

## Nickel Titanium Double-Loop System for Simultaneous Distalization of First and Second Molars

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Superelastic nickel titanium wires have been found as effective as other means in producing distal movement of the maxillary first molars. When the distalization is carried out before the second molars have erupted, it can reliably produce 1-2mm of space. Once the second molars have erupted, however, the distal movement can be more difficult and time-consuming, and loss of anchorage is likely.<sup>1-4</sup>

This article shows how a Class II relationship can be corrected by simultaneous distal movement of the maxillary first and second molars, using a superelastic nickel titanium wire with shape memory<sup>5</sup> (NeoSentalloy).

### Appliance Design

1. The mandibular first and second molars and second bicuspid are banded, and the remaining mandibular teeth are bonded. A lip bumper is placed to prevent any extrusion from the use of Class II elastics.
2. The maxillary molars and bicuspid are banded, and the anterior teeth are bonded. The arch is aligned as usual.
3. An 80g NeoSentalloy archwire (regular *mandibular* archform recommended) is placed on the maxillary arch and marked distal to the first bicuspid bracket and about 5mm distal to the first molar tube (the distobuccal cusp can be used as a landmark). Stops are then crimped in the archwire at each mark.
4. Two sectional nickel titanium archwires (one for each side) are prepared by crimping stops distal and mesial to the second bicuspid and about 5mm distal to each second molar tube (Fig. 1A).
5. Uprighting springs are inserted into the vertical slots of the first bicuspid bands, and Class II elastics (6oz, 5/16") are placed between the mandibular first molars and the maxillary canine bracket hooks. This system produces simultaneous and bodily distal movement of the first and second molars (Fig. 1B).

### Case Report

A 24-year-old female presented with a Class II, division 1 malocclusion without crowding (Figs. 2A, 2B). She had never undergone orthodontic treatment. Cephalometric analysis showed a Class II skeletal discrepancy (ANB 5°) and normal vertical position (FMA 24°).

Treatment objectives were to:

- Correct the Class II dental relationship by molar distalization.
- Achieve proper placement of the maxillary and mandibular incisors.
- Preserve the mandibular archform.

In the first stage of treatment, we corrected the Class II molar relationship by moving the maxillary first and second molars distally. The nickel titanium double loop was placed in the maxillary arch as

described above (Fig. 3), and the patient was seen every three weeks to check molar movement, mandibular anchorage, and activation of the uprighting springs. The molars were moved into an overcorrected Class I relationship within five months (Fig. 4).

Once the molars have been moved distally, they must be stabilized in their new positions. Class I forces should not be applied until three months after a super-Class I relationship has been achieved. During this second stage, the second bicuspid can drift distally into a Class I relationship, due to spontaneous reorganization of the transeptal fibers (Fig. 5).

The third stage consisted of anterior space closure with Class I forces and Class II elastics to the cuspids. Correct incisor positions were achieved using a preadjusted appliance and rectangular archwire for three-dimensional control. Total treatment time was 24 months (Figs. 6A, 6B).

## **Discussion**

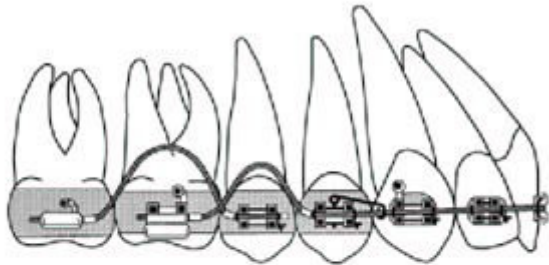
The nickel titanium double-loop system is a useful technique for Class II treatment with minimal patient cooperation. It is ideal for simultaneous first and second molar distalization in the permanent dentition, when traditional intraoral forces may be ineffective in moving the first molars. Second molars seem to be easier to move distally than first molars because of the different anatomical shape of their roots and the lack of posterior obstacles.

Because of the stretching of transeptal fibers, the first molars can be distalized in this system using lighter 80g nickel titanium wires, instead of the 100g or 200g wires normally used for molar distalization. Anchorage can be controlled more easily with light forces, eliminating the need for a transpalatal bar or Nance appliance cemented to the first premolars.

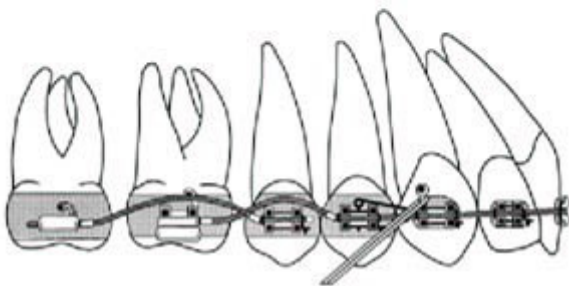
Although the force of the nickel titanium double-loop system is applied in a Class I direction, care must be taken in a dolichofacial patient with open-bite tendency, because the intrusive force produced by the uprighting springs might cause an anterior open bite to develop. □

## **FIGURES**

**A**



**B**

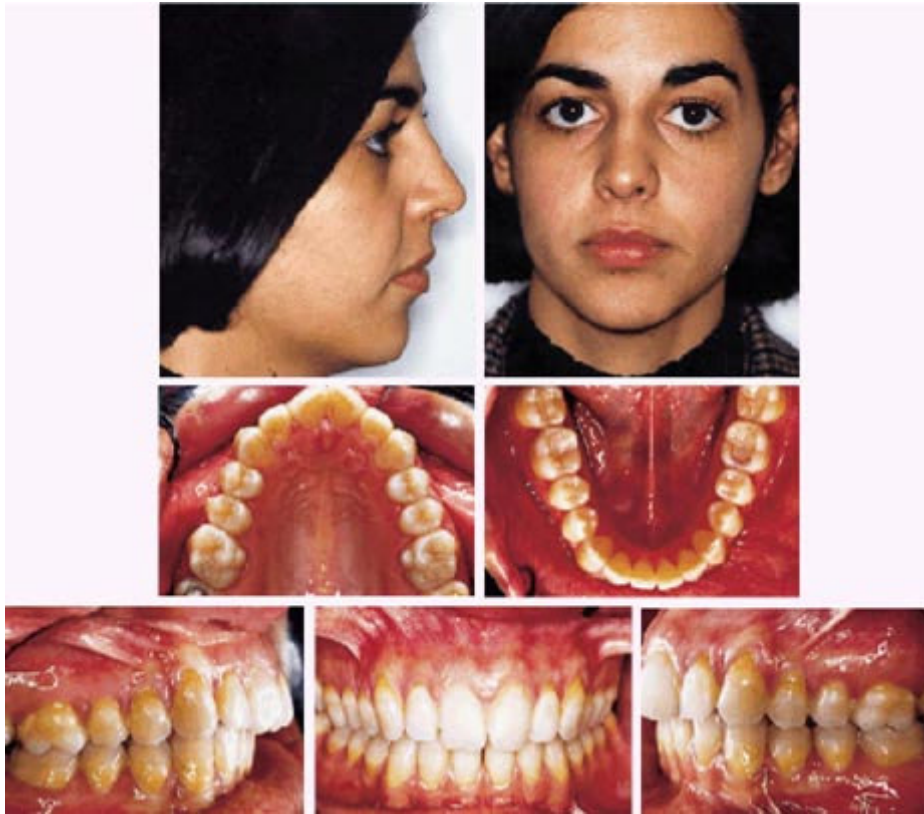


**Fig. 1** A. Nickel titanium double-loop system. B. Simultaneous distalization of first and second molars.

SNA	82°
SNB	77°
ANB	5°
FMA	24°
SNA-ANB <sup>+</sup> PF	26°
P.occl <sup>+</sup> PF	11°
NSB <sub>u</sub>	144°
Ar-Go	60 mm
SNA-ANB/Me	72 mm
IMPA	97°
Inc sup <sup>+</sup> PF	112°
NasoLab <sup>+</sup>	110°
Le-Ls	-2 mm
Le-Li	0 mm



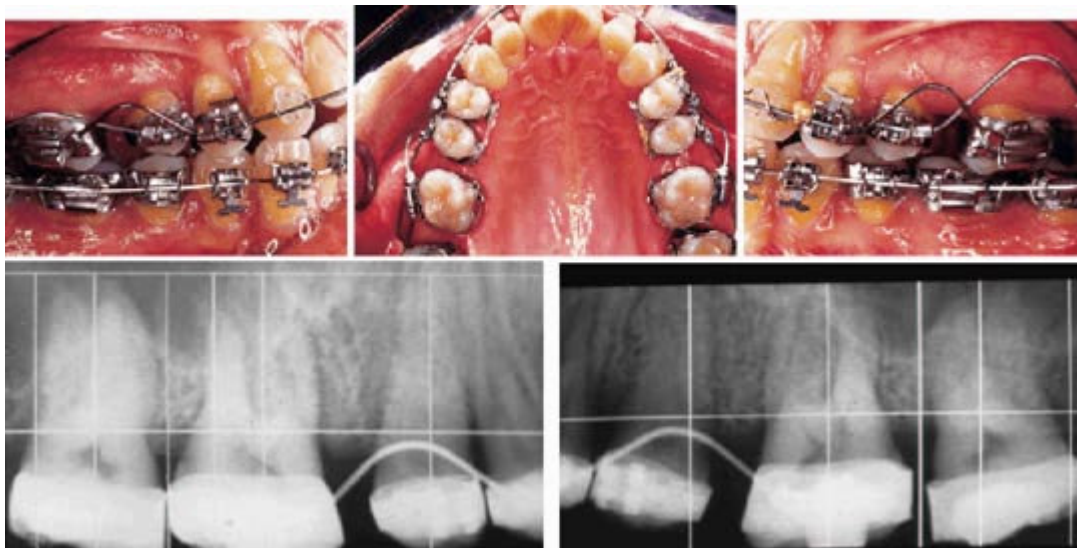
**Fig. 2A** 24-year old female with Class II, division 1 malocclusion.



**Fig. 2B** 24-year old female with Class II, division 1 malocclusion.



**Fig. 3** Nickel titanium double loops in maxillary arch.



**Fig. 4** Overcorrected Class I relationship after five months of treatment. Radiographs taken after removal of posterior nickel titanium loops show bodily distal movement.

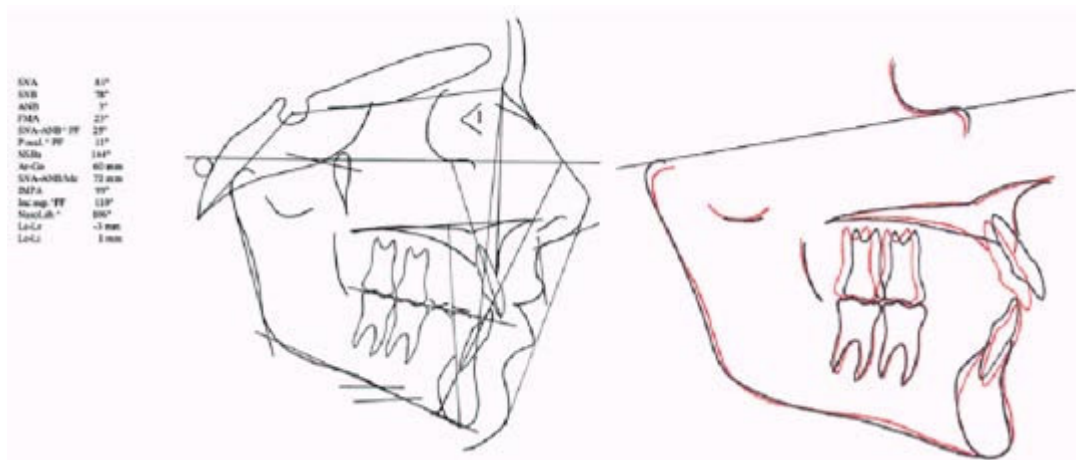




**Fig. 5** Distal drift of bicuspids and cuspids during second stage of treatment.



**Fig. 6A** After 24 months of treatment.



**Fig. 6B** After 24 months of treatment; superimposition of cephalometric tracings.

## REFERENCES

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## FOOTNOTES

- 1 Trademark of GAC International, Inc., 185 Oval Drive, Central Islip, NY 11722.