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POST SECOND PREMOLARS EXTRACTION: CHANGES IN DENTAL AND SOFT-TISSUE OF FEMALE PATIENTS IN PAKISTAN

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Abstract:

Background and objectives: *Bimaxillary protrusion is a condition wherein aesthetic concerns are the principal purpose for looking for orthodontic treatment.*

The aim of this retrospective cephalometric study was to assess the soft tissue profile and dental changes among female Pakistani bimaxillary protrusion patients treated with extraction of throughout the second premolars followed by retraction of the anterior teeth.

Materials and Methods: Pre and post-treatment cephalometric radiographs of grown-up female patients (ages 18–30 years) who went through orthodontic treatment for Class I bimaxillary protrusion were gotten. Information was dissected with SPSS 20. A paired t-test and Pearson's relationship coefficients were led with the statistical significance set at 95% (P-value < 0.05).

Results: *At posttreatment, there was a general decline in the mean values among the majority of the soft tissue and dental cephalometric angles and linear estimations. Among soft-tissue factors, there was a peripheral expansion in the upper lip length by 1.49 mm (P < 0.001), and the nasolabial angle expanded extraordinarily by 7.64° (P < 0.001). Additionally, a stamped increment in ratiocination by 5.95° (P < 0.001) was seen among the dental factors. On the other hand, no significant changes were noted in the lower incisors. Pearson's relationship investigation uncovered a significant connection between's all the distinctive dental factors. Inside the soft tissue factors, there was a significant positive connection between's adjustments in the upper lip protrusion, lower lip protrusion, upper lip thickness, and the separation from the upper and lower lips to the S-line.*

Keywords: *Bimaxillary protrusion, orthodontic therapy, soft tissue profile*

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INTRODUCTION:

Bimaxillary protrusion is a typical clinical condition wherein esthetic worries of the individual are the principle explanation for looking for orthodontic treatment.[1] The protrusion of the upper and lower incisors, alongside obvious lip incompetency that describes bimaxillary dentoalveolar protrusion, warrants exhaustive orthodontic treatment planning and mediation, which, much of the time, includes the extraction of teeth.[2] Contemporary orthodontic treatment protocols have required a far reaching approach toward upgrades in soft tissue profile notwithstanding the remedy of occlusal discrepancies.[3] The satisfying aesthetics accomplished toward the finish of orthodontic administration for an individual with bimaxillary dentoalveolar protrusion regularly approves the thorough treatment approach.[4] However, ideal facial equilibrium and a satisfying soft tissue profile are not feasible without legitimate information on the post orthodontic soft tissue profile changes.[5] This legitimizes the requirement for a logical proof base relating to the significant soft tissue profile changes that happen because of as of now operational orthodontic treatment protocols.[6]

The administration of bimaxillary protrusion with extraction of the four premolars followed by retraction of the maxillary and mandibular incisors has been accounted for to improve facial profile convey results.[7] Most usually, the first four premolars are separated and proclined incisors are along these lines withdrawn to diminish lip procumbency and upgrade the facial profile.[8] In ongoing exploration, the lip profile changes among extraction and nonextraction cases were credited to the natural morphology of the soft tissues.[9] According to Saelens and De Smit (1998), when nonextraction treatment is performed without the utilization of extra-oral traction, it is expected that the arrangement of the teeth results in proclination of the anterior teeth, just as of the facial profile of the patient.[10] However, Mascarenhas et al. (2015) revealed that the decision of orthodontic treatment with dental extraction is a significant choice and should be emotionally changed by every patient's treatment necessities. The choice of which tooth/teeth to remove is very difficult,[11] and clinicians ought to set up this dependent on the tooth/teeth that, whenever extricated, will have minimal impact on the patient's profile.[12] Moreover, the choice to separate teeth ought to be made not just founded on the measure of dental crowding yet additionally upon the normal effect on the patient's soft tissue facial profile.[10]

As per an investigation by Hans et al. (2006), the teeth most regularly separated for orthodontic treatment are the premolars.[13] Their area between the anterior and back portions of the mouth makes them an advantageous choice for extraction.[14] Premolars are ordinarily taken out to make space to determine dental crowding or to treat patients with bimaxillary protrusion.[15] Schoppe (1964) dissected cases treated by second premolar extractions and presumed that more controlled mesial development of the molars could be accomplished while keeping up them in a decent inclination.[16] Steadman (1964), while talking about Schoppe's examination, seen that extraction of the second premolars made space closure simpler and permitted the teeth to stay synchronized with the development of the soft tissues and the profile.[17] In some clinical cases wherein first premolar extraction is justified, a choice to extricate the second premolars is additionally thought to be because of the helpless structure of the last mentioned and to protect the sound first premolar.

Notwithstanding the broad current proof on changes post first premolar extraction in numerous ethnic gatherings, there is a lack of studies that examine the post orthodontic soft tissue profile and dental changes after the extraction of maxillary and mandibular second premolars among the Pakistani female populace. In this manner, the current retrospective examination was conceptualized to assess, utilizing cephalometric evaluation, the soft tissue profile and dental changes among female Pakistani bimaxillary protrusion patients treated with extraction of throughout the second premolars followed by retraction of the anterior teeth.

MATERIALS AND METHODS:

This investigation assessed the pre and posttreatment soft tissue profile and dental changes utilizing horizontal cephalometric records acquired from a sample of grown-up female patients with bimaxillary dentoalveolar protrusion. The testing outline for the examination included patients who went through orthodontic treatment in a private work on setting in Riyadh, Pakistani Arabia, between April 2018 and February 2019. In view of an accepted statistical force of 80%, for this clinical preliminary and certainty level of 95%, deciding an opportunity of 5% winding up with $P < 0.05$,[18] the sample size was assessed as 30 patients.

The samples were remembered for the examination dependent on the accompanying incorporation rules: Adult female patients in the age scope of 18 to 30, Angle Class I molar relationship with pretreatment interincisal angle under 118°[19].

Patients with mellow to-direct crowding and negligible inconsistency of incisor position and facial profile who were completely made arrangements for treatment with best orthodontic extraction of the four, second premolars and resulting retraction of the anterior teeth with corresponding anchorage mechanics [20] Availability of horizontal cephalometric radiographs with sufficient indicative quality.

Patients were avoided on the off chance that they had gone through functional appliance treatment or careful orthodontic therapy, had innately missing teeth (barring third molars), or in the event that they had a clinical history of pharyngeal pathology and additionally nasal hindrance, wheezing, obstructive rest apnea, adenoidectomy, and tonsillectomy.

All parallel cephalometric radiographs were gotten as a component of the patients' standard records for orthodontic treatment and were taken by a similar dental radiology specialist with the patients keeping a characteristic head position, with the teeth in impediment and lips loose as recommended initially by Burstone (1967).[21]

All subjects were treated by a similar clinician. The normal treatment span was 20 months. All patients got full-fixed appliances utilizing 0.022" slot brackets with Roth solution. Proportional anchorage mechanics were applied during orthodontic space closure post second premolar extraction.

Cephalometric investigation was finished. The amplification likelihood was slain through calibration of the real length of the ruler on the head positioner with corresponding distinguishing proof of the finishes of the rulers and the anatomical benchmarks. The soft tissue profile and dental benchmarks were recognized dependent on recently announced examinations.[22],[23]

Further, the anterior cranial base life systems was utilized to superimpose pre and post-treatment cephalometric radiographs and evaluate the changes in each variable.[24] In request to increase the legitimacy of the estimations, the genuine vertical line was utilized as the vertical reference line during superimposition. ID of cephalometric benchmarks on the computerized pictures was done physically by a similar inspector, trailed by the soft tissue and dental linear and rakish variable estimations, utilizing various examinations. To guarantee intraexaminer unwavering quality, 10 haphazardly chose cephalometric radiographs were followed and estimated by a similar examiner. The ID of the cephalometric benchmarks and estimation of the factors was done in two distinct meetings isolated by a time of about fourteen days.

Statistical investigation:

The mean values of the factors were contrasted with a paired t-test with recognize any significant blunders. The information were examined utilizing the Statistical Package for the Social Sciences (rendition 21.0 for Windows; SPSS, Chicago, Ill). Clear measurements were determined for every factor of interest. The change from the pre and post-treatment cephalograms was evaluated utilizing a paired t-test. Pearson's relationship coefficients were likewise determined for all the factors of interest. Any P esteem under 0.05 (5%) was considered statistically significant, and a P esteem under 0.01 (1%) was considered profoundly significant.

RESULTS:

All the cephalometric linear and rakish estimations were recorded based on the reference planes and benchmarks. Additionally, the distinctive soft tissue profile and dental cephalometric estimations and the pre and post-treatment engaging insights for the factors of interest are organized (Dental cephalometric estimations). All the factors followed a typical circulation design aside from soft tissue facial tallness proportion and between labial hole. These were examined utilizing nonparametric tests. Results of the paired samples t-test and Wilcoxon sign position nonparametric test between the pretreatment and posttreatment factors are appeared in.

The paired samples t-test and Wilcoxon sign position nonparametric test between the pretreatment and posttreatment factors uncovered a statistically significant change for all estimations aside from the soft tissue facial angle (0.59°, P = 0.297), upper lip thickness at A point (1.83 mm, P = 0.065), soft tissue facial tallness proportion (0.01%, P = 0.564), and vertical lip-jawline proportion (0.68%, P = 0.3980). What's more, the adjustment in facial convexity angle (5.32°, P = 0.045) was not exceptionally statistically significant.

Following the extraction of the second premolars and fixed orthodontic appliance treatment for bimaxillary protrusion, there was a general decrease in the mean values among the majority of the soft tissue and dental cephalometric angles and linear estimations. Among soft tissue cephalometric factors, there was a minor increase in the upper lip length posttreatment by 1.49 mm (P < 0.001), and the nasolabial angle increased especially by 7.64° (P < 0.001). Also, a checked increase in the lower incisor retroclination

by 5.95° (P < 0.001) was seen among the dental cephalometric factors. There was no adjustment in the dental factors relating to the lower incisors.

Pearson's connection between's the distinctive cephalometric factors, which indicated statistically significant changes posttreatment. There was a statistically significant relationship between's all the diverse dental factors. Further, it was seen that the adjustment in upper incisor retraction had a significant positive connection with the upper lip length, lower lip length, and lower lip protrusion. Additionally, the changes in lower incisor retraction and lower lip to mandibular plane angle had a significant positive relationship with the upper lip length. Strangely, there was a significant negative connection between's the upper lip length and lower lip protrusion, when contrasted with an adjustment in the lower incisor retroclination. Likewise, changes in the lower incisor to the angle shaped between the long hub of the lower incisors and line attracted from nasion to pogonion (NB angle) indicated a significant positive relationship with the lower lip protrusion and the separation from the lower lip to the S-line.

Inside the soft tissue factors, there was a significant positive relationship between's changes in the upper lip protrusion, lower lip protrusion, upper lip thickness, and the good ways from the upper and lower lip to the S-line. While the facial convexity angle demonstrated a significant positive relationship with changes in the lower lip protrusion, the nasolabial angle was significantly adversely corresponded with changes in the lower lip length, upper lip protrusion, lower lip protrusion, upper lip thickness, facial convexity angle, and interlabial hole. The lone significant positive relationship saw with changes in the nasolabial angle was with the mentolabial sulcus profundity. Despite the fact that changes in the interlabial hole demonstrated a significant positive relationship with the upper lip length and upper lip thickness, they were significantly adversely associated with changes in the upper lip length, lower lip length, nasolabial angle, and mentolabial sulcus profundity.

DISCUSSION:

Throughout the long term, the issue of facial profile changes has been generally broke down in various populaces with shifted facial structures and extended the skylines of orthodontic treatment outcomes.[25] In the current examination, 23 linear estimations, five rakish estimations, and two proportions were utilized to dissect the post-orthodontic soft tissue facial structure variations.[22],[26] The past investigations looking at the facial aesthetics of extraction and nonextraction cases announced intriguing results.[23] Luppanapornlarp and Johnston (1993) detailed that subjects treated with extraction of four first premolars had satisfying post-orthodontic profiles with an unequivocal decrease in the convexity near the ideal facial balance.[8] In the current examination, correlation of the pre and post-orthodontic soft tissue profiles uncovered a significant decrease in the facial convexity (P = 0.04, mean SD = −0.96). This finding was like before examines that assessed first premolar extraction as the received treatment modality.[27] Further, it was seen that the adjustment in upper incisor inclination had a significant positive connection with the upper lip length, lower lip length, and lower lip protrusion. Additionally, the changes in the lower incisor retraction and lower lip to mandibular plane angle had a significant positive connection with the upper lip length. Curiously, there was a significant negative connection between the upper lip length and lower lip protrusion, when contrasted with an adjustment in the lower incisor retroclination.

In a past report contrasting the impacts of extraction of the first and second premolars on the soft tissue profile, insignificant retraction was accounted for in the second premolar extraction group.[23] However, in our examination, a considerable measure of upper incisor retraction was apparent. Likewise, upper incisor retraction was positively corresponded with upper and lower lip protrusion. This detailed variable measure could impact the treatment convention in choosing the rules for orthodontic extraction of the first or second premolars. Further in a new report, the measure of upper incisor retraction accomplished with second premolar extraction was estimated under controlled facial convexity. Like our examination, there was a more noteworthy retrusion of the upper lip position (by 0.15 mm) in the second premolar bunch in standard with first premolar extraction (Omar, 2018 #21). The writing uncovers that extraction of the first four premolars is suggested just when a more prominent measure of lower incisor retraction is the ideal outcome.[28] Hence, the pre-treatment position of the lower incisor is a significant determinant in choosing the extraction protocols.

Current clinical situations have uncovered that the majority of the patient populace liked to settle with a straighter profile.[3] Ironically, a large portion of the investigations have evaluated the apparent aesthetics of individuals with frontal perspectives and not their real profiles.[29] Thus, legitimate appraisal of the facial angles and extents is a basic necessity for achieving posttreatment understanding fulfillment with esthetic concerns.[5] In any retrospective

accomplice considers, as the samples are selected based on a specific openness (extraction of each of the four second premolars), the impact of puzzling variables can't be prevented.[30]

CONCLUSION:

This examination uncovered significant soft tissue changes when patients with bimaxillary protrusion were treated with extraction of the four, second premolars and ensuing retraction of the anterior teeth. In opposition to the set up broad supposition, the extraction of the second premolars can likewise be received by orthodontists with an obvious improvement in facial profile.

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