Clinical Decisions for Anterior Restorations: The Concept of Restorative Volume

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ABSTRACT

The choice of the most appropriate restoration for anterior teeth is often a difficult decision. Numerous clinical and technical factors play an important role in selecting the treatment option that best suits the patient and the restorative team. Experienced clinicians have developed decision processes that are often more complex than may seem. Less experienced professionals may find difficulties making treatment decisions because of the widely varied restorative materials available and often numerous similar products offered by different manufacturers. The authors reviewed available evidence and integrated their clinical experience to select relevant factors that could provide a logical and practical guideline for restorative decisions in anterior teeth. The presented concept of restorative volume is based on structural, optical, and periodontal factors. Each of these factors will influence the short- and long-term behavior of restorations in terms of esthetics, biology, and function. Despite the marked evolution of esthetic restorative techniques and materials, significant limitations still exist, which should be addressed by researchers.

The presented guidelines must be regarded as a mere orientation for risk analysis. A comprehensive individual approach should always be the core of restorative esthetic treatments.

CLINICAL SIGNIFICANCE

The complex decision process for anterior esthetic restorations can be clarified by a systematized examination of structural, optical, and periodontal factors. The basis for the proposed thought process is the concept of restorative volume that is a contemporary interpretation of restoration categories and their application.

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INTRODUCTION

Minimally invasive approaches are generally established as the most desirable strategies in medical treatments. In dentistry, it is well known that preservation of dental tissues has a profound impact on the life span of teeth.[1–3] Traditional preparation design for full coverage restorations based on retention and resistance forms had not changed significantly for many decades. The paradigm shift toward less invasive adhesive restorations is currently being supported by relevant scientific data. There is increasing evidence that in many situations, it is possible to bond highly esthetic materials to tooth structure recovering a significant portion of its original physical properties with minimal preparation. However, the preparation design for

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adhesive restorations, the amount of tooth structure to preserve, and the dentin's ability to promote a long-standing adhesive interface are still a matter for scientific debate.[4–6] Therefore, the clinical decision on the type of preparation and restoration to use is less simple today than two decades ago.

Neuroscience research has shown a highly complex process whenever a decision is being made by the human brain.[7] Past experience in memories and also emotional factors seem to play a significant role in this process. Studies suggest that physicians, facing several markers of disease severity, tend to spontaneously aggregate data to form a gestalt.[8] A complete perception as a whole (gestalt) is formed and drives the decision rather than the sum of different variables. This supports the fact that experienced dental clinicians have developed decision processes, which may seem effortless but in fact are quite complex. Less experienced clinicians may find difficulties making treatment decisions because there exists a plethora of different restorative materials and many similar products with varying commercial brands.

Dental literature is very dense on restorative material selection, but most research and reviews relate to isolated factors. Nevertheless, these factors often present themselves combined and in complex situations in clinical practice. Some of these biomechanical and esthetic factors are within the control of the restorative team, whereas other factors cannot be managed. The factors that can be managed by the restorative team should be individually identified and then analyzed concomitantly to produce a predictable final decision. The objective of this report is not to produce strict guidelines for clinical restorative decisions. The purpose of this article is to suggest a simple and generic "thinking process" that can help clinicians, especially those less experienced, identify risks, and support their restorative decisions based on the scientific evidence.

TYPES OF RESTORATIONS

It is well accepted that the most appropriate restorative materials for anterior teeth are composites and ceramics. Each of these two materials has indications, advantages, and limitations. The best clinical application for each one may be a debatable issue because composites and ceramics may share some mutual indications.

Resin composites are versatile materials and should be the first choice for conservative defects on anterior teeth.[9,10] However, the larger the restoration, the greater the likelihood of subsequent treatment repair or replacement because of marginal staining, surface discolorations, or fractures that often occur within the first 3 to 5 years.[11] Their biomechanical behavior is inferior than enamel (lower elastic modulus), thus increasing fracture risk.[12] Although the indirect fabrication of composite restorations has gained some popularity, most clinicians still place them directly. Reasonable experience is important as well as extended chair time to achieve natural results with very large direct placement of direct composites. Nevertheless, they still present a safe, economic, and appropriate treatment in many situations, especially considering their minimal or noninvasive application.[13]

Ceramic restorations can provide the natural illusion of tooth surface, long-term stable optical behavior,[14] and good long-term survival rates.[15–17] Several authors[18–20] have classified ceramic restorations into two groups. One group includes ceramic restorations that have a reinforced core (coping) like the porcelain fused to metal (PFM) or the porcelain fused to zirconia/alumina, also called all-ceramic crowns. They do not require adhesive bonding to the underlying tooth structure because they intrinsically possess sufficient strength as a unit. Because the core is more opaque, a deeper preparation is usually needed to create a proper depth illusion and translucency.[14] The second group includes ceramic materials that rely on an adhesive interface for adequate strength, rigidity, and resistance like feldspathic porcelain and glass ceramics, and are applied in thinner restorations. These materials promote light transmission from within the tooth structure and require less tooth preparation.[14]

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It is worthwhile to note that newly developed lithium disilicate pressable glass ceramics have shown promising in vitro physical properties.[21] Although no long-term clinical data is yet available, this material seems to combine higher strength that allows conventional cementation (when adequate thickness of ceramics exists in the restoration), with excellent esthetic results when used by experienced clinicians and technicians.[22]

The literature shows that similar longevity can be expected in anterior restorations, irrespective of ceramic system used, whether PFM crowns, all-ceramic crowns reinforced with zirconia/alumina copings, glass ceramics, or feldspathic veneers, as long as specific protocols and indications are used for each system.[15,23–29] Therefore, considering today's medical paradigm of minimally invasive and conservative treatment, the most appropriate ceramic material would ideally be the one that requires the least tissue preparation and still provides an adequate esthetic result for the patient, considering the clinician and technician experience.[6,18,19,30]

THE CONCEPT OF RESTORATIVE VOLUME

According to the glossary of prosthodontic terms, a "crown" is an artificial replacement that restores missing tooth structure by surrounding part or all of the remaining structure with a material such as cast metal, porcelain, or a combination of materials such as metal and porcelain.[31] However, the term is commonly used to describe a full coverage restoration distinguishing it from a "veneer" that covers mainly the buccal surface of anterior teeth. This simplistic approach still seems to be the basis of clinical decisions for indirect restorations on anterior teeth for many clinicians. However, an adhesively retained restoration can be partial or full coverage depending on the extent of palatal coverage. This palatal extension depends on factors like occlusion and even the need for additional enamel bonding surface (Figure 1). The decisive process should not be based on the extent of coverage ("crown" versus "veneer") but instead on the amount of centripetal reduction needed to achieve certain restorative, biologic, and esthetic objectives.

The dental restorative volume can be considered as the overall amount of material needed to replace or enhance tooth structure to achieve the final outcome in terms of esthetic, biologic, and functional goals for a given restoration. From this, we can assume that the restorative volume is a direct consequence of the amount of lost tooth structure to repair and the quantity of prepared tooth structure to substitute to achieve the final restorative objective (wax-up,

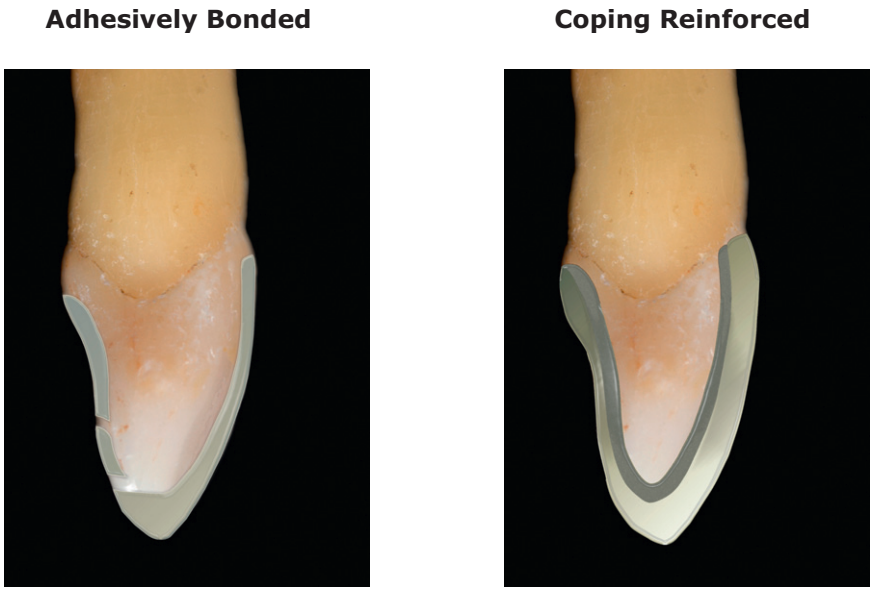

FIGURE 1. Adhesively bonded restorations may have different extensions over the lingual surface. Clinical choices should not be based on the extent of coverage ("veneer" versus "crown") as it reduces and oversimplifies the decision process.

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mock-up, or set-up). We can consider, from an analytical perspective, that ceramic restorations with a reinforced core contain higher restorative volumes, whereas feldspathic/glass ceramics possess smaller restorative volumes.

Structural Factors

Enamel adhesion can provide a highly durable interface in terms of biologic and mechanical stability. The literature consistently shows high success rates in dental restorations that enjoy high surface areas of enamel bonding.[10,16,23,32,33] On the contrary, research on adhesion to dentin illustrates that it is technically more sensitive, more prone to bacterial infiltration, and with higher tendency for mechanical breakdown in the medium to long term.[5,34]

If an adequate area of bond to enamel is not possible, then an intrinsically reinforced restoration has to be considered. However, the minimal amount of enamel necessary for a restoration to be safely supported primarily by an adhesive interface, and less on resistance and retention principles, is difficult to access.

From a relative perspective, we can assume that (Figure 2):

1 The more enamel present, the higher probability of using adhesive restorations, the less invasive is the restoration in terms of axial reduction, resulting in a smaller amount of restorative volume
2 The less enamel present, the lower the probability of predictably using adhesive restorations, the more invasive the restoration in terms of axial reduction, and hence, a higher amount of restorative volume

In advanced tissue loss, the tooth restorability has to be questioned. Root canal treatments (RCTs) per se are not responsible for a significant loss of tooth resistance.[35] It seems that the associated degree of tissue loss aggravated with the access cavity and preparation are mainly responsible for the reduced resistance and restorative predictability.[36,37] A predominant factor is the existence of a "ferrule," a minimal amount of cervical structure where the restoration can engage.[38,39] Studies suggest that the "ferrule" is one of the most significant factors in long-term survival of endodontically treated teeth, possibly more important

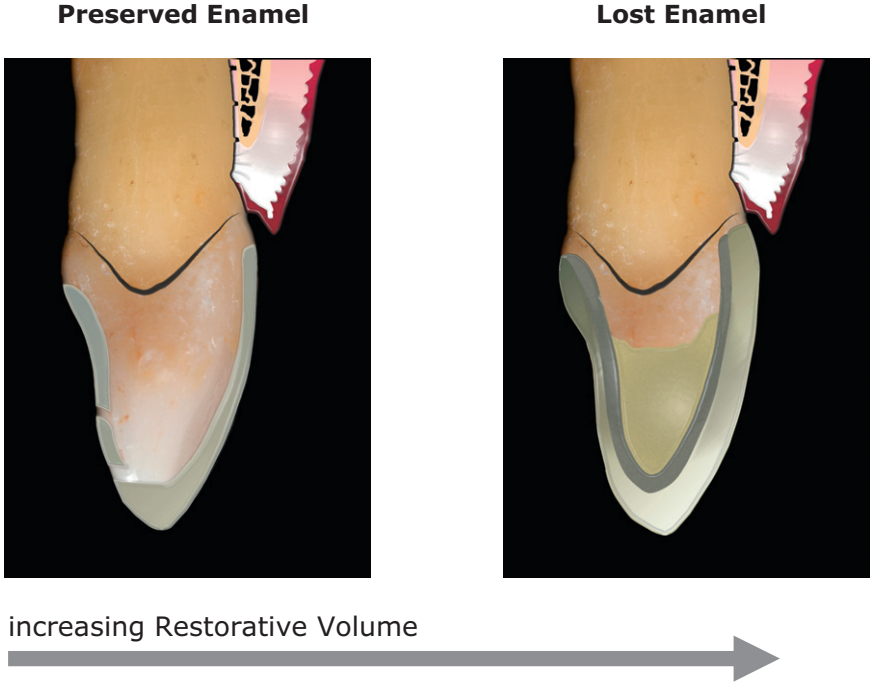

FIGURE 2. Structural factors.

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than the post material, extension, shape, and cementation procedures.[36,37,40–43]

Optical Factors

Etiology of tooth discoloration is multifactorial with intrinsic, extrinsic, systemic, and local factors.[44–47] The mechanisms that cause tooth discoloration following devitalization caused by bacterial, inflammatory reactions or RCT are unclear.[45] It is thought that noxious by-products, blood components, and endodontic filling materials can penetrate into dentinal tubules and affect light transmission.[48] Different techniques have been proposed to minimize discoloration during RCTs, but these do not consistently prevent discoloration.[45] Several reports on nonvital internal bleaching techniques show considerable, and often complete, regression of discoloration; however, the medium- and long-term stability of these techniques has low predictability.[45,49,50]

Clinicians often have to face a difficult decision: perform internal whitening and place a less invasive, less opaque restoration, and assume the risk of future discoloration relapse or place a more invasive opaque restoration to assure that discoloration relapse does not affect the result in the future. In some cases where the palatal surface does not need to be restored, it can be reasonable to provide a buccal restoration and leave palatal access for future internal whitening reentry.[51] In cases where the discoloration does not respond to internal whitening, or when the patient or clinician do not want to deal with future color relapses, a more invasive restoration is often needed. The relation of restorative volume with discoloration would be (Figure 3):

1 For nondiscolored teeth, a less invasive restoration in terms of axial reduction will be able to provide adequate optical properties resulting in a smaller amount of restorative volume
2 In discolored teeth, a more invasive restoration will be needed for adequate space for opaque and depth illusions, therefore a higher restorative volume

Periodontal Factors

Periodontal tissues play a major role in the biologic integration and esthetic result in anterior restorations. It is important that physiologic tissue stability is achieved, avoiding biologic width violation,

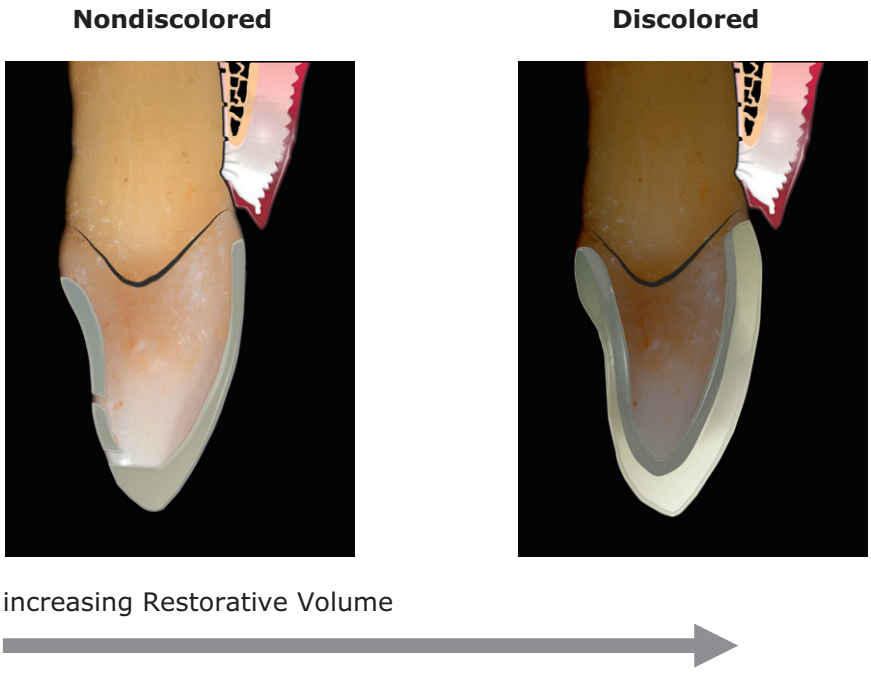

FIGURE 3. Optical factors.

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inflammatory processes, and/or recession.[52–54] On the other hand, correct light transmission in the perio-restorative interface should also be considered in esthetic areas.

Many studies have concluded that narrow zones of keratinized tissue or thin alveolar crests are not significant to maintain gingival health or to prevent tissue recession on nonrestored teeth.[55] But, it is widely accepted that thick and thin biotypes[56–58] do not have the same clinical behavior when tooth- or implant-supported restorations are performed. Thin biotypes with scalloped gingival and bone profiles, thin gingival and cortical bone, and limited amounts of keratinized tissue have been described by several authors[59–62] as having a higher tendency for tissue recession whenever subgingival restorations are placed. Thick biotypes, on the contrary, are often described as more stable to subgingival restorations. Periodontal plastic surgery using soft tissue grafts to augment the thickness of keratinized tissue and improve the stability of the perio-restorative interface has also been proposed by several experts.[56,63,64]

Regarding light transmission on the perio-restorative interface, Magne and colleagues[65] have described the "umbrella effect" with inherently core-reinforced opaque restorations. This phenomenon happens when the light entering the cervical restorative area is blocked; therefore, no indirect light is reflected, and no transillumination occurs through the dental and gingival tissues. This is especially perceived when the lip prevents direct illumination of the gingival tissues. The blockage can be a result of opaque restorative material in the cervical area and also due to discolored roots. Ceramic shoulders and fluorescent ceramics can be applied to attenuate this phenomenon by improving light transmission and reflection in the cervical area.[66] Nevertheless, with opaque core restorations, the margin remains visible because of this light blockage, and subgingival placement into dentin is needed in most cases. This problem does not happen when using enamel-bonded restorations that do not prevent light transmission from within tooth structure in naturally nondiscolored teeth. Because of this, the more translucent restorative material (feldspathic/glass ceramic) is blended with tooth structure, and the margin can be placed justagingival or even supragingival remaining unnoticed. An important practical consequence of this is that in nondiscolored, structurally compromised teeth, high-strength pressable ceramics such as lithium dissilicate may be valid substitutes of conventional coping reinforced restorations (Figure 4). Because of their translucency, the finishing margin may be placed supragingival, avoiding future recession problems and promoting natural light transmission in the cervical area while still providing adequate intrinsic strength.

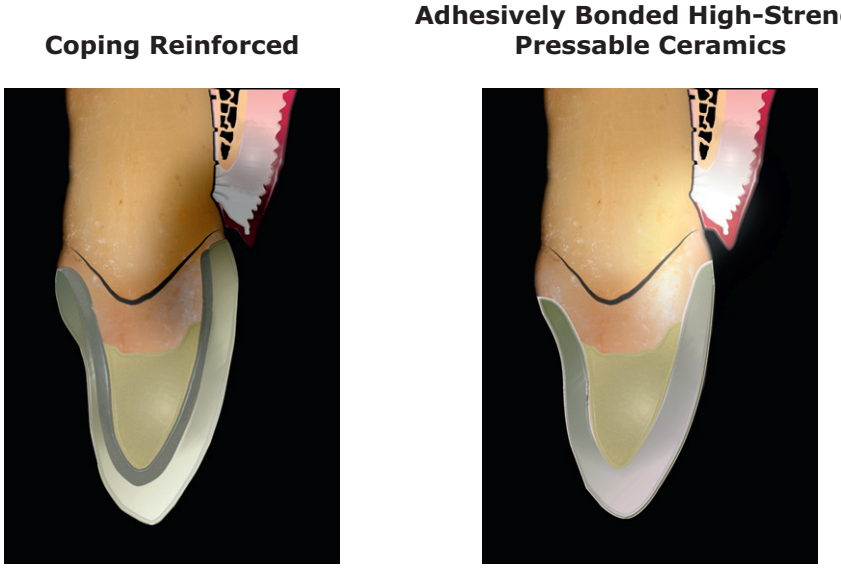

FIGURE 4. In nondiscolored, structurally compromised teeth, high-strength pressable ceramics such as lithium dissilicate may be valid substitutes of conventional coping reinforced restorations. Because of their translucency, the finishing margin may be placed supragingival, avoiding future recession problems and promoting natural light transmission in the cervical area.

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An in vitro animal study shows that the optical influence of restorative materials below the gingiva is diminished by increased soft tissue thickness.[67] For example, a thickness of 2 mm or less cannot prevent a visible color alteration over a dark restorative material like titanium. However, a thickness of 2 mm will prevent visible color changes on tissues covering zirconia. Although this data can be important for material selection in implant-supported restorations with tissue thickness of about 2 mm around the abutments, marginal gingival thickness around natural teeth is usually around 1 mm.[68,69] There is no available data concerning how periodontal biotype and soft tissue augmentation procedures affect the light transmission on the marginal gingiva of tooth-supported subgingival restorations. However, it is reasonable to assume that the thicker the gingival tissues, the less perceivable should be the difference between restored and nonrestored teeth.

Considering the periodontal factors discussed (Figure 5):

1 In thinner periodontal biotypes, a less invasive restoration (reduced restorative volume) in terms of subgingival depth should be performed to provide less chances of recession and avoid the need for more opaque materials that would hinder correct transillumination of tissues
2 Thicker periodontal biotypes seem to better withstand more invasive subgingival restorations (higher restorative volumes) and will probably show less marginal color alterations when transillumination is prevented by opaque materials

CLINICAL CASES

A few clinical cases will be briefly described in order to exemplify clinical decisions as well as the potential risks involved. A schematic description is used in order to better exemplify the decision concept.

Case 1—Upper left central incisor with RCT (Figures 6–11).

Diagnosis:

1 Structural conditions—The tooth has a large restoration, and most enamel was lost; but, a ferrule can still be achieved
2 Optical conditions—Discolored
3 Periodontal conditions—Thick biotype

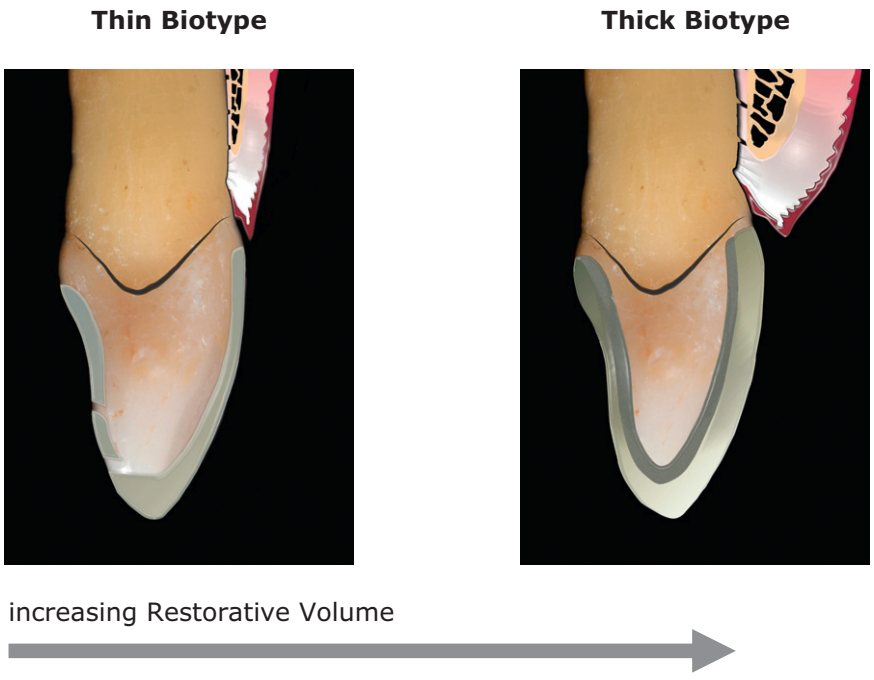

FIGURE 5. Periodontal factors.

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FIGURE 6. Discolored tooth with extensive restoration and thick biotype.

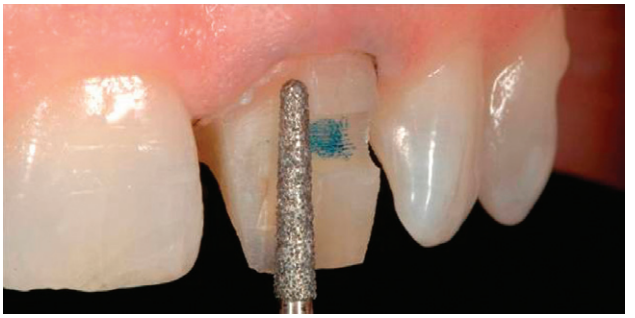

FIGURE 7. Preparation for a coping reinforced crown.

FIGURE 8. Subgingival preparation with adequate adaptation of the provisional restoration.

FIGURE 9. Thick biotypes can maintain very good health conditions even with subgingival restorations.

FIGURE 10. Porcelain-fused-to-zirconia crown.

FIGURE 11. Final result at 6 months.

Treatment:

Because of the discoloration, an opaque material had to be used. Since the biotype was thick, tissue stability to recession seemed favorable. The tooth was already restored with poor adhesive conditions. Therefore, a high restorative volume with an all-ceramic porcelain-fused-to-zirconia crown was chosen.

Prognosis:

1 Soft tissue recession is less likely in such a thick biotype
2 A finishing margin in dentin is always more prone to infiltration. Secondary caries under a crown may cause the tooth to be unrestorable in the future

Case 2—Fractured anterior teeth (Figures 12–18).

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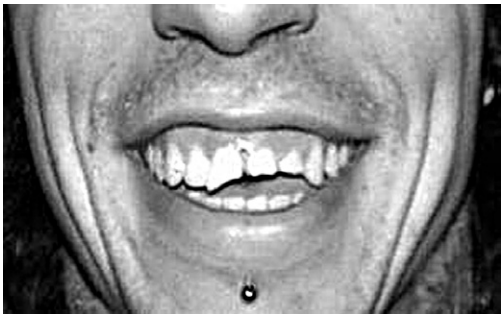

FIGURE 12. Accident, with fracture of teeth 8, 9, and 10.

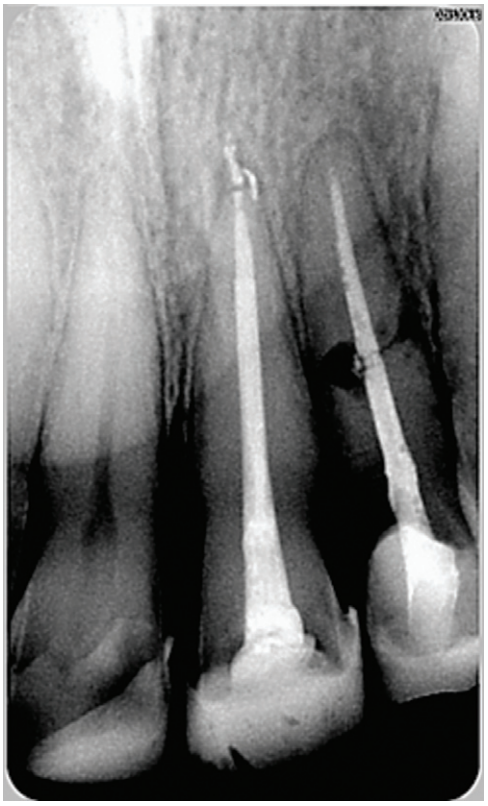

FIGURE 14. Radiographic examination revealing hopeless root fracture on tooth 10.

Diagnosis:

1 Structural conditions—Both maxillary central incisors could still maintain a reasonable amount of enamel on the cervical area after the trauma
2 Optical conditions—Nondiscolored
3 Periodontal conditions—Thin biotype

FIGURE 13. Patient presented with emergency restorations performed at local hospital.

Treatment:

The thin biotype was decisive to avoid a subgingival margin on both central incisors. A glass ceramic full coverage restoration combines adequate translucency with a sufficient resistance for anterior teeth, where a reasonable area of adhesion can be performed. Enamel margins allowed adequate adhesive cementation. Upper left lateral was replaced with an implant.

Prognosis:

1 If recession occurs, the margin will remain unnoticed as long as the future discoloration is not significant
2 Future discoloration can occur; it will be noticeable through the restoration, and the margin will probably become more evident
3 Enamel margins allowed adequate adhesive cementation with good long-term seal

Case 3—Diastema closure (Figures 19–24).

Diagnosis:

1 Structural conditions—Intact, nonrestored anterior incisors
2 Optical conditions—Nondiscolored
3 Periodontal conditions—Thin biotype

Treatment:

The patient's high esthetic demand would be better fulfilled with ceramic restorations. The additive mock-up showed that minimal amount of enamel

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FIGURE 15. Both central incisors maintained cervical enamel. Subgingival restorations on a thin biotype were avoided. Tooth 10 was replaced with an implant.

FIGURE 16. Glass ceramic restorations on natural teeth and on implant abutment.

FIGURE 17. Good marginal access for adequate adhesive cementation.

FIGURE 18. Final result with good light transmission at the perio-restorative interface.

FIGURE 19. Patient with high esthetic demands wishing to improve the smile.

FIGURE 20. Changes performed and additive mock-up transferred from the wax-up.

preparation would allow the use of ceramic veneers. Feldspathic porcelain allowed maximum mimetism of enamel translucency. Restorative margins were supragingival except in the areas where the emergence profile was changed.

Prognosis:

1 Supragingival margins will remain unnoticed, blended with tooth structure even with future recession of the thin biotype

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FIGURE 21. Conservative preparations using Gurel's technique through the mock-up.

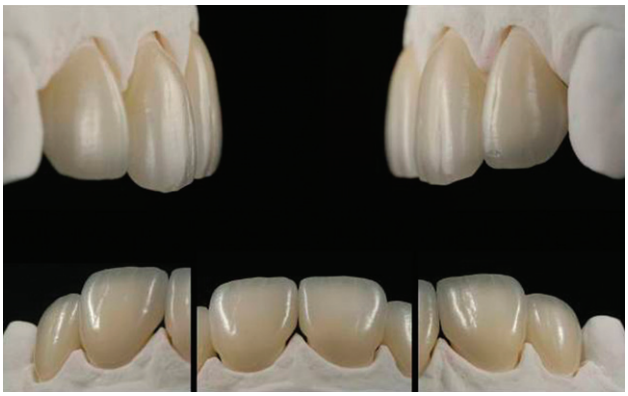

FIGURE 22. Feldspathic veneers provide excellent optical properties.

FIGURE 23. One week after cementation (above) and result at 3 years (below). Note the thin biotype soft tissue integration.

FIGURE 24. Smile view at 3 years.

2 Enamel margins allowed adequate adhesive cementation with good long-term seal

Case 4—Substitution of old PFM crowns (Figures 25–31).

Diagnosis:

1 Structural conditions—Teeth were already prepared
2 Optical conditions—Discolored
3 Periodontal conditions—Thin biotype showing recession on old crowns. Discoloration of tooth structure was visible through the marginal gingival tissues

Treatment:

To avoid future recession and esthetic problems at the perio-restorative interface, the thin biotype was surgically improved locally. After tissue maturation, two all-ceramic porcelain-fused-to-zirconia crowns with subgingival margins were placed. Local conditions of the biotype were significantly improved by increasing the gingival thickness, assuring a more stable gingival margin, reducing the negative optical effects of underlying darkened roots, and lessening the "umbrella effect" usually present on coping reinforced crowns.

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FIGURE 25. Old porcelain-fused-to-metal crowns with recession and poor adaptation.

FIGURE 26. Close-up view of recession on a thin biotype.

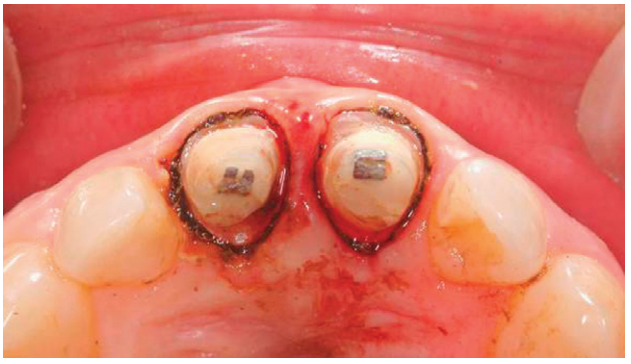

FIGURE 27. Inflamed tissues at crown removal. Very thin marginal gingiva.

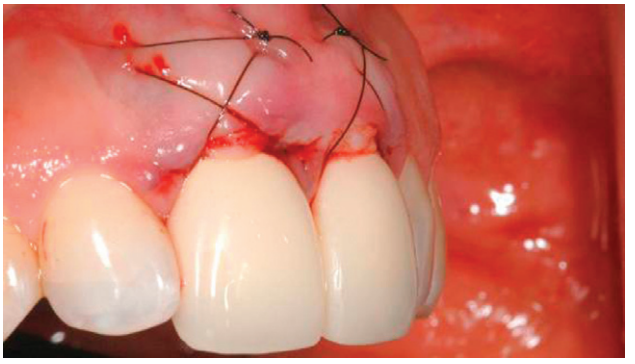

FIGURE 28. Connective tissue graft (tunnel technique) to improve the thickness of marginal gingiva. Correctly adapted provisional crowns were previously placed.

FIGURE 29. After tissue maturation; note the improved thickness compared with Figure 27.

FIGURE 30. Two porcelain-fused-to-zirconia crowns with subgingival margins were placed.

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FIGURE 31. Local conditions of the biotype were significantly improved by increasing the gingival thickness, assuring a more stable gingival margin, reducing the negative optical effects of underlying darkened roots, and lessening the "umbrella effect" usually present on coping reinforced crowns.

Prognosis:

1 The increased tissue thickness will probably assure soft tissue stability for longer periods

DISCUSSION

There are two important landmarks on the life cycle of a tooth: loss of enamel that can jeopardize a conservative adhesive restoration and also the loss of vitality that can lead to discoloration, and the consequent problems in esthetic light transmission. These, together with the periodontal biotype, are the basis of the concept of restorative volume.

Table 1 summarizes the presented concept in a simplistic way. The clinical suggestions deal with risk analysis assuming that there will always be a degree of risk with changing oral conditions, material deterioration, and physiologic aging. Clinical guidelines for decisions in esthetic dentistry should always be regarded in a relative nonrigid perspective. Structural, optical, and periodontal factors were related to restorative volume because these are critical aspects for clinical decisions. The relative approach of the concept is probably more appropriate and insightful than the traditional "veneer" versus "crown" decision process. These factors are presented in dual characterizations (thick versus thin, discolored versus nondiscolored, . . .); however, we know that in everyday practice, there are a myriad of intermediate conditions that require the application of more complex decisions, as described in the clinical cases. Although structural, optical, and periodontal factors should be individually analyzed, their relative contribution should be weighted in each specific situation in order to provide the most appropriate solution for the patient, clinician, and technician. The technician's experience and, more importantly, the clinician–technician calibration with a given material or system may influence the final choice for a restoration.

The concept presented is only being described from a single tooth standpoint. Nevertheless, when multiple restorations are being performed, an overall compromise may need to be well thought out. When we are presented with different degrees of structural damage, for example, a partial adhesive restoration may be indicated adjacent to a tooth that will certainly require a full crown. Even though crowns and veneers can be successfully performed with good esthetic results in adjacent teeth, these situations provide significant challenges for the restorative team in order to consistently have a successful esthetic result using different materials. This means that in some cases, controlled risks should be taken to provide a reduced restorative volume adhesive restoration in a structurally compromised tooth or vice versa in order to provide an overall harmonious result with adjacent restorations.

Structurally compromised, discolored teeth with thin, scalloped periodontal biotype present the biggest challenge for clinicians for the following reasons: (1) a subgingival restoration with higher opacity is usually needed, and thin biotypes may easily present recession; (2) light transillumination at the restorative interface will be compromised. It is clear that more research should be conducted on bleaching techniques that provide long-term color stability. Research on periodontal biotypes has been mainly driven by implant-supported restorations, and the only data available for biotype behavior on tooth-supported restorations is based on expert opinions, which is generally accepted by clinicians. Nonetheless, it would

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TABLE 1. Relative decision guidelines for anterior restorations based on the restorative volume concept

	Structural factors		Optical factors		Periodontal factors	
	Preserved enamel	**Lost enamel**	**Nondiscolored**	**Discolored**	**Thin biotype**	**Thick biotype**
Restorative volume	+	+ + +	+	+ + +	+	+ + +

be important to know, in a more specific manner, how periodontal biotypes and soft tissue augmentation affect both the tissue stability and the esthetic light transmission on natural teeth.

An important restorative factor not included in the concept is occlusion. Whether occlusal factors influence material selection in anterior restorations is a matter of ongoing debate. The authors believe that with adequate occlusal schemes specific for each patient, any type of anterior ceramic restoration can be used as long as adhesive and/or structural principles are respected for each material. Preoperative diagnosis of patterns of tooth wear and its causes, a comprehensive interdisciplinary optimization of occlusal and TMJ conditions, as well as patient behavioral and medical factors should always be considered. Severe parafunctional patients, however, present a different challenge; occlusal splint therapy may be indicated, and more invasive restorations may be needed, sometimes demanding materials inherently more resistant like metallic occlusal surfaces.

The presented concept is an analytic thought process for risk analysis and does not promote strict guidelines. However, some practical suggestions arise from the presented concept:

1 If adequate enamel is present on the buccal surface, a partial coverage adhesive restoration should be performed, and the palatal surface should be preserved. However, factors like occlusal contacts, the need for larger enamel bonding surface, and incisal reduction for esthetic purposes may require specific palatal preparations. The amount and distribution of preserved enamel that would enable an adhesive retained restoration is still not known
2 Only in cases of no possible adhesive restorations should a core-reinforced restoration (PFM, zirconia, etc.) be considered. These restorations are more invasive, promote less light transmission, and require subgingival placement in most cases
3 High strength pressable ceramics may be an alternative in coping reinforced restorations in nondiscolored teeth. They can finish supragingival and promote light transmission in cervical region
4 Discolored teeth that do not respond to internal bleaching require opaque materials and significant thickness of the restoration. The needed depth of the preparation may result in the loss of all enamel. If no enamel is present, the restoration should be intrinsically resistant and not adhesively bonded
5 Carefully consider the placement of a core-reinforced opaque restoration on a thin periodontal biotype. Thin biotypes cannot mask transillumination problems in cervical areas and seem more prone to recession. Soft tissue thickness augmentation may provide a reasonable solution to the problem in some cases

CONCLUSION

The concept of restorative volume based on relative structural, optical, and periodontal factors can be a useful "thinking process" for anterior tooth restorations in light of the current evidence. Other factors like multiple restoration requirements, technician experience, as well as occlusal and patient-related factors must always be considered in a comprehensive manner. Interdisciplinary approaches should be implemented to optimize the long-term results. More research is necessary on the minimal areas of enamel needed for the use of adhesive restorations as well as the management of discolored teeth because they still present a clinical challenge.

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