Glycine: New dimension in subgingival biofilm removal

By Juliette Reeves

The removal of biofilm deposits from within the periodontal pocket is recognized as being fundamental in reducing bacterial burden and down regulating the pro-inflammatory response in the treatment of the periodontal diseases. Recolonization of the periodontal pocket by pathogenic bacteria, however, occurs within weeks of initial phase therapy making continuous and regular subgingival biofilm removal a prerequisite in the successful management of periodontal disease.

Repeated intervention, however, is not without disadvantages in that a fine balance exists between root surface debridement and disturbance of the epithelial attachment with loss of root substance. Repeated use of traditional methods (hand scalers, curettes, sonic and ultrasonic scalers) can result in significant loss of root substance and surface smoothness, limiting the frequency of such intervention.

Until now, air polishing has been indicated for only supragingival application. With the advent of a glycine-based prophylaxis powder designed for subgingival use, a new dimension in the removal of subgingival plaque and biofilm deposits has arrived.

Air polishing

Surprisingly, air polishing is not a new technology; it’s been used for almost 50 years. In contrast to air-abrasive techniques, air polishing employs a mixture of air, powder and water. This fine jet is directed toward the tooth surface at an air pressure of 4–8 bar and a water pressure of 1–5 bar, leading to the removal of surface deposits.

Until now, the powder of choice has been sodium bicarbonate (NaCO3H); however, with a particle size of 100–200 µm (micron-millimeters), it has proven too abrasive for subgingival application. Compared with conventional instrumentation, NaCO3H is more effective in the supragingival removal of plaque deposits and extrinsic staining; however, because of its high abrasive quality, it is contra-indicated for root surface application and subgingival deposits.

Abraison of dental tissues

Intact enamel surfaces appear not to be significantly affected by NaCO3H air polishing techniques; however, pits and fissures in enamel surfaces subjected to significant plaque colonization and areas of demineralization (white spots) appear to be particularly affected.

Root surfaces (cementum and root dentine) are lower in hardness compared with enamel, and therefore the removal of subgingival plaque deposits with NaCO3H results in substantial wear of the root surface. In vitro experiments on root surfaces have shown significant defects of more than 600 µm following air polishing with NaCO3H.

Histological evaluation of the epithelium, epithelial layers and base membrane of the periodontal pocket have shown significant disruption of epithelium with loss of basal membrane following either hand scaling or NaCO3H in the removal of subgingival plaque and associated microorganisms.

While NaCO3H application is a useful and efficient way of removing plaque and biofilm deposits from supragingival enamel surfaces, it is therefore not indicated in the disinfection and maintenance of the periodontal pocket.

Glycine

Glycine is a non-essential amino acid with one of the simplest structures of all the amino acids. Glycine is found in proteins of all life forms, and it is important in the synthesis of proteins as well as adenosine triphosphate (ATP). Glycine is water soluble, has a low molecular weight (75), and is excreted in the urine.

Grant supports nursing-home oral health

‘Pros in Profession’ winner to use $5,000 from Crest Oral-B to train care staffs

Crest® Oral-B® has awarded Ann Benson Ross, RDH, BS, of Phoenix, the brand’s first-ever Pros in the Profession® grant for “Advancing Oral Health in the Community.” Together with her fellow staff at Mobile Dentistry of Arizona, Ross plans to use the $5,000 grant toward delivering onsite oral health services to nursing home residents who are in critical need of care but unable to obtain such services. Because of financial reasons, physical immobility of patients and lack of proper training among staff, oral health care tends to lag behind other forms of care in nursing homes.

To continue supporting the work that the Pros in the Profession year-one winners are doing in their communities, Crest Oral-B called for grant proposals from these dental hygienists earlier this year. Each unique application centered on a common theme and outlined ways in which the $5,000 funds would be used to improve the state of oral health within each winner’s community. Ross was selected based on her compelling demonstration of the urgent need for financial support to help bring oral health care to nursing home residents who are at a clear disadvantage in her community.

“It is estimated that only 50 percent of people with a significant disability are able to find access to professional dental care,” Ross said. “At Mobile Dentistry of Arizona, it is our priority to close this oral health gap in our community’s nursing homes by bringing dental care access to residents with mobility challenges—a mission that is greatly enhanced and supported with the help of the Crest Oral-B grant.”

Ross’s goals through the grant are two-fold: Along with delivering oral health services to nursing home residents, her team will provide the necessary training for nursing home staff to continue to help maintain residents’ oral health care routine, including assistance with brushing and flossing.

‘Crest Oral-B is proud of dental hygienists like Ann who are truly making an impact in patients’ lives, and we are committed to helping further their impact on oral health beyond their daily practice,’ said P&G Dental Hygienist Relations Manager Wendy Bebey, RDH, BS. ‘We are excited to continue our partnership with Ann through the Pros in the Profession grant and provide her with the means to help fulfill our joint-mission of ‘Advancing Oral Health in the Community.’”

The Crest Oral-B Pros in the Profession program recognizes registered dental hygienists who go above and beyond the call of duty every day. Throughout the year, Crest Oral-B rewards a selection of deserving professionals, as nominated by their peers, who truly make an impact on patients and the oral health cause. To learn more about the program, you can visit www.crestoralb.com. For information about Crest Oral-B products and resources, visit www.dentalcare.com.
control specimens. Epithelial attachment, keratinised layer and base membrane all remained intact following the use of glycine powder for subgingival biofilm removal. This was in comparison with hand instrumentation, which displayed loss of the keratinised layer and gingival epithelial layer, loss of galeal continuity in the lamina propria and strands of epithelial ridges extending into the connective tissue because of the stimulus of inflammation.

Patient acceptance.

For periodontal therapy to be successful, regular maintenance and pocket disinfection is paramount. This is greatly influenced by patient acceptance, pain perception and post-operative comfort.

Patient acceptance surveys conducted across five dental practices involving a total of 80 patients, indicate that treatment with glycerine air polishing is widely accepted. Seventy percent of patients reported either ‘very good’ or ‘good’ comfort, with 76 percent of patients willing to undertake the treatment again.

Further study has also reported greater patient acceptance and comfort with glycerine air polishing compared with hand instrumentation when glycerine air polishing was used. This was a single blind, randomised split-mouth trial using a new subgingival delivery system compared to the powder compared with hand instrumentation (curettes). No adverse effects were reported in the test group, with patients reporting less pain than the hand instrumentation group (10 versus 2.2 on a score of 1–10). Treatment in the test group was also completed three times more quickly than the control group, with comparable microbial reduction.

Conclusion

Subgingival debridement is considered essential in treating periodontitis and has been shown to be pivotal in arresting disease progression. Biofilm formation occurs rapidly in periodontal pockets following plaque accumulation, making the use of pathogenic microflora flora occurs after a few months following treatment. Plaque accumulation on enamel surfaces can be accomplished effectively with air-polishing devices with little or no abrasive effects. However, this method is not indicated for root surfaces, because conventional air polishing (NaCO3) are highly abrasive to root dentine and cementum. When repeatedly performed during maintenance therapy, this cleaning method can cause, with increasingly significant potential to offer significant benefits in the supportive care of the periodontal patient.

References


Considering the high level of patient acceptance, biocompatibility and efficacy, the use of glycine powder for biofilm removal greatly enhances the success of periodontal maintenance therapy and has the potential to offer significant benefits in the supportive care of the periodontal patient.

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