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Herbst Appliance Variations

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It is well established that the Herbst appliance corrects Class II molar relationships through a combination of skeletal and dental changes brought about by a forward positioning of the mandible.1-7 The design of the Herbst appliance, whether crown8,9 or banded10 (Fig. 1), can be modified to achieve other tooth movements, such as closing molar and bicuspid spaces; advancing, intruding, or aligning the lower incisors; or expanding the arches.

This article will explore these design variations. Note that the maxillary part of the Herbst appliance is never modified, except for adding an upper expander when indicated.

Space-Closing Herbst Designs

To retract the lower cuspids for closure of extraction spaces, the crossover wire is moved distally to the area of the second bicuspids (Fig. 2). Elastic chain is attached between hooks on the first molar bands and cleats bonded to the lower cuspids. Cleats are used instead of brackets to clear the lingual of the lower pivots.

Another Herbst, designed by Dr. Terry Dischinger, closes spaces of missing lower second bicuspids or where teeth have been extracted for non-orthodontic purposes such as caries. The mesial driving force of the appliance allows the lower first molars to be moved forward without retracting the incisors or adversely affecting the profile (Fig. 3). A turned-out 9mm expansion screw is soldered from below the pivot area to the distal of the first molars. This screw is turned once every other day until the space has been closed. If more than 9mm of space closure is needed, a second Herbst appliance, coil springs, or nickel titanium closing loops can be added.

The expansion screw is removed with a No. 557 crosscut fissure bur. Archwires can then be placed from the molar tubes to the archwire slots on the pivots to rotate and upright the second molars. Wire ligatures are added from hooks on the molars to hooks on the Herbst to keep the spaces closed and prevent the first molars from rotating.

Cantilevered Herbst Design

The Herbst is cantilevered in a traditional Dischinger design to intrude or advance the incisors (Fig. 4), or to allow an overexpanded lower arch to settle in (Fig. 5). Since a lingual arch is not used with the cantilever design, it is crucial to bond lower incisor brackets to counteract the force of the Herbst.

Expansion Herbst Designs

The Herbst can be used with both upper and lower expansion screws. In many cases, only the maxillary arch is expanded, since it must be 1- 2mm wider than the mandibular arch for the Herbst rods and tubes to function properly.

The upper expander is attached to the Herbst crowns or bands (Fig. 6). The expansion screw is turned once a day, and cut away two months after the desired amount of expansion has been

achieved. Generally, the expansion is completed before the Herbst rods and tubes are attached. A tongue or thumb crib can be incorporated for patients with sucking habits.

Rather than using a separate appliance, an expander can be incorporated into the lower Herbst design (Fig. 7). The expansion screw is turned once every three days.

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FIGURES

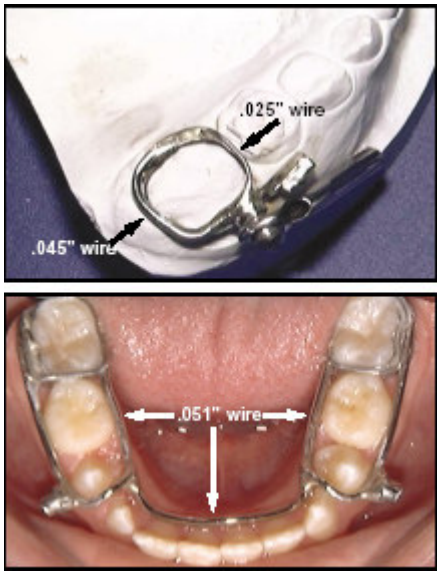
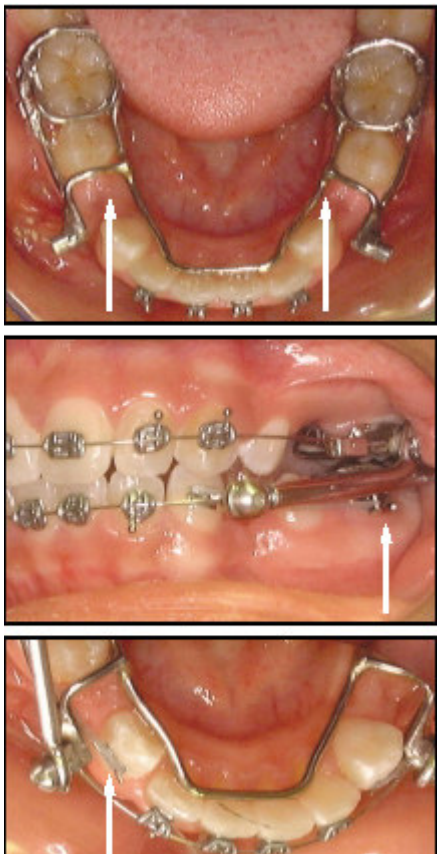


Fig. 1 Standard lower Herbst design.



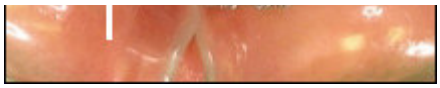


Fig. 2 Extraction-space-closing Herbst. Cleats are bonded to lower cuspids to facilitate retraction with elastic chain attached to molar hooks (arrows).

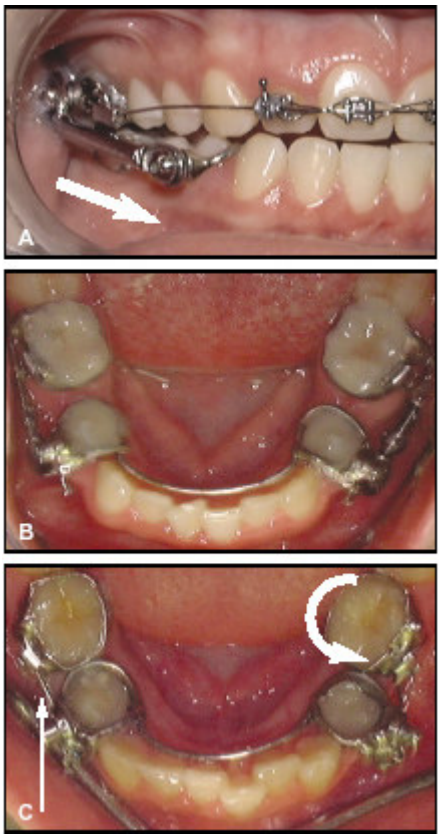


Fig. 3 A. Herbst's mesial driving force (arrow) is used to close spaces while maintaining lower incisor positions. B. Turned-out expansion screw is soldered from below pivot area to distal of first molar. C. After screw removal, archwires are used to rotate and upright second molars (large arrow). Wire ligatures are added from molar hooks to Herbst hooks to keep spaces closed and prevent first molars from rotating (small arrow).

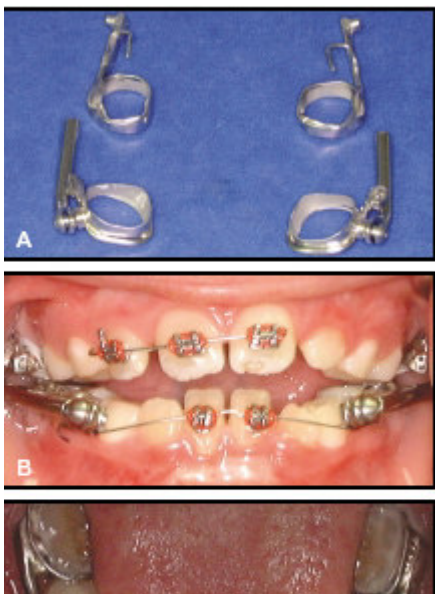


Fig. 4 A. Herbst can be cantilevered with bands or crowns. B. Cantilevered Herbst used to advance lower incisors in thumbsucking patient.

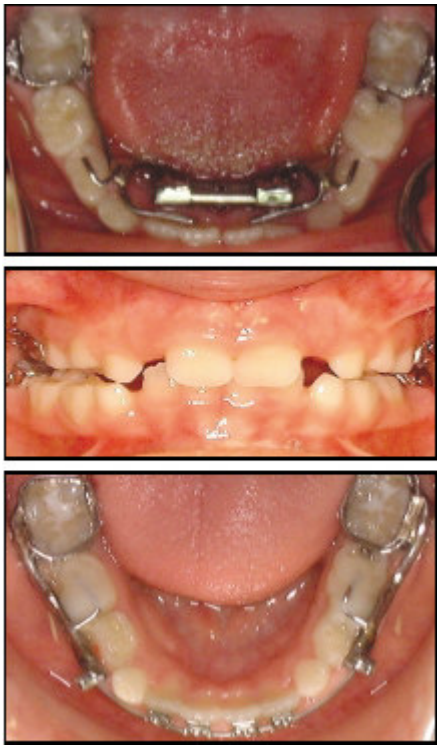


Fig. 5 After removal of fixed lower expander, cantilevered Herbst is cemented in place to allow settling. Lower incisors must be bonded because lingual arch is not used.

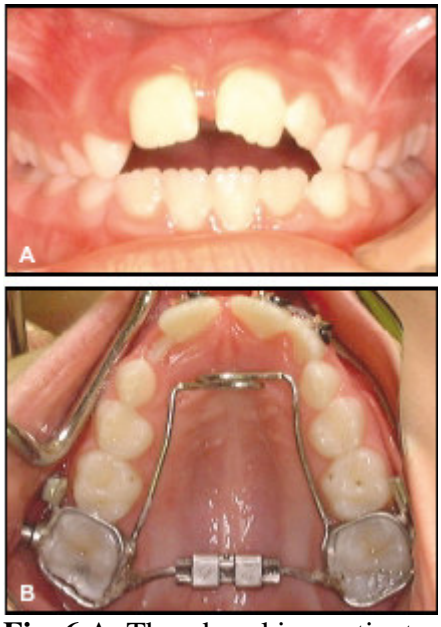


Fig. 6 A. Thumbsucking patient requiring upper arch expansion before Herbst rods and tubes

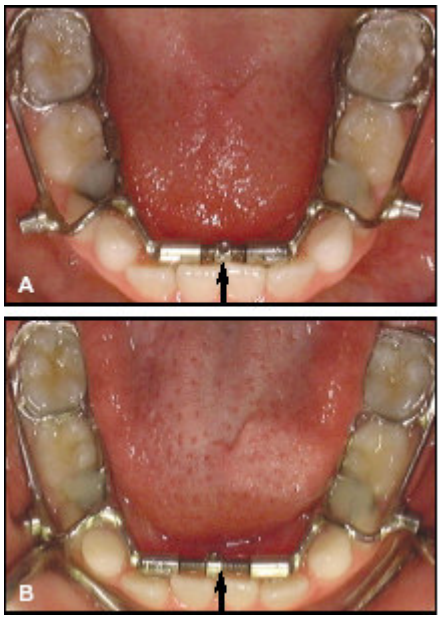


Fig. 7 A. Expansion screw incorporated into lower Herbst appliance. B. After expansion, composite can be added (arrow) to stabilize screw and prevent it from back-turning.

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FOOTNOTES

1 Herbst: Registered trademark of Dentaurum, Inc., 10 Pheasant Run, Newtown, PA 18940.