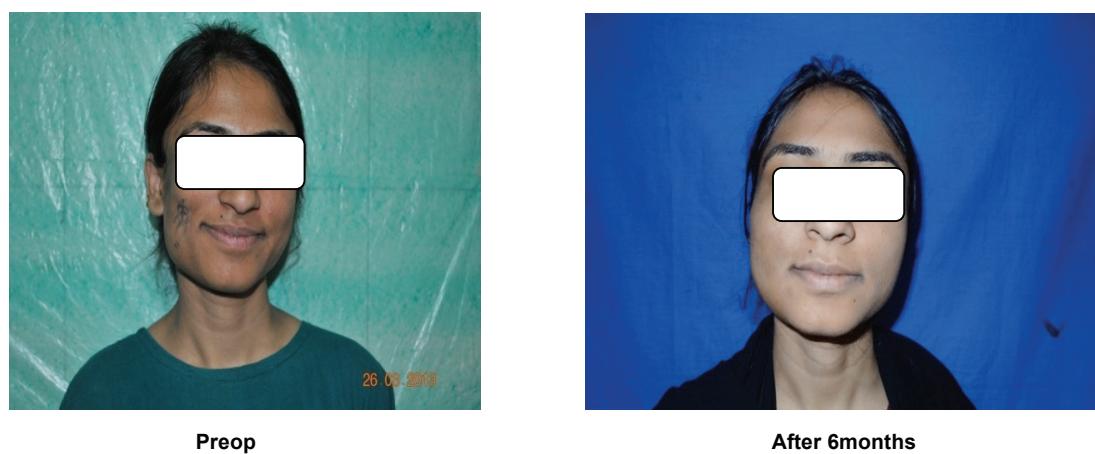


Figure 2: Rt sided, Grade 2.



Figure 3: Rt sided, Grade 3.



Figure 4: Lt sided Grade 3.



Figure 5: Lt sided Grade 2.

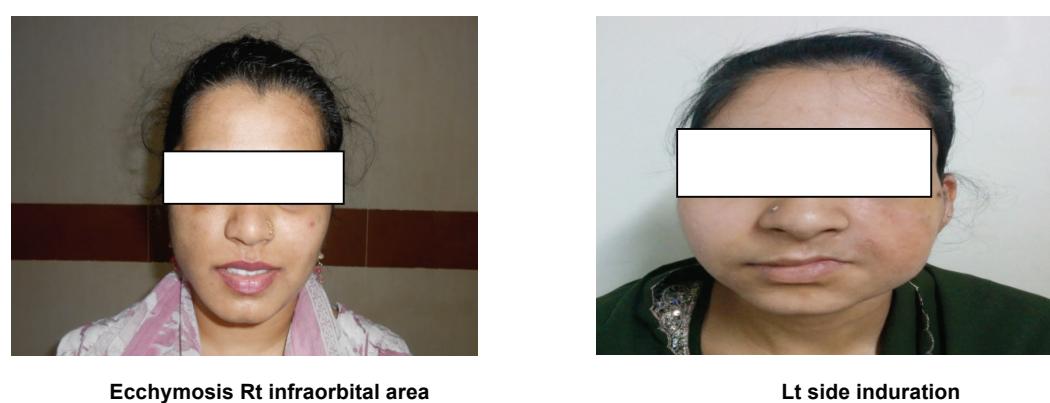


Figure 6: Complications.

of fat with low-pressure suction and small cannulas and infiltrating at multiple points and in multiple planes improves fat survival. No major complications of surgery, minimal donor site morbidity makes it an ideal method for augmentation.

REFERENCES

- [1] da Silva Pinheiro TP, Camarinha da Silva C, Limeira da Silveira CS, Ereno Botelho PC, Rodrigues Pinheiro MD, Viana Pinheiro JD. Progressive hemifacial atrophy: case report. Medicina Oral, Patología Oral y Cirugía Bucal (Internet) 2006; 11(2): 112-4.
- [2] Moore MH, Wong KS, Proudman TW, David DJ. Progressive hemifacial atrophy (Romberg's disease): skeletal involvement and treatment. Brit J Plast Surg. 1993; 46(1): 39-44. [https://doi.org/10.1016/0007-1226\(93\)90063-H](https://doi.org/10.1016/0007-1226(93)90063-H)
- [3] Hickman JW, Sheils WS. Progressive facial hemiatrophy: report of a case with marked homolateral involvement. Arch Intern Med. 1964; 113(5): 716-20. <https://doi.org/10.1001/archinte.1964.00280110096019>
- [4] Cory RC, Clayman DA, Faillace WJ, McKee SW, Gama CH. Clinical and radiologic findings in progressive facial hemiatrophy (Parry-Romberg syndrome). Am J Neuroradiol. 1997; 18(4): 751-7.
- [5] Miller MT, Spencer MA. Progressive hemifacial atrophy. A natural history study. Transact Am Ophthalmol Soc. 1995; 93: 203.
- [6] Sterodimas A, Huanquipaco JC, de Souza Filho S, Bornia FA, Pitanguy I. Autologous fat transplantation for the treatment of Parry-Romberg syndrome. J Plast Reconstr Aesthet Surg. 2009; 62(11): e424-6. <https://doi.org/10.1016/j.bjps.2008.04.045>
- [7] Guerrerosantos J, Guerrerosantos F, Orozco J. Classification and treatment of facial tissue atrophy in Parry-Romberg disease. Aesthet Plast Surg. 2007; 31(5): 424-34. <https://doi.org/10.1007/s00266-006-0215-4>
- [8] Rangare AL, Babu SG, Thomas PS, Shetty SR. Parry-Romberg syndrome: a rare case report. J Oral Maxillof Res. 2011; 2(2): e5. <https://doi.org/10.5037/jomr.2011.2205>
- [9] Iñigo F, Jimenez-Murat Y, Arroyo O, Fernandez M, Ysunza A. Restoration of facial contour in Romberg's disease and hemifacial microsomia: experience with 118 cases. Microsurgery 2000; 20(4): 167-72. [https://doi.org/10.1002/1098-2752\(2000\)20:4<167::AID-MICR4>3.0.CO;2-D](https://doi.org/10.1002/1098-2752(2000)20:4<167::AID-MICR4>3.0.CO;2-D)
- [10] Niechajev I, Sevcuk O. Long-term results of fat transplantation: clinical and histologic studies. Plast Reconstr Surg. 1994; 94(3): 496-506. <https://doi.org/10.1097/00006534-199409000-00012>