LIGHT-FORCE TECHNIQUE FOR THE EARLY TREATMENT OF AN ECTOPIQUE TOOTH

Free crown tipping can be useful when teeth do not erupt in their physiologic sequence and a real intraosseous migration and eruption of a single tooth into a distant ectopic position can be observed. This article presents a case of an ectopic mandibular lateral incisor treated early, with the light-force technique and uncontrolled forces, and finished with the bidimensional edgewise appliance. A Caucasian female patient, 10 years 10 months of age, had a mandibular left lateral incisor displacement, with the lateral incisor crown positioned mesial to left second primary molar. An early treatment was planned to correct the mandibular left lateral incisor displacement and to allow proper eruption of the mandibular left canine and first premolar. A second phase of treatment, in permanent dentition, was planned for the dental Class II subdivision on the right and deep bite correction. Phase 1 treatment was completed after 10 months; phase 2 treatment was initiated in the permanent dentition and lasted 18 months. Treatment achieved the following outcomes: (1) mandibular lateral incisor in corrected position; (2) full canine and molar Class I relationship; (3) overjet and overbite within the normal limits; (4) symmetric arches; and (5) a balanced profile. The radiograph evaluation revealed good root parallelism and mandibular left lateral incisor light root resorption. The light-force technique is not only a possible alternative but the ideal appliance for treatment in the mixed dentition, when the permanent teeth should be controlled. World J Orthod 2005;6:258–264.

At the beginning of the 1900s, Angle pioneered the twin bracket1; in the early 1930s Tweed2–4 introduced absolute tooth control during orthodontic treatment. In the late 1970s Andrews5–7 developed straightwire brackets, where tridimensional prescriptions are contained in the appliance. These appliances were developed for permanent dentition patients.

E.H. Angle was the first, in 1907, to emphasize the importance of free crown tipping during extraction space closure.8 That concept was further developed by Bege.9,10 Today, only “light-force” and “tip-edge” techniques allow teeth some degree of freedom.11–13 Therefore, conventional fixed orthodontic treatment frequently involves tridimensional control. This treatment approach can be useful in the permanent dentition and whenever teeth erupt in physiologic sequence. In rare cases, 2 adjacent teeth interchange positions; less frequently, real intraosseous migration and eruption of a single tooth into a distant ectopic position can be observed.14 Treatment depends on the specific type of ectopy. Whenever root tips appear in the normal sequence, it is easy to produce the best and easiest orthodontic outcome.15 In such a case, the use of uncontrolled forces can be advantageous. The present article presents one case of a dental ectopy treated early, with the light-force technique and uncontrolled

Mauro Cozzani, DMD, MScD1
Daniela Lupini, DMD2
Giuseppe Siciliani, MD, DMD3

1 Adjunct Professor, Department of Orthodontics, Università di Ferrara, Ferrara; and Private Practice of Orthodontics, La Spezia, Italy.
2 Postgraduate student, Department of Orthodontics, Università di Ferrara, Ferrara; and Private Practice of Orthodontics, Giulianova Lido, Italy.
3 Professor and Chair, Department of Orthodontics, Università di Ferrara, Ferrara, Italy.

CORRESPONDENCE
Dr Mauro Cozzani
Via Fontevivo 21 N
19125 La Spezia, Italy
E-mail: maurocozzani@libero.it
forces, and finished by bidimensional edgewise appliance.

**CASE REPORT**

**Diagnosis and treatment plan**

A Caucasian female patient, 10 years 10 months of age, had a displaced mandibular left lateral incisor; the tooth crown was positioned mesial to the left second primary molar. Clinical and radiographic examinations revealed a dental Class II subdivision on the right side and a deep bite. The profile was convex and the frontal view revealed a pleasant face (Figs 1 and 2). Early treatment was planned to correct the mandibular left lateral incisor displacement to allow proper eruption of the mandibular left canine and first premolar. A second
phase of treatment, in permanent dentition, was also planned for the Class II relationship and deep bite correction.

Alternative therapeutic options were considered, including mandibular left lateral incisor extraction and its replacement with an implant. This option was rejected because of the patient's young age. In fact, this option involved at least 2 surgeries, to preserve space in the arch and bone width until the end of mandibular alveolar growth. Another choice involved lateral incisor extraction and its replacement with the mandibular left canine; reshaping of the first premolar, complex asymmetric biomechanics, and compensative extraction of the left maxillary first premolar or third molar would have been performed to preserve occlusal harmony. This option was rejected due to the complexity and length of treatment, and to the compromised occlusal outcome.

**Treatment progress**

A lingual arch was placed on the mandibular second primary molars to maintain anchorage. Light-force technique brackets were bonded to the mandibular incisors and a power chain was placed from the right second primary molar to the displaced incisor; no archwire was applied (Fig 3). Subsequently, a stopped 0.016-inch Australian round wire and a lingual button on the displaced mandibular left lateral incisor were inserted. An elastic power chain was then placed from the mandibular right second primary molar to the lingual button on

---

**Fig 2** Radiographic evidence (panorex) of the displaced mandibular left lateral incisor.

**Fig 3** Light-force technique brackets are bonded to the mandibular incisors and a power chain is run from the right second primary molar to the displaced incisor; no archwire is applied.
the incisor to mesialize and derotate this tooth. Once the lateral incisor was partly derotated, the lingual arch was discontinued and a stopped 0.018-inch Australian round wire was substituted for the previous wire, with a power chain from the left lateral incisor to the right lateral incisor. The lingual arch was discontinued.

A space retainer was not utilized, since eruption of the permanent teeth was following the correct pathway (Fig 5).

An edgewise phase 2 treatment was performed in the permanent dentition to correct the Class II subdivision on the right and the bite depth. A Locasystem\textsuperscript{16} was used to reach an overcorrected molar Class I relationship. Subsequently, the bidimensional edgewise technique\textsuperscript{17} was used to retract the maxillary arch and perform ideal occlusal finishing. Phase 2 treatment lasted 18 months (Fig 6).
Treatment results

Treatment phases 1 and 2 achieved a full canine and molar Class I relationship, overjet and overbite reduction to within the normal limits, symmetric arches, and a balanced profile. However, the dental midlines were not coincident, and the left maxillary canine was rotated slightly mesially. The radiographic evaluation demonstrated good root parallelism, except for mandibular first premolar mesial root tipping; light root resorption of the mandibular left lateral incisor was also observed (Fig 7).

DISCUSSION

In phase 1 mixed dentition treatment, the risk of impinging or damaging lateral incisor root and cortical bone was probably reduced by the use of light-force appliances, which allowed tooth movement through the lowest areas of resistance.

The light-force technique brackets provide the desired crown control without tridimensional involvement, which is not required at this particular treatment stage. In fact, even an undersized archwire inserted in an edgewise bracket slot would have resulted in a certain amount of tipping. Straightwire tridimensional prescriptions were developed for permanent dentition treatment in the mixed dentition, physiologic incisor inclination, in and out, and torque are different. It is known that in the second transition period, the root angulations of the mandibular incisors change from mesial to distal to allow proper eruption of the canines.

The inability of the light-force technique brackets to express any tridimensional control eliminates forced pathways of movement, including mesiodistal or buccolingual movement of the teeth. In the authors’ opinion, the best option would be treatment that does not involve permanent teeth; however, the light-force technique could be considered as not only a possible alternative but the ideal appliance for mixed dentition treatment, when the permanent teeth should be controlled.
Fig 7 Patient at the end of phase 2 treatment (extraoral, intraoral, and radiographic views).
The choice of a specific appliance for specific goals during specific phases of treatment, migration throughout low-resistance areas of mandibular bone in the phase 1 early treatment, and the use of frictional forces in the phase 2 treatment (case refinement stage) are the main factors contributing to a successful result in this case of tooth displacement.

REFERENCES

4. Tweed CH. The application of the principles of the edgewise arch in the treatment of Class II, Division 1 malocclusion: Part II. Angle Orthod 1936;6:256.