

Changes in the strategies for caries management in older adults; a non-invasive alternative.

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The elderly population is increasing worldwide, with predictions for an even more pronounced growth during the next decades, along with a trend for higher life expectancies. Furthermore, studies have shown that older adults are retaining more teeth due to advances in oral health care and access to restorative treatment.¹ Although these trends are promising and may lead to overall improvements in oral health-related quality of life, tooth retention is also associated with an increased risk of developing root caries lesions (RCLs). Indeed, epidemiological studies have demonstrated higher incidence of RCLs with advanced age.² In this scenario, people will live longer, with more teeth and at higher risk for RCLs. When root surfaces are exposed, they are more prone to be demineralized by biofilm stagnation and acid production. Due to the nature of the dentin tissue, acids expose collagen, which is degraded by host-derived proteases contained in saliva and in the dentin, leading to initial degradation of the dentin matrix.³

Restorative management for RCLs has also become challenging due to poor visibility and access to the lesions, moisture control, proximity to the pulp and to the gingival margin, and to the high organic content that impairs the optimal adhesion of conventional restorative materials. Successful treatment of RCLs in older adults can be challenging, especially for those with limited mobility, inadequate financial resources or lack of dental health insurance.⁴ Scientific evidence-based selection of suitable restorative materials for RCLs is rather unsubstantiated, as studies have reported failure rates up to 68% within 12 months.⁵ Thus, prevention or lesion arrest appears to be a more reasonable approach, if clinical conditions are appropriate.

Clinical studies have shown that the initiation of RCLs might be significantly delayed by the implementation of preventive dental programs or by chemical agents professionally applied by the dentist or by the patients themselves. Some of these interventions have been shown to prevent the onset of new RCLs, shifting active to inactive lesions. Fluoridated products are the dental therapy with the most robust body of evidence available, and in the case of RCLs, they have been successfully used as a non-invasive therapy for active lesions.⁶

Delivered in several formats, fluoride has proven to be highly effective in preventing RCLs in older adults,⁷ and it is widely used in the clinic. The anticaries effect of fluoride is related to its ability to alter ionic mineral saturation of the tooth, aiding remineralization and preventing

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demineralization. Also, at high concentrations it may interfere with bacterial metabolism and acid production. The better preventive and therapeutic effect observed with high-fluoride toothpastes could be the result of higher fluoride concentrations in saliva and in the biofilm. Since root tissues are more prone to demineralization at a higher pH (6.5) than enamel (5.5), preventive and non-invasive measures to control RCLs appear as the most suitable strategies to approach this problem.⁸

Fluoride-containing toothpastes are considered the most rational topical fluoride delivery vehicle as they are the major source of fluoride in communities where water fluoridation is not available. In fact, regular toothbrushing with fluoridated toothpaste (F-toothpaste) acts at two levels; mechanically disrupting the dental biofilm, and on the other hand, delivering fluoride to inactivate RCLs.⁹ Studies have suggested that only half of the treatment effect of brushing with fluoride toothpaste could be ascribed to fluoride, and the other half to the cleaning effect. Thus, quality of oral hygiene might play a significant role on the outcome of interventions with fluoride. Based on many studies, it is possible to state that only active RCLs that cannot be accessed by toothbrushing should be surgically removed and then restored using minimally invasive techniques (operative treatment).¹⁰ A recent systematic review showed that daily use of toothpaste containing 5,000ppm F- seems to be more efficacious in reducing active RCLs when compared to dentifrices containing 1,100 to 1,450ppm. This is even more important in older adults with exposed root surfaces. Indeed, high-dose fluoride toothpastes have been shown to inactivate 51% more RCLs compared with

standard fluoride toothpastes.⁶

Despite these promising findings, the authors identified a low number of clinical trials, with a high risk of bias, which provides only limited evidence. Additionally, clinical studies on RCLs have focused on older adults living in long-term care facilities. Few studies, however, have been conducted with community-dwelling elders, who comprise most of the older population in the world. Independently-living elderly people have many differences compared to institutionalized older adults, so studying this population in terms of non-invasive therapies for RCL appears necessary.

The advantages of a non-invasive approach using 5,000 ppm F-toothpastes seems an attractive alternative to traditional restorative treatment for older adults, allowing expanded access to care, at a much lower cost and suitable for non-clinical settings. One of the most remarkable features of this therapy is its self-application nature. The most expensive component in dental care provision is the dentist. Hence, therapies that can be delivered without the permanent presence of the dentist may substantially expand coverage at a very low cost.

The increasing prevalence of RCLs can be significantly controlled by simple and efficient treatment approaches with high-fluoride toothpastes. Yet, the cause of the problem is sugars available to the biofilm, so preventive or therapeutic protocols must include sugars consumption control measures in order to optimize the caries-preventive effect. Public policy and community clinical protocols should include this non-invasive approach during routine clinical practice. This alternative may allow including older adults among the countries' strategic oral health programs.

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