Carries removal and esthetic direct composite restorations

By Ian Shuman, DDS, MAGD

When treating a carious lesion, it is critical to identify and remove only infected tooth structure, avoiding the needless removal of healthy tissue. Past techniques were unreliable for the sole removal of diseased tissue; however, current advances have improved both the recognition of what is considered active caries and those methods for its elimination.

Research conducted at Temple University has verified that a new instrument made from a unique polymer resin technology is able to remove decay, and unlike carbides and other burs, is the only rotary cutting instrument that is incapable of cutting healthy tissue. The Smartburs II works because it is harder than decay, but not as hard as healthy dentin.

Mode of operation

The Smartburs II uses an extraordinary concept in blade configuration and material structure, allowing it to remove carious dentin only, and rendering it incapable of cutting healthy dentinal tissue. By eliminating contact with the dentinal tubules, pain is virtually eliminated.

During the removal process, patients have reported only a feeling of pressure, thereby eliminating the need for anesthesia. This improvement in clinical efficiency translates into savings of both time and cost and an increase in patient referrals.

In cases where the lesion is deep and anesthesia is required, pulp exposure can be greatly reduced, providing safer, more comfortable and effective treatment; making

BEFORE

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AFTER

The 28 newly accredited dentists and laboratory technicians are the most passionate and committed dental professionals. Those who have achieved accreditation have improved their skills, acquired new techniques and can provide their patients with better care and services.

“They understand that a smile is more than just an anatomical part, it’s an expression of who their patients are,” Olson added.

The 28 newly accredited dental professionals will receive their recognition and award at a special ceremony during the 27th Annual AACD Scientific Session, to be held May 18–21 in Boston.

For more information about AACD accreditation, visit www.AACD.com/accreditation.

About the AACD

The AACD is the world’s largest non-profit member organization dedicated to advancing excellence in comprehensive oral care that combines art and science to optimally improve dental health, esthetics and function.

Composed of more than 6,500 cosmetic dental professionals in 70 countries worldwide, the AACD fulfills its mission by offering superior educational opportunities, promoting and supporting a respected accreditation credential, serving as a user-friendly and inviting forum for the creative exchange of knowledge and ideas, and providing accurate and useful information to the public and the profession.
patient outcome — especially in deep preparations — more predictable.

Removing decayed dentin with Smartburs II

Step 1: In order to use the Smartburs II properly, an operating range of 5,000–10,000 rpm in a standard slow speed is ideal and increases the longevity of the bur. In addition, a light brushstroke is used during operation, essentially teasing out the carious tissue.

This is a significant departure from previous techniques using traditional carbide and diamond burs.

Step 2: When treating a carious lesion, it is critical that sharp and ragged enamel edges be removed with an appropriate high-speed bur before introducing the Smartburs II to avoid dulling the instrument.

The Smartburs II is then introduced into the center of the lesion. This helps to avoid unnecessary initial contact with healthy enamel and dentin that could prematurely dull the bur.

Step 3: Starting in the center of the lesion, the most superficial, softest decay is removed using the largest size Smartburs II. The next smaller size Smartburs II is then worked laterally, removing layer by layer throughout the lesion, finally cleaning the entire cavity floor.

The removal of caries to the cavity floor in one area only will prematurely dull the instrument and make caries removal in adjacent areas more difficult.

It is important to emphasize that contact of Smartburs II with hard enamel, healthy dentin or restorative materials will result in dulling and premature failure of Smartburs II.

Step 4: The last action with the Smartburs II is to clean the cavity floor with more forceful strokes. Here you will have increased tactile sense when encountering decay versus using standard carbide burs.

This enables the conservation of healthy tissue when the self-limiting action of the Smartburs II instrument is experienced. After using the Smartburs II instrument, a careful examination of the area is required to confirm complete decay removal.

Case report

A patient reported with the chief complaint of having cavities in his upper front teeth (Fig. 1a). He reported no discomfort, but was self-conscious about his appearance.

Upon examination, the maxillary anterior teeth were diagnosed with both Class V and Class III carious lesions.

A treatment plan was formed that would include the restoration of these teeth using a direct composite resin technique with the possibility of root canal therapy where required.

Following the administration of local anesthesia, the cavity preparation for the maxillary right cen-

Fig 2: The tissue was retracted and all ragged and sharp enamel edges were removed.

Fig 3: A #6 Smartburs II instrument was used to begin gross caries removal.

Fig 4: The preparation with the bulk of various dentin now removed.

Fig 5: Complete removal of remaining infected tooth material was accomplished with a #4 Smartburs II instrument.

Fig 6: The completed preparation.

Fig 7: The completed Class V direct resin restoration.
New option for missing teeth

INDUSTRY NEWS

For many years, people with chronic dental problems or missing teeth had limited options. They could continue with the endless cycle and expense of root canals, crowns and other restorations; live with the chewing, speaking and comfort problems often associated with dentures; or pay the extremely high costs of dental implants.

Now Drs. Andrew Spector and Michael Migdal, practitioners in Havertown, N.J., who have long been at the forefront of dental implant technology, are one of a relative handful of dentists throughout the country (and the only ones in the New York metropolitan area) to offer patients the benefits of “permanent teeth” at about half to one-third the cost of implants, and in a fraction of the time.

Hybridge™ — a hybrid bridge system — is a mix between a conventional fixed bridge and a denture. Unlike a conventional bridge made of metal and porcelain, the system uses a resin and titanium bridge restoration that replaces up to 12 teeth and is supported on five or six dental implants. It is not intended for people requiring single tooth implants, but rather sectional or complete restoration that replaces up to 12 teeth.

This instrument was used until the size of the bur head could no longer access smaller areas for effective caries removal (Fig. 4). This was followed by complete removal of the remaining infected tooth material with a #4 Smarburbs II instrument (Fig. 5). In order to achieve a harmonious, seamless and esthetic transition at the marginal interface, a beveled chamfer was created using an 868-024 flame-shaped coarse-diamond (SS White) (Fig. 6).

In class V composite cavity preparations, bevels have been shown to enhance retention, decrease micro-leakage and improve esthetics. To maximize the amount of light diffusion and the final esthetic outcome, a wavy striation pattern was created.

Following total acid etching and the application of a primer/bonding agent (Optibond, Kerr), composite resin was applied. A thin layer of flowable composite resin in shade A3.5 was placed along the cervical margin and light cured. It has been reported that the application of a thin layer of flowable composite at the cervical margin enhances the marginal adaptation of the restoration.

An initial base layer of medium-flow shade A3.5 composite resin was then placed along the pulpal floor as a complete dentin substitute and light cured.

The restoration was completed with a micro-hybrid enamel shade composite (shade A2) and white tint to mimic calcification patterns (Fig. 7). Studies have shown that the use of micro-particle size composites demonstrates lower polymerization contraction stresses and a decrease in marginal leakage when compared to hybrid composites.

The remaining Class V and Class III carious lesions were prepared (Fig. 8) and restored (Fig. 9).

At the next appointment one week later, the patient was seen for continued treatment.

The gingival margins demonstrated significant improvement owing to the corrected emergence profiles (Fig. 10).

Meanwhile, removable dentures can slip, cause embarrassing clicking sounds and lead to bone loss around teeth they are hooked onto.

“The efficiency and precision of the fabrication with the Hybridge system allows us to keep the fee far lower than traditional implant treatment for those patients who need to replace an entire upper or lower archway,” said Spector, who has been at the forefront of dental implants for many years and taught implantology at NYU Dental School.

“While dental implants remain the ‘gold standard’ for patients replacing single teeth, the cost makes them prohibitive for many who require full mouth or arch restoration, as many older people do.”

Patients for the Hybridge system tend to be older, according to the American Association of Oral and Maxillofacial Surgeons, and by age 74 more than one in four American adults have lost all their permanent teeth.

Yet, Spector said that he has also recommended Hybridge for patients who have lost their teeth as a result of early periodontal disease, traumatic injuries and eating disorders, such as bulimia, which cause tooth decay.