

if it were timed appropriately. Daily variations are also seen in the full-mouth bleeding score, full mouth plaque score, periodontal screening and recording, and periodontal risk assessment in healthy individuals, so timing is also an important consideration when monitoring these parameters.

Osteoblasts and osteoclasts also evidence variations related to circadian clocks that can affect bone resorption activity. Understanding the links between circadian clocks and bone resorption could advance diagnostics in periodontitis patients and possibly reveal new targets for therapeutic interventions.

Light therapy helps in wound healing, although the mechanism has not been well understood. Blue light exposure enhances *PER2* gene expression in a circadian rhythm in human oral mucosa samples; no such effect was seen with green light exposure. Circadian clock rhythms may be evaluated for their ability to stimulate oral soft tissue healing and periodontal regeneration in future therapeutic applications. In addition, salivary glands are an important part of a healthy oral mucosa and may have a peripheral circadian clock. Salivary cortisol levels also show daily variations, peaking in the morning.

### Orthodontics

The right amount of force and duration are essential components to successful orthodontic movement. The forces involved show evidence of circadian variation related to bone remodeling. Use of this information could guide the adjustment of periods when removable orthodontic appliances are worn to achieve a stronger effect with shorter wearing periods. In addition, pain perception and analgesic effectiveness are also associated with specific times each day in patients who have bone disorders. If orthodontic pain trajectories can be correlated with circadian phases, orthodontic treatment may also be improved.

## DISCUSSION

Although the specific functions of the various peripheral circadian clocks in oral tissues and the mechanisms by which they affect the various functions or behaviors of the body remain largely unknown, there appears to be a sound foundation for the application of chronodentistry principles. A dysfunctional clock mechanism has been identified in oral cancer and juvenile skeletal mandibular hypoplasia. In addition, genes are being investigated for their role in circadian rhythm. Overall, chronodentistry remains outside of patient application but shows potential in various dental fields.

### Clinical Significance

Today's lifestyles come with a number of factors that disturb circadian rhythms, including artificial light being available at all times, irregular food intake, and shift work. If the molecular clocks that are found in our bodies can be altered therapeutically, there may be important changes in treatments, with methods more closely tailored to individual chronotypes. Much work remains to be done to better understand these molecular clocks and how they interact with various body systems. For dentists, it will be important to clarify how working with circadian clock effects can provide better dental care for patients.

Janjić K, Agis H: Chronodentistry: The role & potential of molecular clocks in oral medicine. *BMC Oral Health* 19:32:2019

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# COMPLETE DENTURES

## Cleaning dentures



### BACKGROUND

Complete denture wearers often develop poor denture hygiene, with biofilm forming on the tissues and denture surfaces. The microbiological agents can contribute to denture stomatitis as well as several local and systemic diseases. Thus dentures can serve as a reservoir for distant infections, compromise the health of the patient, and produce a higher susceptibility to infection. Clinical evidence of the best way to disinfect and remove the biofilm from complete dentures is insufficient currently. A

crossover randomized clinical trial was performed to assess the effectiveness of several chemical hygiene clinical protocols in removing the biofilm on complete dentures.

### METHODS

One hundred forty-three complete denture wearers were evaluated, with 40 selected for participation in the study. The design included both crossover and triple-blind components and was structured into 4 phases of 14 days each. Four groups were

randomly populated and given instructions to soak dentures once a week in water, 0.5% sodium hypochlorite, 0.12% chlorhexidine, or 5% sodium bicarbonate. Biofilm samples were obtained from dentures and the palate after 7 and 14 days. When each group completed one of the treatments, the participants began another one until all had used the 4 treatments. Biofilm assessments were done after the seventh and fourteenth days for each protocol.

## RESULTS

The counts for *Candida non-albicans* and lactobacilli for all treatments, areas, and time points were similar. Statistically significant differences were found for the treatments of denture teeth after 14 days. Sodium hypochlorite was better than water and sodium bicarbonate. Chlorhexidine was better than water and sodium bicarbonate and had results similar to those obtained with sodium hypochlorite. Evaluation of the palate collections yielded similar results.

*Streptococcus mutans* samples from dentures revealed that sodium hypochlorite had lower counts after 7 and 14 days compared to water. Statistically significant differences were noted for chlorhexidine compared to water after 14 days. Palate samples demonstrated the same results. Sodium hypochlorite was better than water and sodium bicarbonate, and chlorhexidine and sodium hypochlorite performed similarly.

Higher counts of *Candida albicans* and lactobacilli were seen after 14 days. Higher counts of *Streptococcus mutans* and total microorganisms were found after 7 days. When palate samples were considered, *Candida albicans* counts were lower after 7 days when sodium hypochlorite was used compared to water or sodium bicarbonate. These differences in results were not found after 14 days.

## DISCUSSION

Microbial viability on denture surfaces was reduced when the dentures were cleansed in sodium hypochlorite and chlorhexidine. These 2 treatments could be used with mechanical tooth brushing to prevent microbial colonization. Lower counts of *Streptococcus mutans* and lower total microorganism counts were noted with the use of sodium hypochlorite and chlorhexidine regardless of whether the samples came from the palate or the dentures.

### Clinical Significance

The best course of action for cleansing complete dentures was the use of 0.5% sodium hypochlorite or 0.12% chlorhexidine gluconate solution 10 minutes once a week coupled with thrice daily tooth brushing with toothpaste. This approach will effectively reduce the viability of microbial agents on complete dentures.

Valentini-Mioso F, Maske TT, Cenci MS, et al: Chemical hygiene protocols for complete dentures: A crossover randomized clinical trial. *J Prosthet Dent* 121:83-89, 2019

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# DENTAL FLUOROSIS

## Treating fluorosis lesions



### BACKGROUND

Dental fluorosis can occur when enamel development is disrupted, causing hypomineralization. An increased incidence of dental fluorosis is being seen and is likely the result of an excess of ingested fluoride from caries prevention measures, including toothpaste, mouthrinse, gel, or varnishes, which are incorporated into the enamel. The teeth develop diffuse, symmetrical, discolored white opaque stains and striations. More severe forms involve pitting, porosity, and brownish areas on the enamel surface. These enamel changes can cause patients to suffer adverse psychosocial and quality-of-life effects. Various treatment approaches have been developed, including microabrasion, bleaching, and enamel infiltration with low-viscosity light-cured resins.

A comparison of various techniques was undertaken to identify the most effective treatment for mild to moderate dental fluorosis.

### METHODS

Nine databases were searched up until December 2016 for randomized trials focused on the treatment of dental fluorosis. Six trials (348 patients) were identified that met the inclusion criteria. Mean patient age was 17.7 years, and a total of 1518 teeth with enamel fluorotic lesions were included. The methods studied in these trials were external bleaching, microabrasion, resin infiltration (with different application times), and a combination of bleaching and resin infiltration.