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MAXILLARY AND MANDIBULAR SUPERIMPOSITIONS IN THE ASSESSMENT OF ORTHODONTIC TREATMENT OUTCOMES

Berta Meireles^{1(*)}, Ana Cristina Braga², Lucinda Gifford Faria³, Saul Castro¹, Maria João Ponces¹

¹Faculty of Dental Medicine, University of Porto, Porto, Portugal

²Department of Production and Systems, University of Minho, Braga, Portugal

³Orthodontist in Clinical Private Practice, Portimão, Portugal

(*)Email: bertameireles@gmail.com

ABSTRACT

This research aimed to identify the maxillary and mandibular superimposition methods used by orthodontists in the evaluation of orthodontic treatment results, as well as to understand if there was a differentiated choice for cases with and without growth. The analytical study performed allowed to identify that the maxillary linear superimposition in the palatal plane, in anterior nasal spine, was the most frequently used. Regarding the mandible, the mandibular plane at the menton point superimposition was the most frequently used. No statistically significant differences were found for both selected methods in cases with and without growth.

Keywords: cephalometric superimposition, evidence-based, cephalometry, statistics as topic, evaluation studies as topic

INTRODUCTION

Lateral cephalometric superimpositions are the most reliable method to evaluate the results of orthodontic treatment (Duterloo, 2011). Generally, three different types of superimpositions are incorporated: the cranial base, the maxillary and the mandibular. The maxillary and mandibular superimpositions allow the understanding of dentoalveolar changes related, in most cases, to the established orthodontic therapy (Jacobsen, 1995; Muller, 1983).

In growing patients, only structural superimpositions are considered valid, representing Björk's (Bjork, 1983) mandibular and Doppel's (Doppel, 1994) maxillary superimpositions, the gold standard. In adults, other procedures, such as linear ones, are accepted as equally valid (Duterloo, 2011).

The sample included 76 Case Reports from the American Journal of Orthodontics and Dentofacial Orthopedics, published in 2012 and 2013. All data was collected by a single observer and descriptive data analysis was performed using the IBM® SPSS® Statistics program, version 24. In the analytical study of the relationship between the two qualitative variables, the Chi-square independence test was used. Significant statistical evidence was found for values of probability less than 0.05.

RESULTS AND CONCLUSIONS

The 76 clinical articles were analysed, 71 (93.4%) of them presented 2D lateral cephalometric superimpositions and 5 (6.6%) did not. In the 71 mentioned publications, only 46 (64.8%) and 45 (63.4%) manuscripts had attached maxillary and mandibular superimpositions,

respectively. In 20 (43.5%) of the articles with maxillary superimpositions, the method used is unknown. Considering the anatomical structures drawn and the superimposed areas, it was considered that only in 1 manuscript (2.2%) could the Doppel's structural technique be selected. In 8 (42.1%) of the 19 clinical cases where the Doppel's maxillary superimposition could not have constituted the option, there was growth. In the remaining 56.5% (n = 26), linear maxillary superimposition methods were the most frequent (65.4%). All linear superimpositions (n = 17) were performed in the palatal plane, making a total of 76.5% (n = 13) and 23.5% (n = 4) in adults and children, respectively. No element of the sample was found in which the Doppel's structural method had been applied. The Björk's maxillary superimposition was performed in only one case (3.8%). Of the linear ones, the most prevalent was the one that used the anterior nasal spine (Ans) as registration point (76.5%). It was found that there was no statistically significant association ($\chi^2=8.576$, $gl=9$, $p=0.477$) between growth and the preferred maxillary superimposition method. Regarding mandibular superimpositions, in 20 (44.4%) of the articles the method used was unknown. Taking into account the anatomical structures drawn and superimposed, it was considered that only in 3 manuscripts (6.7%) could the Björk's mandibular structural method has been selected. In 6 (35.3%) of the 17 clinical cases where Björk's mandibular superimposition could not have been the option, there was growth. In the remaining 25, 55.6% (n = 25), mandibular linear superimposition methods were the most frequent (64%). Björk's mandibular superimposition was performed in only one case (4%). Of the linear (n = 16), the most prevalent was achieved in the mandibular plane at the menton point (62.5%), making a total of 70% (n = 7) and 30% (n = 3) in adults and children, respectively. There was no statistically significant association ($\chi^2=7.918$, $gl=11$, $p=0.721$) between growth and the preferred mandibular superimposition method, so the two conditions may not be related.

The maxillary linear superimposition in the palatal plane, in Ans, was the most frequently used. Regarding mandible, the mandibular plane at the menton point superimposition was the most frequently used. No statistically significant differences were found for both selected method in cases with and without growth.

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