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RESEARCH ARTICLE

PSYCHOLOGICAL, SOCIAL AND ECONOMIC, SATISFACTION OF DOUBLE JAW SURGERY VS. SINGLE JAW SURGERY: A RETROSPECTIVE CLINICAL STUDY.

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Abstract

Orthognathic surgery involves manipulation of the jaws and skeletal structure to overcome inherited or acquired skeletal abnormalities. The psychological and social effect on these patients is recognized in many literatures. The aim of current study is to compare the quality of life in psychological, social and economic changes after orthognathic surgeries of single jaws vs. double jaws. Methods: A questioner was distributed to 40 patients in a recall visit that underwent orthognathic surgery from January 2015 to December 2017. The questioner included 27 questions divided into 7 sections out of which 3 questions related to demographic parameters such as age, gender and education level, 2 were about etiology of surgery, 3 were about orthognathic treatment plan, 12 questions were about facial changes reflecting psychological outcome of the surgery, 5 about social effect and 2 were about economical outcome of the surgery. Result: Total number of the patients in the current study was 40 out of which, 27 had a double jaw surgery while 13 had a single jaw surgery. The result was divided into four sections, including general information, physiological, social and economic section. The participant scored the highest percentage for improvement of beauty where double vs. single was 20 (64.5%) vs. 11 (35.5%). In regards to gummy smile improvement the participant reported 8 (29.6%) vs. 4 (30.8%) in double vs. single jaw. Lip fullness was significant in single jaw surgeries with P-value 0.015. Mandibular angle changes reported in 12 out of 27 (44.4%) in double jaw comparing to 1 out of 13 (7.7%) in single jaw with a significance of 0.029. In documenting post-op TMJ clicking, double jaw surgeries reported having 12 (44.4%) clicking while it was only 5 (38.5%) in single jaw where all patient did not experienced TMJ clicking pre surgery. Conclusion: Generally orthognathic surgery has a positive influence on the psychological, social and economic status of patients with jaw deformities. Unexpectedly there was no difference in between double and single jaw surgeries in psychological, social and economic

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status except in lip fullness and mandibular angle. In the current study patient with single jaw surgeries reported increases in lip fullness while double jaw surgeries reported significant increases in the mandibular angle improvement.

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..... **Introduction:-**

Orthognathic surgery involves manipulation of the jaws and skeletal structure to overcome inherited or acquired skeletal abnormalities, which could involve single or double jaws surgery.¹

The main goal of those surgeries is to attain satisfaction esthetically, functionally and psychologically.²

Generally complication of these surgeries includes bleeding, infection, temporomandibular joint symptoms and nerve injuries^(1,3,4,5). The psychological and social effect on these patients is recognized in many literature.^{6,7,8}

Brunault et.al (2016) reported that the perception of patients for psychosocial benefits of treatment for 286 patient were positive; where 27 (67.5%) patients stated that their social communication significantly enriched and 30 (75%) patient's reported improvement of self-confidence.⁹

Corso et.al (2015) reported that there was an improvement in the quality of life after orthognathic surgery for all groups of dentofacial deformities, particularly vertical and anteroposterior deficiency of the maxilla and excess of the mandible. There was a lesser reduction of negative impact for transverse jaw deformities when compared with other deformities.¹⁰

The aim of current study is to assess the quality of life, psychological, social and economic changes after corrective surgeries of single jaw as compared to double jaw surgery.

Material and methods:-

This retrospective study was conducted in oral and maxillofacial surgery department – College of Dentistry, King Saud University, Saudia Arabia. Approval of CDRC # IR 0286 was obtained. It included patients who underwent orthognathic surgery from January 2015 to December 2017.

Inclusion criteria involved patient who underwent orthognathic surgery for double or single jaw, above 18 years of age, no major medical illness, post-operative follow-up of at least six months. Exclusion criteria included patients younger than 18 years; medically compromised, patient with craniofacial abnormalities, cleft lip, mental retardation, psychiatric treatment and pregnant patients.

A questioner was distributed to 40 patients in a recall visit by a post graduate of oral and maxillofacial surgery department and by phone for those who couldn't come up for the follow-up visit. During the period of answering the survey, a post-graduate to clarify any unclear question accompanied patients.

The Questioner included 27 questions divided into 7 sections out of which 3 questions were, personal including age, gender and education level,

1. 2 were about causes of surgery,
2. 3 were about orthognathic treatment plan,
3. 12 questions were about facial changes reflecting psychological outcome of the surgery,
4. 5 about social effect and finally
5. 2 were about economical outcome of the surgery.

Psychological impaction section involved multiple questions about changes in the nose shape and width, gummy smile, cheek changes, mandibular angle, chin and lip fullness, phonetic defect, temporomandibular joint involving clicking and limitation of mouth opening and tongue movement. This section was numbered in a scale from 1 to 10 where 1 (10%) indicating not satisfied and 10 (100%) indicating complete satisfaction.

All questioner papers were anonymous to maintain the patient privacy and each patient was given a number to identify the subject. The questioner papers were kept with the main researcher in his private locker with the ability of the second researcher to have access to it.

Statistical Analysis:-

PSSC version 20 was used to analyze the data. Descriptive analyses were used to evaluate the responses of participants to each section of the questionnaire. The age, gender, level of education of the subject at the study was also calculated. The characteristics of participants and non-participants in the survey were compared using chi square tests. The data were compared based on the surgeries type conducted as single jaw or double jaw, a chi-square was used with a P-value < 0.05 to compare the outcome.

Results:-

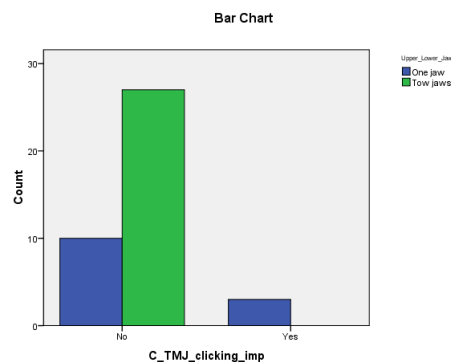
Total number of the patients in the current study was 40 where 15 (37.5%) were male and 25 (62.5%) were female. 16 (40%) were between age group of nineteen and twenty-four years, 9 (47.5%) were between twenty-five and thirty years and only 5 (12.5%) were above thirty years.

27 patients had a double jaw surgery while 13 had a single jaw surgery.

As in regards to the level of education 6 (15%) patients had high school degree, while the majority of the patient 29 (72.5%) had a bachelors degree and only 5 (12.5%) patients had a postgraduate degree.

For the second section exploring the reasons for surgery, the participant scored the highest percentage for improvement of beauty where was 20 (64.5%) as compared to 11 (35.5%) in double jaw and single jaw surgeries respectively. The second reason was improvement-chewing function, which account for 9 (69.2%) as compared to 4 (30.8%) in double and single jaw surgeries respectively. Third reason was improvement of the speech, which account for 8 (80%) as compared to 2 (20%) for double and single jaw surgeries respectively. Improvement of TMJ clicking was the 4th cause of surgery where none reported in double jaw while it was surprisingly 3 (100%) in single jaw surgery with a significance of P-value 0.009.

Chart 1:-



Physiological effect:

The fourth section in the study was for evaluating physiological changes occurred after surgery including gummy smile, post-operative numbness, cheek fullness, lip fullness, mandibular angle and chin changes, chewing, speech and TMJ clicking improvement, limitation of mouth opening and tongue movement

In regards to gummy smile improvement the participant reported 8 (29.6%) as compared to 4 (30.8%) in double jaw surgery and single jaw surgery respectively.

In respects to facial numbness post-operatively; the participant replied that 1 patient from each group had none while 2 patients from each group had facial numbness up to 2 weeks in both double and single jaw group. Where-as it ranged from 2-3 months for 12 participants who underwent double jaw surgery and 6 who underwent single jaw

surgery. Numbness disappeared after 6 months for 5 patients who underwent double jaw surgery and 1 patient who underwent single jaw surgery while it was 1 patient from each group, which took 2 years to recover from numbness. Cheek fullness reported as positive in 8 (61.5%) patients and 25 (82.5%) with no changes in patients who underwent double jaw surgery whereas it is positive in 2 (7.4%) patients and 4 (30.8) patients with no changes in patients who underwent single jaw surgeries.

Lip fullness was reported positive in double jaw surgery vs. single jaw surgery as 1 (3.7%) vs. 4 (30.8%) with a significant of 0.015 (**Table1**)

Table 1:-Satsfaction_Lip_fulness * Upper_Lower_Jaw

			Upper_Lower_Jaw		Total
			One jaw	Tow jaws	
Satsfaction_Lip_fulness	No	Count	9	26	35
		% within Satsfaction_Lip_fulness	25.7%	74.3%	100.0%
		% within Upper_Lower_Jaw	69.2%	96.3%	87.5%
	Yes	Count	4	1	5
		% within Satsfaction_Lip_fulness	80.0%	20.0%	100.0%
		% within Upper_Lower_Jaw	30.8%	3.7%	12.5%
Total		Count	13	27	40
		% within Satsfaction_Lip_fulness	32.5%	67.5%	100.0%
		% within Upper_Lower_Jaw	100.0%	100.0%	100.0%

Mandibular angle changes reported in 12 out of 27 (44.4%) in double jaw comparing to 1 out of 13 (7.7%) in single jaw with a significance of 0.029 (**Table 2**)

Table 2:-Did_U_had_any_Mandibular_Angle_Changes? Upper vs.Lower_Jaw Crosstabulation

			Upper_Lower_Jaw		Total
			One jaw	Tow jaws	
Did_U_had_any_Mandibular_Angle_Changes	Slight Change	Count	1	12	13
		% within Did_U_had_any_Mandibular_Angle_Changes	7.7%	92.3%	100.0%
		% within Upper_Lower_Jaw	7.7%	44.4%	32.5%
	Huge Change	Count	1	4	5
		% within Did_U_had_any_Mandibular_Angle_Changes	20.0%	80.0%	100.0%
		% within Upper_Lower_Jaw	7.7%	14.8%	12.5%
	No	Count	11	11	22
		% within Did_U_had_any_Mandibular_Angle_Changes	50.0%	50.0%	100.0%
		% within Upper_Lower_Jaw	84.6%	40.7%	55.0%
Total		Count	13	27	40
		% within Did_U_had_any_Mandibular_Angle_Changes	32.5%	67.5%	100.0%

	% within Upper_Lower_Jaw	100.0 %	100.0 %	100.0 %
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Genioplasty was performed in 11 patients where 10 were performed along with double jaw surgery while only 1 patient was performed along with single jaw surgery.

Chin changes irrespective of genioplasty reported in 20 (74.1) patients who underwent double jaw surgery and 10 (76.9%) patients who underwent single jaw with no statistical significance.

Chewing ability improved in 11 (73.3) patients who underwent double jaw and 4 (26.7) patients who underwent single jaws.

Speech improvement was reported positive in one patients who underwent double jaw surgery comparing to neutral response in all of single jaw surgical patients with no significance.

Post-Operative TMJ clicking was present in 12 (44.4%) patients who underwent double jaw surgery while it was 5 (38.5%) patients who underwent single jaw. All subjects were free of TMJ clicking pre operatively.

In reporting limitation of mouth opening 33.3% (9 in 27) was found in patients who underwent double jaw surgery and 30.8% (4 in 13) patients who underwent single jaw surgery.

For difficulty in tongue movement post-surgery, 5 (18.5%) patients who underwent double jaw surgery had tongue movement difficulty and 2 (15.4%) patients who underwent single jaw surgery.

In the question of post-op psychiatric treatment only 2 (7.4%) participants were exposed to psychiatry treatment from the double jaw surgery participant and none reported from single jaw surgery participant.

Social effect:

In evaluating post-operative social satisfaction 5 questions were given to the participants including participant satisfaction, family and friends satisfaction, possibility of doing the surgery again, reflection of the changes occurred post-surgical for friends, family and at work and recommendation of the participant to other about the surgery.

For participant satisfaction, 3 (11.1%) vs. 1 (7.7%) reported 70% satisfaction in double vs. single, While 80% satisfaction reported in 4 (14.8%) vs. 1(7.7) in double vs. single jaw. 90% satisfaction was conveyed in 2 (7.4%) vs. 4 (30.8%) in double vs. single while 100% satisfaction was documented in 16 (59.3%) vs. 6 (46.2%) for double vs. single jaw with no significant between the two groups.

In the question of “Would you do the surgery again”? The participant replied as strongly agreed in 11 (40.7%) vs. in 8 (61.5%), agreed in 8 (29.6%) vs. 2 (15.4%), neutral in 1 (3.7%) vs. none and disagreed in 4 (14.8%) vs. 1 (707%) for double vs. single jaw surgeries correspondingly.

In the question of “Would you recommend the surgery to others”? The participant answered as strongly agreed in 19 (70.4%) vs. 12 (92.3%), agreed was documented in 4 (14.8%) vs. 1 (7.7%), neutral in 3 (11.1%) vs. none and disagreed in 1 (3.7%) vs. none in double vs. single jaw surgeries correspondingly.

For the question of “Did you have difficulty for family and friends recognizing you”? The participant answered as yes in 14 (51.9%) vs. 3 (23.1%) and no in 13 (48.1%) vs. 10 (76.9%) in double vs. single with no significant between the two groups.

For the question “Did family and friends liked your face”? The participants replied in double jaw as yes in 26 (96.3%) comparing to 13 (100%) in single jaw with no significance.

For the question of “Satisfaction of family and friends towards changes in your face” ? The participants in double vs. single jaw surgeries replied as very satisfied in 20 (74.1%) vs. 8 (61.5%), and satisfied in 7 (25.9%) vs. 4 (30.8%) with no significance.

For the part of admiring the participant new face by family and friends, the double jaw surgeries reported 23 (85.2%) out of 27 comparing to 7 (53.8%) out of 13 in single jaw

For the question “Did you have any improvement in your social relationship”? The participants answered in double vs. single jaw as yes in 17 (63%) comparing to 6 (46.2%) and no in 10 (37%) vs. in 7 (53.8%).

Economic effect:

For work relationship improvement, the participant answered range from 11 (40.7%) out of 27 for double jaw to 3 (29.1%) out of 13 in single jaw surgeries.

For financial outcome improvement, double jaw reported none compared to 1 (7.7%) in single jaw.

For the question if the surgery cost them financially, double jaw surgeries reported 6 (22.2%) out of 27 while none reported in single jaw.

Discussion:-

1. A comparison between double and single jaw surgeries in physiological, social and economic impact was not found in literature and to our knowledge this is the first comparative clinical study reported.
2. The number of the patient in the current study is in consistent with the study of Posnick and Wallace⁶. The increased number of the female in the current study is in consistent with many studies^{6,11}.
3. Level of education was not significant in many reported similar studies^{6,12} while it were reported in the current study as the majority of the patient had a pacher degree 29 (72.5%).
4. Psychological effect: In the current study, improvement of beauty reported as the highest cause of surgeries in double jaw vs. single jaw which in consistent with Meadea & Inglehart 2010¹² where significant relation was reported between esthetic and satisfaction and with Rispoli and his coworkers 2004.¹³
5. Improvement of TMJ was reported in the current study as 3 (100%) in single jaw with a significance of P-value 0.009 where none reported in double jaw and this is in consistent with the study of Al-Riyami et al 2009²³ where improvement of TMJ clicking and crepitation was noted.
6. In the current study one case from each group reported having numbness up to 2 years post-operatively and none from the two groups reported having permanent loss of sensation. This is not in agreement with Posnick and Wallace⁶ 2008 where they reported loss of sensation in 21% (9 of 42).
7. In the current study lip fullness was reported with no significant which is in agreement with many studies.^{2,6}
8. In the current study cheek fullness was significant between double and single jaw surgeries with P value <0.015 which not in consistent with Posnick and Wallace⁶ 2008.
9. Change in mandibular angle in the current study is in consistent with the systematic review of Kaklamanos & Kolokitha 2016²⁴ where angle changes will follow the setback of the mandible.
10. Chewing ability improved in 11 (73.3) patients in double jaw vs. 4 (26.7) in single jaws which in consistent with study of Posnick and Wallace⁶ 2008 as they reported 80% occlusion improvement in their study.
11. In the current study speech improvement was reported in a single case 3.7% of double jaw which inconsistent with Posnick and Wallace⁶ 2008 where about 80% were satisfied with their speech post operatively.
12. In the current study, Limitation of mouth opening was reported in 30% of the cases which is inconsistent with the study of Tahir and others 2015 where they reported only 12.5%²².
13. In the current study post-op TMJ clicking reported as 12 out of 27 in double jaw comparing to 5 out of 13 in single jaw surgeries, this inconsistent with the study of Al-Riyami and others 2009²³ where they reported improvement in their signs and symptoms than deterioration in patients having orthognathic treatment and also suffering from TMD appear. In the systematic review of 544 article Bermell-Baviera et al 2016 found no effects of mandibular advancement surgery on the temporomandibular joint neither to improve nor to worsen TMJ health.²⁴
14. Social effect: In the current study satisfaction of double jaw surgeries vs. single is 85% to 78% correspondingly which in accordance to the study of Posnick and Wallace⁶ 2008 where they reported 87% satisfaction and also to some other studies^{14,15}.
15. For the respondent reaction about their agreement to do the surgery again, they reported positive answer in 70.4% (19 out of 27) in double jaw vs. 77% (10 out of 13) in single jaw. This in consistent with the study of Posnick and Wallace⁶, while it is not in agreement with many studies.^{12, 16-20} Meadea & Inglehart 2010¹² reported 80% of their participants were reelecting to have the surgery again while they recommended the surgery to others in 79%.

16. The recommendation of the participants to other to do the surgical correction was positive in 85% (23 out of 27) for double jaw surgeries and 77% (10 out of 13) in single jaw. This is in agreement with the study of Posnick and Wallace⁶ where the participants respond that they will recommend the surgery to others in 93%.
17. In the question whether your family recognizes you post-operatively and if they like your new face, the answer of the participant in this study was not significant between the two group which is in consistent with Posnick and Wallace.⁶
18. For the question whether family and friends like your new face, the participant in the current study respond as very satisfied in 20 (74.1%) for double jaw while for single jaw it was 8 (61.5%). This in agreement with many studies.^{2, 6, 8}
19. For the question whether family and friends admiring your new face, the participant in the current study reported up to 23 out of 27 (85.2%) in double jaw surgeries which is in consistent with many literature review.^{2, 6}
20. For the question "Did you have any improvement in your social relationship"? The participants answered were in consistent with Co-Pereiraa et al 2016.²⁶

Economic effect:

1. For the question inquiry if the surgeries coast them, both group answered as no coast resulted from the surgeries where no such a question was asked in the literature.
2. For the question if the post surgeries increase their personal income participant reported having no effect of the surgery on their income.

Conclusion:-

1. In conclusion, generally orthognathic surgery has a positive influence on the psychological, social and economic status of patients with jaw deformities.
2. Unexpectedly there was no difference in between double and single jaw surgeries in psychological, social and economic status except in lip fullness and mandibular angle.
3. In the current study patient with single jaw surgeries reported increases in lip foulness comparing to double jaw surgeries.
4. In the current study mandibular angle changes reported significant result in double jaw surgeries comparing to single jaw
5. The limited numbers of cases in the current study affect the general result and possible increase in cases.

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