

Evaluation of Dento Facial Vertical Dimension in Class II Division 1 Malocclusion after Premolar Extraction

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Abstract: ***Introduction:** The Purpose of this study was to evaluate dentofacial vertical dimension alteration in patients with class II division 1 malocclusion after the first maxillary premolar extraction. **Methods:** This study used 24 cephalogram each before and after treatment. Dentofacial dimension measured by Sivakumar and Valiathan method. The cephalometric measurements investigated were as follows : mandibular plane angle, anterior facial height, lower anterior facial height, posterior facial height, facial height indeks, FH-UI, FH-U6, FL-LI, FL-L6, $S_{vertical-UI}$, $S_{vertical-U6}$, $Pog_{vertical-LI}$, $Pog_{vertical-L6}$. To determine dento facial vertical dimension changes due to treatment paired t-test were performed, respectively. **Results:** There was no change in the vertical dimension of dento-skeletal significantly between before and after treatment except on the posterior facial height, FL-LI, and $S_{vertical-UI}$. **Conclusion:** The results showed that in patients treated with extraction of two premolars, there was a significant decrease in following cephalometric measurement: the posterior facial height, FL-LI and $S_{vertical-UI}$.*

Keyword: Class II division 1, dentofacial vertical dimension, premolar extraction

1. Introduction

The Goal of orthodontic treatment is to improve the patient's life by enhancing dental and jaw function and dentofacial aesthetics, with healthy periodontal tissue, and the function of the temporomandibular must be maintained [1]-[3]. Extraction of premolars as practical from of orthodontic therapy has been accepted for many years, but there remains a controversy regarding the effect of premolar extraction on the facial dimension. Supposedly, extraction provides some vertical reduction. The indications for the first premolar extraction are usually severe anterior crowding or protrusion, most of the extraction space is use for alleviating crowding and retracting incisors [4]. Maxillary premolar extraction is the first choice in orthodontic treatment plan camouflage Class II division 1 at adult patient, followed by retraction of incisor teeth to correct the inclination angle of the anterior teeth, prostrusif or to decrease the height of the vertical face. Treatment with mandibular retraction often causes rotation anti clockwise, causing a decrease in the vertical dimension [5].

The incisal relationship may undergo appreciable changes after treatment, not only as a result of craniofacial growth and development, but also because of orthodontic procedures adopted, such as extraction, retraction of maxillary incisors, as well as the use of intermaxillary elastic and extraoral appliances [6]. Vertical dimension changes that occur in the orthodontic treatment of malocclusion Class II division 1 is an important thing to be considered for extrusion or intrusion of the teeth can affect the aesthetic and the temporomandibular joint. Wyatt claimed that premolars extraction followed by retraction of anterior teeth on orthodontic treatment with Class II division I can cause the displacement of the condyle to the posterior and anterior disc displacement. Vertical dimension changes can affect the aesthetic smile, this was due to the change in position of the maxillary molar teeth, the inclination of the occlusal plane, and the direction of craniofacial growth [6].

During this time it is debatable whether premolar extraction will affect the changes in the vertical dimension or not. Cusinamo et al, indicated that premolar extraction does not result in decreasing the facial height [4]. Al Nimri et al study results proved that an increase in anterior facial height, lower anterior facial height, posterior facial height in the treatment of Class II division I with extraction of two The first maxillary premolar and two the second maxillary premolars [7]. Some studies demonstrated increases in the absolute values of anterior and posterior facial height, even with premolar extraction with no further in the mandibular plane angle (MPA) [8],[9]. Based on the above description researchers interested in conducting research on changes in the vertical dimension to the treatment of dento-facial malocclusion class II division I use a fixed appliance with two the first maxillary premolars extraction.

2. Material and Methods

The Samples were taken from all patients with Class II division I, which had been treated at the Orthodontic Postgraduate Programme Clinic, Orthodontics Faculty of Dentistry University of Padjadjaran. Twenty-four lateral cephalometric radiographs before and after selected with the following criteria: (1) The age of patients was more than 15 years. (2) Gender male and female, (3) patients have medical records, study model, lateral cephalometric radiographs before and after treatment. (4) Class II division I malocclusion. (5) Treatment compromise edgewise technique with two the first maxillary premolar extraction. Cephalometric tracing is done manually with calibration intra etraminer on transparent acetate paper. A reference point in this study are: Nasion (N), Sella tursica (S), Menton (Me), Artikulare (Ar), Gonion (Go), pogonion (Pog), Gnathion (Gn), Spina nasalis anterior (SNA), posterior Nasal Spine (PNS). The reference lined used were palatal plane (ANS-PNS), Frankfort horizontal (FH), Mandible plane (G0-Gn), and the mandibular fiduciary line (FL). FL was drawn

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