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## An alternative technique in the treatment of anterior cross bite in a case of nichel allergy: a case report

### ABSTRACT

**Aim** The objective of this paper is to show an alternative use of an Essix based appliance in the treatment of anterior single-tooth crossbite malocclusion in a patient with Nickel allergy.

**Materials and methods** Anterior crossbite malocclusion of one or more teeth, without posterior crossbite association, is a relatively frequent condition both in the mixed and the permanent dentition. This kind of malocclusion is usually treated with either fixed or removable appliances. The use of preformed Essix appliances could be an alternative to traditional removable and fixed orthodontic devices in patients with Nickel allergy as well as in every patient.

**Results** The treatment was successfully completed in 12 weeks, the anterior single tooth crossbite was corrected using three full arch Essix-based appliances planned on the set-up casting, providing a gradual vestibular movement. Patient compliance was requested in order to provide the planned dental movement.

**Conclusion** The Essix appliance can be successfully used to correct a single-tooth crossbite even in allergic subjects in a short time with patient cooperation.

**Keywords:** Anterior crossbite; Essix appliance; Nickel allergy.

## Introduction

Anterior crossbite malocclusion of one or more anterior teeth, without posterior crossbite association, is a relatively frequent condition related to eruption anomalies that can be detected both in the mixed and the permanent dentition. This kind of malocclusion is usually treated with fixed or removable appliances in order to correct the occlusal impingement of one or more teeth [Moyers, 1988; Lindauer and Shoff, 1998]. In the case of patients allergic to Nickel, the use of

traditional appliances is not recommended because the alloy could contain a percentage of Nickel.

The use of preformed Essix appliances could be an alternative to traditional removable and fixed orthodontic devices in allergic patients as well as in every patient.

The Essix appliance is an esthetic removable device, retained by the anatomy of the teeth, it is made of plastic copolyester material, in which one sheet of plastic material of 1 mm thickness (Scheudent type A) is thermally molded on the cast reducing the thickness to 0.65 mm [Giancotti et al., 2004]. It is manufactured when the orthodontic setup of the teeth to be moved has been completed through a progressive correction aiming at the ideal alignment.

The thermoforming process guarantees the posterior stability of the appliance, providing flexibility for ease of insertion and removal and it does not interfere with speech. Therefore it is comfortable, aesthetic and well accepted by the patient who can easily wear the appliance full-time. The Essix is not limited to long-term retention as introduced by Sheridan, but it can be used for other applications [Sheridan et al., 1993; Sheridan et al., 1994; Sheridan et al., 1995; Sheridan, 1996; Rinchuse and Rinchuse, 1997]:

- biteplane;
- space maintainer;
- palatal expansion retainer;
- molar uprighting device;
- pontic holder for a single missing anterior tooth.

In a previous paper we showed the use of an Essix-based appliance to correct an anterior single tooth crossbite in an early mixed dentition patient [Giancotti et al., 2004].

The aim of this paper is to describe an early treatment with the Essix-based appliance to correct a maxillary central incisor crossbite in a patient allergic to Nickel.

## Case report

A 10-year-old male, presented at the Department of Orthodontics of "Fatebenefratelli" Hospital (University of Rome "Tor Vergata", Italy) with a Class I malocclusion in the mixed dentition, normal skeletal pattern, a crossbite on the maxillary right central incisor, and a gingival retraction with slight inflammation on the lower right incisors probably due the traumatic occlusion. As referred by the parent and confirmed by medical tests, the patient was allergic to Nickel alloy (Fig. 1).

The orthodontic treatment consisted of three full arch Essix-based appliances that had been planned on the setup casting, providing a gradual vestibular movement of 3 mm of the right central incisor in order to solve the anterior crossbite. To improve the Essix's mechanical retention two resin buttons were planned on the buccal surface of the maxillary primary canines and on the second primary molars during the laboratory phase [Sheridan et al., 1993] (Fig. 2).

The patient was instructed to wear the Essix appliance all day, except for eating, in order to achieve 22 hours of cooperation.

**ORTHODONTIC TREATMENT IN A PATIENT ALLERGIC TO NICKEL**

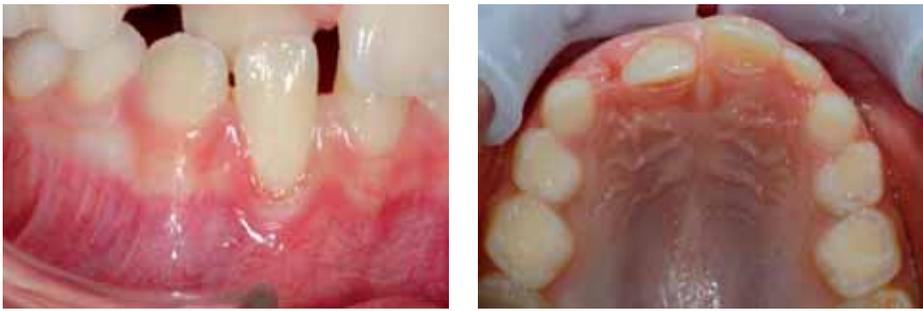
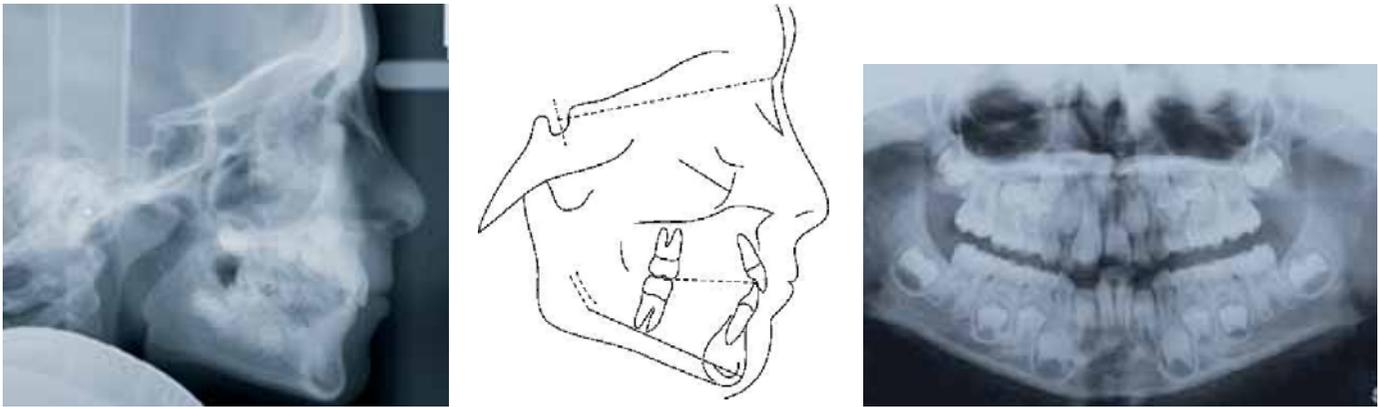


FIG. 1 - Pre-treatment records.



Four weeks later, the second Essix appliance, with the sequential maxillary incisors' buccal movement of 1 mm

more was given to the patient. The last Essix with the maxillary incisors' final position was delivered four weeks later.

In twelve weeks the correction of the maxillary right central incisor was completed and no allergic reaction was referred by the patient throughout the treatment. Moreover at the end of the treatment the gingival retraction and inflammation had decreased considerably (Fig. 3).



FIG. 2 - Essix set-up.



FIG. 3 - Crossbite correction 12 weeks later.



FIG. 4 - Follow up at 16 months.

## Discussion

In the case of patients with crossbite malocclusion of one or more anterior teeth, the interceptive orthodontic treatment chapter of some orthodontic textbooks suggest the use of the Hawley retainer with finger springs to promote the labial movement of the tooth in crossbite (Fig. 4), the use of a mandibular bite plane with the same purpose, or in the case of poor patient's compliance several authors suggest to use the Quad Helix with long arms [Moyers, 1988; Rinchuse and Rinchuse, 1997]. However, when treating patients allergic to Nickel, the application of these traditional fixed or removable devices can be contraindicated because they could, in part (vestibular arch, springs, molar clamps, bands etc.) contain a little amount of Nickel that can represent a problem. Therefore, several authors evaluated alternative solutions for these patients.

Tse showed an alternative procedure for one tooth crossbite solution: an inclined plane bonded to the labial surface of the maxillary incisor in crossbite [Tse, 1997]. Clearly, this procedure obviates patient compliance, but to be successful it requires a minimal overbite with contact between the labial surface of the maxillary incisor and the lingual surface of the mandibular incisor.

Croll in 2002 proposed to correct the anterior dental crossbite using a bonded compomer bite plane in both primary and permanent dentition [Croll and Helpin, 2002; Croll, 1996]. However, the use of an Essix-based appliance with setup for single tooth crossbite correction provides the following advantages.

- It is not affected by overjet or overbite reduction.
- It is not affected by allergic reactions to Nickel, which is found in small amount in Hawley retainers.
- It is a clear and aesthetic appliance.
- It does not affect the patient's oral hygiene.

Although a strong patient compliance is required, this treatment option can be considered as an elective choice in allergic patients.

## Conclusion

This case report shows the use of an Essix-based appliance to correct a single-tooth crossbite in a short time in a patient allergic to Nickel alloy with minimal patient's cooperation.

The Essix appliance is an aesthetic and efficient alternative to traditional removable orthodontic devices, being quick and comfortable and allowing to gain stable results in the permanent dentition.

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