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# DOCTOR of DENTISTRY

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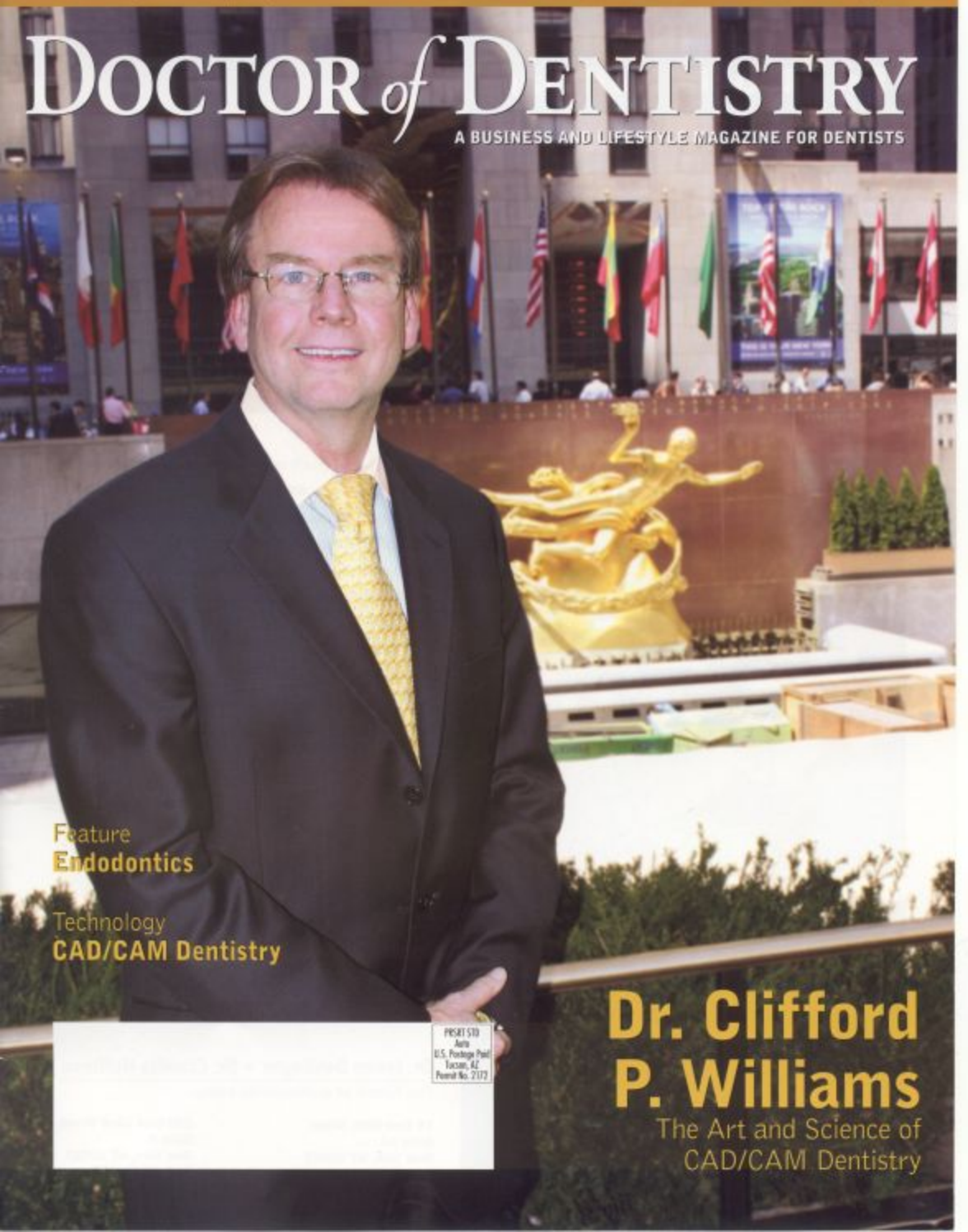

Feature
**Endodontics**

Technology
**CAD/CAM Dentistry**



## Dr. Clifford P. Williams

The Art and Science of CAD/CAM Dentistry

# contents

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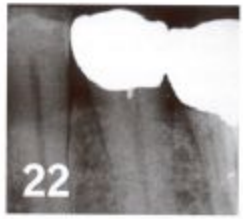


**ON THE COVER**
Dr. Clifford P. Williams



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# Dr. Clifford P. Williams

## The Art and Science of CAD/CAM Dentistry

By Mark Ellis

Few would argue that dentistry has come a long way in the last 30 years. One of the industry's most notable and recent advances has been CAD/CAM-enabled restorations. One dentist who has totally embraced this technology and has built a thriving practice around it is Dr. Clifford P. Williams. With a dental career that spans over 30 years, Dr. Williams has witnessed the evolution of dental technology and has adopted much of it into his practice at 1 Rockefeller Plaza. And, unlike many of his technophobic peers, Dr. Williams adopted some of this new technology early on and in some instances played a key role in its development. For this and other reasons, we have selected Dr. Williams as the cover story for this special CAD/CAM dentistry issue of *Doctor of Dentistry*.

### FROM THE STARTING GATE

To help pay his way through dental school, Dr. Williams set up a small dental studio in the basement of his parents' home. This enabled him to make some money waxing and casting crowns. During the summer after graduating from dental school he also worked at a dental lab here in the city. This experience and training provided Dr. Williams with valuable insights into the inner workings of a dental lab and many of the problems and challenges they face when preparing models and prosthetics. This experience would later prove to be an invaluable aid to Dr. Williams in his transition over to CAD/CAM dentistry.

Upon graduating from Fairleigh Dickinson University of Dentistry in 1978, Dr. Williams landed his first job as an associate with Dr. William Hudson, who was a prosthodontist in Rockefeller Center. In addition to learning very valuable clinical skills, it also provided additional training and experience on the dental lab side as the practice employed two full-time lab technicians. When he wasn't busy on the clinical side, the technicians taught him how to do porcelain work, staining and glazing to name a few. These were skills you simply didn't learn in dental school. "There are not too many tricks in the laboratory business that I don't know," comments Dr. Williams. "I enjoy working with some very fine and talented technicians, but they know that I know."

Unlike many of his peers, Dr. Williams has also worked in a fee-for-service private practice. "I have always been in a private practice," says Dr. Williams. "I have never really worked in a hospital residency program or a clinic environment. From day one it has always been fee-for-service private practice, which has worked out very well for me." After completing two years with Dr. Hudson as an associate, Dr. Williams decided it was time to open his own practice.

Starting a new dental practice can be a daunting challenge, especially if you are opening one in New York City.


Consumer Research Council of America — Excellence Award


Dr. Williams has the unique privilege of being a member of The American Academy of Restorative Dentistry.

"In New York," confesses Dr. Williams, "it is very difficult to open a new practice and do construction in the beginning stages of your career. It is often more desirable to either cost-share space with another dentist or purchase a practice from one who is retiring." Fortunately, Dr. Williams had a secret weapon on his team whose sales experience with a leading office-product technology company would prove an invaluable aid to the practice — his wife, Debra. "In the beginning, my wife was very instrumental in getting nice contacts with major companies and getting patients from that," says Dr. Williams. From 1980 up to 1986, his practice continued to see steady growth. During that same year in 1986, Dr. Williams acquired a practice from a retired dentist and absorbed his patients, which resulted in dramatic growth for the practice. "With all this growth we suddenly had to put on another hat that was much bigger to wear called 'management,'" explains Dr. Williams. "In dentistry, it is 80% clinical and 20% management. And for many practices that management time doesn't happen during clinical hours, it happens after hours, on your train ride home or on weekends."

## THE JOURNEY TO CAD/CAM

Dr. Williams' journey to high-tech dentistry began with a single front-desk computer back in 1985. This single-user unit, which replaced the existing pegboard system, ran a simple scheduling and database program for managing appointments and patient information. "Suddenly, everybody always needed to be on the front desk computer because that was where all the data was stored," says Dr. Williams. "As the practice grew and expanded there came a growing need for a second data access point, so in 1987 a second computer was added to share front-desk operations and handle back-office functions including check writing and basic accounting.

"Our first real push at putting technology in the patient-visible arena was the intraoral camera, which we placed in the hygiene room," explains Dr. Williams. "We put it in the hygiene room because that's where patient education happens and much of it is 'show and tell.' It was so nice to have the advantage of taking an image of a tooth that had a crack in it or decay that was totally unperceived or unfelt by the patient and putting it on the screen where a picture is worth 1,000 words." Commenting on the advent and advantages of dental imaging technology, Dr. Williams adds, "I really admire some of the dentists of many years ago that just didn't have the advantage and ability to display what we can display to patients today. The perception years ago was that if the doctor said that it needed to be done, it needed to be done. They were at a tremendous disadvantage in that they had to rely on the BLT factor of believability, likeability and trust. On

Dr. Williams is shown here with a Beechcraft Model 58 Baron.

the other hand, I believe that the dentists of many years ago with the BLT factor had a stronger camp than some of the practices today because it is easier today to communicate to patients what needs to be done with the use of pictures."

Another venture for Dr. Williams that involved the pioneering use of dental technology came about 1989 and involved the use of cosmetic dental imaging. "We could take a picture of a patient's face and through computer manipulation do the 'before' and 'after' images of the dental procedure. This gave us a big push into cosmetic dentistry."

By this time the practice was operating with three computers: one for the front desk, one for back-office operations and one in the hygiene room. It didn't take long to realize a real need for a fourth computer in the treatment room. "So often I would be in my clinical treatment room where the dentistry was being done saying 'I wish I had another camera,'" says Dr. Williams. "So rather than jockeying the camera from room to room I purchased another one. I wanted to be able to show patients what we were doing for them, especially when we were very early pioneers in tooth-colored restorations. I have tried all of the esthetic materials out in the market. If it was tooth colored, we were doing it and trying it."

Portable dental tools used for emergency cases

Adding a computer and intraoral camera in his treatment

Dr. Williams is shown here consulting with a patient before a restoration procedure.

CEREC 3-D data acquisition unit

CEREC 3-D milling unit

room, Dr. Williams had the ability to provide visual documentation of a dental procedure for the patient. "We would take a picture of the tooth before we started, we would take another picture once the filling was removed and a third picture once all the decay was removed to show what was left of the tooth. The last picture we took would be the final result. This allowed the patient to see the transition of the before, after and in-between steps. This tool provided us with great documentation if ever a patient called regarding prolonged sensitivity. I could refer to my digital X-rays and intraoral photos taken the day the service was provided. I could see if it was a deep filling and if I had to base it out to protect the nerve, which might help explain why the patient is experiencing sensitivity."

(Left) Milled zirconium restoration after milling (Right) Restoration after sintering

Sirona inEos stand-alone scanner

It wasn't long before Dr. Williams added another intraoral camera and computer in his second treatment room. "When we put our third computer in the clinical arena in operatory two, it was the advent of digital capture technology through a software program called Vipersoft. Once we got into the Vipersoft program with the digital capture capability, it paved the way for us to transition from printing out all our intraoral camera images to storing them as digital files on the computer. Unfortunately,

A digital photo is taken of the patient's upper and lower teeth using a mirror for presentation and consultation.

with that innovation we had to change our format to add an additional computer as a file server. Now we were fully geared up with a front-desk computer, back-office computer, hygiene-room computer and one in each of the two operatories."

"Our next leap forward in technology was digital X-rays," says Dr. Williams. "The first digital X-ray system that I took a serious look at was Dexis. I went with Dexis over Schick because they used a PCMCIA card reader and I knew that I could easily integrate those readers into my existing computers. At this time, if you wanted to get into digital X-rays with Dexis they gave you a laptop computer and X-ray sensor. Well, I didn't need the laptop computer so I asked Dexis if the system could be networked. They (Dexis) said they weren't quite sure and they had to contact the engineer in Germany that developed the technology. The engineer got back to them and said that the system could be networked. Well, guess who got involved in beta testing their network version ... you're looking at him. I was coming in extra early in the morning and staying late at night to contact the engineer to sort things out. It took about a month of going back and forth with him and uploading patch files before it started working. We were probably one of the first practices in the country that was using this technology in a network.

"After the great 'wow' factor we got from digital X-rays, our next step was digital photography," remembers Dr. Williams. "Instead of using video capture for creating 'before' and 'after' cosmetic dentistry images, I could now use high-resolution digital photos to create more photorealistic results."

## THE ARRIVAL OF CAD/CAM DENTISTRY

CAD/CAM dentistry, like any new dental technology, has a learning curve. For some dentists this curve can be pretty steep. In addition to learning the computer three-dimensional software, the dentist must learn how to calibrate the milling unit and how to finish and bond the restoration. With a solid background in dental laboratory procedures and years of experience implementing and integrating computers into his practice, it is hard to imagine few dentists who are better qualified than Dr. Williams to comment on the benefits and challenges of CAD/CAM dentistry.

"My background in the dental laboratory really prepared me for our next step forward in dental technology, which was CAD/CAM dentistry," says Dr. Williams. "I spent two years looking at this technology before I got my first CAD/CAM system, which was CEREC 3. It was a two-dimensional system that used vectoring technology to display a wire-frame image of the restoration. Conceptually, it was a little difficult to understand, but I did this for six months until they came out with the CEREC 3D. I was already familiar with CAD/CAM milling machines that were used in the dental laboratories, so I knew there had to be a good cost-to-benefit ratio for the labs to be using them. This also played a key factor in my putting this technology in the practice.

"When it comes to CAD/CAM dentistry, if you know the laboratory side of the equation it is going to help you on the clinical side," explains Dr. Williams. "If you understand what the lab technician has to do in the laboratory to get you the results you are looking for, you will better understand what you have to do on the clinical

Dr. Williams and staff

side to make it all happen. This is especially true when it comes to CAD/CAM dentistry. When you become a CAD/CAM dentist you have to be a lot more careful in managing tooth preparation as it relates to gum tissue. If you have a previous restoration that is buried far below the gum line you really are going to be hard pressed to get an accurate digital capture because of the bleeding. It teaches you to be more careful and conservative in prepping the tooth because you have to start thinking like the computer — what does it want to see. That only comes at the hands of time and experience."

Commenting on the challenges of CAD/CAM dentistry Dr. Williams adds, "In using CAD/CAM dentistry, you really have to be a wizard at gum control, bleeding management and moisture control. You have to have the patience of a saint to properly execute it. You have to remember that on the laboratory side there are no blood or moisture issues. It is completely different on the clinical side where the restoration can be contaminated with blood or moisture that can later fall out. On the other side of the equation, CAD/CAM dentistry calls you to be a laboratory technician as well as a dentist who helps improve the way you work with labs." ■

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**Training**

Springfield College, Springfield, MA, 1970-1973 B.S.
Fairleigh Dickerson University of Dentistry, Hackensack, NJ, 1974-1978, D.M.D.
Graduate of the Dale Carnegie Institute, 1995

**Technology**

Dexis digital X-rays — digital X-rays
Dentrix Clarity — video imaging program
Kavo-Diagnodent — caries detector
Sirona — laboratory CAD/CAM milling system
Sirona CEREC 3D — CAD/CAM milling system
Tekscan — dental occlusal analysis system
Velscope — oral cancer screening system
Cynovad-ShadeScan — shade matching system
Premier Diode Laser — soft-tissue laser
Vident Vita Easy Shade — shade measuring system
Canon 5D EOS — 35mm digital camera
BRS DOM — dental office management software