Mandibular pendex spring appliance for use in mixed dentition

Aldo Giancotti* / Paola Radico** / Raffaella Docimo***

Loss of space in the mandibular arch is a common occurrence due to several different causes such as caries, trauma or iatrogenic damage. This paper describes a new TMA spring used in mixed dentition for space regaining in the mandibular arch. A clinical report is presented and the advantages of the method are discussed.
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INTRODUCTION

Loss of space in mandibular arch is a common occurrence in mixed dentition reducing the available space for the permanent teeth.

The most frequent causes are:

- premature loss of primary teeth due to caries, traumas or iatrogenic damnage;[1]
- agenesis, inclusion or ankylosis of permanent teeth;[2]
- serious dental-skeletal discrepancy.

Even if gaining space in the mandible is more difficult than in the maxilla, different devices have been developed to recover space and maintain a correct lower arch length. For this purpose many fixed and removable appliances as lip bumper, lingual arch, Jones Jig, Franzulum appliance, Ni-Ti coils have been used.[3,4,5]

This article describes a new system called M.P.S.- Mandibular Pendex Spring- for recovering space in posterior segments of mandibular arch, that we consider particularly suitable in mixed dentition.

Figure 1. The Mandibular Pendex Spring.

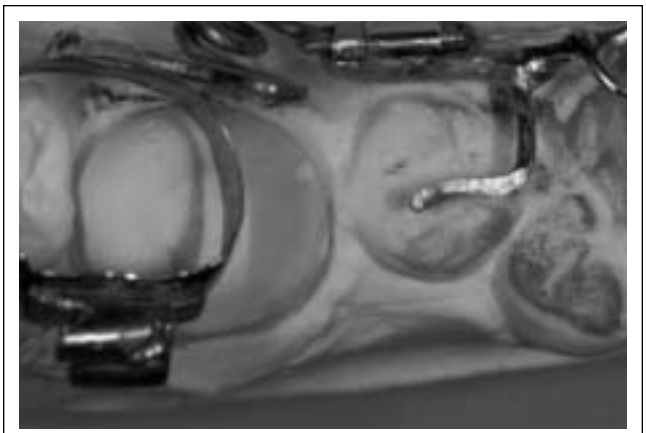

Figure 2. Extra-oral activation of the M.P.S.

APPLIANCE DESIGN

The appliance we have designed is called "Mandibular Pendex Spring" appliance because of the similarity with Pendulum, a device for distalization of upper molars, which was first introduced by Hilgers[6] and later modified by Scuzzo *et al*.[7] by the insertion of removable springs.

The M.P.S. works in the lower arch and can be used both symmetrically and asymmetrically. A removable spring, formed by modelling a 0.32" TMA wire, represents the working part of the appliance and produces a light and continuous force that moves the lower first molar distally (Figure 1).

* Dr. Aldo Giancotti, University of Rome "Tor Vergata", Fatebenefratelli Hospital – Isola Tiberina – Roma, Department of Orthodontics.
** Dr. Paola Radico, University of Rome "Tor Vergata", Fatebenefratelli Hospital – Isola Tiberina – Roma, Department of Orthodontics.
*** Dr. Raffaella Docimo, University of Rome "Tor Vergata", Fatebenefratelli Hospital – Isola Tiberina – Roma, Department of Orthodontics.

Send all correspondence to Dr. Aldo Giancotti, Viale Gorizia 24/c, 00198 Rome, Italy.

E-mail: giancott@uniroma2.it

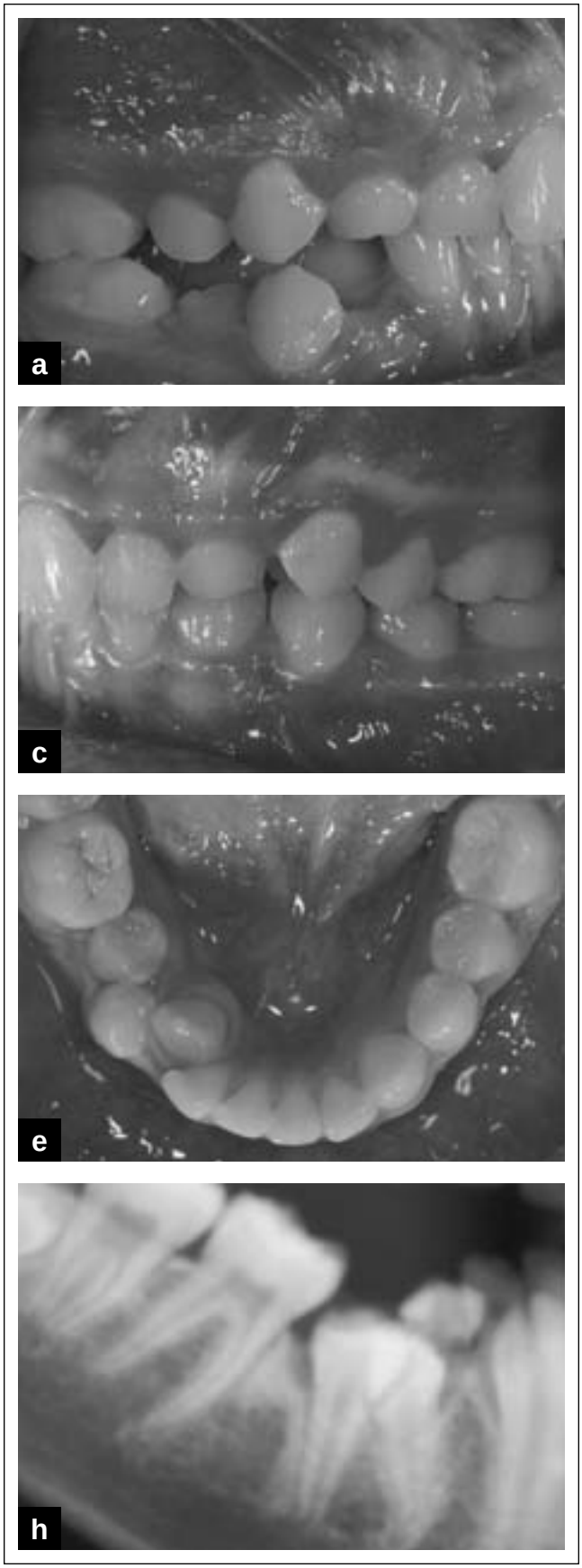

Figure 3a-h. Intraoral photographs and radiographic records.

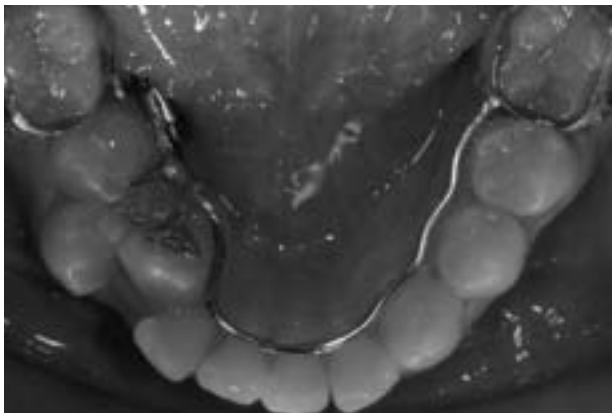

Figure 4. Mandibular Pendex Spring in place.

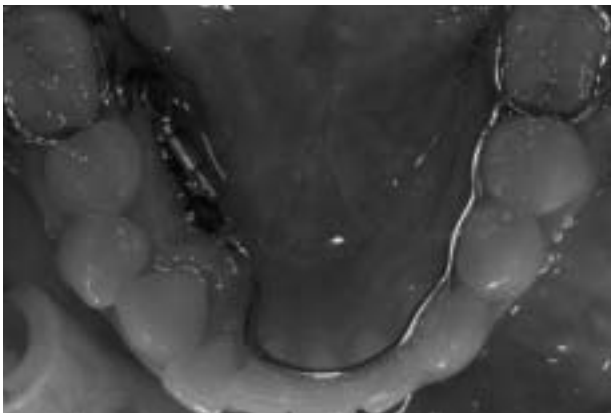

Figure 5. Clinical observation after 16 weeks of active treatment.

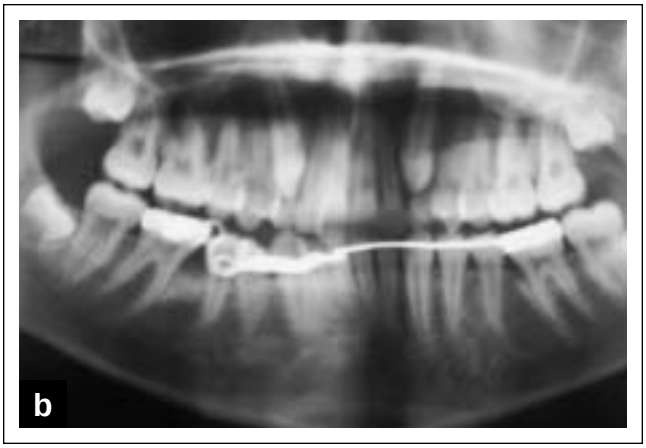

Figure 6b-c. Radiographic post-treatment records.

A lingual arch with a sheath soldered into its terminal segment represents the anchorage unit. The TMA spring has a retentive part that is inserted in the final segment of the lingual arch and a closed helix for progressive activation.

Although the spring can be activated intraorally, it is suggested that the dentist preactivate the applince before placing the Pendex (Figure 2).

The M.P.S. spring is activated up to 40-45°, resulting almost parallel to the medial sagittal axis before intraoral placement. The activation should be repeated until the desired distalization of the molar is obtained.

The placement of M.P.S. initially implies the fixation of the bands on the lower molars, then the creation with composite resin of bonded rests on the first bicuspid and cuspid, and finally the insertion of the spring into the lingual sheath using a Weingart plier.

Distal root tipping can also be produced by adjusting the horizontal loop of the spring. Tipping back the recurved portion of the spring at the loop causes a more direct distal movement of the molar.

CASE REPORT

A 12-year old male presented with an asymmetric malocclusion due to the mesialization of right lower first molar caused by premature loss of the second primary molar.

Intraoral examination showed Class I molar relationship on the right side, Class II dental relationship on the left side, overjet of about 3mm and deep bite (Figure 3).

Cephalometric analysis showed Class II skeletal discrepancy (ANB=7°) and normal vertical position (FMA=25).

In order to correct the molar position on the right side, the Pendex Spring appliance was used with the aim to distalize the first and second lower molars simultaneously, creating space for eruption of the second premolar (Figure 4).

Molars were moved into the correct position within six months (Figure 5). After removing the rests, we left the appliance in place to maintain the lower space while preparing the upper arch.

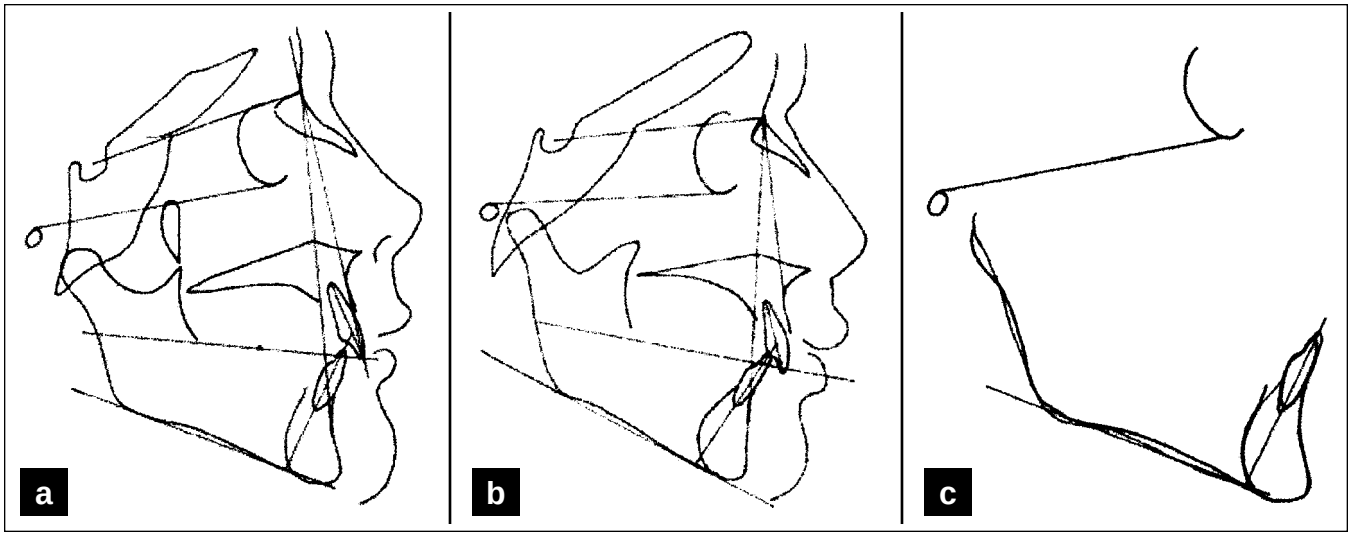

Figure 7a-c. Pre-Post cephalometric tracing and superimposition.

DISCUSSION

The Mandibular Pendex Spring is an effective and rapid system to recover space in the mandibular arch: it allows an efficient control of the molar movement and does not required compliance by the patient.

Patient tolerance is good since the appliance has a little encumbrance only on the lingual side and uses a light, graduated, continuous force ((80g), produced by the TMA springs.

In the presented case, superimposition of the initial and post-treatment cephalometric tracings did not show a mesial movement of the lower incisor and IMPA angle have changed from 97° to 95° (Figure 7).

Since the Pendex Spring drives lower molars distally quite rapidly, there is a tendency for the anterior bite to open. The open bite generally corrects itself in brachyfacial types, but in dolycofaccial patients it can make the vertical discrepancy worse. For this reason diagnostic criteria should include the valuation of vertical cephalometric values of the patient.

CONCLUSION

In this case-report, the Mandibular Pendex Spring was effective in producing distalization of the lower first molar.

This is a particularly suitable appliance in mixed dentition that allows the correct eruption of blocked out teeth due to loss of space in the posterior sectors.

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