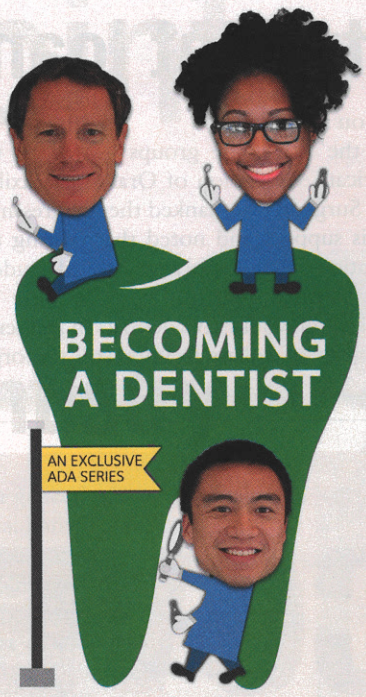
Dental students enjoy technology-enhanced learning

BY JENNIFER GARVIN

Editor's note: In November 2017, the ADA News launched Becoming a Dentist, a series of stories that follow three dental students at the University of Maryland School of Dentistry — Dan Yang, LaShonda Shepherd and Ben Horn — during their journey of becoming dentists. The first story, which introduced the students, ran in the Nov. 6 ADA News.



Baltimore — It's hard to resist stepping into a lab that bills itself as the "Dream Room."

As computer-aided design and computer-aided manufacturing — CAD/CAM — becomes more commonplace in dentistry, so does its power to revolutionize dental education.

"I've been teaching dentistry for 32 years, and this is one of the most exciting things that I've seen in dentistry," said Dr. Gary Hack, who teaches at the University of Maryland School of Dentistry in the department of advanced oral sciences and therapeutics.

Most dentists, when they hear the term CAD/CAM, might immediately think "same-day restorations." However, Dr. Hack uses this technology as a teaching tool for any variety of dental preparations, including those for amalgam and composite.

Prior to CAD/CAM, he would show students the preparation designs by using a mold, model, drawing or chart. Now, with the CAD/CAM intraoral cameras that can scan the preparations and place them on the computer screen — which is magnified 25 times — his task is much easier, and the level of excitement he sees from the students is remarkable.

"When a dental educator tries to explain to a student, 'This is the axial wall. This is the pulpal wall,' on a tiny amalgam tooth preparation, it is very challenging," Dr. Hack said. "Sometimes there will be three or four students gathered around a small typodont tooth preparation, and nobody will clearly see what you're doing, so what I now show the students is that we can scan their cavity preparations very quickly and see them magnified many times on the computer screen.

"Many people don't realize that you can actually scan these undercut amalgam preparations," he said, holding up a model of the mouth as an example.

Today, following a full day of her regular classes, LaShonda is there for some extra time in the dream lab. She's joined by second-year dental student David Morabito, who will be guiding her through a practice assignment of making a crown for tooth No. 5.

"This is a great tool for someone like me who's a visual learner," LaShonda said. "In dentistry, you're dealing in millimeters and very small spaces, so for the professor to be able to magnify the preparation like this and point things out to me clearly and directly while I'm still learning terms and trying to figure out what I'm doing is a great resource."

In fact, when it came time for LaShonda to pick a dental school, she said she purposefully looked for a school that offered cutting-edge technology like CAD/CAM.

"Right now we're in the technology era, and the world is changing, and when I graduate in three years there's going to be even more change so I don't want to start out using outdated practices," she said. "I want to graduate being comfortable using technology and be able to provide good care to my patients."

LaShonda knew about the Dream Room at UMSOD even before applying to Maryland.

"I did a little homework and when I came here for my interview, and they showed us around, I thought it was really cool that CAD/CAM was integrated in the curriculum and that we had access to the equipment even as first-year students," she said.

Her fellow first-year classmates, Dan and Ben, agreed.

"The high resolution allows students to critique and evaluate our own work in great detail, especially since all of the dental students are such perfectionists when it comes to what we produce," he said. "Furthermore, there is no doubt that the field of dentistry is headed towards this type of technology in clinical practices. This is another reason why we should be learning this now as it will be a very relevant piece of tech in our future practices," said Dan.

Added Ben, "The bottom line is that when you're learning a new skill — in this case, preps and restorations on simulated teeth, the student just needs to expose themselves repeatedly and put the time in. Just get in there and do it. The more tools one has to assess their work, the better they will become, so the digital approach to analyzing a prep is great. As long as the student is putting the time in, they will see improvement."

At UMSOD, there is a fixed prosthodontic course that is a yearlong class for second-year dental students that incorporates CAD/CAM into the curriculum. Additionally, the school allows the first-year students to visit the Dream Room whenever they want and holds training sessions for those interested in the technology. The school uses CEREC machines, which are designed for fabricating crowns, onlays, veneers and bridges. Currently there are 15 BlueCam scanners and two OmniCam scanners for use in the Dream Room and in the school's dental clinics.

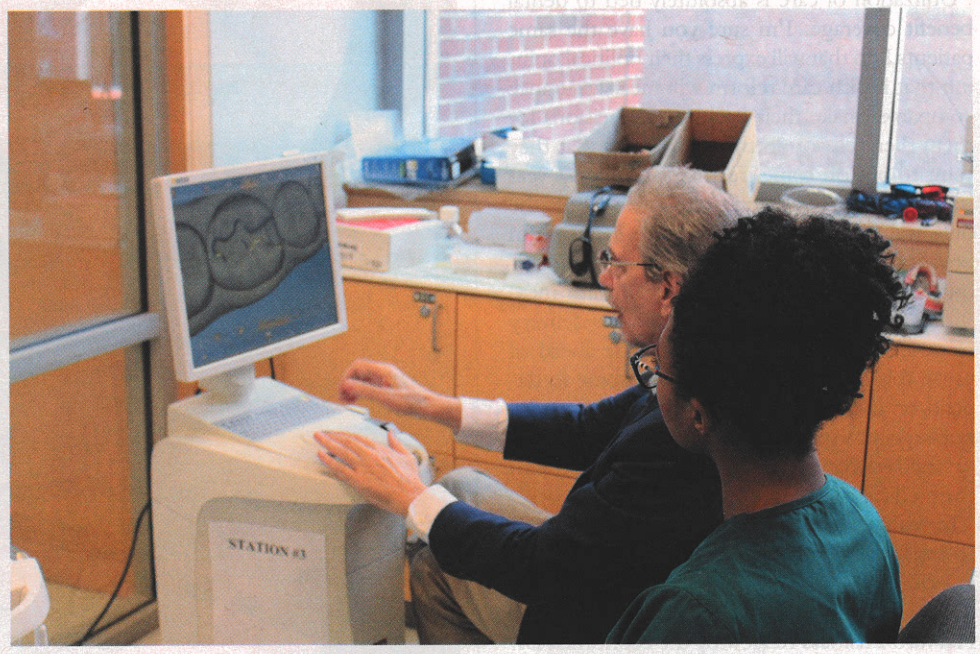
To demonstrate how the technology assists in evaluating year-one amalgam preparations, Dr. Hack guides the mouse over a scanned image and points out various aspects of the cavity preparation.

"Now I can say to LaShonda, 'Your pulpal wall is very flat, and this is the marginal ridge integrity, and this is your axial depth and so suddenly it makes sense.' You can also use the software's measuring tool to measure distances between any two points on the preparation to a 1/100 of a millimeter."

The camera magnifies the scan 25 times the actual size and the distance tool shows exactly what the measurements achieved by the student are.

"The measurements — that's definitely a big one," LaShonda said. "In the beginning, you're still learning hand skills, you're still learning how to measure. It's hard to visualize it, and this is a perfect resource to teach us how to see preparations and show us what we're looking for."

Finished product: Dental students David Morabito and LaShonda Shepherd pose with their finished crown for tooth No. 5.



Teaching technology: Dr. Gary Hack called CAD/CAM technology "one of the most exciting things" that he's seen in 32 years in dentistry. Here, he teaches LaShonda Shepherd how to use CAD/CAM.

To better enhance both of the students' learning experiences during this practice assignment, Dr. Hack observes and lets David teach LaShonda. The son and grandson of dentists, David began shadowing the dentists at his father Robert's practice in Falls Church, Virginia, as a junior in high school. During a gap year between high school and college he also worked at a dental lab. He loved the work but realized he wanted the doctor-patient relationship.

"The best part is seeing the final delivery and the patient's ecstatic reaction," David said.

For today's simulation, David and LaShonda both begin by scanning a full crown preparation on the computer.

After scanning, they each spend about 10 minutes designing the digital crown and getting their dimensions just right, with David checking to see if LaShonda's measurements work. The computer lets them know they do. Next the two are ready to mill the crown in the milling machine. Less than 15 minutes later and voila, the final product is ready.

"What a great experience for the students who both get an A+ for today's exercise in digital dentistry," Dr. Hack said. ■

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