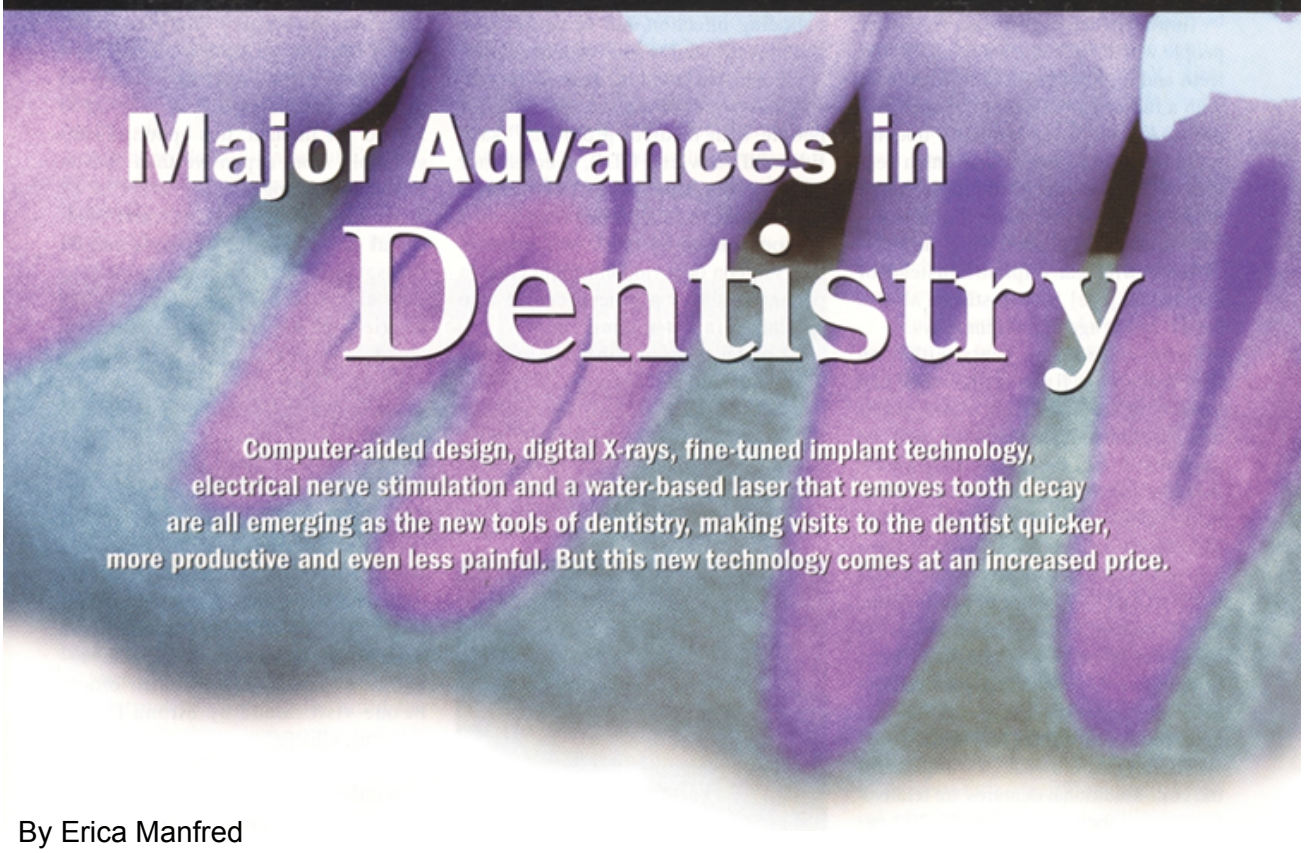

Major Advances in Dentistry

Computer-aided design, digital X-rays, fine-tuned implant technology, electrical nerve stimulation and a water-based laser that removes tooth decay are all emerging as the new tools of dentistry, making visits to the dentist quicker, more productive and even less painful. But this new technology comes at an increased price.

By Erica Manfred

Anyone who has watched the reality-TV shows "Extreme Makeover" or "The Swan" has witnessed some of the miracles of modern dentistry. It's now possible to go into the dentist's office toothless and come out with a full set of permanent teeth. You can view digital images of your teeth the instant they're captured by the Xray machine, or have a tooth crowned in a single visit. And thanks to a dental laser that uses energized water, it won't be long before you'll be able to have cavities filled painlessly.

All of this is happening so fast that what couldn't be done during your last checkup might be possible when you return 6 months to a year later. When it comes to dentistry, the term "space-age technology" is literally true. For instance, one of the adhesives used by NASA on the exterior of the space shuttle is now being applied as a dental bonding material to make repairs that used to be impossible.

These advances come with a high price tag, however. Unless you're chosen to be a contestant on a makeover show, you may not be able to afford high-tech dentistry, and most dental-insurance plans don't cover it. But it may be worth arranging long-term financing for some procedures if the result allows you to eat comfortably or obtain relief from pain caused by temporomandibular joint disorder (TMJ).

Inside Track on Implants. "Many people still [think] that implants are experimental or only for the rich," says Michael C. Alfano, DMD, PhD, dean of New York University's Dental School. "But what was a marginal technology 15 years ago has now moved into the mainstream. We are teaching our dental students how to do implants."

Dental implants are 1/2- to 3/4-in. metal posts that are inserted into the jawbone, serving as replacement roots for missing teeth. They are made of medically pure titanium, the same metal used for hip, knee and other orthopedic replacements. The replacement teeth that are screwed or snapped onto the implants are made of acrylic or porcelain and look, feel and function like natural teeth. "The jawbone fuses to the implant during what's called *osseointegration,* creating anchors for new prosthetic teeth. Implants can be used to replace a single tooth or to anchor an entire arch of bridgework," explains Thomas Balshi, DDS, in his book "A Patient's Guide to Dental Implants."

Implants have enormous benefits over other types of restorations. For example, when a single tooth is missing, the conventional treatment is a three-unit bridge. However, that entails *filing* or *cutting down* adjacent healthy teeth so that the bulky crowns fit over them. Because they're connected, the crowned teeth can't be cleaned as effectively as other teeth (you can't floss between them) and may decay over time. (A single tooth implant costs about the same as a three-unit bridge.)

In addition, implants last a lifetime, whereas if you lose a bridge and the teeth that support it, you've lost both permanently. If a replacement tooth cracks, the implant can still be used for a new tooth or bridge.

"[But] implants were once controversial, [too]. We got into neuromuscular dentistry because we know that fixing someone's bite can get rid of a lifetime of pain."

Pain Free "Drilling" with Lasers. Heat and vibration cause most of the pain associated with drills. But now lasers, the treatment of choice for eye surgery, dermatology and many general surgical procedures, are the new hope for painless dentistry.

> "[Lasers are] great for the patient because there's no shot. There's no vibration, which is perceived as less painful. [And they're] incredible accurate."
> -New York City dentist Elisa Mello

There are different types of dental lasers-diode and carbon dioxide, for example-that can be used only for soft tissues such as gums. However, the most advanced laser, the Waterlase, can also be used for hard tissue. The Waterlase works by emitting laser energy into a very fine spray of atomized water capable of cutting a wide range of human tissue, including enamel, bone and cartilage. Novocaine isn't necessary, sparing patients the pain of the injection and the extended feeling of numbness afterward.

Lasers do a very precise job of removing decay, preserving more of the healthy tooth structure than conventional drills. The Waterlase performs numerous soft-tissue procedures with little or no bleeding, giving general dentists a tool for many procedures that previously would have required referral to a periodontist.

Dental lasers aren't prone to many common problems of metal drills, including cracks in the teeth from the vibration and high speed. Also, lasers decontaminate as they cut, reducing the chance for bacterial infection. A restoration is likely to last longer if prepared with a laser, according to Chris Kammer, DDS, founding member of the American Academy of Cosmetic Dentistry.

Lynda Matos, who had her cavities lasered at New York City Smile Design, says, "It was just a slight warm sensation, not harsh at all. The healing process was a lot quicker."

Although lasers are now preferred for gum recontouring and soft-tissue periodontal surgery, their effectiveness is limited when it comes to cavities. They can only be used on the top surface of teeth on areas that can be easily seen-not between teeth, which makes them most effective for smaller cavities.

An even bigger issue is the high cost of the equipment. The Waterlase costs $70,000; other dental lasers are similarly priced. Dentists don't buy the equipment outright-they lease it-but that cost, too, is passed along to the consumer. Bill Brown, marketing director for Biolase, maker of the Waterlase, says only 4,000 of the 160,000 general dentists in the United States have lasers.

Pediatric dentists have been early adopters of lasers because children are so afraid of the drill and tend to have smaller cavities. Dentists who use it regularly quickly grow to appreciate its advantages. "It's great for the patient because it means no shot," says New York City dentist Elisa Mello. "There's no vibration, which is perceived as less painful. [And] it's incredibly accurate, as it allows you to pinpoint the area you are working on."

Digital X-Rays Make Inroads. The days when dentists tacked X-ray film on a light box to show you a cavity (which looked more like a tiny shadow) are quickly passing. Dentists are digitizing X-ray technology. You still need to wear a lead apron and bite down on sensors, but you're exposed to only 10 percent to 20 percent of the radiation you'd get from traditional X-rays and you can see cavities enlarged up to 300 times.

Digital sensors are connected to a digital X-ray machine hooked up to a computer. In the past, the dentist developed the film; now an X-ray beam activates the sensor and shows the image immediately on a computer monitor. The dentist can manipulate the image in a variety of ways, such as increasing the size and contrast, which makes it easier to detect problems.

Digital imaging improves dental recordkeeping, since the patient's chart can be stored on the computer with the X-rays. Eventually, dentists will be able to e-mail the digital images to insurance companies along with claims.

On the downside, digital sensors are thicker and more uncomfortable to bite down on than film sensors. Sensors cost about $4,000 apiece. X-ray films come in three sizes, so to get all three sizes, a dentist has to purchase three sensors. Over time, though, digital sensors are more economical because they eliminate the need to buy film.

And even better imaging is on the horizon. Titus Schleyer, DMD, Ph.D., director of the Center for Dental Informatics at the University of Pittsburgh School of Dental Medicine, is hoping dentists will soon be able to use digital imaging to detect cavities earlier. Schleyer says new imaging technologies will allow dentists to image areas in 3D, resulting in more accurate diagnoses.

"Sensors are also improving," he says. "Eventually we'll be using phosphor storage plates, which use a scanner instead of a developer. They're the same dimension and size as a film plate and will feel more comfortable."

These new technologies can make going to the dentist a little easier. We strongly encourage you to talk to your dentist about them. If he/she doesn't use them, it might be worthwhile to seek another dentist who does. ■

Erica Manfred has written about health and medicine for a variety of consumer magazines, including Cosmopolitan, Ladies Home Journal, New Age Journal and Parenting.

Consumers Digest November/December 2005 pgs 23-26