Abstract
This continuing education course provides a comprehensive review of air polishing. The initial portion of the course reviews the history of air polishing. The course includes a description of how air polishing removes dental stain and plaque and the clinical techniques used for air polishing, and the Mohs hardness number of abrasive particles. The course material includes the identification of medical conditions that exclude patients from being candidates for air polishing and a description of facial emphysemas and how they can be a sequela from use of an air polisher. Surfaces of teeth and the types of dental restorative materials that can be effectively treated with air polishing procedures are also identified.

Educational Objectives:
1. Identify the origins of air polishing.
2. Compare and contrast the advantages of air polishing.
3. Describe the symptoms of facial emphysema and identify the method for treatment.
4. Identify the clinical techniques that can be used to best control the inherent aerosol spray produced during air polishing.

Author Profile
Caren M. Barnes received her BS in Dental Hygiene in 1973 and her MS in Dental Hygiene Education and Research from UMKC School of Dentistry in 1974. She currently serves as a Professor and researcher at the University Of Nebraska Medical Center College Of Dentistry. Caren has conducted a wide range of research projects and serves as a research consultant and key opinion leader to many dental manufacturers in the US and Europe. Caren is regarded as an expert in airpolishing and traditional polishing both nationally and international-ally. Professor Barnes has over 175 publications and has received many prestigious honors. She can be reached at cbarnes@unmc.com.

Author Disclosure
Caren M. Barnes discloses that she has served as a key opinion leader and consultant to DENTSPLY. In addition she has participated in a number of research studies conducted on behalf of DENTSPLY.
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Abstract
This continuing education course provides a comprehensive review of air polishing. The initial portion of the course reviews the history of air polishing. The course includes a description of how air polishing removes dental stain and plaque and the clinical techniques used for air polishing, and the Mohs hardness number of abrasive particles. The course material includes the identification of medical conditions that exclude patients from being candidates for air polishing and a description of facial emphysemas and how they can be a sequela from use of an air polisher. Surfaces of teeth and the types of dental restorative materials that can be effectively treated with air polishing procedures are also identified.

Introduction
In June 2013, the American Dental Hygienists’ Association will formally celebrate the 100th anniversary of the dental hygiene profession. We will be celebrating a profession created by two individuals; Dr. Alfred C. Fones and Miss Irene Newman. In the first decade of the 1900s, Dr. Fones recognized that keeping teeth clean by removing plaque and calculus could actually aid in the prevention of dental diseases. This may seem like an extremely basic concept at this point in time, but it was a radical concept in the early twentieth century. He recognized that keeping patients’ teeth free from dental plaque and calculus build-up could help patients retain their teeth instead of succumbing to extractions. He put his beliefs into action and in 1906 Dr. Fones began to train the very first dental hygienist, Miss Irene Newman, so that she could provide oral prophylaxes for Dr. Fones’ patients. While Dr. Fones did not enjoy a groundswell of support from his dental colleagues initially, by 1913 Dr. Fones opened the Fones School of Dental Hygiene in Bridgeport, Connecticut.

As the dental profession celebrates such an important milestone this year, there will no doubt be a great deal of focus on the future and reflection on the past. The myriad of changes that have occurred regarding the central role that dental hygienists play in the prevention of oral diseases as well as providing therapeutic procedures that play a key role in healing and arresting oral diseases are truly amazing. In a short period of time, dental hygienists’ impact on the delivery of care has fundamentally changed the dental profession. At the same time, reflections will be made on how many things have not changed. Notably, the oral prophylaxis has remained fundamental to the preventive and therapeutic healthcare services that dental hygienists provide and to Dr. Fones’ vision. The very definition of the term, “oral prophylaxis” has remained basically unchanged. The American Dental Hygienists’ Association states that an oral prophylaxis should consist of “supragingival and subgingival removal of plaque, calculus, and stain.” The American Academy of Periodontology defines an oral prophylaxis as the “removal of plaque, calculus and stain from exposed and unexposed surfaces of the teeth by scaling and polishing as a preventive measure for the control of “local irritational factors.”

While the procedures that are fundamental to an oral prophylaxis (scaling and polishing), have not changed, there have been prodigious changes in the instruments and equipment dental professionals use to perform these procedures. The most significant areas of change in the armentarium for performing an oral prophylaxis involve the use of powered equipment. The first powered equipment that had an impact on the delivery of the oral prophylaxis was a belt driven motor for powering the slow-speed handpiece. Polishing of teeth to remove dental plaque and stain no longer had to be the laborious task it had been with the use of a porte polisher (see Figure 1). A much greater impact on scaling and polishing procedures occurred with the introduction of the ultrasonic scaler in 1957. Heavy, tenacious calculus and some heavy stains almost impossible to remove with hand scaling, could be accomplished in seconds or minutes rather than hours. Several decades passed before powered devices were available that had a major impact on dental hygiene practice.

Figure 1. A porte polisher. Prior to the advent of powered polishing equipment, teeth were polished by applying the polishing paste with the disposable wooden tip on the porte polisher. The polishing agent was applied with circular, vertical, diagonal or horizontal strokes.

The focus of this continuing education course is air polishing, also known as air powder polishing, which has been in existence long enough to receive widespread acceptance. Critical for the acceptance of air polishing is the requisite research necessary to establish scientific evidence
on which to base its use in oral prophylaxis polishing procedures. A significant body of knowledge exists for air polishing and it is now a mainstay in the oral prophylaxis armamentarium.

Air Polishing—The Invention

Like so many inventions, air polishing was borne out of an invention that had nothing to do with polishing teeth. On the contrary, air polishing was born out of an invention that was meant to use abrasives to cut cavity preparations in teeth.

In the early 1940’s, Dr. Robert Black, a dentist-inventor was in search of a technology that would allow dentists to provide “painless” dental treatment. Dr. Black was very sensitive to the fact that so many people went without dental treatment due to their fear of the pain and discomfort that was associated with dentistry. Dr. Black’s vision was to invent a method to cut cavity preparations that would be painless and not require the administration of anesthesia. He felt that if he succeeded at that, then dental treatment would be much more acceptable to society. What he devised and introduced in 1945 was the Air Dent, a very large cumbersome machine that utilized highly abrasive particles (dolomite, crushed walnut shells, and aluminum oxide) that were propelled under highly compressed air pressure combined with water.

Dr. Black revisited his invention in the late 1960’s and early 1970’s and focused on stain removal with the device. The abrasives he used for cutting cavity preparations with the Air Dent were much too abrasive for use as polishing agents. After trying numerous types of abrasives Dr. Black discovered that a specially processed sodium bicarbonate could be utilized to remove stain and plaque, and thus air polishing became a reality. There are a number of air polishing equipment manufacturers that are commercially available to dental professionals worldwide. Like any new innovation, it took time for air polishing to gain widespread acceptance. Dental hygienists and other clinicians had to learn the concepts behind air polishing and most importantly, the appropriate technique for use. It has been no coincidence that the dental providers who were the most accepting of air polishing were the ones that took the time to learn the correct techniques for use.

Air Polishing—The Science

It is more important than ever for dental professionals to understand the scientific principles related to polishing and the use of abrasive agents. Two examples that highlight the need for appropriate polishing procedures and products are (1) the unparalleled demand for esthetic restorations and (2) a burgeoning population of senior citizens with issues related to dentinal hypersensitivity and root exposure due to gingival recession.

The primary goal of dental polishing, regardless of method used, is removal of stain and/or dental plaque while preserving the enamel surface and preserving the surface characterization of dental restorations. From a material science perspective, polishing is intended to produce intentional, selective and controlled wear. Polishing used in dental procedures is accomplished by two types of wear; abrasion or erosion. Traditional polishing with a rubber cup and polishing paste is accomplished by abrasion; which is the process of creating finer and finer scratches with a series of finer and finer abrasives, until the microscopic scratches are smaller than the wavelength of visible light (<.05 µm), producing gloss and luster. Air polishing is accomplished by erosion, which is the recession of surfaces, in this case dental stain and plaque, by suspended abrasive particles within a moving fluid. Specifically, air polishing is accomplished by
the propulsion of abrasive particles through a mixture of compressed air and water through a handpiece nozzle. Kinetic energy propels the air polishing abrasive particles against the tooth surface, thus removing stain and/or dental plaque.

For any type of polishing the following factors determine the rate of abrasion: speed, pressure, quantity of abrasive applied, size of the abrasive particle, shape of abrasive particle and hardness of the abrasive particle.8-12 However it is the hardness of the abrasive particle and particle size that truly determines the stain removal capacity of the abrasive agent.13 The abrasive capacity of commercially prepared prophylaxis polishing pastes can only be identified by the manufacturer’s designation as fine, medium or coarse. It is interesting to note that there is no industry standard that determines the size, type or hardness of the agents in the commercially prepared prophylaxis polishing pastes.14 Likewise, there is no index to determine the abrasiveness of air polishing powders, although research is currently underway to create an air polishing abrasive index.15 Therefore, dental professionals must turn to the significant body of air polishing research on tooth structures and restorative materials to determine which air polishing powders are best suited for natural tooth surfaces and/or restorative materials. There are many widely used indices to indicate material hardness or resistance to indentation, among which are the Knoop Hardness Test, Vickers Hardness Test, Brinell Hardness Test and the Mohs Scale of Hardness. These indices provide at least some comparative information regarding abrasive potential of various abrasive agents utilized in prophylaxis polishing pastes and air polishing powders. For simplification, the Mohs hardness numbers will be used in this continuing education course. The Mohs Hardness Scale ranges from 1-10. On the Mohs Hardness Scale, talc has a Mohs number of 1, while diamonds have a number of 10. The Mohs hardness number for the hydroxyapatite for enamel ranges from 5.5-6. It is confusing because some references to the Mohs Hardness Scale indicate that tooth enamel has a Mohs hardness number of 6, which may not be an accurate representation of the hardness of enamel if the hardness number actually refers to the hydroxyapatite structure of enamel.

Air Polishing—Clinical Use

There are two basic types of air polishing delivery systems. The self-contained air polishing unit attaches to the compressed air and water lines of the dental unit and requires an electric outlet. An alternative type of air polisher attaches to the handpiece connection on the dental unit, obtaining the compressed air and water from the handpiece lines. No electrical connection is required for the handpiece connection type of unit. In general, self-contained units have a range of water pressure of 10-50 psi. The inlet air pressure from the dental unit is approximately 60 psi. The outlet air pressure, which is delivered out of the nozzle, is set between 58-60 psi.

While manufacturers of air polishing equipment may have instructions for use that are unique to their equipment, there is a universal air polishing technique that can be used with all air polishing systems (see Figures 2, 3, 4, 5). The nozzle of the air polishing unit should be kept 3-5 mm away from the surface being polished and the handpiece should be kept in a constant circular motion. With proper technique, the average tooth receives .5 seconds of exposure to the air-powder-water stream during air polishing procedures.

![Figure 3](image1.png) Illustration of the correct angulation for airpolishing posterior teeth.

![Figure 4](image2.png) Illustration of the correct angulation for airpolishing occlusal surfaces.
Figure 5. Illustration of the incorrect angulation of an airpolishing handpiece. The airpolishing spray should never be directed into soft tissues, into the gingival sulcus or a periodontal pocket, an extraction site or into an open oral wound.

The angulation for the handpiece nozzle to anterior teeth should be 60 degrees, while the angulation for the handpiece nozzle to posterior teeth should be 80 degrees. The only time the handpiece nozzle should be directed at a 90 degree angle is for polishing the occlusal surfaces of the teeth. The key to controlling the aerosol spray is use of the recommended angulations as well as the use of high-speed evacuation.

Standard infection control procedures are followed when using air polishing. Patients should be asked to remove their contact lenses and the use of protective eyewear is mandatory. Clinicians should wear a high filtration mask and a preprocedural rinse should be used to lower the microbial loads that will be in the inherent aerosols created during air polishing procedures.

The health history of patients should be carefully evaluated prior to using air polishing systems, including patients with a physician-directed sodium restricted diet or hypertension (if a specially processed sodium bicarbonate powder is to be used). Sodium free air polishing powders that are safe for use with patients on a sodium restricted diet are commercially available. However, research has indicated that the amount of sodium bicarbonate ingested during air polishing is not sufficient to cause elevated blood pressure, alkalosis in the blood stream or an increase in blood levels of sodium.

Additionally, use of air polishing should be avoided on patients with respiratory problems such as chronic obstructive pulmonary disease, or any other condition that interferes with the patient’s ability to breathe or swallow. Air polishing should not be utilized on patients that are immunocompromised, have a communicable infection, or are taking potassium anti-diuretics or steroid therapy. The use of air polishing should be avoided on patients with end-stage renal disease, or who have Addison’s disease or Cushing’s disease.

The air polishing handpiece nozzle should never be directed into or near a surgical wound site, traumatic lacerations, gingival sulcus or periodontal pocket, especially periodontal pockets with extensive bone loss. To do so would risk the creation of an iatrogenic facial emphysema, which is the entrapment of air into subcutaneous tissue spaces and can occur even in small areas open to subcutaneous tissues. Facial emphysemas associated with dental procedures usually result in facial swelling and the patient may experience a “crackling” sensation when the affected tissues of the head and neck area are touched. Additional symptoms may include tenderness and pain.

While the occurrence of facial emphysemas related to use of air polishing equipment is uncommon they must be recognized and treated. It is important to note that emergency medical personnel may not be familiar with them and they may be difficult to diagnose. If facial emphysemas are detected early, the patient will require observation, analgesia and antibiotic therapy, and are usually resolved within a few days. The sequelae that can develop from facial emphysemas can be life-threatening and can result in bilateral pneumothorax, cerebral air embolism, cervicofacial emphysema, facial emphysema, mediastinal emphysema, pneumomediastinum, pneumothorax and retropharyngeal emphysema.

Air Polishing—The Evidence

With over thirty years of experience and research on air polishing, there is a significant body of evidence behind the use of air polishing as well as a wealth of clinical experiences. Like any product or equipment, uninformed use or misuse can cause clinicians to blame the product or equipment for its failure to perform satisfactorily. The following is a list of information about air polishing that is supported by scientific evidence when using an air polishing powder with a Mohs hardness number of 3 or less:

- Air polishing removes stain and dental plaque in half the time it would take using traditional polishing, and stain can be removed 3.15 times faster than with a curette.
- Air polishing is less abrasive than prophylaxis polishing pastes (the Mohs hardness number for pumice, which is the primary ingredient in commercially prepared polishing pastes is 6).
- Air polishing is not painful if the air/water/powder stream is not directed at soft tissues.
- Any soft tissue trauma that may occur from air polishing usually dissipates within 24 hours.
- Air polishing can be safely used on titanium implants and is the method of choice for orthodontically banded
Air Polishing Powders
Dr. Black solved the manner in which the abrasive particles should be delivered for stain removal. It could be delivered with compressed air and water in a new device modeled after the Air Dent, but in a small unit that had an appropriate reduction in the air pressure which delivered the stream of abrasive particles without removal of tooth enamel. Dr. Black had previously identified abrasive agents that were too abrasive for use in stain removal. The issue that remained was the type of abrasive agent that could remove stain safely. Dr. Black had to identify an air polishing powder that would remove heavy tooth stains, yet leave surface enamel intact. The abrasive powder could not injure soft tissues or tooth structure in the oral cavity and had to be physiologically compatible with the digestive system as well. Furthermore, the abrasive particle could not become embedded as a foreign body in soft tissues of the oral cavity. After many trials, Dr. Black found the first acceptable air polishing powder that met all these criteria: specially processed sodium bicarbonate.

Sodium Bicarbonate
Dr. Black collaborated with a variety of scientists including chemists, pharmacists and engineers, and came up with the formula that has now become the “gold standard” for air polishing powders—specially processed sodium bicarbonate. The powder is free-flowing, food grade, contains calcium carbonate, and may contain scant amounts of silica as a flow aid. The Mohs hardness number for sodium bicarbonate is 2.5 and the particles average 74 µm in size.5, 37-45

Specially processed sodium bicarbonate for use in air polishing procedures is safe for use on enamel, amalgam, gold, porcelain, orthodontically banded and bracketed teeth and dental implants. Specially processed sodium bicarbonate should not be used on any type of composite or tooth-colored restoration.37-50

Aluminum Trihydroxide
In the early 2000’s, some dental hygienists called for an alternative to sodium bicarbonate air polishing powder due to the concern that the sodium bicarbonate powder could not be used on patients on a physician-directed sodium restricted diet, patients with chronic kidney disease and patients with hypertension. Aluminum trihydroxide air polishing powder was developed to address this issue. Aluminum trihydroxide is much more abrasive than sodium bicarbonate, with a Mohs hardness value of 2.5-3.51 and the particle size is 80-325 µm. Johnson et al investigated the effects of aluminum trihydroxide on restorative materials and results revealed that it is quite abrasive and should only be used on heavily stained enamel.52 The use of aluminum trihydroxide should be avoided on exposed cementum and dentin, composites, porcelain and gold restorations.

New Powders
In the past few years there have been several new air polishing powders available for use. Those include glycine, calcium carbonate, and calcium sodium phosphosilicate. While research on these air polishing powders is in progress there is insufficient evidence at this point to make recommendations as to which restorative materials can or cannot be treated with these air polishing powders. Until there is sufficient scientific evidence, it would be prudent to avoid the use of these air polishing powders on any restorative materials. Clinicians should be aware that usage of an air polishing powder that does not come with the unit, or one that is not recommended by the manufacturer, could void the warranty on the air polishing equipment.5

Glycine
Glycine is an amino acid used in powders. Glycine crystals are grown using a solvent of water and sodium salt. Glycine particles for use in air polishing have a Mohs hardness number of 2 and are 20 µm in size.52 Glycine is currently being investigated for subgingival use in Europe by Petersilka and Fleming.53-55 It is important to note that the subgingival application is not recommended with the air polishing handpiece and nozzles on currently available equipment. Subgingival application of air polishing in Europe is accomplished using a specially designed subgingival application tip.

Calcium Carbonate
Calcium carbonate is a naturally occurring substance that can be found in rocks. It is a main ingredient in antacids, and is also used as filler for pharmaceutical drugs. Calcium carbonate has a Mohs hardness of number of 3.

Calcium Sodium Phosphosilicate
The latest air polishing powder introduced to the market is calcium sodium phosphosilicate. Calcium sodium phosphosilicate is a bioactive glass and has a Mohs hardness number of 6, making it the hardest particle used in air polishing powders. The particles vary from 25-120µm in size. With a Mohs hardness number of 6, the abrasive potential for this product is too extreme for use on natural or restored surfaces until more research is conducted.56, 57

Air Polishing And Air Abrasion
Air polishing and air abrasion are not the same. Air abrasion uses greater air pressure and more abrasive particles and is intended for procedures such as removing decayed enamel and roughening enamel surfaces prior to bond-
ing. The standard abrasive particle used in air abrasion is aluminum oxide which has a Mohs hardness number of 9, which is four to five times more abrasive than air polishing agents.5

Conclusion
With over thirty years of use in the dental profession, air polishing has become a mainstay in the armamentarium for polishing. It has proven to be a significant labor-saving device, providing clinical results that would be difficult to achieve without its use. Improvements in air polishing equipment design, powder and particle technology and proper usage to maximize clinical efficacy and minimize unintended consequences have all contributed to the widespread acceptance of air polishing. There is a large body of research being conducted at the present time on air polishing and it will be exciting to follow the findings. As is the case with virtually every aspect of the dental profession, advances in knowledge lead to enhancements in the manner in which we take care of our patients. It is likely that there will be many new developments that will enhance the use and efficacy of air polishing in the very near future.

References
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Author Profile
Caren M. Barnes received her BS in Dental Hygiene in 1973 and her MS in Dental Hygiene Education and Research from UMKC School of Dentistry in 1974. She currently serves as a Professor and researcher at the University Of Nebraska Medical Center College Of Dentistry. Caren has conducted a wide range of research projects and serves as a research consultant and key opinion leader to many dental manufacturers in the US and Europe. Caren is regarded as an expert in airpolishing and traditional polishing both nationally and internationally. Professor Barnes has over 175 publications and has received many prestigious honors.

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Questions

1. Air polishing removes dental stain and plaque by which one of the following actions?
   a. Abrasion
   b. Controlled wear
c. Erosion
d. Attrition

2. Which one of the following is not a symptom related to facial emphysema?
   a. Tenderness
   b. Internal Bleeding
c. Pain
d. Swelling

3. Which one of the following air polishing powders is considered the “gold standard” for air polishing powders?
   a. Calcium carbonate
   b. Calcium sodium phosphosilicate
c. Sodium bicarbonate
da. Aluminum Trihydroxide

4. Which one of the following angles is universally recommended for removing stain and plaque from posterior teeth?
   a. 60 degrees
   b. 70 degrees
c. 80 degrees
da. 90 degrees

5. When polishing with an air polisher, how far should the nozzle of the handpiece be kept from the surface being polished?
   a. 1-2 mm
   b. 2-3 mm
c. 3-4 mm
da. 3-5 mm

6. The Mohs Hardness Scale has a range of:
   a. 1-10
   b. 1-100
c. 1-1000
da. 1-10,000

7. The air polishing handpiece nozzle should be:
   a. Held in a stationary position for 3 seconds prior to moving it to another area
   b. Moved back and forth in a horizontal direction from the cervical area of the tooth to the occlusal or incisal area
c. Moved up and down in a vertical direction from the cervical area of the tooth to the occlusal or incisal area
da. In constant circular motion

8. Which one of the following factors can be effectively used to control aerosols inherent with air polishing?
   a. Reduce the amount of water used in the air/water spray
   b. Hold the handpiece in a stationary position
c. Decrease the amount of powder used in the air/water spray
da. Use of high-speed evacuation

9. Which one of the following is a symptom of facial emphysema?
   a. Affected tissue is marked with bruising
   b. Affected tissue feels tender and painful
c. Affected tissue is erythematous
da. Affected tissue is covered with waxy bumps

10. Which one of the following statements about air polishing is not true?
    a. Air polishing removes dental stain and plaque in approximately half the amount of time it would take to polish the same area with traditional polishing.
b. Air polishing is more abrasive than traditional commercially prepared polishing pastes.
c. Air polishing can remove 100% of bacteria and endotoxins from cementum.
da. Air polishing with specially processed sodium bicarbonate can be safely used on titanium implants.

11. Which one of the following abrasive particles is utilized for air abrasion?
    a. Aluminum trihydroxide
    b. Glycerine
c. Calcium Carbonate
da. Aluminum oxide

12. Which one of the following air polishing powders has the highest Mohs hardness number?
    a. Calcium sodium phosphosilicate
    b. Specially processed sodium bicarbonate
c. Calcium carbonate
da. Aluminum trihydroxide

13. Which one of the following surfaces should not be polished with specially processed sodium bicarbonate?
    a. Porcelain
    b. Amalgam
c. Composite
da. Gold

14. Of the following physical factors, which one has the greatest impact on the rate of abrasion?
    a. Size
    b. Shape
c. Amount of abrasive used
da. Hardness

15. What type of energy propels air polishing abrasive particles to the surface to be polished?
    a. Kinetic
    b. Thermal
c. Gravitational
da. Sound waves

16. Which one of the following abrasive powders is not utilized for air polishing?
    a. Special processed sodium bicarbonate
    b. Aluminum trihydroxide
c. Dentin
da. Calcium carbonate

17. Which one of the following angles is universally recommended for removing stain and plaque from anterior teeth?
    a. 60-degree angle
    b. 70-degree angle
c. 80-degree angle
da. 90-degree angle

18. The first commercially available air polishing device was introduced in which one of the following years?
    a. 1920
    b. 1945
c. 1957
da. 1962

19. Which one of the air polishing powders has a primary particle that is an active bioglass?
    a. Glycerine
    b. Calcium carbonate
c. Aluminum trihydroxide
da. Calcium sodium phosphosilicate

20. Which one of the following air polishing powders was professionally available as the first alternative to specially processed sodium bicarbonate air polishing powder?
    a. Glycerine
    b. Calcium carbonate
c. Aluminum trihydroxide
da. Calcium sodium phosphosilicate

21. Traditional polishing removes dental stain and plaque by which one of the following actions?
    a. Attrition
    b. Erosion
c. Chemical dissolution
da. Abrasion

22. Which one of the following surfaces should not be treated with air polishing, regardless of the type of air polishing powder?
    a. Composite restorations
    b. Dental implants
c. Porcelain
da. Enamel

23. Prior to powered polishing devices professional tooth polishing was accomplished with which one of the following?
    a. Over-the-counter sodium bicarbonate
    b. Porter polisher
c. Toothpaste
da. Belt drive slow-speed handpiece

24. According to results of research, which one of the following statements about air polishing with specially processed sodium bicarbonate is true?
    a. It is used as a method of choice for polishing orthodontically banded and bracketed teeth.
b. The use of air polishing improves the uptake of sodium fluoride.
c. Air polishing is a method of choice for teeth affected with exposed dentin.
da. Air polishing is contraindicated for dental implants.

25. Identify which one of the following conditions that is not a contraindication for the use of air polishing?
    a. End-stage renal disease
    b. Cushing’s Disease
c. Addison’s Disease
da. Type II Diabetes

26. Based on research findings, which one of the following statements about the use of specially processed sodium bicarbonate is true?
    a. The use of special processed sodium bicarbonate can cause elevated blood pressure.
b. The use of specially processed sodium bicarbonate should only be used on heavily stained enamel.
c. The use of specially processed sodium bicarbonate will not elevate blood levels of sodium.
da. The use of specially processed sodium bicarbonate can cause alkalosis of circulating blood.

27. Any soft tissue trauma that is incidental to the use of air polishing will usually dissipate and heal within approximately which one of the following amounts of time?
    a. 72 hours
    b. 48 hours
c. 24 hours
da. 8 hours

28. Which one of the following medications is typically prescribed for patients who have facial emphysema?
    a. Steroids
    b. Antibiotics
c. Diuretics
da. Anti-emetics

29. Air polishing can remove which of the following amounts of bacteria and bacterial endotoxins?
    a. 25%
    b. 50%
c. 75%
da. 100%

30. The following is a list of air polishing powders and their Mohs hardness scale number. Which one of the air polishing powders is listed with the wrong Mohs hardness scale number?
    a. Specially processed sodium bicarbonate; Mohs hardness scale 2.5-3.0
    b. Aluminum trihydroxide; Mohs hardness scale number 4.0
c. Calcium sodium phosphosilicate; Mohs hardness scale 8.0
da. Calcium carbonate; Mohs hardness scale 3
Air Polishing: A Mainstay For Dental Hygiene

Educational Objectives

1. Identify the origins of air polishing.
2. Compare and contrast the advantages of air polishing.
3. Describe the symptoms of facial erythema and identify the method for treatment.
4. Identify the clinical techniques that can be used to best control the inherent aerosol spray produced during air polishing.

Course Evaluation

1. Were the individual course objectives met?  
   Objective #1: Yes No  
   Objective #2: Yes No

2. To what extent were the course objectives accomplished overall?  
   1 2 3 4 5

3. Please rate your personal mastery of the course objectives.  
   1 2 3 4 5

4. How would you rate the objectives and educational methods?  
   1 2 3 4 5

5. How do you rate the author’s grasp of the topic?  
   1 2 3 4 5

6. Please rate the instructor’s effectiveness.  
   1 2 3 4 5

7. Was the overall administration of the course effective?  
   1 2 3 4 5

8. Please rate the usefulness and clinical applicability of this course.  
   1 2 3 4 5

9. Please rate the usefulness of the supplemental webliography.  
   1 2 3 4 5

10. Do you feel that the references were adequate?  
    Yes No

11. Would you participate in a similar program on a different topic?  
    Yes No

12. If any of the continuing education questions were unclear or ambiguous, please list them.

13. Was there any subject matter you found confusing? Please describe.

14. How long did it take you to complete this course?

15. What additional continuing dental education topics would you like to see?

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The PennWell Corporation is designated as an Approved PACE Program Provider by the Academy of General Dentistry. The formal continuing dental education programs of this program provider are accepted by the AGD for Fellowship, Mastership, and membership maintenance credit. Approval does not imply acceptance by boards of dentistry by states. Credit earned will be recorded in personal dental continuing education record. How to report credits earned will be provided upon request.

All questions should have only one answer. Grading of this examination is done manually. Participants will receive confirmation of passing by receipt of a verification form. Verification of Participants forms will be mailed within two weeks after taking an examination.

Any participant who is not 100% satisfied with this course can request a full refund by contacting PennWell in writing.

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