

Technical Update: Improved BruxZir Esthetics Thru Ultrasonic Cleaning

Issued May 24, 2011

Overview

With the ever-increasing demand for BruxZir Solid Zirconia, Glidewell Laboratories has continued to devise, test, and implement new processes intended to improve both the quality of these crown & bridge restorations and the efficiency with which they are produced. Often, an innovation in one area provides enhanced results in the other.

One such innovation is the new process by which Glidewell technicians clean milled BruxZir restorations and prepare them for coloring. Previously, individual crowns were painstakingly brushed by hand to remove excess zirconia dust. Not only is this time-consuming, but it was discovered via Scanning Electron Microscopic analysis that, no matter how diligent the effort, it is all but impossible to completely remove all the zirconia dust through manual means. Any residual milling debris left on the surface could result in a greater opacity or a higher shade value.

As-Milled



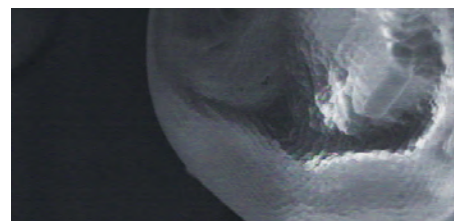
SEM 15x

After Brushing



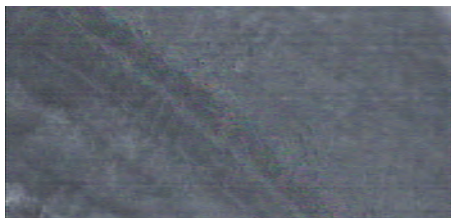
SEM 15x

After Ultrasonic



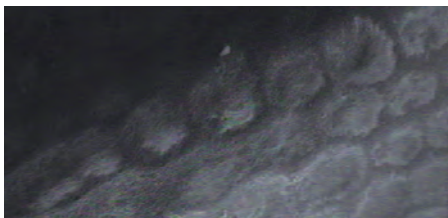
SEM 15x

As-Milled



SEM 100x

After Brushing



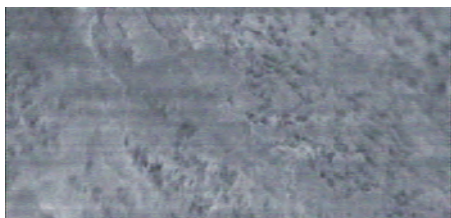
SEM 100x

After Ultrasonic



SEM 100x

As-Milled



SEM 5000x

After Brushing



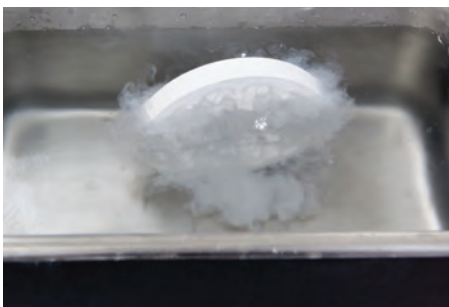
SEM 5000x

After Ultrasonic

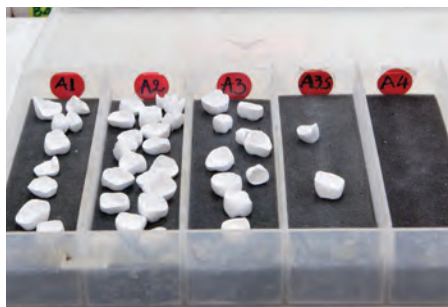


SEM 5000x

The new method, outlined in detail below, involves the use of an ultrasonic bath to clean the milled block, which is faster, cleaner, and more effective than brushing each crown by hand. Crowns are then cut from the block, grouped by their designated shade, and bathed again, helping to remove all of the fine particles from the crown surface. The shade-grouped crowns are then placed in sintering trays and dried — first in a microwave and then beneath a heat lamp. Once dried, the crowns are submerged in the proper coloring solution and colored under vacuum, after which they are dried again before being sintered.



Step 1: Place the milled block in the ultrasonic bath of clean water for one (1) minute. This removes dust faster than using a brush, cleans the individual crowns more thoroughly, and makes it easier to remove them from the block.



Step 2: Move the crowns to the ultrasonic staging area and separate them by shade. We use a simple plastic organizer box for this. (In theory, sintering only crowns of the same shade should eliminate any particulate cross-contamination, ensuring more consistent shading results.)



Step 3: Place each group of separated crowns in a large tea strainer, and submerge these strainers in the ultrasonic bath for five (5) minutes. The objective is to clean the remaining fine particles off the surface of the crowns. The water in the ultrasonic bath should be changed regularly.



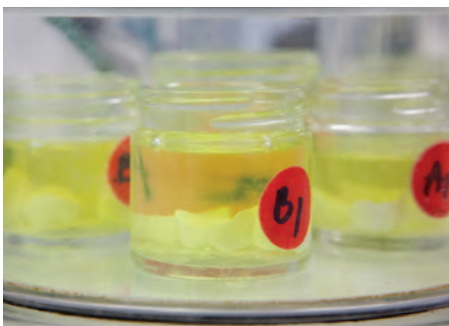
Step 4: Place each set of crowns in a sintering tray.



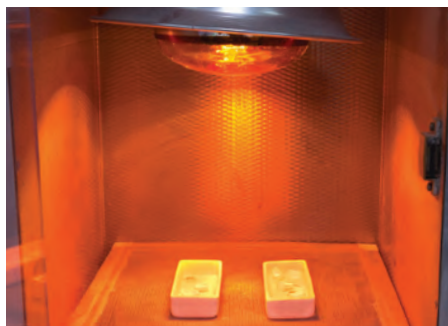
Step 5: Place the respective sintering trays in the microwave at full power for four (4) minutes to dry.



Step 6: Leaving the crowns in their sintering trays, allow them to dry beneath the heat lamp for one (1) minute.



Step 7: Color each set of crowns under vacuum for five (5) minutes.



Step 8: Dry beneath the heat lamp for ten (10) minutes.



Step 9: Sinter following standard procedures.

Improved Esthetics

The benefit to this revised cleaning procedure is the discovery of improved esthetics. It has been observed that the thorough removal of the exterior layer of particulate resulting from the milling process enables finished crowns to take full advantage of the BruxZir material's optical transmission property, which is the result of a patent-pending process. The overall result is a lower value (with a lower value comes the ability to achieve a higher chroma in a red/magenta hue) than that found in other monolithic zirconia materials, helping BruxZir crowns & bridges to more closely resemble natural dentition.