43rd Annual Meeting:

Vilnius, Lithuania

EMERGING TECHNOLOGIES IN DENTAL EDUCATION:

THE UNIVERSITY OF MARYLAND EXPERIENCE:

THE EDUCATIONAL APPLICATION OF MULTIPLE DIGITAL TECHNOLOGIES AND THEIR RELATED RESEARCH.

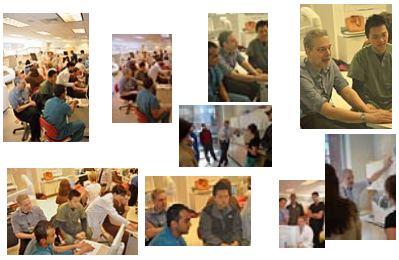
GARY HACK, DDS

UNIVERSITY OF MARYLAND SCHOOL OF DENTISTRY.
BALTIMORE, MARYLAND, USA

GHACK@UMARYLAND.EDU

UNIVERSITY of MARYLAND SCHOOL OF DENTISTRY

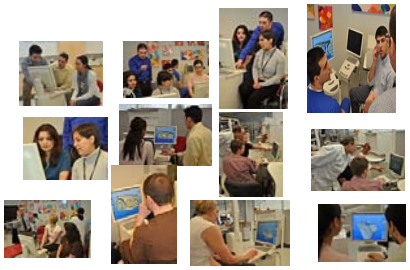
Sophomore Training: CAD/CAM



University of Maryland School of Dentistry (UMSOD) Oldest Dental in the World: 1840

Gary D. Hack, DDS
Associate Professor and Director of Clinical Simulation
Department of Advanced Dental Sciences and Therapeutics
University of Maryland School of Dentistry
650 West Baltimore Street
Baltimore, Maryland 21201
410-706-7542
Email: ghack@umaryland.edu

CAD/CAM Training: Sophomores



Emerging Technologies that will change Dentistry Forever:

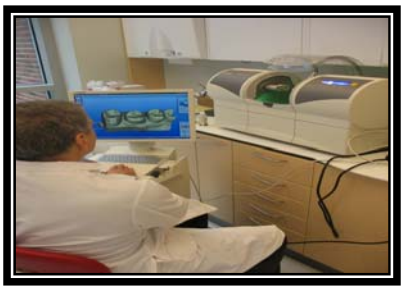
Sophomore CAD/CAM Project:

All 130 sophomore dental students had their typodont preparations scanned and given access to the digital file to work with the software.

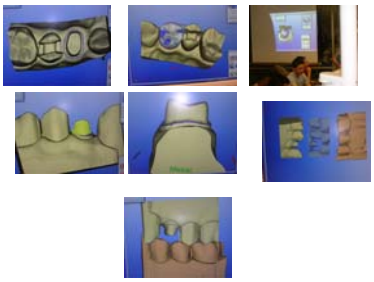
Dream Room:
Teaching Digital Dentistry:

10 Compact Milling Machines:

MCXL Milling Machine & BlueCam Acquisition Unit

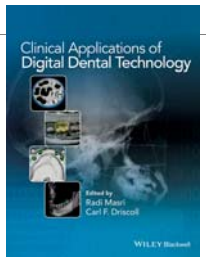


CAD/CAM as a Teaching Tool:



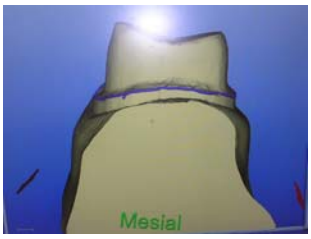
Dream Room:
Note MCXL Milling Unit

Clinical Applications of Digital Dental Technology:



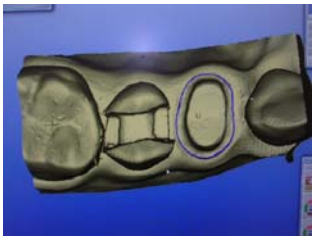
CAD/CAM Training for AGD Residents:

Now I Understand!

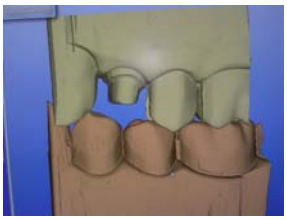


AGD Resident Training:

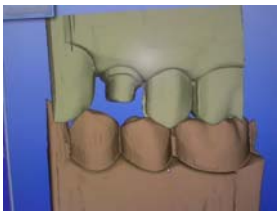
Oh, that's what you meant!



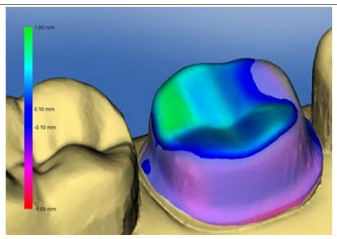
A learning tool for Fixed Prosthodontics:



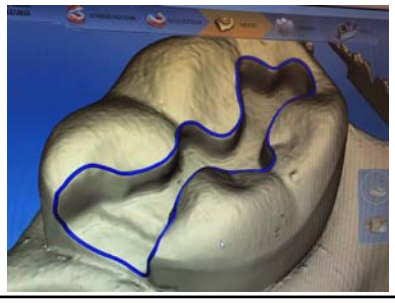
Occlusal clearance/reduction: Now I see what you mean!

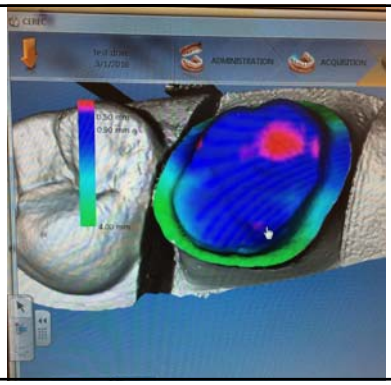


Prepcheck Evaluation Tools:



Class 2 Amalgam Preparation





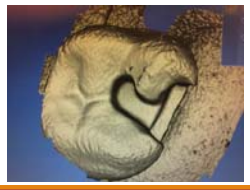
Class 2 Amalgam Preparation

CAD/CAM in Year 1

Class 3 Composite Preparation

CAD/CAM in Year 1 Operative Dentistry:

Is that Possible?



Unique Presentation for Better Understanding:

Magnified Visualization of Intra-Oral Preparation:

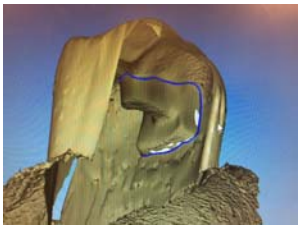
Survey Statistics/Comments: Digital Dentistry

This is new-age dentistry and we should be learning this in our first year of dental school. I will more than likely be using this or even better technology once I graduate from Maryland, and having this experience may give me a competitive edge against a dentist that hasn't used this technology. I hope, for the sake our education, this session and more CAD/CAM technology will be added into the curriculum.

This was the best elective I took by far. I think it would be really helpful too if they could open it up to more students. I think this course was amazing, but I think if we could image each others' mouths (clinical setting), instead of a typodont for the 2nd class, that would be very cool. Dr. Bloom and Dr. Hack really did an amazing job with this elective.

This course was extremely beneficial. Digital dentistry is going to be a big part of our generations' careers. We need to learn what technology is out there, it's capabilities, and how to utilize the technology. This course was very helpful to open that door, but I wish we had more time and exposure. This was a great course and I would recommend it to all students!

Class 2 Amalgam Preparation:



Comments: Digital Dentistry

This elective was one of the most interesting and useful courses these past two years due to the fact that us students really need to know how to work in the digital world. CADCAM is going to replace many of the traditional methods of fabricating restorations and I was glad to learn a lot more about that in this course.

Dentsim Training after 4 weeks of Oper.

Planmeca Soveirgne Chair:

Good Morning,
Thank you so much for having me to use the DentSim program, I found it to be very helpful.
Here is my feedback about DentSim:
I still remember the first time I held a hand piece and stared working on my first preparation; I was scared and had no idea what I was doing. Even after seeing pictures and videos with specific instructions, I found myself having trouble creating a mental image of what my preparation should look like "from the inside." What I mean by this is that I could create a preparation that looked like it was supposed to with the proper measurements but did not have the right wall angles and floor smoothness that I would have liked. I consider myself to be a visual learner, however when it comes to dentistry, two dimensional images are still not enough.
I like the emphasis of three dimensional technology that DentSim provides; it makes me feel in control. I was able to see my preparation unfold itself both in the screen and in person, stopping every once in a while to check my progress. DentSim's 3D technology helped me understand concepts that are difficult to visualize as a first year student, for instance, the concept of wall angles. I am now constantly aware of the angle in which I hold my hand piece, looking at the Dentsim screen to correct angle of my hand piece before I start drilling. Dentsim can help in developing great techniques from the beginning of dental students careers that can translate into their patient intearctive years.

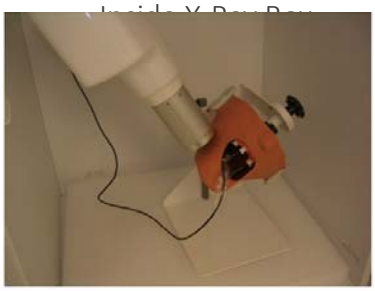
I think dental students would benefit from starting their first simulated clinical experiences using Dentism. This way they can have a three-dimensional understanding of what a preparation should look like and guide themselves to achieve it through self evaluation. Dentsim is also great when obtaining feedback from faculty because the faculty can be able to see exactly what the student did wrong and explain how to improve or avoid a problem.
Noemi Tismineshy
Class of 2019

Bench Simulation: In Action

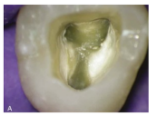
GUI: Graphical User Interface ;

X-Ray Box:

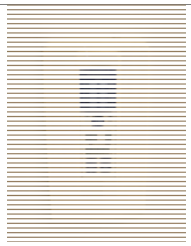
Inside X-Ray Box



Surgical Microscopes for Simulation Endodontics:



X-Ray Box: External Controls



Magnified Endodontics for Preclinical Course:

20 Surgical Microscopes in Simulation Center:

Clinical Simulation:
CAD/CAM, Rotary Endodontics, & Digital Radiography

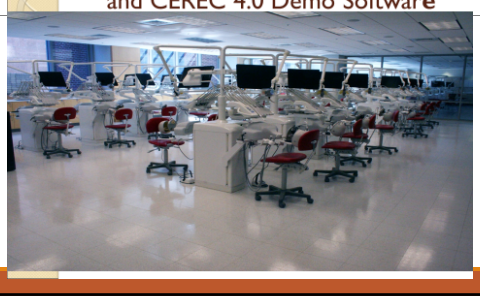
Clinical Simulation:
Student at work!

Clinical Simulation:
Emulates the Clinical Environment

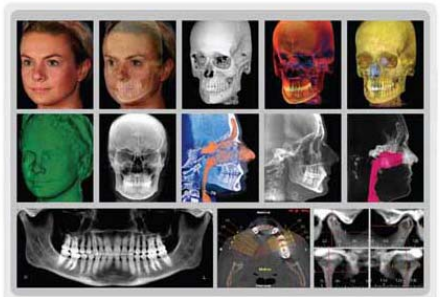
Clinical Simulation

Bench Simulation: Say "Ah"

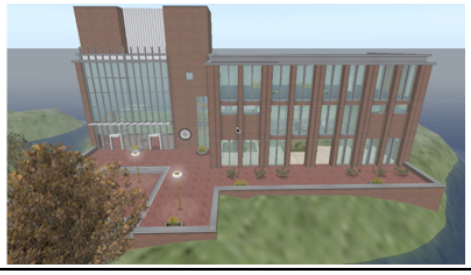
Clinical Simulation:
81 Units: All with 64-bit Windows 7
and CEREC 4.0 Demo Software



Bench Simulation:
91 Stations
Each with 64 Bit, Windows 7
and CEREC 4.0 Demo Software

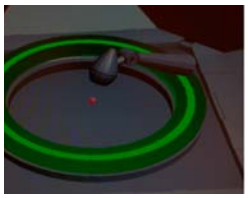


UMSOD: Virtual Dental School on Second Life

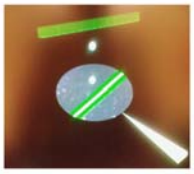


Haptics:

Haptics:



Simodont



Comments: Simodont

Thank you for this experience. As someone who has never used a hand piece or taken a single dentistry related class, I was surprised by how easy the simulator was to pick up. I was amazed by the resistance I felt while I moved the hand piece along the grooves I had created in the virtual structure. I truly felt as if there was an object that I was shaving away beneath my hands. Some concerns were raised by the other students such as a lack of finger rest and the fact one can approach the tooth/object at any angle, so there is no way to simulate the cheek of the patient. I believe this is a great and exciting technology and although it may not be used in place of the manikins, I think much could be gained by having this at our school. I know that I will feel more confidence when I go to work on a practice tooth for the first time. (Perspective student)

I thought that the Simulation Trainer was most helpful that it gives you different resistance when drilling enamel and dentin, this is something that you do not feel when drilling in pre-clinic. However as I stated it does not provide a finger rest and you do not have the simulation of cheeks which you have in pre-clinic. So there some pros and cons. But I do think that it has use here at the dental school. (Student)

The technology was incredible. Thank you so much for letting me be the first to try it!
I think that the Trainer could be very useful in simulating what enamel vs. dentin vs. pulp feel like when we are drilling. I feel this is especially important because as D1s and D2s, the D3s and D4s would always say that drilling in a typodont is nothing like drilling in a real tooth. Additionally, it is great practice for perfecting hand-skills because the simulation is incredibly accurate and it is like you are actually touching a real tooth. With the new technology, it also makes it exciting to use, and the numerical feedback from a session is helpful in seeing where you can

Electric Handpieces with Scanning tabs:

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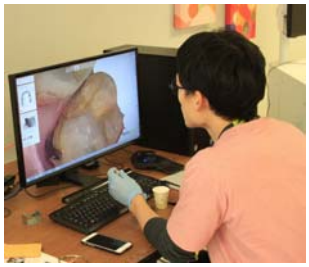
Additionally, if they could add models that are more representative of real teeth and different types of occlusions, rather than the ideal/perfect typodont we use, it would help prepare us for the real world. It could also help train us in using the mirror for indirect vision. Perhaps the engineers could add restrictions of the patient's movement so that we are used to how far we can tilt the head so we can work on our ergonomics and perfect how to hold our instruments.
I did dislike the fact that I can't wear loupes, especially since you do need to get used to wearing them for some period of time. The bar that was also present made it difficult to maneuver a bit, yet at the same time, I could not find a comfortable fulcrum.

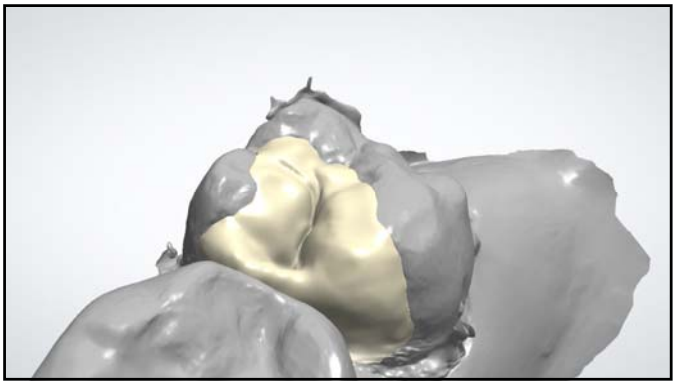
This would be difficult to incorporate into the current curriculum, but perhaps it could be an extracurricular/after school lab project, where people could sign up every now and then or if they finished another lab project early. If possible, it could be incorporated into the curriculum like the endo-scopes. Groups can rotate through the section during their operative lab.
I hope this helped. Please let me know if there is anything else I can provide.
Thank you again!,

3D Printing: Projet 1200

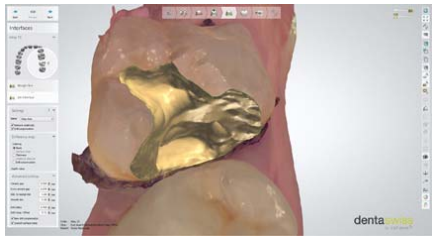
3D Printing:

3D-Printing:





3D Printing:



Research:3D Printing of Ceramic Crown:

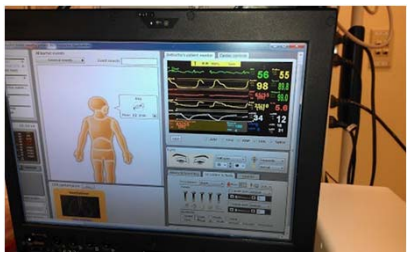
Clinic Monitoring

In a Dental Chair:

Interprofessional Collaboration

Monitoring the Entire Event:

Sim Man Feedback:



Thank You…

- Questions?