

PSYCHOLOGICAL ISSUES IN ORTHOGNATHIC CASES

Sreevatsan Raghavan^a, Koshi Philip^b, Puneet Batra^c

ABSTRACT

Background and Objective: To evaluate the motivation and satisfaction of combined orthodontic-orthognathic treatment and to assess the outcome of the same objectively (cephalometrics) of post-treatment soft-tissue profile and subjectively through profile photographic aesthetic evaluation by laypersons and clinicians. Correlation with satisfaction of the patients and the degree of post-treatment soft-tissue correction

Materials and Methods: The sample comprised of 30 patients (Kerala origin) who had completed combined orthodontic-orthognathic treatment. Motivation and satisfaction with treatment results were evaluated using a pre-validated questionnaire. Post-treatment cephalograms were assessed using the Burstone and Legan's Soft tissue analysis along with comparison to regional norms of the Kerala population. Standardized pre and post-treatment profile photograph aesthetics were assessed by six laypersons and six clinicians using a 7-point scale.

Results: The most common reasons for seeking orthognathic treatment were dissatisfaction with facial appearance (76.7 percent)- majority (14/23) being women and problems in biting and chewing (23.6 percent). All patients were satisfied with treatment results. Some degree of numbness in the lips and/or jaw beyond 1 month post-operatively was experienced by 66 percent. The most satisfied patients were the ones who were dissatisfied initially with their facial appearance. Complete cephalometric normalization of the parameters was not achieved with orthognathic surgery, showing significant differences when compared to the aesthetic norms. There were significant differences in the aesthetic scores between laypersons and clinicians.

Interpretations and Conclusion: Although satisfied with the results, majority of the patients found the surgical experience as the most unpleasant part of the whole treatment process. The professionals should make efforts to understand the patient's motivations for and expectations of treatment. Maxillary prognathism and vertical height ratio were the only cephalometric parameters that significantly influenced clinicians' assessment of profile aesthetics. Patient satisfaction was not related to cephalometric change observed.

Keywords: Motivation; Satisfaction; Orthodontics; Orthognathic Surgery; Aesthetics; Psychological; Kerala Population; Cephalometrics

INTRODUCTION

Orthognathic surgical soft tissue changes are of utmost importance to both patients and professionals. The motivation for seeking treatment and the expectations of the results should be considered carefully in treatment planning. Although proper functioning of the jaws is highly valued in surgical orthodontic treatment, satisfaction is usually high if the patient's expectations concerning facial appearance are also fulfilled.¹⁻⁶ The ultimate treatment goal is to correct the profile (soft-tissue and skeletal) to an extent that it falls in the range of what is considered normal defined by the supposed measuring stick i.e. the aesthetic norms which are usually ethnically and regionally specific.⁷⁻¹³ In terms of aesthetics, who is the REAL judge:

the orthodontist, the surgeon, the spouse or significant other, the parent, or the patient?¹⁴

Sex, age, education, socioeconomic status, and geographic location also factor in determining the aesthetic preferences of the public.^{3,10,15} Very few studies have been done on Indian population especially South Indian (Kerala) where adults are actively seeking surgical orthodontic treatment, with regard to above mentioned parameters.

REVIEW OF LITERATURE

Literature shows that orthodontists and oral surgeons are most tolerant of different profiles, while the patients themselves are least tolerant; perhaps reflecting the reality that orthodontic treatment compared with orthognathic surgery is a slower biologic process with a wider range of acceptable outcomes.^{16,17} Several studies have also found that the patients who seek surgical correction of their facial deformity were usually more anxious, introverted, possessed a poorer self-concept, and were more prone for being teased. Treatment was usually sought to improve appearance, but patients could not specify what they wanted

^a Private Practitioner

^b Professor and Head, Department of Orthodontics and Dentofacial Orthopaedics, government Dental college thiruvananthapuram

^c Vice Principal, professor and head of department, department of Orthodontics and Dentofacial Orthopaedics, IDST

to change.¹⁸⁻²⁰ Literature shows that women were generally more dissatisfied with their facial appearance than men.^{21,22}

Patient's Expectations

The goal in evaluating patient expectations is to find out whether they are realistic or not. Patients with moderate and realistic expectations (such as feeling more comfortable in social situations) are likely to be quite satisfied with the outcome and those with unrealistic ones are not satisfied with the same. Literature highlights the necessity to provide the patient with an overview of what will happen at surgery. Patients who feel unprepared are much more likely to experience dissatisfaction, hostility, or anxiety. Little is known about what kind of information (e.g., how much information, the amount of detail, and the mode of communication) best prepares orthognathic patients for the surgical experience.²⁴

Satisfaction with Treatment

Essentially all long-term studies show that the great majority of dentofacial patients are satisfied with the result of treatment and would recommend it to others.^{21,25,26} Older patients and patients who are positive about their aesthetic improvement tend to be more satisfied with no significant difference noted in treatment duration or in occlusal outcome between single- and double-jaw surgeries.^{27,28} An important point to note while assessing satisfaction is that the patient must adapt to the new look and self-esteem changes caused by unexpected facial changes. Appropriate family member support is crucial for the same else disruption of normal family and peer functioning may occur.

AIMS AND OBJECTIVES

Aims:

1. To evaluate the outcome of surgical orthodontic treatment by objective and subjective evaluation by laypersons and clinicians.
2. To correlate the motivation and satisfaction of the patient with the degree of soft tissue correction according to the set norms.

Objectives:

1. To evaluate the level of motivation and satisfaction for combined orthodontic-orthognathic treatment
2. To assess the correction of dentofacial deformity to the "set cephalometric norms" of the South Indian (Kerala) population
3. To evaluate the pre and post treatment assessment of profile photographs by laypersons and clinicians
4. To correlate the satisfaction of the patient with the amount of soft tissue correction achieved surgically.

METHODOLOGY

The study was a Single- arm Cohort, conducted after obtaining ethical clearance in the Department of Orthodontics and Dentofacial Orthopaedics, and the Department of Oral & Maxillofacial Surgery of Government Dental College, Kottayam, conducted for a period of eighteen months with a sample of 30 patients.²⁹

Motivation and satisfaction with treatment results were evaluated on the basis of replies using a pre-validated questionnaire²¹ which was cross-culturally adapted and translated into the local language which involved a pilot study. The pre and post-treatment cephalograms of these patients were analysed using the paired 't' test, using NemoCeph for Windows (Nemotec version 6.0) cephalometric software (Figure 1). The reproducibility of the measurements was determined by selecting 10 cephalograms at random and repeating the onscreen digitization by the same examiner one month after the initial digitization.

Six laypersons and six clinicians (3 Orthodontists, 3 Oral Surgeons) scored the esthetics of each profile using a 7-point scale when given standardized pre and post-treatment profile photographs. Scoring was done as such that 1 represented very unattractive and 7 very attractive. No time limit was given for the rating. A two-sample *t*-test was used to test for significant differences between the mean cephalometric values and the aesthetic norms (Burstone and Legan's Soft tissue analysis³⁰ and local soft-tissue Cephalometric norms given by Valiathan and John³¹). The layperson and clinician subjective scores were compared with the Wilcoxon signed ranks test. Spearman's correlation coefficient as well as Fleiss' Kappa was used to assess the correlation and agreement between the layperson and clinician subjective scores respectively. Statistical significance was set at P d" .05.

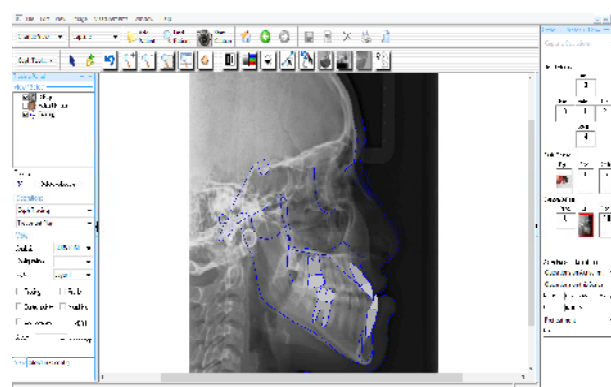


Figure 1 - Soft-tissue cephalometric pre-treatment analysis of Legan and Burstone being performed using the NemoCeph for Windows (Nemotec version 6.0) Cephalometric Software

Inclusion Criteria

1. Reported to the OPD of the Department of Orthodontics seeking orthodontic treatment
2. Indicated to undergo combined orthodontic-orthognathic treatment
3. Have an ethnic background from Kerala

Exclusion Criteria

1. Cleft lip and palate or other congenital craniofacial anomalies
2. History of previous orthodontic treatment

Pre-Treatment Questionnaire:

- a. Why did you seek Orthodontic-Surgical treatment? Dissatisfaction with facial appearance – 1 eating difficulties -2 temporomandibular joint problems- 3 symptoms of headache -4 other -5 (PLEASE SPECIFY)
- b. Were the different treatment alternatives explained to you clearly? (yes -1/no -2)
- c. Were you given adequate information about different treatment procedures? (sufficiently-1/ reasonably- 2/ far too little- 3)
- d. Would have wanted more information regarding the treatment options (yes -1/no -2); if yes how?

Post-Surgery Questionnaire

The patient was recalled after a minimum recovery period of 1 month after the conclusion of the orthognathic surgery.

1. Did you experience pain during orthodontic treatment (yes/no)
2. How did you feel about Anesthesia? (pleasant/unpleasant)
3. Did you have numbness in the lips and/or jaw after operation (yes/no); if yes for how long?
4. Have you noticed a change in chewing ability (yes/no); if yes has it improved or worsened?
5. Have you noticed a change in your appearance (yes/no); if yes has it improved considerably/ slightly/worsened?
6. Did you have difficulties in adjusting to your changed appearance (yes/no/I don't know)
7. Have your relatives and friends noticed the change in your facial appearance (yes/no) and how? (good/bad)
8. Have you noticed any change in your self-confidence? (yes/no); if yes what kind of change? (increase/decrease)
9. What was the most unpleasant part in the whole treatment? (Orthodontic/Surgical)
10. How satisfied are you with the treatment result? (very satisfied/ reasonably satisfied/ not satisfied)
11. Treatment results were better/ as good as/ worse than you expected?

RESULTS & DISCUSSION

The mean age was 22 years \pm 0 months with a range of 18 to 27 years with 11 subjects residing in urban areas and 19 in rural respectively. 6 out of 30 patients had siblings with similar skeletal conditions for which they sought orthodontic-orthognathic treatment.

Motivations for Seeking Treatment

76.7 % (23/30) of patients were found to be seeking treatment for improving facial appearance, whereas 7/30 patients sought treatment for improving eating/chewing. Orthognathic treatment is usually only considered when other treatment options including orthodontic camouflage are not feasible options. Thus, the severity of cases usually undergoing such orthognathic treatment is quite high; this might explain the desire for facial appearance improvement (76.7 %) as a major motivation factor when compared to other reasons for seeking treatment. The finding in this study is in contrast to the findings of Nurminen et al.²¹ but in accordance to the findings of Rivera⁵ and Ryan³¹. In our study, this difference between the two sexes was not statistically significant which was similar to the results of Nurminen as well.²¹

24 out of 30 patients (10 males and 14 females respectively) stated that all the different treatment options were mentioned clearly, with 18 out of 30 finding the given information adequate (8 males and 10 females respectively). 40 % thought the given information about the various treatment options, modalities was inadequate, which is a higher value when compared to the study by Tordis,²⁴ where only 10 % patients stated that the information was inadequate. Nurminen²¹ suggested that the patient should be given written and verbal information and the surgeon should explain the course of surgical treatment and prepare the patient psychologically. This was also suggested by the likes of Kiyak,^{4,32} DeSousa,³³ Broder.³⁴ Also, it was suggested that patients who would like to speak with somebody who has undergone the same operation, an opportunity should be arranged.²³ The amount of pre-surgical information it seems from the results has to be planned individually and thus needs to be investigated especially regarding a baseline or threshold regarding the information that should be essentially provided to the patients.

Pain during Orthodontic Treatment

A total of 11 out of 30 patients (3 males and 8 females) experienced pain during orthodontic Treatment and found that the surgical part was the most unpleasant part of the treatment. This distribution was not statistically significant

as determined by Yates'- Corrected Chi-Square test. The findings related to the most unpleasant part of the treatment, are in contrast to the findings of Nurminen et al ²¹, who found that a majority of patients experienced pain during orthodontic treatment and found the orthodontic phase to be the most unpleasant part of the treatment but in line with findings of Kiyak.⁴

Patient Experiences and Feelings after Combined Orthodontic-Orthognathic Treatment

All patients did not find anesthesia unpleasant. All patients had numbness in the lips and jaws post-surgery with a majority of patients i.e. 20 out of 30 patients (11 males, 9 females) reported having numbness for more than 1 month (not statistically significant). This is in accordance to the literature published on the same subject, with sensation typically beginning to return within a few weeks, but even when objective testing indicates no impairment, some patients will still report altered sensation.^{21, 24} Similarly, this is also in line with the writing of Travess and co-workers,³⁵ who stated that change in sensation occurred rapidly within the first 6 weeks postoperatively and more slowly thereafter. The distress caused by sensory loss is strongly related to the amount of sensory disturbance for both the face and the mouth, which although could not be investigated in this study, could yield some interesting facts on the subject.

All patients noticed an improvement in their chewing ability as well as an improvement in their facial appearance. 19 out of 30 patients (9 males and 10 females) noticed a considerable improvement in their appearance whereas the remainder 11 (3 males and 8 females) noticed a slight to moderate improvement in their appearance which was statistically not significant. This result is in partial agreement with earlier studies ^{4,21} where reported results varied between 40 and 80 percent and stated by Tordis,²⁴ the most pronounced improvement in a long term follow-up was chewing. But since the result is based on subjective assessment by the patients, it isn't fully possible to say whether a real improvement in chewing ability had occurred unless it is correlated with relevant occlusal indices.

All patients had no difficulty in adjusting to their new changed appearance and stated that the relatives and/or their friends noticed the change in their appearance and it was noted that all of them gave a positive feedback i.e. an improvement for the same. Although, this particular statistic differs from the previous findings,²¹ an important fact remains that the comments which patients receive from those close to them concerning their changed appearance affect their satisfaction with treatment. All patients had

noticed an increase in their self-confidence, which differs with the findings of Nurminen,²¹ however since this study did not probe beyond 6 weeks or more, this could be investigated with a long-term follow up on surgical orthodontic patients to obtain more precise results on the same subject.

Satisfaction with Treatment

All patients were satisfied with their treatment, with 20 out of 30 patients (9 males and 11 females) being very satisfied out of which, 16 patients sought treatment for an improvement in facial appearance, and 4 for an improvement in chewing ability and the remainder (3 males and 7 females) being reasonably satisfied, with 7 seeking treatment for improving appearance and the remainder for improving their chewing ability. The results were not statistically significant. The results concur with the previous studies.^{4, 24, 26}

19 out of 30 (9 males and 10 females) patients found the treatment outcome better than they had expected, whereas the remainder (3 males and 8 females) found the treatment outcome as much as they had expected, thus none reported a treatment outcome below their expectations. This result was not statistically significant. The findings are in agreement with previous studies.^{4, 21} It potentially indicates that the patients had a moderately realistic expectation of the treatment outcome and a good social support of family and friends ^{23, 36} with little or no hidden agenda whilst seeking combined orthodontic-orthognathic surgical correction.³⁷

Objective Assessment of Treatment Outcome

Paired t- test was used to test for significant differences in pre and post-treatment cephalometric values of the 30 subjects, whereas the Wilcoxon signed rank-test was used to compare the pre and post-treatment clinician's and layperson's scores. The mean score of the layperson's assessment was 2.15 ± 0.17 (Pre-treatment) and 4.96 ± 0.8 (Post-treatment), while the mean score of the clinicians' assessment was 2.34 ± 0.27 (Pre-treatment) and 5.75 ± 0.38 (Post-treatment). This is summarized in Table-1 and Table-2, Figure 2 respectively with * indicating a statistically significant difference ($P < 0.05$)

Two-sample t-test was used to test for significant differences between the mean post-treatment cephalometric values and the prescribed soft tissue norms (both Caucasian and Kerala). Table 3 summarizes the results of the same, * indicate statistically significant values ($P < 0.05$).

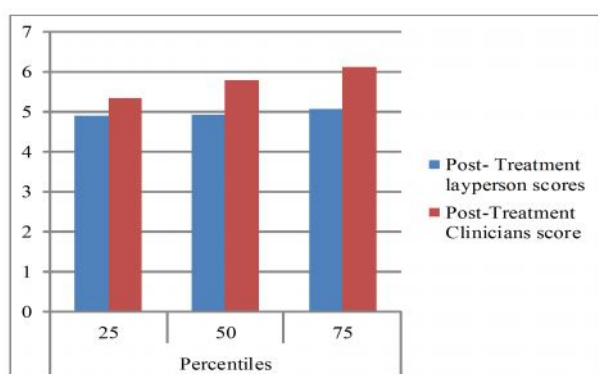
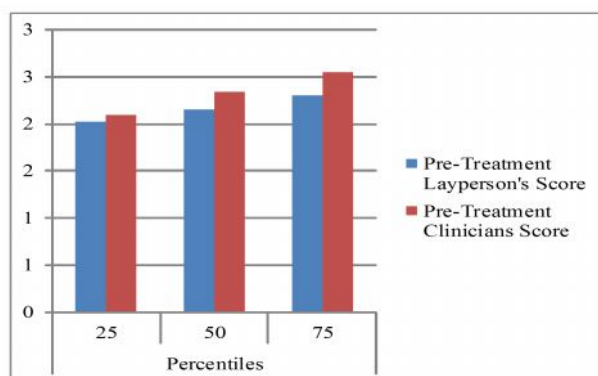


Figure 2 – Distribution of subjective Pre and Post Treatment Profile Scores between Laypersons and Clinicians

Although the paired-t test shows statistical significant result ($P < 0.05$) of changes occurring in maxillary prognathism, vertical height ratio, mentolabial sulcus and lower lip protrusion when the pre and post-treatment cephalometric values were compared, the results of this study showed that there were significant discrepancies between the post-treatment results and the aesthetic norms established by Burstone and Legan³⁰ as well as the Kerala Norms by Valiathan and John.³¹ These findings are in contrast to the study results of Burden et al.³⁸ but in line with the findings of Chew and Sandham.⁷

The facial convexity angle, vertical height ratio, vertical height depth ratio, lower face throat length, upper lip protrusion and lower face throat length did not show much deviation from the Causcasian norms, but almost all parameters except for vertical height and vertical height depth ratio showed significant differences from the Kerala norms ($P < 0.05$). There could be several reasons why the treatment outcome had not matched the aesthetic norms. These include:

- (1) Severe initial jaw deformity not open to complete normalization and decompensation due to surgical

Table 1 – Comparison of Means of Pre and Post-Treatment Cephalometric Values

	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Facial convexity	-.77	8.49	1.55	-.496	29	.623
Maxillary prognathism	-1.47	3.11	.56	-2.59	29	.015*
Mandibular prognathism	1.66	5.55	1.01	1.64	29	.112
Vertical height ratio	-.046	.12	.022	-2.04	29	.050*
Lower face throat length	-1.55	13.50	2.46	-.63	29	.534
Vertical height depth ratio	.063	.28	.052	1.20	29	.239
Nasolabial angle	-2.91	12.55	2.29	-1.27	29	.214
Upper lip protrusion	.89	4.31	.787	1.13	29	.264
Lower lip Protrusion	-4.48	3.48	.63	-7.04	29	.000*
Mentolabial sulcus	-1.00	1.46	.26	-3.75	29	.001*

Table 2 - Comparisons of Subjective Scores of Pre and Post-Treatment Layperson's and Clinician's Profile Scores

	Layperson	Clinicians
Z	-2.207 ^b	-2.201 ^b
Asymp. Sig. (2-tailed)	.027*	.028*

and orthodontic limitations and post-operative relapse

- (2) Improper transfer of planned surgical movement to the actual surgical setting
- (3) Short follow up period hence full profile normalization may and could not occur,

The literature and our results serve here to tell us that normal dentofacial appearance cannot be solely constructed from measureable biologic variables (e.g. aesthetic norms) and the same should be noted during treatment planning.^{39, 40}

Correlation of the Subjective Scores and Agreement amongst Different Raters

The layperson's and clinician's score showed poor correlation $r = -0.121$ which was statistically not significant. Table-4 highlights the Fleiss' Kappa results between the two raters group with both inter and intra group statistics, with * denoting statistically significant value ($P < 0.05$). The present study found that clinicians rated the post-treatment profiles more favorably when compared to

Table 3 - Comparison of Mean Post-treatment Cephalometric values with Caucasian Norms and Kerala Norms

		Caucasian Norm					Kerala Norms				
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper				Lower	Upper
Facial convexity angle	Equal variances assumed	.976	-.030	1.01	-2.05	1.99	.000*	-4.55	.92	-6.41	-2.69
	Equal variances not assumed	.976	-.030	1.01	-2.05	1.99	.000*	-4.55	.92	-6.41	-2.69
Maxillary prognathism	Equal variances assumed	.036*	1.32	.61	.091	2.55	.034*	1.39	.64	.11	2.67
	Equal variances not assumed	.036*	1.32	.61	.091	2.55	.034*	1.39	.64	.11	2.67
Mandibular prognathism	Equal variances assumed	.032*	-2.17	.99	-4.14	-.19	.000*	-4.25	1.01	-6.27	-2.23
	Equal variances not assumed	.032*	-2.17	.99	-4.14	-.19	.000*	-4.25	1.01	-6.27	-2.23
Vertical height ratio	Equal variances assumed	.896	.020	.15	-.29	.33	.691	-.010	.02	-.060	.04
	Equal variances not assumed	.896	.020	.15	-.29	.33	.691	-.010	.02	-.060	.04
Lower face throat length	Equal variances assumed	.077	-3.2	1.79	-6.8	.36	.000*	-13.24	1.73	-16.71	-9.77
	Equal variances not assumed	.077	-3.2	1.79	-6.8	.36	.000*	-13.24	1.73	-16.71	-9.77
Vertical height depth ratio	Equal variances assumed	.637	.073	.15	-.23	.38	.362	-.037	.04	-.12	.04
	Equal variances not assumed	.638	.073	.15	-.24	.38	.362	-.037	.04	-.12	.04
Nasolabial angle	Equal variances assumed	.000*	-9.8	1.92	-13.66	-5.9	.054*	-4.30	2.18	-8.67	.07
	Equal variances not assumed	.000*	-9.8000	1.92	-13.66	-5.9	.054*	-4.30	2.18	-8.67	.07
Upper lip protrusion	Equal variances assumed	.958	.020	.37	-.73	.77	.050*	-.75	.37	-1.50	.00
	Equal variances not assumed	.958	.020	.37	-.73	.77	.052*	-.75	.37	-1.50	.00
Lower lip Protrusion	Equal variances assumed	.000*	-3.82	.47	-4.70	-2.94	.000*	-5.17	.44	-6.05	-4.29
	Equal variances not assumed	.000*	-3.82	.47	-4.70	-2.94	.000*	-5.17	.44	-6.05	-4.29
Mentolabial sulcus	Equal variances assumed	.000*	-8.21	.40	-9.02	-7.40	.000*	-8.33	.33	-8.99	-7.67
	Equal variances not assumed	.000*	-8.21	.40	-9.02	-7.40	.000*	-8.33	.33	-8.99	-7.67

Table 4 – Fleiss Kappa Correlation Tabulation

Group	Fleiss Kappa	Sig.	95% CI
Orthodontists	0.3564	0.0519*	0.2155 to 0.4973
Oral Surgeons	0.3350	0.0521*	0.1937 to 0.4763
Laypersons	0.2905	0.0316*	0.2285 to 0.3526
Orthodontist and Oral Surgeons	0.1001	0.0298*	0.0417 to 0.1585
Laypersons and Clinicians	0.1374	0.0138*	0.1104 to 0.1643

laypersons which were statistically significant ($P < 0.05$) using the Wilcoxon signed rank test and there was moderately fair agreement between the aesthetic scores of clinicians but there was only slight correlation and agreement with the scores of clinicians and laypersons. These findings do not match the findings as reported by Chew.⁷

Table 5 depicts the results of the correlation tabulations between the subjective scores as well as the post-treatment cephalometric corrections achieved and as well as patient satisfaction. Studies have suggested that the antero-posterior dimension was one of the most important factors in judging facial attractiveness.^{7, 12} This does not match the findings of this study which showed poor correlation between profile convexity and subjective assessment of profile attractiveness by both clinicians and laypersons.

The influence of vertical facial proportion on perception of facial attractiveness has also been investigated with varied findings with some studies reporting that a reduced lower facial proportion was more acceptable than an increased lower facial proportion especially in females, while others have demonstrated otherwise with a reverse order of the observations.^{7, 16, 41} The findings of this study showed that an increased lower facial proportion was perceived to be more unattractive primarily by the layperson, but the correlation was poor and was not statistically significant, which was similar to the study by Chew.⁷ But maxillary prognathism and vertical height ratio were positively co-related with the clinicians subjective scores ($r = .928$ and 0.877 respectively) with $P < 0.05$. The preponderance of surgical cases primarily presenting with a Class III in this geographical region⁴² associated with a maxillary deficiency and mandibular sagittal and vertical excess might be a potential reason for this

scoring. This could also explain the statistically significant correlation values of maxillary prognathism with the clinical subjective scores.

The mean upper and lower lip position found in this sample was significantly higher and lower respectively when compared to both norms which were used in this study, which was similar partially to the findings of Chew⁷ especially in relation to the lower lip values. These findings may indicate that there was a general imbalance of the upper and lower lip positions in many of these post-surgical patients with the lower lip significantly more retrusive compared to the upper lip, which showed increased protrusion.

None of the cephalometric parameters showed a significant correlation with the patient satisfaction except for nasolabial angle ($r = 0.36$) when using Spearman's rho ($P < 0.05$). Patient satisfaction depended on a number of factors⁴³ and to simply point towards one objective mode of measuring would not suffice in explaining it. The influence of the culture of "arranged marriage" is another factor which is largely prevalent in the Indian subcontinent and its populace. Many patients seek to improve their facial appearance as in shown in this study, with an agenda in mind to help them find a better matrimonial suitor. How, in what way, and in each sex; this atypical yet culturally unique factor along with the other above mentioned parameters plays into the picture of the clinical orthodontic scenario would be an interesting study to perform.

CONCLUSION

1. Majority of the patients sought this treatment to improve facial appearance, with more females seeking treatment with this specific motivation in mind.
2. All the patients were satisfied with the treatment outcome, with a good proportion being very satisfied with the treatment outcome which was much better than they had expected.
3. The post-treatment cephalometric values showed poor correlation with patient satisfaction as well as the patients subjective profile scores
4. Positive correlation on only 2 parameters i.e. maxillary convexity and vertical height ratio was seen with the clinicians' subjective scores. This indicates that cephalometry alone is insufficient to judge a successful treatment outcome.
5. Majority of the patients found the surgical experience to be the most unpleasant part of the treatment.
6. The laypersons and clinicians scores showed poor correlation with the clinicians rating the post-treatment profile more favorably than the laypersons.

Table 5 - Correlation Tabulations between Post-Treatment Cephalometric Means and Subjective Scores of Laypersons and Clinicians, Satisfaction of Patient to Treatment expectations and outcome

Parameter		Layperson scores	Clinicians scores	Satisfaction with treatment result	Treatment expectations and results
Spearman's rho	Facial convexity angle	Co-eff	.638	-.237	-.240
		Sig.	.173	.207	.202
		N	6	30	30
	Maxillary prognathism	Co-eff	.928	-.299	-.196
		Sig.	.008*	.109	.299
		N	6	30	30
	Mandibular prognathism	Co-eff	-.754	.065	.000
		Sig.	.084	.731	1.000
		N	6	30	30
	Vertical height ratio	Co-eff	.877	.087	.163
		Sig.	.022*	.646	.391
		N	6	30	30
	Lower face throat length	Co-eff	.377	.139	.080
		Sig.	.461	.464	.674
		N	6	30	30
	Vertical height depth ratio	Co-eff	.329	-.222	-.196
		Sig.	.525	.239	.299
		N	6	30	30
	Nasolabial angle	Co-eff	-.406	.360	.272
		Sig.	.425	.05	.146
		N	6	30	30
	Upper lip protrusion	Co-eff	-.754	-.012	-.076
		Sig.	.084	.949	.689
		N	6	30	30
	Lower lip Protrusion	Co-eff	.638	.270	.344
		Sig.	.173	.149	.063
		N	6	30	30
	Mentolabial sulcus	Co-eff	-.691	.291	.252
		Sig.	.128	.119	.179
		N	6	30	30

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