

Dental esthetics: "oral personality" and visual perception*

Aris-Petros Tripodakis, D.D.S., M.S., Dr. Odont.**

Introduction

An important consideration in the pursuit of dental esthetics is the concept of the "body image," which is defined as the mental picture that each individual has of his own appearance. The esthetics involved in prosthodontic treatment are strongly related to the individual's self-esteem and interpersonal relationships.

Thus, a fixed partial denture should not be seen just as a work of art or functional appliance. It is more: it becomes a part of the human body and so has tremendous influence on the patient's self-image. Therefore, esthetic interpretation during oral reconstruction should not become simply a subject of personal taste, either from the dentist's point of view or from that of the patient.

The patient's preconceived ideas on esthetics can sometimes be totally misleading, having been influenced by social or cultural input. Nevertheless, the dentist should always consider the patient's desires and keep in mind that the patient is a sensitive human being wanting to hear intelligent advice. The patient deserves honest communication. An impersonal prosthesis proposed as the only effective treatment plan does not honor this relationship.

The goal in undertaking the challenge of dental esthetics must be to satisfy the requirements of both reality and beauty.

Reality enables the prosthesis to become visually assimilated by the oral and facial environment. Moreover, it transforms it to a living part of the patient's personal body image. Beauty, on the other hand, improves and enhances this image.

Unfortunately, the lack of sufficient objective landmarks in the esthetic procedure makes the achievement of this goal a very complicated task. Additionally, the general difficulty in communication that exists between the dentist and the dental technician impairs this procedure. Therefore, the clinical result is usually compromised esthetically.

This paper attempts to explore and define objective guidelines for creating a realistic, personalized, and visually pleasant dental composition in a fixed prosthesis.

"Oral personality"

In nature there exist visual laws according to which the eye can inform the brain about beauty. Thus, a fixed partial denture can be judged as harmonious when examined at the laboratory bench. However, it may have nothing to do with the person for whom it has been prepared and his personal body image.

What would a person be without his own smile? Could oral reconstruction provide him just any smile and allow him to be socially recognized as the same person?

Starting the search for personalized complete dentures, Frush and Fisher 30 years ago conceived the "dentogenic concept."¹ Their "dynesthetic interpretation" took into account vital factors such as sex, personality, and age. This became the first positive step in organizing guidelines for approaching the esthetic problem in a more personal way.

Nevertheless, the authors admitted that, "Paradoxically, the more experience we have with dentogenic concept, the less we tend to follow exactly the didactic and arbitrary rules of recognized dynesthetic composition." This was a dynamic indication that the complexity of human nature fails to obey the "true answers" given by any rules or regulations. To face this problem, Frush and Fisher had to combine their disciplined dynesthetic effort with the essential "artistic freedom needed."

Yet, the patients who seek oral rehabilitation in fixed

* Presented at the tenth annual meeting of the European Prosthodontic Association, Oxford, England, September 1986.

** Private practice, Athens, Greece.

Address all correspondence to: Dr. A.-P. Tripodakis, 92 Vas. Sophias Avenue, Athens 115 28, Greece.

Prosthodontics

prostheses have their own smile to begin with. They have had it for years; it is part of their personal image. It is their "oral personality."

"Oral personality" can be defined as the dental composition that reflects the individual's personality at the level of his facial appearance. All the effort during prosthetic intervention should be directed toward maintaining it unaltered. Dental esthetics should therefore, before anything else, be related to the unique elements that characterize the oral personality of the individual. The esthetic dimension, determined by the preoperative size, form, and position of teeth, as well as the line of the composition, provides the objective references from which his personal oral image can be identified. These elements, after careful examination, should be incorporated into the prosthesis in such a manner that the image is not changed, but simply improved. The following cases demonstrate clinical implications of this principal.

Case 1 (Figs. 1a to 1c)

The main complaint of this patient was her total and justified discontent with her oral image. She only wished to acquire "pearly teeth." Her desire was fulfilled, and to her delight she found that her new teeth looked like her originals, the ones she thought she hated. The preoperative size and shape of the anterior teeth, as well as the position of the lateral incisors, became the objective links between the new improved composition and her oral personality.

Case 2 (Figs. 2a to 2c)

The main structure of this patient's smile existed even before the maxillary arch was fully reconstructed. Examination of the study casts before and after treatment shows that the size, shape, and position of the teeth have been accurately duplicated.

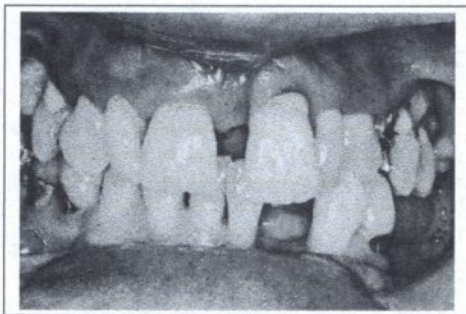


Fig. 1a Case 1. Preoperative condition. (Courtesy Paul Cammarata)

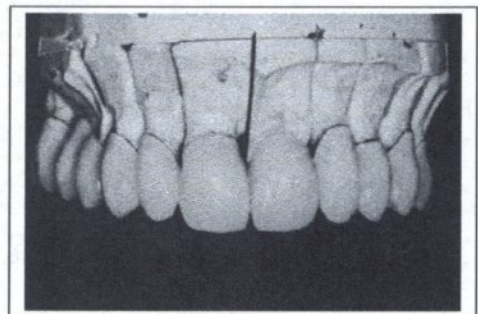


Fig. 1b The fixed prosthesis on the working cast.



Fig. 1c Appearance of the patient after the reconstruction. (Courtesy Paul Cammarata)



Fig. 2a Case 2. Preoperative condition.

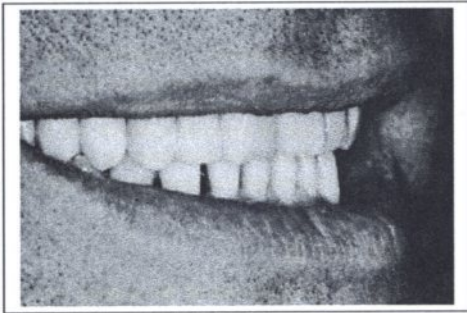


Fig. 2b The patient's smile after the reconstruction.

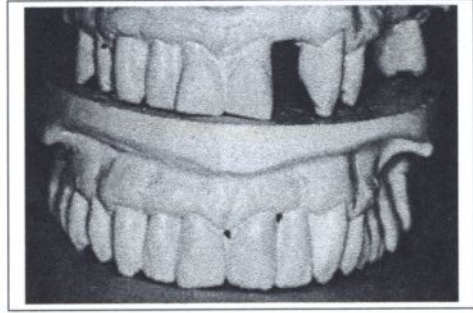


Fig. 2c Comparison of preoperative and postoperative study casts.

Case 3 (Figs. 3a to 3d)

The only socially visible change in this patient's oral image was the change in color, which gave the impression that the patient simply had his teeth bleached. In truth, restoration of the destroyed tooth structure introduced the improvement while the identity of the composition was reproduced in every detail.

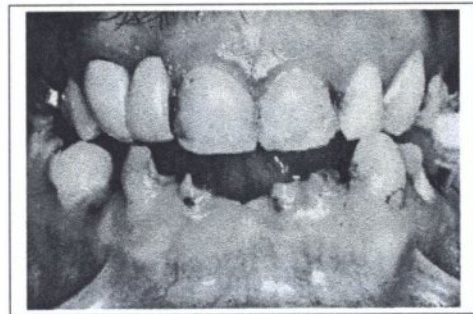


Fig. 3a Case 3. Preoperative condition.

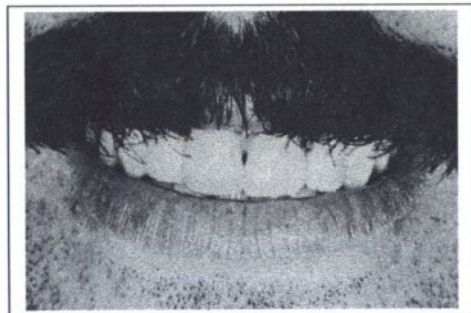
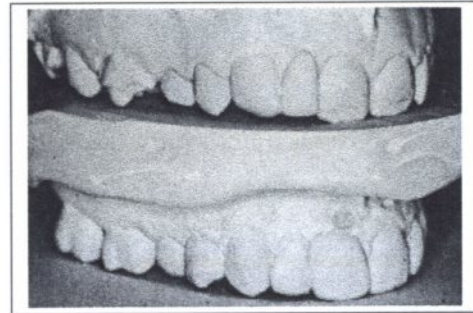


Fig. 3b The patient's smile after the reconstruction.



Figs. 3c and 3d Comparison of preoperative and postoperative study casts.

Prosthodontics

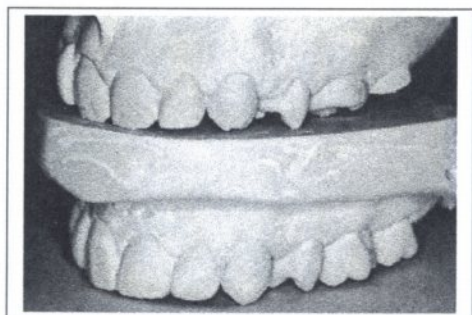


Figure 3d

Case 4 (Figs. 4a to 4d)

When this patient presented for treatment, all teeth except two central incisors had been distorted by previous dental work. In the reconstruction the incisors were replicated, and all adjacent dentition was related proportionally to them. The diastema was only slightly reduced so that the original appearance was retained.

Case 5 (Figs. 5a to 5d)

Even when all the elements of the original oral personality are lost, an old photograph can provide important information for restoration.

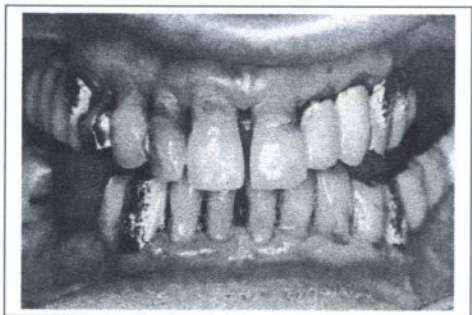


Fig. 4a Case 4. Preoperative condition.

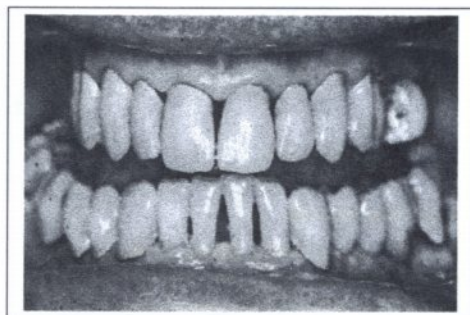


Fig. 4b Intraoral appearance after the reconstruction.

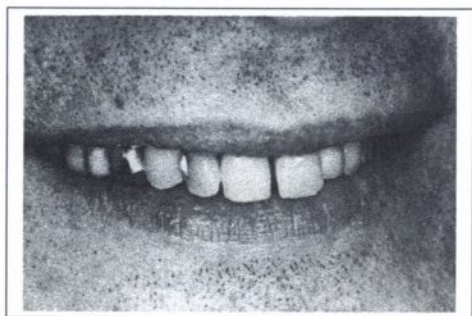


Fig. 4c The patient's smile preoperatively.

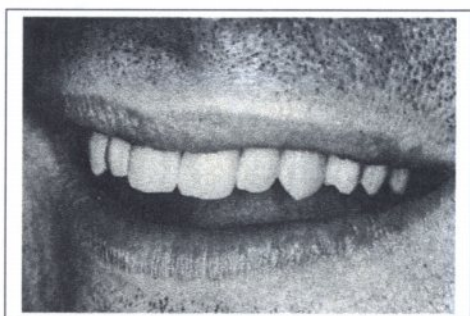


Fig. 4d The patient's smile postoperatively.

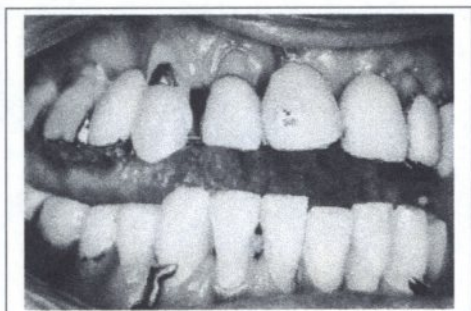


Fig. 5a Case 5. Preoperative condition.

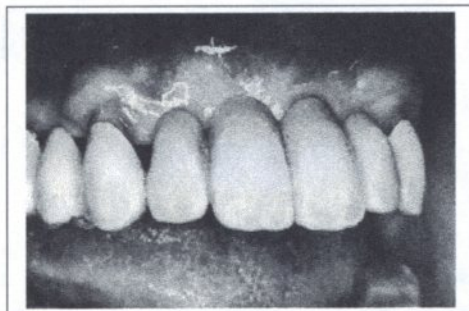


Fig. 5b Intraoral appearance of the maxillary arch after the reconstruction.

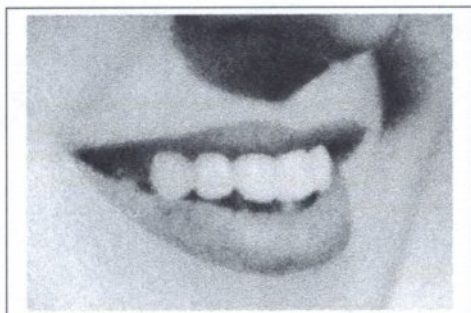


Fig. 5c The patient's appearance with her natural dentition as observed in an old photograph.

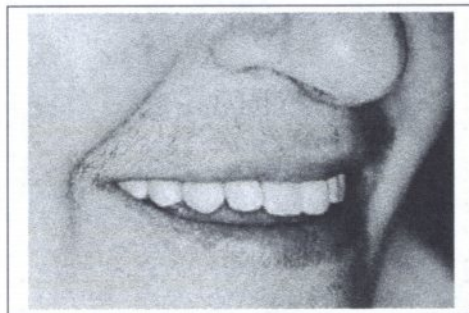


Fig. 5d The appearance of the patient after the reconstruction.

Creative image and visual perception

A creative image, composed by an artist, is meant to express the artist's inner world along with his personal interpretation of what he perceives. It is not important whether the final product is at all related to the model.

On the other hand, the goal of dental esthetics is a creative image molded for a specific prosthodontic patient—an image that not only is related to the person but also reflects and enhances his unique and irreplaceable oral personality and introduces the required improvement.

The viewer's response, whether pleasant or unpleasant, to observed images is a result of the interpretation of physiological processes constituting the function of visual perception.

Scientific investigations into the physiology and psychology of sight resulted in the formulation and verification of laws and principles of visual perception. Qualities such as unity, balance, and proportion, which are abundantly found in nature, induce vitality and beauty when incorporated into a created composition. Thus, the artist, through the utilization of these elements, is able to compose harmony.

If the viewer's favorable response to the sight of a reconstructed dental composition is desired, then the above elements should also be used by the dentist in his creative images. The principles of visual perception and their clinical application in the esthetics of complete dentures were described by Lombardi in 1973.² He stressed the importance of unity, harmony, and balance in an esthetic dental composition.

Prosthodontics

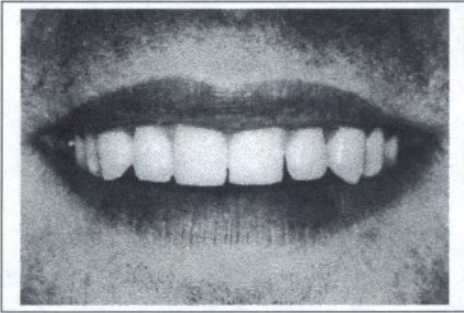


Fig. 6a Normal smile with natural dentition involving dominant central incisors, and a midline dividing the composition in two visually balanced halves. Note the parallelism between the line of the lower lip and the line created by the incisal edges.



Fig. 6b The proportional visual width of the teeth promotes unity with organized variety, whereas the parallelism of the long axes promotes harmony.

Unity

The primary prerequisite of an esthetic composition is unity. Repetition of elements such as shape, color, and line present a cohesive potential that unifies the composition.

The unity that is exhibited by structures with geometric repetitive shapes, related in a passive and inert way, is of a static type. In contrast, dynamic unity is presented by a composition with a flowing continuity that involves a generating nucleus and actively leads toward a climax. In nature, crystals and snowflakes are examples of static unity, whereas plants and animals represent examples of dynamic unity.

A dental composition that is meant to become esthetically assimilated by the active and living facial environment should present dynamic unity. A static and inert dental composition most certainly does not belong in this environment.

Dominance is the quality that will provide the generating nucleus from which the composition will unfold. One shape, color, direction, and line should dominate the overall appearance, and all coexistent variety must yield to and complement them.

The central incisors naturally dominate in any dental composition. Thus, they should provide all the characteristics that the rest of the teeth will inherit (Fig. 6a).

Continuity on the other hand, should be based on proportion. Proportion will dictate the relative size of adjacent teeth. For example, the established ratio between the widths of central and lateral incisors should be repeated between the lateral incisor and the amount

of canine visible, as well as between canine and premolar, etc. (Fig. 6b). Thus, every tooth will be different in visible width but related because of the repeated ratio. The final result will be unity combined with organized variety.

Harmony

The second element necessary for an esthetic composition is harmony. Parallel lines tend to reduce contrast between the elements of a composition and thus promote harmony. In a harmonious dental composition, therefore, lines going in the same direction should be parallel (Figs. 6a and 6b). Vertical lines should follow the lines drawn by the long axes of the teeth; horizontal lines should duplicate the imaginary parabolic line that is formed by the incisal edges and buccal cusps of the teeth and the line of the lower lip at the smile position.

Balance

The third important factor to be considered is balance. Visual relationships create forces in a composition. Balanced compositions involve equal visual forces from both sides of a centrally located axis. These compositions look stable, permanent, and peaceful. In contrast, unbalanced compositions are disconcerting.

Two identical halves over a midline are perfectly balanced. This is static symmetry. On the other hand, two similar but not identical halves with balanced visual

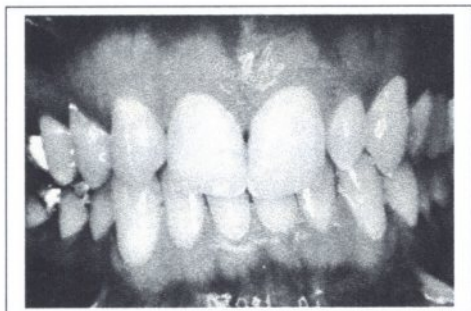


Fig. 7a Natural dentition with a missing lateral incisor in the right side, and a peg lateral in the left side.

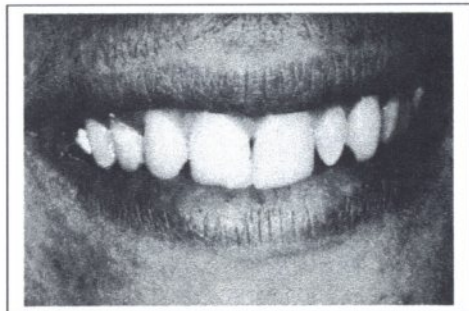


Fig. 7b The balanced visual weight of the observed amount of tooth structure in both sides creates a pleasant composition. The only disturbing feature of this smile is the visually unbalanced presence of the gold crown on the right side.

weights exhibit dynamic symmetry. Static symmetry does not exist in the human body; neither does it belong in a dental composition.

The requirements for a balanced dental composition are as follows:

1. A midline that is visually stable and balanced under a contemplative look that embraces the entire facial image (Fig. 6a)
2. Equal visual weight on both sides of the midline exhibited by similar but not identical halves (dynamic symmetry)

Visual forces in a dental composition are created by the amount of tooth structure shown, as well as by the negative image created by the incisal edges contrasting against the dark background of the mouth (Figs. 7a and 7b).

Reality and fixed prostheses

All the factors already described must be used for the final result to be a personalized and visually pleasant dental composition.

As far as complete dentures are concerned, most of these factors are already present in the prefabricated teeth. The manufacturer has incorporated unity, proportion, and dominance in the denture. Also, the possibility is offered for the shape and size to be chosen according to the individual's personal needs. This is the raw material from which the denture will be fabricated. Thus, the only possible esthetic shortcoming in a com-

plete denture would be in the way that the teeth are put together in a three-dimensional composition.

In a fixed prosthesis, however, the technician must start from scratch with the basic raw materials. If he has a cast with the abutment teeth prepared and voids where teeth are missing and is simply asked to "fill the gaps," then the prosthesis will be fabricated by uniting the abutment teeth by the shortest possible way, i.e., a straight line. The length of this line will be equally divided into areas for each tooth to be restored (Fig. 8a). The final result then will be a violation—not only a violation of the patient's oral personality and of the principles of visual perception, but also a violation of reality.

Reality in fixed prostheses has to be achieved on two levels:

1. Reality of the position of the teeth
2. Reality of the form of the teeth

Reality of tooth position

There is a tendency in fabricating fixed partial dentures to place the pontic teeth against the residual ridge as if it were the gingival tissue.

As a result of bone resorption, the ridge recedes from its original location. Therefore, there is a three-dimensional misplacement of the pontic teeth. The curve of the arch is not respected, nor is the direction of the line of the composition. This is more evident when more than one missing tooth is being replaced. The shortening of the curve of the dental arch results in an

Prosthodontics

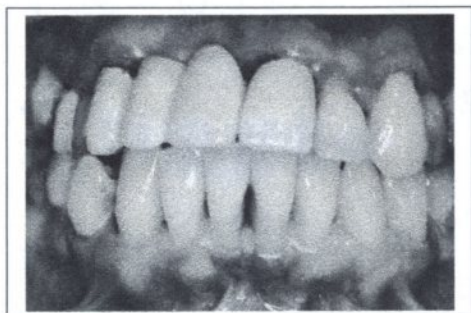


Fig. 8a Three-dimensional displacement of the pontic teeth resulting in an unnatural dental composition. Note the equally unnatural form of the restored teeth.

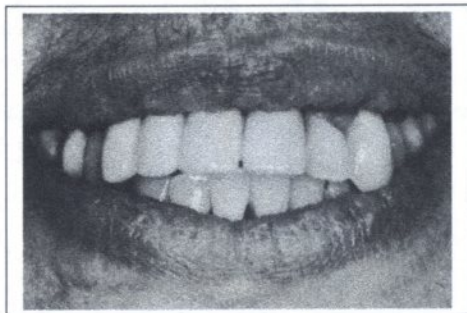


Fig. 8b The result is also esthetically compromised because of reduced support of the upper lip.

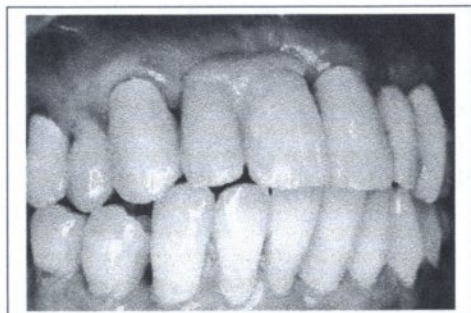


Fig. 9a The corrected dental composition involves proper tooth form and position. The missing gingival tissue is reproduced in pink porcelain.

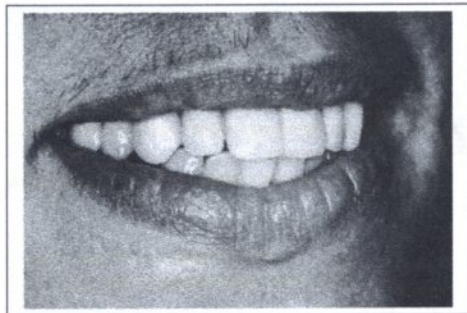


Fig. 9b Adequate support of the upper lip has been established.

esthetic imperfection in the dental composition and also in the facial structure because of reduced support (Figs. 8a and 8b).

The anatomic crown of the pontic tooth must be positioned three-dimensionally in space, following the line and the direction of the composition as well as the full curve of the dental arch. This position becomes independent of the location of the residual ridge. Apically of the anatomic crown, the pontic tooth can shift toward the ridge. If this results in an exaggerated tooth length because of extensive ridge resorption, the missing tissues can be replaced by reproducing the gingival tissue of the pontic teeth with restorative material (Figs. 9a and 9b).

Reality of tooth form

Natural teeth are not flat pieces of enamel laid in a row. A close examination reveals their three-dimensional shape. Behind their beauty exist many concavities and convexities that generally give the teeth a pear shape (Fig. 10a). This shape, when incorporated into a restoration, suggests three-dimensionality and individuality (and therefore reality) in the dental units (Fig. 10b).

Triangular or square teeth also have a general pear-shaped form that lies behind their obvious shape and conveys to the eye a feeling of naturalness (Fig. 11). The same happens in the posterior teeth as well (Fig. 12).

A violation of reality of tooth form can also result

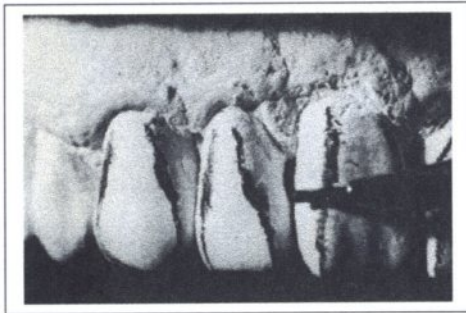


Fig. 10a Running the tip of a pencil placed horizontally against the tooth surface can reveal the three-dimensional pear-shaped form of the natural teeth.

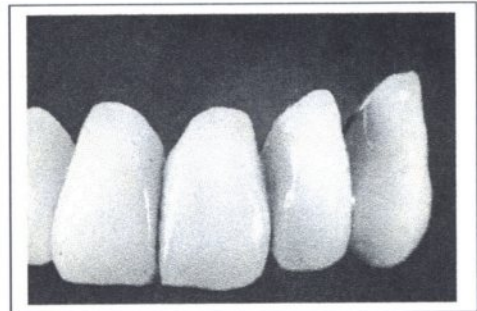


Fig. 10b Introducing the pear-shaped form into the restoration imparts three-dimensionality and individuality to the dental units.

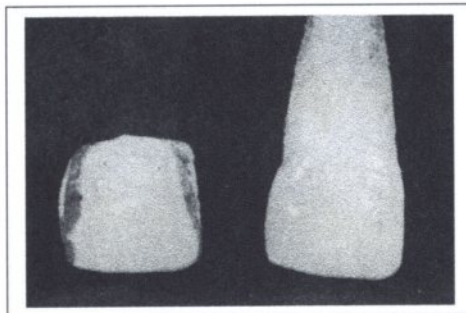


Fig. 11 The pear-shaped form is also revealed in a square tooth, as demonstrated on the stone replica.

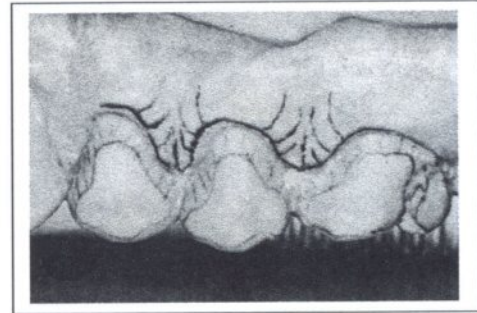


Fig. 12 Posterior teeth also demonstrate the pear-shaped form.

from inappropriate space provided by the edentulous area for the pontic teeth. This space is sometimes either too small or too large.

Inadequate space in the edentulous area should not lead to a visible reduction in the mesiodistal dimension of the pontic teeth. Crowding and overlapping the anterior teeth will preserve their natural appearance and suggest normal dimensions (Figs. 13a and 13b).

On the other hand, the visible portion of the posterior teeth is the mesial half. This half should be reproduced in normal dimensions, while the distal half can be reduced (Figs. 14a and 14b).

In contrast, too much space should not lead to an increase of the mesiodistal dimension of the pontics.

The visible width of the anterior teeth is mainly determined by the length of the incisal edges, as defined by the incisal embrasures. If the joints of the metal substructure are brought lingually and cervically as far as possible, the incisal embrasures will be allowed to widen. The width of the incisal edges will then be reduced, suggesting normal mesiodistal dimensions for the restored teeth (Figs. 15a to 15d).

In the posterior teeth, the increased distance between two joint areas should not lead to a distorted pontic tooth with an increased mesiodistal width. A slight shift around its long axis will allow the coverage of this distance, while the normal form of the tooth is preserved (Fig. 16).

Prosthodontics



Fig. 13a Preoperative condition with crowded dental composition.

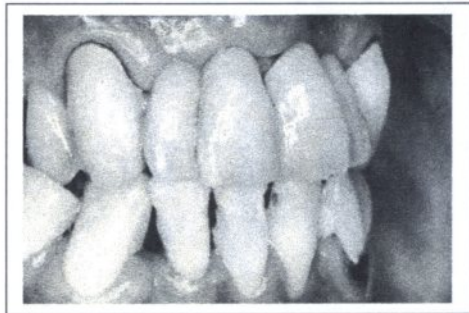


Fig. 13b The four anterior teeth were extracted and replaced with a fixed partial denture. The crowding was maintained for a realistic result.



Fig. 14a Inadequate space for a pontic with the normal dimensions of the missing premolar.

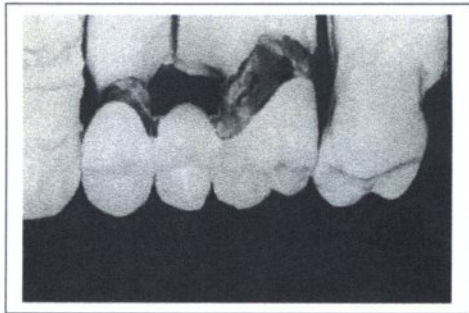


Fig. 14b The mesial half of the premolar was reproduced in normal dimensions, while the width of the distal half was reduced.



Fig. 15a Preoperative condition of a patient with retained primary lateral incisors.

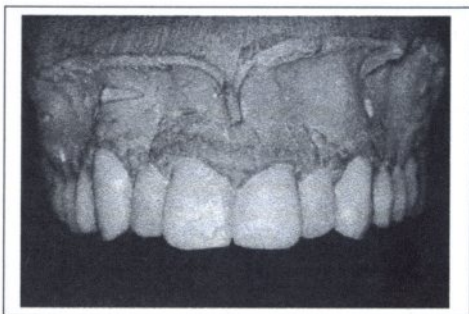


Fig. 15b The lateral incisors were extracted. Note the wide edentulous space between the central incisor and canine.



Fig. 15c The joints of the metal substructure are brought lingually and cervically as far as possible to allow widening of the incisal embrasures.



Fig. 15d The patient's smile postoperatively. Note the normal mesiodistal dimension of the restored teeth.

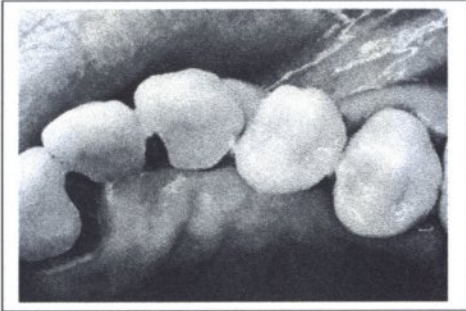


Fig. 16 A shift around the long axis of the replaced posterior tooth allows the coverage of the wide edentulous area, while the normal tooth form is preserved.

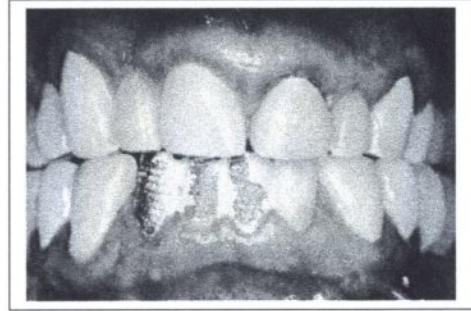


Fig. 17a The patient's preoperative condition with a previous reconstruction. Note the unnatural and impersonal look of the dental composition.

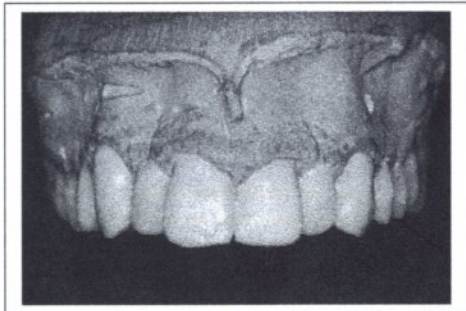


Fig. 17b The diagnostic waxing attempts to restore the original oral image. Note the dominant central incisors and canines, while the lateral incisors remain less prominent, as in the photograph.

Esthetic diagnosis and treatment plan

It now becomes clear what a complicated task esthetic excellence represents. Moreover, it would be absolutely impossible for fixed partial dentures to meet all of these esthetic requirements if the necessary information is not communicated in every detail to the dental technician. The final result should not be subject to his improvisation. The whole scheme must be preplanned by the dentist, then tested and verified by clinical application during the provisional restoration stage.

The tremendous help that diagnostic waxing can provide to the esthetic procedure cannot be over-emphasized. The potential dental composition can be designed three-dimensionally on the dental cast to meet the patient's general needs (Figs. 17a and 17b). It will then be transferred into the provisional restoration, and

Prosthodontics



Fig. 17c The preplanned dental composition transferred into the provisional restorations.



Fig. 17d The final result fabricated by the dental technician. The already-established composition in the provisional restoration has been reproduced.

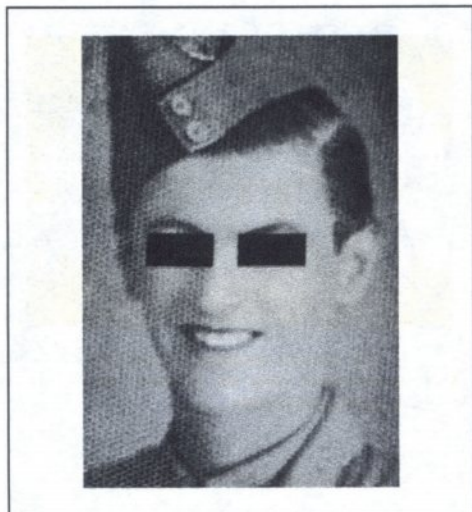


Fig. 17e An old photograph reveals the lost "oral personality" of the patient.

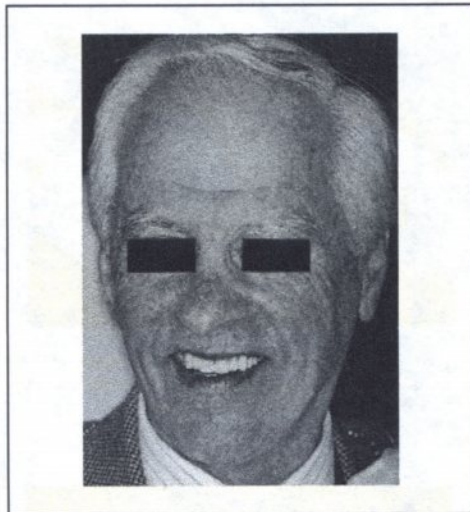


Fig. 17f The oral personality restored.

modifications will be made intraorally according to specific esthetic and functional requirements (Fig. 17c). If both dentist and patient are satisfied with the esthetic accomplishment, a cast of the provisional result will become the pattern which the technician must reproduce (Figs. 17d to 17f). This systematic approach facilitates communication between the dentist and the patient, as well as between the dentist and the technician.³

In some cases, an additional possibility is offered for fabricating a trial restoration superimposed preoperatively over the patient's natural teeth (Figs. 18a to 18e). The designed composition in the diagnostic waxing is tried in the mouth before a total commitment to treatment is made. Therefore, the patient and the dentist have a specific idea of the final result in a totally reversible way.



Fig. 18a Preoperative condition of a patient with a cleft palate.

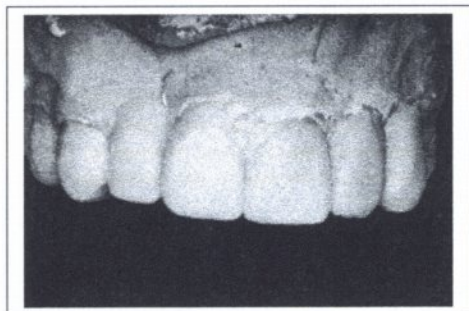


Fig. 18b Diagnostic waxing.

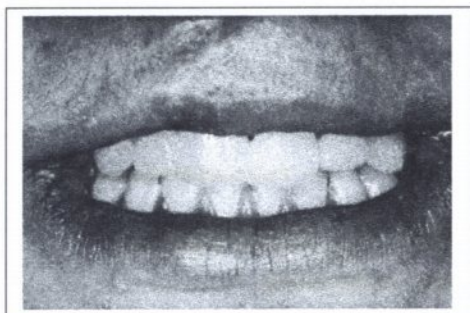


Fig. 18c Trial restoration superimposed over the patient's natural teeth.

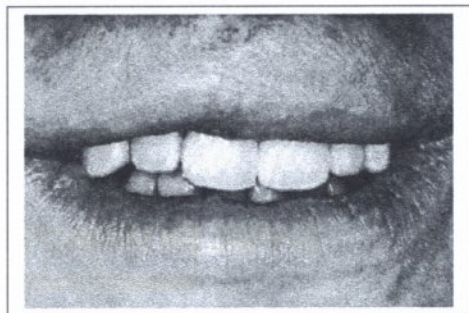


Fig. 18d Intraoral condition after the reconstruction.

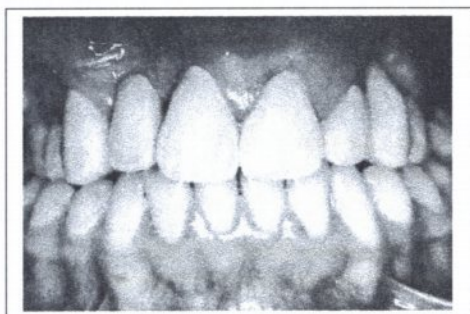


Fig. 18e The patient's appearance postoperatively.

Summary

An attempt has been made to define objective guidelines for esthetics in fixed partial dentures. The aim is to enrich the restored dental composition with reality and beauty uniquely designed for each individual patient. The attitude should not be to compose or create an esthetic result through an autonomous artistic improvisation. The key word of our esthetic goals must be *respect*: respect for the principles of visual perception; respect for the reality of the human body; respect for our specific patient's "oral personality." That is respect for the patient. Undertaking this task is a great honor for dentistry, sometimes representing an almost unbear-

Prosthodontics

able load of responsibility as well. This responsibility must be carried by the dentist and not transferred to the dental technician.

L. L. Miller has often stated, "There is little possibility that dental cosmetics will improve unless dentists themselves respond to the challenge by resuming more effective leadership in the fabrication of these restorations."⁴

This is the everyday struggle for all of us.

References

1. Frush, J. P., and Fisher, R. D. The dynesthetic interpretation of the dentogenic concept. *J Prothet Dent* 8:560-581, 1958.
2. Lombardi, R. E. The principles of visual perception and their clinical application to denture esthetics. *J Prothet Dent* 29:358-382, 1973.
3. Preston, J. D. A systematic approach to the control of esthetic form. *J Prothet Dent* 35:393-402, 1976.
4. Miller, L. L. Personal communication. Sept., 1980. □

Funchal/Madeira 1987

Oral Implantology in Europe

Evaluating current research and practice

★

Congress from 26th to 29th of October 1987

★

30 speakers from all dental and implantology societies in Europe have been invited to participate. Among the international guest speakers will be Dr. Leonard Linkow of New York.

★

Official languages: English (2 days), German (2 days)
Congress fee: DM 600

★

Registration and Travel-Organisation: Telephone (0421) 17 15 80
Congress Partner GmbH, Sögestraße 76, D-2800 Bremen 1, West Germany

Requests for Scientific Lecture Abstracts: Telephone (089) 51 60 29 00
Secretary to Prof. Dr. Dr. Schlegel (Mrs. König)
Lindwurmstr. 2a. D-8000 Munich, West Germany