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Perio Reports provides easy-to-read research summaries on topics of specific interest to clinicians.

Perio Reports research summaries will be included in each issue to keep you on the cutting edge of dental hygiene science.

Perio Pathogen Linked to Brain Abscess

Periopathitis is a bacterial infection that contributes to the overall inflammatory burden on the body. Periodontal pathogens are linked with several systemic diseases, including infectious bowel diseases, atherosclerosis, coronary heart disease, stroke, diabetes and rheumatoid arthritis. Aggregatibacter actinomycetemcomitans (Aa) is a major periodontal pathogen, found most often in association with endocarditis.

A man, age 42, with a history of heavy smoking and alcohol abuse was admitted to a hospital in Leeuwarden, the Netherlands, complaining of confusion and reduced consciousness over the previous three days. Lab tests revealed an elevating white blood cell count and a moderately elevated C-reactive protein level. His oral health was poor. A CT scan of the brain revealed four lesions. No other lesions were found elsewhere in the body.

The patient was treated with dexamethasone and a follow-up CT scan showed no changes. Biopsy confirmed inflammation and abscess formation. Aa was the primary microorganism detected. IV antibiotics were begun. Nine days later, the patient's condition worsened, yet a new CT scan showed no change in the abscesses. It was decided to drain the abscesses and an oral surgeon extracted five teeth with advanced periodontitis. Antibiotics were continued for six weeks. At one year follow-up, he was doing fine.

Several other published case reports confirm the presence of Aa in a variety of infections in non-oral areas of the body.

Clinical Implications: Poor oral health can impact more than the teeth and gingiva, when oral pathogens travel to other parts of the body. Good oral health is necessary for good general health.


Saving Questionable and Hopeless Teeth

The primary goals of periodontal therapy are to stop disease progression and save teeth. Treatment planning aggressive and chronic periodontal cases includes identifying teeth that are questionable or hopeless. Researchers have shown that with healthy gingiva (no gingivitis) the tooth survival rate is 99.5 percent. In the presence of gingivitis (gingival index score of 3) survival rate drops to 63.4 percent.

Researchers at the University of Greifswald in Greifswald, Germany, looked back at dental school charts for periodontal patients who had been treated and monitored with supportive periodontal therapy (SPT) for 15 years. Those who showed signs of bone loss (on at least two teeth) before age 34 were diagnosed with aggressive periodontitis (AgP). Those with bone loss (on at least two teeth) appearing after age 40 were diagnosed with chronic periodontitis (CP). Each group had 34 patients. Periodontal therapy consisted of scaling and root planing and in some cases, access flaps were needed to reach all subgingival deposits. Antibiotics were used only rarely. SPT intervals were individualized for each patient ranging from three to 12 months.

Teeth considered hopeless were those with 50 to 70 percent bone loss. Hopeless teeth were those with more than 70 percent bone loss. In the AgP group there were 262 questionable teeth and 63 hopeless teeth. After 15 years, 88 percent of questionable teeth and 60 percent of hopeless teeth survived. Tooth survival rates were similar for both the AgP and CP groups.

Clinical Implications: Many questionable and hopeless teeth can be saved with effective supportive periodontal therapy and good patient compliance.

**Obesity and Dental Caries in Adolescents, No Direct Link**

Dental caries and childhood obesity are growing problems worldwide. Changes in diet and lifestyle are impacting the health and nutritional status of many populations. Decreased fruit and vegetable consumption, decreased physical activity and increased snacking on highly processed foods contribute to these declining health levels globally.

Researchers at the University of Copenhagen in Copenhagen, Denmark wanted to know if there was a link between dental caries and childhood obesity or if there were lifestyle factors shared by both. The researchers evaluated 385 adolescents from eight municipalities in Denmark. The teens were all 15 years of age. Dental records were available and written questionnaires were mailed to the teens and their parents. The questionnaires provided basic demographic data and information on eating breakfast, daily fruit consumption, physical activity, smoking and alcohol consumption. BMI was calculated for each student from weight and height measurements.

There was no direct correlation between obesity and dental caries in this group. Sixteen percent of the group was classified as obese and 62 percent of the group had no decayed, missing or filled teeth (DMFT). The average DMFT for the group was two. However, those who had no decay reported more healthful habits: eating breakfast, eating fruit, exercising and no smoking or drinking. Teenagers who did not eat breakfast were more likely to smoke and drink alcohol.

Bad habits begun as children are likely to follow these teenagers into adulthood, leading to more significant health problems. More must be done to address both obesity and dental caries earlier.

Clinical Implications: Dentists and physicians should work together to manage both obesity and dental caries.


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**Toothbrush Age and Plaque Removal**

Many studies are published measuring plaque removal effects of both manual and power toothbrushes, but few are published on the impact of toothbrush wear on plaque removal. One reason might be the lack of a standard way to measure toothbrush wear. Toothbrush wear varies considerably between people and many use their toothbrushes for much longer than the recommended three months.

Researchers at Ponta Grossa State University in Brazil devised a method to determine toothbrush wear by measuring bristle splay from the brush head. They were able to categorize toothbrush wear into three categories: low, moderate and high wear. A total of 110 undergraduate, non-dental students were recruited from the university for this four-month study. Subjects were randomly assigned to one of four groups, having plaque and toothbrush wear measured at four weeks, eight weeks, 12 weeks and 16 weeks.

The students were all given a new manual toothbrush, plastic toothbrush cover, Colgate toothpaste and instructed to brush and floss three times daily. Baseline plaque and gingivitis scores were recorded. Subjects returned at their assigned time.

No statistical difference in gingivitis scores was measured at any time point. There was more gingivitis on lingual surfaces than on facial surfaces. Plaque scores remained similar throughout the study, with more plaque found on lingual surfaces than on facial surfaces. Toothbrush wear increased over the 16-week study, but this wear didn’t impact plaque or gingivitis scores.

Clinical Implications: Toothbrush age or wear might not be an important factor in effectively removing plaque. The toothbrushing method used and the time spent on lingual surfaces might be more important.

**Triple-headed Toothbrush**

Children under the age of 10 usually need their parent’s help to effectively brush their teeth. Children do not effectively remove bacterial biofilm due to lack of motivation and poor manual dexterity.

A triple-headed, manual toothbrush is available from DenTrust in Newport, Rhode Island and is designed to clean facial, lingual and occlusal surfaces with one motion. This design does not rely on manual dexterity to effectively reach all surfaces.

Researchers at the University of Sao Paulo in Brazil compared the triple-headed toothbrush to a conventional manual toothbrush. They asked two questions. First, was the new brush better at plaque removal and second, did it matter if the mother or the dentist did the toothbrushing. Four-year-old children were selected from two kindergarten classes for the study.

In this cross-over study, each child received toothbrushing with both brushes at different visits, one week apart. Disclosing solution was used to measure plaque scores both before and after brushing with the assigned toothbrush. The mothers and the dentist were instructed in the use of both toothbrushes and they practiced on a typodont until proficient.

The mothers were more efficient in removing plaque with the triple-headed toothbrush than with the conventional toothbrush. The dentist was more efficient with the manual brush than with the triple-headed toothbrush. Overall, the dentist removed 76 percent of plaque compared to 53 percent removed by the mothers.

**Clinical Implications:** The triple-headed toothbrush might be an option for parents who are not effectively removing all plaque from their children’s teeth with a conventional brush.


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**Soft vs. Medium Toothbrushes**

Researchers at Franciscan University in Santa Maria, Brazil wanted to know the difference between medium and soft toothbrushes for plaque removal and soft-tissue abrasion. A total of 25 undergraduate students participated in the study, all free of gingivitis. At baseline, the students were asked to refrain from all oral hygiene for 96 hours, to allow plaque to accumulate. Using disclosing solution, plaque scores for all facial surfaces were measured except central incisors and third molars.

For the experiment, students were randomly assigned to brush two contra-lateral quadrants with the medium brush and the other two quadrants with the soft toothbrush. This way, both right and left sides of the mouth were brushed with both the soft and medium brushes. The lower quadrants were brushed with Colgate Triple Action toothpaste and the upper quadrants were brushed without toothpaste. Upper quadrants were brushed first, before lower quadrants. Each quadrant was brushed for 30 seconds.

Both medium and soft toothbrushes removed significant amounts of plaque. There was no difference in plaque removal between brushing with or without toothpaste for the soft toothbrush. The medium toothbrush with toothpaste removed more plaque than without toothpaste. Both brushes removed more plaque from facial surfaces than from proximal surfaces. The medium toothbrush removed more plaque than the soft toothbrush in the premolar area. Both brushes removed more plaque in premolar areas than molar or anterior areas.

The medium toothbrush caused more cervical abrasions than the soft toothbrush and the medium toothbrush with toothpaste resulted in more tissue abrasion than without toothpaste.

**Clinical Implications:** Soft toothbrushes with or without toothpaste should be recommended.