Ethics of esthetic dentistry

Michael Liebler, Dr med dent, DDS[1]/Alessandro Devigus, Dr med dent[2]/Ros C. Randall, PhD, M Phil, BDS[3]/F.J.Trevor Burke, DDS, MSc, MDS, FDS, MGDS RCS, FDS RCPS, FFGDP[4]/Ulla Pallesen, DDS[5]/Antonio Cerutti, MD, DDS[6]/Angelo Putignano, MD, DDS[7]/Didier Cauchie, LSD[8]/Reinhard Kanzler, Dr med dent[9]/Kari P. Koskinen, DDS, MS, PhD[10]/Henrik Skjerven, DDS[11]/Gunhild V. Strand, PhD, DDS[12]/Rob W.A. Vermaas, DRS[13]

Patient demand for esthetics has increased globally, and often for reasons of patient self-esteem. However, important ethical issues encompass treatment for purely esthetic reasons. Also, perceptions of what is esthetic differ among patients and clinicians. Therefore, the aim of this article is to make suggestions regarding some of the issues surrounding the ethical, esthetic treatment of patients, as well as present three cases illustrating the different meanings of esthetic health to different people. *(Quintessence Int 2004;35:456–465)*

Key words: appearance, clinician-patient communication, esthetic dentistry, ethics, patient choice

Ethics and esthetics–derived from the Greek word "perception"–are both branches of philosophy. Their interaction is central to contemporary restorative dentistry, in which the appearance of teeth is becoming almost as important as the achievement of a comfortable, healthy, functional dentition. In that respect, the adjective "esthetic" was introduced into English to supply "sense of beauty."[1] The Collins Dictionary[2] definition of esthetics, "concerned with beauty and taste" does not apply well to dentistry, where function must be an integral aspect of successful treatment. However, patient demand for restorations of good appearance have highlighted the importance of this area.[3] The use of tooth-colored restorations for posterior teeth has been increasing in the United States (US),[4] and this may soon also occur in parts of Europe, led by environmental issues, patient concerns in respect of mercury toxicity, and patient demands for esthetic restorations. A number of techniques, designed principally with the aim of improving the appearance of teeth, have been introduced within the past two decades. Among these, porcelain laminate veneers have shown good success rates,[5] with only minimal tooth preparation being required. However, no restoration lasts forever, and patients who decide to receive veneer restorations are necessarily entering a cycle of restorative dental treatment from which they cannot exit. There are, therefore, important ethical issues surrounding the provision of

[1]Private Practice, Nurnberg, Germany.

[2]Private Practice, Bulach, Switzerland.

[3]3M ESPE, St Paul, Minnesota.

[4]Professor, University of Birmingham School of Dentistry, Birmingham, United Kingdom.

[5]School of Dentistry, University of Copenhagen, Copenhagen, Denmark.

[6]Professor, University of Brescia, Faculty of Medicine and Surgery, Brescia, Italy.

[7]Associate Professor, Department of Restorative Dentistry, University of Ancona School of Dentistry, Ancona, Italy.

[8]Private Practice, Brussels, Belgium.

[9]Private Practice, Schwabach, Germany.

[10]Private Practice, Helsinki, Finland.

[11]Private Practice, Oslo, Norway.

[12]Professor, Faculty of Odontology, University of Bergen, Bergen, Norway.

[13]Private Practice, Zevenaar, The Netherlands.

Reprint requests: Dr F.J.T. Burke, University of Birmingham School of Dentistry, St Chad's Queensway, Birmingham B4 6NN, United Kingdom. E-mail: f.j.t.burke@bham.ac.uk

restorations purely for esthetic reasons. There are also issues surrounding the provision of tooth-colored restorations that may not have the longevity of less-esthetic metal restorations. There are also issues relating to the differences in patients' perceptions of esthetics and what is perceived as esthetic by clinicians,[6] given that Brisman found patients preferred symmetrical tooth arrangements,[6] while a majority of clinicians chose asymmetric arrangements as their preference.

Touyz et al[7] have discussed cosmetic or esthetic dentistry. They presented information that indicates patients, dentists, and dental insurance personnel have considered cosmetic and esthetic dentistry to be the same. However, they consider any modification of appearance that involves elimination of component parts could be termed *mutilation*, and when modification consists of changing the shape of a part, it could be termed *deformation*.[8]

What is the definition of dental esthetics?

There are few definitions of esthetic dentistry in dental texts or dental dictionaries. Moreover, the dictionary definition is not helpful in that it suggests esthetics pertains to "beauty, taste, following the rules and principles of art."[2] In dentistry, restorations cannot be esthetic in isolation of all else; they also must function under the forces of occlusion in a moist environment, often in contact with the dilute organic acids in plaque. Indeed, as clinicians' concepts of esthetics were found 20 years ago to differ from that of the patients,[8] it may also be that clinicians' views on what is esthetic may differ from clinician to clinician. Perhaps this will be related to the clinicians' training and knowledge–one who has recently attended a postgraduate education course on ceramic veneers is likely to see more opportunities to prescribe this treatment than a clinician who is not aware of this treatment option. Given these difficulties, it may be considered appropriate to suggest different levels of dental esthetics (Table 1):

- A basic or classical level. This embraces the rules of symmetry, where the patient's smile conforms to the Golden Proportion[9] and where there is harmony between white and pink, with a positive smile line.
- A cultural or regional level of esthetics. For example, very white, straight teeth are expected in the US, while the provision of a full gold veneer crown in some cultures on an anterior tooth, is accepted.
- A cosmetic or fashion level. Image-related, no dental need, reversible, with no harm accompanying the provision of this treatment (eg, tooth jewelry, Dracula teeth for Halloween).

TABLE 1 Levels of esthetics

	Classic	Cultural	Cosmetic
Contour		•	•
Form	•	•	•
Shade		•	•
Texture		•	•
Symmetry	•		•
Smile line	•	•	•
Midline	•		•
Incisal edges		•	•
Gum line		•	
Size		•	•
Blend with face	•		•
Alignment		•	•

A virtual level of esthetics is also possible, this being a level of esthetics achievable on the computer screen but not in a given patient's mouth.

Perhaps, the definition given to esthetics by Pilkington[10]–"the science of copying or harmonizing our work with nature and rendering our art inconspicuous"–two thirds of a century ago, is still most appropriate. However, form must also follow function. A crown of accurate color match will not be esthetic if the form is not harmonious with the surrounding tissues. In this respect, a malformed tooth is as unesthetic as a discolored one. Indeed, it may be argued, with the advent of the 21st century, that the clinician's objective should be to carry out all treatments in an esthetic manner. That could include a gold crown on a second molar tooth, which completely restores contour and function to a broken-down tooth. Each patient will have a concept of their own ideal dental esthetics. They may then be able to assess where they are in terms of their own esthetic health. In conclusion, esthetic is in the eyes of the beholder; what appears esthetic to the clinician may not appear esthetic to the patient. It is therefore essential that the patient is aware of what treatment options are available and what the clinician is trying to achieve.

ESTHETIC TREATMENT: CLINICIANS' OR PATIENTS' CHOICE?

Esthetic treatment is a meeting of clinician and patient minds. It may be considered that many patients know their life circumstances better than their clinician, and paternalistic dentistry (or medicine) is a thing of the past. Patients are also better educated than in the past; therefore, the approach to treatment must be patient centered. With regard to esthetics, the clinician must necessarily know the rules of dental esthetics, such as

symmetry and the Golden Proportion[11] and must have learned the clinical techniques that allow these concepts to be applied. Thus, communication between the clinician and patient is paramount. The patient's needs must be defined by both sides. The clinician may inform the patient on available treatment options by offering verbal and written information, video simulations, or wax-ups. And though the patient must be the one who makes the final decision, the clinician, with his/her knowledge, should not carry out treatment that offends his/her consciousness. The patient's decision cannot be honored if the treatment may be harmful to their well-being. The patient may demand esthetic treatments, but the clinician's role is to inform and warn. Furthermore, as patients tend to be media driven, basic treatment must not be neglected on the altar of esthetics.

Performance of esthetic materials

Should patients be informed? Is there a trend to sacrifice function and longevity for esthetics? There are a number of recent reports detailing restoration age at replacement of tooth-colored restorations in posterior teeth in comparison to amalgam restorations. Amalgam restorations outperform resin-based composite (RBC) in each of these studies.[12-15] However, while comparison of the two techniques provides useful information, direct comparison is difficult, given that amalgam restorations normally require tooth preparation to provide retention, while initial RBC restorations may be made with an adhesive cavity design, which saves tooth substance. Therefore, the likelihood of pulpal insult with a properly bonded RBC restoration may be reduced, in comparison with amalgam restorations, of which half may be found to exhibit deterioration of occlusal marginal adaptation at 5 years.[16] Recent reports provide evidence that poor wear resistance is no longer considered a problem and that resin composite materials may be successful, with El Mowafy's meta-analysis[7] indicating "high clinical performance" and Mair's 10-year data[18] showing "adequate clinical service for 10 years," which would appear to indicate that the performance of materials used in these studies is better than the early materials that suffered from extreme wear. Furthermore, the American Dental Association recently published a list of applications for resin composites,[19] by the current scientific literature, indicating their suitability in Class 1 and 2 medium-sized restorations,[19] but not supporting the use of resin composite materials for teeth with heavy occlusal load or teeth that cannot be isolated.[19] However, the majority of the above studies[16-18] were carried out in dental school environments, without the pressures of time and economics, which prevail in general dental practice. In this respect, the operator may play a major part in longevity of RBC restorations.

Patients should also be aware that RBC restorations are more time consuming, and potentially more difficult, to place than amalgam restorations, and are therefore unlikely to be cost effective.[20] Nevertheless, clinical evaluations cannot always compare like with like, given that composite restorations may require less tooth substance loss. Furthermore, composite restorations may be more readily repaired than amalgam restorations, possibly improving their cost effectiveness. Cracks and fractures may be found beneath old and corroded amalgam restorations, with such restorations potentially expanding at a rate of 2 to 5 μm per day.[21] Patients requiring restoration of a posterior tooth should be provided with this information so they may make an informed choice. Perhaps the best evidence of success is for the clinician to present data on the effectiveness of restorations placed in his/her practice. Good information of this type is a key to successful practice and optimum patient information. For larger restorations in posterior teeth, tooth-colored inlays have demonstrated reasonable longevity in some studies.[22,23]

Patients should be aware of the longevity of esthetic techniques before making an informed choice, especially if the esthetic materials and techniques are not as long lasting or cost effective as "traditional" techniques.

Are good-looking teeth important to patients' health? If so, is esthetics part of health? It has been considered that the psychologic benefits of an oral esthetic improvement are potentially more important to a patient than traditional dental procedures.[24] Work carried out on orthodontic patients demonstrated that concern with dentofacial appearance often provided the main motivation for parents to seek orthodontic treatment for their children. Over 70% of those questioned considered such treatment important to their child's future success.[25] Furthermore, it has been shown that young adults with a normal dental appearance will be judged more socially attractive.[26] Poor dental esthetics has been linked to a personality lacking in self-confidence, and thus, disadvantaged in social, educational, and occupational settings.[27] Linn[28] reported that dental appearance is very important for those running for public office. Therefore, the patient's esthetic health may be considered an increasingly necessary aspect of overall patient satisfaction following treatment.

It may be concluded that esthetic health is important to a person's well-being. The converse of this may be that poor dental appearance may be bad for self-esteem, and that the general health of some individuals could be adversely affected by poor dental appearance.

A further conclusion may be that people of different social groups may have different aspirations regarding esthetic health, given that the achievement of an esthetic result may be time consuming and costly, although this suggestion is by no means absolute: For example, a composite buildup of a peg-shaped lateral incisor may provide a low-cost improvement in esthetics.

Is the US a trendsetter in esthetic dentistry? Is there a difference in esthetic perception in different countries? A review of the literature demonstrates that a majority of esthetic techniques originated in the US. However, while RBC materials were derived from work carried out in the US, much of the early work on posterior composites was carried out in a clinical trial in both the US and Europe.[29] Esthetic dentistry is not inexpensive dentistry and, therefore, is carried out in more affluent locations. However, the procedures appear to have been adopted worldwide where patients can afford to pay.

It may be surmised that the different cultural backgrounds of different countries will lead to different demands. For example, patients requesting veneers in Europe may not wish to receive restorations as white as those requested in the US, where manufacturers have reacted to demands for white teeth by producing new "extra-white" shades of RBC materials. However, there is no evidence from the literature that this is so.

In conclusion, although many esthetic techniques originated in the US, esthetic dentistry is now a global phenomenon.

Is there a difference in the perception of esthetics by clinicians and the general public? There are few reports on this subject, especially since the widespread acceptance of porcelain veneers by the dental profession and the public. However, work carried out in 1980 by Brisman[6] indicated that clinicians' views could differ from those of the public. Research carried out in 1991 from The Netherlands[30] showed that the public's perception of dental appearance differed from those of the clinician in > 45-year-old age groups, with clinicians identifying more esthetic "problems" in the older age groups of which the patients were not aware.[30]

Ultimately, the idea of esthetic health may be different for different people, different age groups, and different cultures.

Is esthetic dentistry need driven or want driven? Esthetic dentistry must be led by a patient request: It is, therefore, "want" driven. By comparison, treatment of a caries lesion should be "need" driven. However, the latter may also be "want" driven if the patient requests an esthetic restoration. Patients should be provided with the information on what treatments are potentially available, and if they "want" it enough, and the clinician can justify this "want" in the context of, for example, removal of tooth substance, then the treatment can be justified. Above all, however, the treatment should not harm the patient. In this respect, the clinician must be able to provide the treatment that the patient wants. This will require the clinician to undertake postgraduate education in order to remain updated in current techniques.

What is the role of the insurance system in the esthetic equation? Third party insurers use subscribers' or taxpayers' monies to pay for treatment: They must, therefore, be able to justify their spending to shareholders, taxpayers, or government. There is no question that orthodontics is beneficial to the patient's lifelong self-esteem, and payment through a third party insurer (such as the National Health Service [NHS] in the UK) can be justified. However, whether treatments with a more short-term chance of success may be justified by a third party insurer is questionable, given that failure of short-term treatment invariably leads to a future treatment need, with the attendant costs to the insurer. One insurance system may therefore find itself "picking up the bill" for a failed esthetic treatment originally funded under a different scheme.

Other matters are involved too. People are increasingly attending shops for tongue piercing, but has the attendant risk of cracked teeth been discussed with the patient? Should an insurance system pay for the damage so caused? The dental professional is aware of the potential for periodontal damage by smoking: Should the insurance system pay for the periodontal treatment made necessary by the patient's habit? Insurance organizations and companies are increasingly discussing what is and what is not necessary for health. Surely the concept of esthetic health must now be brought into this equation. The clinician is not following fashion changes by painting different colors on a patient's teeth, but is achieving a long-lasting effect on teeth that may be discolored or unesthetic. If esthetics is important for the health of a person, and if the person is esthetically unhealthy, then the dental surgeon may help that person and provide esthetic health. There would appear to be a strong case for insurers to pay for such treatment, given that, increasingly, there is a psychosocial necessity for esthetic health.

In conclusion, while esthetic treatment may often be justified for the patient's self-esteem, it is unlikely to be readily funded by third party insurers. An index of treatment need for esthetic dentistry may be a way forward.

How about cutting healthy teeth to make them look better? The placement of an RBC restoration to restore caries in a posterior tooth may require the removal of less tooth substance than the placement of an equivalent amalgam restoration. However, incorrectly

placed RBC restorations may cause pulpal problems or damage to the supporting tissues by poor approximal contacts. Poor patient selection may lead to premature failure of these restorations in bruxing patients.

Esthetic treatments may require the removal of sound tooth substance. For example, when veneers were originally proposed, they were considered to be a nonpreparation treatment modality. However, tooth preparation is necessary for veneers in order to produce the correct emergence profile and to provide the technician with sufficient space to produce an esthetic restoration. Incorrect preparation–too little or too much–may lead to damage to the supporting tissues or pulp. Inadequate knowledge of the use of dentin- and enamel-bonding agents may cause significant pulpal problems. The placement of crowns for esthetic reasons requires more tooth reduction than veneers. Porcelain-fused-to-metal restorations have been considered to have good longevity but may cause gingival irritation due to insufficient tooth preparation (Here is the quandry for the restorative clinician–keep the periodontists happy or the pulp biologists?). Good communication between clinician and patient, and vice versa, is essential to successful esthetic treatment. The patient's informed consent is needed, and this should serve to raise the consciousness of the patient to the proposed treatment. The patient's judgment should be honored unless the proposed treatment is deemed harmful to their well-being. However, it is ultimately the clinician who must take responsibility for the treatment and execute it with care and to the highest possible standard. In this respect, training is important. Less invasive options should be encouraged. For example, it may be perceived as easier to place four or six anterior veneers rather than attempt the difficult restoration of one discolored tooth. However, the true professional should be able to take on the challenge of the one unesthetic tooth. According to Croll,[31] bleaching should be attempted before treatment of discolored teeth. Esthetic treatment should not be carried out in isolation of a full oral examination and a treatment plan individualized for each patient, with an interdisciplinary team if necessary, and with a full risk/benefit assessment also being carried out.

In conclusion, only those techniques with a published satisfactory longevity should be attempted for esthetic reasons. Better still, the clinician should be able to produce evidence of satisfactory longevity of the chosen technique. Only when the patient has weighed the disadvantages of tooth preparation and the need for replacement restorations in due course, should the treatment proceed. The clinician should always remember that there is no dentistry better than no dentistry.

Are there special ethical considerations in the communication between clinician and patient dealing with esthetic dentistry? The clinician has a duty to inform patients about all aspects of all treatment, but for esthetic treatment, the clinician should provide information on the long-term sequelae to treatment and compare this with no treatment. Written details should be provided and a workup made of the treatment, ideally in the form of an intraoral mockup. Patients may demand treatment, but the clinician must feel justified in terms of the psychosocial benefits to the patient before commencing any form of tooth preparation. There are likely to be differing considerations for different patients. For example, the actor may feel that good-looking teeth are essential for employment.

The clinician is responsible for fully informing patients seeking esthetic treatment, especially in terms of the effect of tooth preparation on long-term viability.

Does the manufacturer have a role in esthetic dentistry? Given the raised profile of esthetic treatments in recent decades, manufacturers have an important role in producing esthetic materials that are reliable, repairable, and cost-effective. At the time of writing, no materials are an absolute substitute for enamel and dentin. The era of esthetic dentistry for posterior teeth will truly arrive at the same time as an easy-to-use, non–technique-sensitive, tooth-colored restorative material that is repairable and permanent.

Manufacturers and clinicians should liaise closely on what is required in terms of esthetic dental materials.

CASE REPORT 1

A 25-year-old woman presented requesting a new porcelain veneer for her maxillary right lateral incisor. The resin veneer on this tooth had been placed 6 years previously to cover a white spot lesion, and the patient found the veneer of poor color match (Fig 1a). The patient also expressed dissatisfaction with the appearance of the gingival tissue associated with this tooth. Following discussion with the patient, it was decided that a crown-lengthening procedure with minimal removal of bone would be carried out, and the discolored veneer would be replaced. Enamel microabrasion would be conducted to remove or reduce the white spot lesions on the other anterior teeth.

The gingival surgery was carried out (Fig 1b), and after healing, the resin composite veneer was removed from the maxillary right lateral incisor (Fig 1c). The crown lengthening made the patient's lateral incisor tooth appear larger, the shade match was satisfactory, and the minimal lingual displacement of this tooth was not of concern to the patient. Accordingly, it was decided not to replace the veneer, and the tooth was

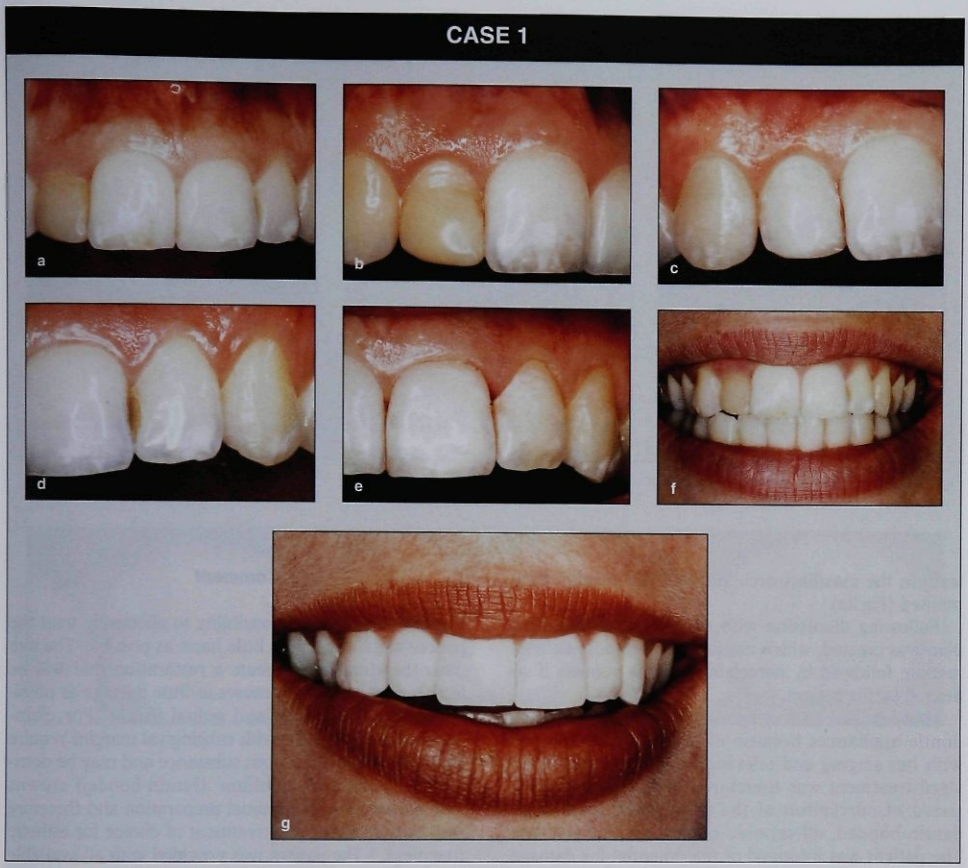

Fig 1 *(a)* Preoperative view. Maxillary right lateral incisor tooth has a 6-year-old resin veneer present with poor color match. Other incisor teeth have white spots resulting from dental fluorosis. *(b)* View following crown-lengthening procedure. *(c)* Old resin veneer has been removed and the facial surface of tooth polished. *(d)* View preceding enamel microabrasion. *(e)* View following enamel microabrasion of maxillary left central and lateral incisors. *(f and g)* Smile at pre- and posttreatment.

treated with a fluoride gel and polished. Enamel microabrasion was carried out on the remaining maxillary anterior teeth (Figs 1d to 1g).

Comment

The treatment carried out was of low cost, of minimal intervention, and of good durability. Had a replacement veneer been chosen for treatment, it would have been necessary to prepare the tooth, and during the patient's lifetime, it would have been necessary to replace the veneer several times. Moreover, when teeth are reprepared, tooth substance is lost. The enamel microabrasion treatment is without risk of relapse. The treatment carried out was esthetically sound and of certain prognosis, with minimal intervention. Sometimes the most simple option for treatment may be overlooked.

CASE REPORT 2

A 39-year-old female singer presented with a request for esthetic improvement of her anterior teeth. Her principal esthetic complaint was that spaces were present between her maxillary premolar and canine

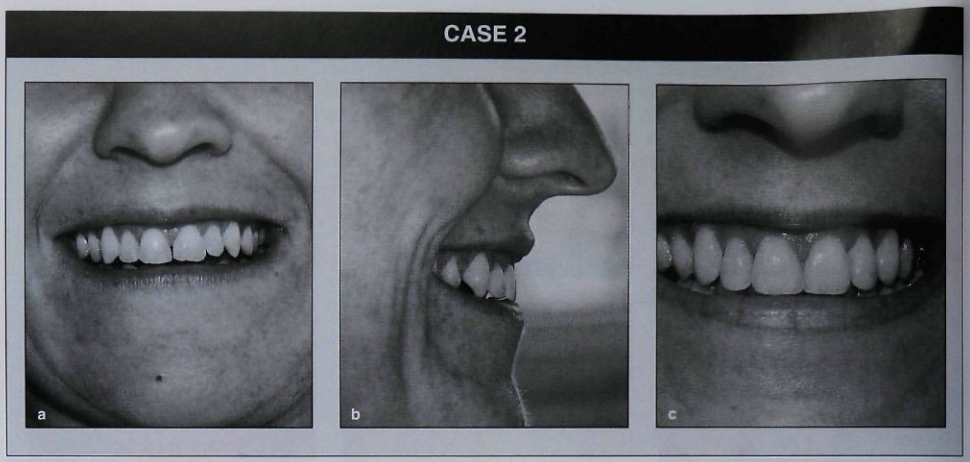

Fig 2 *(a)* Case 2 pretreatment. *(b and c)* Teeth upon completion.

teeth in the maxillary arch and that the cuspids were pointed (Fig 2a).

Following discussion with the patient, a treatment plan was created, which consisted of orthodontic correction, followed by porcelain laminate veneers if so desired by the patient.

However, the patient was unwilling to wear orthodontic appliances because of potential interference with her singing and television performances. A revised treatment was therefore developed. This consisted of correction of the misaligned teeth with dentin-bonded, all-ceramic crowns and/or veneers. The patient was informed of the potential for damage to her teeth as a result of their preparation and was told that there was little information concerning the long-term success rate of the proposed restorations. However, she was given details of satisfactory medium-term success rates in a retrospective evaluation.[32] The patient, so informed, elected to proceed with the revised treatment plan that did not involve orthodontics.

The length of the cuspids was functionally correct, so that it was necessary to lengthen the central incisor and weaken the pointed cuspid teeth without shortening them. An all-ceramic laboratory technique was used with dentin bonding (Scotchbond 1 and Rely X ARC Dual Cure Cement, 3M Dental Products).

An additional challenge was that the crowns/veneers had to be completely finished from Monday to Friday because of the patient's busy work schedule. The results are shown in Figs 2b and 2c.

Comment

It is the clinician's responsibility to effectively treat the patient while causing as little harm as possible. The aim must therefore be to create a restoration that will be long lasting and which causes as little damage as possible to the periodontal and pulpal tissues. Porcelain-fused-to-metal crowns with subgingival margins require extensive removal of tooth substance and may be detrimental to the periodontium. Dentin-bonded crowns and veneers require minimal preparation and therefore may be considered the treatment of choice for esthetic treatment.[33] The patient was provided with all available information regarding her proposed treatment, and, thereby informed, decided not to seek orthodontic intervention. Rather, she chose the restorative route, despite the fact that tooth preparation, albeit minimal, was required. The benefit of this treatment to the psychologic well-being of the patient and, thus, to her singing career cannot be underestimated.

CASE REPORT 3

A 30-year-old woman presented requesting removal, for esthetic reasons, of an amalgam restoration in her mandibular left first molar tooth (Fig 3a). The patient was initially counseled that there were no physical reasons for the replacement of the amalgam restoration[34] and that the potential longevity of a tooth-colored replacement restoration could be less satisfactory.[17]

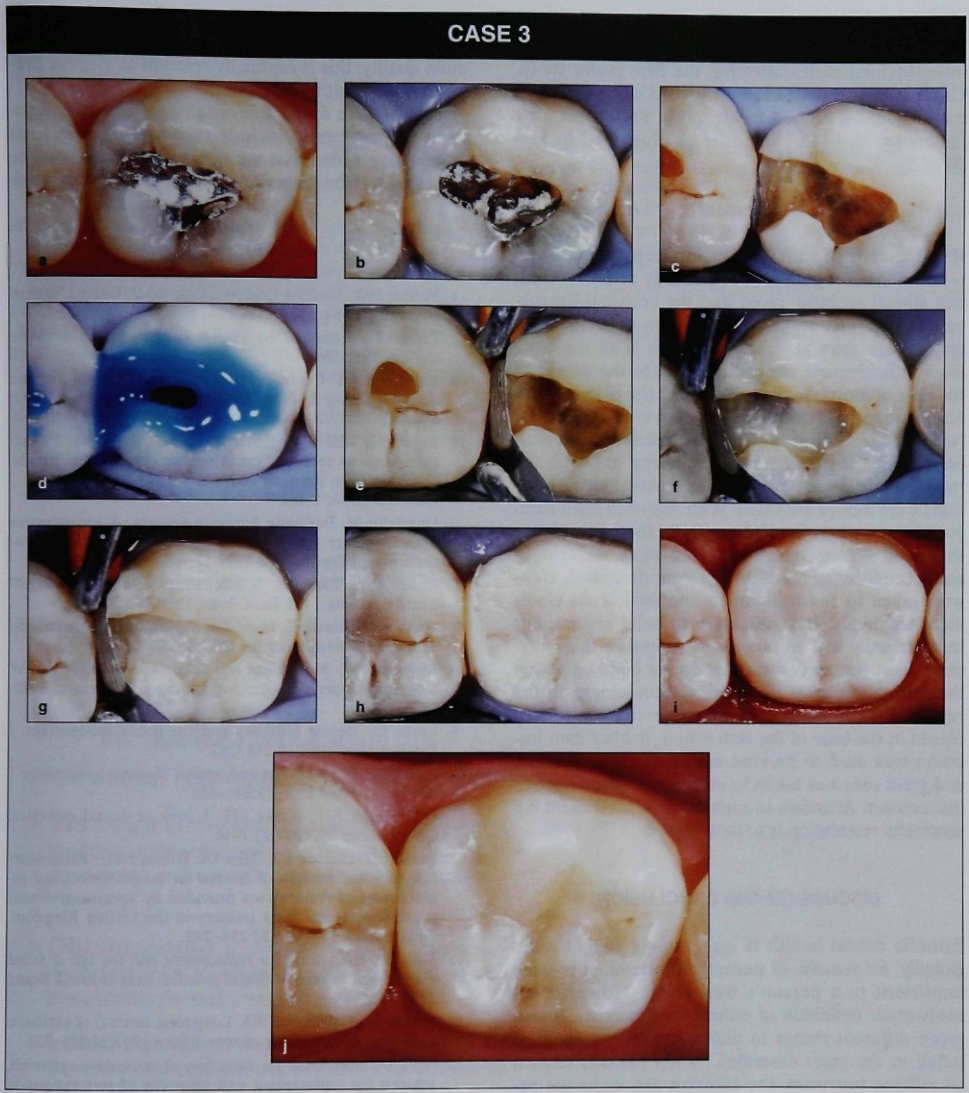

Fig 3 *(a)* Mandibular first molar with amalgam restoration; interproximal caries diagnosed. *(b)* Teeth were isolated with rubber dam, and the old amalgam restoration was removed. *(c)* Cavity outline in first molar determined by existing amalgam restoration and extent of caries. Minimal cavity prepared in occlusal aspect of mandibular second molar. *(d)* Enamel and dentin etched. *(e)* Dentin-bonding agent applied (Prime & Bond NT, Dentsply). Sectional matrix (3M Dental Products) was applied and wooden wedge inserted. Interproximal contact improved by the placement of the separating ring. *(f)* Flowable composite applied to the floor of the cavity (Filtek Flow, 3M Dental Products). *(g)* Incremental buildup of the distal wall with composite (Esthet-X, Dentsply). *(h)* After enamel shades were placed and adapted (A2, A1, and CE) in 2-mm increments, final increment was placed and the matrix band removed. *(i)* With the restoration finished and polished, the rubber dam was removed and discs and points were used for final finish. *(j)* Postoperative view.

However, the patient elected to proceed, and a bitewing radiograph was taken. This showed the presence of interproximal caries affecting the first molar tooth. Caries was also diagnosed on the occlusal surface of the mandibular second molar tooth. Both teeth were restored with resin composite as illustrated in Figs 3b to 3j.

Comment

Replacement of functional, satisfactory, amalgam restorations at a patient's request may present a difficult ethical problem, given that the potential for success of resin composite restorations in posterior teeth may be less than for amalgam.[12] This is all the more likely if inadequate attention is paid to the details of the restoration placement, given that the placement of resin composite restorations has been considered to be "technique sensitive." In the case described, this ethical dilemma first seemed to be present, although the radiographic discovery of caries meant that restorations were indeed indicated. With regard to resin composite restorations in posterior teeth, there is evidence that good success rates may be obtained under optimum conditions,[17,18] and in the case described, steps were taken to ensure isolation and meticulous placement technique. It is necessary to build restorations incrementally and to take steps to ensure that polymerization contraction stresses do not build up within the restoration or at its margins. Accordingly, in the restorations illustrated, a flowable composite was placed at the base of the restoration. Rubber dam isolation was used to prevent moisture contamination, and great care was taken to ensure a good interproximal contact. Attention to such detail is paramount if a successful restoration is to be achieved.

DISCUSSION AND CONCLUSION

Esthetic dental health is increasingly sought after, globally, for reasons of patient self-esteem. It is often important to a person's well-being. However, no ready-made definition of esthetic health exists. It may mean different things to different persons, as illustrated in the cases described. When patients request an esthetic treatment, the clinician can make the patient aware of what the clinician may be able to achieve. It is then for the patient to decide–esthetic treatment should be patient led, but clinician guided. Patients should be aware of the longevity of esthetic techniques before making an informed choice, especially if the esthetic materials and techniques are not as long lasting or cost effective as "traditional" techniques. Esthetic treatment may or may not be cost intensive. At all times, treatment must be of the optimum quality: this is especially relevant to elective procedures of an esthetic nature.

Finally, there would appear to be an increasing argument for insurers to include such treatment in their schemes, provided that the psychosocial need can be identified and the longevity of the treatment guaranteed.

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