

# AOA Appliances, etc.

ALLESEE ORTHODONTIC APPLIANCES/PRO LAB

VOLUME 5, NUMBER 2, 2001

## THINKING APPLIANCES

We sincerely appreciate your feedback concerning AOA/Appliances, etc. AOA/Pro's team looks forward to receiving your ideas for articles, "pearls" or design modifications you may like to share with the profession in our newsletter. Give us a call at the laboratory or stop by our booth at your constituent meeting this fall. Max Hall, Paula Allen-Noble, Liz Henrich or I will be there to discuss your ideas and share current appliance updates with you and your staff.

In this issue we are proud to feature two exciting articles, both of which present new approaches in the treatment of difficult orthodontic cases. Dr. Terry Dischinger discusses treating mixed and permanent dentition high-angle open-bite patients and Dr. Matthew Coats shares his approach to dentoalveolar Class II correction.

We would like to say thank you for your continued support of AOA/Pro and we appreciate the opportunity to serve your practice.



David Allesee, General Manager  
AOA/Pro Laboratory  
(800) 262-5221 or (262) 886-1050



Dr. Dischinger completed his dental training at the University of Tennessee and his orthodontic residency at the University of Oregon Health Science Center. He has been published and is a frequent lecturer on early treatment, functional appliances and teamwork. Dr. Dischinger also holds a quarterly hands-on, in-office, full-face orthopedics course that includes his staff and selected patients. He has maintained his private practice of orthodontics in Lake Oswego, Oregon, for 21 years. As a clinician continually in search of new treatment techniques, Dr. Dischinger is a well-known leader in Herbst therapy. (See his articles in *Clinical Impressions* at [www.ormco.com/ci](http://www.ormco.com/ci).)

## OPEN-BITE INTRUSION HERBST

Terry Dischinger, DDS  
Lake Oswego, Oregon

### TREATING HIGH-ANGLE OPEN BITE

Open bite is found in 5%<sup>1</sup> of the adolescent population and is one of the most difficult problems that orthodontists face, with one in three<sup>2</sup> of these patients relapsing. Surgically, posterior impaction of the maxilla allows the mandible to autorotate and can be used in conjunction with mandibular advancement. However, even these cases relapse. Dr. Gene Dellinger has used opposing magnets to intrude posterior teeth and close open bites. Many forms of functional appliances have also been used to correct open bites, but all with mixed results. Is there a better approach to correct open bite?

I propose using the Herbst\* appliance as anchorage to correct high-angle open-bite cases through impaction of the maxillary posterior teeth and repositioning the mandible. I believe this approach introduces an orthopedic aspect no other treatment method has broached in the past. Research on my cases conducted at university orthodontic programs indicates that Herbst treatment can effect a downward and forward position of the articular fossa. The open-bite intrusion Herbst design is only in its infancy of use in my office – we are still learning with each patient. Initial results have been positive and are very exciting. I don't believe we have a better way to treat these cases. However, long-term studies will be required to prove greater long-term stability than previously achieved by other means of treatment.

### MIXED DENTITION OPEN-BITE INTRUSION HERBST

This appliance could have great merit in the mixed dentition. With a high-angle Class II open bite, treating early to impact the maxillary molars allows autorotation of the mandible, creating a low-angle case. Intrusion usually occurs in three to four months, with an additional three to five months for Class II correction.

The maxillary appliance is designed with primary second and permanent first molar crowns. Stops extend from the primary second molar crowns onto primary first molars and .036 stainless steel intrusion wires with helix loops are soldered to the primary second molar crowns to intrude the maxillary permanent first molars. Cantilever extensions with .022 archwire tubes are soldered to the primary second molar crowns, placing axles distal to the primary second molar crowns and just mesial to the permanent first molar crowns. The Herbst mechanism will be initially attached to these axles



Mixed Dentition  
Maxillary Appliance



\* Herbst is a registered trademark of Dentaaurum, Inc.



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to hold the maxillary primary molars in place from extruding during intrusion of the first permanent molars. Axles that are placed on the permanent first molar crowns are not used during intrusion but will be used to hook up the Herbst mechanism and to hold the intruded molars during the Class II correction.



Mixed Dentition Mandibular Appliance

The mandibular appliance is designed with primary second molar crowns. In contrast to a standard Herbst, the mandibular cantilever arms are offset low and gingivally to produce more vertical force, with stops extending onto the primary first molars. This component of vertical force is necessary during first molar intrusion to help prevent extrusion of the maxillary primary first and second molars and to help hold the maxillary arch in place while intruding the maxillary permanent first molars. Stops also extend from the primary second molar crowns to both the primary first and permanent first molars to stabilize the mandibular cantilevers to prevent them from tipping down in the vestibule or toward the teeth.

### MIXED DENTITION APPLIANCE DELIVERY

At appliance delivery, cement the maxillary permanent molar crowns first. (These crowns must be placed prior to intrusion; otherwise, if you wait until after intrusion and removal of the intrusion part of the appliance, the first molars will be intruded too much to place the crowns as you continue with Herbst Class II correction.) Before cementing the maxillary primary second molar crowns, activate the attached intrusion wire 90°. To temporarily deactivate the activated intrusion wire and allow cementation, tie the intrusion wire down with a ligature wire and then cement the crowns. Remove the ligature wire after cementation. Bond all stops to the teeth with composite material as added anchorage to ensure stability. Also bond the end of the intrusion wires that rest on the occlusal tooth surface of the maxillary permanent first molars. These molar crowns have a precut occlusal hole to accommodate this procedure. Cement the mandibular appliance. Attach and engage the Herbst rods and tubes.

At the next appointment, usually in two to three weeks, bracket the maxillary and mandibular incisors so that all the teeth and the

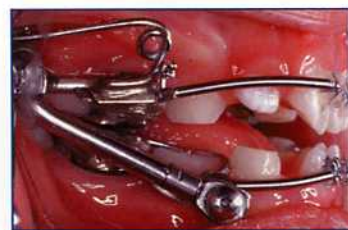
intrusion appliance can be used as anchorage to intrude the maxillary permanent first molars.

Often there is constriction of the maxillary arch. If the arch is not wide enough when the rods and tubes are attached, there will be interference with the mandibular cantilever arms, preventing closure of the mandibular teeth and/or the patient's mouth. If this is the case, a maxillary expander can be incorporated into the Herbst attached to the maxillary primary second molar crowns.

In several intrusion cases, we used only the maxillary arch as anchorage and experienced flaring of the maxillary incisors. To counter this effect, include the mandibular arch and attach the Herbst rods and tubes. Using the Herbst for Class II correction while intruding also involves lip seal and lip pressure to help maintain the position of the maxillary teeth.

Once the maxillary permanent first molars are intruded, the primary second molars will be in occlusion, holding the bite open. After intrusion is completed, attach the Herbst rods and tubes to the intruded maxillary first permanent molars and extract the maxillary primary first and second molars. The mandible will autorotate closed and the Herbst will hold the maxillary permanent first molars in place. To maintain maximum intrusion and stabilize the molars, place a light-cure bonding material on the occlusal surface of the molars to maintain occlusal contact.

After the teeth are intruded, use the appliance like a standard Herbst to correct the Class II. The key to stability is cuspid relationship. Overcorrect a full tooth based on cuspid relationship with the maxillary cuspids located distal to the mandibular primary first molars.



Intrusion Herbst engaged, intruding permanent first molars.



Intruded permanent first molars with primary second molars in occlusion, holding the bite open.



The mandible autorotated closed with extraction of primary first and second molars.

### CASE 1 - MIXED DENTITION

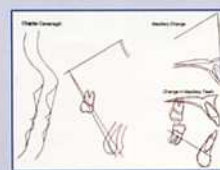
Male, age 8 years 10 months.  
Class II, long face and gummy smile, with difficulty in lip closure.

### TREATMENT PLAN

Impact the maxilla to decrease the mandibular plane angle and correct the gummy smile and difficult lip closure, allowing more normal growth and development.

### PROGRESS RECORDS

After 3.5 months of maxillary permanent first molar intrusion, the intrusion Herbst was removed. The upper tubes were moved to the axles on the first molar crowns and the Herbst mechanism was engaged, correcting the Class II. The primary first and second molars were extracted, allowing the mandible to autorotate closed. After 15 months of treatment, progress records were taken, with ceph showing an 8° closure of the facial axis. Maxillary and mandibular holding arches were placed, ending the first phase of treatment.





## PERMANENT DENTITION OPEN-BITE INTRUSION HERBST

The permanent dentition open-bite intrusion Herbst is more complicated. You don't have the option to extract primary first and second molars, and often, permanent second molars that also need to be intruded are present. If you need to intrude both maxillary first and second molars, intrude the first molars first. If you intrude the second molars first, there won't be any way to hold them in place. When intruding second molars, a second upper intrusion appliance will be necessary. With the permanent dentition open-bite Herbst, the initial appliance does not include crowns on the first molars if you are intruding both first and second molars. Intrusion of the first molars usually occurs in approximately three to five months, with an additional three to five months to intrude the second molars and three to eight more months for Class II correction.

**The maxillary appliance for first molar intrusion** is designed with first bicuspid crowns, allowing placement of first molar crowns if second molars aren't erupted (as in an adolescent open-bite case). For both adolescents and adults it is sometimes difficult to place adjacent molar crowns. Stops extend from the first bicuspid crowns to anchor them together and .036 stainless steel intrusion wires with helix loops are soldered to the first bicuspid crowns to intrude maxillary first molars. Cantilever extensions with .022 archwire tubes are soldered to the first bicuspid crowns, placing the maxillary Herbst axles toward the center of the first molars.



Permanent Dentition Maxillary Appliance (for first molar intrusion)



**The mandibular appliance** is designed with first molar crowns. Stops extend from the first molar crowns not only distally to the second molars but also mesially across the second bicuspid to the first bicuspid. The cantilever arms are offset low and gingivally with stops extending from the mesial end of the arms and resting on the first bicuspid. Archwire tubes are soldered to the cantilever arm above and centered behind the axle.



Permanent Dentition Mandibular Appliance

**The maxillary appliance for second molar intrusion** is designed with first bicuspid and second molar crowns. Stops extend from the first bicuspid crowns across the second bicuspid and onto the previously intruded first molars. There are .036 stainless steel intrusion wires with helix loops soldered to the first bicuspid crowns to intrude the maxillary second permanent molars. Cantilever extensions with archwire tubes are soldered to the first bicuspid crowns, locating the



Permanent Dentition Maxillary Appliance (for second molar intrusion)



axles distal to the first molars. The Herbst mechanism is initially attached to this axle during intrusion of the second molars. After intrusion is completed, the Herbst mechanism will be attached to the second molar crowns. The second molar crowns have an occlusal hole to accommodate the composite material placed over the occlusal surface of the molars, keeping the intrusion wire from slipping off the tooth and providing occlusal forces to maintain tooth position.

## PERMANENT DENTITION APPLIANCE DELIVERY

At the first maxillary appliance delivery, activate the intrusion wire 90°. To temporarily deactivate the activated intrusion wire and allow cementation, tie the intrusion wire down with a ligature wire. Cement the maxillary first bicuspid crowns with attachments to intrude the maxillary first molars. Remove the ligature wire after cementation. Bond all stops to the teeth with composite material as added anchorage to ensure stability. Also bond the end of the intrusion wires that rest on the occlusal tooth surface of the maxillary permanent first molars. Cement the mandibular appliance. Attach and engage the Herbst rods and tubes.



Intrusion was completed, but in this case only the maxillary arch was used as anchorage, which caused flaring. To counter this effect, include the mandibular arch and attach the Herbst rods and tubes.



At the next appointment, usually in two to three weeks, bracket the maxillary and mandibular incisors and maxillary cuspids to provide additional anchorage for intrusion of the maxillary first molars.

The intrusion portion of the Herbst was removed and composite buildup was placed over the occlusal hole in the first molar crowns to maintain maximum intrusion and stabilize the molars. The Herbst was attached to the axles of the first molars and the second bicuspid were bracketed to intrude the remaining teeth.

Often there is maxillary arch constriction, requiring expansion to allow the rods and tubes to be attached without interference with the mandibular teeth or mandibular cantilever arms. The rods and tubes cannot be attached until expansion is completed. Once expansion is completed, remove the expansion screw.

To intrude the maxillary second molars after the first molars have been intruded, disengage the rods and tubes and remove only the maxillary appliance – leave the mandibular appliance in. Take impressions (lower used as guide) for the new maxillary intrusion Herbst and an invisible retainer. Make the retainer immediately and give to the patient. This retainer will hold the first molar intrusion until the second maxillary appliance is delivered.

At the second maxillary appliance delivery, cement the second molar crowns with attached axles. Activate the intrusion wires 90°, tie down with ligature wires as before, cement the first bicuspid crowns and then remove the ligature wires.

After the maxillary second molars are intruded, remove the maxillary first bicuspid crowns with attached intrusion wires, leaving a standard Herbst in place on the maxillary second molars, which will be used to continue Class II Herbst treatment. (The key to stability is cuspid relationship. Overcorrect a full tooth based on cuspid relationship with the maxillary cuspids located distal to the first bicuspid.) Place a composite material buildup on the occlusal hole in the maxillary second molar crowns so the composite is in occlusion with the

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mandibular teeth, providing occlusal forces to maintain tooth position until the remaining maxillary teeth are intruded orthodontically.

Once intrusion is completed (whether only maxillary first molars or including second molars), bracket the remaining maxillary posterior teeth occlusally at separate appointments. Bracket the first molars, intruding them to the level of the second molars.

At the next appointment, bracket the second bicuspids and intrude. Follow this sequence until all the bicuspids are intruded and then place an edgewise wire to stabilize the teeth. Then remove the buildup of adhesive from the occlusal surface of the molars to allow the mandible to autorotate closed. Evaluate the smile line, intrude the incisors if necessary and then set the mandible to the maxilla.

## CONCLUSION

I believe that the intrusion open-bite Herbst has great potential. It allows us to treat very difficult cases that have not had good treatment protocol in the past. Along with the maxillary impaction and closure of the facial axis, an additional advantage of Herbst treatment is the downward and forward remodeling of the fossa, which has been shown in research. Fossa remodeling gives greater long-term stability of open-bite correction. In open-bite closure, one third of all open bites relapse. One main reason for relapse, whether treated surgically or nonsurgically, is that the condyle is distracted from the fossa. With my proposed treatment, I believe the fossa remodels downward and forward along with the impaction and closure of the facial axis, adding an orthopedic aspect to treatment that is not a part of current standard treatment protocols. If you are treating open bites with this approach, verification with a tomogram to confirm condylar position in the fossa prior to appliance removal is important.

When we started using the open-bite intrusion Herbst, I was happy to just close open bites and hoped to get better smile lines. Our treatment protocol now is to intrude the maxillary molars until we can visualize the smile line of the maxillary incisors relative to the lip, intrude the incisors if necessary, and then set the mandible to that relationship.

Time will determine the many advantages of this treatment approach, giving us potential for better results and long-term stability.

### References

1. Kelly, J.E. & Harvey, C.R.: Assessment of the occlusion of the teeth of youths 12-17 years. U.S. Dept Health, Education, and Welfare, Publication HRA 77-1644. Vital Health Statistics Series, 11:1-65, 1977.

2. Lopez-Gavito, G.; Wallen, T.R.; Little, R.M. & Joondeph, D.R.: Anterior open-bite malocclusion: A longitudinal 10-year postretention evaluation of orthodontically treated patients. Am J Orthod, 87:175-186, 1985.

## CASE 2 – PERMANENT DENTITION

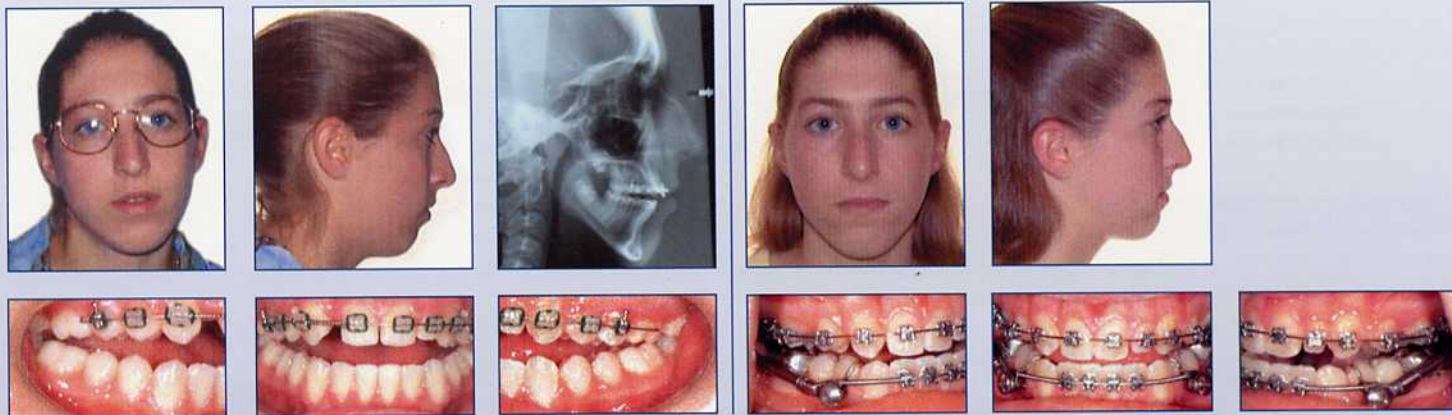
Female, age 15 years 3 months. Class II with severe anterior open bite.

### TREATMENT PLAN

Extract maxillary and mandibular permanent second molars to help close the severe anterior open bite, which would also eliminate the need to intrude the maxillary second molars (we rarely extract permanent second molars). Treatment to close the anterior open bite and correct the Class II malocclusion, allowing lip competency and decreasing the anterior facial height. Before referral to our office, she was scheduled for orthognathic surgery (transfer X-ray shown below – progress X-ray will not be taken until after Herbst treatment is completed).

### PROGRESS RECORDS

Thirteen months into treatment, her severe open bite was closed and she is now being treated as a standard Herbst patient. Space has been created in the posterior of the mouth to allow maxillary midline correction and create space where she is congenitally missing the maxillary right lateral incisor. The results we are seeing from this treatment are exciting. At the appointment prior to these progress records, her mother approached me with tears in her eyes and said, "I want you to know that this afternoon my daughter ate a sandwich using her front teeth for the first time in her life."





# DENTOALVEOLAR CLASS II CORRECTION

Matthew J. Coats, DDS, MS  
Flower Mound, Texas



After 8 years practicing general dentistry in Arlington, Texas, over 700 hours of continuing dental education, and advancing to the fifth continuum level while attending the L.D. Pankey Institute, Dr. Coats entered and completed the orthodontic graduate program at Temple University. He has extensive experience in restorative dentistry, occlusion and function. Dr. Coats is a fellow of the Academy of General Dentistry and an assistant clinical professor in the Department of Orthodontics at the Temple University School of Dentistry, while practicing orthodontics in both Flower Mound and Carrollton, Texas.

## THE COATS TRANSLATOR

Simple, efficient, predictable Angle Class II correction has been a much sought-after goal in orthodontics, with many different treatment approaches developed since the founding of the specialty. With the dentoalveolar treatment approach, the appliances used to distalize maxillary molars include the straight-pull, high-pull and cervical-pull headgears; Cetlin appliance; ACCO appliance; Jasper Jumper; Pendulum appliance; nickel titanium coil springs; magnets; bimetric distalizer; and a host of other appliances. This approach is not without side effects such as anterior anchorage loss, molar extrusion, molar tipping and relapse after appliance therapy. Lengthy treatment time for correction is also a hindrance. Unfortunately, to date no appliance (old or new) has addressed these unwanted side effects or lengthy treatment time in full. The purpose of this article is to present a new appliance that eliminates these side effects – the Coats Translator.

The Coats Translator is relatively simple to use and is available as a removable maxillary single arch, removable maxillary and mandibular double arch, fixed maxillary single arch or fixed maxillary arch and removable mandibular arch combination. The single maxillary fixed appliance is the most simple and predictable. It is also most suitable for children as a noncompliance appliance. However, it works equally well with adults. The number of teeth to be distalized determines whether a mandibular appliance will be needed for anchorage bolstering. Clinically, when second molars are present, anterior anchorage loss has not been observed. However, if the appliance is being used on an adult, the addition of a lower appliance is recommended.

### Functional Components

- Maxillary full-arch hard-acrylic splint.
- Flat plane of hard acrylic from the mesial of the maxillary first molar to the terminal end of the appliance.
- Maxillary first molar bands with vertical tubes.
- Removable maxillary first molar vertical distalizing springs.
- Mandibular full-arch hard-acrylic splint. Mandibular male attachments are integrated to join with maxillary female receptacles if desired for additional anchorage.



Mandibular male attachments are integrated to join with maxillary female receptacles if desired for additional anchorage.

### LAB REQUIREMENTS FOR FABRICATION

The lab requires only upper and lower stone models and a special centric occlusion bite registration (AOA/Pro Laboratory, Inc., hinge-axis controlled bite stick – 4 mm for double-arch and 2 mm for single-arch appliance). If you choose to retain the distalization with a Hayes Nance appliance after removing the Coats Translator, send the lab an additional pre-appliance-therapy upper impression with fitted bands.

## APPLIANCE INSERTION

The initial insertion appointment is very low stress for both the orthodontist and patient. This appointment, which includes cementing molar bands, should require less than 30 minutes.

- Cement the maxillary first molar bands. Since the bands will be used for only 6 to 12 weeks, excellent adaptation is not necessary. No problems or failures with fitted bands from the lab have been noted.
- Try-in the appliance for accuracy of fit. If necessary, remove any underside undercuts on the appliance that are preventing it from seating. Check the occlusion to ensure that at least a few posterior teeth are touching the appliance. If not, adjust the appliance as needed to aid in mastication and to eliminate occlusal interference and rocking of the appliance. Activate the maxillary first molar springs 5 mm.
- For a removable appliance, instruct the patient on insertion and removal and in wearing it 24 hours a day, 7 days a week, except during meals. Have the patient insert the appliance partially, insert the springs and then complete the appliance insertion. For a fixed appliance, isolate and acid etch all upper arch tooth surfaces. Pour a thin mix of any two-part monomer or polymer clear acrylic into the appliance, being careful not to pour acrylic into the flat molar trough or to use so much material that it is forced into the flat molar trough when inserting it.



Removable Appliance



Fixed Appliance

- After seating the appliance, insert the maxillary molar springs. With a rotation tie attached to the distal end of the spring, insert the spring into the molar tube using a Weingart plier. After inserting the springs into the tubes, loop the rotation ties over the molar band hooks with a hemostat. The rotation tie keeps the spring from coming out of the tube between patient visits. Finally, insert the springs into the sheaths on the appliance. A very active spring will protrude into the cheek slightly but will not cause patient discomfort. As the molars distalize, the springs will lie flat against the appliance.

## ACTIVATION APPOINTMENTS

Because the springs are fast acting, see patients at two-week intervals. Spring adjustment should take no more than ten minutes. The average time for completion of molar distalization is 60-120 days. Completion is judged when the maxillary first molars being distalized are 1 mm farther than an ideal Angle Class I relationship (super Class I). A visible red mark is built into the appliance to assist in assessing the achievement of Class I relationship.



# RED, WHITE AND BLUE INVISIBLE ACTIVE RETAINER SYSTEM

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"Hi doc. My son Jimmy's teeth are looking great! You know, I was wondering, I really don't want braces, but could you do something with my anterior teeth? This space bothers me as well as this sort of rotated lateral on the left side."

An opportunity has just presented itself... And AOA/Pro has a solution for you to offer those adult cases that seem to be just outside the normal range of removable tooth-aligning appliances or those patients who simply want the most aesthetic system possible to correct minor to intermediate anterior tooth irregularities.

Our Red, White and Blue System is based on the concept of aligning anterior teeth using invisible active retainers. A concept that was first developed by Dr. Robert Ponitz of Ann Arbor, Michigan, in the early '70s and detailed by Dr. James McNamara in his book "Orthodontic and Orthopedic Treatment in the Mixed Dentition," Chapter 19, published January 1993, Needham Press.



Technology offers us better materials to make invisible active retainers with varying capabilities that can be selected specifically to meet your patient's needs. The Red, White and Blue System consists of a series of three invisible active retainers. These retainers are fabricated by sectioning the anterior teeth from work models and resetting in progressively corrected "set-ups." At each step, an invisible retainer is fabricated, using the finest material available. The first series of three active retainers can be followed by an additional series, as the situation dictates. Each retainer is identified with a color dot to keep the wearing order simple and easy for your patient to remember - Red, White and, finally, Blue for final alignment and ongoing retention.

Lab Requirements - For this service, impressions must be taken with a material such as Extrude (polyvinylsiloxane) or Take One (hydrophilic, polyvinyl). These impression materials are manufactured by Kerr dental and may be ordered through your local dental supplier. AOA/Pro will pour the models.

Dennis Post, production manager at the Wisconsin laboratory (800-262-5221), and Liz Henrich, manager of the Connecticut laboratory (800-826-2224), will welcome any questions you may have concerning AOA/Pro's Red, White and Blue System.

## UPCOMING 2001-02 COURSES/LECTURES FOR CONSIDERATION

### DRS. TERRY & BILL DISCHINGER

**DISCHINGER ORTHODONTIC 2-DAY TRAINING CAMP**  
**IN-HOUSE HANDS-ON HERBST/DAMON 2 COURSE**  
October 19-20, 2001; February 15-16, 2002,  
April 19-20, 2002 - Lake Oswego, Oregon  
Doctor and Staff (limited attendance)  
Contact Paula Allen-Noble at (800) 990-3485

### DR. LARRY HUTTA

**IN-HOUSE HANDS-ON HERBST COURSE**  
October 5-6, 2001 - Worthington, Ohio  
Contact Vicky Sickles at (614) 885-2000

### DR. DIDIER FILLION

**IN-HOUSE LINGUAL BASIC & ADVANCED COURSES**  
Contact Dr. Fillion at 33-1-48-59-16-17

### DRS. JIM HILGERS & STEVE TRACEY

**ADVENTURES IN ORTHODONTICS**  
October 10-13, 2001 - Palm Springs, California  
Contact Suzie Gleason at (949) 830-4101

### DR. MARIO PAZ

**HANDS-ON LINGUAL ORTHO** (typodonts/patients)  
October 4-6, 2001 - Beverly Hills, California  
Contact Kaci Korkis at (310) 822-4224

### GORMAN INSTITUTE

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