

Air Polishing: Winning the War on Biofilm A Critical Tool for Implant Maintenance

BY DR. ALAN EDEL

BIOFILM IS LOCATED EVERYWHERE in our mouths and is difficult to remove in some of the most important areas, such as around implants, under restorative margins, and in periodontal pockets. The traditional mechanical method for polishing teeth, using a handpiece and rubber cup with polishing paste, has been superseded by the air polishing technique, which is more effective and efficient at removing extrinsic stain and plaque biofilm and also offers many other advantages. One of the most important advantages is that air polishing provides effective removal of bacteria and inhibits plaque formation. For patients with implants, air polishing is arguably the best treatment option.

Deldent's JetPolisher 2000™ air polisher has been cleared by the FDA for use around implants, the only air polisher with this qualification. With the increase in implant placements, the potential for use of air polishing in regular implant maintenance and treatment of peri-implant mucositis and peri-implantitis may be the most important reason to include air polishing in a practice's clinical arsenal. Air polishing provides significant benefits

over traditional techniques using specialized ultrasonic inserts and hand instrumentation. Air polishing is accomplished by generating and propelling an air laden spray of abrasive particles and water through a handpiece nozzle. This is directed against the tooth surface, thereby removing stain and dental plaque by erosion. (FIG. 1 and 2)

DELIDENT JETPOLISHER 2000™

Air polishing unit features the patented H.S.T. Technology, which eliminates nozzle clogging, produces a gentler yet more efficient cleaning action than other air polishers, and causes no damage to implants. No electrical connection is required making these units conveniently mobile.



FIG. 1
Before



FIG. 2
After

ABRASIVE PARTICLES

The most common air polishing abrasive particle is a special food grade Sodium Bicarbonate which is carefully graded and has additives to enhance free flowing and flavor. Particle size is carefully graded to be between 60-80 microns. Sodium bicarbonate having a Mohs hardness number of 2.5 is far less abrasive than pumice, the standard particle used in prophylaxis paste, which has a value of 6. Recently, other air polishing powders have been introduced. These include Glycine, Calcium carbonate, Calcium sodium phosphosilicate and Aluminum trihydroxide.

Glycine, an amino acid, is a very mild abrasive with a Mohs hardness of 2. When used for air polishing, the particles are 20 μm in size. In Europe specifically, glycine powder has been recommended with a special device for use subgingivally. Other researchers claim that no air powder polishing agent should ever be directed subgingivally, to avoid a possible facial emphysema or air embolism¹. Although both sodium bicarbonate and glycine can cause mild transient soft tissue damage, this has been shown to be of little clinical significance. Calcium carbonate is a naturally occurring substance with a Mohs hardness of 3, while calcium sodium phosphosilicate, which is a bioactive glass, has a Mohs hardness of 6, making it the hardest air polishing particle. Aluminum trihydroxide powder has a Mohs hardness of 4 and the particles are 80 – 300 micron in size. It is contraindicated for use on dentin, cementum, amalgam, gold, composites, glass ionomers, and implants.

ADVANTAGES OF AIR POLISHING

Air polishing offers significant advantages over other techniques for patients with hypersensitivity or implants and for plaque removal. In addition to efficiency and time saving, air polishing with sodium bicarbonate creates less discomfort for patients with hypersensitivity, as the sodium bicarbonate particles embed in the dentinal tubules, occluding them, thus lessening dentinal hypersensitivity during treatment.

Endotoxins and bacteria are removed efficiently with air polishing, and this can subsequently promote the growth of fibroblasts on previously infected surfaces.

Air polishing removes plaque from pits and fissures, thereby increasing the area available for sealants and bonding procedures and has been shown to increase the retention of these materials. In addition, unlike many prophylaxis pastes that contain glycerin, or pumice which is insoluble and can interfere with the bonding procedures, air polishing leaves no residue. Research has determined that air polishing causes little or no disruption of enamel, cementum, and dentin. It also produces smoother cementum than traditional polishing or the use of curettes.

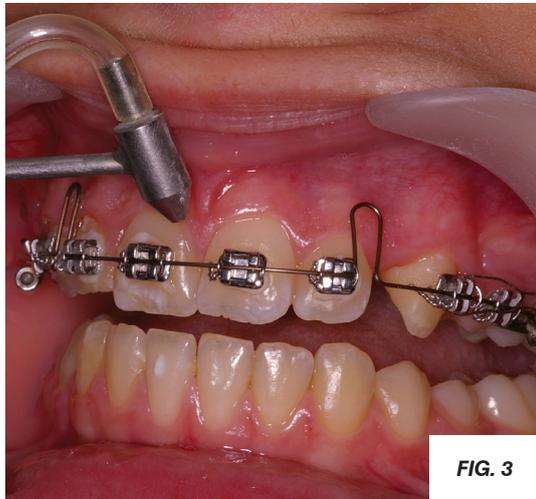


FIG. 3

Air polishing is also ideal for removing dental plaque and stain around orthodontically bracketed and banded teeth. (FIG. 3)

One of the most exciting aspects of air polishing is its potential for use in regular implant maintenance and treatment of peri-implantitis. Deldent Ltd. has been at the forefront of the technology that allows for the safe and effective use on and around titanium implants. The Deldent JetPolisher 2000™ and Deldent JetSonic 2000™ combination scaler/polisher are the only air polisher options available for use on implants, and **the only ones cleared by the FDA for use around implants.**

DELIVERY SYSTEMS

There are two basic types of air polishing units: stand-alone and those that attach to hand-piece tubings. Stand-alone units require compressed air and water lines and also require an electric outlet. They have a dedicated foot control. They cannot be conveniently moved from one work station to another. Handpiece-connecting air polisher units attach to the hand-piece tubing of the dental unit, and using the existing foot control, obtain air and water from the handpiece lines. No electrical connection is required. This makes these units conveniently mobile.

In almost all air polishing systems, there are separate nozzles for water and air-powder streams, designed to keep the hygroscopic particles of sodium bicarbonate separated from the water stream. The two streams mix only on the tooth surface. The Deldent air polisher is unlike any other system currently available. Deldent Ltd. patented a unique system - The H.S.T polishing system. This unique technology pre-mixes the sodium bicarbonate laden air stream together with water within the spray head to produce an homogenous air, powder and water stream that is emitted from a single nozzle.

The H.S.T. system provides several advantages over other air polishing systems:

1. Nozzle clogging is virtually eliminated in this one nozzle system by preventing the build up of anhydrous sodium bicarbonate that occurs in the air/powder nozzle orifice of units with separate nozzle systems.
2. It produces a more efficient polishing stream so that only 35 psi of air pressure is needed, providing a safer procedure.
3. Softening of the surface of the abrasive particles begins within the spray head and produces a less aggressive yet more efficient cleaning action than other air polishing systems.
4. **This system has been shown to cause no damage to titanium implant surfaces² and is widely used by leading clinicians as part of routine implant maintenance.** The JetPolisher 2000™ can effectively be used for non-surgical treatment of peri-implant mucositis and peri-implantitis. (FIG. 4 and 5)



FIG. 4
Before



FIG. 5
After

The Deldent JetPolisher 2000™ and the Deldent JetSonic 2000™ are critical tools to include in the dental office for both fast and effective routine removal of stains and bio-film from all surfaces and the safe maintenance and treatment of implants. With their patented H.S.T. technology, the JetPolisher 2000™ and JetSonic 2000™ are the only air polishers cleared by the FDA for use around titanium implants, making them the only safe and effective options for using air polishing with patients with implants.

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trained at the University of Birmingham (UK) and achieved a Masters in Periodontology at the University of London. He has been in private practice limited to periodontics since 1972 and is a pioneer in the area of connective tissue grafting for mucogingival surgery. Dr. Edel is a past president of the Israel Society of periodontology and, until recently, a member and examiner in periodontology of the Israel Dental Association Scientific Council.



REFERENCES:

1. Barnes, CM. "An In Depth Look at Air Polishing", *Dimensions of Dental Hygiene*, 2010; 8(3): 32, 34-36, 40.
2. Barnes, CM; Fleming, LS; Mueninghoff, LA. "SEM Evaluation of the In-vitro Effects of an Air Abrasive System on Various Implant Surfaces", *International Journal of Oral and Maxillofacial Implants*, 1991; 6:463-469.