

Cantilevers — a simple method for Class II corrections

Dr. Larry White discusses a simple and easily managed apparatus

Introduction

Cantilevers offer orthodontists perhaps the most simple and easily managed apparatus for solving Class II malocclusions because they give clinicians statically determinate and efficient mechanisms that they can employ without fears of uncontrollable and unneeded side effects.

Cantilevers are simple beams secured at one end and free on the other. The secured end will carry a load and produce a force and a moment, whereas the free end will attach with a one-point contact and produce only a force with no accompanying moment.

Orthodontists will use cantilevers as Class I levers where the effort is usually applied via a single point of contact with a tooth or wire and where the resistance will be within a tube or bracket. Orthodontic cantilevers can also have a reactive anchor within the acrylic of a removable or fixed appliance and the free end touching a tooth or wire at only one point.¹

Cantilever corrector designs

Nanda² fabricated a cantilever for correcting Class II malocclusions (Figure 1) using a design by Burstone.^{3,4} The elastic activates the cantilever by providing a distal force to the molar, which creates a strong moment that tips the molar distally. The resultant force from the cantilever and the elastic is downward and backward (Figure 2).

An alternate strategy for producing similar movements on the molar is with a two-piece cantilever that uses an anterior sectional arch in the incisor brackets. This cantilever design has the disadvantage of intruding the maxillary incisors, which is seldom indicated. Clinicians can offset this intrusion by applying Class II elastics to the anterior sectional wire.

The Pendulum Appliance⁵ (Figure 4) offers another illustration of a cantilever that fixes the wire within the acrylic of the

Educational aims and objectives

This article aims to discuss a solution to the most difficult feature of Class II malocclusions at the initiation of treatment when patients are likely to display more enthusiasm and compliance.

Expected outcomes

Orthodontic Practice US subscribers can answer the CE questions on page XX to earn 2 hours of CE from reading this article. Correctly answering the questions will demonstrate the reader can:

- Identify some cantilever corrector designs.
- Identify an alternate strategy for producing similar movements on the molar.
- Recognize a simplified Class II cantilever that requires minimal instrumentation.



mechanism, while the free end of the wire makes a one point contact within the lingual sheath of the molar.

The Carrière® Motion™ Appliance (Figure 5), on the other hand, has the fixed, reactive part of the cantilever beam attached to the canine or premolar, while the active part has a one point contact via the rotational ball-and-socket that works against the molar. This mechanism is totally dependent upon

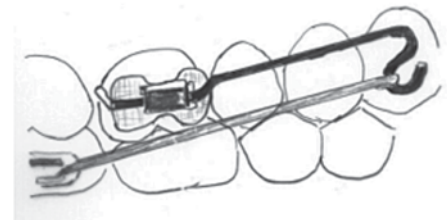


Figure 1: A schematic of a .032 x .032 TMA attached to the molar through a bonded hinge-cap lingual tube with the free end of the cantilever touching the Class II elastic

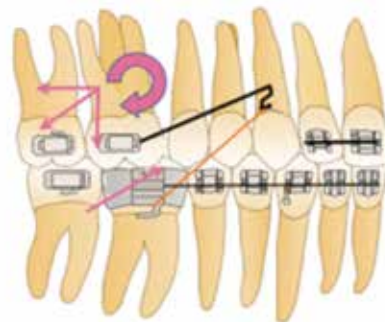


Figure 2: The force system from the appliance shown in Figure 3

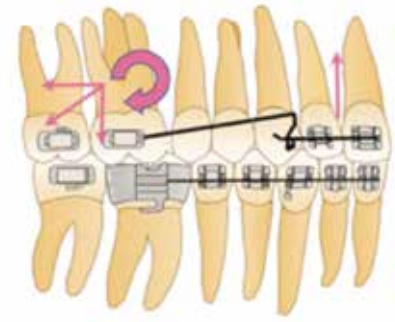


Figure 3: A schematic for a cantilever from the molar attached to an anterior sectional wire. Note the intrusion of the maxillary incisors



Figure 4: Pendulum Appliance pre-activated before the .036 TMA cantilever wire is inserted into the .036 doubled lingual sheath



Figure 5: Carrière® Motion™ Appliance illustrates the fixed-anchored part of the appliance bonded to the canine and the one-point contact via the ball-and-socket arrangement against the molar

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Figures 6A-6B: Unbent 8mm crimpable tube and bent tube from two views



Figure 7: Bent crimpable tube bonded to the maxillary canine

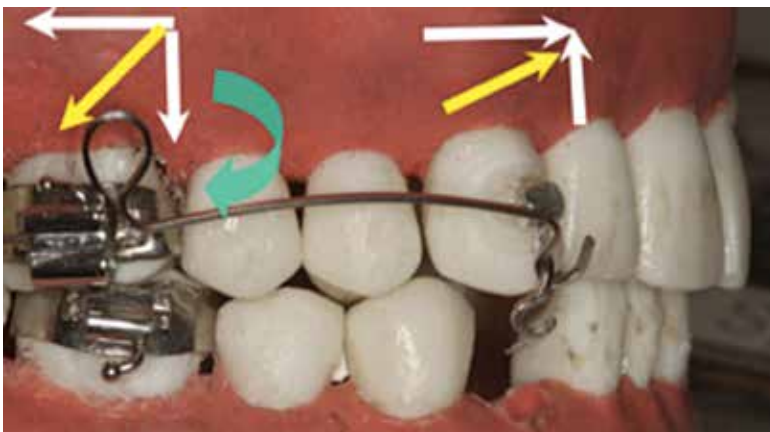


Figure 8: Note the compression of the omega loop and the slight bowing of the cantilever as it responds to the length of the wire

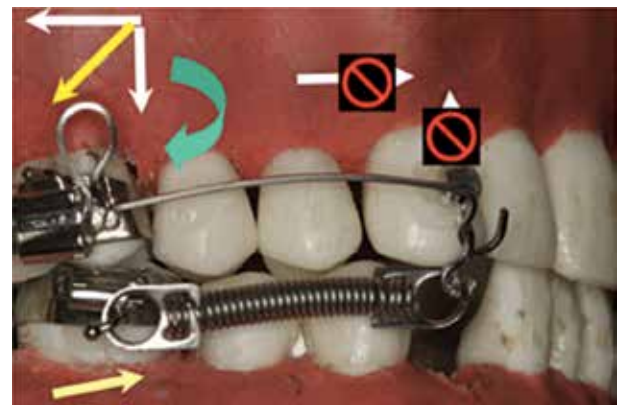


Figure 9: Adding a Class II force with elastics or springs can negate the anterior and intrusive forces on the canine. The hooks on the mandibular molar tube and canine need closure to maintain the spring in place

the patient wearing Class II elastics to the anterior part of the cantilever to effect movement of the teeth.

A new and different Class II cantilever

This article displays a simplified Class II cantilever that requires minimal instrumentation, which orthodontists typically have in their armamentarium.

An 8 mm crimpable hook is bent 90° twice to give a horizontal span to which a sectional archwire hook can attach (Figures 6A and 6B). The bent tube is then bonded to the canine with a light-cured composite (Figure 7).

A slightly long .016 x .022 stainless steel sectional archwire is made with a large omega loop that abuts the molar tube on one end and a hook that will have a one-point contact against the bent crimpable hook bonded to the canine. The sectional archwire is tipped upward about 45°, and when the omega loop touches the molar tube, the anterior cantilever hook will lie forward of the bonded canine attachment by 1 mm-2 mm.



Figure 10: Initial Class II subdivision malocclusion



Figure 11: Cantilever and Class II elastics effect after a few weeks of application



Figure 12: Class II malocclusion resolved and complete appliances added to finish therapy

As the sectional archwire is brought occlusally and attached to the horizontal span of the crimpable hook, it will slightly compress the omega loop, which will create a distal force on the molar along with a strong clockwise moment and, simultaneously, will produce a forward and intrusive force on the canine but no momentum (Figure 8). Class II elastics or NiTi springs will cancel the intrusive and anterior forces on the canine (Figure 9).

Figures 10-13 illustrate an adolescent female patient treated with this Class II cantilever mechanism.

Conclusion

Class II malocclusions account for some of the most formidable challenges orthodontists encounter, which clinicians have sought to solve with complicated and expensive mechanisms — e.g., Herbst, Jasper Jumpers, Forsus, MARA, Distal Jet, Pendulum, Carrière® Motion™, etc.

The Class II cantilever corrector featured in this article offers the profession a simple, effective, efficient, and inexpensive technique of correcting Class II malocclusions with sound Newtonian principles without the harmful side effects of the aforementioned appliances. The Herbst, Jasper Jumper, MARA, and Carrière Distalizer and other fixed interarch functionals ordinarily displace the mandibular incisors excessively facially, while the Pendulum, Distal Jet, and other intra-arch appliances force the maxillary incisors facially.

This cantilever corrector requires a minimum of instrumentation, instruction, and skill to implement and permits clinicians to solve the most difficult feature of Class II malocclusions at the initiation of treatment when patients are likely to display more enthusiasm and compliance. Once the Class II malocclusion has changed into Class I, the malocclusion becomes much easier to complete. **OP**

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Figure 13: Class II malocclusion completed therapy

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