

A Simple Means of Ensuring Class II Elastic Wear

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Appliances such as the Eureka Spring,* Saif springs,** the Jasper Jumper,***¹ the Pendulum,^{†2} and the Herbst^{‡3,4} were developed to correct Class I and Class II malocclusions without relying on patient cooperation. Virtually all of these devices call on orthodontists to modify their treatment mechanics, however, and some require time-consuming impressions and laboratory fabrication.

Appliances designed to protract the mandible and/or the mandibular dentition, such as the Jasper Jumper, Eureka Spring, and Herbst appliance, deliver relatively heavy forces to the mandibular incisors that can rapidly produce proclination of the entire mandibular anterior segment. Many orthodontists have had to change the torque values of the mandibular incisor brackets to control this labial flaring tendency. Treatment mechanics must usually be modified to prevent intrusion and buccal rolling of the maxillary first

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‡Registered trademark of Dentaurum, Inc., 10 Pheasant Run, Newtown, PA 18940.

††Registered trademark of TP Orthodontics, 100 Center Plaza, La Porte, IN 46350. Patent No. 5,873,716.



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molars. In addition, special molar tubes and other auxiliaries are often required to properly engage these appliances.

The Outrigger Appliance

The Outrigger^{††} (Fig. 1) is a new maxillary auxiliary for Class I and II treatment that offers several significant advantages over other non-compliance appliances. Most important, it does not require the orthodontist to modify treatment mechanics. There are no lab fees, and placement is extremely easy.

Each end of the Outrigger has a hook for elastic engagement and a coiled eyelet through which the base archwire is threaded prior to its engagement in the mouth. Without elastics in place, the Outrigger hooks extend labially in an uncomfortable position (Figs. 2A,6B). When elastics are engaged on the Outrigger hooks, however, the hooks swing down incisally into an unobtrusive position that is much more comfortable for the patient (Fig. 2B). Thus, the patient is presented with an uncomfortable—but not painful—reminder whenever the elastics are not engaged.

Overjet and overbite correction can occur relatively quickly once the Outrigger is placed and the patient begins wearing the elastics (Fig.



Fig. 1 Outrigger has coiled ends with hooks for Class II elastic engagement.



Fig. 2 A. Outrigger in place around .020" main archwire. Intermaxillary hooks lie in uncomfortable horizontal positions. **B.** Class II intermaxillary elastics move hooks to comfortable vertical positions. Note increased horizontal component of force when elastics are engaged to Outrigger.

3). The response of the mandibular dentition to the forces delivered by the Outrigger is the same as seen with conventional Class II elastics, with little, if any, proclination of the mandibular anterior segment (Fig. 4).

Use of the Outrigger

To ensure successful clinical use of the Outrigger, the orthodontist must keep the following guidelines in mind:

- A patient who has previously experienced excessive appliance damage is not a good candidate for the Outrigger.
- The Outrigger should only be used when the patient is expected to wear the elastics 24 hours a day. There is little reason why elastics cannot be worn at all times, even during meals and

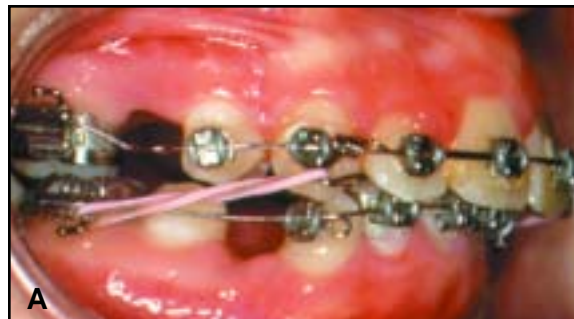


Fig. 3 A. Outrigger placed to encourage elastic wear for non-compliant patient. **B.** Just over three months later, note dramatic improvement in overbite and overjet.

sports, when an overjet and/or overbite is present. Patients should be advised to twist the elastics once or twice when placing them to prevent food from being caught between the strands.

- The Outrigger will not deepen an anterior overbite. The slight curvature of the Outrigger is easily overwhelmed by archwires of adequate diameter and stiffness. Therefore, it is recommended for use only with stiff archwires of .016" or greater diameter, and not with nickel titanium or other highly resilient archwires. With the proper archwires, the Outrigger actually facilitates bite opening as it reduces the vertical component of pull normally delivered by Class II elastics (Fig. 2B).
- Due to the repeated flexing of the appliance, the Outrigger cannot be expected to function indefinitely without breakage. On average, an appliance will last for three to five months, but durability varies from patient to patient. If the

Outrigger does break, elastic wear will still be encouraged, since one or both hooks will still extend labially when the elastics are not worn. If additional Class II correction is required, the Outrigger is easily replaced at the patient's next appointment. Breakage rarely necessitates an emergency appointment for repair.

- If the Outrigger is worn for prolonged periods of time (four or more months) with .016" base archwires, molar expansion can occur. This side effect is easily overcome either by constriction of the .016" base archwire or by use of a larger-diameter archwire.

Selection and Placement

To determine which of the seven available Outrigger sizes is to be used, the distance from the distal of the maxillary right lateral incisor bracket to the distal of the maxillary left lateral incisor bracket is measured. To minimize opening of anterior spaces, the shortest possible Outrigger should be selected. It is important, however, that the coiled ends do not contact the mesial or distal surfaces of adjacent brackets.

The force required to pull the Outrigger hooks into their incisal positions can be adjusted by adjusting the curvature of the appliance. If the curvature is reduced, the hooks will swing down more easily. If it is increased, more Class II elastic force will be required to move the hooks (Fig. 5).

For proper orientation and action, the end of the Outrigger marked with a colored identification tag should normally be placed on the patient's right side. With some appliance systems, the Outrigger may work better with the marked end on the patient's left; it can function in either configuration.

Any base archwire can be used, up to full-size rectangular wires, as long as it does not have circles or posts. The base archwire is threaded through each coiled end of the Outrigger prior to engagement (Fig. 6A). Both the auxiliary and the archwire are then ligated into the archwire slots of the central and lateral incisor brackets, with the archwire on top, using either elastomeric or stainless steel ligature ties (Fig. 6B,C). Some

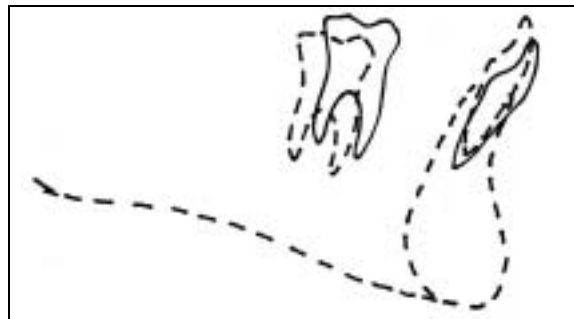


Fig. 4 Cephalometric tracings of patient in Figure 2 before and after overjet correction. Mandibular superimposition reveals similar tooth movements as with conventional Class II elastic wear, with no significant proclination of mandibular incisors. Mesial and vertical movement of mandibular molars was intentional for correction of Class II molar relationship and deep anterior overbite.

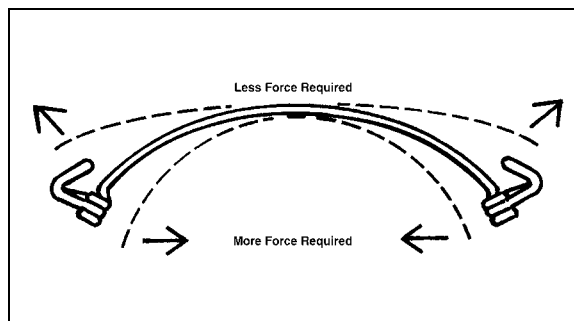


Fig. 5 Amount of force required to pull Outrigger hooks into incisal (vertical) positions is easily adjusted. Curvature of Outrigger is increased to increase force required to pull hooks; curvature is reduced to decrease force required.

means should be taken to ensure that the base archwire does not shift mesiodistally, such as bending down the ends of the archwire distal to the molar tubes or placing a small "V"-bend at the midline before sliding the Outrigger over the archwire.

Appliance Variations

If minor anterior spaces are present, the

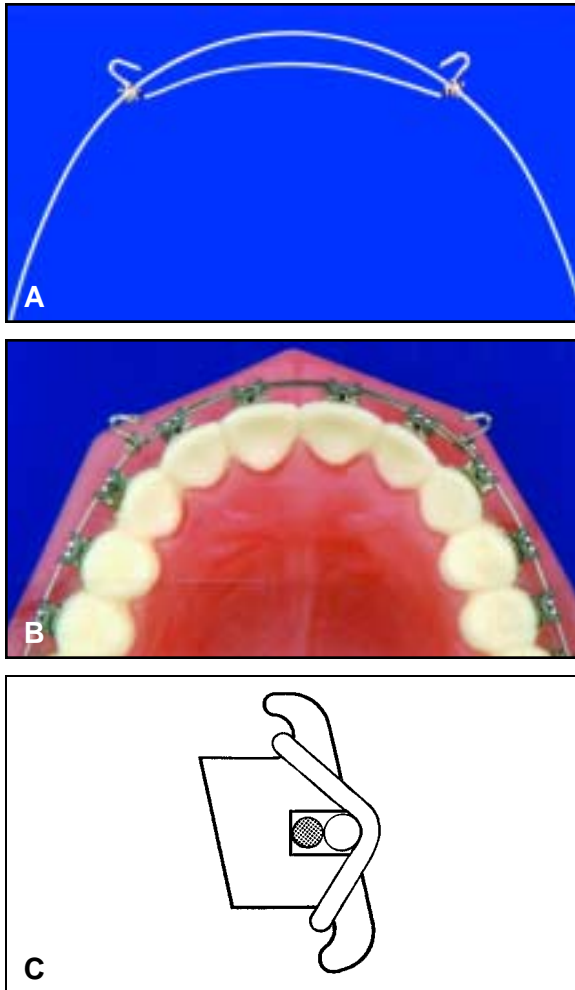


Fig. 6 A. Outrigger threaded over main archwire before placement, with colored ring on patient's right side (with some appliance systems, may function better on patient's left side). B. After archwire is ligated into bracket slots, Outrigger hooks extend labially until Class II elastics are engaged. C. When fully engaged, Outrigger lies directly under main archwire in bracket slot.

Outrigger can be used in conjunction with a power chain. In this situation, the elastomeric links of the chain are engaged around the bracket bases from canine to canine before the archwire is tied in (Fig. 7). The archwire with the attached Outrigger is then placed in the bracket slots over the elastomeric chain or module. This



Fig. 7 To close minor spaces or keep pre-existing spaces closed while Outrigger is in place, power chain is engaged prior to archwire. Each link is stretched around one bracket base, providing more space in slot for Outrigger and archwire.

arrangement can be left in place if anterior spaces tend to reopen during treatment.

To maximize incisor torque control with rectangular archwires, the straight section of the Outrigger can be left out of the bracket slots, so that it lies behind the gingival tie wings of the maxillary incisor brackets when the elastics are engaged (Fig. 8). When the elastics are removed for brushing, the section of wire behind the tie wings moves away from the tooth surfaces to allow good access.

Presenting the Appliance

The Outrigger should always be presented in a positive manner. If it is seen as a means of punishment, acceptance may be limited.

The parents should be told that in addition to making it easier to hook the elastics, the Outrigger serves as a reminder to encourage patient cooperation. Invariably, the parents are relieved that the Outrigger frees them from continuous monitoring of the child's elastic wear. If the parents are not on hand when the Outrigger is delivered, they should be contacted by phone to inform them of the reasons for placing the appliance and how it will expedite treatment.

The patient and parents should be advised to keep an extra supply of elastics in their locker or car in case one is broken or lost when the

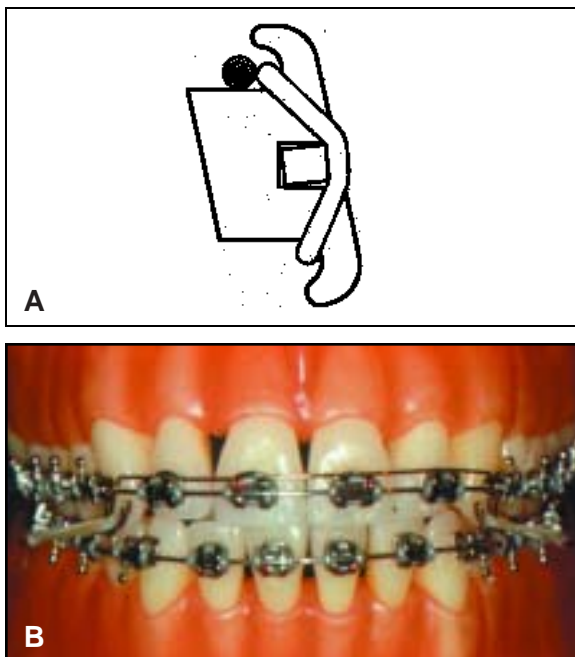


Fig. 8 A. To ensure maximum torque control when using rectangular archwires, portion of Outrigger running between coiled ends can be placed behind gingival tie wings of central and lateral incisor brackets. **B.** Outrigger engaged with rectangular archwire for maximum torque control.

patient is away from home. They should also be told to call the office if an edge-to-edge incisal relationship is reached, because the Outrigger must be removed at that point to prevent development of an anterior crossbite. The patient should be instructed to continue hooking elastics on the Outrigger if breakage occurs, and advised that an emergency visit is not required unless the end of a wire is causing irritation.

Conclusion

In extensive clinical testing, the Outrigger has proven successful in enhancing patient cooperation with Class II elastics. Since the placement and removal of the Outrigger can easily be delegated to office staff, it can save significant chairtime for the orthodontist. The lack of outside laboratory work, impressions, and special placement appointments provides additional savings in time and expense. For all these reasons, the Outrigger may be the most cost-effective means of ensuring the successful correction of overbite and overjet in non-compliant or forgetful patients with Class I or Class II malocclusions.

REFERENCES

1. Jasper, J.J. and McNamara, J.A. Jr.: The correction of interarch malocclusions using a fixed force module, *Am. J. Orthod.* 108:641-650, 1995.
2. Hilgers, J.J.: The Pendulum Appliance for Class II non-compliance therapy, *J. Clin. Orthod.* 26:706-714, 1992.
3. Pancherz, H.: The Herbst appliance—Its biologic effects and clinical use, *Am. J. Orthod.* 87:1-20, 1985.
4. Dischinger, T.: Edgewise Herbst appliance, *J. Clin. Orthod.* 29:738-742, 1995.