Deep Temporalis FasciaBlanketing Supra-SMAS(superficial musculoaponeurotic) layer Versus Sub-SMAS layer dissection and preservation in preventing nasal dorsal irregularities.

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ABSTRACT: Background: Rhinoplasty is a complex surgical procedure used to correct nasal deformities. The main aim of this procedure is to improve thefunction and aesthetic aspect of thenose, enhancing facial harmony and the symmetryof the nose .It isconsidered asone of the most challenging operations in the field of Otolaryngology practice. In primary rhinoplasty,the two common techniques used are sub superficialmusculoaponeurotic system (Sub-SMAS)layer dissection andSupra SMAS deep Temporalis Fascia (DTF)blanketing for prevention of dorsal nasal irregularities. The aim of this study is to compare the irregularity of the nasal dorsum after rhinoplasty between(DTF)blanketing supraSMAS layer and(Sub-SMAS) layer dissection and preservation inprimary rhinoplasty.**Methods:**The study wasapproved by institutional review board (IRB).A retrospective chart studywasconducted on(64) patients who presented to (ENT OutPatient Department) and underwent primary rhinoplasty at tertiary care, Saudi Arabia. Patients were divided equally into2 groups,50%(32) Patients underwent (DTF)blanketing.and 50%(32) patientsunderwent(Sub-SMAS) layer dissection. Data was collectedbyobserving the preoperative and postoperative dorsal aesthetic lines symmetry outcomes.Data were tabulated using Microsoft excel sheet,SPSS used for Statistical analysis.Comparison between groups made by Student's, t-test and Chi square test for categorical values.**Result:**postoperative nasal dorsal aesthetic line symmetry observation scorewas given for both the groups rngingfrom (1,2,3,4,5), 1 means-0% marked dorsal aesthetic line symmetry,2- 25% symmetry, 3- 50% symmetry four 75% symmetry and 5-100% symmetry.It was seen that25.8% of patient with temporalis fascia blanketingsupraSMAS layer had a score (5), 12.9% had score (4), 38.7% score (3), 12.9% score (2) and 9.7% had score (1), while 36.4% of patient with(Sub-SMAS) layer dissection had score (5), 33.3% score (4) , 24.2% score (3) and 6.1 % score (2). The mean score in patients before (DTF)blanketingsupraSMAS.was 2.25 and 3.32 after the surgery, while the mean score in patients (Sub-SMAS) layer dissection group was 1.97 and 4 after the surgery. The postoperative dorsal nasal irregularity observation showed that 87.1% of patients with (DTF)blanketingsupraSMASlayer,have a regular nose while 12.9% of patients have irregular nasal dorsal.87.9 % of patient with (Sub-SMAS) layer dissection have a regular nasal dorsum.while

12.1 % of them have irregular nose as the t test was significant..**Conclusion:** (Sub-SMAS) layer dissection is superior to the (DTF)blanketingsupraSMAS layer.in the nasal dorsal aesthetic lines outcomes, while there is no significant difference in nasal dorsal regularity between the two groups.Sub-SMAS layer dissection is superior to the supraSMAS(DTF) blanketing as observed in this study , and also offers the advantage that it can be obtained from the same operative site rather than obtaining DTFfrom a different site.

Introduction:

Rhinoplasty is a combination of art and science. It's a fascinating and complex surgical procedure, aiming to obtain a well-functioning and aesthetically pleasant nose[(1)]. It enhances facial harmony and the symmetries of the nose. It can as well adjust the structural defects of the nose that cause breathing difficulties, In open classic primary rhinoplastytechniques, the dissection of Sub-superficial musculoaponeurotic system (Sub-SMAS) layerfascia which forms one of the soft tissue layer of the nose, from the inner aspect of the nasal skinto upper part overlying the nasal cartilages, which is present abundant extending from the upper part of the lower lateral cartilage till the nasal bones laterally and superiorly untill the root of the nose.This layer acts like an envelope holding the nasal bones and nasal grafts in place thereby preventing nasal dorsal irregularities. The dissectionsubSMAS that is (supraperichondrial and sub periosteal)fasciallayer is carried out with a Joseph periosteal elevator to the radix area and laterally to the nasal bones.[(2)] Fascia is often used in rhinoplasty for many assorted reasons, the refinements of the nasal dorsum and the nasal tip . Placing temporalis fascia over the applied cartilage grafts provide a good cover that hides the postoperative irregularities or distortions that may appear in the late postoperative period. [(3).]. Splitting of SMAS layer duingrhinoplasty involves thinning of the skin over the nasal dosum and the nasal deformity becomes obvious in thin skin individuals moreoften.. Aesthetic rhinoplasty in patients of Saudi Arabia extraction epitomizes primary goals of ethnic nasal surgery, which include avoidance of aggressive maneuvers, preservation and modification of native structures and addition of supporting grafts capable of withstanding postoperative forces of contracture. [(4)]**The aim** of this study is to compare the postoperative irregularity the nose when using Deep Temporalis Fascia(DTF) as blanketsupraSMAS layer and (Sub-SMAS) layer dissection in primary rhinoplasty in Saudi patients.

Methodology:

This study was **approved** by institutional review board (IRB) of our institute.A retrospective observational chart review studywasconducted on**(64),** Saudi patients whopresented to (ENT Head and Neck Surgery Out Patient Department)underwent primaryrhinoplasty at King Abdullah Medical City(KAMC) Makkah, Saudi Arabia from 2013 to 2017. Patients were divided equally and randomly into 2 groups. Male and females were equal in number.Application of the deep temporalisFascia (DTF)supraSMAS layerapplication was done to**50%(32)** patients and (Sub-SMAS) layers dissection and preservation to the rest of(50%)32patients.. Preoperative evaluation: Informed written consent was taken from all the patients, standard photographs were taken basal,lateral,dynamic,frontal,side to side view, examination of nasal bone, cartilages and endoscopic examination were done to all the patients.Inclusion criteria: In our study all the patients were Saudi ,more than 18-year, with preoperative dorsal nasal irregularity and nasal deformity after trauma and primary cases only . Exclusion criteria: non-Saudi, less than 18 years, patients who seek rhinoplasty for aesthetics purpose only and secondary rhinoplastyAll patients underwent Rhinoplasty under general anesthesia. A trans columellar incision was done followed by subcutaneous dissection till the nasal dorsum until the radix was reached nasal deformity was corrected and then DTF blanketingsupraSMAS layer, or Sub SMAS layer dissection and preservation was carried out. Postoperative evaluation was done after one year from the date of operation for observation of dorsal aesthetic lines and dorsal irregularities when all the dorsal nasal edema was completely resolved.This observation was done by a doctor of the same department who has not performed the surgery in order to avoid bias.Data were collected from the patients by observing the pre and postoperative photographs of the **(**64) patients. Data collection not showing any nominative information.Patients was identified by serial study code and initials. This was being linked to patient's name and MRN in a separate identification log sheet which was kept in a safe locked place. Two.Data entry was performed using Microsoft Excel 2014 and Static analysis was performed using the SPSS software, package used for Comparison between groups made by Student's, t-test or Mann Whitney test according to data distribution and Chi squared test for categorical values.

Surgical Methods:

Deep Temporalis Fascia (DTF)application:

- Deep Temporalis fascia is that part of the fascia which covers the temporalis muscle and measures approximately10 x 12 cm.A vertical line is drawn from the tragus upwards till the

temporalis muscle marking the anterior limit of the fascia.2 angular lines from this point run backwards in the hair bearing area over temporalis muscle about 5 cmslength,the subcutaneous tissue exposed and wider temporalis fascia approximately 5*5 cms is obtained which enables to cover the nasal dorsal irregularities, fig. (2) .The skin incision was closed using staplers and pressure dressing applied.The fascia end was brought out of the skin using 4-0 vicry and it was secured with steristrip and external splint over the nasal dorsum to stabilize the fascia in place.Thevicryl stitch was removed after 24 hours.

sub superficialmusculoaponeurotic system (Sub-SMAS) layer dissection:

Inthe other 32 patients of primary rhinoplastieswe start the dissection through the inverted v shaped incision at the middle 1/3 of the columella of the nose, the surgeon elevates the enveloped skin and dissect above the mucoperichondrial of the lower lateral cartilage till the level of the upper lateral cartilage a transverse incisionis made using 15 no blade Fig. (3) under thesub superficialmusculoaponeuroticsystem (Sub-SMAS)above the lower lateral cartilage and nasal bone till the radix and so the full thickness of the Sub-SMAS Layer was preserved and dissection was carried out and nasal deformity was corrected ,subSMAS layer preservation holds the tissues in place and camouflage any dorsal irregularityat the time of surgery.

1-Dissection supraSMAS layer

2- Application of the deep temporalis facia above the nasal dorsum

3- Dissection below the Superficialmusculoaponeurotic system

Results:

In this study**(64)**cases have been included, all of them are Saudi patients. Deep TemporalisFascia (DTF) application was done to **50% (32)**patientsand (Sub-SMAS) layers dissection was done to the rest of them.

Pre-and post-operative nasal dorsal aesthetic lines and postoperative nasal dorsal regularity have been observed and analyzed.postoperative nasal aesthetic lines score: with Deep Temporal Fascia (DTF) applicationsupraSMAS layer was **25.8%** of patients given a score **(5)**, **12.9%** of them was given a score **(4)** , **38.7%** of them was given a score**(3), 12.9%** of them was given a score **(2)** and **9.7%** of them was given a score **(1)**.

While with(Sub-SMAS) layers dissection:**36.4%** of patient given a score **(5)** , **33.3%** of them was given a score **(4)** , **24.2%** of them was given a score**(3)**and **6.1 %** of them was given a score **(2)**.

Table1: - Post operative nasal aesthetic line score

Operation Type			Frequency	Percent
Temporalis fascia harvest rhinoplasty supraSMAS layer	Valid	1.0	3	9.7
		2.0	4	12.9
		3.0	12	38.7
		4.0	4	12.9
		5.0	8	25.8
		Total	31	100.0
(Sub-SMAS)layer dissection	Valid	2.0	2	6.1
		3.0	8	24.2

		4.0	11	33.3
		5.0	12	36.4
		Total	33	100.0

The mean score in patients before DeepTemporalis Fascia(DTF)application surgery was **2.25** and **3.32** after the surgery, while the mean score in patients before (Sub-SMAS) layer dissection rhinoplasty was **1.97** and **4** after the surgery.

Table2: - pre and postoperative score:

Operation Type			Before	After
Temporalis fascia application	N	Valid	31	31
		Missing	0	0
	Mean		2.258	3.323
	Median		2.000	3.000
	Std. Deviation		1.4368	1.2751
	Skewness		.739	-.142

	Std. Error of Skewness		.421	.421
	Kurtosis		-.921	-.801
	Std. Error of Kurtosis		.821	.821
	Minimum		1.0	1.0
	Maximum		5.0	5.0
Sub-SMAS layer dissection	N	Valid	33	33
		Missing	0	0
	Mean		1.970	4.000
	Median		1.000	4.000
	Std. Deviation		1.1855	.9354
	Skewness		.900	-.488
	Std. Error of Skewness		.409	.409
	Kurtosis		-.283	-.743
	Std. Error of Kurtosis		.798	.798

	Minimum	1.0	2.0
	Maximum	5.0	5.0

According to the t- test, the difference between the mean score of the Deep Temporalis Fascia (DTF)application and dissection (Sub-SMAS)layer were significant.

Table3:

	Operation Type	N	Mean	Std. Deviation	Std. Error Mean
After	**Temporalis fascia harvest rhinoplasty**	31	3.323	1.2751	.2290
	Sub-SMAS layer dissection	33	4.000	.9354	.1628

Table4:

	Levene's Test for Equality of Variances		t-test for Equality of Means	
	F	Sig.	t	Df

After	Equal variances assumed	3.778	.056	-2.434	62
	Equal variances not assumed			-2.411	54.857

Table5:

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
					Lower
After	Equal variances assumed	.018	-.6774	.2783	-1.2338
	Equal variances not assumed	.019	-.6774	.2810	-1.2406

Table6:

	t-test for Equality of Means

		95% Confidence Interval of the Difference
		Upper
after	Equal variances assumed	-.1210
	Equal variances not assumed	-.1143

postoperative dorsal nasal regularityobservation:**the surgeon observes87.1%** of patients with Deep Temporalis Fascia (DTF) application have a regularnose post-operative while **12.9%** of patients have irregular nose.Also, the surgeon observed that**87.9 %** of patients with(Sub-SMAS) layers dissection have a regula**r** nose while **12.1 %** of them have irregular nose.

Table7: postoperative dorsal nasal regularity:

Operation Type			Frequency	Percent
Temporalis fascia application	Valid	Yes	27	87.1
		No	4	12.9
		Total	31	100.0
Sub-SMAS layer dissection	Valid	Yes	29	87.9
		No	4	12.1
		Total	33	100.0

Comparison between Deep Temporalis Fascia (DTF) application and (Sub-SMAS)layer dissection in dorsal nasal regularity revealed that **48.2 %** of patients with regular nose undergo Deep Temporalis Fascia(DTF)application and **51.8%** undergo(Sub-SMAS) layer dissection surgery .

50 % of patients with irregular nose undergoDeep Temporalis Fascia(DTF)application.and 50 **%**undergo(Sub-SMAS)layer dissection.

Table8: comparison between Temporalis fascia application and Sub SMAS layer dissection in dorsal nasal regularity

			regularity		Total
			Yes	No	
Operation Type	**Temporalis fascia application**	Count	27	4	31
		% within regularity	48.2%	50.0%	48.4%
	Sub-SMAS layer dissection	Count	29	4	33
		% within regularity	51.8%	50.0%	51.6%
Kl=[]\Total		Count	56	8	64
		% within regularity	100.0%	100.0%	100.0%

. The chi square Test indicate ; regularity

Dose not significantly differ between the twooperations.

Table7:-Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
hi-Square	.009[a]	1	.925		
Correction[b]	.000	1	1.000		
Ratio	.009	1	.925		
act Test				1.000	.610
Linear n	.009	1	.925		
Cases	64				

Discussion:

The nasal dorsum has two symmetrical smooth dorsal astheticlines.They are slightly curved divergent lines extending from the medial superciliary ridges to the tip defining points.They are broa superiorly and narrow down when they descend downwards towards tip defining point.Superiorly these lines are formed by soft tissue countours and underlying nasal bones and inferiorly the dorsal septum and upper lateral cartilages and underlying softtissue of the midvault.We started our study by comparing between two procedures (Deep Temporalis Fascia(DTF)supraSMAS,application over the nasal dorsum postoperatively and (Sub-SMAS) layer dissectionand measuring (pre and post-operative nasal dorsal aesthetic lines) that was done by observation in **64** cases all of them were Saudi patients . Deep TemporalisFascia (DTF) application was done to**50% (32)** patientsand (Sub-SMAS) layers dissection was done to the rest of them.Pre and post-operative nasal dorsal aesthetic lines given a score before and after the operation**(5,4,3,2,1)**respectively ,Where score**5**represents the best result while score **1** represent severely dorsal nasal irregularity.The data was collected then the result analyzed and shows that in Deep TemporalisFascia (DTF) application**25.8%** of the patientshad a score **(5)** , **12.9%** of them were score**(4)** , **38.7%** of them score**(3)**, **12.9%** of them had score **(2)** and **9.7%** of them had score **(1)**,while in

(Sub-SMAS) layers dissection**36.4%** of patient had score**(5), 33.3%** of them had score**(4)**,**24.2%** of them has a score **(3)** and **6.1 %** of them had a score**(2)**. The mean score in patients before Deep Temporalis Fascia(DTF)application was **2.25** before surgery and **3.32** after the surgery, while the mean score in patients before (Sub-SMAS) layer dissection rhinoplasty was **1.97** and **4** after the surgery.According to these results and the comparison between the two groups we found that in Deep Temporal Fascia (DTF) applicationsupraSMAS,the most of them had score **3** whereas in(Sub-SMAS) layers dissection the most of the patients had a score of **5** which is the best and there was no score**(1)** unlike DeepTemporal Fascia (DTF) application the score **(1)** was seen in **9.7%.**The difference between the mean score of theDeep Temporal Fascia (DTF) harvest RhinoplastysupraSMAS, and (Sub-SMAS) layers dissection depending on t test which was statisticallysignificant.Regarding postoperative dorsal nasal regularity: in each individual operation, the result showed that **87.1%** of patients with Deep Temporalis Fascia (DTF) application have a regular nose while **12.9%** of patients have irregular nose. Whereas in(Sub-SMAS) layers dissection 87.9 **%** of patient have a regular nose while **12.1 %** of them have irregular nasal deformity.According to the chi-square test theirregularity didnt differ significantly among the two operations which support all of our resultsrepresented in table 5,6,7* .As there were no previous studiescompared between Deep Temporalis Fascia(DTF)supraSMAS ,and (Sub-SMAS) layer dissection in Primary rhinoplasty in Middle East patients ,we need studies of larger samples before we could comment on superiority of subSMAS and generalizing any statement in this regard

Conclusion:

Our data suggest that the (Sub-SMAS) layers dissection is superior to the Deep Temporal Fascia (DTF)application supraSMAS ,for correction of nasal dorsal aesthetic lines asymmetry, while there is no significant difference in postoperative nasal dorsal irregularity between the two groups.AssubSMAS careful dissection and preservation provides the avantage of holding and enveloping soft tissues and grafts postoperatively and preventing nasal dorsal irregularities thereby avoiding morbidity and unnecesseary surgical procedure of obtaining temporalis fascia from a different site to camouflage nasal irregularity.

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