

*Dear Friends*

It takes competence, commitment and performance to produce excellence. . . "Bona prudentiae pars est nosse stultas vulgi cupidates, et absurdas opiniones" (Desiderius Erasmus)

## MARKETING THE CAD/CAM IN DENTISTRY

"It is a good part of sagacity to have known the foolish desires of the crowd and their unreasonable notions." . . a quote of the 16th-century philosopher, Erasmus; he understood the precepts of marketing, even if he'd never heard the term.

This newsletter is the result of two days of privileged "brainstorming" with CAD/CAM people from Henson, the editor of the Journal of the American Academy of Practice Administration, and key people in the marketing arena.

This newsletter takes on a "what if" format, and promises nothing. Any similarity to facts or people, living or dead, will be purely coincidental!

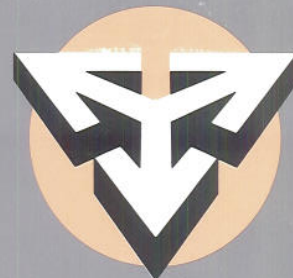
Nevertheless. . . the discussion during the Napili CAD/CAM workshop in late 1986 in New York City brought together four leading forces that accounted for the critical mass of the time. Two of these have continued to emerge. . . the Diane Rekow/University of Minnesota project and the Francois Duret/Henson projects. They have met together on lecture stages around the country, so the sharing has been generalized.

The questions and answers that are sought by the unreasonable notions of the crowd expresses, perhaps, our foolish desires.

Nevertheless. . . what if?

The subjects that are racing through the curious minds in dentistry today relate to these systems' accuracy, user friendliness, the materials available that are new and promising, the time-saving that is provided by the procedure not requiring impressions, temporaries or second visits. These factors coming to fruition certainly relieve stress for both the person coming for care and for the persons providing that care.

There are questions and concerns about the simplicity of application, the ability to preview the preparation on the tooth prior to accepting it as a completed ideal preparation. No question about the



REED'S  
INTERNATIONAL  
LETTER

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satisfaction achieved by scanning and bringing up on the screen the exact replication of the preparation which will then be easily integrated into the process of providing the retainer for that preparation.

We are impressed with CAD/CAM ability to adapt to any and all preparations, particularly using the new materials and the bonding we presently have available. We are impressed with the spectrum which includes crowns, inlays, bridges (three- to four-units presently, with promises for the future) and currently inlays, onlays and laminants. Future projections include full-arch fabrications as well as the superstructure for osseo-integrated cases with unreasonable accuracy and promptness.

The fact that no anesthesia is required for the non-existent second sitting is certainly a health improvement for the person coming for care. The fact that the obsolescence of the equipment is cared for through constant update and software improvement as with our other computer-driven apparati is a pleasing perspective. Other use for the same hardware in the office allows a complete random access, relational data base program-generated administrative package that will conveniently and rapidly operate on the same hardware for the user dentist. The spectro-colorimetry and the coloration of the crown, whether it's porcelain or one of the hydroxy-appetite/exotics that will become available, makes this an ideal characterization application for "mass customization". The

challenge that we get from proof of fit prior to fabrication and the acceptance of using or not using the rubber dam certainly provides us with a whole host of subject matter to poke, probe and question.

Will the CAD/CAM measure a Bureau of Standards die and produce a crown that fits within 50-100 microns?

Only with sectioning the die and crown, or tooth and crown, and using the electron microscopy would one actually be able to measure, and then at only one point/plane through the "transaction", therefore, the "now" standard is becoming the laser scan of the die, crown and the resultant fit.

Reports from France on "average" U.S. lab cases show 150-300 microns as the range of standard accuracy of fit. A study is currently being accomplished and will be reported by Francois Duret and Jack Preston at the FDI/ADA meeting in Washington D.C. in October. The study and report will be done on a CAD/CAM produced crown and an American laboratory produced crown on the standard dies making these parallel crowns for the useful purpose of "who sets the standards."

That will happen on Sunday, should be an interesting meeting, shouldn't it?

The Ford Motor "comment" at the time of the Chicago MidWinter in February was a stinger. It was overheard at the meeting that Ford Motor had tried to use CAD/CAM to mill out acrylic tail lights for

**Who measures?**

**Who sets the standards?**

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one of its custom sports models and found they couldn't depend on a degree of accuracy in sufficient quantity to get the tall lights to fit the molding. "Therefore," the dentist commented, sneeringly, "how do they expect to make a crown?"

The CAT scan computerized tomography being accomplished on body parts and being replicated with micro-milling machines produce a commercial accuracy available in the medical market today that proves astounding.

Ford Motor Company may have had other variables creep in that "crapped out" the project, however, our experience with the CAD/CAM allows us to know that even a selected cement-thickness clearance can be allowed on everything but the last millimeter where the margin adaptivity is preserved at the discretion of the operator.

One of the exciting things that's happened in our world since you last heard about CAD/CAM and its application to dentistry is included as an addenda to this newsletter. Please note that, as the laser printer assembles the printing on the page, layer after layer in nano seconds, compounds can be layered into three-dimensional complex models for sintering or fusion and a model can be CAD/CAM produced without micro-milling.

Will silane or some other space age exotic material become our new crown and bridge/inlay/laminant material without micro-milling?

Will Duret's hydroxy appetite type, three-way fiber reinforced

material with its stats and advanced excellence in physical characteristics, eventually be used in powder form to lay up and replicate the desired crown with intense accuracy and with either sintering or other energized systems "cast" the material into the desired solid state and physical characteristics without micro-milling?

Will we begin to fully realize the tremendous accuracy of the recording done of the various views of the mandible and its relationship to the maxilla? the lateral views and functional occlusion being taken in centric, protrusive and the opposing occlusal surfaces being replicated with the intensity and accuracy presently unavailable? The precision demonstration of seating a crown with little or no adjusting as a result of the pictures generated by the probe interpolating the peculiarities of function of the individual person being cared for?

The infinite simplicity of the laser probe taking two or three angulations of a preparation with a potential for even penetrating 1 to 2 millimeters below a free margin through hemorrhage as is sometimes the case, or with the supergingival healed perio type preparation that is obviously preferred without retraction being a simple process that can be learned and easily and quickly demonstrated. The computer and its keyboard being easily used "even by a dentist" using dental language, and a "mouse" that is part of the set up to quickly and easily change the morphology of

The system is quick, yet it is personal.

"Selective laser sintering."

High-tech,  
high-touch  
care is the  
way to assure  
the long-term  
loyalty of  
those served.

The system  
requires the  
dedication of  
the doctor and  
his/her entire  
team.

the crown taken out of the computer's library for morphology. Can one really conceive of how simple it is to put a block of material that has been pre-selected for shade and/or for its blank configuration into the micro-milling device and automatically placing a disk with nine to twelve rotary instruments in it for the ten to twelve minute procedure for making a full crown?

How about the modem that can be used in an office without a micro-milling device with a signal being sent to the laboratory for delivery within the hour?

The actual coverage of the margin, irrespective of its irregularity, within 50-100 microns is something we all covet, is it not?

And all of this in a package the size of a breadbox? (How many are old enough to remember the size of a breadbox?!)

And how exciting it is to remove the block from the micro-milling machine with a finished polished crown in it and remove the sprue from the buccal/lingual or from the intaglio if you're making an onlay or an inlay so as to not effect either morphology or accuracy. The ability to then shade the Dicor or the hydroxy appetite, the Kevlar, the fiberglass, the carbon fiber or whatever space age material will relentlessly serve us.

Or how about using one of the old standards, like gold or platinum block, that is drafted, small, medium and large, in the general configuration for the process. Since the box is closed, we easily

collect and salvage the entire unused portion of the block for recovery, irrespective of what the material is.

The accuracy and the class with which this process produces a service for a person coming for care, as it leaks out on the community, will provide a tremendous exclusivity that one must consider with care. Is the "mass customization" elitist or populist? Will you do more for less? or is the "hook" for you the exclusive service in less time with the appreciation and values of the person served interfacing with you in co-developing a fee?

It is not speculation that in France this September a dozen or more of these systems will be in place and, without question, one might imagine that by the time of the Chicago MidWinter, 1989, one will be able to place a one-year delivery order firmly with a down payment that gives a numbered position on the list for delivery.

Most dentists approach a process such as this with a loss or gain mind set. Will you be at a loss without it? Is it more important a "driver" in your behavior than the obvious gain for you and for the person coming for care.

Those pressures are seldom sensed at the conscious level. When we can have a system that provides proof of fit, cosmetically ideal retainers with excellent morphology, periodontally acceptable contours, occlusal perfection, a standard-setter as a restoration in minutes at the first appointment. . . price is certainly no object.



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The exciting fact remains, as well, that no office needs to be interrupted by remodeling to insert one of these "breadboxes". The standard operator will receive all the hardware that's essential, even if the entire system is placed in the existing dental office. Obviously one could have a scanner in every operator, "hanging on the rack" like a handpiece, and have it modemed to the laboratory or to the central location in your own building or office. This would produce the most desirable end result of which we speak.

The second insert is from friend Neuman in Vancouver . . . astute author that he is. . . think for a minute about his choice of toys for the moment being coupled with the intra-oral camera software available with laserjet and Polaroid print-out capacity, or disk storage of images given to the person coming for care for his/her future use. As important as an x-ray? . . . and the addition of the software (IBM compatible) that registers the occlusal contacts, frequency, intensity and sequence in a new statistically significant way. . . and the remarkable video displayed, computer intensified instantly displayed x-ray, also a mergeable software package. Are we experiencing change?!

The remarkable view of prosthetic dentistry as we see it through this new window with the remarkable opportunities it presents shows us an opportunity to "catch a different ride". This ride, perhaps, called upscale service to our fellow man,

certainly, at least, called class one. We deserve to be at that point, at least, don't we?

And what about storing the centric, vertical, TMJ function, the entire cosmetics and morphology of your own dentition on a floppy disk for future rehabilitation or post-trauma rehab. . . yes! your entire "dental study model", "micro-millingly" produced off a laser scanned experience on your own floppy disk. . . a part of new patient record-taking?

What an interesting opportunity it would be to have a 10-15 minute video tape that completely embraces and encompasses the above-mentioned factors, demonstrating and answering the questions, providing a three-dimensional testimony to the existence, simplicity, adaptability, reliability, accuracy, user friendliness of CAD/CAM in dentistry. Keep your mailbox open.



We have reached a new age . . . these are the good old days!