Impression Materials in the Prosthodontic Practice

by Izchak Barzilay DDS, Cert. Prostho., MS

Advances in technology have made the dental office of today very different from offices of 15 years ago. Computers, imaging devices, lasers and other "high tech" products have improved our efficiency, productivity and quality of our dental treatment. After practicing for just a short period of time with these new dental technologies, one finds it very difficult to imagine working without the aid of these devices. Although technology has advanced our thinking and changed the ways we manage our practices, many of the basics of "good dentistry" have not changed. Ideal crown contour and fit, proper occlusion, shade matching, tooth preparation without heat generation, proper bonding and cementation are all concepts that are cornerstones to the way we practice. With all the new advances, these factors remain unchanged.

In the practice of prosthodontics, and restorative dentistry, new dental materials are always being introduced as products that will save time, money, effort, and make both the practitioner and patient more comfortable. It is up to the practitioner to decide which claims are valid and worthy of our further consideration and which are just marketing ploys to increase sales of old products that have been repackaged and given new names. We work with many materials that have been tested over time and have been found to be both effective and useful in our clinical practices. Sometimes we wonder why we need to change these products to newer ones that have many wonderful claims but are short on clinical research and scientific data.

One product that is used constantly in the prosthodontic practice is impression material. We use irreversible hydrocolloid (alginate) for diagnostic impressions to fabricate diagnostic and opposing casts. More accurate materials include the polyvinyl siloxanes and polyether materials that are used to prepare master casts for both removable and fixed prosthodontic prostheses. The market is always introducing new materials along these lines with claims of more accuracy, shorter setting times, hydrophilic improvements and better taste.

A big improvement in the eyes of the author is the advent of the automated mixing systems. These systems, whether they are via a "hand gun" device of via a stationary machine, ensure a consistent mix free of voids regardless of who is mixing the material. As the mixing tips get smaller, the amount of wasted material is reduced and thus the cost per impression becomes more reasonable.

A busy practice may have several different types of impression materials. It is not unusual to have **irreversible hydrocolloid** for preliminary casts, **light, medium, and heavy bodied polyvinyl siloxane** materials together with a **putty type mate-**

FIGURE 1 Multiple impression materials of different types make up the general impression material armamentarium.

FIGURE 2 Two component hydrocolloid system by CADCO.

FIGURE 3 Cadco alginate mixing bowl produces a mix without voids and bubbles.

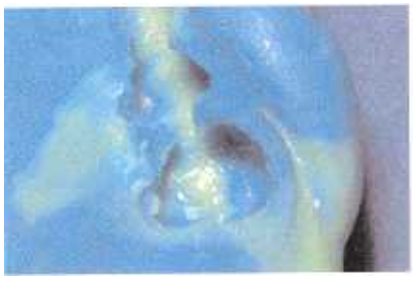

FIGURE 4 Impression surface using both reversible and irreversible hydrocolloid gives a more accurate surface.

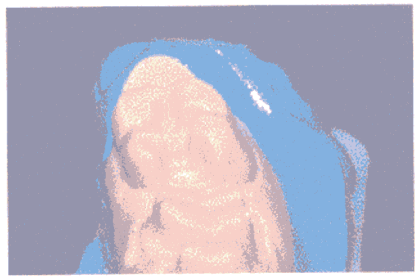

FIGURE 5 This cast has been poured in polyvinyl die material and may be used to fabricate simple restorations.

FIGURE 6 ESPE PENTAMIX is centralized in the office and provides an ideal mix of material without significant waste.

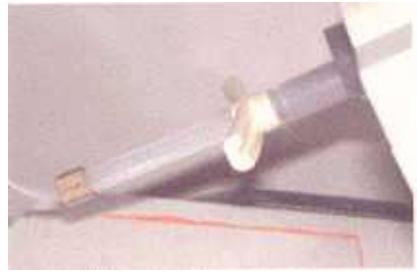

FIGURE 7 An impression syringe is loaded directly from the PENTAMIX While the material is being injected intraorally, the same mixing tip is used to load the impression tray.

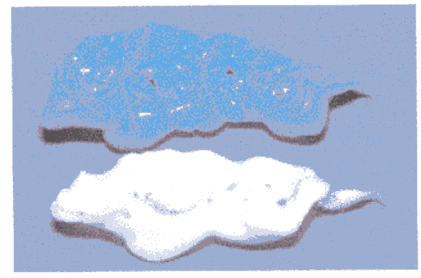

FIGURE 8 Polyvinyl Siloxane bite registrations (Blu Mousse and Vanilla Mousse) are rigid and accurate. Interproximal portions needs to be trimmed before use.

rial for crown and bridge impressions, **polyvinyl siloxanes** that have a high durometer value for bite registrations and for use in accurate mounting situations, and a **polyether** material (also in multiple consistencies) for impressions of fixed or removable prostheses and for bite registrations (Fig. 1). All these materials are useful and have their individual advantages. By far the largest disadvantage to using all these materials is the need to keep them in stock making sure that the stock is not outdated or deteriorating. The author believes that it is in the practitioners' best interest to minimize the different types of materials used and stored in the dental office. This paper will describe how the author makes use of these different materials, while minimizing the in office inventory.

IRREVERSIBLE HYDROCOLLOID

Most offices have one brand of alginate that is used regularly. Alginates are available in different configurations based on setting times. Over the years, the author has evaluated many different alginates and alginate systems and has found them all to be effective. However, the one currently used, and has been used for the past eight years is the system sold by CADCO Dental Products (Oxnard CA). This system is very useful from several points of view. It was first introduced to the author as part of a system of more accurate impression materials using a combination of reversible and irreversible approaches. The material has two components:

1. Irreversible component (mixed component) – Cadco – Duoloid Dental Alginate.

2. Reversible component (injectable hydrocolloid for use around preparations) – Cadco Duoloid Hydrocolloid Syringe Material (Fig. 2).

The author uses the irreversible component (alginate) for all diagnostic casts. Its advantage is not only its ease of mix but its method of mix. This alginate is marketed with a rotating mixing bowl (Cadco Alginator II – Cadco Dental Products, Oxnard , CA) (Fig. 3). At first, one would first think that this is an unnecessary luxury however it significantly reduces the incorporation of air into the impression material and gives a mixed material of excellent quality and consistency. It takes little time to train additional personnel to use the mixer and seems to save time on "clean up" as well. When more accuracy is desired (opposing casts for crown and bridge restorations), the reversible hydrocolloid is used in combination with the irreversible material. It is injected over the occlusal surfaces of the teeth to increase the detail captured in the impression (Fig. 4). This combination can also be used when inlays are being prepared and recorded. The alginate can be poured in either type III, IV, or type V die stone or polyvinyl die material (Mach II, Parkell Inc. Farmingdale NY) for immediate use (Fig. 5).

POLYETHER IMPRESSION MATERIAL

The author uses this impression material (Impregum – Penta, ESPE – Norristown PA) as the "work horse" material in the office. The material is mixed in a mechanical mixing device (ESPE PENTAMIX) that is positioned centrally in the office (Fig. 6). The material reservoir is quite large and as such does not need constant replenishing. The material is mixed and dispensed into an injecting syringe that is delivered to the practitioner (Fig. 7). The tray is then loaded without

changing the mixing tip. For impressions of tooth or implant supported fixed prostheses, custom trays are not required and the material has enough "body" to stand up well in the dual arch impression technique (triple tray). For removable prostheses where tissue contact is important (complete dentures and tissue borne partial dentures), custom trays are recommended to ensure ideal soft tissue extension. The material is available as a medium consistency that is placed into both the syringe and the tray. A similar material is also available in light and heavy body consistencies (ESPE Garant), but the author has found that over the past 12 years he has not had a need for the other consistencies. Impregum is the material of choice for all fixed and removable applications in the author's dental practice. Impregurnm can be poured in many different stone and epoxy die materials and may be poured several times if needed.

POLYVINYL SILOXANE MATERIAL

The author uses polyvinyl material for bite registrations (Blu Mouse Super Fast, Parkell, Farmingdale NY, Vanilla Bite Registration and Matrix Material, Discus Dental, Culver City, CA) (Fig. 8). The registration material is dispensed through a mixing tip attached to a hand held mixing gun and has a high durometer value. This allows the material to be used for registration since distortion is avoided. The registration material is so accurate that it must be trimmed carefully. At times, it may be more accurate than the opposing cast causing a discrepancy in the resultant mounting. Care must be taken to ensure that casts are properly cleaned of all debris and "bubbles" before mounting procedures. The author does not use polyvinyl siloxane materials for general prosthodontic impressions since the polyether material works so well and with the Impregurn, only one consistency is required.

CONCLUSION

The dental market in North America has many products to choose from that perform the same role. At times it is difficult to decide which material to use due to manufacturer claims of superiority. The author has found that limiting the products stocked in the dental office has made it easier to master the use of the impression materials that have been described in this paper. This does not suggest that improvements cannot be made but improvements should be followed up with adequate clinical and scientific data to suggest changing currently used dental materials.

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QUESTIONNAIRE

1. Alginate (irreversible hydrocolloid) may be combined with hydrocolloid (reversible) to produce more detailed impressions.

   True False

2. Combination alginate and hydrocolloid are accurate enough to impress inlay and single unit restorations.

   True False

3. Polyether impressions may be poured more than once if the need arises and retain working accuracy.

   True False

4. Polyvinyl siloxane materials may be used as bite registration materials to mount opposing casts. Because they are somewhat flexible, casts are readily seated to the registration.

   True False

5. Automated mixing devices use more material than the traditional hand-mixed methods.

   True False

6. Polyether can be injected from a syringe and used as a tray material in the same medium consistency.

   True False

7. Custom fabricated trays are always indicated when using Polyether material.

   True False