



Finishing mouthguards

By Peter Herring, Adv Dip Dent Tech, ACCDP



A custom mouthguard is an unusual appliance. It is one of the few products we make that directly competes with volume manufactured items and thus represents a very grey area in the consumer's mind. Dental appliance or sports safety commodity? Hence to compete in the marketplace with a relatively low cost/high demand appliance, rapid, consistent and quality finishing of the final product is imperative. Custom mouthguards which are poorly finished lead to reduced consumer acceptance, raising aesthetic product issues and compromised levels of comfort when in use. This is certainly not the message we as a profession would want to portray. Particularly with a user group with such a high potential for repeat business and with such an important safety device that we have been entrusted to provide.

In this article we will discuss rationale and methods that will lead to a clean, consistent product that we will be proud to provide and the client will be delighted to own and use.

It starts with the thermoforming

As discussed in previous articles (*Anyone Can Make Custom Laminated Mouthguards - eLABORATE Jan/Feb 2007* and *Systematic Finishing of Thermoformed Appliances - eLABORATE Sep/Oct 2006*), the thermoforming techniques employed have the greatest bearing on the ease of finishing, consistency and protective potential of the finished mouthguard.

Recapping briefly, laminating with the clear layer first will result in a near perfect peripheral thickness needing minimal finishing. While the use of inbuilt separating and spacing foils (Figure 1) eliminates the need for separating solutions leaving a smooth, clean, hygienic surface, the spacing function of these foils also allows for post-forming material shrinkage, providing enhanced wearer comfort.

Removing from the model

After thermoforming we have two options to trim the excess material away to the mouthguards final extensions. Serrated scissors or hot scalpel.

Scissors (Figure 2) are easy to use and require no heat source. When completely cooled to room temperature, the mouthguard is removed from the model and the scissors are used to trim to the final extension. This should be done as accurately and as neatly as possible to reduce the work required in the later stages.

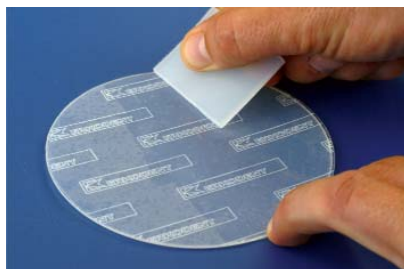


Figure 1. The addition of UZF-plus to the EVA foil improves the quality of the thermoforming and client comfort.

Hot scalpels are often favoured for higher volumes of production. The scalpel is heated over a flame or electric heat unit and the material cut through at the exact extension of the finished mouthguard whilst still on the model. Again accuracy is of the utmost importance, as if this stage is done correctly, it can result in a mouthguard that is almost finished!

Refining the final extensions

This is best done with tungsten carbide burs (Figure 3). The idea is to define the extension of the mouthguard and frenum relief areas. To effect this, the bur is used at 90 degrees to the material edge. We are not concerned here with "rounding" or thickness of the peripheries at this stage so after this, the peripheries will be almost "square" but at the absolute final extension required.

Smoothing/Shaping peripheries

The peripheries are now rounded and smoothed for patient comfort using silicon impregnated discs (Figure 4), taking care to have minimal impact on the smooth shiny freshly thermoformed surface. Any vertical thickening of the periphery can also be done now but if the thermoforming process has been thoughtful, this should be minimal.

Restoring the shine to the modified areas is done with a small hot air pen (Figure 5) with the mouthguard on the model. The new FG finishing sheets



Figure 2. Serrated scissors can be used to trim to the mouthguard's final extension.

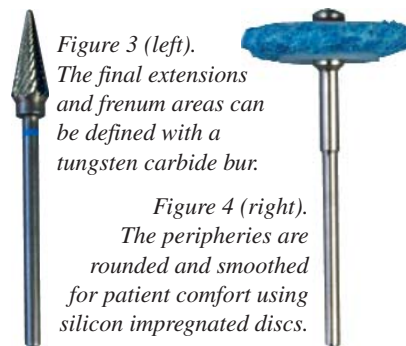


Figure 3 (left). The final extensions and frenum areas can be defined with a tungsten carbide bur.

Figure 4 (right). The peripheries are rounded and smoothed for patient comfort using silicon impregnated discs.

(Figure 6) may also be employed at this stage to shine larger areas of the mouthguard surface and in some instances to correct errors of thickness and extension.

Chemical solvents such as Chloroform and Trichloroethylene and their commercial derivatives are not recommended and unnecessary. Although these solvents are



Figure 5. Restore the shine to the modified areas using a small hot air pen.



Figure 6. FG sheets can be used to shine larger areas and for modification.



Fig 7. A ventilated case of sufficient size will avoid compressing the appliance.

very efficient, they are carcinogens and will leave lasting residues and an unpleasant taste on the mouthguards surface.

Presentation and delivery

After a final clean and disinfection, the mouthguard is ready for use. All that remains is packaging and final presentation. The mouthguard should be packaged in a ventilated case of sufficient size so as not to compress the appliance (Figure 7). The case also needs to be strong enough to withstand knocks and bumps from other sports paraphernalia in sports bags, etc.

Care and use instructions should be included, preferably on a permanent waterproof label affixed to the case. These instructions might include:

- Your mouthguard should only be washed in luke warm water and soap;
- Rinse well before and after each use;
- Do not let others use it;
- Do not place in direct sunlight or other hot locations;
- Never chew on your mouthguard;
- If your mouthguard becomes loose, tight or causes you any discomfort contact your supplier immediately.

Your client now possesses a superb protective product, superior to your mass produced competitors.

About the author

Peter Herring is a dental technician and prosthetist based in Perth, WA. He is a regular contributor to eLABORATE on thermoforming and is the Australian agent for Erkodent thermoforming machines. He also runs a busy laboratory dedicated to thermoformed appliances. For more information, please call 1800-242-634 or pjh@erkodent.com.au