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Full-Mouth Rejuvenation Using the Biologic Approach: An 11-Year Case Report Follow-Up

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ABSTRACT

Bioesthetic dentistry is a conservative interdisciplinary approach to the restoration of dentition to its natural form and function. It requires the examination of the patient's teeth, gingiva, lips, smile, and face as a single collective structure, rather than considering them as individual units. Long-term appearance and harmonious function depend on a cohesive relationship between the anterior and posterior dentition, the temporomandibular joints, and the neuromuscular system. This article summarizes the initial treatment of a patient and presents the observations evidenced during the 11-year long-term rehabilitation. Slides and drawings illustrate the progress. The patient's dentition is juxtaposed and compared with that of a man of the same age group with ideal, intact dentition. The follow-up results show that relaxation of the facial complex becomes evident when the orofacial dentognathic system is in equilibrium, and that it remains free of muscle tension for years to come.

LEARNING OBJECTIVES

After reading this article, the reader should be able to:

- identify natural guidelines for the long-term rehabilitation of the orofacial dentognathic biologic system.
- describe the significance of posterior guidance and the need to develop natural (sharp) posterior cusp forms to execute this function.
- identify a method for altering vertical dimension without significant consequences on a long-term basis.

"Bioesthetics studies the beauty of living things in their natural forms and functions," states Lee[1] in a 1982 publication on anterior guidance. The success of functional and esthetic dentistry depends on the clinician's understanding of the morphology of natural dentition, including tooth position, temporomandibular joint (TMJ), and gingival contours, and the influence of these elements on the dental, dentofacial, and facial complexes. Such success requires the understanding of the entire dentofacial system. This article discusses the concept of bioesthetics, the interdisciplinary approach in dentistry, and the interrelationships between function and objective esthetics. Application of these concepts allows the clinician to provide restorative care that is both functional and esthetic.[2,3]

Lee was one of the first clinicians to examine, observe, and measure healthy human dentition

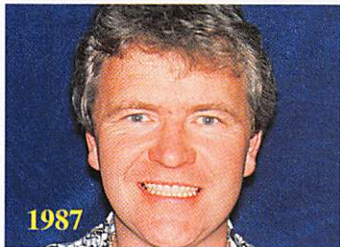

Figure 1—Pretreatment facial appearance of the patient exhibits muscle tension with a rhomboidal shape.

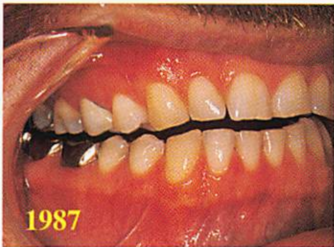

Figure 2—A horizontal pattern of mastication has developed, causing additional wear to the existing severely worn occlusal surfaces.

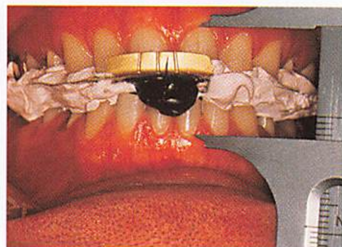

Figure 3—View of the centric wafer discluder (greenstick compound) that is used to deprogram the neuromuscular system to establish an optimal centric bite.

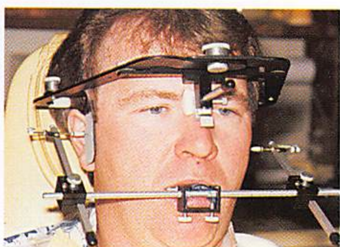

Figure 4—An axi-path recording is used to establish the hinge axis, condylar paths, and the Bennett movement.

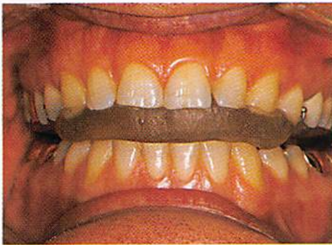
Figure 5—A stable condyle position in centric relation is best established with a properly constructed, fitted, adjusted, and maintained anteriorly guided occlusal orthosis. Note the absence of the posterior occlusion; only anterior occlusal contact is present.

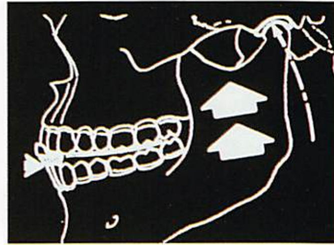
Figure 6—The drawing depicts autorotation of the condyle into the superior/anterior/medial (SAM) position by means of contraction of elevator muscles to seat in the condylar fossa. (Courtesy of Robert L. Lee, MS, DDS.)

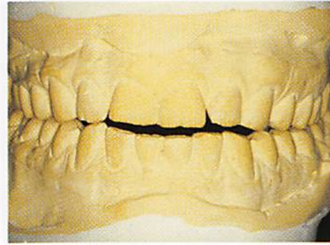
Figure 7—Anterior teeth are out of occlusion in centric relationship. Please note in maximum intercuspation the anterior teeth are in contact.

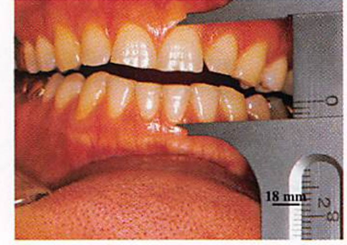

Figure 8—A preliminary estimate of 18 mm was used to establish the final vertical dimension, which was established by parameters subsequently discussed and developed in the wax-up shown in Figure 10.

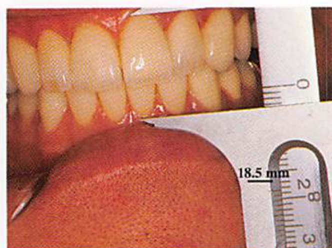

Figure 9—Completion of the case at 18.5 mm vertical dimension—an increase of 4.5 mm.

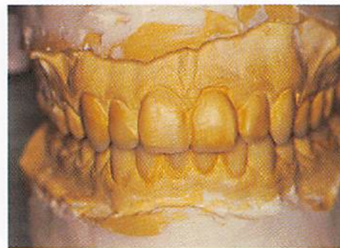
Figure 10—The wax-up was completed to fabricate the provisionals at a vertical dimension of 19 mm to allow some vertical dimension refinement during the final adjustment of the occlusion.

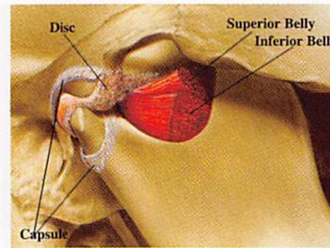

Figure 11—The attachment of the lateral pterygoids, the disk, and the capsular relationship to the condylar head. (Reprinted with permission from Quintessence Publishing Co.)

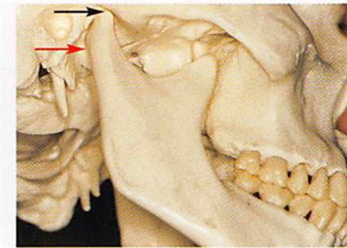
Figure 12—The black arrow is pointing to the lateral head of the condyle, the red arrow to the mesial.

and soft tissues in people aged 30 and older that showed little or no wear.[1] He completed the work in 1990 and published the findings in *Fundamentals of Esthetics*.[4] In his quest to understand how the human dental system functions in health, Lee used his previous studies of advanced biology to facilitate his study of optimal biologic systems. He observed and recorded the similarities in nature's most successful, long-lasting, and unworn dentitions. These discoveries led to a paradigm change in the methodology of his dental practice. By applying the qualities he observed to be successful in nature to the restorative procedures he used for his patients, he found his comprehensive cases became more predictable, functional, and esthetic, with long-term stability. He discovered that this type of approach was superior to any treatment he had used previously. It was from the blending of biology and dentistry that Lee coined the term "bioesthetic dentistry"—a treatment concept based on healthy human dentition.[5] The work of other clinicians supported Lee's observations, and dentists became identified as "hard tissue plastic surgeons."[6]

Dahl and Krogstad[7] published a study in 1985—conducted within a period of 5 to 8 years—which indicated that increases in occlusal face height (averaging 1.9 mm) were well tolerated and did not result in a rapid return to the base. No relapse occurred in any of the cases that were followed during an average observation time of $5^1/_2$ years. Mack[8] stated in 1991 that "the occlusal plane is ultimately the determining factor in restoring necessary facial height." By altering the vertical dimension and developing the appropriate symmetry, a significant facial change is effected. As stated by Charles Wold, DMD, director of the Orognathic Bioesthetics International, Inc., Salem, Oregon, "Long-term diagnosis is anticipation of what is going to happen 20 years down the road" (personal communication, September 1999).

When reestablishing vertical dimension or freeway space, phonetics was not considered in the earlier restorations. According to several investigators, the clinical rest position changes and adapts to the new vertical dimension of occlusion.[9-11]

It was from the blending of biology and dentistry that Lee coined the term "bioesthetic dentistry."

The interocclusal distance varies because it is controlled by tonic muscle activity, which is influenced by the vertical dimension of occlusion. Airway, posture, tension, and phonetics may influence this position, but normal clinical functional movements of the mandible originate from a clinical rest position, not from phonetics.

The presentation of the current 11-year follow-up substantiates the observations of the above authors.

Case Presentation and Treatment

A 30-year-old brachyfacial-type man, characterized by a diminished lower-facial height, presented for dentofacial treatment in 1988 (Figure 1).[12] In addition, there had not been compensatory eruption of the maxillary apparatus to compensate for the wear of the patient's 32 maxillary and mandibular teeth (Figure 2).[13]

A complete series of color photographs, 3 × 5 orthodontic series, a CR record (Figure 3), axi-path recording (Figure 4), and tomographic and cephalometric films were used to document the pretreatment condition. The TMJ complex was asymptomatic and no abnormalities were seen on the tomograms. A maxillary anterior-guided orthosis was prepared and comfortably worn by the patient for 2 weeks

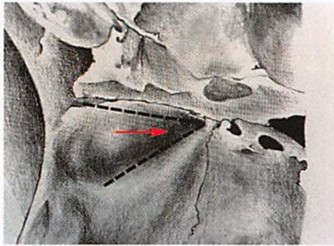

Figure 13—The red arrow is pointing to mesial condylar head depicting a bone-brace relationship in the condylar fossa. (Reprinted with permission from C.V. Mosby Co.)

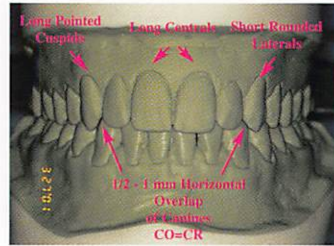

Figure 14—Model of an unworn or slightly worn dentition mounted in centric relationship, showing the occlusal scheme between maxillary and mandibular teeth to provide incisive guidance and to allow a marginal relationship with the cusp of the posterior teeth.

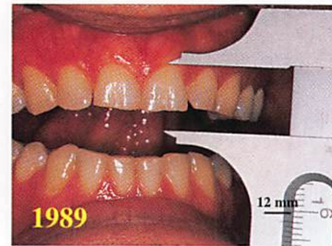

Figure 15—To achieve proper incisive guidance, 4.5 millimeters of unsupported porcelain is added to the veneers.

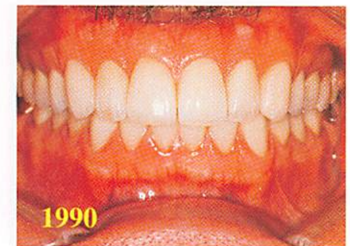

Figure 16—Model of a well-occluding dentition. Maxillary central incisors and canines are positioned approximately the same vertically, and the lateral incisors are shorter, cervically and incisally, as seen in the biologic model shown in Figure 14.

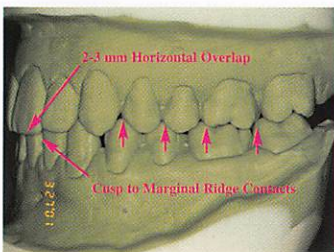

Figure 17—Model for comparison. An ideally occluding dentition with correct anterior and posterior teeth position for proper mastication.

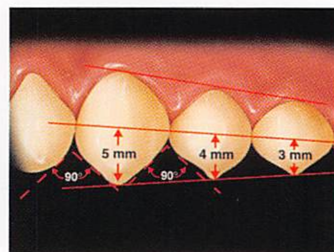

Figure 18—Drawing of distally converging lines (gradation effect) demonstrates height of the cementoenamel junction (CEJ), interproximal contact points, and buccal cusp tips. (Reprinted with permission from Practical Periodontics and Aesthetic Dentistry.)

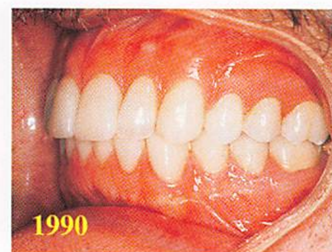

Figure 19—Patient in 1990, left lateral view. The vertical dimension was reestablished, and the occlusal plane placed the correct vertical loading on the posterior teeth, as in the ideal model.

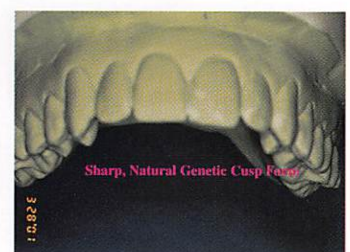

Figure 20—Comparison model of the ideal maxillary dentition, prepared for comparison with the rejuvenated teeth.

until centric relationship was achieved, without any clinical indications of TMJ dysfunction (Figure 5).[14,15] This mandatory procedure was necessary to allow the condyles to assume their superior, anterior, and medial (SAM) positions in intimate contact with the thinnest part of the biconcavity of the disc (Figure 6). The orthosis allows for the diagnosis of a true centric relationship from maximum intercuspation (MI≠CR) (Figure 7). It also permits the entire TMJ complex to attain improved functional health; it allowed the posterior avoidance patterns of occlusion to wane and a new vertical dimension to be established (Figures 8 and 9).[16-19]

The orthosis enabled an esthetic evaluation of the patient's entire craniofacial complex to ascertain that the craniomaxillary segment of the lower third of the face was in accordance with the "golden proportions."[20] This evaluation was one of the factors that guided the determination of the patient's proper vertical dimension.[4,8,20-22] Another requirement was the creation of sufficient space to develop sharp posterior teeth. By increasing the length and width of the anterior/posterior teeth and tooth morphology, the dentofacial symmetry and facial esthetics were restored. The procedure

The 11-year postoperative views reveal that the restoration/ rejuvenation is still functioning.

also ensured that the diagnostic measurements of condylar movements and CR were accurately recorded, and condylar stability verified with Condyle Position Indicator (Panadent® Corp.). It provided training in anterior-guided mastication cycles because there was no contact of the posterior teeth on the orthosis, eliminating eccentric contacts (Figure 5).[1]

After orthotic therapy, a diagnostic wax-up was completed on a set of study models (Figure 10) and mounted in CR. As with CR, the creation of the proper vertical dimension of occlusion is of critical importance.[17-19] The desired vertical dimension was estimated to be 19 mm (measured from the cementoenamel junction [CEJ] of the maxillary central incisor to the CEJ of the mandibular central incisor) (Figure 3). Porcelain veneers were placed on teeth Nos. 6 through 11 (cuspid to cuspid, inclusively) in the maxillary arch, and teeth Nos. 22 through 27 in the mandibular arch. The posterior teeth were restored with porcelain-fused-to-gold or gold crowns at the new vertical dimension.

Comparison of the Case with Intact Dentition

Before discussing the changes that have taken place during the 10 years that followed, let us compare the restored case with an ideal healthy and stable dentition of a man the same age. This intact oral environment, containing natural dentition, is typical of those observed because it shares the common attributes with the dentitions examined and reported by Lee.[1,4] Why did one case deteriorate, whereas the other remained intact? In the healthy dentition, when the teeth of both dental arches are in complete contact, the condyles are in the most SAM position, engaging the thinnest portion of the articular disc (MI=CR). In a worn dentition, as depicted in Figure 7, centric relationship is not coincident with maximum intercuspation (MI≠CR). The anatomic shape of the condylar head conforms to the condylar fossa. Some clinicians have observed that, when crushing the bolus of food, the anatomic design of the condylar head is seated in the fossa to support the forces of mastication, and the compression is important in de-

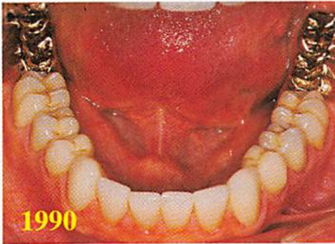

Figure 21—Patient in 1990. Occlusal mandibular view of the rejuvenated dentition.

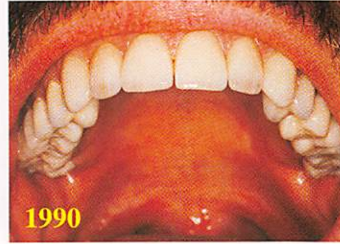

Figure 22—Patient in 1990. Anterior-occlusal view of the rejuvenated maxillary arch. In Figures 20 and 21, note the development of sharp genetic tooth forms, which ideally create a cusp to marginal ridge relationship.

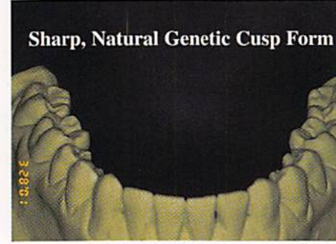

Figure 23—Model of the ideal mandibular dentition. Note the cusp development. Cusp development of the maxillary and mandibular teeth shown in Figure 20 necessitates chewing in a vertical plane.

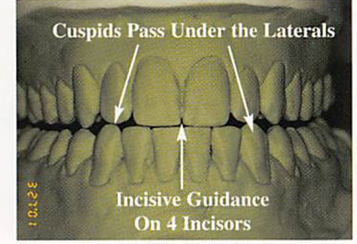

Figure 24—Model of the ideal occlusion. Note that during incisive guidance the mandibular canines pass through the maxillary laterals.

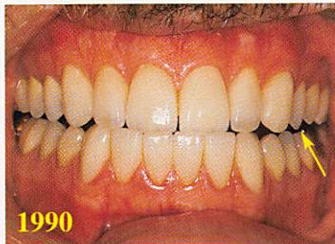

Figure 25—Patient in 1990. Anterior occlusal view of the patient treated. Note that the human rejuvenation follows the model with ideal dentition.

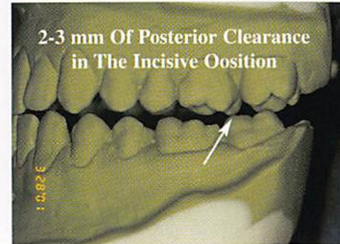

Figure 26—The model indicates that there must be a minimum of 2 to 3 mm of clearance between the posterior teeth during incisive guidance. Note the yellow arrow shown in Figure 25.

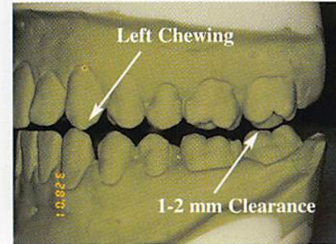

Figure 27—Left lateral view of a model demonstrates canine guidance with appropriate posterior clearance of 1 to 2 mm on the masticating side and 2 to 3 mm on the nonmasticating side.

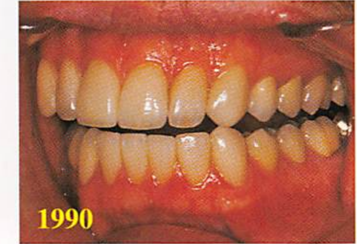

Figure 28—Patient in 1990. Left lateral view of the rejuvenation, showing canine guidance with an appropriate posterior clearance, even with sharp posterior cusp forms.

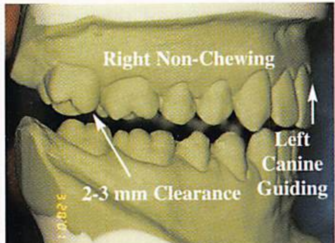

Figure 29—Right lateral view of the model, displaying posterior clearance, even with sharp posterior cusp forms.

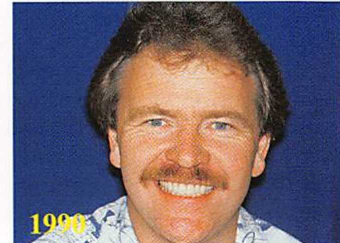

Figure 30—Anterior full-face view of the patient in 1990. When the orofacial dentognathic system is in equilibrium, a relaxation of the facial complex becomes evident.

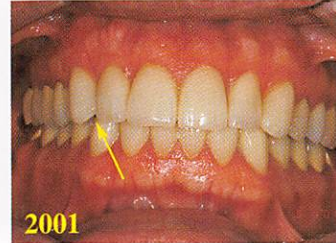

Figure 31—Patient in 2001, at the 11-year follow-up. Anterior view. There are no incisal fractures in the maxillary teeth with 4.5 mm of unsupported porcelain shown in Figure 15.

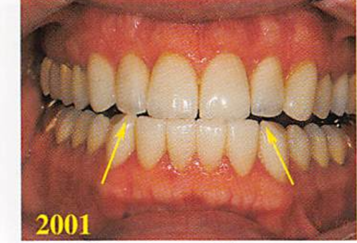

Figure 32—Patient in 2001, anterior view. There is no significant wear on any buccal cusp tips other than the cuspids.

livering nutrients to the joint tissue (Figures 11 through 13).[23-25]

Genetic unworn or slightly worn tooth morphology is present in nature (MI=CR) (Figure 14).[26-28] As a general guide, the length of the maxillary central incisors should be approximately 12 mm (Figure 15),[29] the cuspids 12 mm, the mandibular central and lateral incisors 10 mm, and the mandibular cuspids 12 mm. The lengths of the maxillary lateral incisors should be shorter than the central incisors and are determined in conjunction with the mandibular cuspids to guide them through the incisive movement (Figure 16). The width is predicted based on the golden proportion rule, negative space, and the size of the mouth.[12]

The embrasure between the maxillary central incisors is

Use of the human model will be the standard of dental care in the future.

approximately 1 mm, the space between the central and lateral incisors 2 mm, and the space between lateral incisors and the cuspids approximately 3 mm (Figures 14 and 16).[4] The eyes, commissural line, or facial contour should never be used to establish the horizontal plane. With the patient's head perfectly erect, the maxillary cuspid incisal line is made parallel to the horizon.[30]

The posterior occlusion rises toward the Frankfort Plane (Figure 17). The length of the buccal cusps of the "first through fourth" (canine, first premolar, second premolar, and first molar), measured from the interproximal contact points, are approximately 5, 4, and 3 mm, respectively. This sequencing of the teeth establishes posterior guidance. The mesial and distal embrasures of the canine are usually approximately at 90 degrees moving posteriorly; the maxillary cusp tips and the gingival marginal crest converge. The 90-degree embrasures allow space for more natural (sharper) cusp forms of the mandibular teeth, developmentally and restoratively (Figure 18). Figure 19 presents reproduction of the human biological model in rejuvenation, developing cusps to marginal ridge relationship.

Among the clinicians studying nature, several have noted the presence of cusps on the posterior teeth.[1,4,26-28,31] These observations, obtained from the healthiest and finest in natural dentition, are known as the "bioesthetic principles" (Figures 20 through 23).[1,4] Anterior guidance, in both dental arches, is sufficient to prevent premature posterior occlusal contacts in all

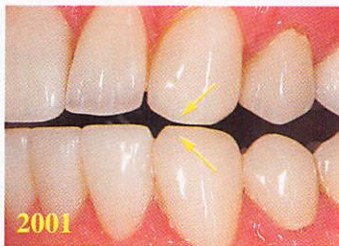

Figure 33—Left lateral view of the patient in 2001. Canine guidance is still present on the chewing side (arrows), despite the slight wear on the cuspids.

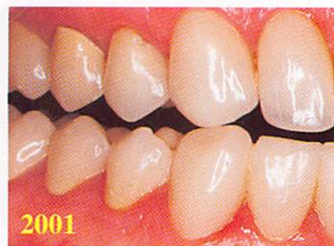

Figure 34—Right lateral view of the patient in 2001. The canine guidance is still present, with no wear posteriorly.

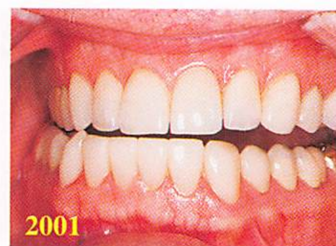

Figure 35—Left anterior view of the patient in 2001. Note the canine guidance and tissue health maintained during the 11 years.

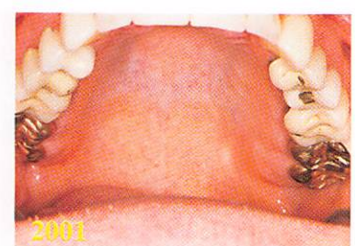

Figure 36—Palatal view of the maxillary dentition. Gold crowns were placed on the posterior teeth to allow for wear—in the event of a change in centric relation with the development of eccentric contacts.

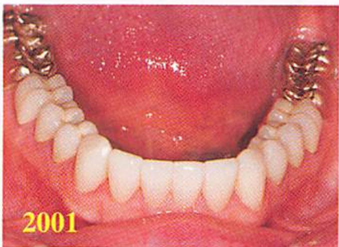

Figure 37—Occlusal view of the mandibular dentition, with gold crowns on the posterior teeth.

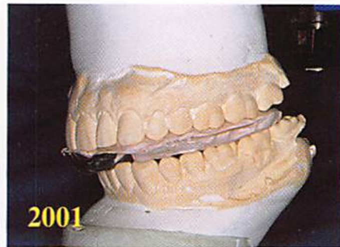

Figure 38—Model of the patient's dentition in 2001, mounted on the hinge axis on Panadent Articulator, provides a centric relation record.

Figure 39—Model of the patient's dentition in 2001, mounted in centric relation, with a slight separation of the anterior teeth.

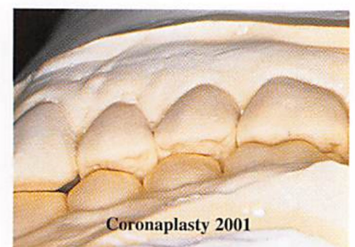

Figure 40—Model of the patient's dentition after a minor coronaplasty—minor adjustment of the posterior teeth—performed in 2001. Anterior coupling is developed, and occlusion is established in centric relation.

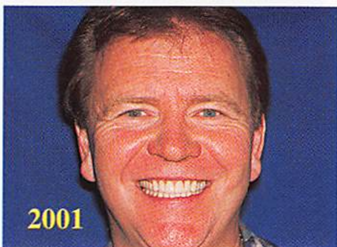

Figure 41—Postoperative full-face anterior view of the patient at the final follow-up in 2001. The facial complex is still free of muscle tension and has changed to a more triangular appearance. Compare with the view at presentation shown in Figure 1.

excursive and late closing movements during mastication (Figures 24 through 29).[32,33]

The functional goal of the biologic model is to maximize the anterior guidance (Figures 24 through 29), which allows for verticalization of the posterior segment, natural (sharp) posterior crown forms (Figures 17 through 23) with the normal physiologic position of the condyles in CR (Figures 11 through 13). When considering the relationship of anterior-to-posterior teeth, it is important that we understand Williamson's[34] statement: "Only when posterior disclusion is obtained by an appropriated anterior guidance can the elevating activity of the temporal and masseter muscles be reduced. It is not the contact of the canines that decreases the activity of the elevator muscles, but the elimination of posterior eccentric contacts."

The developed anterior guidance allows retention of more natural (sharper) posterior crown forms without eccentric occlusal interference, thereby minimizing the influence of condylar guidance on the morphology of the posterior teeth. A standard of natural biomechanical excellence is thereby established on which the care of the human dental system may be based. When the orofacial dentognathic system is in equilibrium, relaxation of the facial complex becomes evident (Figure 30). It follows logically, therefore, that if we build these attributes into a treatment plan for a less fortunate oral environment, a comfortable function can be restored and further deterioration prevented.

The model is patterned after nature and serves as a framework for all dental disciplines.

Discussion: 11-Year Follow-Up

Having compared the ideal intact model to the rejuvenation performed, note how this case has withstood the test of time. Has the verticalized occlusion functioned as the ideal model suggests or has the conversion of horizontal to vertical masticating teeth (chewers) destroyed the rejuvenation, as some observers have suggested?[35]

From the frontal view (Figure 31), the only apparent wear is on the mandibular left cuspid (see yellow arrow). The horizontal overlap of the cuspids is now more than the ideal 1-mm measurement. In Figure 32, both canines can be seen to be wearing. Note the additional clearance between teeth Nos. 10 and 22 between 1990 (Figure 25) and 2001 (Figure 32). Figure 33 shows equal wear on the left maxillary and mandibular cuspids. Note a slight porcelain fracture at gingival margin of the porcelain crown on tooth No. 12. When the case was completed in 1990, wear on the canines was anticipated because of avoidance patterns from the third molars, although the case was completed in CR.[4]

Figures 34 and 35 show that the masticating and nonmasticating sides still exhibit posterior clearance, even with the wear that has taken place on the cuspids. There appears to be somewhat more marginal breakdown of the crown gingival margins in the maxillary premolar area on the right side than on the left (Figure 33). There is no marginal leakage in the porcelain laminate veneers, although first-generation bonding and luting agents (Tenure®, Den-Mat®; Porcelite, Kerr Corp.) were used in 1988.

The incisal and occlusal surfaces on the maxillary and mandibular incisors and posterior teeth show virtually no wear. There is some wear on teeth Nos. 4 and 14 and on the maxillary occlusal surfaces or teeth Nos. 12 and 13 (Figures 36 and 37).

A CR record was taken to document the amount of change that had taken place over more than 11 years (Figure 38). There

was predominately more occlusal load on the posterior teeth and less on the anterior teeth (Figure 39). A minor coronaplasty was performed on the model, establishing the occlusion in CR (Figure 40).

The final photograph of the 11-year follow-up, taken in 2001, demonstrates that the facial complex has maintained a relaxed appearance and improved proportion (Figure 41). The patient's facial appearance (Figure 1) vs his appearance 11 years later (Figure 41) shows less masseter development and diminished appearance of facial strain. Note the more triangular appearance of the face in 2001 vs in 1987. The patient's response has been an awareness of abatement of clenching and bruxism throughout the 11 years of the rejuvenation. This statement is substantiated by the minimal wear of the dentition.

Conclusion

The 11-year postoperative views reveal that the restoration/rejuvenation is still functioning. This case demonstrates that by incorporating the bioesthetic principles of esthetics and function, the long-term prognosis for the patient has indeed continued with the rejuvenation. The human biological model has set the standard—an ideal and finite goal for treatment. As Dumont[5] said, "It serves all ages and conditions, and its applicability extends from the smallest interceptive preventative corrections to the most extreme orthognathic surgical or restorative rehabilitations. Use of the human biological model will be the standard of dental care in the future. The model is patterned after nature and serves as a framework for unification of all dental disciplines and specialties to a common cause. This paradigm will facilitate the understanding of our magnificent dental system and greatly benefit the quality of care for the patients." ○

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Continuing Education Quiz

Instructions

Contemporary Esthetics offers 12 Continuing Education (CE) credit hours per year. Each clinical CE article is followed by a 10-question, multiple choice test, providing 1 hour of credit. To receive credit, record your answers on the enclosed answer sheet or submit them on a separate piece of paper. You may also phone your answers in to (888) 596-4605, or fax them to (703) 404-1801. Be sure to include your name, address, phone number, and social security number. The deadline for submission of quizzes is 12 months after the date of publication. Participants must attain a score of 70% on each quiz to receive credit. To register, call (732) 656-1143. Participants are urged to contact their state registry boards for special CE requirements.

1. The success of functional and esthetic dentistry depends on the clinician's understanding of:
- a. the morphology of natural dentition.
- b. the temporomandibular joint.
- c. the influence of gingival contours on the dentofacial and facial complexes.
- d. all of the above.

2. Which of the following were used to document the pretreatment condition?
- a. a complete series of color photographs
- b. a centric bite record
- c. an axi-path recording
- d. all of the above

3. A maxillary anterior-guided orthosis was prepared and comfortably worn by the patient for how long until centric relationship was achieved?
- a. 1 week
- b. 2 weeks
- c. 3 weeks
- d. 4 weeks

4. Which of the following factors guided the determination of the patient's proper vertical dimension?
- a. facial width
- b. phonetics
- c. creation of sufficient space to develop sharp posterior teeth
- d. lingual musculature

5. In the healthy dentition, when the teeth of both dental arches are in complete contact, the condyles are in what position?
- a. superior
- b. anterior
- c. medial
- d. all of the above

6. As a general guide, the length of the maxillary central incisors should be approximately:
- a. 10 mm.
- b. 12 mm.
- c. 14 mm.
- d. 16 mm.

7. The mesial and distal embrasures of the "first canine" (posterior occlusion):
- a. usually are at 90 degrees moving posteriorly.
- b. the maxillary cusp tips and the gingival marginal crest converge.
- c. are at 90 degrees and allow space for more natural (sharper) cusp forms of the mandibular teeth.
- d. all of the above.

8. Among the clinicians studying nature, several have noted the presence of what on the posterior teeth?
- a. wear facets
- b. cusps
- c. shallow inclines
- d. deep grooves

9. The functional goal of the biologic model is to:
- a. minimize the posterior guidance.
- b. minimize the anterior guidance.
- c. maximize the anterior guidance.
- d. minimize the Frankfort Plane.

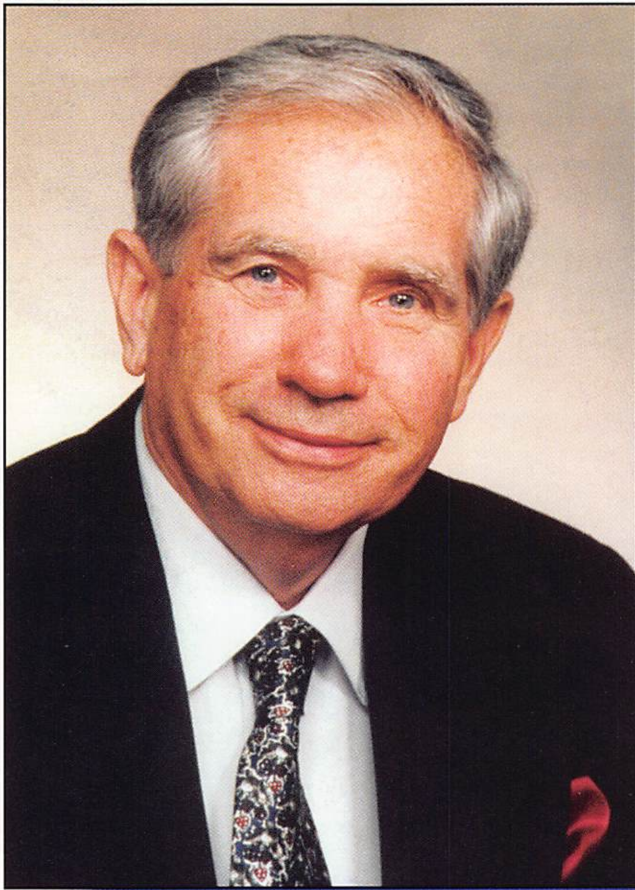
10. For the 11-year follow-up, the horizontal overlap of the cuspids is now how many more millimeters than the ideal measurement?
- a. 1 mm
- b. 2 mm
- c. 3 mm
- d. 4 mm

Product References

Product: Condyle Position Indicator
Manufacturer: Panadent® Corporation
Address: 22573 Barton Road, Grand Terrace, CA 92313
Phone: 800.368.9777
Fax: 909.783.1896

Product: Tenure®
Manufacturer: Den-Mat®
Address: 2727 Skyway Drive, Santa Maria, CA 93455
Phone: 800.445.0345
Fax: 800.922.6933

Product: Porcelite
Manufacturer: Kerr Corp.
Address: 1717 West Collins, Orange, CA 92867
Phone: 800.KEER.123
Fax: 800.537.7345



Robert Lee, MS, DDS
1926-1997

Bioesthetic Dentistry

Dr. Robert Lee dedicated his life and his career in the pursuit of helping others. His research developed the concept of Bioesthetics, *"the study or theory of the beauty of living things in their natural forms and functions"*. Dr. Lee utilized his master's degree in advanced biology to facilitate his study of optimal biologic systems. He observed and recorded the similarities in nature's most successful, long-lasting, and unworn dentitions. These discoveries lead to a paradigm change in how he practiced dentistry. By applying the qualities he observed in the successes of nature, he found his cases to be very predictable, functional, esthetic, and stable.

Dr. Lee pioneered the ***biologic model*** that is now recognized as the foundation of occlusal dentistry. He first published his results in 1969, in the Journal of Prosthetic Dentistry. His research also greatly impacted modern day articulator design. In 1974, together with his wife, Arlene, he founded **Panadent Company**, the producers of precision articulators and accessories used in leading universities, and made available to the private practice dentist.

In 1978, he founded **Occlusion Seminars**, a highly recognized continuing education program, dedicated to training dentists, laboratory technicians, and auxiliaries worldwide to provide optimum dental health for their patients. Occlusion Seminars became the **Lee Institute for Oral Bioesthetic and Function** in 1990, and continues today as a library and a repository of educational material and articles on Bioesthetic Dentistry, proctored by his lovely wife, Arlene, in Grand Terrace, California.

The "Master" himself trained many dentists throughout the world, with sixteen of us completing his advanced program. In 1994, the **Orognathic Bioesthetics International, Inc.**, **(OBI)** program was established in Salem, Oregon, to carry on Dr. Lee's principles. Under the direction of Charles Wold, DMD, **OBI** has taken pride in eleven classes completing the advanced Level IV curriculum, and more than 500 dentists and laboratory technicians having participated in hands-on courses in clinical application of Bioesthetic Dentistry in Levels II and III. Countless others have been introduced to Level I.

I would like to thank Dr. Lee for all the wonderful changes he has made in my life personally and professionally. Bob had a fierce belief in, and a great desire to share his biologic model, and did so in such a gentle manner. I have never met another man with such unfailing modesty, generosity, and graciousness towards not only his supporters, but also his rivals.

His mentoring over ten years, enables me to provide a higher level of care to my patients. He has given me purpose in my life, by instilling in me the importance of teaching and sharing this wonderful gift—the biologic model. I give thanks for all that he has given me.

Kenley H. Hunt, DDS