About Specialty Appliances
Specialty Appliances is a full service orthodontic laboratory located in Atlanta, Georgia. Founded in 1981 as a functional appliance laboratory, Specialty has developed a complete product line that includes retainers and spring retainers, metal appliances, functional appliances, splints, and labial and lingual indirect bonding services. We pride ourselves on the quality of our laboratory work, which is complemented by outstanding customer service. We invite your practice to try Specialty Appliances for your laboratory requirements.

Specialty Appliances and the Herbst Appliance
Specialty Appliances has fabricated the Herbst since 1981. Over the years, we have worked with numerous leading clinicians in Herbst designs and improvements. In addition, our many Herbst customers are continually providing us with feedback and suggestions on design improvements. Our long-term experience and extensive clinical interaction have moved us to the forefront in Herbst technology and have enabled our laboratory personnel to become an extremely valuable resource for practices that are either using the Herbst or are considering this unique appliance.

Specialty’s Herbst Educational Material
In addition to providing laboratory services, Specialty has become an educational resource for the Herbst. We have been instrumental in sponsoring seminars on the Herbst, as well as producing a comprehensive educational videotape on the Herbst that features Dr. Terry Dischinger and his “team.” This manual is another of the outstanding educational pieces our customers have come to expect from Specialty. Our goal with this manual is to provide a reference source on the Herbst for the entire practice, including the clinician, clinical staff, and laboratory members. Our experience with the Herbst, as well as with other appliances, has shown that providing educational information to our clients helps improve the working relationship for all parties involved.
Introduction to this Manual
This manual is designed to guide the practice through the basic steps involved in successfully implementing the Herbst appliance into their practice. The material is presented in the order that a practice would generally follow in the overall treatment sequence. In addition to the clinical steps outlined in using the Herbst, supplemental sections provide valuable information on Herbst appliance design, and Herbst troubleshooting.

We suggest practices refer to the Specialty Appliances Internet site at www.specialtyappliances.com for additional information on the Herbst Appliance.
Overview and Benefits of the Herbst Appliance
The Herbst appliance is one of the most popular functional appliances used in the United States today. It is designed to correct a Class II malocclusion by advancing the lower jaw. Class II correction occurs via a combination of dental and skeletal changes, with the net result being a predictable Class I occlusion. Over the past few years, the Herbst has surpassed appliances such as the Bionator and Frankel in terms of overall use. This is due to the non-removable aspect of the appliance. Unlike removable appliances, the Herbst can be fixed to the teeth. This reduces the need for active patient cooperation. This is an advantage not only for the orthodontic practice, but also for the patient and parents. By eliminating the potential negative implications associated with lack of patient cooperation, the practice can concentrate on and reinforce the positive factors involved in the orthodontic care.

The Herbst Offers Predictable Treatment
The 24-hour wear of the fixed Herbst appliances generates predictable results. Without question, a predictable treatment outcome is linked to more profitable overall results. The Herbst appliance allows practices to estimate-with a high degree of accuracy-the length of time necessary for Class II correction, and therefore, the time required to treat the entire malocclusion. Reducing treatment overruns leads to enhanced productivity, which enables the orthodontist to be more competitive in today’s marketplace. This has been a major advantage for orthodontists using the Herbst, and another reason why the Herbst has seen a dramatic acceptance in new practices, as well as an increase in overall appliance application.

Multifaceted Treatment Effects with the Herbst
Many of the Herbst used today include accessories added to the basic design to increase the effectiveness of the appliance. Expansion screws to widen the arches, archwire tubes to combine fixed appliances and other modifications extend the treatment effects of the Herbst beyond Class II correction. The ability to simultaneously correct multiple factors contributing to the malocclusion has also increased the widespread use of the Herbst.
The Original Banded Herbst
The original banded Herbst was developed by Emil Herbst in the early 1900s. It was reintroduced by Dr. Hanz Pancherz in the late 1970s. Pancherz employed orthodontic bands on the lower first bicuspids and upper first molars. Due to the learning curve that was necessary to correctly fabricate this design, many of the early banded appliances made in the United States did not withstand the forces in the mouth. Even though those initial attempts met with limited success, the overall promise of using the Herbst kept several clinicians involved in developing alternative designs. The banded designs that are in use today are able to withstand the forces of the mouth. Specialty Appliances offers many designs that are widely used by clinicians today.

The Acrylic Splint Herbst
The Acrylic Splint Herbst was originally designed to be bonded to the teeth. However, a large percent of clinicians experienced problems with this appliance. First, there was a leakage problem in the bonding system that increased the potential for decalcification. Another major problem arose when it came time to remove the bonded splints. The procedure was time consuming and actually posed a risk to the teeth due to the forces required to remove the bonded appliances. Due to these problems, the acrylic Herbst did not achieve widespread acceptance in the market.

The Stainless Steel Crown Herbst
Clinicians using the Stainless Steel Crown Herbst have seen the most favorable results in terms of ease of clinical application, patient acceptance, and appliance removal. Many advocates of the crown Herbst have added accessories such as expansion screws and archwire tubes, and have established protocols to combine the Herbst with traditional fixed appliances. This has led to improvements in terms of the overall treatment sequencing, as well as a reduction in the overall length of treatment when the Herbst appliance is used.
The Herbst System
The Herbst system is composed of several components. The Herbst mechanism is made up of rods, tubes, screws, and pivots.

The Herbst Rods and Tubes
The terminal ends of the rods and tubes are fabricated with a hole that fits over each pivot. The rods slide freely inside the tubes (there are right and left side tubes) and the patient is free to open their mouth. The size of the hole on the rods and tubes is larger than the corresponding pivot, which allows lateral movement due to the “play” in the system.

The Herbst Screws and Pivots
The Herbst screws have a small hex head that assists in inserting them into the pivots. It takes three to four turns to fully engage and seat the screws. The suggested method to secure them into place in the pivots is to use a small drop of Ceka Bond on the ends of the screws. Ceka Bond is a material designed to hold dental implants.

Note: The hex screws are interchangable with the slot screws from Specialty.

The Herbst Anchorage Appliance
The Herbst anchorage system is the appliance-using bands, crowns, or splints-that attaches the mechanism to the teeth. This appliance is custom fabricated at Specialty Appliances for the individual patient. The screws fit over the rods and tubes and lock them in place on the pivots. The pivots in turn, are soldered to the anchorage units, such as crowns or bands, or are attached to a wire framework in the acrylic designs.
The Acrylic Splint Herbst Overview
The Acrylic Splint Herbst was originally introduced as a replacement for the banded Herbst. On the upper arch, the splint was routinely bonded. On the lower arch, however, bonding was optional since the patient, for the most part, had to wear the lower splint with the upper fixed in place. The bonded design is not as popular today due to problems with leakage and appliance removal.

TMD and Sleep Disorders Uses
The acrylic splint Herbst has proven useful in treating patients with TMD and sleep disorders. The acrylic incorporates the teeth on both arches, and the lower jaw is repositioned to the exact anteroposterior, vertical, and lateral positions required by the treatment plan. In addition, adjusting the occlusal surfaces of the acrylic and/or changing the length of the Herbst rods and tubes can alter the orientation of the lower jaw quickly and easily.

The Acrylic Splint Herbst Design
In fabricating the acrylic splint Herbst, a wire framework is used that includes the bicuspid and first molars. This framework crosses the occlusion and follows the arch contours of the bicuspid and molars at approximately the mid-point of the teeth. The Herbst pivots are soldered directly to this wire framework to ensure maximum strength. The framework is then incorporated into an acrylic splint on each arch. The occlusal surfaces of the splints are trimmed and balanced to the waxed construction bite provided by the clinician.
Original Banded Herbst Design
The Banded Herbst, as introduced by Pancherz, utilized bands on the lower first permanent bicuspid and upper first permanent molars. When orthodontists and laboratories in the United States originally attempted this technique, many cases failed due to the insufficient thickness of the bands and inadequate laboratory fabrication. Once a custom band material was adopted, greater success was achieved. However, this was a time consuming process that was not very “user friendly” to orthodontists and laboratories.

Current Banded Designs
There are several extremely durable and well-proven banded Herbst designs in use today. As in the original design, a band is still placed on the first permanent molars on the upper arch. A wire surrounds the occlusal portion of the band and is soldered in a continuous manner, which provides a dramatically stronger appliance. One of the keys to successful use of this design is an understanding of the laboratory process, a process that Specialty Appliances has been instrumental in developing.

Banded Herbst Design Options
Depending on the clinician’s preference, a band may also be included on the first permanent bicuspid. In this design, a continuous wire connects the bands on the first bicuspid and first molar on each side. In the lower arch, once the first permanent bicuspid are erupted, they may be banded and included with the lower first molars in the overall appliance. On younger patients whose permanent bicuspsids are not yet present, a wire is extended forward to the first bicuspid region. In the lower first bicuspid area, the Herbst pivot is soldered to the anchorage wire.
Stainless Steel Crown Herbst
The Stainless Steel Crown Herbst is the most popular Herbst appliance in use today. Crowns offer excellent anchorage for the appliance and provide a clean and hygienic design for the patient. The crowns also facilitate the addition of auxiliaries such as expansion screws, archwire tubes and other accessories. Much of the crown Herbst’s popularity can be attributed to its durability—it has proven to be the most durable of all of the Herbst anchoring systems.

Selecting and Fitting the Stainless Steel Crowns
Crowns are extremely durable and are strong enough be soldered to. Ideally, the crowns are cut and contoured to cover the complete tooth and will have a certain amount of “play” in the overall fit. At Specialty Appliances, clinicians elect to have our technicians fit crowns in more than 95 percent of the cases. Due to our experience and expertise in fitting crowns, orthodontic practices are able to save valuable clinical chair time, as well as reduce their necessary inventory of crowns. The saved chair time alone gives great value to the indirect technique of fitting the crowns.

Crown Herbst Appliance Design Options
When using crowns, it is easy to add a Rapid Palatal Expansion (RPE) screw to the upper arch, as well as an expansion screw to the lower arch. Archwire tubes are one of our more popular auxiliaries for either arch. They enable the clinician to utilize sectional wires to the anterior teeth during Herbst treatment. Depending on the clinician’s preference and the anchorage requirements of the case, a combination of stainless steel crowns and bands can be used.
The Cantilever Herbst Appliance Overview
The most popular of the crown Herbst Appliances is the cantilever design. This is a modification that was originally designed to better adapt the Herbst to younger patients. It accomplishes this by eliminating a crown or band on the deciduous first molars. The cantilever name describes the metal bar that is soldered to the buccal of the crowns on the lower first molars. This bar extends forward to the bicuspid area where the Herbst pivots are located. The cantilever can also be used on permanent dentition cases.

The Cantilever Herbst Appliance-Upper Arch
Stainless steel crowns are fit on the upper and lower first permanent molars. On the upper arch, the Herbst pivots and archwire tubes are soldered on the buccal of the crowns. A band may be added to the first bicuspid with a wire extension from the buccal and lingual of the crown on the molar. An option to increase anchorage is to bond a wire rest from the crowns to the occlusal of the deciduous molars. However, seating is much easier when the crowns are treated as individual units. This also allows the molars to rotate mesial-buccally, which helps in the Class II correction.

The Cantilever Herbst Appliance-Lower Arch
On the lower arch, a stainless steel bar extends forward from the buccal of the crown on the molars. This bar has the Herbst pivot located on the mesial, adjacent to the first bicuspid. In order to further stabilize the lower cantilever, a continuous lingual arch may be incorporated. Another design alternative is to place bonded occlusal rests on the deciduous molars. Note: when second molars are present, an occlusal rest must be incorporated in the design to control the eruption of these teeth and prevent any undesirable eruption.
Using Anterior Brackets with the Cantilever Herbst

The anterior teeth can be bracketed with the archwire engaging tubes built into the Herbst pivots. By bracketing the lower anteriors, anchorage is dramatically improved, and simultaneous alignment of the lower anteriors is also achieved. Generally, the lower brackets will have a negative torque to help level the arch. These brackets are also very important in controlling the forces of the cantilever Herbst. Depending on the age of the patient and the overall treatment timing and sequence, the transition from Herbst appliance therapy to full fixed appliances can be made with minimal, if any, “holding” phases.

Expanding the Upper Arch with the Cantilever Herbst

In addition to repositioning the lower jaw, arch development is often one of the treatment goals. With the stainless steel crown design, expansion can be built into the appliance for either the upper or lower arch. On the upper arch, a traditional rapid palatal expansion screw is added to the molar crowns on the Herbst. In this design, there is no need to include the first bicuspids in the appliance.

Lower Arch Expansion with the Cantilever Herbst

On the lower arch, an expansion screw can also be added to the Herbst. With crowns on the permanent molars, a continuous lingual wire is used with a modified expansion screw placed along the midline. Bonded rests are also incorporated into the expansion device to help prevent the expanders from rotating to the occlusal or gingival. These rests also help keep the teeth vertical while the expansion is taking place.
“How to Do” Sequence - Introduction
Subsequent sections of this manual present a “how to” sequence for clinical implementation of the crown Herbst appliance. Whenever possible, topics are presented as they would routinely occur while using the Herbst. The material is organized as follows:

In the Clinic Prior to Sending Your Case to Specialty Appliances
The first section discusses what a practice does initially to utilize the Herbst appliance. Included are steps discussing impressions, models, and the construction bite. Also presented are the key steps involved in completing the new Specialty Appliances Herbst Rx form.

In the Laboratory at Specialty Appliances
The next section provides an overview of what Specialty Appliances does in the laboratory to fabricate the Herbst. Over the years, we have found that practices that have an understanding of what goes on in the laboratory usually are much better off in terms of problem solving in the event that there are any difficulties in the clinic.

Clinical Delivery of the Herbst
The next section provides a comprehensive review of the clinical delivery and cementation of the Herbst. Following the comprehensive review is additional information on patient and parent instructions, Herbst troubleshooting, and other relevant clinical topics that will help the practice integrate the Herbst appliance.

Dr. Terry Dischinger Herbst Educational Videotape
We strongly encourage practices to obtain our videotape featuring Dr. Terry Dischinger and his “team”. It contains more than two hours of step-by-step instructions on the Herbst appliance, including many of the topics discussed in this section.
Steps in the Practice Prior to Sending a Herbst to Specialty

There are several key areas the practice should fully understand for optimal use of the Herbst appliance. In addition, there are important steps a clinic should take prior to sending a Herbst case to Specialty Appliances. The information below is an overview of those critical points. They are covered in further detail on the next several pages.

Consultation Appointment

The Herbst is presented to the patient and parent during the initial consultation. The benefits are explained and a decision is reached to use the Herbst.

Note: Specialty can provide your practice with a sample Herbst appliance on plastic models to use as a demonstration aid during consultations with patients and parents. Call Specialty at (800) 522-4636 to order a Herbst demonstration appliance.

Impressions and Crowns

When impressions are taken for the Herbst, there are two options depending on whether the practice or the laboratory is fitting the crowns. When requesting Specialty to fit crowns in the laboratory, it is not necessary to create space (with spacers) prior to taking the impressions. Simply provide a model and we will fit the crowns in anticipation of the appropriate space being created mesial and distal to the molars. This saves an appointment!

If crowns are fit in the office, spacers are necessary (usually worn for 1 week) to create adequate space to fit the crowns. Using this technique, the crowns are poured into the models using a traditional “pick-up” method, which should result in working models with the crowns seated in the ideal position. Some offices also elect to fit crowns directly in the mouth but send them loose to Specialty where we seat them on the models. This reduces the chance of the crowns “floating” during the model pour-up. These impressions should be taken with the crowns off the teeth.

With either technique, spacers should be utilized while the appliance is being fabricated so there are no clinical problems at the time of Herbst delivery.
Impressions and Models
As with any orthodontic appliance, accurate working models are critical for the laboratory to fabricate the appliance. In the case of the Herbst, an accurate set of working models poured in orthodontic stone is required from the practice. For patients where the Herbst starts the initial treatment, one set of impressions may be taken and poured twice—the first for laboratory use and the second for general records.

Fitting the Crowns
When using the crown Herbst with Specialty providing the crowns, there is no need to place spacers prior to taking the impression. At Specialty Appliances, we will calculate the appropriate space mesial and distal to the teeth receiving crowns. For offices that prefer to furnish and fit their own crowns, the crowns are fit on the patient’s teeth and removed before the impressions are taken. This technique works best because the crowns having little retention to hold them in place while the impression is being poured.

Construction Bite
Many functional appliances utilize a wax construction bite taken directly from the patient to show the desired mandibular repositioning to be built into the appliance. With the Herbst, a wax construction bite is not required. The clinician can simply indicate on the models (using pencil lines) where they want the mandible advanced in relationship to the maxilla.
Specialty Appliance Prescription Form

Specialty Appliances provides practices with a detailed prescription sheet for the Herbst appliance. The key areas for this prescription sheet are illustrated in the graphic below. Please note that each of the sections of the prescription sheet includes an important piece of information regarding the appliance design. Please fill out the prescription form completely. If you have any questions regarding the form, call (800) LAB-INFO (800-522-4636).

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### HERBST APPLIANCE / Rx

Doctor ____________________________
Address ____________________________
City __________________  State _____  Zip ____________
Telephone ____________________  Fax ____________
Patient Name ____________________________
Date Shipped ____________________________
Date Needed ____________________________

**ACRYLIC HERBST DESIGNS**
- [ ] ACRYLIC SPLINT HERBST
- [ ] SLEEP DISORDER HERBST
- [ ] Labial Bow
- [ ] Ball Clasps
- [ ] Arrow Clasps
- [ ] Expansion Screw

**METAL HERBST DESIGNS**
- [ ] BANDED HERBST
- [ ] CROWN HERBST
- [ ] METAL UPPER/ACRYLIC LOWER

**DISCHINGER DESIGNS**
- [ ] ORIGINAL CROWN HERBST
- [ ] CANTILEVER HERBST
- [ ] DISCHINGER OTHER (diagram)

**SMITH DESIGNS**
- [ ] TYPE I
- [ ] TYPE II
- [ ] TYPE III

**HILGERS DESIGN**
- [ ] BAND / CROWN HERBST

**MAYES DESIGN**
- [ ] CANTILEVER HERBST

**ACCESSORIES**
- Archwire Tubes .018 .022
- Acrylic Coverage - 2nd Molars
- Acrylic Cap - Upper Anteriors
- Add Palatal Acrylic
- Bonded Acrylic Design
- Add Debonding Screws

**CROWNS and BANDS**
- Specialty Appliances Provide and Fit Crowns/Bands - per diagram below
- Crowns/Bands Enclosed with Case Specialty Seat - per diagram below

**CIRCLE CROWNS TO BE SEATED**
- R 6 5/e 4/d  d/4 e/5 6 L
- 6 5/e 4/d  d/4 e/5 6

**CIRCLE BANDS TO BE SEATED**
- R 6 5/e 4/d  d/4 e/5 6 L
- 6 5/e 4/d  d/4 e/5 6

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P.O. Box 105224 Atlanta, GA 30348 (for use only with Specialty Appliances prepaid business reply labels)
1670 Oakbrook Drive Suite 390 Norcross, GA 30093 (for all cases shipped directly to street address)
1 800 LAB-INFO  In GA (770) 416-1822  Fax (770) 446-6958  www.specialtyappliances.com
Laboratory Overview

This section presents a brief overview of the key technical steps involved in the laboratory when fabricating the crown Herbst appliance. Many of our Herbst customers have indicated that their practices are able to better utilize the Herbst by understanding what happens in the laboratory. This is especially true when it comes to troubleshooting and problem solving with the Herbst.

Quality Control - Incoming Stage

The first step in the laboratory is to verify the accuracy of the model received from the practice. This is done on a routine basis with all cases received at Specialty Appliances, but is especially important with the Herbst because of the precise fit of the stainless steel crowns. We recommend that you use stone for your models since plaster may fracture too easily when seating the stainless steel crowns.

Fitting the Crowns

The next step is to prepare the model and fit the stainless steel crowns. In this step, crowns are fit on the upper and lower first permanent molars. The model is prepared by trimming the margins around each tooth. The goal is to simulate the dental anatomy with the surrounding tissue removed. The appropriately sized crown is selected, trimmed, contoured, and fit on the model.
Locating and Soldering the Pivots and Attachments

On the upper crown, the Herbst pivot and archwire tube are located on the buccal of the crown. On the lower arch, the Herbst cantilever bar is positioned along the buccal of the crown. On the mesial of the cantilever arm, the Herbst pivot and the archwire tube are located. Once the parts have been soldered, they are removed from the models and finished.

Fitting the Herbst Mechanisms

The final step in the laboratory is to cut the Herbst mechanisms. The upper and lower jaws are held in the desired occlusion and the Herbst mechanisms are cut to this dimension. The upper and lower members of the Herbst are placed over the eyelets on the pivot, where it is easy for the technician to mark the correct length of the tubes and rods.

Final Quality Control Process

All cases are checked to make sure the cantilever arms and other parts fit accurately. The edges of the crowns are checked for sharp spots. Another important point to check at this stage is the end of the rods where they come out of the back of the tubes in the upper first molar region. They should be two to three millimeters long—any additional rod length in this area could cause ulcerations.
Delivery Appointment and Staff Involvement

Clinical Delivery-Overview
Once the office receives the appliance, there are several key steps involved in the initial appliance delivery. The next section provides a detailed explanation of the clinical steps involved in delivering the Herbst appliance.
In the experienced practice, the initial appliance delivery takes approximately sixty minutes. Depending on the specific state laws, many of the clinical delivery steps may be performed by the staff. Quality of care is enhanced when the staff has a complete understanding of the necessary procedures and of the theoretical basis behind the appliance.

Dr. Terry Dischinger Herbst Educational Videotape
The above statement is the basis for the educational videotape Specialty Appliances produced with Dr. Terry Dischinger and his staff. All key aspects of the Herbst appliance are covered in this tape, along with detailed, close-up photography. Throughout the tape, Dr. Dischinger explains and narrates the theory and basis for using the Herbst, as well as how each phase of the Herbst and related topics fit into the overall treatment.

Contact Specialty Appliances for Herbst Videotape and Demonstration Appliance
This valuable educational videotape is available from Specialty Appliances and can be ordered by calling (800) 522-4636. In addition to this videotape, we recommend ordering a Herbst demonstration appliance on pink and white acrylic models. This patient and parent educational tool is invaluable in explaining the treatment and clinical steps involved with the Herbst, especially relating to the appliance delivery and initial home instructions.
**Initial Step - Identify and Organize the Herbst Parts**

The first step in delivering the Herbst is to assemble and organize the Herbst parts. It is important for the staff members to keep the upper and lower, and right and left portions of the appliance identified and separated. Even though the right and left lower rods are interchangeable parts, in the laboratory at Specialty, they are cut to fit the right and left sides of each patient’s case.

**Herbst Screws Attached to the Crowns**

Typically, for clinical delivery, the lower rods are removed from the crowns, while the upper tubes are left connected to the upper crowns. The standard protocol at Specialty Appliances is to return the mechanisms attached to the crowns with the screws “finger tightened.” This assists in the clinical steps for the delivery of the Herbst, since the parts will be removed and secured with Ceka Bond before the final delivery of the appliance.

**Upper Crowns and Herbst Tube Assembly**

Many offices bond the upper crowns with the Herbst tubes attached due to the difficulties in placing the screws on the upper crowns once they are cemented. For offices that do bond the crowns with the Herbst attached, the screws need to be removed, dipped in Ceka Bond, and then re-inserted into the pivots on each upper crown. This may be done prior to the initial try-in. However, once all the crowns are cemented and the mechanism assembled, any discrepancies in the mandibular position or working of the Herbst mechanism may result in having to remove and adjust the upper tubes.
Spacers and the Fit of the Crowns
An important point worth mentioning again is the use of spacers to create adequate room for the crowns. The thicknesses of the crowns are approximately twice that of orthodontic bands, so adequate space will be required in order to seat the crowns. In addition, the crowns come in only seven graduated sizes, so the overall fit will not be as precise as an orthodontic band. This does not present a problem, however, since excess space inside the crown is filled with the bonding material. All crowns are etched to help aid in retention before they leave Specialty Appliances.

Trial Fitting the Crowns and Cantilevers
We recommend that on a routine basis, all Herbst appliances be trial fit in the mouth prior to cementation. The crowns have been contoured at Specialty; however, additional contouring may be necessary to get a “snap fit” of the crown. This is done using the crown contouring pliers. These pliers will produce a slight undercut in the border of the crown, which in turn snaps in place on the tooth. In checking the fit of each crown, many practitioners and assistants report that they actually hear the crown snapping into place when it fits properly.

Verify the Fit of the Crowns
Crowns used for the Herbst will have a “positive” fit on the tooth as described above. They may not seat completely from an occlusal standpoint however as the cusps of the teeth may contact the inside of the crown. A slightly elevated (1-mm) crown position on a molar does not present a problem as long as it does not interfere with the opposing teeth.

Important Note: After each crown is fit and verified, it should be immediately removed from the mouth to prevent any chance of the patient swallowing an uncemented crown.
Checking the Cantilever Arms and Occlusal Rests
Once the crowns are fully seated, the position of the cantilever arms and any occlusal rests should be evaluated. The cantilever arms are formed in the laboratory to lay approximately 1mm from the adjacent teeth. If these bars are too close to or too far from the tissue, they can cause irritation. Any adjustments required can be made using a pair of headgear pliers.

Checking the Occlusal Rests
The occlusal rests should also be evaluated to make sure they lay flush against the dental surfaces. Of critical importance is the position of the rests on the second permanent molars (if present). The second molar rests should engage the buccal occlusal groove completely to prevent unwanted vertical eruption of these teeth. This also prevents tongue irritation.

Cleaning the Crowns
After the crowns have been satisfactorily trial fitted, they are removed and the insides cleaned using alcohol. As a routine procedure, all Herbst crowns and bondable rests are micro-etched at Specialty Appliances before they are sent to the orthodontist. Micro-etching the metal increases the adhesion of the bonding material to the metal. This is extremely helpful in removal and clean up when the desired result is for as much of the adhesive as possible to remain on the inside of the crown, with as little as possible on the tooth.
Herbst Appliance Delivery Protocol
Bonding the Herbst is a procedure that typically requires the doctor and staff member to work in a “four handed” fashion. At this point, the orthodontist has checked and verified the fit of the appliance and the Herbst has been removed and cleaned back to the condition in which it was delivered from Specialty Appliances. All supplies and materials required for cementing the Herbst are assembled and ready for the procedure.

Tooth Preparation
When using Fuji I glass ionomer cement (from GC America), there is no need to etch the teeth. Experience has shown that adequate bond strength for crowns is achieved by bonding the entire periphery of the tooth, without the occlusal surface included. This is accomplished by placing a small amount of Vaseline on the occlusal surface of each molar using a Q-tip. The Vaseline prevents the adhesive from adhering to the occlusal surface of the molar, which makes appliance removal and clean up easier.

Herbst Appliance Preparation - Holding the Tubes
In this illustration, the upper tubes are attached to the crowns on both sides. The fit of the appliance was verified directly in the mouth, so the Herbst screws are secured with Ceka Bond. When the upper crowns are cemented with the Herbst tubes already assembled, an elastic is used to hold the mechanism against the crown during the bonding process. This prevents the tube from “hanging down” into the working field while cementing the crown.
Appliance Preparation
Screw pivots, RPE key holes, and archwire tubes on any Herbst parts must be covered prior to bonding so the adhesive will not accidentally flow into these areas. This is done by placing toothpaste in these holes. Once the Herbst is cemented, the toothpaste is easily rinsed out of these holes.

Bonding Adhesive
There are several adhesive products on the market that may be used to bond the crown Herbst. One of the more popular adhesives is Fuji I glass ionomer cement from GC America Corporation. This material is extremely strong, durable, and easy to handle. Cements are also available in colors, which helps in identifying the residual material on the teeth during the clean-up process. The adhesive is mixed on a cold slab and loaded generously into each of the crowns.

Delivering the Appliance
From the beginning of mixing the adhesive, there is approximately 8 minutes of total working time. At this point, the clinician is at the chair and can begin seating each crown. The crown is seated with finger pressure first, and then the patient should be asked to bite down on a band-seating instrument to fully seat the crown. On cases with the right and left sides connected (a RPE Herbst) the patient should bite alternatively on each side to seat the appliance completely.

*Note: Lingual cleats can be added to the crowns to aid in seating the appliance.*
Cement Clean Up

The excess adhesive is expressed from the edges of the crown where it can be easily cleaned up using an air-water syringe and Q-tips. Since the crowns were trial fitted, the delivery can be done in minutes, leaving ample time for clean up before the cement starts to set. After removing the excess adhesive, a scaling instrument is used around the entire border of each crown. Care must always be taken to make sure that all of the adhesive is removed from the gingival margins, as excess adhesive could cause tissue irritation.

Adhesive for Bonding the Occlusal Rests

Several popular Herbst designs utilize bonded occlusal rests to provide additional stability and anchorage. These wire rests are bonded using a light-cure adhesive. The Fuji Ortho LC bonding adhesive is recommended for this procedure, as moisture control is not an issue and etching the surfaces of the teeth is not required. A standard light cured adhesive with etching can be used if desired.

Bonding the Occlusal Rests

Using an explorer or scaler, the light-cure adhesive is adapted to the occlusal surface where it covers the bonded rest. Once the adhesive is properly contoured, the material is cured with the hand-held light gun. The outer surface of the bonding adhesive should be smooth and require no further finishing. This procedure is repeated until all of the bonded occlusal rests have been placed.
Appliance Check
At this point, all four crowns have been cemented and the occlusal rests bonded. Prior to assembling the Herbst mechanisms, the following items are once again checked:

Cement Clean up
All cement must be removed from the margins below the crowns. This is checked visually as well as by using an explorer. Excess cement that is not removed can cause tissue inflammation and discomfort for the patient. This may be noticeable due to blanching of the tissue.

Cantilever Position
With the crowns cemented, the position of the cantilever arms is again checked. The bars should lay adjacent to the teeth with a 1-2mm clearance. Once the crowns are cemented, it is very difficult to adjust the cantilever arms, so they need to be checked carefully during the try-in procedures.

Occlusal and Rests
Bonded occlusal rests should be secure and smooth. Occlusal rests on the second permanent molars should be adjusted to fit completely into the buccal/occlusal groove. Note: The wire rests on the second molars are not bonded to the teeth, in fact, these rests may be left a little occlusal in cases where the teeth are still erupting.
Trial Fit the Herbst Mechanism
Once the crowns have been cemented and the adhesive cleaned up, the next step is to attach the Herbst mechanism. Depending on the experience level of the practice, a suggestion that may be helpful is to “trial fit” the Herbst mechanism prior to setting the screws with Ceka Bond. There are several important areas regarding the mechanism that need to be checked and adjusted if necessary.

Assembling the Mechanism
If the upper tubes were not included in the initial delivery, they are attached at this point using the offset on the allen wrench. The lower rods are then inserted into the tubes on their respective sides and the patient is instructed to protrude the mandible. With the lower jaw advanced, the holes on the ends of the lower rods will fit over the Herbst pivots in the lower first bicuspid area. Another suggestion here is to lightly tighten the lower screws to hold the appliance in place while checking the overall fit of the mechanism.

Setting the Screws
If the screws are set with Ceka Bond immediately after placing the mechanism, any necessary follow-up adjustments will require removal of the bonded screws. This is accomplished by grasping the outside head of the screw with a pair of “Howe” or “Weingart” pliers to break the bond. The screws can then be removed with an Allen wrench. Once the final fit of the appliance has been verified, the screws are set using the Allen wrench with the ends of the screws first dipped in Ceka Bond.
Laboratory and Clinical Coordination in Fitting the Herbst Mechanism

In the Specialty Appliances laboratory, the Herbst mechanism is cut and fit for each individual patient. The amount of mandibular advancement is determined by either the clinicians wax construction bite, or by reference lines on the sides of the models. We also check the working range of the appliance, and test to make sure there is no binding of the mechanism. Even though these items are checked in the laboratory, they must be checked again once the appliance is assembled in the mouth. Some patients adapt better than others to the appliance, and minor problems with the fit can occur clinically that cannot be determined in the laboratory.

Checklist for Fitting the Herbst Mechanism

There are several important items to check regarding the fit and function of the mechanism:

* Amount of mandibular advancement
* Alignment of the dental midlines
* Smooth working of the mechanism (no binding)
* Rod length out of the distal of the tubes (not too much)
* Sufficient rod length to keep the mechanism from disengaging on opening
Amount of Mandibular Advancement
The first point to check is the amount of mandibular advancement. This is determined by the length of the upper tubes. If needed, this can be altered several ways. The first option is to reduce the length of the tubes if the mandible is advanced too far. This is done by cutting the tube with a diamond wheel and finishing the ends smooth with a stone or carbide burr. If the lower jaw is not advanced far enough, shims (small rings made from tube sections) can be added to both sides of the mechanism.

Alignment of the Dental Midlines
Occasionally, the dental midlines may not be aligned properly when the mechanism is in place. This is corrected by either replacing the tubes (one or both), by reducing the length of the tube on one side, or by adding a shim to advance one side. When shims are added, they should be crimped onto the rod with a heavy wire-cutter to prevent tissue irritation. Any time shims are added, the patient is checked to make sure they do not disengage on wide opening.

Smooth Working of the Mechanism
Another important point to check is the overall smooth working of the Herbst mechanism. There should be no binding when the patient opens or moves laterally or side to side. In the laboratory, the eyelets of the tubes and rods are enlarged routinely, which increases the “play” in the system and helps prevent binding. Patients with narrow upper arches may need an expansion system added before the appliance will function properly.
Rod Length Out of the Distal of the Tubes
One of the most important points to check is the length that the rods extend out of the back of the tubes in the upper first molar area. Most patients (especially younger ones) will tolerate only a couple millimeters of the rod extending out of the tube. Adjustments to the rod must be made prior to final assembly of the mechanism. The rods can be cut with a heavy-duty wire cutter and the cut ends blunted off with a rubber wheel.

Sufficient Rod Length to Keep the Mechanism from Disengaging on Opening
While it is critical the rods do not extend too far out of the tubes, at the same time they must have sufficient length so the patient does not disengage on wide opening. This is addressed by first making sure the rods are cut to their full length. For patients who still disengage on wide opening, additional instructions are provided at the time of the patient/parent consultation to demonstrate how to reassemble the mechanism.

Final Assembly of the Mechanism
Once the final fit and function of the mechanisms has been verified, the screws are set in place using Ceka Bond adhesive. If necessary (for example, to readvance the mandible), the screws can be loosened once they are placed with Ceka Bond by turning them. This will break the seal. In some instances, it may be necessary to replace a screw that has previously been set in place with Ceka Bond.
Patient and Parent Instructions
Once the appliance has been delivered, the next step is to provide instructions and home care information to the patients and parents.

Muscle Tenderness
The first point to explain is that the patient will require an initial period of adjustment to the Herbst. The most common concerns are overall muscle tenderness and soreness of the teeth themselves. The patient is instructed that they may have to change their diet to softer foods for the first week or so.

Tissue Irritation
The second point to explain is that the patient will have to get used to the Herbst mechanisms, especially the screws on the lower arch. It will take the mouth time to adapt and build “calluses” with regards to the metal parts. In the transition period, the patient may want to use cotton rolls secured to the Herbst with a small rubber band in the lower first bicuspid region. These should be worn at night for the first 1-2 weeks and daily only if tenderness persists.

Facial Appearance
Some patients may be concerned with their appearance regarding the “fullness” of their face, especially in the lower bicuspid area. Explain to them that this will become less noticeable over a short period of time. On the other hand, it can be extremely positive to emphasize the improvements that have been made in their profile view now that the lower jaw is advanced.
Herbst Becomes Disengaged
Patients who have the capacity to open wide, may disengage the Herbst mechanism on one or both sides. This information must be explained to the patient during the initial delivery appointment to reduce the need for unnecessary follow-up appointments. Using a typodont with a sample Herbst appliance, it is easy to show the patient and parents how to reassemble the mechanisms if it comes apart.

Rapid Palatal Expansion Activation
Patients who have an RPE screw incorporated into their Herbst are given instructions on how and when to activate the screw. Many offices will activate the RPE screw at the initial delivery appointment by turning it 1/4 turn with the parent present, and then instruct them do activate it another 1/4 turn, assisting as needed. Check the screw activation by measuring the gap with a millimeter gauge.

Appliance Breakage
If there are any parts of the appliance that become loose or break, the patient is instructed to contact the office and explain the problem. In many instances, such as a loose screw, the patient can be seen the next day. Other situations, including a broken or damaged appliance, may necessitate an emergency appointment.

Note: Many offices provide parents with a screwdriver or hex wrench and extra screws. With proper explanation, parents can, in many cases, replace or tighten a Herbst screw, eliminating the need for an “emergency” visit.
Appointment Sequences
Depending on the clinician’s preference, the use of Herbst auxiliaries, and the overall treatment plan, there may be several related adjustment appointments required. The following section of this manual illustrates several of the follow-up Herbst-related appointments and the clinical steps related to those procedures including:
* Fixed appliances used with the Herbst
* Expansion screws used with the Herbst (upper and lower)
* Molar distalization with the Herbst
* Mandibular reactivation

Length of Treatment Time
The Herbst can be used in the basic design for anteroposterior changes only, or can be enhanced by the addition of auxiliaries. On average, the Herbst is used for 8 to 12 months to correct Class II problems. The exact time will vary based on the clinicians’ attitudes toward the time required for skeletal, dental, and muscular adaptation. The severity of correction needed, as well as the age of the patient, factors into treatment time. For the basic Herbst appliance, many practices have extended the time between appointments to 6, 8, or even 10 weeks, as long as there are no problems reported.

Herbst Removal
The last part of this section covers clinical techniques for removing the Herbst. Practices often have questions and concerns when removing crowns. This section addresses these issues. The most common way to remove the crowns is to cut them in sections and separate the crown with band removing pliers. This technique is covered in detail in the Dr. Dischinger Herbst Video.
Placing Anterior Brackets
Many clinicians use fixed appliances on the anterior teeth in conjunction with the Herbst to provide anchorage and to align the teeth. When indicated, anterior brackets are typically added at the appointment after the initial Herbst delivery. This reduces the overall length of the initial delivery appointment, which already takes approximately sixty minutes. Patients treated at an age when more of the permanent teeth are present may also have brackets placed on the cuspids and bicuspids.

Bracket and Archwire Location
The sectional archwire is engaged in the brackets with the terminal ends extending into tubes fitted into the Herbst pivots. At Specialty, the clinician can specify the location of the archwire tubes depending on the case requirements. For deep bite cases where an intrusion force is desired, the archwire tubes are located gingival to the Herbst pivots. Conversely, in an open bite situation, the tubes are located occlusal to the pivots. In cases that have been leveled before the Herbst treatment, the tubes are placed in the center of the pivots.

Brackets and Archwires
Many clinicians use a relatively full-sized, flexible rectangular wire to gain anchorage with some initial torque control of the anterior teeth. In addition, minus 10 degree lower anterior brackets may be used to counteract any “dumping forward” forces on the anteriors. On the upper arch, .022 degree centrals and .014 degree lateral brackets are recommended to establish and maintain proper torque control for Class 1 correction. The terminal ends of the archwire insert into the tubes, where they are bent back to avoid tissue irritation.
The Herbst Combined with Arch Expansion

Many clinicians elect to expand the jaws in conjunction with Herbst therapy by incorporating expansion screws into the stainless steel crown design. In the original Class II posterior relationship, the upper jaw may accommodate the lower jaw in the molar width. With the mandible advanced, however, often the upper arch is not wide enough. This discrepancy, if not addressed, can cause the Herbst rods to “bind up” when the patient moves laterally. Expanding the upper arch can usually solve this problem.

Herbst Expansion and Treatment Sequencing

Screws may be placed in the upper appliance in the traditional manner, as with the banded RPE. Once the expansion has been achieved and stabilized, the screw can be removed using a diamond burr in a high-speed handpiece, all while continuing Herbst therapy. The Herbst will naturally hold the upper expansion due to the buccal forces it inhibits.

Lower Arch Expansion with the Herbst

An expansion screw also can be added to the lower appliance by incorporating a heavy lingual support wire, which the screw is soldered to. When using either expansion design, the treatment sequence is explained to the patient and parents and the parent instructed to activate the expansion screw(s) on the schedule provided by the clinician. The lower arch expander will need to be left in for at least 10 weeks after expansion is completed.
Molar Distalization with the Herbst
The Herbst has a natural tendency to distalize the upper molars due to the forces transmitted from the lower jaw, through the Herbst mechanism, to the upper molars. Depending on the desirability of this treatment effect, the molars may or may not be “tied in” to the rest of the upper teeth when using fixed appliances with the Herbst.

Controlling the Upper Molar Movement
By using fixed appliances on the upper teeth and “tying back” a continuous archwire to the molar crowns, the amount of distal molar movement can be minimized. If, on the other hand, maximum molar distalization is desired, the crowns are not connected to the rest of the upper arch. A longer archwire tube may be added to keep the molar upright while it is distalizing.

Herbst Combined with the Pendulum
Another option is the addition of a Pendulum type appliance to the Herbst. In this design, palatal expansion with molar distalization is achieved while wearing the Herbst. Wires can be added from the pendulum acrylic and soldered to the molar bands/crowns, where they hold these teeth until the initial expansion is achieved. Once the upper arch is expanded, the stabilization wires are cut, and the Pendulum springs can distalize the molars.
Mandibular Advancement
The next clinical adjustment the practice may need to consider is the reactivation of the lower jaw. This will depend on the amount of mandibular advancement built into the initial appliance at the laboratory. Many clinicians also believe that once the Class I cuspid relationship has been achieved, the appliance should be activated to an overcorrected anterior position to account for the rebound once the appliance is removed.

Clinical Sequence for Mandibular Advancement
Whether the Herbst is being activated for further mandibular advancement or overcorrected positioning, the clinical sequence is identical in adjusting the mechanism. The first step is to remove the lower screws that hold the rods to the anchorage units. The rods are then removed from the tubes on each side to allow placement of the shims. The shims are crimped onto the rods using a heavy-duty wire cutter. This prevents the shim from moving up and down on the rod when the patient opens and closes.

Placing the Shim and Reseating the Mechanism
With the shims crimped and placed, the rods are inserted back into the tubes and the screws replaced in the pivots with Ceka Bond. Some patients who are “reactivated” forward may report initial contact with the anterior teeth with little posterior occlusion. This is usually due to the anteriors not being level and the patient having too deep of a bite. Use of anterior brackets to level and align will help prevent this problem.
Herbst Re-activation with Shims and Rods
In some instances when reactivating the mandible for further advancement, it may also become necessary to replace the upper tubes. As the shims are added to the rods, the rods fit further forward inside the tubes. On some patients, this will eventually cause a problem in that opening the mouth will cause the mechanisms to disassemble. In some instances (for example, in the second advancement), this can be overcome by substituting a new, longer rod on the lower in addition to adding the advancement shims.

Replacing the Upper Tubes
When it becomes necessary to replace the upper tubes with a longer overall length, they are removed from the crowns and a longer, pre-cut tube (3-5mm longer) is selected for each side. Practices that have experience with the Herbst will have extra parts on hand for these types of adjustments. When new rods or tubes are used (directly from the manufacturer) make sure to enlarge the holes where the parts fit over the pivots to facilitate lateral movement.

Reassembling the Upper Tubes to the Herbst
Once the longer tubes have been screwed onto the upper crowns, the new set of rods can also be fit. The decision on exactly which technique to use to advance the lower jaw is dependent on the case requirements and the overall experience of the practice. Some practices find there is no difficulty whatsoever in simply adding shims to reactivate the mandibular advancement, while other practices report it is easier to replace the Herbst mechanisms with a longer set, as needed.
Herbst Appliance-Stainless Steel Crowns Removal
Removal of the stainless steel crown Herbst is accomplished in a two-step procedure. First, the crowns are cut using a high-speed handpiece and cross-cut burr. Next, the crowns are lifted from each tooth using a crown removing tool. As with most techniques in orthodontics, this procedure has a learning curve and becomes easier with experience.

Remove the Herbst Mechanism
The first step in Herbst removal is to take off the mechanisms. This is accomplished by unscrewing the four screws that hold the tubes and rods in place. During this process, while the Herbst is disassembled and the lower rods are removed, make sure the patient does not “bite down,” since the upper tubes that are still attached could impinge into the tissue. The elastics used to hold the upper tubes during cementation also work well for this step.

Cutting the Crowns
Next, a high-speed handpiece with a 1171 cross-cut burr is used to cut each crown. The crown is cut along the buccal wall, then extended over the occlusal surface all the way forward to the opposite side of the crown. It is important to cut the crown all the way to the gingival. Once the cut has been completed, a crown removing tool is used to gently pry the crown from the tooth. The patient should be informed that they might feel “pressure” during this procedure, and that it will be very brief.
Occlusal Removal
An alternative technique for crown removal is to cut a hole or “window” in the occlusal surface of the crown. Once this window has been cut, the “anchorage foot” of the removing tool is placed against the occlusal surface and the lever force is activated against the bottom of the crown in a lifting fashion. The advantage of this technique is that more of the adhesive tends to remain on the inside if the crown.

Add Vertical Cut in Crowns
Some clinicians advocate using a small vertical slit in the gingival-most edge of the crown. This cut is made in the laboratory, and provides the clinician with a routine and predictable place to access the pliers for crown removal. With this technique, the removal pliers are also used with a “lifting and prying” motion to unseat the crown, making the procedure as comfortable as possible for the patient.

Herbst Removal-Cement Clean up
The time required to clean up the adhesive is proportional to the amount of time spent in properly preparing the case during the initial delivery. If the Vaseline was applied to the occlusal surface during initial bonding, the removal will be much easier at this point. Cement removal is best accomplished using crown removing pliers to remove the large bulk adhesive, followed by a series of acrylic burrs in a low speed handpiece.
**Herbst Troubleshooting**

For the most part, the Herbst appliance, especially the stainless steel crown and banded designs, is quite durable, and the majority of appliance breakage has been eliminated. There are, however, certain situations where there may be problems with the Herbst. This section is designed to inform the practice of what type of problems can occur with the Herbst, and to provide troubleshooting tips in solving the problems. Below is a list of the more common problems that can be encountered with the Herbst.

* The Herbst cannot be delivered (the crowns do not fit).
* The Herbst mechanism is binding on opening or lateral movement.
* The midline is off with the Herbst mechanisms in place.
* A stainless steel crown has become loose.
* A bonded occlusal rest has come loose.
* A Herbst screw has come loose or come out.

**“Emergency” Appointments**

Many of these clinical problems can represent a potential emergency for both the patient and the practice. In many instances, however, these are not true emergencies and they can be dealt with accordingly. The key is to communicate to the patient and parent that the practice is aware of these situations and is prepared to resolve them quickly.
Fitting the Crowns
There is a definite “learning curve” in working with the stainless steel crowns, whether in the clinic or lab in sizing and fitting, or in the clinic when the appliance is delivered. Each practice will determine their comfort level regarding the initial fitting of the crowns, either by doing this important step in the office or requesting that Specialty provide and fit the crowns in the laboratory.

Importance of Trial Fitting the Herbst
In sizing and fitting crowns, there are only 3-5 sizes to select from once the overall shape and anatomy of the tooth is determined. Regardless of which technique is used to size and fit the crowns, there may be cases where the delivery of the appliance is difficult or not possible due to the fit of the crowns. This is determined during the “try in” step just prior to cementing the Herbst.

What to do When the Herbst Cannot be Delivered
Depending on the appliance design, there may be different solutions to the problem when the Herbst does not fit. On the lower arch when the bicuspids and molars are included in one section and the unit does not fit, the entire appliance must be remade in the laboratory. A new impression model is taken and the model sent to Specialty along with the appliance. If a single crown does not fit (for example, one side on the upper molars), a model and that crown are sent to Specialty for resizing.
Alignment of the Herbst Parts
In the laboratory at Specialty Appliances, one of the critical factors in making the appliance is lining up the Herbst pivots to ensure the smooth functioning of the mechanisms. Once this angle is set, the pivots are soldered to the crowns and cannot be changed clinically. In situations where the patient has possibly bent the mechanism, the deformed sections of the appliance will need to be replaced.

Fit of the Rods and Tubes over the Pivots
Another important factor is the fit of the eyelets on the rods and tubes over the Herbst pivots. At Specialty, a small burr is used to enlarge the eyelet openings on all four components of the mechanism. This ensures the mechanisms will function properly when attached to the pivots. Of primary concern is the lateral movement, which is greatly enhanced when these holes are enlarged.

Other Binding Problems
Another potential problem that may affect the functioning of the mechanisms is the width of the upper jaw. If the maxilla is too narrow in the first molar area once the lower jaw has advanced, the engaged mechanisms can cause binding of the appliance. In this situation, the upper jaw usually needs to be widened to accommodate the mandible and ensure the mechanisms will function freely.
Midline Alignment with the Herbst
The alignment of the dental midlines is determined by the length of the rods and tubes on each side. In the lab at Specialty, we carefully adjust the Herbst mechanism to advance the lower jaw and align the midlines (unless an alternative midline relationship is requested by the clinician).

Checking the Midline in the Clinic
When delivering the Herbst, the midline can be checked with the appliance fully engaged, just prior to securing the screws with Ceka Bond. The rods and tubes are placed over the pivots and held in place while the midline is observed (for practices that deliver the upper with the tubes attached, only the lower rods need to be held). If there is a midline problem that needs to be corrected, either the rod and/or tube on one side can be modified or replaced.

Correcting the Midline
If the midline is shifted undesirably to one side, the situation can be corrected by further advancement of the opposite side, or shortening the longer side, which will correct the midlines. This is accomplished by trimming the tube on the long side, or by adding either shims or a longer tube to the shorter side. In general, adding shims is the easier alternative to correct the midline.
Fuji Glass Ionomer Cement

When using Fuji I glass ionomer cement (GC America Corporation), loose bands or crowns are extremely rare. There may, however, be occasions where the patient is constantly biting against or working the Herbst side to side, and a crown becomes loose. In this situation the crown can be rebonded following the manufacturers instructions.

Removing a Crown for Replacement

If a loose crown can be removed without sectioning, it can be reused by removing all of the original adhesive, followed by microetching the inside of the crown. All of the original adhesive must also be cleaned off the tooth. Once the crown and tooth have been thoroughly cleaned, the crown is rebonded using the same procedure as described earlier.

Note: An easy way to remove cement from a crown is to gently heat it over a Bunsen burner and quench it in water. This will facilitate removing the cement with a scaler.

Damaged Crown Sent Back to Specialty for Replacement

In cases where a loose crown needs to be sectioned for removal, or when a supporting wire (such as a lower lingual wire) breaks, the appliance is typically removed and sent back to Specialty for repairs. Often, we can repair the original Herbst using a current model. If the appliance cannot be repaired, we fabricate a new one using the current model.
Occlusal Rest Designs
Many Herbst designs utilize occlusal rests for additional appliance anchorage and stability. Several types of wire rests are typically bonded to the teeth using light-cure orthodontic adhesive. There are considerable overall forces on the Herbst appliance, especially in the vertical dimension. This can on occasion, cause an occlusal rest to fracture, which is a relatively easy clinical repair.

Occlusal Rest Repair
The first step in repairing a fractured occlusal rest is to remove the old bonding adhesive from the wire rest and the dental surfaces. Once the adhesive has been removed, new light-cure adhesive is applied over the occlusal rest and smoothed out using the explorer tip, followed by rebonding with the light-cure gun.

Occlusal Molar Rests
The wire rests on the second molars are very important as they prevent the undesirable eruption of the teeth. These rests are made from .032 stainless steel wire, and are soldered to the crowns in the laboratory. On rare occasion, these wire rests can fracture from the crown. In this event, the rest must be replaced or the second molar could erupt and cause undesirable loss of vertical control.
Loose Screws with the Herbst
Early in the design and evolution of the Herbst, the screws presented a significant problem in terms of coming loose. With the application and use of Ceka Bond, this problem has been greatly reduced and in many practices virtually eliminated. Ceka Bond is designed to secure dental implants and is an extremely strong adhesive that easily holds the Herbst screws in place.

Stripped Screw or Pivot
There are rare situations where a screw may come loose, even with the application of Ceka Bond. The first recommendation is to try a new screw using Ceka Bond. If that does not work, the screw or pivot is probably stripped. When this happens, the screw will continue to turn as it is tightened, but it will not stay secure in the pivot. In this situation, the appliance will need to be removed and returned to Specialty Appliances where we will replace the pivot and add a new screw.

Screw Head Damaged
Another problem that can occur is damaging the screw head. If too much force is applied when tightening the screw, not only can the threads inside the pivot be stripped, but the inside head of the screw can become stripped or even break off. If the inside hex is stripped, a new screw can be used. If the head breaks off, the part should be returned to Specialty Appliances for repair.
**Herbst Appliance Designs**

Several leading clinicians have developed Herbst designs based on specific treatment objectives. Through lectures and publications, these designs have been advanced throughout the profession and are often referred to by the clinicians’ name. At Specialty, we have worked with the leaders in Herbst designs and are able to offer the appliance designs as referred to by those doctors’ names. The following section presents many of the most popular Herbst designs advocated by Specialty and leading practitioners.

Dr. Terry Dischinger Herbst Designs

Dr. Bob Smith Herbst Designs

Dr. Jim Hilgers Herbst Designs

Dr. Joe Mayes Herbst Designs
1. Crowns placed on upper molars and lower bicuspids
2. Bands on lower molars
3. .045 lingual arch connects lower components
4. Archwire tubes added to upper and lower crowns
1. Bands are placed on upper and lower first molars
2. TPA wire connects upper bands
3. Heavy reinforced wire on lower
4. Archwire tubes can be added to upper and lower
1. Upper and lower individual splints
2. Incisal acrylic should be at least 1.5mm thick if used
3. Upper is connected with TPA
4. Clasp can be added for additional support
1. Crowns on first permanent molars
2. Archwire tubes on lower cantilever and upper molars
3. Bondable rests to lower bicuspids
4. Occlusal rest on permanent molars if erupting
1. Crowns are placed on upper front molars
2. TPA archwires on upper crowns
3. Lower acrylic splint gives full stability
4. Second molar rest are added to prevent undesirable eruption
1. Upper and lower are completely tooth born splints
2. Hooks are placed at upper cuspids for elastics
3. Appliance has acrylic on second molars for added support
4. Appliance is fully adjustable for proper airway opening
1. Upper appliance is secured by using bands on the first permanent molars
2. TPA connects upper bands
3. Lower removable splint offers complete support
4. Second molar rests are added to prevent super eruption
1. Archwire tubes are placed on upper molars and lower cantilever.

2. Crowns are placed on upper and lower first permanent molars.

3. Ball stops are used to prevent tipping and prevent eruption.

4. Bioprogressive technique helps balance treatment effects.
1. Upper and lower first molars are crowned
2. Archwire tubes are added to upper molars and lower cantilever
3. Ball stops help prevent tipping and eruption
4. RPE screw is trimmed to allow better access and reduce bulk
1. Crowns are placed on first permanent molars
2. Archwire tubes are placed on upper crowns and lower cantilever
3. Bondable rests are placed on lower bicuspids
4. Expansion screws are trimmed to reduce bulk
1. Crowns placed on Deciduous second molars
2. Archwire tubes added to cantilevers and molars
3. Cantilever upper expands opening
4. Bondable ball rests are added for stability
1. Crowns placed on Deciduous second molars
2. Archwire tubes added to cantilevers
3. Reduced expansion screw for reduced bulk
4. Bondable ball rests are added for stability
1. Crowns on upper molars and lower bicuspid
2. Molar kept upright with tube on band for sliding mechanism
3. Archwire closing loop and springs close space
4. Archwire tubes on upper molars, lower molars and bicuspid
1. Crowns on upper and lower first molars
2. .045 lingual added to lower for support
3. Rests on lower deciduous molars for support
4. Archwire tubes added to upper molars and lower cantilever
1. Crowns on upper molars and lower bicuspids
2. Bands on lower molars
3. Archwire tube and rests added on request
4. Low profile for comfort

Upper

Lower
1. Crowns on upper and lower first molars
2. .045 lingual added to lower for support
3. Rests on lower deciduous molars for support
4. Expansion screw added to upper arch
5. Archwire tubes added to upper molars and lower cantilever
1. Bands placed on upper molars and lower bicuspids
2. .045 lingual arch added to lower molars
3. Rests on lower molars bonded
4. Archwire tubes added on request
1. Crowns placed on upper molars and lower bicuspids
2. .045 lingual arch added to lower molars
3. Rests on lower molars bonded
4. Archwire tubes added on request
1. Crowns placed on upper and lower first molars
2. .045 lingual arch added to lower molars
3. Molar rest added on request
4. Archwire tubes added on request
1. Crowns placed on upper and lower first molars
2. .045 lingual arch added to lower molars
3. Cantilever arm parallel to occlusal plane
4. Archwire tubes added on request
5. .060 wire for lingual support on RPE
Also, please keep in mind your Herbst experts at Specialty are only a telephone call away and are ready to assist your practice with valuable information. We can be reached at:

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