Chapter 2

Impression Materials in the Preparation Phase

The recording of an accurate impression following tooth preparation is critical to the long-term success of a given restorative procedure. One of the most effective communication modalities available to the clinician, a detailed impression allows information obtained chairside to be transferred to the laboratory for use in the fabrication of the definitive restorations. Even the most meticulous preparation design and sophisticated porcelain buildup are of little value unless high-quality impression materials and techniques are used to produce an exact replica of the patient's clinical condition.

While traditional impression materials for crown and bridge procedures were often difficult to implement, odorous, and rubber-based, recent innovations have resulted in the development of fast-setting, easy-to-use polyvinylsiloxane materials. During their evolution, technique, accuracy, and stability have become the benchmarks by which all impressions are evaluated. The duration of the setting period, tear resistance, and flexibility have also become increasingly important in the selection of an impression material.

Addition reaction silicones, or polyvinylsiloxane materials, provide hydrophilic properties in a wide range of viscosities that permit their use in conjunction with various impression techniques. The use of these materials allows the clinician to obtain an accurate impression with suitable tear strength, dimensional stability, and neutral odor and taste. The removal of polyvinylsiloxane impressions is facilitated by fast-setting components that minimize patient discomfort and periodontal complications. The inherent hydrophilicity of polyvinylsiloxane materials can also be beneficial in the clinical setting, minimizing distention of the impression when immersed in disinfecting solutions.

Impression material selection is generally based on physical properties that allow easy intraoral adaptation and reduce patient discomfort. Diligence in this phase of treatment captures the position of the prepared dental tissues and transfers this information to the laboratory technician. The fundamental point for all members of the restorative team to remember is that a precise impression is necessary to ensure an aesthetic result postoperatively.

Figure 1.

Preoperative view of the anterior maxillary region. The maxillary incisor is aesthetically compromised by intrinsic discolorations that cannot be treated with traditional tooth-whitening procedures. An all-ceramic crown will be used with a conservative preparation design to restore the tooth to proper aesthetics.

Figure 2.

Once the patient is anesthetized (CCS, Dentsply Professional, York, PA), a modified shoulder is initiated with facial reduction of 1 mm to 1.5 mm using an NTI coarse 847KR-016 diamond bur (LS-7501 set, Axis Dental, Irving, TX). A butt joint margin is rendered, and gingival reduction of 1 mm is performed. It is also necessary to remove approximately 1.5 mm of tooth structure incisally.

Inset A: An NTI 379-023 coarse football-shaped bur (Axis Dental, Irving, TX) is used to achieve proper lingual clearance (~1.5 mm).

Inset B: Nonvital teeth and those requiring significant color shift are prepared with maximum reduction. Preparation design may also vary depending on the porcelain system selected for the all-ceramic crowns.

Figure 3.

Placement of a retraction material into the gingival sulcus allows precise finish lines and margins to be rendered and captured in a detailed impression. Proper packing also allows the impression material to flow subgingivally, which enables the soft tissue topography and prepared hard tissues to be properly recorded. Note that all internal line angles are rounded.

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Ultimately, practitioners must be able to utilize materials that they can expect to enhance the result of the aesthetic restorative procedure.”

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Figure 4.

The polyvinylsiloxane material (Take 1, Kerr/Sybron, Orange, CA) is placed peripheral to and over the preparations. The tip of the impression syringe can be placed directly into the open sulcus to facilitate injection of the material and prevent the formation of air pockets. The impression material should extend to all sulci and cover the moist prepared regions.

Figure 5.

The impression tray is loaded and placed until the impression sets completely. The tray should be removed without denuding the mucosa. Note the smooth gingival finish lines and roughened buccal surfaces achieved following tray removal. The completed impressions facilitate accurate communication of the exact shape, surface texture, and surface anatomy of the preparations.

Figure 6.

Postoperative facial view of the all-ceramic crown restoration fabricated from the aforementioned impression procedure demonstrates healthy gingiva and well-integrated margins.