

fundamentals of adhesion

REDEFINING THE RESTORATIVE CONCEPT

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Restorative concepts of the past sanctioned the removal of sound tooth structure, as needed, in order to perform restorative procedures.¹ When Black proposed these principles and his classification of cavity designs, dentistry focused on controlling caries, but without scientific knowledge of the disease or scientific rationale.^{2,3} Modern restorative concepts seek to minimize the biologic cost of the natural tooth^{4,5} by adopting a philosophy that combines prevention, remineralization, and minimal intervention for the replacement of tooth structures and/or restorations.⁶ Greater understanding of the disease process, improvements in caries detection and control, developments in diagnostic modalities, and advancements in instruments and tissue-cutting concepts have all contributed to the changes in the restorative concept.

Modern restorative dentistry has thus adopted a medical treatment model that provides the clinician with adequate information for proper assessment and decision making in the treatment of disease. This allows clinicians to individualize and evaluate all components of the process for a proper treatment strategy. This process also educates and involves the patient in treatment decisions, which results in cooperative strategies aimed at optimizing oral health.

Modern Restorative Objectives

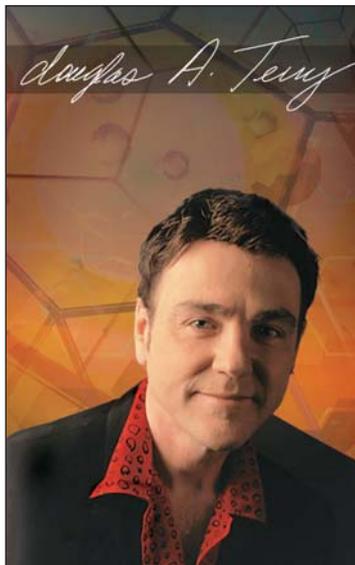
This new restorative philosophy has three principle objectives for patient treatment. The first objective is to retain maximum integrity of the natural dentition through prevention.⁷ The second goal is to preserve hard and soft tissue during restorative therapy; the third is to increase the longevity of the dentition and restoration. These objectives should be incorporated into the diagnosis

and treatment stages for any restorative therapy. The patient should be informed of this treatment philosophy and be allowed to adopt this concept before finalization of the treatment plan.

Prevention

Prevention begins with assessment and management of disease processes. Key aspects of treatment now include the identification and consideration of a patient's risk factors for dental disease, while applying one's understanding to properly diagnose and provide treatment. Factors to consider for the management of disease include the patient's age, oral hygiene and related habits, salivary and microbiological conditions, dietary habits, fluoride exposure, behavioral conditions, prior dental treatment, and family history.^{7,8} Controlling and preventing risk-related disorders in the oral cavity can begin with counseling the patient about the etiology of the disease and then a selection of the following:

- Eliminating the causes of disease for at-risk patients;
- Initiating preventative measures;
- Providing oral hygiene instructions and plaque control (Figure 1);
- Delivering fluoride treatments, calcium and phosphate applications, and/or desensitizing dentifrices (Figure 2);
- Management of dentin hypersensitivity with dentin adhesives;
- Applying preventative resin restorations and pit and fissure glass-ionomer sealants (Figure 3); and
- Providing early intervention in situations where delay would lead to additional care.



fundamentals of adhesion *continued*



Figure 1. Plaque control is a primary mechanism of defense in the prevention of caries.



Figure 2. Management of the dynamic interplay between demineralization and remineralization can be provided with applications of calcium and phosphate.

Using modern assessment and management principles for restorative therapy (ie, periodontal and/or operative procedures), one can reduce, control, and/or eliminate the disease processes. Supportive periodontal management is an ongoing modality that allows the clinician to modulate the disease process as well as to achieve stability and the conditions for long-term management. Noninvasive and minimally invasive procedures can limit the size of the preparation and thus retain areas of demineralized dentin and enamel that can heal through remineralization. These contemporary procedures include remineralization, placement of sealants (eg, resin, pit and fissure glass-ionomer sealants), and preventative resin restorations. Furthermore, research is being directed toward restorative materials that are bioactive and capable of arresting caries, eliminating disease while regenerating hard and soft tissue.⁹

Preservation

Preservation involves the conservation of hard and soft tissues throughout a patient's lifespan. The principle of preservation in restorative dentistry encompasses a myriad of disciplines and conservative approaches that are available for numerous restorative procedures. These procedures include adhesive composite restorations (ie, Class I through V) that can reinforce, strengthen, and increase retention of tooth structure, while requiring no specific geometric outline form. Noninvasive procedures include tooth-fragment reattachment, preparation-free veneers (ie, direct, indirect), bleaching, and orthodontics (ie, forced eruption for preservation of fractured teeth). Surgical procedures include socket preservation (ie, alveolar ridge and soft tissue conservation) after tooth extraction, gingival margin preservation, alveolar ridge regeneration, and a host of preservation procedures involving implant placement. Each of these procedures has a common goal, which is retaining the dentogingivoalveolar complex with reduced trauma to the pulp tissue and supporting structures.

Perpetuation

The most important of the restorative objectives is to perpetuate the longevity of the dentition and restorations and to extend the period between replacing any restoration. This is predicated on the success of the first two objectives. Discipline and oral hygiene maintenance contribute to healthy dentition and supporting periodontium that can result in longer lasting dentition and restorations. Conservative procedures in restorative treatment can also extend the lifespan of the dentition and restorations. Correcting restorative and aesthetic challenges by selecting a progressive treatment concept that begins with the most conservative restorative option and progresses to more advanced, invasive procedures as required in the future can perpetuate longevity. In addition, utilization of meticulous adhesive protocol and finishing procedures, and maintaining an optimal occlusal scheme is necessary for increasing their longevity. Other considerations include the importance of educating patients on the significance of maintaining bonded restorations and how this can influence their long-term clinical performance.



Figure 3. Pit and fissure glass-ionomer sealants provide a conservative approach to the management of caries and are an integral part of pediatric and restorative dentistry.

Conclusion

Integrating these restorative objectives into the assessment and decision-making phase of treatment is only part of the restorative solution. An equally important aspect requires the involvement of the patient, especially through education. This process will not only ensure success by increasing the longevity of the dentition, but will enhance the durability of the restorations, while promoting patient satisfaction. This article has described the primary objectives of contemporary restorative treatment; the following discussions will address the utilization of these principles in various disciplines of restorative dentistry.

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