Looked in the mirror lately? How often do you check the lateral view? Probably about as often as your patients do. Yet, since the advent of cephalograms, we as orthodontists have focused on the lateral X-ray as our primary source of skeletal and dentoalveolar data for diagnosis and treatment planning. It is my contention that frontal cephalograms, photographs and occlusal and basilar radiographs contain valuable information unique from that perspective and should be incorporated into our analysis. It is the foundation for treating the entire face three-dimensionally – not just the dentition. Asymmetries, in particular, are best detected from the frontal perspective at the diagnostic phase. It’s not unusual for the clinician and patient to pay less attention to asymmetry in a crowded or misaligned malocclusion. In fact, it may often be masked at that stage, only to become obvious after leveling and alignment. Then it may be more challenging to address. It’s better to detect asymmetry during diagnosis, factor it into the treatment-planning options and set expectations for different treatment options than to develop a rationale for discovering it and dealing with it as the case progresses. As we all know, such rationales at that stage can sound like excuses.

It was during consultations on re-treats, especially for surgical cases, that the failure to optimally correct facial asymmetries became apparent to me. Patients often seek re-treatment not because of their dentition, but rather because they aren’t pleased with the overall facial and esthetic outcome. A patient with straight teeth and a good, functional occlusion, yet who still has a smile line that is tipped or upper incisors that are off center from the face will probably not be pleased with the result.

Facial asymmetry is the rule rather than the exception (Figures 1a-c). It is common in nature, especially in patients having skeletal dysplasias, facial trauma histories, growth and developmental disharmonies, neoplasias, and/or TMJ disease. Dealing with asymmetry is no different from dealing with other abnormalities when it comes to making decisions regarding treatment. The model is this: When the issues are functional in nature, the clinician typically decides on the best alternative, with the patient trusting that judgment. When the issues are esthetic, patient input helps guide and takes priority in the selection of the preferred treatment option. Many times, cost and insurance reimbursement factor into the equation and the patient chooses a compromise from the optimal treatment. I recommend communicating directly with the patient regarding this model of decision-making, being particularly clear about what expectations the patient should have based on the treatment option chosen – especially if the patient has chosen a camouflage treatment.

**Dr. Duane Grummons** is recognized for his innovative approaches to orthopedic, TMD and orthodontic treatment, specifically using functional appliances. He has delivered presentations in 44 U.S. states, developed a textbook, videos and manuals on TMD, early treatment and nonextraction innovations and orthopedics, authored many articles for orthodontic journals and serves as a reviewer for the AJO/DO. He recently moved his family and his practice from Marina del Rey in Southern California to Spokane, Washington. With a D.D.S. from Marquette University, School of Dentistry and an M.S.D. from the orthodontic department of Fairleigh Dickinson University, Duane has been in private practice for 24 years. He has served as associate professor in the department of orthodontics at Loma Linda University since 1987 and is a diplomate of the American Board of Orthodontics.
Frontal Analysis

Hard-Tissue Analysis Easily Pinpoints Dental and Skeletal Asymmetries

The Simplified Grummons Frontal Asymmetry Analysis provides a practical method to determine the locations and extent of facial asymmetry using hard-tissue analysis (Figure 2). It is useful for orthodontic, facial orthopedic and/or orthognathic surgery applications and is of greatest clinical value when integrated with frontal cephalometrics, submentovertex and/or occlusal radiographs. It allows you to pinpoint the midsagittal reference (MSR) line in order to compare the right and left sides for transverse asymmetry, proportional relationships and overall facial harmony (Figure 3). Most computerized cephalometric programs now feature this analysis. I’d like to quickly review its use and then share with you how I address a variety of asymmetries in the clinic. The midsagittal reference (MSR) is the skeletal midline that allows you to easily

1. Reverse the frontal X-ray so it becomes an A-P view – Label the X-ray for left and right sides. (Pearl: When tracing the P-A cephalogram, reverse the X-ray, observing it as an A-P view. The tracing will then be as we see the patient on models, in photographs, and as they appear to themselves. This will minimize confusion during analysis and conversations with the patient and other clinicians).

2. Draw MSR –
   a) Bisect crista galli (Cg) or nasion (Na).
   b) Bisect anterior nasal spine (ANS).
   c) Extend beyond chin (Me).

3. Locate maxillary incisors in relation to MSR –
   Check incisors clinically to confirm the upper-dental-to-skeletal midline.

4. Locate midsymphysis of mandible –
   Determine how many millimeters the chin reference (Me) is located laterally from the MSR.

5. Draw occlusal plane (OP) – Use wire transversely across palate to depict true maxillary occlusal plane. (Pearl: When taking the frontal X-ray, position a 50 to 60 mm length of .014 wire at the mesio-occlusal of the maxillary first molars and have the patient bite down. The wire will be visible in the X-ray for tracing to identify the true maxillary molar occlusal plane).

continued on following page
compare the right and left sides of a patient's face in order to detect skeletal and dental asymmetry. It is constructed from the anatomic crista galli (Cg) vertically through the anterior nasal spine (ANS) and extends inferiorly beneath the chin (Me). From specific skeletal and dental landmarks, you can draw perpendicular lines laterally (transversely) to assess relationships between skeletal and dental references. Observing down the MSR line, you can easily compare the intersection of the right and left references at the point where they intersect the MSR to readily see and measure asymmetries (Figure 4).

![Figure 4](image-url)

For example, if the line from the right side antegonion (Ag) is 3 mm above the intersection of the left Ag line, then you know these points are asymmetric by 3 mm vertically. After you have made these determinations, there are at least five important questions to ask.

1. Is the maxillary width equally wide?

Case 1: A Straightforward Dental Asymmetry

Pretreatment – Female, age 28, presented with a posterior crossbite and midlines 3 mm off center.

Pretreatment – Her narrow smile left dark areas along the buccal corridors. There were multiple occlusal disharmonies and midline and crossbite irregularities.

Treatment in Progress – The surgically assisted RME jackscrew helped recreate space on the upper left by increasing the arch circumference.

Treatment in Progress – Orthodontic detailing was able to localize space for a premolar replacement.

Posttreatment – Re-treatment resulted in a symmetric smile that nicely fills and supports her soft tissue.

Posttreatment – Re-treatment resulted in a symmetric smile that nicely fills and supports her soft tissue.

Pretreatment – In order to replace the maxillary premolar that had been removed during previous orthodontic treatment, greater arch length was required.

Posttreatment – The upper teeth were relocated to match (MSR) skeletal midline. The final result was an optimal, mutually protected functional occlusion.
2. Is the occlusal plane level?
3. Is the upper dentition centered with the skeletal midline?
4. Are the upper and lower midlines aligned?
5. Is the chin centered or nearly so?

An off-centered midline is one of the most common asymmetries. Their etiology may be one or more of the following:
• Tooth-size discrepancy
• Missing teeth and migration
• Extra teeth
• Crowding
• Eruption sequence variation
• Crossbites
• Habits influencing facial morphology
• Mandibular functional shift or defective contacts
• Skeletal dysplasia
• Corpus length/mandibular body length variations
• Condylar hyperplasia or hypoplasia
• Condylar process remodeling, degeneration (condylysis)
• TMJ disc dislocation/dyscrasia or fossae changes
• Prematurely fused craniofacial sutures
• Paralysis, especially in young
• Neoplasia/tumors
• Airway compromise, typically greater on one side
• Cervical dysfunction, scoliosis, degenerative conditions.

Addressing a Dental Asymmetry
The patient in Case 1 provides a common example of a straightforward dental asymmetry, superimposed upon a symmetric maxillary transverse hypoplasia or narrow upper jaw. She consulted with me four years after her initial orthodontic treatment elsewhere because she did not like her facial result. Her chief complaint was that her midlines were off center and her upper smile width was too narrow. Her initial orthodontic treatment included the removal of her upper left first premolar. Treatment relapse caused the left buccal segment to tend toward crossbite. I recommended a

continued on following page
surgically assisted RME to increase the transverse width, gaining arch circumference and 7 mm of arch length, creating sufficient space to replace the missing premolar with a bonded pontic.

**Using Soft Tissue to Disguise Hard-Tissue Asymmetries**

With adults, it is sometimes possible to use soft tissue to disguise hard-tissue asymmetries. This technique is particularly useful when a patient has declined orthognathic surgery. Such was the situation in Case 2. The patient had concerns about her smile esthetics. Applying an interdisciplinary approach for such complex cases by a team of colleagues is best. The treating clinicians recognized the skeletal factors and underlying dental irregularities, coupled with periodontal and restorative issues.

In this case, the maxillary skeletal width was insufficient bilaterally, but more asymmetric on the side of the missing incisor. Irregular gingival margins related to the missing upper left lateral, asymmetric alignment and periodontal recession in certain areas. Fortunately, her upper lip drape and gingival/tooth display when smiling (animation) covered the gum line reasonably well. Research now shows that the adult female may respond minimally to dentoalveolar expansion after maturity. This patient responded to .25 mm each 4 days, which widened the maxillary arch at the molars by 6 mm. Orthodontic alignment and subsequent anterior veneers provided enhanced esthetics. The final gingival contours remained asymmetric (upper left cuspid next to the central incisor), but the lip covered and camouflaged it. If the gingival areas had been displayed more when the patient was smiling, the orthodontic approach may have required opening space for the missing left lateral incisor and/or gingivoplasty to create optimal gingival margins with the cuspids and centrals higher than the lateral incisors. Obviously, having four upper incisors in the final smile is preferred and makes for best smile harmony, symmetry and esthetics.

**Guidelines to Follow in Gauging the Soft-Tissue Smile Aspects**

These guidelines for determining optimal smile aspects assist in establishing facial harmony.

- The upper lip length is typically 20 to 23 mm from subnasal to lip embrasure. (This guideline serves for most ethnicities.)
- To be considered attractive, the upper gingival display should range from 0 to 2 mm above the incisors when fully smiling.
• The upper incisal display should be approximately 2 mm in repose.
Pearl: General guidelines have favored 2 mm of incisal display in repose. I have found that with relaxing and tonicity changes of the face and greater display of the lower teeth through aging, cases 10 to 20 years after treatment have benefited from a 2 to 4 mm guideline.
• The interlabial gap (ILG) should be 1 to 2 mm.
Pearl: A good method to get to the interlabial gap is to have the patient say the word, “Emma.” Just after the word is spoken, the lips relax and the measurement will be the most accurate.
Pearl: To simulate the most relaxed jaw posture and soft-tissue drape, instruct the patient to count backward from 80 to 70. This phonetic exercise reveals a muscually relaxed mandibular posture and vertical facial dimension.
Pearl: The effect of aging should be factored into treatment objectives. Per decade, people demonstrate approximately 1 mm less display of upper incisors at rest and when smiling. Males reach neutral sooner; upper incisors often display 0 mm at rest by age 40 to 50. Females typically reach 0 mm of upper incisal display by age 60.

Addressing Asymmetry in Three Planes with a Growing Patient
So far we have discussed adult cases. In the growing patient, of course, there are at least two other considerations: growth redirection (inhibition or expression of growth vertically) and maxillary orthopedic and/or dental expansion. One of my priorities with the patient in Case 3 was to address issues simultaneously in all three planes of space: widen the palate, distalize the molars and control the vertical dimension at the molars. To deal with such cases, I developed a multipurpose appliance called the GrumRax.
Similar to the Pendex and PhD appliances, the GrumRax expands and distalizes molars. In addition to these functions, it also controls the vertical dimension (3-D) and the maxillary molar position. In this case, the upper left molar needed to be intruded as it was moved distally in order for the occlusal plane to level and the midline to move toward the center. The appliance can also be used to extrude or hold molars against their usual eruption down the facial growth axis.

Outside-the-Box Appliance Designs

With thinking-outside-the-box appliance designs, you can efficiently customize treatment for any number of individual cases. Here are appliance designs that permit greater expansion/transverse changes on one side compared with the other (Figure 5a-c).

Addressing Excessive Upper Incisal Display (Gummy Smile)

When the objective is to get the incisors to match the lip line, a utility arch (.016 or .017 square Elgiloy/Azurloy™ or an .016 x .022 Ni-Ti®/TMA®) can be anchored to the GrumRax molar bands or to Herbst* crowns (Figure 6). The key here is to use very light forces. It typically requires 20 to 30 grams of force per tooth to intrude lower incisors and 30 to 40 grams per tooth for upper incisors, depending on the root surface area. The utility arch facilitates relocation of the upper incisors for optimal centering and provides upright angulation, resulting in the optimal vertical display of incisors in the smile. The utility arch can be cinched at the molar tubes and activated or shaped to move the midline of the upper incisors until the teeth become centered on the facial midline. With this segmental approach, the incisors remain upright and do not tip toward the midline. It is possible to intrude or extrude the incisors until the action results in the most esthetic upper incisor placement, both in repose and with animation.

Case 4: Articulating Complex Cases a Must

The case required surgical leveling of the occlusal plane and midline change to ideal with maxillary osteotomy, so the upper dental midline coincided with the skeletal facial midline (MSR).

* Herbst is a registered trademark of Dentaurum, Inc.
Articulating Complex Cases Ensures Accurate Diagnosis and Therapy
The adult patient in Case 4 clearly exemplifies why articulation of mounted models and A-P analysis are essential to provide a full understanding of complex cases for accurate diagnosis and treatment planning. This patient presented with a Class II skeletal open bite and associated maxillomandibular asymmetry. Her dental compensations and mandibular functional shift required articulated models to perceive and analyze the frontal asymmetry that would otherwise have been masked.

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Figure 6. An .016 square utility arch can be anchored to the GrumRax molar bands or Herbst crowns to relate upper incisors to the smile line for esthetic harmony.

The occlusal plane of the lower right teeth had needed 3 mm of dental elevation and eruption to the level of upper occlusal plane to resolve the asymmetric lower transverse.

In-Office Voyages of Discovery
Dr. Duane Grummons & Staff
June 22-23, 2000
September 21-22, 2000
Spokane, Washington

Join a limited-attendance group of like-minded specialists who are interested in developing expanded clinical skills that offer a variety of approaches to day-to-day clinical challenges.

- Removable – fixed therapies
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- Interdisciplinary care for adults
- Ortho-perio restorative options
- Treatment sequencing for best results
- Jaw stabilization aspects
- Imaging: interpretation and applications
- Orthognathic co-management
- Forms, letters and related communications
- Staff participation in these approaches

Each 2-day seminar features private lectures and direct patient care with limited registration to ensure individualized attention and discussions. There are combined sessions for doctors and staff as well as breakout sessions for each group. You are encouraged to bring at least one staff member with you. Included are a course syllabus, materials, lunches and Washington state continuing education credits (8 per day).

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To register, contact our seminar coordinator, Tracie, at (509) 328-5744 or fax (509) 328-5949.
How many times a day do your hands become teeth, with your fists as dentition to show patients and parents how teeth move? Well, I’ve found a way that beats hand movements hands down. It’s the At-Home Orthodontics CD-ROM. It uses movies, morphing and powerful close-up photographs with voice-overs to give patients a clear understanding of their specific orthodontic condition and a review of the entire treatment process. And it only takes a couple of minutes to set up at the initial exam. What’s different about this disc is that it’s designed to go home with the patient after the examination/consultation (Figure 1). Once Johnny sees it in the office, he’s going to want to show it to somebody.

First, he’ll want to show it to dad. As we all know, most dads are primarily concerned about the fee. If dad didn’t attend the exam/consultation, he doesn’t have much to go on except the fee. With At-Home, Johnny has a way to share his experience with dad and I have a powerful tool that markets my practice while families are making their decision. I always make the point at the initial exam that I have no doubt about my ability to straighten Johnny’s teeth. My goal at that first appointment is to establish a great relationship with patients and parents. I consider that to be one of the most important aspects of the treatment process. That relationship is part of what differentiates me when I am $300 higher than the orthodontist down the street. Giving patients this tool speaks volumes about how important communication is to that relationship. The fact that it’s on CD-ROM means I’m using the same cutting-edge technology that all the kids use everyday. I can see Johnny showing it to his father saying, “This CD is so cool. It shows exactly what my teeth look like and what Dr. Scott said will happen in my treatment.”

Using the Disc at the Exam/Consultation

I use At-Home first during the initial exam/consultation to describe the patient’s orthodontic problem. There’s no better way to show a particular orthodontic condition. If Susie is in the late mixed dentition with a Class II, division 1, with moderate crowding, she and her parents will see that type of case (Figure 2). The CD gives clear explanations of orthodontic terms, demonstrates the entire treatment process from records through appliances and includes important sections on oral hygiene and emergencies (Figures 3 & 4). It’s better than typodonts, models and photographs and a whole lot better than using my hands. I then customize the program with the patient’s name and a specific treatment plan, save it to the floppy disk and hand the floppy and the CD-ROM to the patient to take home.

I know what some of you are saying. It sounds too complicated. A floppy disk, a CD-ROM. But not to kids. They’re way ahead of us on this stuff. I have trouble getting on the Internet most nights because so many teens are talking on the phone with a friend and doing IMs online. :-( To those of you not in the know, IMs are instant messages where people talk back and forth online. ( Heck, I saw on the news this morning that baseball cards are available on CD-ROM.) What really sold me is that At Home passed my acid test for such products: It kept my 13-year-old son’s attention – and for half an hour! :-)

What’s more, the disc includes a free Web site and a link directly to it, providing a convenient way for patients who have reviewed their consultation to move directly to my home page for additional messages and the smiling faces of my staff and me.

Using the Disc at Banding

With a laptop at chairside, one of my clinical assistants walks the patient and parent through hygiene and emergency procedures at the bonding/banding appointment. These sections have universal application to any orthodontic office and are thorough and current with the latest technologies, including interdental brushing. Since it goes home, it

Dr. Michael Scott earned his D.D.S. from the University of Tennessee School of Dentistry in 1982 and his M.S.D. in orthodontics from Baylor College of Dentistry in 1984. He has lectured extensively in the United States, Asia, Latin America and Europe on the Orthos Appliance System, Copper Ni-Ti, early treatment, facemask therapy and is a proponent of extended treatment intervals. He maintains a private orthodontic practice in Longview, Texas.
with CD Technology

Figure 1: What makes this CD different is that it goes home with the patient.

Figure 2: Orthodontic terms such as Large Overjet are explained in everyday language with close-up photographs that reinforce the message. Morphing jaw changes with elastics makes the point far better than any hand gestures.

Figure 3: Laura Hammett, one of my clinical assistants, reviews oral hygiene and emergencies with the patient and parent chairside at the banding appointment. Notice the body language. You'd think it was Star Wars.

Figure 4: At-Home Orthodontics covers the spectrum of orthodontic treatment from records through retention, including oral hygiene and emergencies. Each section is cross-referenced to the entire list of orthodontic terms (shown on the left side of the screen) as well as to terms directly related to it. You can also customize the CD so that the patient sees screens specific to his or her treatment. Each image comes with an on-screen explanation and audio support, as well as direct links to emergencies, oral hygiene and your Web site on the Internet.

At-Home Orthodontics gives patients immediate access to the hygiene and emergency information they need, saving us time in the practice.

One thing that makes me so sure At-Home will be an effective marketing strategy for the long-term is my successful experience with the Something to Smile About practice video I developed through Ormco seven years ago. It was state of the art then and is still viable. Prospective patients often tell us not to send it because they already have a copy from a friend. New patients continue to mention that their child felt comfortable coming in because they already got to know us from the video. I expect At-Home will take on a similar life and its marketing usefulness will increase as kids show off their personalized CD to their friends. Many of those friends need braces, too.

At-Home Orthodontics was developed by orthodontists. Dr. Courtney Gorman and I were pleased to be asked to make recommendations for its development prior to its introduction. I can happily say that all my suggestions were incorporated and that I worked diligently to make it universal so it would have applicability throughout the specialty. My staff became familiar with the CD and provided feedback as well. Because they have no reservations about using it, they'll make it a vital and ongoing part of our marketing.
Creating Your Ideal Practice: It Takes Seeing the Big Picture. It Takes Vision.

by Rodney D. Littlejohn, DDS
Waterloo, New York

With MBAs the starting point for business achievement and books by Bill Gates and Michael Dell typical reading on the best-seller's list, it has become commonplace to speak of vision. The potential impact of vision is often taken for granted and even disregarded for more seemingly important, tangible concerns. I had never realized the power of a well-conceived vision until I recognized that running a growing practice demanded business skills I had not yet acquired. The practice and its supporting cast needed guiding principles to focus on and inspire them.

Leaders are readers. Read or, better yet, listen to audiotapes on leadership, developing people skills and customer service. Any book you pick up on leadership will talk about the importance of vision – a big, clear, compelling vision. You've focused your entire education on clinical skill development. It's now time to develop other skills for success – leadership skills that are integral to building and running a financially successful practice.

According to the Carnegie Foundation, only 15% of one’s financial success is due to technical knowledge. A full 85% is due to skills in human engineering (people skills), personality and the ability to lead people. Management of any enterprise, from the largest multinational concern to the two-assistant practice, must have a clear vision of where it's headed. This vision must strike a chord in and evoke the passion of every member of the organization. Webster defines vision as “the ability to imagine and prepare for the future.” A vision is a target that beckons, a huge dream that clearly outlines what you want your practice to become. It's a declaration of what's important to you. Vision sets direction.

The first step is to envision what is meaningful to you. How do you want your practice to run? What ambiance do you want to create? Consider your style – cool and professional, colorful and fun, caring and timely? What kind of image do you want to portray to the community? How important is team play and how involved do you want your staff in managing the practice? With the answers to these and other such questions, you are defining your ideal practice. With the end in mind, work backward to develop a game plan to get there. Keep it simple. Then write your vision statement as a declaration in the present tense, such as “Our practice delivers the best customer service available” or “We choose to be kind instead of right” or “We treat everyone as the most important person in the world. We treat them so well, they hesitate to leave.” By declaring your vision, you put it into motion. Create goals that support your vision with measurable criteria for assessing your performance.

Your vision needs to be clear and concise and your staff needs to understand what it means in terms of day-to-day behavior. Don't be a closet visionary. Read your vision every working day and live by it. Enlist staff members to use it to guide them in handling difficult situations. Role play. If Mrs. Smith is insisting on all afternoon appointments, how can the appointment secretary satisfy Mrs. Smith, fulfill the scheduling policy and serve the vision as well?

A leader's role is to be clear about their vision, be unconditionally committed to it, keep staff focused on its principles, operate out of it and lead by example. Compliment staff members when they exhibit behavior that supports the vision and mention the specific

continued on page 13
behavior to the entire group. In a staff meeting comment, “Tiffany, I really appreciate your jumping in to help chairside yesterday when we got backed up – without even being asked. You kept us on schedule, and that’s one of the ways our patients judge our customer service. Good going.” (Remember: praise in public; criticize in private.) When we lose focus on our vision, we’re still setting an example for our staff – just not a healthy one. They, too, will lose sight of the vision, and the messages to our patients and parents will become cloudy.

When hiring, be sure candidates can align themselves behind your vision. Create a picture of a typical day and ask them if it sounds like the kind of place where they’d like to work. Review the vision with the staff members if they seem out of vision, and if outplacement becomes necessary, use it to explain to them why the practice is moving on without them – because their performance is not consistent with the practice vision. Doing so keeps the communication clear and simple.

A well-considered finely crafted vision is a powerful tool for practice success. It establishes the unique character of your business and helps guide day-to-day interactions and decisions. Create your vision now. Dream big, like Walt Disney. Share your vision with your staff – massage it and change it from time to time. And, most of all, have fun. Carpe diem.

**Suggested Reading**


**Residency-to-Retirement Program Demonstrates Our Commitment to Long-Term Relationships**

Ormco’s Residency-to-Retirement Program acknowledges the need of orthodontic residents and recent graduates (up to five years) to augment their business and clinical knowledge beyond their academic curriculum in one-day workshops presented by experienced practitioners at locations around the United States. The practice management topics address issues of most concern to orthodontists at the beginning of their careers: fiscal management, customer service, leadership and marketing. Resident's Corner is an intermittent column that complements this program. For more information about this program, call Kathi Carpenter at (800) 854-1741 x 7272, or e-mail: carpentrk@sybrondental.com.

**Suggested Reading**


**Suggested Reading**


**Suggested Reading**


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A high percentage of malocclusions present with a deep-bite pattern. Diagnosis and treatment planning for the correction of this condition involves differentiating between two distinctly different types of deep bites. The first is caused by reduced lower facial height and insufficient eruption of the posterior dentition. The second is a result of supereruption of the anteriors.

Traditionally, when a deep bite is related to a lack of eruption of the posteriors, a removable biteplate or biteplane appliances have been used. These appliances permit only the mandibular incisors to occlude against the acrylic portion of the appliance, providing several millimeters of freeway space in the posterior region. The posteriors are then free to erupt until they are in occlusion. Effective bite opening requires that the patient use the removable appliance on a full-time basis; thus, the treatment is contingent upon excellent patient compliance. Recently Ormco developed a lingual bracket called the Bite Turbo to function as a built-in biteplate. Bite Turbos are modifications of lingual incisor brackets. Their biteplanes are parallel to the occlusal plane. The incisal edges of the mandibular anteriors occlude against these biteplanes in a fashion similar to the removable biteplate. Patient compliance is now eliminated (Figure 1).

Bite Turbos function most effectively when they are all placed at the same level, allowing an even distribution of the occlusal load. Improper placement may lead to supereruption of mandibular anteriors. I prefer to bond Bite Turbos only on the upper central incisors. The biting contact of the central incisors is ample to provide occlusion with the lower four incisors. I recommend a dynamic bonding technique that we developed for the precision placement of Bite Turbos. The steps of this technique are outlined in Figure 2.

**Dynamic Bite Turbo Placement and Removal**
Using a flexible cheek retractor allows the patient to close during the bonding procedure so that you can attain the desired

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**Dr. Martin Epstein** serves as associate clinical professor at New York University College of Dentistry, Department of Orthodontics, and on the attending orthodontic teaching staff at Staten Island University Hospital. He is engaged in the private practice of orthodontics in New York City and Staten Island, New York.

**Dr. Quat Tran** received his D.D.S. from the University of the Pacific in 1996 and his certificate in orthodontics from New York University in 1999. He has just recently gone into practice in San Jose, California, where he is focusing on finding solutions for everyday problems.
Step VII: Check that the lower incisors occlude evenly with both Bite Turbos.

Step VIII: Light cure at this position.

Step IX: Check the newly established vertical dimension for accuracy and desired posterior clearance.

Figure 1. Biteplate Effect of Bite Turbos.

Deep-bite pattern prior to Bite Turbo placement.

“Biteplate” effect after Bite Turbo placement.

Figure 2. Dynamic Bite Turbo Placement Technique.

Step I: Place an adequate amount of Enlight on the mesh pad of the Bite Turbo.

Step II: Place the bracket firmly on the incisal third of the lingual surface of the maxillary central incisor.

Step III: Guide the patient to bite down gently on the bracket until the desired bite-opening height is reached (accommodated by the use of a flexible cheek retractor).

Step IV: Remove any excess flash and light cure the Bite Turbo into place.

Step V: Repeat procedure on adjacent central incisor, placing the Bite Turbo slightly more incisally.

Step VI: Guide the patient to bite down gently until the exact level of the other Bite Turbo is attained.

Step VII: Check that the lower incisors occlude evenly with both Bite Turbos.

Step VIII: Light cure at this position.

Step IX: Check the newly established vertical dimension for accuracy and desired posterior clearance.

(Left) Final precision placement of the Bite Turbos.
bite-opening height. To ensure adequate working time for the precise placement of the Bite Turbos, use a light-cured bonding material such as Enlight™. I recommend use of a contra-angled utility plier or cutter to remove Bite Turbos. Ormco just modified and reintroduced the ETM Lingual Debonding Pliers that also can be used (Figure 3).

Deep Bite Case: Reduced Lower Facial Height and Low Mandibular Plane Angle
First, determine that the deep bite is related to reduced eruption of the posteriors. Cephalometric values will usually indicate a reduced lower facial height and an average or below average mandibular plane angle. The Bite Turbos can be placed on the maxillary central incisors at the time the maxillary arch is fully bracketed (Figure 4). The mandibular arch can remain without appliances for several months while the posteriors erupt into occlusion (Figure 5).

Case Report: Bite Turbos Can Produce a Bite-Jumping Effect
The patient is a 12-year-old female with a Class II molar occlusion and a deep-bite pattern characterized by a low mandibular plane angle (Case 1). Intraoral examination revealed the presence of an over-retained maxillary left primary canine and unerupted maxillary permanent canines. Bite Turbos were placed on the lingual surfaces of the maxillary central incisors using the Dynamic Placement Technique previously described. The incisal edges of the mandibular anteriors occluded on the horizontal biteplanes of the Bite Turbos. This permitted bite-opening by posterior eruption and uncoupling of the occlusion, allowing the mandible to fully express itself. Similar to a functional appliance, Bite Turbos can deprogram the occlusion and musculature, allowing the mandible to assume its uncoupled position. Six months after placement of the appliances, significant posterior eruption occurred and the mandibular arch assumed a more anterior position with the molars in Class I occlusion. The patient is now ready for bracketing the lower arch.

Conclusion
Bite Turbos are a beneficial addition to the repertory of appliances that can be utilized for bite opening. They are easy to place, well tolerated, do not require patient compliance and are easily removed.

References
Case 1. Bite Turbo Therapy.

Female, 12 years old, presents with a Class II dental relationship, deep bite and low mandibular plane angle with unerupted primary and permanent canines.

Pretreatment

The bite-opening effect of the Bite Turbos permitted posterior eruption as well as uncoupling of the occlusion, allowing the mandible to fully express itself.

Treatment in Progress

End of Bite Turbo Therapy – 6 months

With the mandibular arch having assumed a more anterior position, the molars are now in Class I occlusion and the patient is ready for bracketing of the lower arch.
Enlight and the lower viscosity Enlight LV* are light-cured bonding resins clearly indicated for use with aesthetic brackets, both ceramic and plastic. The photo-initiated resins continue to cure after the initial set, ensuring a thorough cure under metal brackets as well. The exposure time for light-cured resins under metal brackets with a filament bulb should be at least 30 seconds per bracket, exposing from multiple directions (Figure 1). A 10-second-per-bracket exposure seems to be adequate for both ceramic and plastic brackets (Figure 2).

One reason light-cured resins are recommended with clear brackets is that light provides the energy for the initiation of polymerization, replacing the amine polymerization accelerator found in self-cured materials. The amine accelerator in self-curing materials is one of the primary causes for resin discoloration. Light-cured materials undergo significantly less discolouration and, therefore, are better suited to keeping clear brackets clear.

As we all recognize, one of the greatest advantages of light-initiated resins is their extended working time. A popular procedure with light-cured resins is for staff members to perform the initial bracket placement followed by the orthodontist repositioning the brackets and then a staff member performing the light curing.

There is, however, a possibility for increased bond failures with the light-initiated resins because ambient light, particularly the operatory light, is enough to initiate polymerization. The cohesive strength of the polymer can be weakened if the bracket and bonding material is moved after the initial gel (beginning polymerization) has occurred. This weakened bonding material usually results in a cohesive failure (some or all resin remaining on the enamel and within the bracket mesh), not immediately, but within the first three months of treatment.

At what point the integrity of the cure is compromised enough to cause bond failure is, of course, highly variable. What we do know is that ambient light — sunlight, incandescent lights and especially the operatory light (fluorescent lights are not as troublesome) — begins to set light-cured resin rapidly. In a study reported in The Journal of the American Dental Association, August 1998, exposure to an operatory light for as little as 2 minutes...
polymerized the resin by almost 50% (Figure 3). The amount of polymerization will depend on the wavelength and intensity of the light. In our operatory, the dental light will set Enlight (or Enlight LV) in as little as 10 seconds. To eliminate costly, excessive bond failures, position and cure the brackets with minimal delay. If there is any delay between bracket placement and repositioning, shield the brackets and adhesive from light. Place a red (1st preference) or orange (2nd preference) plastic shield over the dental light if it is causing the adhesive to set too fast.

**Maximum Bond Strengths Require Time**

Another common cause of bond failures is placing too great a force on brackets early in curing the adhesive. All bonding adhesives (light-cured materials as well as self-cured) require at least 24 hours to reach their maximum strength. The cohesive strength of either light- or self-cured resins with metal brackets may be only about 50% of maximum at the time we normally place the first archwire – 10 to 15 minutes into the procedure (Figure 4). While light-cured resins have a rapid initial set, the degree of polymerization and bond strength under metal brackets is about the same as with self-cured resins at the time of archwire placement and ligation. With metal brackets, light-cured resins still require at least 24 hours to mature fully.

Maturing bonds need to be treated with care. Do not attempt to engage a large diameter or relatively stiff archwire at either the bonding or rebonding appointment. If you are already into a larger, stiffer archwire when rebonding, back up to a lighter smaller archwire for one visit. It might also be a good idea to leave that rotation until the next visit. Whether bonding or rebonding, use large elastic ligatures on new bonds. Caution patients to eat only soft food during the first 24 hours after bonding or rebonding.

Replacing bonded brackets is costly – as much as $100 to $200 per bracket in labor and overhead. It can also extend treatment time and is highly inefficient. As we begin extending appointment intervals by capitalizing on the properties of the titanium alloy archwires, keeping bond failure rates down takes on added import. With careful protocol, you can take advantage of the advanced properties of light-cure, keeping bond failures and added costs at a minimum.

**References**


Figure 3. Exposure to the dental operatory light for 2 minutes achieved nearly half the total polymerization obtained from the curing light. *The Journal of the American Dental Association*, August 1998.

Figure 4. While light-cured resins have a rapid initial set, the degree of cure (and thus the bond strength under metal brackets) at the time of wire placement (10-15 minutes after bonding) is not much more than self-cured systems. With metal brackets, light-cured resins still need 24 hours to mature fully. *American Journal of Orthodontics and Dentofacial Orthopedics*, October 1996.
Hyper-Aesthetic Orthodontics: Standing Out from the Crowd

by Stephen Tracey, DDS, MS
Upland, California

“Tastes great!”…“Less filling!”
“Tastes great!”…“Less filling!”

The point is they’re both right – depending upon your point of view. But what does a beer commercial have to do with orthodontics? Stay tuned and you’ll find out.

Several years ago, Dr. Jim Hilgers coined the term “Hyper-Efficient Orthodontics” and, in great part, was responsible for the movement away from mechanics that depended upon patient compliance in order for cases to be completed successfully. While headgears and removable functional appliances may still have a place in some orthodontists’ armamentarium, most of us would be hard-pressed to classify them as hyperefficient. Consequently, use of Herbst* appliances of all types – Jasper Jumpers, Bite Fixers, Eureka Springs, and the Pendulum family of appliances – has become common in the hands of many a practitioner. Lots have jumped on the bandwagon (or, more correctly, the freight-train) and now we even have self-ligating brackets, which seem to offer another level of hyperefficiency.

Well, if there is one thing I’ve learned from Jim, it’s this: If everyone seems to be looking in one direction, it’s probably time to be looking in another.

Although the story’s become cliché, it’s probably worth repeating that when asked what made him so much better than all his peers, hockey legend Wayne Gretzky said, “While everyone else skates to where the puck is, I skate to where the puck is going.”

So with that in mind, I’d like to jump off the hyperefficient freight train just for a moment and suggest that maybe we should be looking in a different direction. (And I’m certainly not discounting quality results. Let’s take quality as a given.) I might be wrong, but it seems to me we have become so obsessed with efficiency in orthodontics today that we may be overlooking something I believe to be even more important – aesthetics.

Now before you get all riled up, I am not saying hyperefficient, non-compliance appliances are not important – they are. What I am saying is this: They are an answer to challenges as seen through the filter of what’s most important to orthodontists, not necessarily what’s most important to patients.

Yes, patients want treatment to be convenient. Yes, patients want to complete treatment as quickly as possible. And, yes, many of the appliances we consider hyperefficient were developed as aesthetic alternatives to traditionally unaesthetic appliances such as headgears. But ultimately, if you stop to look through the patients’ eyes, you’ll see that patients not only want treatment to be convenient, quick and painless, they want it to be aesthetic.

I can see it now, our previously mentioned beer commercial mutated into a stimulating discussion on what’s most important in orthodontics today. On one side of the table is a group passionately chanting “Works efficiently!” while on the other side of the table is another group chanting just as enthusiastically “Looks great!”

* Herbst is a registered trademark of Dentaurum, Inc.
“I am thoroughly convinced that the most successful practices in the new millennium will be, first and foremost, obsessed with aesthetics.”

Works efficiently!”…“Looks great!”

Works efficiently!”…“Looks great!”

I could be wrong, but something tells me our hyperefficient pal, Jim Hilgers, would be on my side of the table shouting “Looks great!”

What makes me so sure about all this aesthetic mumbo jumbo? Let me tell you a little story. Once upon a time there was an orthodontist who already had what most people would consider a pretty darn successful practice in beautiful Upland, California (on the corner of Euclid and “F” Street, thank you very much). In spite of a definite belief in and commitment to hyperefficient orthodontic treatment, this wisdom-seeking Jedi had a gnawing in his gut that there was more to his patients’ expectations than hyperefficiency. So in his quest for ultimate truth, he decided to give his patients a choice – with no strings attached.

“Mini metal braces?”…“No problem.”

“Gold braces?”…“If that’s what you want.”

“Colors?”…“Absolutely, a virtual rainbow of colors.”

“Clear braces?”…“Of course, and with no extra charge.”

Much to his surprise, once he made cost irrelevant, at least nine out of ten patients chose clear braces, regardless of age, and his practice began to grow exponentially.

Orthodontic patients have always wanted to look their best. For most, it’s why they come to us in the first place. But when presented with the specter of additional cost and the possibility of extended treatment time and compromised results for clear brackets, they are easily coerced into accepting something they may perceive as less than the ultimate in aesthetics.

The fact is, things have changed dramatically since the introduction of the first clear brackets in the early 1980’s. Both bracket design and materials have radically improved over the last 20 years, making the difference between metal and clear brackets negligible. It’s just that we’ve told our patients and ourselves the story so many times, we’ve failed to notice the changes. We’ve failed to notice that in spite of the fact that more and more patients are choosing clear brackets, appointment intervals continue to extend further and further. We’ve failed to notice that producing quality results with clear brackets is easily doable without extending overall treatment times. Overall, we’ve failed to notice the opportunity to grow our practices by giving patients what they’ve wanted all along - the chance to be attractive, not just after treatment, but during treatment as well.

Of course, one would expect that most adults would choose clear braces when given the choice, but the kids, too? Yessiree – as long as they could have colored ligatures. Clear braces with colored ligatures? What the heck is going on here?

What’s going on here is this: When given a choice, free from additional cost, patients will nearly always choose clear brackets, by our definition, the most aesthetic appliance available. But here’s the catch. What’s most aesthetic is not really up to you or me; it’s up to the patient. When it comes to braces, beauty is in Dr. Stephen Tracey believes in combining innovative yet prudent orthodontic mechanics with the seemingly limitless potential of the human spirit to create practice success through technology and teamwork. An active civic leader, he founded a 5k run to raise money for indigent dental care, served on the board for LEAP for Excellence which supports educational programs in high-need areas and founded Wings of Love, another charity fundraiser. His interest in pursuing what’s possible led him to the blistering lava fields of the Ironman Triathlon, a climb to the summit of Mt. Rainier and a 110 mile trek in the Amazon. Locally, he manages an active practice in Upland, California, and serves as assistant professor at Loma Linda University, where he earned his D.D.S and M.S. in orthodontics and where he was named instructor of the year in 1995. He has written articles for numerous orthodontic publications and has lectured in 13 countries.
When Ormco and “A” Company merged a year ago, the two engineering teams joined forces, bringing to bear their combined engineering acumen to create our newly designed and manufactured sapphire bracket – the only crystal clear bracket available in orthodontics. Made of chemically inert, pure, monocrystalline sapphire, inspire! will not absorb, stain, cloud or discolor. It goes on clear and stays clear throughout treatment. Improved heat treatment ensures reliability by maintaining the strength of the material, making it highly resistant to fractures.

Modifications of the tie-wing geometry of inspire!™ make the wings more available for ligation and produce more robust wing strength, which significantly reduces the potential for wing failure. Greater under-tie-wing space accepts double ligatures without increasing the overall dimensions of the bracket. Improved tumbling has resulted in better rounding of corners and edges, which fosters greater patient comfort and minimizes wire binding.

inspire! is a pure A+ Straight-Wire®, true twin appliance. That means you can combine it with any other Straight-Wire bracket within the arch without compromising the precision of treatment. Its mechanical ball base achievies consistent bond strength with a reliability equal to traditional stainless steel mesh. No special primers or adhesives are necessary. inspire! incorporates Ormco’s patented Face Paint™ System, designed to facilitate identification as well as provide crosshairs for ease of bracket placement.

Debonding inspire! is a snap…literally. Just squeeze the mesial and distal sides of the bracket and it’s off. Its mechanical ball base is designed to leave a clean adhesive layer on the tooth for safety and to avoid damage to the enamel.

Finally, you have aesthetics and function combined in one appliance. inspire! is available in 5x5 upper and 3x3 lower, Roth prescription. Both .018 and .022 slot sizes are available with or without cuspid or bicuspid hooks.

1U.S. Patent No. 4,595,598
2U.S. Patent Nos. 5,071,344; 5,197,873
3U.S. Patent No. 5,074,783
Dr. Tracey

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the eye of the beholder. Consequently, the first rule of what I call hyperaesthetic orthodontics is this: Aesthetics is whatever the patient says it is… period, end of story!

What about self-ligating brackets, you ask? Quite honestly, they’re a bit of a hard sell for me at this point in time. For adults, they’re not clear enough. For kids, they’ll work only if they can have colored ligatures as well (which you have to admit tends to defeat much of the purpose).

There is no doubt in my mind that friction-reducing passive self-ligation is the wave of the future, but, for me, it will become viable only when it becomes aesthetic in the eyes of the patient.

So where am I going with all this talk of “Hyper-Aesthetic Orthodontics?” I am thoroughly convinced that the most successful practices in the new millennium will be, first and foremost, obsessed with aesthetics. Let me repeat that: I am thoroughly convinced that the most successful practices in the new millennium will be, first and foremost, obsessed with aesthetics. And not just with regards to treatment modalities. The savvy orthodontist will consistently incorporate aesthetics into each and every part of his or her practice, including office design and appearance, logos, brochures, uniforms, advertisements (yes, advertisements), as well as sounds, scents and lighting to create memorable sensory experiences—unique experiences that will provide a vital competitive advantage to those willing to innovate.

In the next edition of Clinical Impressions, I will address a number of the common concerns doctors express when I talk about an “all-aesthetic” practice, share the marketing philosophy that has catapulted my growth and explain some of the science of the new aesthetic material that give us the means to provide patients with what they want while maintaining the efficiency we have come to expect.

Dr. Grummons

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Differential Protraction Facemask Therapy

Maxillary orthopedic development and expansion provide significant benefits. Asymmetrical facemask protraction (Case 5) can be helpful in altering the upper dental midlines and upper jaw position (RME/RPE screw placed at an angle – see Figure 5b on page 8) or can be used with elastics to differentially advance the lower arch.

Conclusion

Comprehensive clinical approaches by thorough colleagues must include the frontal perspective and the information garnered from it. Not to provide such three-dimensional assessment and therapy denies patients the best possible care.

Much gratitude to Ms. Teri Anyan of my exceptional staff for her significant contributions to this article.

References


Case 5: Facemask Therapy

The Grummons orthopedic facemask easily shapes to the face and gains its anchorage without compressive force against the mandible or TMJ component.

Elastics are placed from the buccal arms of the RPE to the crib area of the facemask. Greater force load is placed on the side that requires more asymmetric/forward movement.

Facemask therapy on a growing patient transforms a negative convexity, Class III profile into nicely balanced facial proportions with maxillary skeletal (1.5 mm) and dental (2.5 mm) advancement and nasal tip elevation.
## Lecture/Course Schedule at a Glance

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*Typodonts and/or Participation

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