**Gingival hyperplasia** is caused by alterations in the connective tissue resulting in overstimulation of fibroblasts and overgrowth of gingival tissue. Drug-induced hyperplasia occurs within the first three months of taking a drug and begins with enlargement of interdental papilla. Calcium channel blocker (CCB) drugs inhibit intercellular uptake of calcium, which may affect fibroblasts or reduce collagenase production, thus causing gingival hyperplasia. CCBs are prescribed for the treatment of cardiovascular diseases. Other drugs prescribed include diuretics, beta blockers and renin-angiotensin systems affecting drugs (RAS). These drugs have not been found to cause gingival hyperplasia.

Researchers in the Netherlands evaluated medical and dental charts from a large electronic database of more than 800,000 patients. Subjects were selected based on CCB prescriptions and also a report of gingival hyperplasia by the physician and confirmed by a dentist.

Of the 20,636 subjects taking CCB or RAS drugs, 103 patients were identified as having definitive gingival hyperplasia. Cases of mild, asymptomatic gingival hyperplasia were not identified in the medical charts. Gingival hyperplasia was found to be dose- and time-dependent for CCBs. Subjects taking the drug for several months and those taking a higher dose were more likely to have a diagnosis of gingival hyperplasia. Additionally, an association was found between those taking antiepileptic drugs and gingival hyperplasia.

**Clinical Implications:** At least one month prior to beginning bisphosphonate treatment, particularly intravenously, patients should be examined by a dentist and receive any necessary dental work to assure a healthy oral condition.


**Bisphosphonates and Osteonecrosis of the Jaws**

Bisphosphonate drugs are given intravenously when treating various cancers and their side effects. It is prescribed orally for the treatment of osteoporosis. Bisphosphonates preserve bone by inhibiting osteoclast function, inducing apoptosis (programmed cell death) for osteoclasts and inhibiting the differentiation of bone marrow cells into osteoclasts. The half-life of intravenous bisphosphonate drugs in bone is approximately 10 years, depending how long the drug was administered.

Bisphosphonate-induced osteonecrosis of the jaws is defined as an area of exposed bone that persists for more than six weeks. Other symptoms may include pain, swelling, infection, drainage, bone necrosis, bone fracture, fever and lymphadenopathy. Osteonecrosis occurs most often in those given intravenous bisphosphonate drugs. To a lesser extent, cases have been reported for those taking oral bisphosphonates such as Fosamax. Tooth extraction is the dental procedure most likely to trigger alveolar bone destruction.

Treatment is unclear, but antibiotics are recommended to curb potential infection. Due to the long half-life of bisphosphonate drugs, discontinuing the drug is not likely to speed healing of the osteonecrosis, nor is discontinuing the drug before a problem exists thought to prevent osteonecrosis. Prevention is the best approach—being sure the oral cavity is healthy prior to beginning bisphosphonate drug therapy.

**Clinical Implications:** At least one month prior to beginning bisphosphonate treatment, particularly intravenously, patients should be examined by a dentist and receive any necessary dental work to assure a healthy oral condition.


**Calcium Channel Blockers and Gingival Hyperplasia**

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**Clinical Implications:** Patients taking calcium channel blockers may experience gingival hyperplasia occurring within the first month of drug use.


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**Clinical Implications:** At least one month prior to beginning bisphosphonate treatment, particularly intravenously, patients should be examined by a dentist and receive any necessary dental work to assure a healthy oral condition.

Toothbrushes are the primary tool for oral hygiene, despite the fact that disease occurs most often between the teeth. Only 10 percent of people regularly clean between their teeth, so toothbrushes are being designed to achieve better interproximal plaque removal. One of these new designs is the Aquafresh Between Teeth brush. In addition to the standard, rounded end, same-length bristles, there are fine, tapered bristle filaments that are four millimeters longer to reach between the teeth.

Researchers at the GlaxoSmithKline Consumer Health Care Company in Buehl, Germany compared the Aquafresh Between Teeth brush to the Oral-B CrossAction brush with X-angled, dual-length bristles and the Oral-B Indicator multitufted brush. Laboratory testing followed a method shown to accurately predict clinical outcomes. Laboratory studies are done prior to clinical studies, as they are less expensive and can provide useful information to justify human clinical trials.

Six brushes of each type were tested four times, for a total of 24 tests per brush type. Brushes were tested for 15 seconds with two strokes per second. Brushes were positioned at a 90-degree angle to the simulated anterior and posterior teeth, since this is the way the majority of people brush, despite being taught to use a 45-degree angle. Brushes were tested in both vertical and horizontal motions.

The Aquafresh extended reach bristles were more effective in removing simulated plaque from interproximal surfaces on the laboratory model.

Clinical Implications: Look for clinical studies in the future exploring the potential for innovative manual toothbrush designs to remove interproximal plaque.

Interdental Brushes Better than Floss

The toothbrush is successful at removing plaque on facial, lingual and occlusal surfaces, but not very effective on interproximal surfaces. Dental floss, wood sticks, picks, rubber tip stimulators, oral irrigation and interdental brushes are used to reach plaque on interproximal surfaces.

Researchers at the Department of Periodontology, Academic Centre for Dentistry Amsterdam in the Netherlands reviewed research evaluating the effectiveness of interdental brushes compared to manual tooth brushing alone, and compared to other interdental aids, including floss and wooden sticks. Of the 234 abstracts and articles found on this topic, nine full text articles were found that were similar enough to each other to warrant comparison. This elimination process is how systematic reviews are done. Until researchers follow similar protocols, using like-indices, only a few studies will qualify for standardized comparisons.

Each of these studies were at least four weeks in length; a few were 12 weeks. A wide variety of interdental brushes were tested from several companies. Conclusions found interdental brushes more effective for plaque removal interproximally than a manual toothbrush or dental floss. Interdental brushes also reduced pocket probing depths more effectively than dental floss.

The authors suggest a triangular-shaped interdental brush, following the form of commonly used interdental wooden sticks, may provide better adaptation in interdental spaces, and thus result in greater tissue healing. They also point out the importance of selecting products specific to each patient based on patient preference, ability to use and willingness to comply with daily use.

Clinical Implications: Interdental brushes are an appropriate choice for interproximal plaque removal, when space allows.


RDHs Providing Oral Hygiene for Hospitalized Patients

Aspiration pneumonia is a serious disease of the elderly and those hospitalized. Oral bacterial biofilm is responsible for some of these respiratory infections. Prevention of these infections can be accomplished with proper oral care. Unfortunately, those most in need of good oral hygiene are left on their own to clean their mouths each day.

Researchers at Saitama Medical University in Saitama, Japan compared professional oral hygiene provided by dental hygienists to brushing and rinsing as instructed by a nurse. The 40 subjects were all inpatients at the Department of Respiratory Medicine in the university hospital. All subjects were instructed by a nurse to brush and rinse with povidone iodine both morning and evening. Half the subjects were randomly assigned to receive 15 minutes of professional oral hygiene instructions from a dental hygienist with follow-up visits every two to three days. Hospital stays for both groups averaged several weeks.

Plaque scores for both groups were similar at baseline. Plaque scores for the control group remained at 66 percent on day five and the day of hospital discharge. Those receiving professional dental hygiene instructions had a plaque score of 46 percent on day five and 30 percent on the day of hospital discharge. According to a short questionnaire, oral health attitudes and behaviors improved in the treated group compared to the control group.

Clinical Implications: The most effective oral care for hospitalized patients is provided by dental hygienists, rather than expecting patients to effectively clean their mouths themselves.