

Faster Is Not Always Better When it Comes to Impressioning

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In practice, many dentists today want to use the fastest setting dental products, the fastest curing lights, the fastest single step adhesives and the fastest setting impression materials. These faster products are desired for a number of reasons: some clinicians want to save time in order to pack more patients into the day, some want to make procedures faster and more comfortable for their patients, some manufacturers even promote the so called fast curing lights in ways to make you think you will save so much time you can take extra vacation days at the end of the year. One light manufacturer even claims that all you need is a one second cure for a 4mm layer of composite resin!

Freedman states that “faster

setting impression materials are very advantageous in the efficient practice”.¹ He then rightly qualifies this statement with “the underlying assumption is that faster setting in no way

compromises the quality of the impression.” However, in a recent study of the quality of dental impressions for fixed partial dentures, 89% of the impressions had one or more detectable errors that would impact the final

fit of the restorations: 51% had voids or tears at the finish line (Fig. 1), 40% had air bubbles at the finish line (Fig. 2) and 24% had flow problems² (Fig. 3). Could there be any relationship

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to using fast set impression materials? When it comes to impression materials, the idea of a fast set product is to limit the amount of time the impression is in the mouth for both patient comfort, as well as, to limit the

opportunity for the patient to move and distort the impression while it is setting³. Although the concept is admirable, many clinicians experience drags, pulls (Fig. 4), inaccuracies (Fig. 5) and distortion in their impressions simply because they don't understand how much working time they really have!

Terry in his article on the impression process gives us two definitions: "The setting time of impression materials is the total time from the start of the mix

until the impression material has completely set and can be removed from the oral cavity without distortion, and the working time is measured from the start of the mix until the material can no longer be manipulated without introducing distortion or inaccuracy in the final impression"⁴. These two processes are of course intimately related by the chemistry of the impression material. Many clinicians think they know the working time of their light body and heavy body impression materials but we can

pretty much guarantee that most do not! One of the disadvantages of PVS impression materials is their relatively short working time⁵. If you think the working times of your light body polyvinyl siloxanes is what is listed in the manufacturer's instructions, then you too may not understand the true "intraoral" working times of your material.

By specification, the working times of impression materials are calculated at 23°C and at 50% relative humidity. Unfortunately

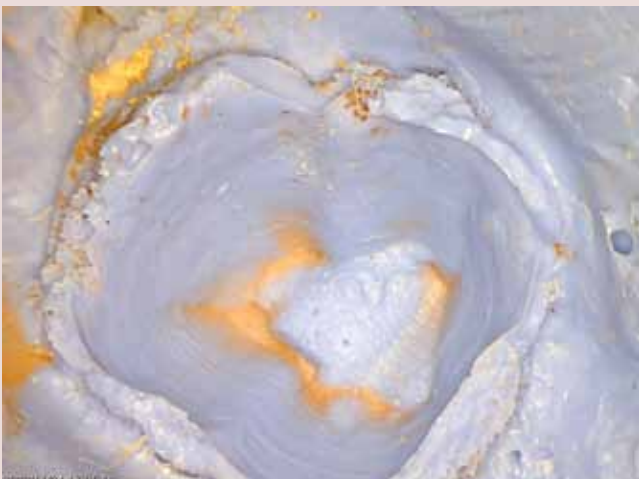


FIGURE 1—Impression of molar with multiple voids at the margins.

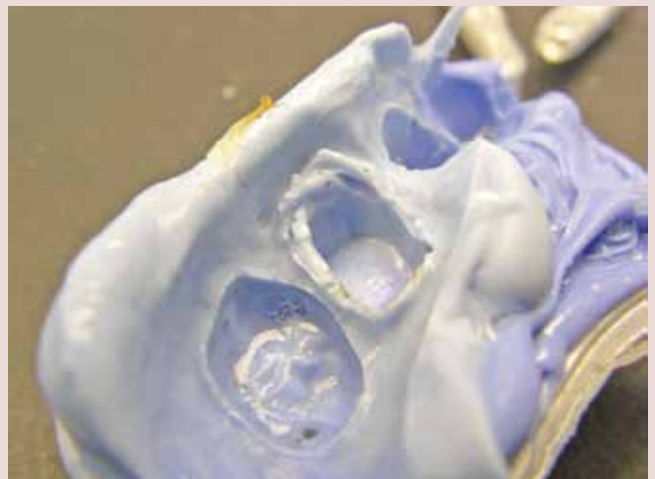


FIGURE 2—Air bubbles and voids incorporated into the light body.



FIGURE 3—Flow problems demonstrated as multiple areas of lack of adaptation.



FIGURE 4—Drags or pulls resulting from premature set of the impression heavy body.

the oral cavity is much warmer and significantly wetter! In the ADA Professional Report on Elastomeric Impression Materials, the ADA found that times measured at 23°C were 66 to 77% longer than those measured at 35°C (intra-oral temperature range)⁶. Some PVS impressioning materials such as Genie Ultra Hydrophilic (Sultan Healthcare Inc.) and Correct Plus (Pentron Clinical Technologies, LLC) whose instructions claim working times of 135 and 90 seconds respectively, actually have less than 10 seconds working time intraorally!⁶ This makes it difficult for some, and impossible for others, to impress a single unit, let alone multiple units, and be able to deliver the tray prior to the light body setting.

**For every 10 degrees above
room temperature, you lose up to
50% of your working time!**

So why is this relevant? In order to ensure a fluid blend between your light body and heavy body PVS impression materials, both materials must be fluid and un-polymerized at the time the tray is inserted. If not, this could lead to gaps or ledges between the different viscosities of material (Figs. 6 & 7) which will lead to inaccuracies and to high occlusion of your final restoration. As well, we as practitioners, assume that upon insertion of our heavy body material, it will drive the light body into better adaptation to our preparation. Of course, this is not possible when the light body is already set (Fig. 8). This means that unless the light body is meticulously placed, in the first instance, we cannot improve the impression by the hydraulics of the heavy body im-

pression material.

Where are your impression materials stored? Are they stored in a wall cabinet with hot fluorescent lights underneath? Is your air conditioning on a timer? Do you turn the air conditioning down to save energy over the weekend? If your air conditioning is on a timer or the temperature of your operatory/office is higher than 23°C over the weekend or during the day, you need to keep in mind that it takes 8 hours for impression materials to acclimatize. On those hot humid summer days or nights, your impression materials can get significantly warmer than room temperature (70°C) and will not cool back down until 8 hours after the

air conditioning comes back on! This is of significant importance when it comes to your working times. For every 10 degrees above room temperature, you lose up to 50% of your working time! For some materials this may mean less than five seconds intraoral working time. It is impossible to impress one unit of crown and bridge in this time, let alone multiple units. Hence the need for a temperature controlled storage unit for temperature sensitive materials or strict control of the office temperature environment.

In clinical crown and bridge cases where you must take an impression of multiple units, it can be difficult if not impossible with any standard impression material, due to the shortened

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intraoral working times, which for most materials on the market today, is less than half or even a third of what is stated on the manufacturer's instructions. However there was a product introduced to the market a number of years ago which is designed specifically for these cases. Multi-Prep from the Affinity line of impression materials (Clinician's Choice) has the longest intra oral working time on the market today. Although not the 2:40 seconds stated in the manufacturer's instructions it has an intraoral working time

of 90 seconds followed by a relatively short and independent intraoral set time. Figure 9 shows a full mouth reconstruction

for their light bodies as tested by the ADA: Examix NDS (GC America, Inc.) at 70 seconds and the polyether Impregum Penta

impression taken with Multi-Prep, which shows superb detail, adaptation, and marginal capture. Two other materials come close to this working time

Soft Quick Step (3M/Espe) at 70 seconds.

If you are trying to make a decision on choosing a new im-

If you are trying to make a decision on choosing a new impression material...beware of clever marketing and advertisements



FIGURE 5—Inaccurate margins due to lack of flow, lack of hydraulics and/or inadequate retraction.



FIGURE 6—Obvious gap between the light body and heavy body.

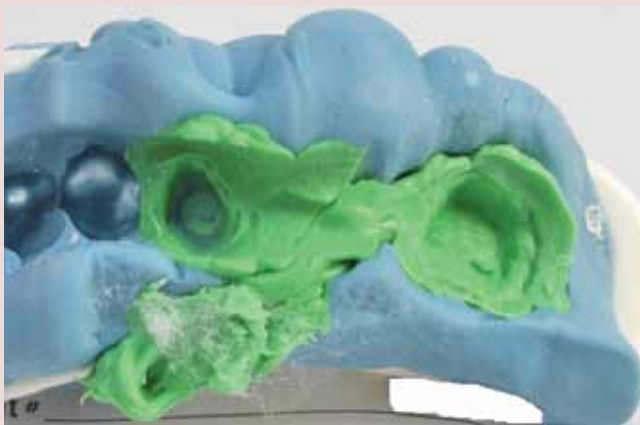


FIGURE 7—Gaps and ledges with lack of union between light and heavy body.



FIGURE 8—Lack of adaptation of light body around implants — light body was set and could not be moved by heavy body hydraulics.

pression material for your practice, you must beware of clever marketing and advertisements. Many manufacturers will make you think singular qualities of their material should be important in your decision making

better in the presence of moisture or effectively displace moisture during impressing. Some of these tests are done on set impression materials, which is a clinically irrelevant test as we use the materials during its po-

they will not properly capture detail on wet surfaces, but the surfactants have enhanced PVS wettability with gypsum products⁸. There is no relation between the contact angle and the ability to displace moisture contamination⁹. Similarly another example is the “shark fin test” which is designed to test how a material flows — the larger the fin, the more it must flow. Yet how relevant is this if you have less than 10 seconds to take the impression? There is no correlation between results of the shark fin test versus dimensional accuracy, and respectively, surface detail reproduction¹⁰.

Should your decision be based on water droplet contact angles, shark fin tests, price, color and taste, powerful advertising? Or, should it be based on clinically relevant qualities...

process. One example shows images of the contact angles of water droplets on the manufacturer’s material, which are lower than the contact angle of others. What does this prove? The idea is to make you think that if the contact angle is lower than their competitors that it must flow



lymerization process. With some PVS materials, the movement of the surfactant to the surface to affect the wetting properties becomes limited as the material is polymerizing⁷. “Hydrophilic” PVS impression materials may continue to be hydrophobic in the un-polymerized state, and

There are a number of choices for impression materials on the market today and as with anything, each has its pros and cons. Should your decision be based on: water droplet contact angles,

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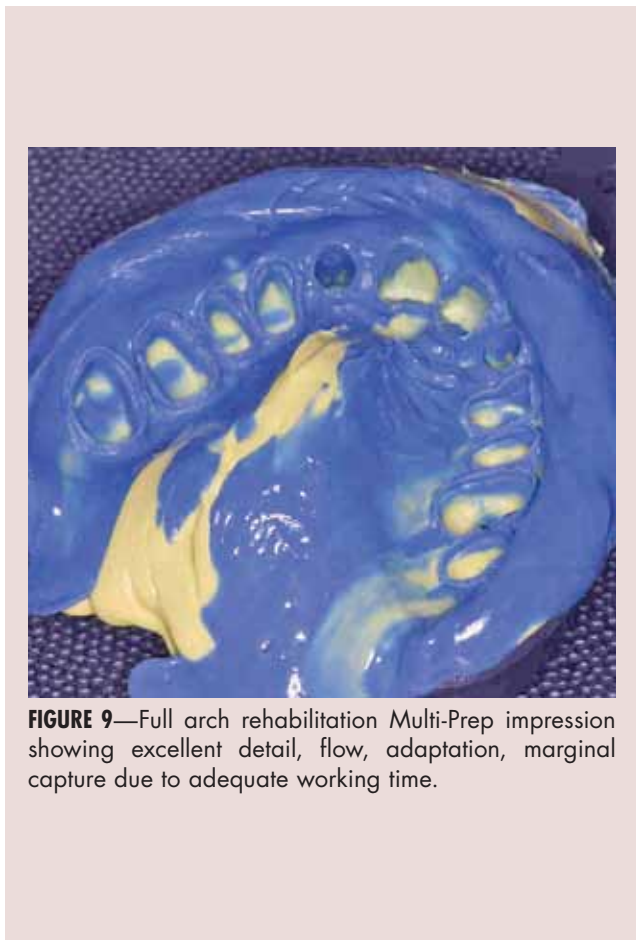
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shark fin tests, price, color, and taste, powerful advertising? Or should it be based on clinically relevant qualities such as: intra oral working times, polymerization rate, dimensional stability,

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tear strength, accuracy, consistency, quality control, and most importantly of all, independent, clinically relevant research? OH

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