The Monkey Hook: An Auxiliary for Impacted, Rotated, and Displaced Teeth

S. JAY BOWMAN, DMD, MSD
ALDO CARANO, DO, MS

Many kinds of treatment mechanics have been used to direct the eruption of an impacted tooth by applying force to an attachment on the tooth. One such attachment is the versatile "loop-button" or bondable eyelet, a 1mm helix of round wire welded or brazed to a small bondable base.

The Monkey Hook* is a simple auxiliary with an open loop on each end for the attachment of intraoral elastics or elastomeric chain, or for connecting to a bondable loop-button (Fig. 1). Its S-shaped design was inspired by the children's game, "Barrel of Monkeys",** since more than one Monkey Hook can be linked together to form a chain (Fig. 2). The hook can be closed with a plier to prevent disengagement.

A combination of Monkey Hooks and bondable loop-buttons allows the production of a variety of different directional forces to assist in the correction of impacted, rotated, or displaced teeth.

*American Orthodontics, 1714 Cambridge Ave., Sheboygan, WI 53082.
**Hasbro, Inc., 1027 Newport Ave., Pawtucket, RI 02862.

Dr. Bowman

Dr. Carano

Dr. Bowman is an Adjunct Associate Professor at St. Louis University and the straightwire instructor at the University of Michigan. He is in the private practice of orthodontics at 1314 W. Milham Ave., Portage, MI 49024; e-mail: drjwyred@aol.com. Dr. Carano is an Adjunct Professor at St. Louis University, a Visiting Professor at the University of Ferrara, and in the private practice of orthodontics in Taranto, Italy.

Vertical Intermaxillary Eruptive Forces

Because of today's improved bonding procedures, only a small area of the crown needs to be surgically exposed for direct bonding of a loop-button with attached Monkey Hook. The loop should be positioned parallel to the roots of the adjacent teeth to allow subsequent attachment of more hooks for production of a variety of forces (Fig. 3). The Monkey Hook can extend through the gingival tissue after surgical exposure. If the tooth is deeply impacted, a second Monkey Hook can be linked to the first.

Conventional intra-arch mechanics used to direct the eruption of impacted teeth, such as elastic thread applied to a gold chain, use reciprocal forces that tend to tip or intrude the teeth adjacent to the impacted tooth, thereby altering

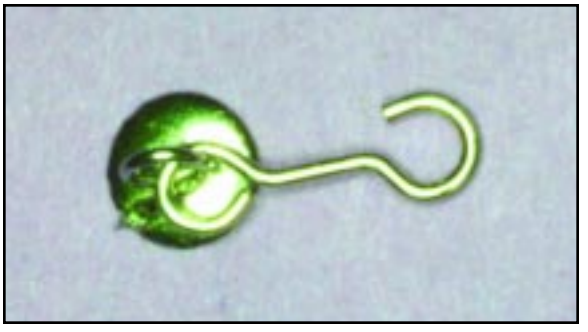

Fig. 1 Monkey Hook is S-shaped wire linked to bondable "loop-button".

Fig. 2 Monkey Hooks linked together into chain.

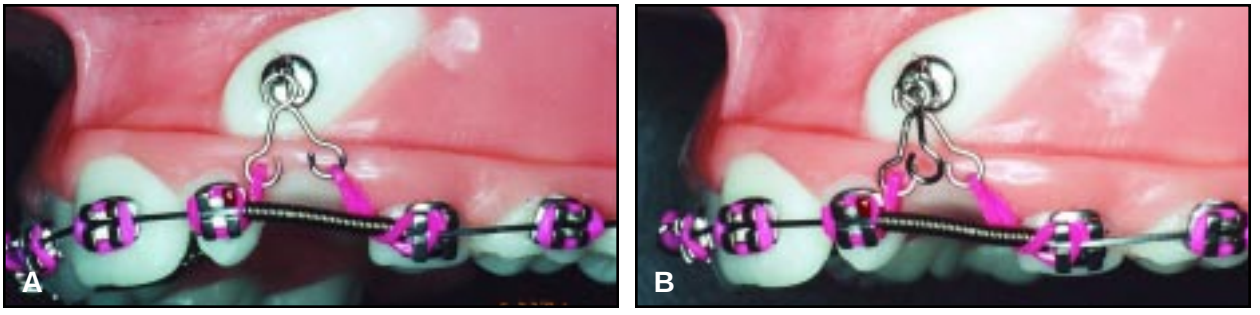

Fig. 3 A. Monkey Hooks attached to bonded loop-button on buccally impacted tooth. Elastomeric chains stretched from Monkey Hooks to adjacent brackets produce vertical and/or lateral directional forces. B. Intermaxillary elastics, supported by opposite dental arch, can be attached to third Monkey Hook to produce vertical eruptive forces.

Fig. 4 A. 15-year-old male patient with palatally impacted maxillary canines. B. After surgical exposure of canines and direct bonding of loop buttons, Monkey Hooks and elastomeric chains were attached to produce lateral "slingshot" forces supported by continuous stainless steel archwire. Coil springs were used to create and maintain space for canines. Third Monkey Hook on each side was used for attachment of intermaxillary elastics to produce vertical eruptive forces, with anchorage from mandibular arch. C. After five months of eruption, second loop-button was bonded to lingual side of each canine. Rotational couple was produced using elastic thread to lingual cleat on first molar and thermal superelastic archwire threaded through buccal loop-button. D. Progress after 18 months. E. Bracket bonded to right canine. F. Progress after 23 months.

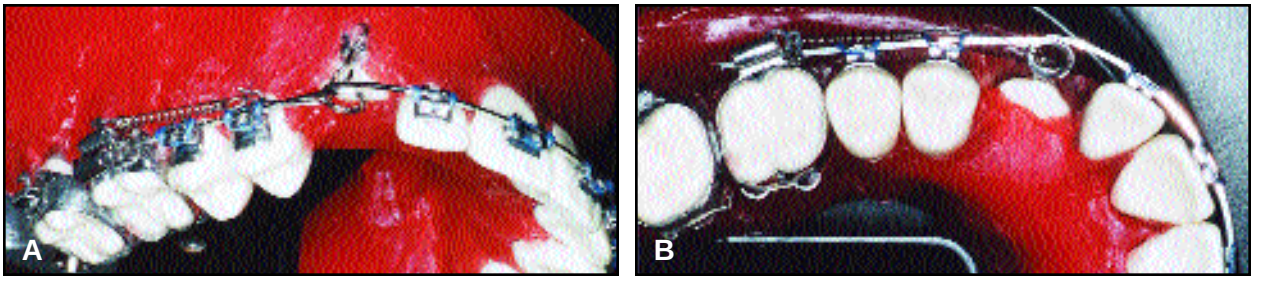

Fig. 5 Alternative method for producing intra-arch vertical eruptive forces. Helix is bent into continuous rectangular archwire, parallel to occlusal plane, and positioned over final destination for impacted tooth. Eyelet on superelastic closed-coil spring is hooked to buccal attachment on first molar. Spring is activated by tying stainless steel ligature from eyelet over and through helix in archwire to Monkey Hook on impacted tooth.

the occlusal plane. In contrast, Monkey Hooks can be attached to intermaxillary elastics, with anchorage derived from the opposing dental arch (Figs. 3,4B). The hooks provide more rigid support for intermaxillary elastics than is produced by twisting a steel ligature into a hook. Although elastic thread or chain can be tied from a ligature hook to a base archwire, the forces produced by these materials will decay dramatically over time. If patients are asked to change the intermaxillary elastics daily, thus avoiding the diminution of forces to the impacted tooth, the variable of patient compliance is introduced.

An alternative is to place a continuous superelastic archwire through the Monkey Hook to direct tooth eruption. Later this archwire can be passed directly through the lumen of the loop-button to continue the process (Fig. 4C).

Vertical Intra-Arch Eruptive Forces

If anchorage is unavailable from the opposing arch, vertical intra-arch eruptive forces can be produced using superelastic coil springs. A horizontal helix is bent in a continuous rectangular archwire at the position of the impacted tooth (Fig. 5). A stainless steel ligature tied to a Monkey Hook is directed vertically through this helix. The ligature is then tied to the eyelet of a superelastic closed-coil spring attached to the first molar.

In this arrangement, a continuous and more predictable force is applied to the impacted tooth, directing eruption toward the middle of the alveolus. The disadvantage of this system is the stress on posterior anchorage and the potential alteration of the occlusal plane from intrusion of adjacent teeth.

Lateral Directional Forces

More than one Monkey Hook can be added to a loop-button attachment, much like keys on a key ring (Fig. 3). Elastomeric chain or superelastic coil springs can be attached to these hooks to direct forces laterally, creating a slingshot effect. To prevent the teeth adjacent to the impacted tooth from being tipped together, soldered stops, crimpable stops, or closed-coil springs can be placed on the base archwire (Fig. 4B).

The lateral forces can also be combined with the vertical eruptive force of intermaxillary elastics from a third hook (Fig. 4B). This combination of intra-arch and intermaxillary forces is a significant advantage compared to the conventional method of simply tying elastic thread from an impacted tooth to a continuous archwire.

Rotational Couples

More than one Monkey Hook and loop-button may be attached to a single tooth to correct a severe rotation. If a loop-button is bonded on each side of the tooth, forces can be applied in opposite directions—for example, to the lingual cleat of a molar and mesially to the anterior

Fig. 6 A. Loop-buttons bonded on opposite sides of severely rotated second premolar. Monkey Hooks and elastomeric chains added to create rotational couple from forces applied in opposite directions. B. Second premolar tied into main archwire after derotation.

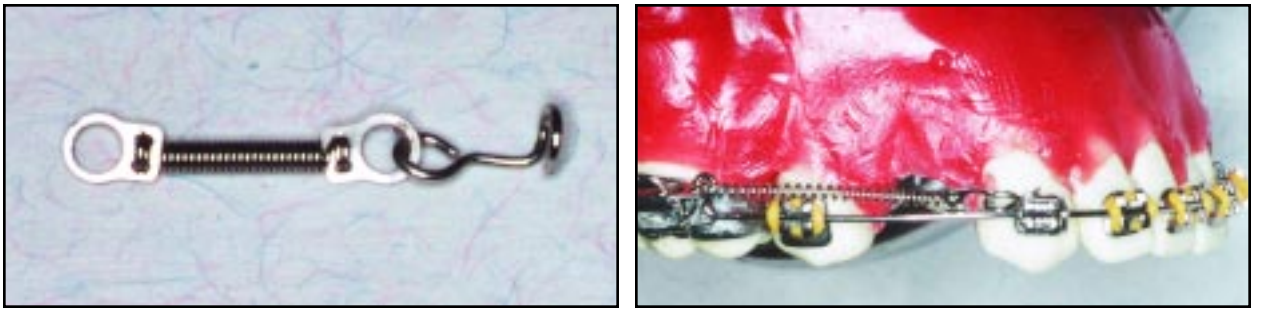

Fig. 7 Combination of Monkey Hook and superelastic coil spring used to retract individual teeth or dental segments. One end of Monkey Hook is bent 90° and hooked over archwire.

teeth—thus creating a rotational couple (Figs. 4C,6).

Retraction Hook

The Monkey Hook can be attached to elastic thread or a superelastic closed-coil spring and used as a retraction module in sliding space closure of dental segments or individual teeth. A right-angle bend is made in one end of the Monkey Hook to form a helix. After stretching the elastic thread or spring to the teeth that are to be moved, the helix is hooked over the archwire or a soldered or crimpable hook (Fig. 7).