Air Polishing

mCME articles in Dental Tribune have been approved by HAAD as having educational content for CME credit hours. This article has been approved for 2 CME credit hours.

By Salim Rayman, RDH, MPA, and Elvis Dincer, DDS

The concept of air-polishing units is based on a technology developed by Dr. Robert Black in 1945. Black invented a device called the Air Dent, which used compressed air, water and a high-velocity stream of air to remove tiny particles from the tooth surface. The Air Dent proved to be efficient, safe and effective in removing extrinsic stains from the enamel surfaces of the teeth. It was capable of being used by all types of care providers in both office and home environments.

While the Air Dent presented many problems, the technology represented the first step in air-polishing devices. Air-polishing units were first introduced in 1976, and from that time forward it became widely available. Air-polishing units can be accomplished by the use of particles of various substances through a mouthpiece or catheter. The use of a dental handpiece allows the operator to place the particle against the tooth surface either directly or through a handpiece nozzle.

The use of extrinsic stains by suspended abrasive particles against the tooth surface improves the effectiveness of stain removal (Figs. 1, 2, 3).

Air-powder polisher:

Air-powder polisher is manufactured as separate handpiece units that attach directly to the air/water contact tips of the dental unit or in combination with an ultrasonic scaler.

Indications for use:

Coronal polishing is a cosmetic procedure designed to remove extrinsic stains from the enamel surfaces of the teeth. It can be used to remove abrasion and erosion of the enamel surfaces.

The most common technique for removal is rubber cup polishing. This technique uses an abrasion polishing agent and a slowly revolving abrasive polishing agent against the tooth surface. Air-powder polishing is accomplished by erosion of extrinsic stains by suspended abrasive particles.

Kinetic energy propels the air-powder polishing mixture against the tooth surface, thus removing stain (Figs. 1, 2).

The air-powder polishing device is shown to be effective, safe and effective in removing extrinsic stain and plaque biofilm from tooth surfaces. It is equally effective in decreasing root surface roughness after instrumentation. It is also reported to remove plaque, biofilm and staining as effectively as a rubber cup and does so in less time.

Patients often exhibit extensive stain and plaque biofilm on the enamel surfaces of the teeth. These areas are typically the most difficult to clean. Air-polishing units are capable of reaching difficult-to-clean areas of the mouth with the use of air-powder polisher.

The air-powder polishing unit is shown to be effective, safe and effective in removing extrinsic stain and plaque biofilm from tooth surfaces. It is equally effective in decreasing root surface roughness after instrumentation. It is also reported to remove plaque, biofilm and staining as effectively as a rubber cup and does so in less time.

Patients often exhibit extensive stain and plaque biofilm on the enamel surfaces of the teeth. These areas are typically the most difficult to clean. Air-polishing units are capable of reaching difficult-to-clean areas of the mouth with the use of air-powder polisher.

The air-powder polisher:

Air-powder polishing can render certain enamel surfaces more uniformly smooth, compared with traditional polishing or the use of curets.

The air-powder polisher can remove subgingival bacteria through the Venous effect. This occurs when the air/water spray contacts the tooth in a 90-degree angle to the interproximal spaces so that a vacuum is created, which extracts fluids, including subgingival bacteria from the subgingival space. The air-powder polisher has been used for debridement of Class V abraded areas before placement of glass ionomer cements.

When comparing dental units with a rubber-cup polisher, the air-powder polished teeth had less microlux. Around the enamel cement interface, similar results were noted when using the air-powder polisher before sealant application. It was reported to be superior to rubber-cup polishing in preparing enamel for sealing and sealing.

Deep resin penetration into enamel and increased sealant bond strength was also reported in comparison with traditional polishing with pumice and water. In addition, clinicians prefer using the air-powder polisher on orthodontic, and research has shown that it does not affect the bracket adhesive system.

Types of powder:

The most common type of abrasive particle used with the air-powder polisher is sodium bicarbonate, which is treated to be free-flowing with calcium phosphate and silica. Sodium bicarbonate is a food grade material, and each particle is approximately 74 microns in size. The Mohs’ scale hardness number for sodium bicarbonate is 2.5. In comparison, Pumice has a Mohs hardness number of 6.

Sodium bicarbonate is safe for use on enamel, amalgam, gold, porcelain, implants (titanium) and orthodontic materials. However, it should be avoided on all types of composites, glass ionomers and luting agents (cermetics). When used on implants with aluminum trihydroxide does not cause any adverse reactions with the implant. When used on porcelain margins and margins of porcelain restorations, aluminum trihydroxide has been documented to cause pitting of the porcelain.

Contraindications for using the air-powder polisher also include patients taking potassium, anti-diuretics or steroid therapy—all of which can disrupt the acid/base balance. Contraindications for use of the air-powder polisher also extend to the hard and soft tissues; therefore, the dental history assessment is paramount. Hard tissue that presents with any composite restorations, sealants or glass ionomers should be avoided because of susceptibility of those materials to surface roughness or pitting.

Porcelain margins and margins of all restorations can be altered by extrinsic stains. Therefore, it is extremely important to keep stain from the enamel surfaces of the teeth.

Prevention. When the unit’s hamber is filled with abrasive powder, the unit must be turned off. It needs to be filled with a powder that is appropriate for the tooth surface.

Aerosol-reduction device:

An aerosol-reduction device contains two separate handpiece units that attach directly to the air/water contact tips of the dental unit or in combination with an ultrasonic scaler.

Another advantage to the aerosol-reduction device is the possibility of tooth abrasion because the cap is placed over the mouthpiece, which is a significant factor in traditional polishing techniques. When using the aerosol-reduction device, the cap is placed over the mouthpiece, which is a significant factor in traditional polishing techniques.
Dental Tribune Middle East & Africa Edition | July - August 2013

Fig. 6 DENTSPLY Cavitron Jet Plus with Tap-On technology.

parts, a disposable cup that attaches to the air-powder polisher and a saliva ejector is attached to the saliva ejector or high volume evacuator (HVE).

The patient assessment process should include regular health assessment to identify and possibly rule out patients who have hypertension and/or are on a physician-directed, color-restricted diet.

Clinical technique

There is a universal air-powder polishing technique that can be used with all types of systems, however, manufacturers may have different instructions for use of their equipment. The recommended technique prevents undue aerosols from deflecting back to the clinician or being directed into the patient’s soft tissues. The use of high-speed evacuation or the saliva ejector is the most efficient way to control the aerosol spray. While positioning of the patient and operator are basically unchanged, direct vision and access becomes significantly important when the polisher is active.

Positioning the patient slightly up-right at 45 degrees with the patient’s head toward the operator to access areas—and reclining to treat maxillary surfaces—is the most efficient way to control the aerosol spray. Placing moistened 2-by-2-inch gauze squares over the tongue or on patient’s lip near the work area will help reduce burning and stinging experienced by some patients. The clinician has two compressions and halfway compression produces a stream of water for rinsing and cleaning the mouth. The autocycles work in short, medium or long settings (Fig. 7). Each cycle begins with a two-to-three second stream of water. The “short” autocycle is 0.75 seconds of air-powder polishing/rinse cycle. The “medium” autocycle is two seconds of air-powder polishing followed by a one-second rinse; and the “long” autocycle is three seconds of air powder polishing followed by a two-second rinse.

The manual cycle setting enables the clinician to flare the cup. The clinician will apply the disposable cup to the tooth surface, not the exposed soft tissues, which results in a decrease in disease parameters. Polishing root surfaces is possible with both the rubber-cup or airpowder polisher; however, the rationale for selecting the air-powder polisher is for its effectiveness and efficacy.

Conclusion

Therapeutic polishing is the removal of stains from the unexposed root surfaces, which results in a decrease in disease parameters. Polishing root surfaces is possible with both the rubber-cup or airpowder polisher; however, the rationale for selecting the air-powder polisher is for its effectiveness and efficacy.

The clinician should follow the precautions and considerations presented when polishing for therapeutic benefits with the air-powder polisher. The clinician should be aware to direct the air-powder spray against the tooth surface, not the exposed soft tissues. Most importantly the clinician must consider all options — esthetic, therapeutic and patient goals — when designing a treatment plan that meets the individual patient’s specific needs.