Esthetic Correction of Anterior Dental Malalignment: Conventional versus Instant (Restorative) Orthodontics

FRANK M. SPEAR, DDS, MSD*

ABSTRACT

Over the past 20 years since its introduction, adhesive dentistry has suffered, at times, from overuse, particularly in patients with problems of malalignment for which conventional orthodontics would once have been used. The purpose of this article is to create a "flow sheet" to aid decision making regarding whether conventional orthodontics should be used, and what the limitations of treating a patient are if treatment is performed without any orthodontics.

CLINICAL SIGNIFICANCE

A suitable framework will help separate the patients who would benefit from orthodontic intervention from those who can be managed with purely restorative care.

(*J Esthet Restor Dent* 16:149–164, 2004)

Over the past two decades, nothing has changed the way dentistry is practiced as much as endosseus root form implants and adhesive dentistry.[1–6] When introduced to the profession, both technologies provided the ability to restore patients in more conservative ways, leaving natural teeth minimally altered. Over the 20 years that have followed their introduction, both technologies have suffered, at times, from overuse. Some therapists decided that implants were so successful, it would be beneficial to remove more teeth and use more implants. To that extent, many implant publications have shown patients who would routinely have been treated with periodontics and restorative dentistry in the past, now being treated with full-mouth extractions and implant reconstructions.

This same phenomenon has also been applied to adhesive dentistry, particularly bonded porcelain, particularly in patients with problems of malalignment for which conventional orthodontics would once have been used. Now "instant orthodontics" is being performed routinely with bonded porcelain. In fact, in every major city in the country, one can look in the Yellow Pages and find a dentist offering "two-appointment orthodontics." It is now commonplace to have at least one publication per month arrive at our office showing a patient with unrestored teeth receiving 10 or 20 bonded porcelain restorations correcting a problem of alignment.

The purpose of this article is not to judge whether all of these treatment plans are right or wrong—I spend the majority of my practice time performing bonded porcelain restorations to alter patients' appearance—but to create a "flow sheet" to aid decision making regarding whether conventional orthodontics should be used, and what the limitations of treating a patient are if treatment is performed without any orthodontics.

The decision process can be viewed as a series of questions, and

*Founder and director of the Seattle Institute for Advanced Dental Education; Private Practice, Seattle, WA, USA

depending upon the answer to the questions, the practitioner and patient can decide whether to involve orthodontics.

QUESTION 1

Will the teeth need to be restored to satisfy the patient's esthetic desires regardless of whether orthodontics is performed?

This is a critical question to answer. If the teeth will need to be restored because of existing restorations, poor tooth size or shape, or color problems that cannot be corrected with bleaching, then orthodontics will have to provide some other significant benefits to be chosen to correct malalignment. On the other hand, if the teeth do not require restorative treatment other than perhaps bleaching and recontouring following orthodontic treatment, there are compelling reasons to do conventional orthodontics and leave the teeth unrestored (Figures 1 and 2).

As good as our current techniques and materials are, there is certainly no evidence that they will survive a lifetime when placed in young individuals.[7–9] Because of this, the expediency of the quick fix must be weighed against the long-term consequences of preparing teeth in patients who would not require restorations if conventional orthodontics was performed.

However, if the teeth need restorations even after orthodontics, the treatment planning process becomes an issue of whether an acceptable result can be achieved by the restoration alone, or whether it will be necessary to use both orthodontics and restorative

Figure 1. A *and* B, *Patient who desired an esthetic correction of her smile. Even if orthodontic treatment had been performed to correct alignment, the teeth would still have needed restorations to improve their appearance and condition.*

Figure 2. The completed restorations on the patient in Figure 1. Because all the other considerations were acceptable, the alignment correction was managed with the restorations.

dentistry to create the desired esthetic outcome.

Will the teeth need to be restored to satisfy the patient's esthetic desires regardless of whether orthodontics is performed? If so, go to Question 2. If not, orthodontics is the preferred treatment plan.

QUESTION 2

Can the occlusion be managed without orthodontics but with restorative dentistry?

Often restorative dentistry can solve the esthetic problems of maxillary and mandibular anterior teeth but cannot correct the occlusal relationship of the anterior teeth (Figures 3 and 4). This is especially true of patients with inadequate or excessive overbite or overjet, or single-tooth anterior crossbites.

For the restorative dentist, the most common occlusal problems encountered when desiring to restore the maxillary anterior teeth to a new length are a lack of room owing to inadequate overjet, particularly in cases of excessive wear, or a concern that the new, longer restorations will create an excessively deep overbite that may result in fracture of the porcelain.

The restorative dentist's thought process to solve these spatial problems typically involves a desire to increase the vertical dimension of the occlusion. Often a measurement is made from the cementoenamel junctions or gingival margins of the maxillary central incisors to the mandibular central incisors to determine whether this distance is below the average of 18 to 20 mm and then to decide whether a vertical opening is required to regain lost vertical dimension.[10,11] Unfortunately, all these measurements help evaluate is the state of eruption of the maxillary and mandibular anterior teeth, not the vertical dimension of occlusion. Unless the posterior teeth, particularly the molars, show significant wear or are lost, it is highly unlikely that the patient has lost vertical dimension. So, why not increase the vertical dimension restoratively? Primarily because there is the cost

Figure 3. Adult who required restorations on her peg-shaped lateral incisors and had impacted permanent canines. The maxillary esthetics and canine replacement could have been managed restoratively, but the occlusal relationship, particularly the anterior crossbite and natural canine guidance, could only have been corrected with orthodontic treatment.

Figure 4. The patient from Figure 3 following exposure of the impacted canines and orthodontics to bring them into correct alignment and occlusion. (Orthodontics courtesy of Vince Kokich, DDS, MSD)

to the patient and the need to restore posterior teeth that otherwise would require no treatment.

How can orthodontics overcome the problem? If the problem is one of excessive overbite due to wear and anterior eruption, orthodontics can level the arches intruding the anterior teeth, allowing the dentist to restore the anterior teeth and leave the patient's posterior teeth unrestored (Figures 5–8). If the problem is one of inadequate overjet, as in an end-to-end occlusion, the orthodontist can strip or extract mandibular teeth, creating room for the mandibular anterior teeth to be retracted. A normal overjet is created to properly position or restore the anterior teeth, leaving vertical dimension unchanged.

Another occlusal problem commonly associated with cases of severe crowding is the inability to create a normal canine relationship in the occlusion, even with full-coverage restorations. Again, orthodontics can resolve the canine relationship, and only a conservative veneer, or even no restoration at all, is needed, rather than very aggressive restoration.

Can the occlusion be managed without orthodontics but with restorative dentistry? If so, go to Question 3. If not, orthodontics is preferable.

QUESTION 3

Is the most apical free gingival margin level esthetically acceptable?

Figure 5. A *and* B, *Patient who had severe attrition of his mandibular anterior teeth and what appeared to be a loss of vertical dimension of occlusion.*

Figure 6. A measurement made from the cementoenamel junctions or gingival margins of the maxillary to mandibular central incisors showed a distance of only 10 mm, appearing as a significant loss of vertical dimension. An examination of the posterior teeth showed no wear and an acceptable occlusion. A measurement from the gingival margins of maxillary to mandibular first molars revealed a normal vertical dimension of occlusion, the anterior measurement simply reflecting secondary eruption of the anterior teeth owing to severe wear.

Figure 7. Orthodontics was performed to intrude the lower incisors and level the lower arch after the teeth were first built up. The upper arch was also leveled.

With the emphasis on esthetics that has occurred over the past 25 years, the relationship of gingival levels to appearance is now well accepted.[12] What does not seem to be as well understood, however, is why aberrations in gingival margin levels occur. That is, why are the free gingival margins at different levels on two central incisors in the same patient? What we know biologically is that, in most patients, the biologic width is constant for that patient around all teeth.[13,14] Therefore, variations in gingival margin height must be due to differences in bone level or sulcus depth between teeth in the same patient. If recession of facial bone on one central incisor has occurred, so that its bone level is 3 mm apical to the adjacent central incisors, it would not be surprising to see the gingival margin on the central incisor with the bony recession also recede. What also can happen, however, is that the bone levels vary not because of bony recession, but because of differences in tooth eruption. An example would be two overlapped central incisors, one to the lingual and one to the facial aspect. The tooth to the lingual aspect will always exhibit more wear than the one to the facial aspect. As it does, it will erupt, bringing the bone coronally with it and resulting in a coronally placed gingival margin.

Figure 8. Final restorations consisted of four maxillary and four mandibular anterior restorations. The posterior teeth and vertical dimension remained unchanged. (Restorations courtesy of Dr. Gregg Kinzer, DDS, MSD)

Another possible cause of aberrations in gingival margin heights is variations in sulcus depth between the central incisors, despite correct bone levels. The tooth with the shallower sulcus will have a more apically positioned gingival margin than the one with a deeper sulcus. This variation in sulcus depth is common in cases of anterior tooth malposition. The more labially inclined teeth have a thinner gingiva and a shallow sulcus, and the more lingually placed teeth have a thicker gingiva and a deeper sulcus (Figures 9–15).

So what does all this have to do with whether I use orthodontics? We all know periodontal surgery can alter gingival margins, and we also know it is much easier to remove tissue or bone than to create it.[15–17] So, one must consider whether the most apical free gingival margin level is an acceptable one. If it is, then it is possible to use either gingivectomies or osseous

Figure 9. Patient who was seeking esthetic correction of her anterior teeth. The central and left lateral incisors required some restorative treatment whether orthodontics was performed or not. The occlusion was acceptable, as was the most apical free gingival margin, which was on the left central. The tissue on the right central and left lateral incisors was coronally positioned relative to what is ideal.

surgery to apically position the gingival margin heights on all the other teeth relative to the most apical tissue. However, if this process would create excessively long and thin-appearing teeth, then a new problem exists. Although connective tissue grafting is predictable and effective for covering exposed root surfaces, it is far less predictable for moving tissue coronally to cover enamel or ceramic on labially positioned teeth. Therefore, if the patient has a high smile line and the most apically positioned free gingival margin is unacceptable owing to a labially positioned tooth, orthodontics to reposition the teeth and tissue is the most predictable solution.

Figure 10. Note, in the incisal view, how the free gingival margin levels corresponded to the labial lingual position of the teeth in the alveolus. The right central incisor had tissue more coronal than the left central incisor owing to its lingual position, and the left lateral had more coronal tissue than the right lateral incisor, even though it had had a crown placed that attempted to correct the lingually positioned root.

Orthodontics can also be used to correct the other situations described above. When a coronally positioned gingival margin owing to a lingually positioned tooth and a deep sulcus are present, one can correctly position the tooth, and the gingiva will thin to a normal thickness sulcus depth and level. Last, a tooth in labial version with slightly apical thin tissue and a shallow sulcus can be correctly positioned, and the gingiva will thicken to a normal sulcus depth and level.

As an aside, it currently is popular to use a laser or electrosurgery to sculpt the free gingival margins to ideal levels during cosmetic restorative procedures.[18] This results in a far more pleasing final result esthetically. However, the practitioner must identify the cause of the gingival aberration prior to selecting the mode of treatment for the gingival levels. If the problem is one of bony levels, then flap surgery and osseous recontouring are necessary to provide biologic health and tissue stability. If the problem is excessive sulcus depth owing to a lingually positioned tooth, then sculpting the tissue is biologically acceptable. But since the tooth is in lingual version, a significant amount of tissue regrowth may occur, and it may be necessary to periodically retrim the tissue to maintain the ideal appearance.

Figure 11. A gingivectomy was performed on the right central and left lateral incisors to correct their tissue levels esthetically. Whether bone removal would also be necessary depended on whether the tissue levels were incorrect owing to variations in the vertical eruption of the teeth that created discrepancies in the bone, or whether the bone levels were correct and the variations in tissue existed owing to differences in the sulcus depth resulting from labiolingual differences.

Orthodontic repositioning of the tooth can also alleviate the problem (see Figures 9–15).

Is the most apical free gingival margin level esthetically acceptable? If so, perform surgery to correct the tissue and go to Question 4. If not, consider whether grafting can provide the necessary coverage. If still not, orthodontics is preferable.

QUESTION 4

Are the papilla levels harmonious?

As with free gingival margin levels, the papilla levels are critical to the overall esthetics of anterior teeth.[12] Papillae that are positioned too far apically result in either an open gingival embrasure (black space) or the development of an excessively long contact and subsequent rectangular-looking teeth. Three factors come into play in establishing papilla levels: underlying bone level, the patient's biologic width, which is a combination of the connective tissue and epithelial attachment heights, and the gingival embrasure form and size. Of these, the patient's biologic width is relatively constant, but bone level and embrasure form can vary dramatically with tooth eruption. This variance can create a significant esthetic challenge for the restorative dentist. In general, unless a patient has had wear or excessive overjet and secondary eruption, the interproximal bone is rarely positioned too far coronally. And, unless the patient has had periodontal disease, the interproximal bone is rarely too far apical. This means that in most patients who present for cosmetic procedures, variations in papilla level are related to embrasure form. Interestingly, excessively large embrasures, as in the presence of diastemata, can result in papillae that are positioned apically. Excessively small embrasures, as can happen in overlapped or rotated teeth, can also result in papillae that are positioned apically. The key question, then, is whether the most apically positioned papilla is acceptable; that is, does its position result in an excessively long contact and disharmony of coronal form

Figure 12. To determine whether variations in the bone or sulcus depth created the original discrepancies in tissue level, sounding the bone with a probe was performed. Note that on the left central incisor, which had the more labial position and did not have a gingivectomy, the tissue was 3 mm coronal to bone, which would be normal for most patients.

Figure 13. On the right central incisor, 1 mm of tissue was excised to correct the tissue level, yet the sounding revealed a 3 mm depth. This meant that prior to the gingivectomy, the tissue was 4 mm coronal to the bone and had a 2 mm sulcus as opposed to the 1 mm sulcus of the left central incisor. The variation in tissue height above the bone can be explained by the differences in labiolingual position.

that is esthetically displeasing? If so, orthodontics is the only option to correct it. Currently there are no periodontal surgery procedures that can increase the height of interproximal bone or grow predictable interproximal soft tissue. However, orthodontics can erupt teeth to move interproximal bone coronally, close diastemata to move soft tissue papilla height coronally, or align overlapped teeth, allowing the papillae to move to the normal coronal position above the bone. Of these examples, significantly malaligned overlapped teeth is the situation that most often benefits from orthodontics to correct papilla levels. Typically, patients with multiple diastemata do not have normal papilla heights, but the heights of all the papillae are even. Therefore, the appearance is harmonious, just with slightly larger contacts than if the diastemata were closed. Malaligned teeth, however, are a significantly different problem. Some embrasures are normal and have normal papilla height; others are very small because of the overlap and have significantly apically positioned papillae. In these patients, if orthodontics is not performed, there is often a significant disharmony of contact length and final coronal form (Figures 16–18).

Figure 14. On the left lateral incisor, 3 mm of tissue was removed to correct the gingival level. The sounding depth still revealed 3 mm of tissue coronal to bone. This meant that prior to the gingivectomy, there was 6 mm of tissue coronal to the bone and a 4 mm sulcus owing to the lingual root position.

Are the papilla levels harmonious? If so, go to Question 5. If not, orthodontics is preferable.

QUESTION 5

Can an acceptable contour and arrangement be created?

This is really a question of coronal width and length. In my role as an educator, this is the question I am most often asked concerning instant orthodontics. Students approach me carrying a photograph or model showing large diastemata or severe crowding and say, "Do you think I need to send the patient to an orthodontist?" What they are really asking is, Can I make these teeth look good given their existing position and alignment? My response to the question is always the same: without drawing my desired tooth form on the photograph or doing a diagnostic wax-up on the model, I

Figure 15. The patient following gingivectomy, tooth preparation, and provisionalization. The root position remained a challenge. The restorations had corrected the coronal alignment, but the roots of the right central and left lateral incisors were still lingually positioned. This created a high potential for the gingiva to rebound coronally negating the esthetic benefits the gingivectomy had provided, and may have required that the tissue on the right central and left lateral incisors be excised periodically to maintain pleasing esthetics for the patient. Although this is not a biologic problem, it is certainly an annoyance for the patient. Orthodontic alignment of the teeth prior to the restorations would have eliminated this problem.

Figure 16. This patient presented after reading about cosmetic dentistry and desired the restoration of all her maxillary teeth to change their appearance. She also made it clear she desired a near-perfect final result. Her left central incisor was the only anterior tooth that would require restoration (other than some incisal bonding on the right lateral and central incisors) if she underwent orthodontic treatment. A review of her papilla levels quickly changed her mind. Because of the rotated left lateral incisor, the papilla between the lateral and central incisor was apically positioned owing to the small gingival embrasure. Restoring the teeth would not have moved the papilla coronally and would have resulted in a very long contact.

do not know. Having said that, I believe a few comments are appropriate concerning contour and arrangement.

First, let us consider patients with multiple diastemata. This condition occurs for two reasons: inappropriately small natural anterior teeth or normal teeth with an excessively large arch form. The two conditions can be very different to treat. The patient with diastemata owing to small teeth is usually best treated with restorative dentistry, regardless of whether orthodontics is performed. Patients with normal-sized teeth but a long arch form can often be treated with either restorative dentistry alone or orthodontics alone. The key to determining appropriate treatment is to perform a diagnostic wax-up or set-up on mounted models.

At the other extreme are patients with severely overlapped and crowded teeth. These patients commonly present with biologic and structural problems as well, which we address in Question 6. The esthetic concern for both patients with diastemata and those with crowding is how the teeth will look if they are restored in their current position. There are several articles discussing the use of the "golden proportion" in planning treatment for patients with malalignment.[19,20] Although this may be a useful tool for doing a wax-up or set-up, it can fall short of creating ideal esthetics in patients with diastemata or

Figure 17. From the incisal edge, the rotation of the lateral incisor and the narrowing of the embrasure were obvious.

crowding. The reason for this shortfall is simple: the golden proportion creates a proportionate relationship of the teeth relative to their widths. This seems logical, but the evidence is clear that some anterior teeth, particularly the maxillary central incisors, carry more weight in patients' assessment of esthetics. Conversely, the maxillary lateral incisors can have large variations in their width and still be judged esthetic as long as they are symmetric. This concept must be considered when developing a plan for patients with an extreme amount of excessive space or crowding. In either case, the golden proportion will apportion the space to a percentage, which may create very large or very small central incisors. It is more pleasing esthetically to create the ideal proportion to the central incisors and to allow the laterals to be wider or narrower than ideal. Proportionate central incisors create the illusion of a pleasing smile, whereas misproportioned lateral incisors are rarely noticed as long as they are symmetric to each other.[12]

Figure 18. Because the bone level was correct, when orthodontics corrected the rotation following placement of a correctly shaped temporary on the left central incisor, the papilla returned to its normal level. Following orthodontics, the only restoration placed was the replacement crown on the left central incisor and direct bonding on the incisal edges of the right lateral and central incisors.

Can an acceptable contour and arrangement be created? If so, go to Question 6. If not, orthodontics is preferable.

QUESTION 6

Are structural compromises necessary to correct the alignment?

One of the great strengths of bonded porcelain is its conservative nature compared with conventional full-coverage restorations.[4] When malalignment is being corrected, the tooth preparation must be significantly more aggressive. A labially positioned tooth that needs a significant amount of labial reduction to bring it into line sometimes requires near amputation of the existing coronal form. A lingually positioned tooth that needs significant lingual tooth preparation to avoid an excessively thick incisal edge and rotated teeth may require a combination of significant labial and lingual reduction on mesial and distal aspects to accomplish the desired alignment. It is an interesting challenge to determine how much tooth preparation is acceptable in a treatment plan. Historically, dentistry has espoused the most conservative treatment

possible for any tooth; however, there are no clear-cut guidelines that a particular degree of reduction will result in a certain percentage of success. It does seem prudent, however, to consider the patient's age and current dental condition when determining appropriate reduction. The younger the patient and the fewer current restorations, the more desirable it is to perform tooth preparations conservatively.

Are structural compromises necessary to correct the alignment acceptably? If so, go to Question 7. If not, orthodontics is preferable.

QUESTION 7

Are the biologic consequences of correcting the alignment restoratively acceptable?

The answer must take into consideration two components: the pulpal and periodontal issues. If the desired contour requires a tooth preparation that exposes the pulp or amputates the pulp and coronal tooth structure, strong consideration must be given to treating the situation with orthodontics. As good as our pulp caps and endodontics procedures are, they definitely are not 100% successful.[21–23] In a young individual, choosing between elective endodontic therapy and a foundation restoration may impact whether the tooth lasts for the patient's lifetime (Figures 19–22).

The risk of adversely affecting the periodontium biologically must also be taken into account when considering a restorative-only correction. Anytime a rotated or lingually positioned tooth is corrected restoratively, there is the potential for significant alterations in emergence profile,[24] which may have an impact on gingival health. Restorative alignment of severely overlapped teeth certainly has the potential to negatively impact the periodontium. As the teeth overlap, the contact moves apically, and the risks of violating the biologic width during tooth preparation and of subsequent inflammation increase. Simply

Figure 19. This patient, a dentist, desired restorative correction of his tooth malalignment rather than orthodontics. The teeth needed restoration to achieve his esthetic goals regardless of whether orthodontics was completed. The occlusion was able to be managed without orthodontics. His high lip line did not show the discrepancies in free gingival margin levels, and the papilla levels, which did show, were acceptable. However, to bring the left lateral incisor into alignment would have virtually guaranteed pulpal involvement during tooth preparation, and subsequent endodontics.

Figure 20. The occlusal view showed the labial positioning of the left lateral incisor. When presented with the option of endodontics versus short-term orthodontics, the patient chose orthodontics.

Figure 21. Following stripping of the teeth, 5 months of orthodontics achieved the alignment shown.

separating the contact with a bur creates a high likelihood that the margin will be placed in the attachment. Note the apical position of the contact between the left central and lateral incisors in Figures 16 and 17.

Are the biologic consequences of correcting the alignment restoratively acceptable? If so, perform instant orthodontics using restorative dentistry. If not, orthodontics is preferable.

Figure 22. The final result consisted of conservative porcelain veneers from first premolar to first premolar, except for the right lateral incisor, which had the preexisting crown.

SUMMARY

The ideal patient for instant orthodontics would meet the following requirements:

- Have a need for tooth restoration regardless of whether orthodontic treatment is done
- Have an ideal occlusion without any orthodontic treatment
- Have a free gingival margin and papilla levels that are manageable without orthodontic treatment
- Have a pleasing and esthetically acceptable contour and arrangement without orthodontic treatment
- Require tooth preparations that will not mutilate the teeth structurally or biologically

Amazingly, many patients meet these requirements and truly are good candidates for nonorthodontic esthetic correction. Unfortunately, equally amazing is the number of patients I see in whom these parameters have been violated, leaving the patient and dentist wondering why the ceramic restoration fractured, the preparation broke, the tissue became inflamed, or the overall esthetic result is mediocre and asymmetric following a restorative-only correction.

The purpose of this article is not to condemn or promote orthodontic or nonorthodontic approaches, but to highlight the criteria by which we evaluate the multiple treatment options available. Putting aside the clinical parameters described above, there are nonclinical reasons dentists cite for not performing orthodontics, for example, "The patient didn't want orthodontics." But as my orthodontic colleague Vince Kokich has said to me, "Nobody wants orthodontics." I believe this is absolutely true until patients are presented with the legitimate benefits and consequences of each approach. I encourage you to create a written list of pros and cons of the orthodontic and nonorthodontic

TABLE 1. PROS AND CONS OF TREATMENT OPTIONS.

Treatment	Pros	Cons
Orthodontics	Costs less	More time involved
	Fewer restorations	Retainer needed after treatment
	No root canals	
	No periodontal surgery	
Nonorthodontic	Less time involved	Costs more
		More restorations
		Aggressive tooth preparation
		Periodontal surgery

treatment options and to present it to your patients. Essentially this list is an informed consent sheet for the purpose of treatment. An example is presented in Table 1. I grant you, this example looks biased toward orthodontics, but it is realistic. After having the pros and cons outlined for them, patients who did not want orthodontic treatment may suddenly decide it will not be so bad. In addition, patients will recognize that you have presented to them an honest assessment of what is possible, regardless of whether it will result in you performing the treatment. That level of commitment to their well-being creates a high level of respect toward you; they will likely refer you to their friends and family who may be considering esthetic care. Patients will trust what you tell them because of your integrity and reputation for putting patients' health above monetary gain. Although you essentially send some patients away, the ultimate gain is that you get more patients in the long run than you would have with a reputation for performing excessive or inappropriate treatments. This does not happen overnight, but practices are built over years by a clear sense of core values that are adhered to despite an initial desire to bring in more money.

In conclusion, I enjoy performing instant orthodontics as much as anybody. But, in my opinion, restorative dentistry is being performed excessively in many patients who would need little or no restorative care if orthodontic intervention were performed. Even worse, it is being performed unsuccessfully relative to the longevity of the restoration or health of the patient. It is my hope that the questions above will be used as a framework to help dentists separate the patients who would benefit from orthodontic intervention from those who can be managed with purely restorative care.

DISCLOSURE AND ACKNOWLEDGMENTS

This article has been reprinted in large part, with permission, from Spear FM. The esthetic correction of anterior dental mal-alignment conventional vs. instant (restorative) orthodontics. J Calif Dent Assoc. 2004 Feb;32(2):133–41.

The author has no financial interest in the companies whose products are mentioned in this article.

REFERENCES

1. Albrektsson T, Zarb G, Worthington P, Eriksson AR. The long-term efficacy of currently used dental implants: a review and proposed criteria of success. Int J Oral Maxillofac Implants 1986; 1:11–25.
2. Avivi-Arber L, Zarb GA. Clinical effectiveness of implant-supported single-tooth replacement: the Toronto study. Int J Oral Maxillofac Implants 1996; 11:311–321.
3. Zarb GA, Schmitt A. The longitudinal clinical effectiveness of osseointegrated dental implants in anterior partially edentulous patients. Int J Prosthodont 1993; 6:180–188.
4. Garber DA, Goldstein RE, Feinman RA. Features of porcelain laminate veneers. Chicago: Quintessence, 1998.
5. Belser UC, Magne P, Magne M. Ceramic laminate veneers: continuous evolution of indications. J Esthet Dent 1997; 9: 197–207.
6. Lim CC. Case selection for porcelain veneers. Quintessence Int 1995; 26: 311–315.
7. Calamia JR. Clinical evaluation of etched porcelain veneers. Am J Dent 1989; 2: 109–115.
8. Friedman MJ. A 15-year review of porcelain veneer failure: a clinician's observations. Compend Contin Educ Dent 1998; 19:625–636.
9. Barghi N, Berry TG. Postbonding crack formation in porcelain veneers. J Esthet Dent 1997; 9:51–54.
10. Lee RL, Gregory GG. Gaining vertical dimension for the deep bite restorative patient. Dent Clin North Am 1971; 15: 743–763.
11. Hunt KH. The impact of bioesthetics on the face, smile and teeth. Dent Econ 1995; 85(3):81–82.
12. Kokich VO Jr, Kiyak HA, Shapiro PA.

Comparing the perception of dentists and lay people to altered dental esthetics. J Esthet Dent 1999; 11:311–324.

13. Gargiulo AW, Wentz FM, Orban B. Dimensions and relations of the dentogingival junction in humans. J Periodontol 1961; 32:261–267.

14. Vacek JS, Gher ME, Assad DA, et al. The dimensions of the human dentogingival junction. Int J Periodontics Restorative Dent 1994; 14:155–165.

15. Freidman N. Periodontal osseous surgery: osteoplasty and osteoectomy. J Periodontol 1955; 26:257–265.

16. Rosenberg MM, Garber DA. Tooth lengthening procedures. Compend Contin Educ Dent 1980; 1:161–172.

17. Friedman N, Levine HL. Mucogingival surgery: current status. J Periodontol 1964; 35:5–13.

18. Krejci RF, Kalkwarf KL, Krause-Hohenstein U. Electrosurgery—a biological approach. J Clin Periodontol 1987; 14: 557–563.

19. Javaheri DS, Shahnavaz S. Utilizing the concept of the golden proportion. Dent Today 2002; 21(6):96–101.

20. Preston JD. The golden proportion revisited. J Esthet Dent 1993; 5:247–251.

21. Langeland K, Langeland L. Indirect pulp capping and the treatment of deep carious lesions. Int Dent J 1978; 18:326–380.

22. Sjogren U, Hagglund B, Sundqvist G, Wing K. Factors affecting the long-term results of endodontic treatment. J Endod 1990; 16:498–504.

23. Kerekes K, Tronstad L. Long-term results of endodontic treatment performed with a standardized technique. J Endod 1979; 5:83–90.

24. Croll BM. Emergence profiles in natural tooth contour. Part I: photographic observations. J Prosthet Dent 1989; 62: 4–10.

Reprint requests: Frank Spear, DDS, MSD 600 Broadway, Suite 490, Seattle, WA 98122.