

Orthodontic treatment of a patient with an impacted canine, maxillary transverse deficiency, and a unilateral Class II malocclusion.

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Case Presentation

This case report describes the treatment of a 13-year-old Caucasian male with a chief complaint of “My lower tooth is growing out of place.” The patient’s health history reveals no conditions that contraindicate orthodontic treatment and is categorized as PS I. The patient has a history of dental trauma with CL II fractures of both central incisors and keeps regular dental appointments. The general dentist referred the patient to the department with concerns about possible maxillary canine impaction and ectopic mandibular canine eruption.

Diagnosis and Etiology

The patient’s extraoral photos (Fig. 1) showed a well balanced face with minor chin deviation toward the right, posterior divergent facial profile with overall convex facial profile, obtuse nasioabial angle, and normal chin neck angle. The patient’s cephalometric analysis revealed a class I skeletal relationship with a class II tendency, and normal skeletal vertical proportions. The panoramic radiograph (Fig. 1) confirmed the general dentist’s concern about possible maxillary right cuspid impaction. Clinical examination and intraoral photographs (Fig. 1) revealed a $\frac{1}{4}$ cusp class III dental relationship on the left with an ectopic mandibular left canine and a $\frac{3}{4}$ cusp class II dental relationship on the right. The patient also presented with a dental deep bite, buccal unilateral crossbite on the right, 4mm maxillary crowding with retained upper primary canines and 6mm mandibular crowding with moderate to severe curve of Spee. The lower incisors were retroclined; upper incisors were within normal limits.

Treatment Objectives

1. Treat maxillary transverse discrepancy.
2. Treat unilateral class II relationship.
3. Level and align both arches.
4. Expose and align maxillary right cuspid.
5. Establish ideal overbite and overjet.
6. Maintain or improve facial esthetics.

Treatment Plan

1. Rapid maxillary expander (RPE)
2. Herbst appliance
3. Upper and lower full bond
4. Exposure of maxillary right canine
5. Level and Align
6. Finish and detail
7. Debond and retain.

Treatment Progress

Maxillary rapid palatal expander was placed in August of 2005. Following activation two times a week for one month the RPE was tied off. Following removal of the RPE the patient was fitted with a Herbst appliance in March of 2006. The Herbst appliance was placed while the patient was in his early permanent dentition and activated in steps in order to attain maximum correction.¹⁻³ Over the next few months the Herbst appliance was extended. Shims were added unilaterally to treat the patient's unilateral Class II molar relationship. The Herbst appliance was discontinued in October 2006 and fixed appliances were bonded. The arches were leveled and aligned an open coil was trapped between the maxillary right lateral and bicuspid to facilitate canine exposure. The maxillary right cuspid was exposed in March of 2007 and brought into alignment utilizing a closed eruption technique.⁴⁻⁵ Interarch elastics were utilized over the next few months to treat a remaining class II dental discrepancy. A bonded lower lingual retainer from canine to canine was cemented and the patient was debonded in March of 2008 (Fig 2). A maxillary Essix retainer was fitted the day of debond.

Final Evaluation of Treatment

Overall the patient and parents were happy with the treatment result. Herbst treatment resulted in skeletal and dentoalveolar treatment of the unilateral Class II molar relationship (Figure 4). Initial retroclination and eventual proclination of the incisors into a wider circumference allowed for resolution of the dental crowding and leveling of the curve of Spee. Canine exposure was performed with the closed eruption technique and the gingival contour is normal, although unbalanced with the contralateral canine. Overall treatment time was increased by breakage of the Herbst appliance and fixed appliances. Due to the ectopic eruption path of the patient's lower left canine, the final gingival contour is uneven and could be considered for a gingival graft. The root of the maxillary left central incisor is angulated distally as a result of utilizing a restoration and gingival contour as guidance instead of a progress radiograph. The mild posterior open bite in the final records, which progressively opened in retention records, can be attributed to maxillary transverse discrepancy as a result of mild maxillary transverse relapse without compensatory over-expansion. Additionally, the Herbst appliance was utilized following the expander and the mandible was advanced, which slightly exacerbated the absolute transverse discrepancy as the wider mandibular inter-molar width was driven anteriorly to correct the patient's Class II discrepancy. The upper Essix retainer also contributed to vertical movement in the posterior segments and as the patient went to nighttime retainer wear some vertical settling of the premolars occurred. PAR score = greatly improved.

References

1. Pancherz H. The Herbst appliance-its biologic effects and clinical use. *Am J Orthod.* 1985; 87:1–20.
2. Pancherz H. The mechanism of Class II correction in Herbst appliance treatment: a cephalometric investigation. *Am J Orthod.* 1982; 82:104–113.
3. von Bremen J, Pancherz H. Efficiency of early and late Class II division 1 treatment. *Am J Orthod Dentofacial Orthop.* 2002; 121:31–37
4. Samir B.E. Impacted maxillary canines: A review. *Am J Orthod Dentofacial Orthop* 2001; 101:159-71.
5. Kokich V.G. Surgical and orthodontic management of impacted maxillary canines. *Am J Orthod Dentofacial Orthop* 2004;126:278-83



Figure 1. Initial records. July 2005.



Figure 2. Final record, February 2008.

Digitized Lateral Ceph. (7/13/2005). Infr
Digitized Lateral Ceph. (3/19/2008). Fr

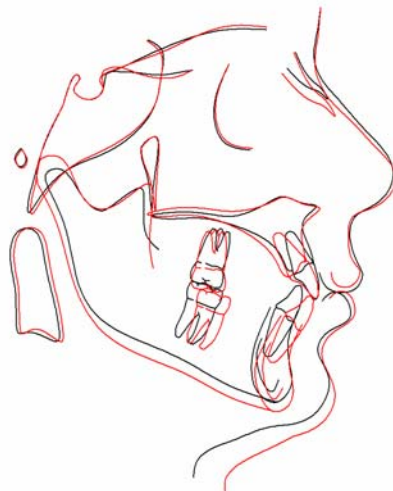




Figure 3. Retention records, July 2008.