Fabricating a Refractory Model

Veneer technique on refractory using GC Initial Ceramic

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Laboratory technicians often neglect important steps such as model work. They focus, instead, on porcelain layering. The build up is only one step in crafting bridges, crowns or porcelain veneers. This article describes the importance of the model work and demonstrates in detail, how to prepare models for refractory veneers. More than ever, models are the basis for a job well done and can’t be overlooked.

First, prepare a regular pin model (Figure 1). It is important to provide adequate space between the dies (Figure 2) to prevent voids during the polyvinylsiloxane pour and increase the polyvinylsiloxane thickness and strength. Next, die spacer is applied (Figure 3) and a Polyvinylsiloxane pour (polypour, GC) is made of the primary cast (Figure 4).

After the polyvinylsiloxane sets in approximately 45 minutes, remove the base and the dies to allow the polyvinylsiloxane to breathe for one hour (Figure 5). Duplicating the primary cast in polyvinylsiloxane allows us to fabricate a new cast with high temperature refractory investment to be used when fabricating the veneer.

Next, pour the refractory material filling just the area created by the dies (Figure 6, GC Orbit Vest) and place thermal pins (G-Cera ceramic pins) parallel to each other (Figure 7). Allow the investment to set for at least 90 minutes (Figure 8). Then, to create the base, fill the remainder of the polyvinylsiloxane with fast setting stone (mounting stone). The short setting time of mounting stone prevents

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moisture from absorbing into the investment, which can make the working dies fragile (Figure 9). Before the base sets completely, expose the top of the pins to allow easy removal when separating the model from the polyvinylsiloxane (Figures 10, 11, 12).

Each die can then be pushed into the resilient polyvinylsiloxane with a spatula to keep them inside the polyvinylsiloxane when removing the base. This prevents any margin damage on the still-fragile investment dies (Figures 13 and 14).
Then, remove the base, leaving the refractory dies in the polyvinylsiloxane (Figure 15).

Next, remove each die one at a time with a little compressed air pressure and place them back on the base to verify accuracy of the pour (Figure 16). Then remove the dies from the base and place them onto a tray and then into the burnout oven to dry the dies over the next hour by raising the temperature gradually from room temperature to
760 C (1400 F) (Figure 17).

Then place the tray with the dies in the porcelain oven. Raise the temperature to 1050 C (1922 F) and hold 5 minutes to maximize the hardness of the refractory stone (Figure 18 and 19). Remove from the porcelain oven and cool. Trace the margins with a special pencil (Whip Mix, Figure 20), and then repeat the previous cycle and hold for 30 seconds (Figures 21). The dies are now ready to accept the veneer layering (Figure 22).

Soak the dies in distilled water to keep the porcelain moisture constant. This soaking is critical for the first porcelain wash because the porous die absorbs the moisture from the porcelain very quickly (Figure 23). When beginning to layer, keep the color of the ceramic substrate in mind, since the first two layers of substrate define the degree of color and opacity for each tooth. Some preparations may have a higher chroma, requiring masking with lighter or more opaque wash porcelain (Figure 24).

Fire the base layer. In this example, the substrate layer required only transparent porcelain to allow the color of the preparation to come through. During build up, treat every tooth with an individual restorative recipe.

After the build up, contouring, texturing and final polishing, it is important to transfer the restorations to the solid master model to establish ideal proximal contacts.

The final restorations (made with GC Initial ceramic) are shown ready for bonding (Figure 25). The veneers in situ four weeks after bonding (Figure 26).