

A clinical case report on the treatment of mandibular diastema, associated with tongue interposition and tongue thrust swallow

Hristina Arnautska¹, Vera Krumova²

1. Department of Prosthetic Dental Medicine and Orthodontics, Faculty of Dental Medicine, Medical University Varna;
2. Department of Orthodontics, Faculty of Dental Medicine, Medical University Sofia;

Abstract

Mandibular diastema does not occur often, however, its abnormal characteristics have more disturbing implications. A major etiologic factor for mandibular diastema are pernicious habits associated with tongue thrust in a low rest position. The aim of this study is to report the approach and effects of intercepting the deleterious habit of tongue interposition and tongue thrust swallowing and the resultant periodontal changes. Tongue interposition and tongue thrust swallowing in lower jaw may lead to gingival recession, loss of alveolar bone, tooth mobility and diastema. Early termination of bad habits allows for prevention of periodontal problems and possibility of regeneration of soft and hard tissues. In the case study reported intercepting the tongue thrust on lower incisors led to the restoration of alveolar bone, reversing the recession and a spontaneous self-correction of the 7-mm diastema. Thus loss of teeth due to the periodontal problem was prevented and periodontal surgery to restore the level of the bone and gingiva was avoided..

Keywords: mandibular diastema, tongue interposition, tongue thrust swallow, pernicious habits

Introduction

The space between central incisors in both upper and lower jaw, exceeding 0.5 mm, is diagnosed as diastema. Diastema in the upper jaw (midline diastema), because of pernicious habits and/or familial tendencies, shows more prevalence over diastema in the lower jaw. Compared to midline diastema (1), mandibular diastema is not as marked and as a growth characteristic occurs less frequently, but the consequences are quite dramatic(2, 3). According to a research by Attia (4) the primary etiologic factor in mandibular diastemas is tongue thrust in a low rest position. As per A.Hedge (5) tongue interposition is considered the second most common harmful habit leading to diastema. Intense tongue interposition results in open occlusion, which can be combined with Class I or Class II occlusion as per Angle's classification, protrusion of upper and lower front teeth and spacing between them(6, 7). Tongue interposition between the front teeth during speech, swallowing and when at rest, is associated with increased pressure on the front teeth in the lower jaw, their vestibular inclination and signs of recessions (8).

Aim

The aim of this study is to report the approach and effects of intercepting the deleterious habit of tongue interposition and tongue thrust swallowing and the resultant periodontal changes.

Clinical case

A 16-year-old girl reported to the clinic for orthodontic consultation, having been referred by a surgeon after disagreement on behalf of her parents regarding a mucogingival surgical procedure. The clinical examination established Class II deformity, lower jaw in a distal position, diastema, gaps in the upper and lower front region, a bad habit of tongue interposition as well as tongue thrust swallow since the development of deciduous dentition until that moment. As a result of the tongue thrust swallow and the pressure the tongue exerted on the front teeth in lower jaw, a 7-mm diastema had formed, as well as protrusion combined with recession of the lower central incisors, gingival inflammation and increased mobility of teeth. This excluded the possibility of conducting treatment before removing the bad habit and the inflammation of soft tissues. Experience has shown that morphological adjustment without intercepting the etiologic factor holds a great relapse potential and can ruin the good results achieved through surgical intervention. Therefore, efforts were applied to first search an approach to cease the pernicious habit of tongue interposition and conduct initial periodontal therapy (Scaling and Root Planning).

The treatment was divided into three stages. First stage involved prevention of the bad habit of tongue interposition via removable appliances. A modified lower lingual plate was mounted with a tongue restrainer as per Krumova. The second stage of treatment included placing a molar distalization appliance in the upper jaw (a pendulum), while the third stage consisted of placing fixed appliance for correcting deviations in an individual dental arch and correction of occlusion.

Upon thorough analysis of patient's data - familial history, clinical and radiographic examination as well as consultation with a periodontist - the clinical decision taken was to begin treatment for eliminating the bad habit, hence the pressure of the tongue on upper and lower incisors.

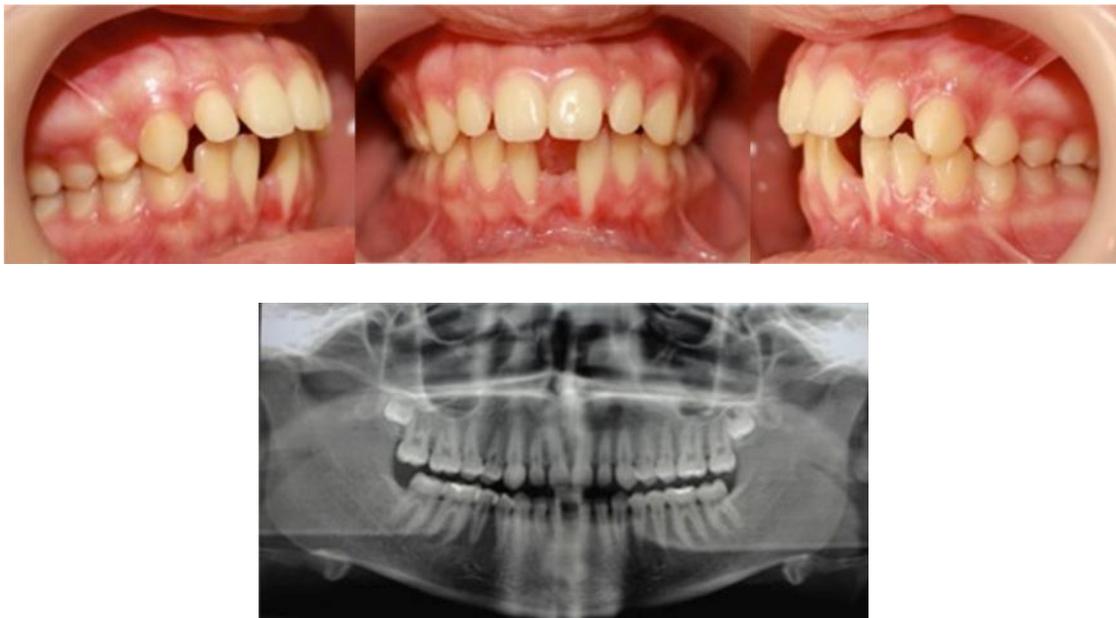


Fig 1. Intraoral status and a pretreatment OPG

The treatment started by placing an upper plate without active elements and a lower plate with a tongue restrainer. In the upper jaw with the help of a vestibular arch the upper front teeth were retruded to reduce overjet. In the lower jaw, 2 mm of the lingual surface of lower incisors were isolated from the lingual plastic body on lower incisors with the purpose of their retrusion (Figure 2). The plastic tongue restrainer was made at the level of the cutting edges of lower incisors to reduce volume and to improve patient's comfort, so that she is motivated to wear the appliance at all times, except for meal time. The prescription given was for wearing the lower jaw appliance at all times, and the upper jaw appliance at night. The patient was also assigned myotherapy to correct the positioning of the tongue.



Fig. 2 Removable appliances in upper and lower jaw

Fifteen months after placing the modified plate in lower jaw and relieving the pressure by the tongue, the examination showed spontaneous self-correction of the mandibular diastema and a significant improvement of the recession and periodontal status of the patient. As a result, the pathologic tooth mobility was eliminated and clinically it was noted that the gingival level in the region of the incisors had recovered. The improved condition of periodontal tissues as a result of relieving the pressure by the tongue pointed to the second stage of the orthodontic treatment, i.e. correction of the Class II deformity.



Fig. 3a) Prior to treatment



Fig. 3b) 15 months after treatment with a lower plate

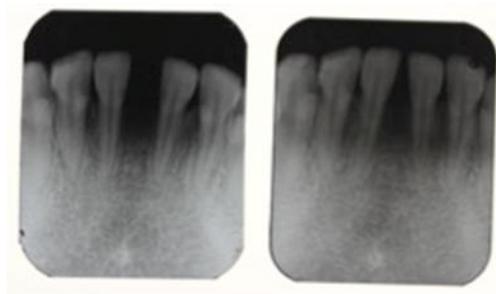


Fig. 4 Segmented radiographs

a) prior to treatment

b) 15 months later using the lower-jaw appliance

The X-rays taken showed the change in the position of incisors and closure of the diastema in lower jaw. X-ray findings confirmed the results of the clinical study. The segmented radiographs demonstrated the change in bone level: the regenerative abilities of young bone structure had been at play. After relieving the extra pressure exerted by the tongue and the adjustment of its position, spontaneous recovery of the septum bone structure between the two teeth was observed which had in turn led to correction of the recession.

At that stage of the treatment a pendulum was placed in the upper jaw and 5 months later lower-jaw braces were mounted for complete closure of the diastema and to adjust the axis inclinations of the two lower incisors. Until the placement of lower-jaw braces the patient continued to wear the lower plate and to

have myotherapy. The final stage of the treatment using fixed appliances in the upper and lower jaw is yet to take place (Figure 5) until complete correction of occlusal relationships is achieved.



Figure 5 The final stage of treatment with fixed appliance with full correction of diastema in lower arch

Every 6 months during treatment, the patient visited periodontist for clinical oral prevention of periodontal structures.

After completion of treatment in the retention phase a fixed retainer in lower jaw will be placed to maintain correction. In upper jaw a removable appliance with tongue retainer will be placed for a continued help with the incorrect position of the tongue during speech and swallowing and the patient will have further myotherapy until breaking the habit.

Pernicious habits play a great role on the formation of dental arches and occlusion. Early diagnosis of deviations and the etiologic factor which causes them are essential in timely prevention. Discontinuation of harmful factors is crucial for the normal dental growth and development of supporting structures. The duration of the deleterious habit and the ensuing initial bone destruction affected the duration of treatment until improvement in the clinical and morphological status of periodontal structures was achieved. However, the patient's young bone structure and bone regenerative abilities led to significant improvement in the periodontal status and the need for bone and tissue grafts was avoided.

Conclusion

Tongue interposition and tongue thrust swallow in lower jaw lead to gingival recession, loss of alveolar bone, tooth mobility and diastema. Early termination of pernicious habits allows for prevention of periodontal problems and possibility of regeneration of soft and hard tissues.

In the case study reported intercepting the tongue thrust on lower incisors led to the restoration of alveolar bone, reversing the recession and a spontaneous self-correction of the 7-mm diastema. Thus loss of teeth due to the periodontal problem was prevented and periodontal surgery to restore the level of the bone and gingiva was avoided.

References

1. Hussain U, Ayub A, Farhan M. Etiology and treatment of midline diastema: A review of literature POJ 2013;5(1) 27-33.

2. Foster TD, Grundy MC. Occlusal changes from primary to permanent dentitions. *J Ortho*. 1986; 13: 187–193.
3. Ramamurthy S, Ramaswamy S. Management of maxillary midline diastema in early mixed dentition by 2x2 appliance. *POJ*.2011;2(3):65-68.
4. Attia Y: Midline diastemas: closure and stability. *Angle Orthod* 1993; 63:209-212.
5. Hegde AM, Xavier AM Childhood Habits: Ignorance is not Bliss—A Prevalence Study *Int Jof Cl PedDent*, Jan-Apr 2009;2(1):26-29.
6. Paola C, Tiziano B, et al. Sucking habits and facial hyperdivergency as risk factors for anterior open bite in the mixed dentition. *Am J Orthod Dentofacial Orthop* 2005;128(4):517-519.
7. Cozza P, Tiziano B. Transverse features of subjects with sucking habits and facial hyperdivergency in the mixed dentition. *Am J Orthod Dentofacial Orthop* 2007;132:226-229.
8. Rahilly G, Crocker C. Pathological migration: an unusual cause of midline diastema. *Dent Update* 2003; 30(10): 547–549.

Corresponding author:

Dr. Hristina Arnautska, D.M.Sc.
Department of PDM and Orthodontics, Faculty of Dental Medicine, Medical University – Varna
84 “Tsar Osvoboditel” Str., Varna
GSM: 0877599675
E-mail: tineia@yahoo.com