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Evaluation of Tongue Position in the Subjects with Skeletal Class

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Abstract

Aim: To evaluate and compare the position of the tongue from rest to centric occlusion in skeletal.

Material and Methods: The study was conducted on 30 individuals equally divided into three groups of skeletal class.

Results: On evaluation of tongue posture, statistically significant difference was observed at the middle portion of the tongue in class II div 1 malocclusion, and at the postero-medial portion of dorsum of the tongue in class.

Conclusion: Tongue position is seen to be the same in both class II div 1 and class II div 2 malocclusions with no statistically significant differences.

Keywords: Dentoskeletal, Dentoalveolar, Tongue Pressure

Introduction

The concept of equilibrium of labio-lingual muscular forces along with the role of muscles in maintaining tooth position and arch stability has been gaining immense popularity amongst orthodontists. The tongue is an agile, versatile, active and extremely sensitive organ performing on a complex muscle background. Various studies have emphasised the role of tongue posture and size in the development of different skeletal malocclusions.

Materials and Methods

A prospective cephalometric study performed on 30 individuals having class II div 1, class II div 2 and class I malocclusions. As tongue formation in most individuals is completed by about 20 years of age and age is seen to have an important bearing on the position of the tongue, 20-25 years was selected as the age range for this study.

Inclusion Criteria

1. Skeletal class I normal occlusion comprised of 10 individuals with skeletal class 1 normal occlusion
2. Skeletal class II div 1 malocclusion - comprised of 10 individuals with a Class II.
3. Skeletal class II div 2 malocclusion - included 10 individuals with a Class II molar relationship on

both the sides and Overjet less than 2mm and an overbite more than 2mm.

Exclusion Criteria

1. Patients with any oral and parafunctional habits, any facial deformity or craniofacial syndrome, and those with any facial trauma, having undergone any facial reconstructive or cosmetic surgery, were all excluded from the study.
2. Patients having undergone orthodontic treatment in the past were also excluded from the study.

Data Collection

The tongue is a soft tissue, hard to visualise radiographically. For better visualization of the tongue, the dorsum surface of the tongue was coated with a radio-opaque solution of barium sulphate.

Patients were asked to protrude their tongue, and a cotton swab was used to coat the barium sulphate, from the middle to the lateral borders, covering the dorsal surface of the tongue. Standardized pre-treatment lateral cephalograms of the individuals were taken with the same x-ray machine and the same positioning instructions at the rest position and in centric occlusion. While shooting the cephalogram, the patients' heads were stabilized in a natural head position, such that the Frankfort horizontal plane of the individual was parallel to the floor. Each patient was instructed to swallow and relax, to keep the lips in a together position and teeth in centric occlusion for the first lateral cephalogram as obtained in Fig 1 and 2.

Figure 1: Lateral cephalogram showing tongue in rest position after being coated with Barium sulphate solution.

Figure 2: Lateral cephalogram showing tongue in centric occlusion after being coated with barium sulphate solution.

Evaluation of tongue position

The position of the tongue was evaluated based on the tongue analysis method using a template described by Rakosi (1982) and further by Graber *et.al.*in 1997. The landmarks selected and marked on the lateral cephalogram are described in Table 1 and can be seen below in Fig 3.

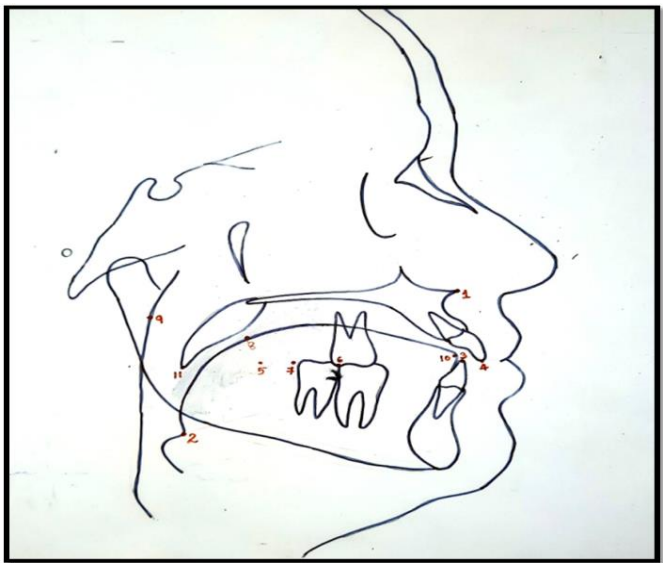

Figure 3: The landmarks marked on the lateral cephalogram.

Statistical Analysis

The statistical software namely SPSS version 20.0 was used to calculate descriptive data. Paired t-test was performed to evaluate the change from rest to centric occlusion in all 3 groups of malocclusions. The ANOVA with post-hoc Tukey test was done to compare the obtained data in all 3 groups of skeletal malocclusions.

Results

The mean values and standard deviation of the 10 parameters studied in rest and centric occlusion in Group 1 can be seen in Table 3. In analysing the different portions of the tongue, at centric occlusion, the maximum value was observed with Tg7 and the minimum with Tg4. At rest position, the maximum measurements were observed with Tg1, while the lowest with Tg5. Statistically significant differences were found between the rest position and centric occlusion position of the tongue at the levels of Tg3, Tg4, Tg5, Tg6 and Tg7.

Discussion

The tongue being an agile, versatile appendage of the oral cavity, has long been considered to have a direct impact on the Dento-skeletal structures. Any abnormality in the function and position of the tongue is seen to have a direct influence on the jaw bases, especially the mandible. While various studies in the past have reported a direct correlation between a lowered tongue posture and class III malocclusion[11] and a retracted tongue posture and class II div 1 malocclusion.

Conclusions

Within the limitations of this study, the following conclusions can be drawn from the study – The tongue posture in class II division 2 malocclusion is more retracted compared to that in class I normal relation. The length of the tongue is also significantly smaller compared to class I normal occlusion. In comparison to class II division 1 malocclusion the middle portion of the dorsum of the tongue in class II division 2 is more highly placed, when at rest position.

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