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ARTIFICIAL INTELLIGENCE CAN ASSIST IN THE DECISION TO EXTRACT TEETH

Technology, increasingly present in our lives, is also transforming medicine. In orthodontics, intra-oral scanning and 3D impressions are good examples of technological advances that have improved our clinical practice. A topic that is currently attracting attention in the medical arena is artificial intelligence. Artificial intelligence is a branch of computer science research that seeks, through computational systems, to build mechanisms and/or devices that simulate the human being's ability to think and solve problems—that is, to be intelligent. Whether dental extractions should be performed is a question that has concerned practitioners since the founding of the field of orthodontics. Artificial intelligence could help us in making decisions about extractions. Based on this assumption, the objective of

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the present study¹ was to develop and explore the usefulness of an artificial intelligence system for predicting the need for tooth extractions during orthodontic treatment. The study was carried out using a database of 314 cases treated by two experienced orthodontists. The data were processed through an automated system (Auto-WEKA) and used to predict the need for dental extractions adjunctive to orthodontic treatment. The results of the study revealed that the use of artificial intelligence can help to predict whether teeth need to be extracted. The accuracy of the extraction prediction increases if models and cephalometric data are combined in the analytical process.

MALOCCLUSION CAUSES SPEECH DISORDERS

For adequate speech production, the stomatognathic system must be anatomically and functionally balanced, providing the conditions for the phonoarticulatory organs to perform the necessary movements. Bone development and the occlusal situation should be considered since they can influence the production of speech, composing the binomial form-function, in which the form corresponds to the bone and the function, to the generic term that relates each part of the orofacial complex. There is still controversy in the literature about the precise role of malocclusions in speech disorders. The objective of this study² was to further explore this issue by evaluating the relationship between malocclusions and oromyofunctional

behavior in speech sound disorders in children. To carry out the study, 290 schoolchildren aged between 4 and 7 years were evaluated with regard to their dental occlusion, orofacial muscles, tongue position at rest, and swallowing pattern (Fig 1). The results led the authors to conclude that there is a relationship between malocclusion and speech disorders. Both can be associated with habits and muscle changes, causing dysfunction that requires interdisciplinary cooperation. The authors emphasize that pediatric dentists and orthodontists should consider and evaluate the physiological factors that influence dentition development and the extent to which they influence speech development in children.

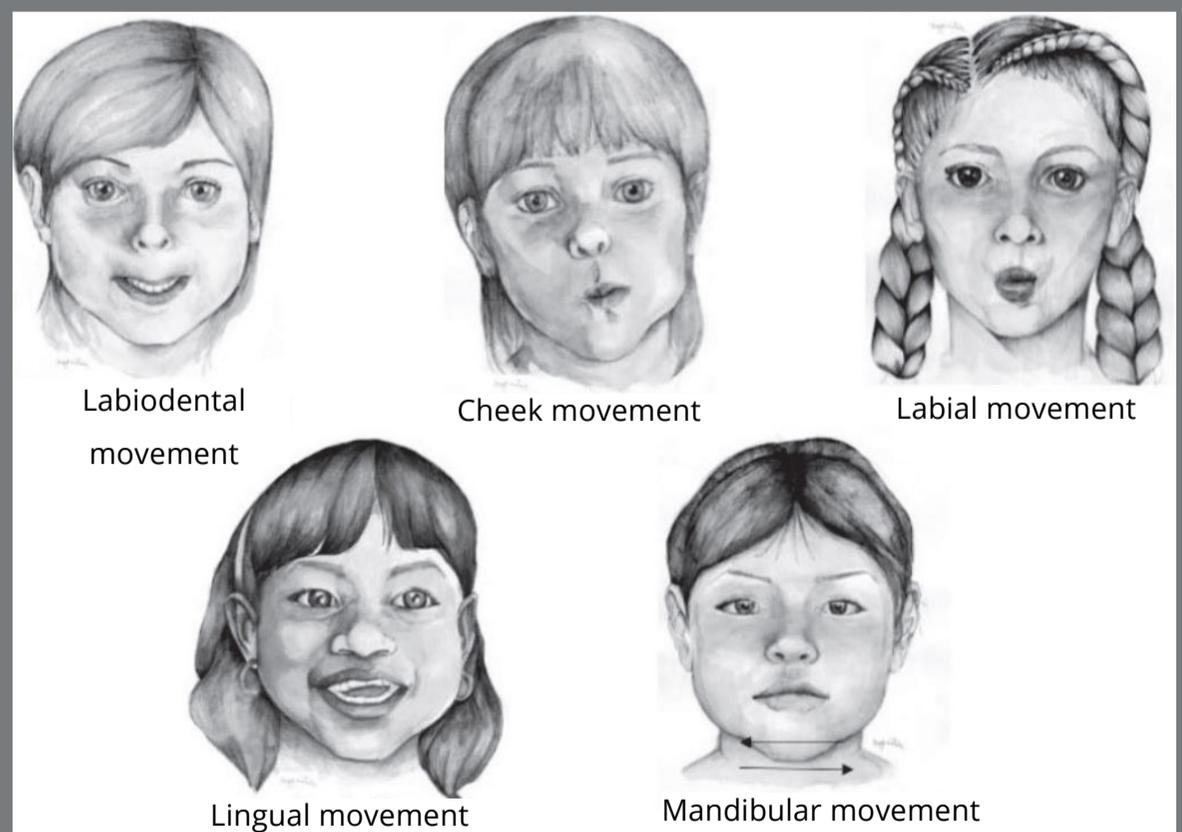


Figure 1: Images used in assessing orofacial praxis. Source: Amr-Rey et al.², 2022.

ORTHOGNATHIC SURGERY DOES NOT CAUSE SIGNIFICANT CHANGES IN TOOTH COLOR

Natural teeth are prone to discoloration. Nicotine, red wine, iron-rich vegetables and fruits and products that have a high concentration of tin can affect tooth color over time. However, these are slow changes that occur in all teeth, making them difficult to be perceived. In contrast, traumatic injuries to the teeth can have the opposite effect. During osteotomies for orthognathic surgery, vascular injuries may occur. Studies reveal that Le Fort I osteotomy is often associated with vascular changes; this has been confirmed by laser Doppler flowmetry. To evaluate possible changes in teeth after orthognathic surgery, a group of researchers from the University of Thessaloniki developed a study to evaluate possible changes in the color of natural teeth after surgical orthodontic treatment. This prospective, controlled clinical pilot study³ included 6 surgical orthodontic patients: 3 received double jaw osteotomies and 3 underwent simple osteotomies of the sagittal mandibular ramus. Twenty subjects served as controls. Eleven were untreated (untreated controls) and 9 received only conventional orthodontic treatment (orthodontic controls). Tooth color measurements were taken with a spectrophotometer on the maxillary and mandibular incisors before the start of surgical orthodontic treatment (T1) and after its completion (T2) (Fig 2).

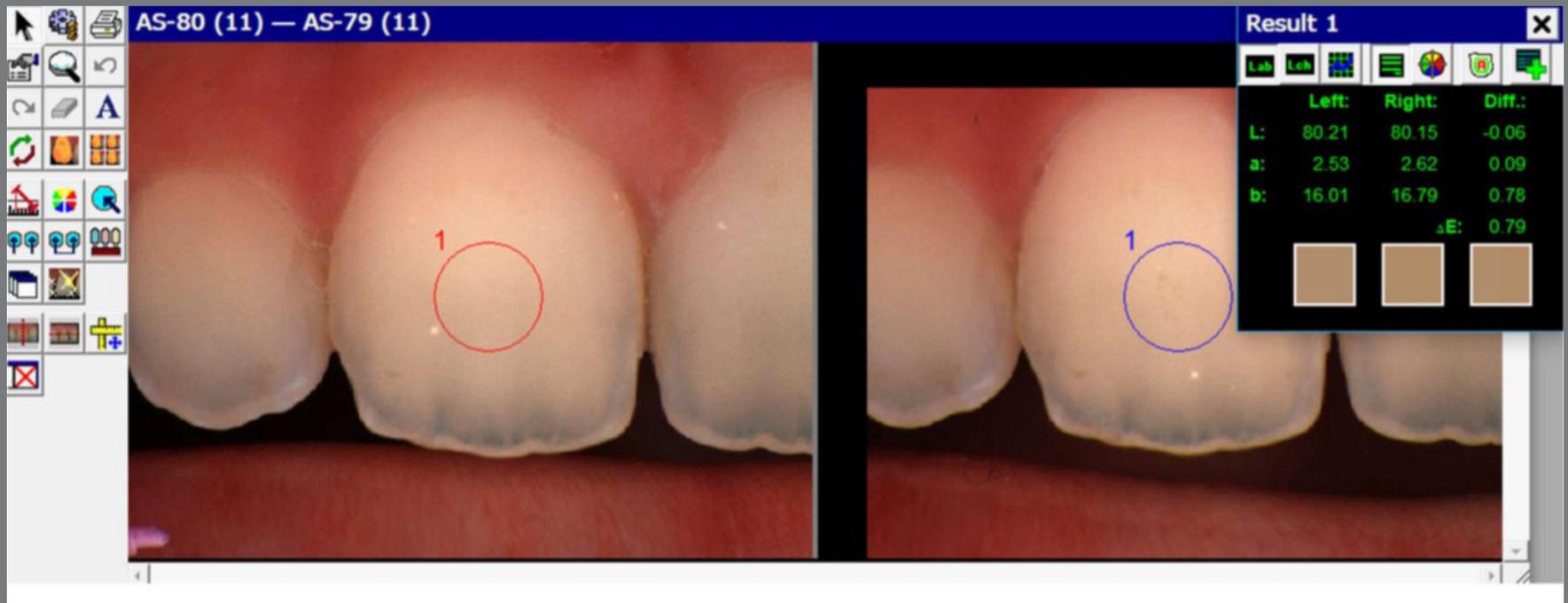


Figure 2: Screenshot of a measurement of a central incisor using the Spectroshade software v3.01 Build 1007a (MHT, Zurich, Switzerland). Source: Lazaridis et al.³, 2022.

The measurements revealed that orthognathic surgery led to little change in the color of the teeth. The authors pointed out, however, that aesthetic changes and the patient's discomfort in the face of this changes are unlikely, given the small impact caused.

THE PRESENCE OF ORTHODONTIC BRACKETS DOES NOT INTERFERE WITH THE QUALITY OF DIGITAL ORTHODONTIC MODELS

For the correct elaboration of an orthodontic treatment plan, the orthodontist must have access to elements that allow a correct diagnosis. Orthodontic models are fundamental because they make it possible to obtain measurements that can guide treatment. Impressions, traditionally used to create orthodontic models, are being gradually replaced by intraoral scanning of the arches. Several studies in the literature support the accuracy of digital models, but until now, no study has evaluated whether or not the presence of brackets interferes with their accuracy. To fill this gap in the literature, Brazilian researchers⁴ recruited 18 orthodontic patients with permanent dentition who submitted to intraoral scanning of the arches. For comparison, molds of the arches were made with alginate and the models obtained from them were scanned. The intermolar, intercanine and mesiodistal width of the incisors were evaluated. The results showed that brackets bonded to the teeth affected digitalization. However, digital intraoral models are clinically comparable and have less distortion than plaster models.

PERSONALITY TRAITS DO NOT AFFECT THE DECISION TO UNDERGO ORTHOGNATHIC SURGERY

The benefits offered by orthognathic surgery include aesthetic, functional, and respiratory improvements. However, the long path of orthodontic preparation associated with the surgical step discourages many patients from moving forward with such treatment. Deciding whether or not to undergo orthognathic surgery is not an easy task. But why do some patients readily accept the procedure and others do not? To explore this question, a group of Croatian researchers developed a study⁵ that investigated the influence of personality traits and quality of life on the decision to accept orthognathic surgery. A total of 108 patients aged between 14 and 53 years (68% women) were evaluated. The personality traits of extroversion, neuroticism, agreeableness, openness, conscientiousness, perfectionism, and self-esteem were compared between patients who accepted orthodontic preparation for orthognathic surgery and those who refused. The authors found that extroversion, neuroticism, agreeableness, conscientiousness and openness did not have a significant effect on the decision to accept orthognathic surgery.

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