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A METHOD FOR IMPROVING THE PREVENTION OF DENTAL CARIES IN CHILDREN USING THE "AERODENT" DEVICE

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Abstract: Dental caries remains one of the most common chronic diseases in childhood and continues to impose a substantial clinical and social burden despite the availability of fluoride, professional prophylaxis, and oral hygiene education. The multifactorial nature of caries, combined with low compliance in young children, makes it necessary to search for adjunctive preventive approaches that are simple, acceptable, and biologically justified. The aim of this article is to present and substantiate a method for improving the prevention of dental caries in children using the "Aerodent" device as part of a comprehensive pediatric oral health program. This paper is based on an analytical review of current recommendations in pediatric caries prevention and published descriptions of the Aerodent device. Available reports describe Aerodent as a tooth-cleaning capsule/device intended to deliver an extract-based solution, including licorice root components, while also assisting the mechanical cleansing of tooth surfaces. The proposed preventive method includes baseline caries-risk assessment, professional examination, individualized hygiene training, supervised home use of Aerodent, fluoride-based prevention according to age and risk, dietary counseling, and follow-up monitoring of plaque control and enamel resistance. The theoretical and practical value of the method lies in combining mechanical cleaning, improved compliance, and local delivery of biologically active plant components with established preventive standards. Aerodent should be considered an adjunct, not a replacement, for fluoride toothpaste, rational nutrition, and regular dental supervision. Further controlled clinical studies are needed to confirm its long-term efficacy and define optimal protocols for different pediatric age groups.

Keywords: children, dental caries, prevention, oral hygiene, pediatric dentistry, Aerodent, licorice extract, fluoride prophylaxis, caries risk.

Introduction

Dental caries in children is still a major public health problem worldwide. It develops through the interaction of cariogenic biofilm, fermentable carbohydrates, susceptible tooth tissues, and time. In practical pediatric dentistry, this means that successful prevention cannot rely on one factor alone. It requires regular plaque control, reduction of free sugar exposure, appropriate fluoride use, parental involvement, and periodic professional evaluation. Global and national recommendations consistently emphasize that most oral diseases are preventable when such measures are applied early and systematically.

At the same time, conventional preventive programs often encounter a familiar problem: children do not always brush effectively, parents may underestimate early non-cavitated lesions, and adherence to hygiene recommendations is frequently inconsistent. Because of this, pediatric dentistry continues to explore adjunctive preventive tools that can increase motivation, improve oral cleanliness, and enhance delivery of active agents to tooth surfaces without making home care more complicated. Risk-based pediatric protocols also support combining core preventive measures with additional methods when a child has elevated caries activity or poor hygiene skills.

The "Aerodent" device is one such locally developed adjunctive approach. Publicly available descriptions linked to the Department of Pediatric Dentistry at Bukhara State Medical Institute identify Aerodent as a research and innovation project aimed at the primary prevention of dental caries in children. Published descriptions characterize it as a tooth-cleaning capsule/device with a tooth-row groove and an ampoule section for extract delivery; some

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reports state that it can clean tooth surfaces while simultaneously administering a licorice-based solution with menthol for oral freshness.

The purpose of the present article is to formulate a clinically logical method for improving the prevention of dental caries in children using Aerodent within a comprehensive evidence-based prevention program.

Materials and Methods

This article was prepared as a narrative scientific review with methodological synthesis. The analytical basis included current public-health and pediatric-dentistry recommendations on caries prevention, official institutional information about the Aerodent project, and available published descriptions of the device and its active components. The method proposed below is therefore not presented as a replacement for standard caries prevention, but as an optimized adjunctive algorithm that integrates Aerodent into routine pediatric dental care.

Special attention was given to the biological plausibility of licorice root extract as a preventive component. Reviews and clinical literature indexed in PubMed indicate that licorice-derived compounds may reduce *Streptococcus mutans*, interfere with biofilm activity, and show anti-cariogenic potential. At the same time, the literature also makes clear that herbal adjuncts should complement, not replace, standard preventive strategies such as fluoride exposure and dietary control.

Results and Discussion

The proposed method for improving caries prevention in children using Aerodent consists of six sequential stages.

First, each child should undergo baseline dental examination with individual caries-risk assessment. This includes recording past caries experience, visible plaque, dietary habits, frequency of sugar intake, salivary or hygiene-related risk indicators where available, fluoride exposure, and parental supervision. Without such stratification, any additional device will be used in a non-selective way and its real preventive contribution will remain unclear. In low-risk children, simple reinforcement of ordinary hygiene may be sufficient; in moderate- and high-risk children, adjunctive methods are more justified.

Second, the child and parents should receive professional instruction before home use begins. In pediatric prevention, compliance is often more important than the sophistication of the method itself. The Aerodent-based approach is potentially useful precisely because it may make hygiene procedures easier to accept and more structured. Available descriptions indicate that the device is intended not only for solution delivery but also for cleansing tooth surfaces. This dual action may be especially relevant in children with poor manual brushing skills, reluctance to brush, or a high plaque index.

Third, Aerodent should be incorporated into daily home prophylaxis under adult supervision. From a clinical standpoint, the most rational approach is to use it as part of evening hygiene and, where necessary, one additional daytime session in children at increased caries risk. The goal is not excessive manipulation, but regular disruption of cariogenic plaque and improved contact of active substances with dental hard tissues. Because published descriptions associate the device with licorice root extract and menthol, its preventive rationale includes both mechanical cleaning and a local phytotherapeutic effect. Licorice has been reported to suppress cariogenic microorganisms and reduce biofilm-related acidogenicity, which may help create less favorable conditions for demineralization.

Fourth, the Aerodent method must be combined with standard evidence-based prevention. This is a critical point. No adjunctive device can compensate for a high-sugar diet, the absence of fluoride, or irregular dental care. Children still require age-appropriate fluoride toothpaste, limitation of free sugars, access to clean drinking water, and periodic preventive visits. In children at increased risk, fluoride varnish and fissure sealants remain important components of prevention. Therefore, the most scientifically defensible place for Aerodent is inside a multimodal prevention package, not outside it.

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Fifth, clinical monitoring should be regular and objective. Follow-up every three to six months is reasonable in routine pediatric practice, with shorter intervals for high-risk children. The dentist should assess plaque accumulation, gingival condition, hygiene quality, new white-spot lesions, caries increment, and parental adherence. Published Aerodent-related materials also refer to improved enamel acid resistance after several months of use, suggesting that enamel resistance tests and early lesion monitoring could be useful outcomes in future formal trials. At present, however, such claims should be interpreted cautiously because the published evidence base remains limited and is not yet supported by large independent randomized studies.

Sixth, indications and limitations must be clearly defined. Aerodent appears most suitable for children with inadequate brushing technique, early plaque accumulation, high caries susceptibility, orthodontic or behavioral difficulties with ordinary hygiene, or a need for more engaging preventive routines. At the same time, use in very young children should be individualized according to age, cooperation, swallowing control, and direct parental supervision. In addition, herbal or device-based prevention should always be evaluated for tolerability and safety before widespread routine adoption. This balanced approach is consistent with modern pediatric dentistry, which favors individualized, minimally invasive, prevention-oriented care.

From a broader clinical perspective, the main value of the Aerodent method is not that it promises a miraculous elimination of caries, but that it addresses a real practical weakness of preventive dentistry: insufficient adherence. A child-friendly device that combines cleaning and local delivery of a biologically active solution may improve routine participation in oral hygiene. Where licorice-derived compounds are used, the preventive concept also gains microbiological plausibility. Still, the best current interpretation is that Aerodent is a promising adjunctive tool whose benefit will be greatest when embedded in a structured, risk-oriented prevention program with fluoride, dietary control, and dental follow-up. That conclusion is an inference drawn from the currently available Aerodent descriptions together with established pediatric prevention standards.

Conclusions

1. Dental caries prevention in children should remain comprehensive, individualized, and risk-based.
2. The Aerodent device is a plausible adjunctive preventive tool because it combines mechanical cleansing with local delivery of a licorice-based solution described in published Aerodent materials.
3. The most rational method of application is to include Aerodent in a broader preventive program that also contains fluoride prophylaxis, sugar control, oral hygiene training, and regular professional monitoring.
4. The expected advantages of this method are improved compliance, better plaque control, and an additional local antimicrobial effect against cariogenic biofilm.
5. Aerodent should not be considered a substitute for standard evidence-based pediatric caries prevention.
6. Further controlled clinical trials are needed to determine its long-term efficacy, safety, optimal frequency of use, and effectiveness across different pediatric age groups.

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