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Original Research Paper

Surgery

"AN EVALUATION OF HAIR FOLLICLE TRANSPLANTATION ON MAXILLOFACIAL SCAR TISSUE- A CLINICAL STUDY."

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ABSTRACT

Aims And Objectives: The aim of this study is to evaluate the hair follicle transplantation on maxillofacial scar tissue and the objectives are to compare the pre-operative and Post Operative survival rate of hair follicles, Assessment of pain, Donar site Morbidity and Patient Satisfaction Index.

Material And Methods: Ten patients with maxillofacial scar tissue who needed treatment and presented to the outpatient department of oral and maxillofacial surgery were included in the present study.

Results: In the present study there is positive graft survival rate, no donor site morbidity. This shows the efficacy of hair follicle transplantation on scar tissue.

Conclusion: Hair follicle transplantation can be considered as an effective modality of camouflage for maxillofacial scars in patients with an added advantage of minimal downtime and effective improvement.

KEYWORDS : Hair transplantation, Scar tissue, Follicular unit extraction, Follicular unit transplantaion, Cicatricial alopecia.

INTRODUCTION:

"Exuberance is Beauty". Appearance and beauty have always been a major aspect of human's lives, regardless of the era. The fascination to look beautiful is an age-old obsession. Well documented beauty practices date back as far as Cleopatra's milk baths, the use of kohl to darken and enhance the eyes, vegetable dyes on cheeks and lips, and hair adornments[1].

Scar is defined as fault or blemish resulting from some former condition, wound, sore or burn. Scar formation is an inevitable consequence of wound healing in which the normal skin is replaced by fibrous tissue.

There are so many types of Scars which include Keloid scars, Contracture scars, Hypertrophic or atrophic, Acne scars. Keloid scars are the result of an overly aggressive healing process. Contracture scars are burned scars. These scars tighten skin, which can impair the ability of skin to move. Hypertrophic scars created when skin responds to injury by overproducing new collagen. Atrophic scars caused when damaged collagen only partially or not at all grows back[2].

Various treatment options include surgical and non-surgical treatment modalities for the treatment of maxillofacial scars. Surgical treatments like scar revisions, W plasty, Z plasty, VY plasty and hair follicle transplantation. Non-surgical management includes medical line of treatments like massaging, silicone gel or sheet, pressure dressing suitable to scar and its anatomical location. Noninvasive procedures include lasers, soft tissue augmentation with fillers, radiotherapy, cryotherapy, interferon, electric stimulation of skin for depressed scar, chemical peeling, microneedling therapy[3].

Loss of hair-bearing tissue in the head and neck area can result from surgery, trauma, burns, tumors, and infection, as well as a diversity of inflammatory conditions such as lichen Plano pilaris, which causes irreversible damage to the hair follicle[4].

Dermatologists and other physicians are often asked to evaluate patients for hair loss. Apart from establishing the etiology of hair loss, patients want to know how the hair can be restored[5].

Historically, it begins with J.Dieffenbach in the year 1822 at Wurzburg, Germany from then Hair restoration surgery has gained momentum, and the number of procedures performed all over the world, has increased enormously in the recent years[6].

Hair transplantation is based on the principle that hairs moved from one part of the body and implanted in another part of the body will grow for as long as they would have grown in their donor location.

There are two commonly used methods of extracting donor hairs: The strip method which entails removing a section of hair-bearing scalp (resulting in a linear scar) and dissecting it under magnification into follicular units and the other one is follicular unit extraction (FUE) technique which entails using a punch tool to remove follicular units. This can be done manually, using automated punches or by a robot.

Hence the aim of this study is to evaluate the hair follicle transplantation on maxillofacial scar tissue and to assess the survival rate(Hair Follicles Per Unit Area), assessment of pain, donor site morbidity, patient satisfaction Index.

AIM:

To evaluate the hair follicle transplantation on maxillofacial scar tissue.

OBJECTIVES:

- Survival Rate(Hair Follicles Per Unit Area)
- Assessment Of Pain
- Donor Site Morbidity
- Patient Satisfaction Index

MATERIAL AND METHODS:

Sample Size:

Ten patients were enrolled from outpatient Department of Oral

and Maxillofacial Surgery, Sibar Institute of Dental Sciences, Guntur, AndhraPradesh, with age between 18 to 29 years requiring hair follicle transplantation on maxillofacial scar tissue.

Parameters Taken Into Consideration Are To Assess:

1) SURVIVAL RATE(hair follicles per unit area):
a) Excellent : >90%
b) Good : 90-75%
c) Fair : 75-60%
d) Poor : <60%

2) Assessment Of Pain:

Verbal Rating scale for pain
0= No pain
1=A little bit of pain
2=A medium amount of pain
3=A lot of pain

3) Donor Site Morbidity:

Sr.No	Signs to check	Present	Absent
1.	Red ness		
2.	Odema		
3.	Infection		
4.	Pain		

4)Patient Satisfaction: Excellent
Very good
Good
Fine
Satisfactory
Poor

Data Collection:

Patients presenting with maxillofacial scars were included in the study and written informed consent was taken for their participation in the study. Details of type of scar either it is traumatic or cleft and age of the patient was recorded. Photographs were taken before and after treatment. 10 patients with maxillofacial scars were treated with hair follicle transplantation therapy with follow up period up to 3 months and at the end of treatment the efficacy of the treatment was assessed. Post operative medication was prescribed for 3 days which includes antibiotics and analgesics.

MATERIALS USED

- Micromotor with Hand piece
- 0.8mm,0.9mm,1mm punches
- Surgical Gloves
- Petri dishes with gauge pieces for storage of grafts
- Tumescent solution(1ml Adrenaline with 70ml saline)
- Insulin syringes
- 18Gauge needle for graft placement
- Cold Saline
- 2x,2.5x,3x,4x optic loupes.
- Forceps for pickup and insertion of grafts
- 5%Bupivacaine local anesthesia

METHODOLOGY:

Ethical clearance was obtained by the ethical committee before the commencement of the study.

Selection Criteria

Inclusion Criteria-

1. Post surgical scars on lips and eyebrow regions
2. Facial scars due to physical trauma
3. Patient willing to participate in the study protocol.

Exclusion Criteria

1. Medically compromised patients.

PROCEDURE:

Under strict aseptic condition patient was shifted to OT. Patient was seated in prone position standard betadine scrubbing was done at the donor area. Bupivacaine 0.5% was used to block the greater auricular nerve for extracting the grafts, after local anesthetic block tumescent (1ml Adrenaline,70ml normal saline) was injected into the donor area(occipital area).Using 0.8mm,0.9mm and 1mm punches singlets, doublets, triplets were removed and stored in petridishes. After extracting the grafts the recipient site dressed with betadine and then patient was shifted to supine position and recipient site was scrubbed with betadine and local anesthetic solution was injected into the scar tissue. Using 18 gauge needle the grafts were inserted into the scar tissue. Post operative medication was prescribed for 3 days and patient was discharged.

Figure 1: Armamentarium For The Procedure

CASE : 1

Figure 2 : Preoperative profile view

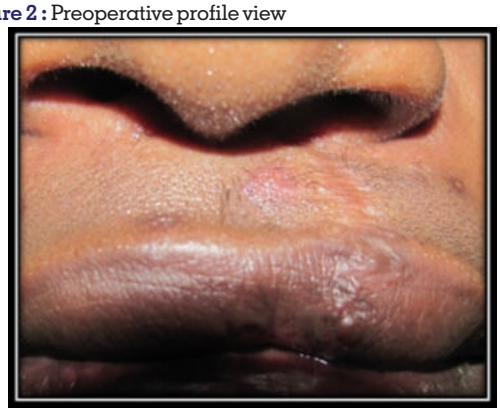

Figure 3 : Pre operative view

Figure 4 : Donor Area

Figure 5 : Greater Auricular Nerve Black

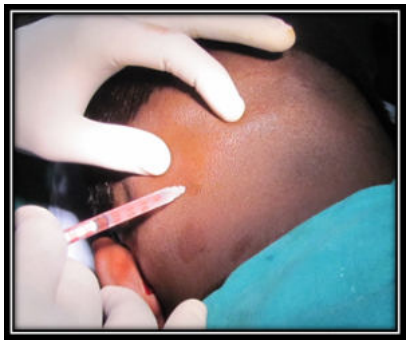

Figure 6 : Injecting Tumescent solution

Figure 7: Grafts Extracting Using Micro Motor And Punches

Figure 8 : Grafts collected in cold saline

Figure 9: Grafts Inserted Into Recipient Site

Figure 10 : Donor Area After Immediate Graft Insertion

Figure 11 : Donor Area After Removal Of The Graft

Figure 12: Donor Area After 1 Week

Figure 13 : Recipient Site After 1 Week

Figure 14: Post operative 3 months front view

Figure 15 : Post Operative 3 Months

CASE: 2

Figure 16 : Pre Operative View

Figure 17 : Post Operative View

RESULTS:

The present study is an evaluation of hair follicle transplantation on maxillofacial scar tissue. This prospective study included ten patients who were in need of hair follicle transplantation and were analysed for the both intra operative and post-operative Survival rate, Assessment of pain, Donor site morbidity, Patient satisfaction Index presented to the Department of Oral and Maxillofacial Surgery, Sibar Institute of Dental Sciences with maxillofacial scars.

Table 1: Mean And SD Age Of Study Subjects.

Age	N	Minimum	Maximum	Mean	SD
	10	18.0	29.0	24.40	3.75

Table 1 shows mean age of 24.40 and SD 3.75.

Table 2: Distribution Of Study Subjects By Type Of Scar.

Scar due to	Frequency	Percent
Cleft	5	50.0
Trauma	5	50.0
Total	10	100.0

Based on type of scar sample size was divided as 5 patients with cleft, 5 patients with post traumatic scar and distribution percentage of 50% and 50% respectively. (Table 2)

Table 3: Survival Rate Of The Recipient Site.

Recipient site Survival rate	Pre OP/Intra Op		Post OP week		Post OP 1 month		Post OP 3 month	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Excellent	8	80.0	3	30.0	3	30.0	3	30.0
Very good	2	20.0	6	60.0	2	20.0	2	20.0
Good	0	0.0	1	10.0	5	50.0	5	50.0
Total	10	100.0	10	100.0	10	100.0	10	100.0
Chi-square value= 15.96 Df=6 P-value <0.01 HS								

The clinical response in recipient site survival rate is intra operatively 80%excellent and 20%verygood, 1week post operatively it shows 30%excellent, 60%very good, 10% good ,where as both post operative 1 month and post operative 3 months it shows 30%excellent, 20%verygood, 50%good results.(Table 3)

Table 4: Assessment Of Pain

Assessment of pain	Pre OP/Intra Op		Post OP week		Post OP 1 month		Post OP 3 month	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
0-No pain	2	20.0	10	100.0	10	100.0	10	100.0
1-Little bit of pain	8	80.0	0	0.0	0	0.0	0	0.0
Total	10	100.0	10	100.0	10	100.0	10	100.0
Chi-square value= 30 Df=3 P-value <0.01 HS								

Clinical response in Assessment of pain Intra operatively 20% No pain, 80% little bit of pain, where as 100% No pain in post operative 1 week, 1month, 3months. (Table 4)

Table 5: Donor Site Morbidity:

Donor site morbidity	Pre OP		Post OP week		Post OP 1 month		Post OP 3 month	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Absent	10	100.0	10	100.0	10	100.0	10	100.0

In all 10 patients there is absent donor site morbidity in intra operative and all post operative examinations i.e 100%(Table 5)

Table 6: Patient Satisfaction :

Patient satisfaction	Pre OP/ Intra Op		Post OP week		Post OP 1 month		Post OP 3 month	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Excellent	2	20.0	0	0.0	2	20.0	5	50.0
Very good	3	30.0	3	30.0	7	70.0	5	50.0
Good	5	50.0	7	70.0	1	10.0	0	0.0
Total	10	100.0	10	100.0	10	100.0	10	100.0
Chi-square value= 18.19 Df=6 P-value <0.01 HS								

Clinical assessment of Patient satisfaction shows Intra operatively 20% Excellent, 30% very good, 50% good results. Post operative 1 week reveals 30% very good, 70% good results. After post op 1 month reveals 20% Excellent, 70% very good,10% good. Post op 3 months reveals 50% Excellent, 50% very good results (Table 6).

DISCUSSION:

The study was performed successfully in 10 patients, all are male patients ages from 18 - 29 years in the Department of Oral and Maxillofacial surgery, Sibar Institute of dental sciences, Guntur.

Based on the type of scar sample size was divided as 5 patients with cleft scars and 5 patients with traumatic scar with the percentage of 50% each.

The clinical response in recipient site survival rate is intra operatively it shows 80% excellent and 20% Good, 1week post operatively it shows 30%excellent, 60% Good, 10% Fair, where as both Post operative 1 month and Post operative 3 months it shows 30% Excellent, 50% Good, 20% Fair results.

The study conducted by Eswari Loganathan et al showed that donor area shows numbness/paresthesia, wide scar and bacterial folliculitis. Donor area complications are due to improper donor harvesting like, too wide a strip, too much tension during closure, poor location, transection of hair follicles, transection of blood and nerve supply and improper undermining. Most of the complications occur with the Follicular unit transplantation method[25].

The parameters taken into consideration are to assess survival rate, assessment of pain, donor site morbidity, patient satisfaction index. The values were recorded intraoperatively and postoperatively periodically at 1week,4 weeks and 3months.

Clinical response in Assessment of pain Intra operatively 20% No pain, 80% little bit of pain, where as 100% No pain in post operative 1 week, 1month, 3months.

In all 10 patients there is absent donor site morbidity in intra operative and all post operative examinations i.e 100%.

Clinical assessment of Patient satisfaction shows Intra operatively 20% Excellent, 30% very good, 50% good results. Post operative 1 week reveals 30% very good, 70% good results. After post op 1 month 20% Excellent, 70% very good,10% good. Post op 3 months have 50% Excellent, 50% very good results.

The present study was to evaluate the efficacy of hair follicle transplantation in the management of maxillofacial scars. Post treatment survival rate of hair follicles, Assessment of Pain, Donor site morbidity, Patient satisfaction were assessed. Results showed that the survival rate as excellent (>90%), good (90%-75%), fair (75%-60%), or poor (<60%). The survival rate is assessed by counting hair follicles per unit area (1 cm2).The success rate of the procedure was assessed as out of 10 cases 3 cases found to be Excellent ,5 were Good, and 2 were Fair. There was no donor site morbidity either intra operative or post operative period. A little bit of pain is seen in 8 cases during the operation, and absolutely no pain is seen in 2 cases. Whereas in all the 10 cases no pain was noticed during intra operative and post operative period. Patients were satisfied with the treatment and they showed positive improvement scores.

Summary And Conclusion:

In the present study there is significant improvement in the survival rate of hair follicle in the recipient site, assessment of pain, donor site morbidity, and patient satisfaction scale preoperatively and postoperatively. This shows the efficacy of hair follicle transplantation. There was also positive patient satisfaction. No significant postoperative complications are noted. Postoperative inflammation at the donor site subsided within two days. Pain during procedure is easily tolerable by the patient and no post-operative pain is noted.

The significant result achieved in this study provides scope for wider and increasingly targeted use of hair follicle transplantation for the management of maxillofacial scars. Our study included less number of cases and short duration of follow up period; so further work is still required to firmly establish the efficacy of hair follicle transplantation for maxillofacial scars.

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