

## Orthodontic alternative in the treatment of congenitally missing lateral incisor

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يعتبر فقدان القواطع الجانبية العلوية ، سواء الخلفي أو كنتيجة لإصابة مرضيه ، من الأمور التي تزيد من تعقيد المعالجة التقويمية . وعلى اختصاصي تقويم الأسنان أن يختار بين نوعين من الطرق العلاجية، إما لفتح مسافات للقواطع الجانبية تملئ فيما بعد بأسنان اصطناعية ، أو بتعديل شكل الأنياب لتبدو كقواطع جانبية ومن ثم تحريكها تقويميًا إلى مكان القواطع الجانبية لتقوم بوظيفتها . إن تحريك الأنياب المعدلة بشكل جيد لتشغل مكان القواطع الجانبية الوتدية الشكل والمفقودة ، يؤدي إلى تحسن وظيفي وتجميلي واضح .

تهدف هذه المقالة إلى وصف المعالجة التقويمية وتعديل الأنياب العلوية على هيئة القواطع الجانبية العلوية لتقوم بوظيفتها .

Missing maxillary lateral Incisors due to congenital absence or loss as a result of an accident or pathologic condition present a problem which complicates orthodontic treatment. Two treatment procedures must be decided by the orthodontist, either to open spaces for the lateral incisor and use artificial teeth in these spaces or to contour the canines to resemble lateral incisors, and positioning them to function in place of the missing lateral incisors. Placing well-shaped canines in positions by removal of peg-shaped lateral incisors is often an esthetic and functional improvement. The purpose of this paper is to describe the orthodontic treatment and reshaping maxillary canines to resemble and function as lateral incisors.

### Introduction

The frequency of hypodontia varies, according to different investigators,<sup>1,4</sup> from 0.27 percent to 11.0 percent depending on the methods of registration, grouping of the material and racial differences. The vast majority of cases of agenesis among the permanent teeth involve the second premolars and maxillary lateral incisors. Before any kind of treatment is decided upon, it is important to be sure, that the tooth in question is in fact missing by taking radiographs.

Treatment alternatives of a missing tooth include (1) space closure by spontaneous drift of teeth/guided eruption; (2) orthodontic space closure; (3) auto-transplantation of other developing teeth; (4) prosthetic appliances; (5) implant.

A number of factors should be taken into consideration when selecting the proper treatment for each individual case, the most important of which concern is the space conditions. Generally speaking, space closure is easier to obtain and more stable in cases with crowding, whereas cases with large spacing are not suitable for orthodontic closure. Other factors that influence the choices of alternatives are: type

of sagittal occlusion, degree of interlocking intercuspitation, axial inclination of the teeth, presence or absence of third molars, age, caries situation and root resorption tendency.<sup>5,7</sup>

### Case Report

This case is about a 12-year 5 months old girl whose chief complaint was a missing upper left lateral incisor and peg-shaped upper right lateral incisor. She was in a good health, not taking any medication with no previous major illnesses or trauma.

#### Facial Appearance

She has an oval symmetrical face and convex profile. During swallowing, the teeth were in contact but no mentalis muscles hyperactivity. The upper midline was deviated to the left (Fig. 1).

#### Clinical Examination

On clinical examination, the patient had Class I malocclusion with 4.5 mm overjet and 6 mm overbite. The upper midline was deviated to the left by 1 mm with the presence of a median diastema soft, dental and periodontal tissues appeared healthy. Tooth #12 has a peg shape and tooth #22 was missing (Fig. 1).

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Figs. 1a - 1i. Pre-treatment photographs.

### Cephalometric Evaluation

The cephalometric analysis showed a decrease in the lower face height. The SNA angle (s-n-ss) was 84.4°, SNB (s-n-sm) was 81.8° which indicated an orthognathic maxilla and mandible in relation to the anterior cranial base, respectively. The distance from the tip of the upper incisor to NA (is-n.ss) was 4.7 mm and from the tip of the lower incisor to NB (ti-n.sm) line was 3 mm, indicating protrusion of the upper teeth and retrusion of the lower teeth. The upper lip was 4.3 mm and lower lip was 3.6 mm from the Esthetic line which indicated retruded profile (Fig. 2).

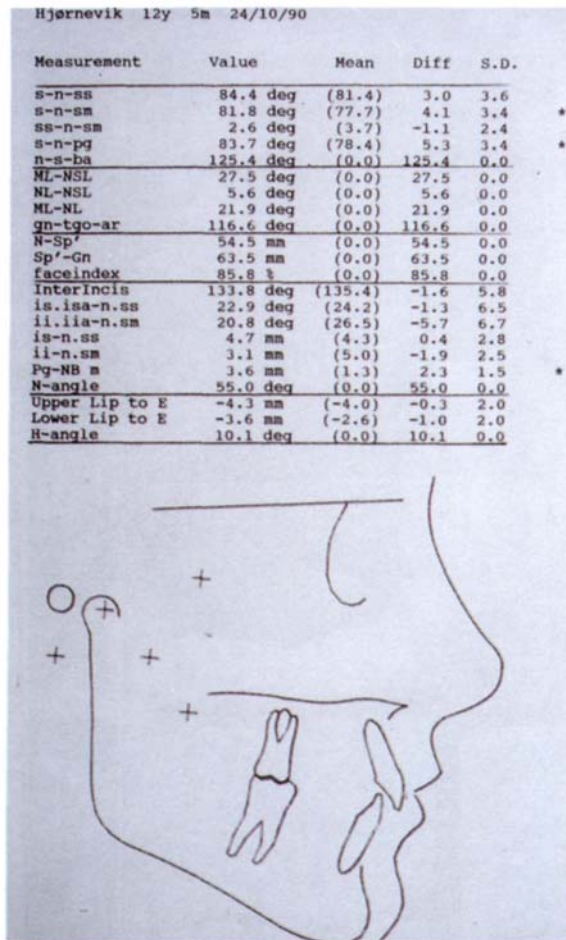


Fig. 2. Pre-treatment tracing.

### Diagnosis

The case was diagnosed as Class I malocclusion with oval face and convex profile, neutral basal sagittal jaw relationship with ANB (ss-

n-sm) angle 2.6°. Vertically, it is characterized by decreased lower facial height with an overbite of 6 mm. An excess of space in the lower jaw by 2.5 mm with agenesis of #22 and peg shaped tooth #12 with an overjet 4.5 mm.

### Treatment Plan

The treatment plan accepted by the patient was to remove tooth #12 for esthetic reason and for symmetry on both sides. Treatment goals were to achieve a better masticatory function by closing the space, align the teeth and to normalize the overbite.

### Treatment Outline

An upper and lower fixed appliance (0.018 bracket slot) was used. In order to hide the palatal cusp of the first premolar and to have the same appearance of the canine cusp the tooth should be rotated mesiopalatally and the bracket placed distally. An upper Hawley retainer and a lower fixed bonded retainer were delivered.

### Variations in Brackets Selection

1. Adequate lingual root torque and enough angulation of the canines is required to avoid the long-roots of the canines from coming in contact and damaging the central incisor root. Different orthodontists use to place the brackets of the central incisors on the canines to achieve this objective. Excessive labial root torque of the canines could damage the apical ends of these long-rooted teeth by forcing them against cortical bone in the nasal area of the maxilla.
2. On the first premolars, brackets of the canine were bonded distally to enable rotation of this tooth to relieve occlusal prematurities. Offset bend was needed in the premolar region of the arch wire to produce canine prominence.

### Re-Shaping Upper Canine

The ability of the operator to re-shape the upper canines to resemble lateral incisors and the original shape of the upper canines determine the degree of esthetic success. In re-shaping the canines to assemble and function as lateral incisors, a definite procedure should be followed. It is the orthodontist's responsibility to contour the

canines himself, or the contouring procedure should be carried out under his personal supervision.

It is preferable to accomplish the contouring procedure at the beginning of the orthodontic treatment. However, in the present case, the re-shaping was done later because the canine did not require too much re-shaping.

#### Instruments Required for Maxillary Canine Contouring

The most practical way to contour the canine is to start with a diamond bur in an air turbine instrument which is useful for gross incisal reduction. However, the entire shaping procedure may be accomplished by means of a safe sided 1/4 inch diamond disc followed by fine sandpaper strips for final polishing. This procedure should be carried out under an air and water coolant. In this procedure, no labial reduction of enamel at the gingival area was done in order to avoid a change in colour and prevent the surface from becoming susceptible to caries later on.

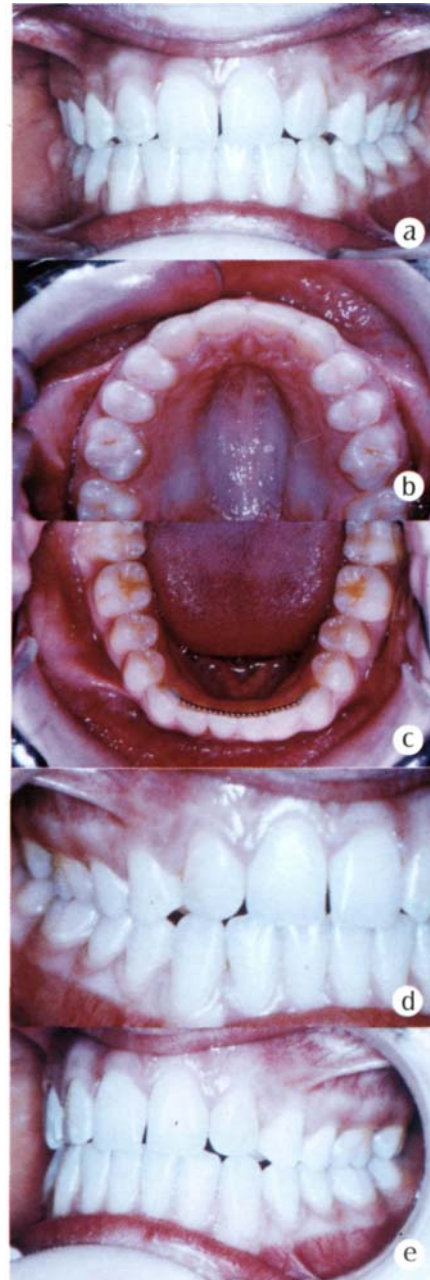
Depending on the overbite and the overjet at the end of the treatment, the lingual surface was reduced at the incisal area if required. Minimum mesiodistal reduction should be carried out. The tip of the canine should be flattened to produce an incisal edge. No local anesthesia was needed in the canine contouring procedure. For enamel protection, topical fluoride was applied to the tooth immediately following the contouring procedure.<sup>811</sup>

#### Treatment Results

The obtained result showed a satisfactory replacement of the canines instead of the upper lateral incisors. Moreover, the re-shaping of the upper canines gave good esthetic result. The molars and the canines were in Class II relation on both sides due to mesialization of the posterior segments. The prognosis is expected to be stable even though the upper molars showed some degree of rotation. However, this rotation can be avoided by making the molar out bend in the arch wire. The lower anterior crowding were corrected by stripping and leveling. The prognosis may be critical due to the high tendency of relapse so the fixed retainer should be bonded and kept for a longtime.

The overjet and the overbite were improved, and the dental midline on both arches coincide

with the facial midline (Figs. 3 & 4). The post treatment panoramic and periapical radiograph showed no caries, no root resorption or periodontal destruction and the cephalometric analysis revealed significant uprighting of the upper central incisors. However, no significant changes were observed in the skeletal and soft tissue relationship (Figs. 5 & 6).



Figs. 3a - 3e Post-treatment photographs.



Fig. 4. Pre and post-treatment front view photographs.

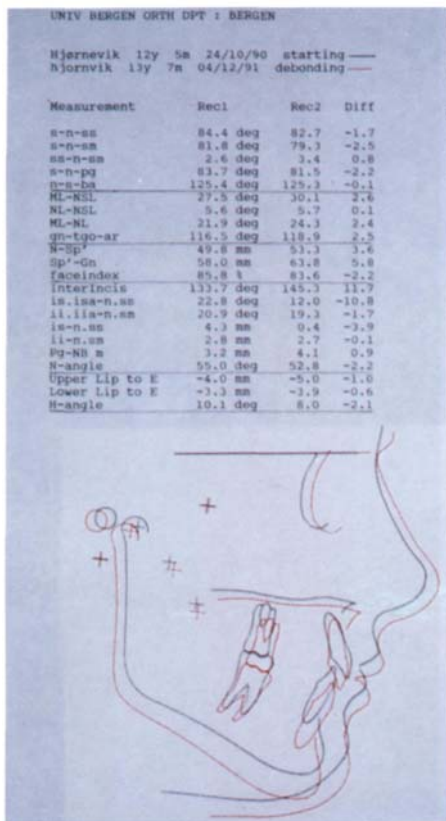


Fig. 5. Overall superimposition. Black - pre-treatment. Red - post-treatment.

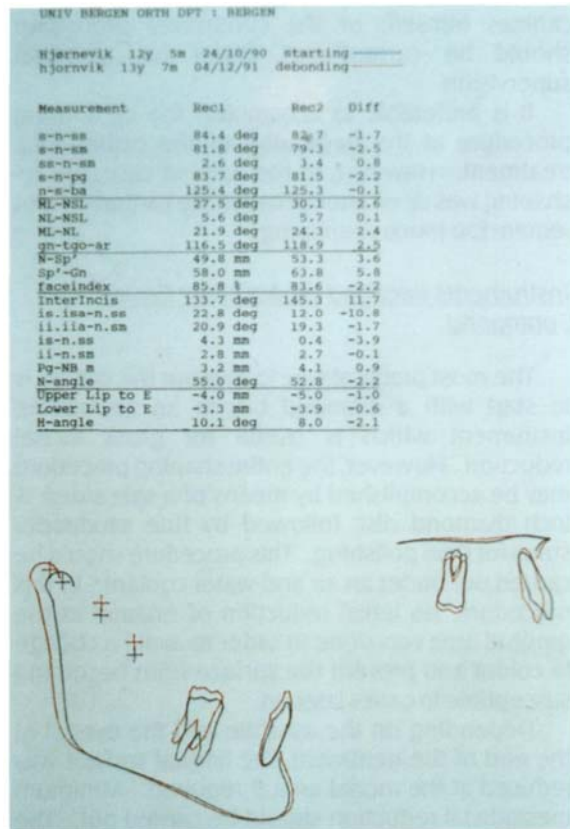


Fig. 6a. Super imposition maxilla. 6b. Super imposition mandible. Black - pre-treatment. Red - post-treatment.

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