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LOWER ANTERIOR FACIAL HEIGHT CHANGES FOLLOWING ORTHODONTIC TREATMENT WITH PREMOLAR EXTRACTIONS

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ABSTRACT

Facial profile plays a key role in facial esthetics and in the process of orthodontic treatment planning. The anterior and posterior height defines the facial balance. Facial types may be classified in a variety of ways but hyperdivergent and hypodivergent are the most common types. Extraction treatment is advocated for hyperdivergent face and non extraction treatment is advocated for hyperdivergent face and non extraction treatment is advocated for hyperdivergent face and non extraction treatment is advocated for hyperdivergent face and non extraction treatment is advocated for hyperdivergent face. There is a controversy regarding the effect of premolar extraction and the change in lower anterior facial height. Some of the authors consider that premolar extraction causes changes in lower anterior facial height whereas other authors disapprove. The objective of the study was to investigate the changes in lower anterior facial height following orthodontic treatment with premolar extractions. Lateral Cephalograms of 10 patients between June 2019 to March 2020 who were treated for malocclusion were collected, were divided into two groups equally based on whether extraction were done or not for aiding retraction. The records were assessed using SPSS software version 26 by IBM. Statistical test was the student T Test . In this study we observe that no statistically significant difference was found in lower anterior facial height between the extraction and non extractiongroups. Within the limitations of study it can be concluded that there is no

significant statistical difference for LAFH between subjects treated orthodontically with extraction and non extraction protocols.

INTRODUCTION

Facial profile plays an important role in facial esthetics and in the process of Orthodontic treatment planning. Anterior and posterior facial height balances the facial profile (*A cephalometric evaluation of the normal skeletal and dental pattern of children with excellent occlusions*, no date). In a normal growth pattern, posterior facial height is more than the anterior one (Downs, 1948). Facial type may be classified in a variety of ways but hyperdivergent and hypodivergent are the most common(*Vertical growth versus anteroposterior growth as related to function and treatment*, no date)[°]. Usually extraction treatment is advocated in case of hyperdivergentface and non extraction treatment was suggested for hypodivergent face.

Premolar extraction is recommended for patients with steep mandibular planes, increased facial height or minor dentoskeletal discrepancies. Anterior crowding or in case of excessive protrusion of lips ('Evaluation of Dento Facial Vertical Dimension in Class II Division 1 Malocclusion after Premolar Extraction', 2016)'. The philosophy behind this treatment is that the extraction would provide forward and upward movement of molar teeth. So that the clockwise rotation of the mandible would reduce the facial height of the patients (Gianelly*et al.*, 1988; Major *et al.*, 1997). Few authors suggest that the premolar extraction will cause TMJ problems due to over closure of mandibles and over retracting the anteriors(Luecke and Johnston, 1992)', whereas other authors disapprove of the relation of premolar extraction and facial height changes (*The extraction--nonextraction dilemma as it relates to TMD*, no date; Kocadereli, 1999).

Our team has done previous studies on other topics (Viswanath*et al.*, 2015; Felicita and SumathiFelicita, 2017b; Krishnan, Pandian and Kumar, 2018), case report analysis (Kumar *et al.*, 2011; Felicita, Shanthasundari and Chandrasekar, 2012; Felicita and SumathiFelicita, 2017a) and researches (Dinesh *et al.*, 2013; Felicita, 2018) but now we moved to focus to more practice oriented studies.

Mini implants can be used for simultaneous intrusion and retraction during ortho treatment to produce good dental and skeletal changes (Sivamurthy and Sundari, 2016; Samantha, 2017; Vikram and Raj Vikram, 2017). Deep bites can be corrected by intruding anterior teeth with mini implants after space gaining with extensions (Jain, 2014; Rubika, SumathiFelicita and Sivambiga, 2015), and any rebounding required can be done after sandblasting (Kamisetty, 2015; Krishnan, 2015).

The purpose of this study was to find out the effect of premolar extraction on the lower anterior facial height.

MATERIALS AND METHODS

This study was done in a university setting. Ethical approval was done by the
universal ethical committee (ethical approval

number:SDC/SIHEC/2020/DIASDATA/0619-0320). In total, three people (2 assessors and 1 guide) were involved in the study.

It is a retrospective cross sectional study carried at the department of Orthodontics,Saveetha Dental College and hospitals,chennai. Pre treatment and post treatment lateral cephalograms of 10 orthodontically treated cases(5 with premolar extraction and 5 with non-extraction) were collected and lower anterior facial height changes were measured. The parameter measured was anterior nasal spine and menton.

Cross verification was done by the 2nd assessor to repeat the measurements. The collected datas were tabulatedin excel sheet and are imported to SPSS software.Statistical software used in SPSS version 26 by IBM. Statistical test done is the student 'T' test. Independent variables are gender and Malocclusion type and dependent variables are lower anterior facial height, extraction and non extraction.

RESULTS AND DISCUSSION

The paired 'T' test of extraction group revealed no significant statistical difference between pretreatment and post treatment LAFH values. The p value of the extraction group was 0.309[Table 1].

The paired 'T' test of the non extraction group revealed no difference in lower anterior facial height between pretreatment and post treatment. The p value of the extraction group was 0.484[Table 2].

The independent 'T' test of extraction revealed no significant statistical differences between post treatment values of the extraction group and non extraction group. The p value of the independent T test was 0.334[Table 3]. In a study ,Cusimano et al included patients with hyperdivergent facial form and found that there were no differences in facial height with first premolar extraction treatment when pre- and post treatment results were compared (Effects of first bicuspid extractions on facial height in high-angle cases, no date). According to a study by Staggers there was no significant difference in the vertical dimension changes between first premolar extraction and nonextraction groups (Staggers, 1994). In another study by Elih et al., there was no significant change in the lower anterior facial height. Difference between T1 and T2 was not significant (p > 0.05) ('Evaluation of Dento Facial Vertical Dimension in Class II Division 1 Malocclusion after Premolar Extraction', 2016) .According to a study by Kocadereli, treatment results of extraction and nonextraction cases showed that the vertical changes occurring after the extraction of first premolars were not different than those occurring in the nonextraction cases (Kocadereli, 1999). According to kim et al., regardless of maxillary and mandibular 1st premolar or 2nd premolar extraction treatments, there was no decrease in facial vertical dimension. All these reported articles are in agreement with the results of the present study. Even though this study had a smaller sample size the results were in agreement with the existing literature.

Limitations of the study

Small sample size was a major limitation of our study and this cannot be generalized into a large population. Different extraction patterns were not included as well as Growth patterns and Malocclusion were not considered and standard biomechanics were not included.

Future scope

To increase the sample size, include more cases from different Malocclusions and growth patterns and include cases with different extraction patterns.

Author contribution :

AarthiMuthukumar carried out the cephalometric study, collection and analysis of data and drafted the manuscript. Dr RK Jain aided in conception of the topic, supervision and appraisal of the manuscript.







Figure 2: Bar graph represents the lower anterior facial height difference in pre op and post op mean values of extraction group. X-axis represents the group and Y-axis represents the mean value of lower anterior facial height. Student T test was done and the difference was found to be statistically not significant. DF: 4, p value: 0.309(>0.05) hence statistically not significant.



Figure 3: Bar graph comparing the mean values of post operative lower anterior facial height across extraction(blue) and non extraction groups(red). X-axis represents the group and Y-axis represents the mean value of lower anterior facial height. Independent sample T test was done and the difference was found to be statistically not significant. DF: 8, p value- 0.199(>0.05) statistically not significant.

CONFLICT OFINTEREST : Nil

Nil

CONCLUSION

Within the limitations of this study it could be concluded that there was no significant statistical difference for lower anterior facial height changes between subjects treated orthodontically with extraction or non extraction protocols.

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