STRUCTURAL, FUNCTIONAL (CHEWING) AND POSTURAL ASYMMETRIES OF SUBJECTS WITH UNILATERAL POSTERIOR CROSSBITE

Bracco P, Piancino MG, Talpone F, Laponte RM, Zimaglia C, Castroflorio T

Dipartimento di Scienze Biomediche e Oncologia Umana; Cattedra di Ortognatodonzia e Gnatologia-funzione masticatoria; Scuola di Specializzazione in Ortognatodonzia, Università degli Studi di Torino, Italy

Introduction

Posterior unilateral crossbite is considered to be a serious asymmetric malocclusion. It develops between two and five years of age, during eruption of the primary dentition, and can involve, later, permanent dentition at a later stage in development.
It is characterised by the inversion of the normal relationship of upper and lower dental cusps, in the frontal plane, on one side of the dental arch only. It may originate from skeletal or dental malrelationship and may lead to mandibular displacement accompanied by lower midline deviation.
It is well established that patients with unilateral posterior crossbite exhibit uncommon chewing patterns on the affected side, characterised by a considerably increased frequence of reversed sequencing (1, 2). Commonly the mandible is deviated towards the bolus side during closure through the trans and intercuspal phases of mastication. In reversed sequencing the two phases commence with the mandible deviated towards the midline of the jaws and then deviate laterally.
In this study, the authors evaluated the chewing patterns, the structural asymmetries and the postural assessment in subjects with unilateral posterior crossbite and in a control group with normal occlusion.

Materials And Methods

25 subjects with posterior unilateral crossbite, and a control group of 25 normal subjects with normal occlusion, were evaluated.The subjects were selected from the orthodontic patients referred to the Department of Orthodontics, University of Turin.
The patients were instructed to chew a soft, premasticated chewing gum and then a hard bolus (winegum) non-deliberately and then deliberately on the right and on the left side for 10 seconds each test. Each test was repeated three times. The mandibular motion was measured with a kinesiograph (K6-I, Myotonics Inc Tukwila, WA–USA). The instrument measures jaw movements to within 0.1 mm of accuracy. Multiple sensors (Hall effect) in an extremely light weight (four ounce) array, track the motion of a tiny magnet attached to the lower inter-incisor point. The kinesiograph was interfaced with a computer for the data storage and subsequent analysis. The raw data were analyzed using an original software developed at the University of Torino, called Chewing Cycles Analyser (CCA) which divides the clockwise cycles from the anticlockwise cycles and eliminates the anomalous ones. The evaluation of the structural asymmetries of the vertebral column was performed by a “Spinal Mouse” (Idiag industry) in a standing sagittal and frontal plane (3). The postural assessment was evaluated by a stabilometric platforme (Lizard). Statistical evaluation was performed by two sample Mann-Whitney rank-sum test.

Results

The results show a statistical significant difference between the percentage of reverse sequencing of the subjects with crossbite, when chewing on the crossbite side, and the control group, in all mastications (soft bolus/right side: P=0.0007, hard bolus/right side P= 0.0003, soft bolus/left side P=0.0315, hard bolus/left side P=0.0439) and between the reverse sequencing on the crossbite side and the noncrossbite side.
The spinal mouse recordings and the stabilometric platform showed a relation between the crossbite malocclusion and the asymmetries of the back and the displacement of the center of foot pressure.

Conclusions

Subjects with unilateral posterior crossbite exhibit uncommon chewing pattern on the affected side, an increased in the structural asymmetries of the vertebral column and an increase of the asymmetric displacement of the center of the foot presure meaning that those subjects have structural, functional and postural asymmetries and

that the neural control of movements is deeply involved.

References

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