Oral Restorative Prosthetics

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Case Study #1: Lava Zirconia

We were presented with a 70+ years old, female patient who had an existing denture that was being retained by 30+ year old sub-periostial implant posts. The patient desired to have a new denture made as her current one was old, worn and stained; had had teeth replaced many times; developed numerous cracks (figures 1,2,3). However the patient had some very specific requests for her new denture:

1. She wanted it to fill out her checks and lips to give her a more youthful appearance.
2. It needed to extend back one tooth further (her current denture only had first molars).
3. She always wanted that "Hollywood white" smile; in essence she wanted a bleach shade, lighter than a B1.
4. She wanted ceramic teeth, not acrylic.

A little more background on the patient revealed that she had in the lower posterior: implant retained, all gold bridges; and natural dentition for the lower anterior with gold inlays on #'s 22 & 27 distal surfaces.
In searching for denture teeth to fit the patient's criteria, we found that none of the denture teeth manufacturers made ceramic teeth in bleach shades. In explaining to the dentist the dilemma, I half jokingly mentioned that I could make individual teeth out of 3M ESPE Lava Zirconia. They would be white as paper, almost indestructible but they would be very expensive. He asked me if I could provide him a sample to show the patient. I created one anterior tooth with just a hint of blue staining at the incisal edge to simulate translucency and one posterior tooth without any shading. I delivered them to the dentist (along with a cost estimate), he showed them to the patient, and she loved them. It was exactly what she was looking for. Cost was not a problem.

As for the process used to fabricate the denture, it was actually quite simple once I figured out how to create the teeth. We started out using the traditional methods of full denture fabrication: custom tray, master model with analogs for the implant posts, bite rim, articulation of the models, and opened the bite 1.5~2.0mm to compensate for the worn denture teeth of her existing denture. We then set teeth in wax using Vitapan composite teeth in a shade 0M1. The dentist did a couple of wax try-ins, making adjustments to the bite, placement, etc. of the teeth until he and the patient were satisfied with the denture (figures 4,5,6). We were now ready to make the Lava Teeth. We made an impression material matrix of the denture set-up so that it could be replicated after the fabrication of the Lava teeth (figure 7).
To make the Lava teeth I removed the teeth, one at a time, from the wax-up, boiled off the wax and drilled diatorics in the tooth. The diatoric was to simulate a prepared tooth for the scanning process (figure 8). I then used a scanable lab putty to create a die (figure 9). I seated the tooth into the lab putty, making sure to bring the putty over the edge of the tooth (figure 10,11). I then cut away the excess putty from the edge of the tooth ending up with a die with a definitive margin that the design software could identify (figure 12,13). Next, I scanned each die, having checked the "wax-up" check box in the case information screen. I used the denture tooth as my wax-up so as to exactly duplicate the teeth that were used for the try-in setups (figure 14, 15). The teeth were scanned so that the sprues would be placed on the mesial & distal aspects of the teeth to keep the facial and lingual surfaces as smooth as possible. All 14 teeth were nested in to two 60mm and one 40mm Lava blanks. They were milled, cut out, the sprues finished down, additional diatorics made on the mesial & distal sides to allow for acrylic to flow into and through the teeth for retention (as you would normally have with ceramic denture teeth) and sintered (figure 16, 17, 18, 19). After sintering, they were stained with the blue incisal edges and cusp tips and glazed. I then reset the Lava teeth onto the baseplate using the putty matrix, checked the bite and function on the articulator and sent the new setup to the dentist to try-in one final time.

The case was sent back for processing as is (figure 20, 21). The denture was processed and delivered to dentist (figure 22,23,24). As with any denture, some minor adjustments were needed, but the dentist was able to easily make the adjustments to the teeth with a diamond and rubber wheel. The denture itself is slightly heavier than a regular denture, but with it being held by 4 implant posts with rubber o-rings, retention does not seem to be an issue (figure 25). If this were a non-implant retained denture, I probably would have suggested that we use the Lava teeth in the anterior and composite/acrylic teeth in the posterior. I could have also lessened the weight a bit by cutting larger diatorics, reducing the amount of Zirconia.
The patient was so happy with her new, white teeth (figure 26, 27). She then decided to have her lower anterior teeth crowned to match. She now has the "Hollywood white" smile she always wanted. She used to smile without showing much of her teeth, now she always has a big grin (figure 28, 29).

Case Study #1

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

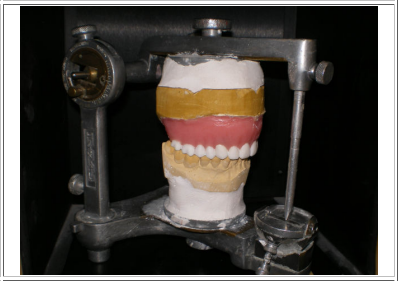


Figure 6

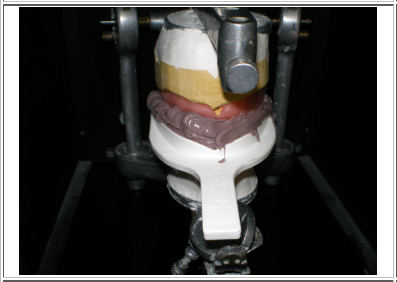


Figure 7

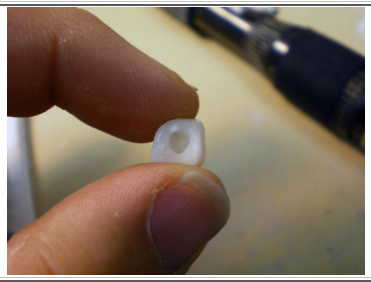


Figure 8

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13

Figure 14

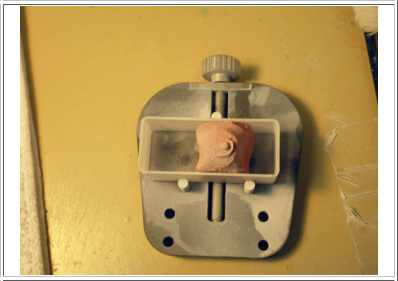


Figure 15

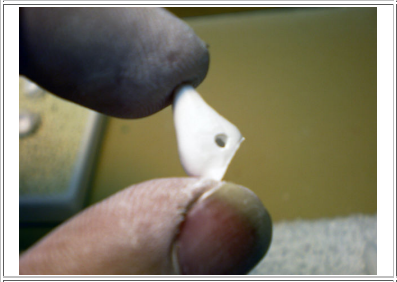


Figure 16

Figure 17

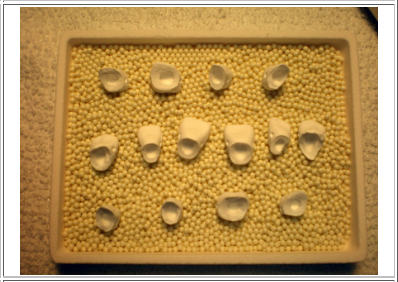


Figure 18

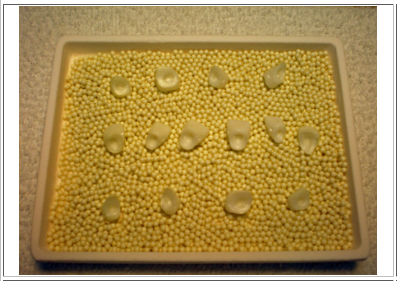


Figure 19	Figure 20	Figure 21
Figure 22	Figure 23	Figure 24
Figure 25		

The Finished Product

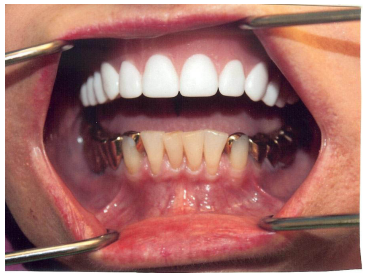
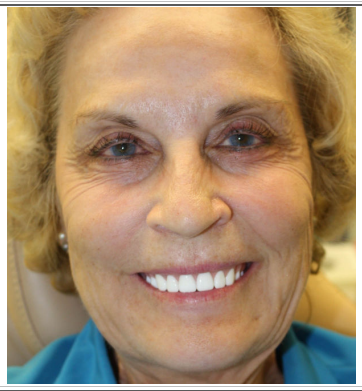
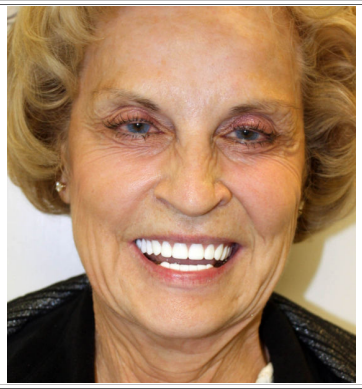
	

Figure 26	Figure 27
	
Figure 28	Figure 29