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The Use of Coconut Oil Pulling in the Prevention and Treatment of Periodontal Diseases and Dental Caries – A Literature Review

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ABSTRACT

Background. Modern dentistry increasingly seeks natural methods to support traditional hygiene procedures. Although oil pulling, originating from Ayurvedic medicine, has been a subject of controversy, recent studies indicate its genuine clinical efficacy.

Aim. The objective of this paper is to analyze the impact of coconut oil on the oral microbiome, gingival health, and plaque reduction.

Material and methods. A review of the available scientific literature from the years 2016-2025 was conducted to evaluate the clinical efficacy and mechanisms of coconut oil in oral hygiene.

Results. A review of the literature demonstrates that coconut oil possesses unique physicochemical properties resulting from its high lauric acid content and the process of saponification. During intensive oral rinsing, the oil reacts with salivary enzymes, leading to the formation of soap-like substances that facilitate the mechanical removal of biofilm. Lauric acid has proven antimicrobial properties, inhibiting the growth of pathogens such as *Streptococcus mutans*. Clinical trials confirm that regular oil pulling leads to a statistically significant reduction in Plaque Index (PI) and Gingival Index (GI), achieving effects comparable to chlorhexidine, without adverse effects.

Conclusions. Coconut oil pulling is an effective, safe, and cost-efficient method for supporting the prevention of periodontal diseases and dental caries. Due to its lack of toxicity, this method is particularly recommended for children and pregnant women.

Keywords: coconut oil, oral hygiene, periodontitis, dental caries, biofilm

1. Introduction

Oral diseases, including dental caries and chronic periodontitis, remain among the most widespread global diseases of modern civilization. Despite widespread access to advanced hygiene products, their pathogenesis, closely linked to the formation of bacterial biofilm, requires a continuous search for new therapeutic strategies. Standard prevention relies on the mechanical removal of dental plaque and the use of chemical antiseptics. Among these, chlorhexidine digluconate (CHX) is considered the “gold standard” due to its strong substantivity and broad-spectrum antibacterial activity. Unfortunately, CHX therapy is fraught with numerous limitations, such as the formation of permanent discoloration on the surface of teeth and prosthetic restorations, taste perception disorders (dysgeusia), or adverse modifications of the oral microbiome when used for more than two weeks [1][2]. As patients become increasingly aware of the ingredients in pharmaceutical products and seek out holistic approaches, traditional medicine-including Ayurveda-is making a comeback. The oil pulling procedure (kavala graha), which involves rinsing the mouth with vegetable oil, has been practiced for millennia, but it is only in the last decade that reliable scientific evidence has emerged confirming its validity. The choice of coconut oil as the medium for this procedure is no accident. In contrast to the traditionally used sesame oil, coconut oil is characterized by higher organoleptic acceptability and a unique composition of fatty acids that exhibit direct biological activity [3][4].

1.1. Research objective

This paper aims to provide a detailed discussion of the biochemical mechanisms underlying the efficacy of coconut oil in the oral cavity and to analyze the results of the latest clinical studies and meta-analyses regarding its use in the prevention of dental caries and gum disease.

2. Materials and Methods

The preparation of this review was based on an analysis of the relevant literature collected through a search conducted in March 2026 in the following international databases: PubMed/MEDLINE, Scopus, Cochrane Library, and Google Scholar. The search strategy included the use of keywords consistent with MeSH descriptors, such as: Coconut Oil, Oral Hygiene, Periodontitis, Dental Caries, and Biofilm. The synthesis included publications in Polish and English published between 2016 and 2025, with particular emphasis on the most recent reports from the last three years. The main criterion for selecting sources was their methodological reliability; therefore, priority was given to randomized controlled trials (RCTs), meta-analyses, and systematic reviews. Anecdotal reports and studies in which the research methodology did not allow for an unambiguous interpretation of the results in terms of statistical significance were excluded.

2.1. AI

AI was utilized for two specific purposes in this research. Text analysis of clinical reasoning narratives to identify linguistic patterns associated with specific logical fallacies. Assistance in refining the academic English language of the manuscript, ensuring clarity, consistency, and adherence to scientific writing standards. AI were used for additional linguistic refinement of the research manuscript, ensuring proper English grammar, style, and clarity in the presentation of results. It is important to emphasize that all AI tools were used strictly as assistive instruments under human supervision. The final interpretation of results, classification of errors, and conclusions were determined by human experts in clinical medicine and formal logic. The AI tools served primarily to enhance efficiency in data processing, pattern recognition, and linguistic refinement, rather than replacing human judgment in the analytical process.

3. State of Knowledge

3.1. Biochemical Basis of the Oil Pulling Procedure

Understanding the effectiveness of coconut oil requires an analysis of the processes occurring at the interface between the oil phase and the aqueous phase (saliva) during dynamic rinsing. This process is not merely mechanical irrigation, but a complex physicochemical reaction.

Saponification Process

During the 10-20-minute rinse, coconut oil undergoes emulsification. Under the influence of the movements of the cheek muscles and tongue, the oil is broken down into microscopic

droplets. Enzymes-salivary lipases-play a key role here, initiating the hydrolysis of triglycerides into free fatty acids and glycerol. In the oral environment, which is slightly alkaline or neutral (depending on saliva secretion), fatty acids react with bicarbonates and other alkaline salts contained in saliva. This reaction results in the formation of natural surfactants (soap).

This phenomenon drastically reduces surface tension in the oral cavity. As a result, the “fatty soap” penetrates hard-to-reach areas-interdental spaces, fissures, and gingival pockets-effectively detaching bacterial biofilm from the surfaces of enamel and mucous membranes. Hydrophobic particles of debris and bacteria are trapped within oil micelles, allowing for their effective removal when the used oil is spat out [2][6].

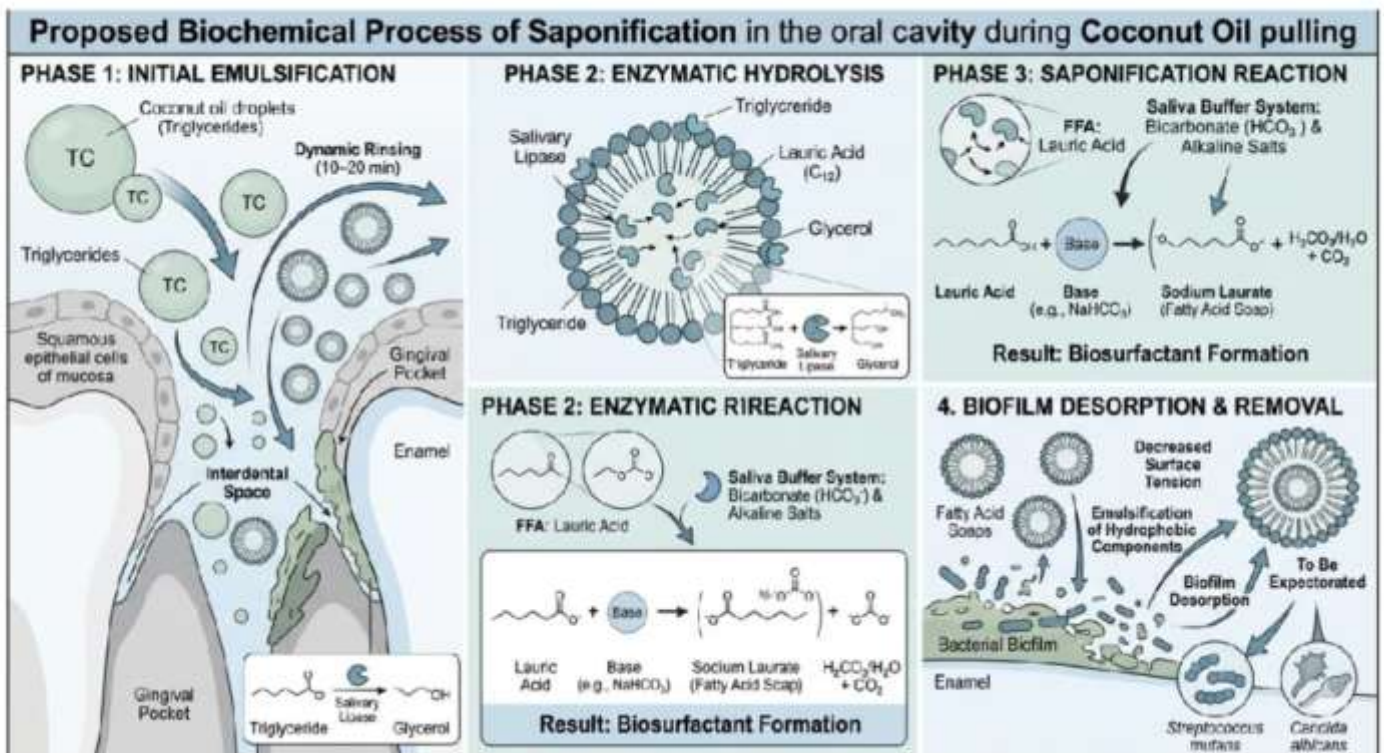


Figure 1. The biochemical mechanism of saponification in the mouth during the coconut oil pulling procedure

3.2. The Role of Lauric Acid and Monolaurin

Coconut oil stands out from other vegetable fats due to its exceptionally high lauric acid (C12) content, which accounts for approximately 48-52% of its composition. This acid has a unique ability to penetrate the cellular structures of microorganisms. When mixed with saliva, it transforms into monolaurin-a monoglyceride with proven strong antimicrobial activity. Monolaurin works by dissolving the lipid envelope of viruses (e.g., Herpes simplex) and disintegrating the cell membranes of Gram-positive bacteria. Of particular importance in dentistry is the inhibition of the growth of *Streptococcus mutans* strains, which are the main etiological factor in dental caries, and yeasts of the genus *Candida albicans*, responsible for prosthetic stomatopathies [1][5].

3.3. Clinical Efficacy in Reducing Plaque and Gingivitis

Modern evidence-based dentistry requires robust clinical evidence. In recent years, a series of comparative studies have been conducted that shed new light on oil pulling.

Srivastava et al. (2024) conducted a randomized controlled trial in which patients were divided into groups using coconut oil rinses and a 0.2% chlorhexidine solution. After 30 days of use, a significant decrease in the plaque index (PI) was observed in both groups. Although chlorhexidine showed a steeper decline in the GI (Gingival Index) during the first week, the differences between the groups were statistically insignificant after completion of the full cycle. A key finding of this study was the high patient acceptance of coconut oil due to the absence of a metallic aftertaste and discoloration, which is a common problem with CHX [2].

A meta-analysis conducted by Peng et al. (2019), incorporating data from several independent research centers, confirmed that OP using coconut oil is a highly predictable method for reducing the PI index. The authors emphasize that coconut oil can be safely used as a daily complementary practice, particularly in individuals for whom standard chemical mouthwashes cause mucosal hypersensitivity [4].

Parameter	Coconut Oil (Oil Pulling)	Chlorhexidine (CHX)
Plaque reduction (PI)	High (via saponification)	Very high (bactericidal)
Gingival impact (GI)	Effective (anti-inflammatory)	Effective (antiseptic)
Aesthetics (staining)	No risk	High risk after 14 days
Taste perception	Neutral / Pleasant	Possible dysgeusia
Microbiome	Modulation and selectivity	Non-selective eradication
Safety	Very high (edible)	Toxicity if swallowed

Table 1. Comparison of the effects of coconut oil and chlorhexidine (CHX) on oral parameters.

3.4. Effects on the microbiome and caries prevention

The oral microbiome is a dynamic ecosystem, and its complete sterilization is undesirable. Strong antiseptics can lead to dysbiosis, promoting colonization by opportunistic pathogens. Amanati et al. (2022) analyzed changes in the composition of the microbiome in coconut oil users. It was demonstrated that oil pulling does not act as an antibiotic. The mechanism primarily involves inhibiting bacterial adhesion to the tooth surface by forming a thin lipid layer on the enamel. Bacteria such as *S. mutans* lose their ability to effectively anchor themselves in the pellicle, which prevents the formation of mature dental plaque. Furthermore, coconut oil

helps maintain the physiological pH of saliva, which is a key factor in protecting against enamel demineralization [5]. In orthodontic patients wearing fixed braces, maintaining oral hygiene is hindered by numerous retention sites. In this group, OP offers particular benefits because the oil phase penetrates the areas around brackets and orthodontic arches more easily than aqueous solutions, reducing the risk of white spots (decalcification) [7].

3.5. Innovations: Lipid-based formulations in the treatment of mucosal disorders

Modern geriatric and oncological dentistry is seeking effective methods to alleviate the symptoms of xerostomia and opportunistic infections. Although coconut oil is valued for its antiseptic properties in oil pulling, its role is evolving toward supporting the integrity of the mucosal barrier. Quindós et al. (2019) indicate that lipid-based saliva substitutes are highly effective in forming a protective film on the surface of soft tissues, which is crucial in patients with salivary secretion disorders [3].

The use of vegetable oils as a base for therapeutic preparations is justified in the treatment of specific pathological conditions:

- Xerostomia: In patients with insufficient saliva production (e.g., due to Sjögren's syndrome or following radiation therapy), the high viscosity and hydrophobicity of the oils allow for long-lasting moisturization of the mucous membranes. The lipid barrier formed prevents mechanical trauma, painful fissures, and excessive water loss from tissues, which significantly improves patients' quality of life [3].

- Candidiasis and inflammation: The combination of lipids' barrier properties with their ability to inhibit microbial adhesion (including *Candida albicans*) makes them an essential component of adjunctive therapy in fungal infections. Lipids limit the availability of receptors for pathogens on the epithelial surface, which, combined with the anti-inflammatory action of lauric acid, may accelerate regenerative processes and the epithelialization of ulcers [1][3].

3.6. Practical aspects, safety, and limitations

Although the oil pulling procedure is safe, it requires a certain degree of discipline on the part of the patient. The optimal rinsing time (15-20 minutes) is based on the time needed for complete saponification and emulsification of the biofilm. Rinsing for too short a time may not yield the expected therapeutic benefits.

Safety profile: Coconut oil is an edible substance, which eliminates the risk of poisoning in case of accidental ingestion, which is crucial in pediatric dentistry. Naseem et al. (2017) emphasize

that this is one of the few antiseptic methods that is completely safe for pregnant women, who should avoid excessive exposure to chemicals that can enter the bloodstream [7].

Limitations and precautions: The main limitation is the risk of oil aspiration into the lungs (lipid pneumonia) if the procedure is performed incorrectly or in individuals with swallowing disorders. Patients should also be instructed not to spit the used oil down the drain, as its high melting point can cause blockages in plumbing systems. However, the most important clinical caveat is that oil pulling cannot replace mechanical tooth brushing with fluoride toothpaste, but should only serve as a supplement to it [6].

4. Conclusions

The literature review clearly indicates that coconut oil pulling is an effective, scientifically validated method that supports the prevention of periodontal disease and dental caries. Thanks to the saponification process and the unique activity of lauric acid, this method offers efficacy comparable to standard chemical mouthwashes, while lacking their side effects.

Key findings from the analysis:

Coconut oil effectively reduces plaque index (PI) and gingival inflammation (GI) scores, as confirmed by clinical studies and meta-analyses.

The procedure is exceptionally safe for high-risk groups (children, pregnant women) and patients with chemical hypersensitivity.

Oil pulling acts selectively on the microbiome, inhibiting the adhesion of cariogenic pathogens without causing oral sterility.

Innovations in the form of enriched oils open up new possibilities in the treatment of xerostomia and mucosal ulcers.

Incorporating oil pulling into daily preventive care recommendations can significantly improve the oral health of the population, offering a low-cost, bioavailable, and safe alternative to synthetic antiseptics.

Disclosure

Conceptualization, Natalia Smyczyńska ; methodology, Mikołaj Kubik; software, Wojciech Pondo; check, Aleksandra Jędras, Natalia Smyczyńska and Mikołaj Kubik; formal analysis, Natalia Smyczyńska; investigation, Aleksandra Jędras; resources, Natalia Smyczyńska; data curation, Wojciech Pondo; writing - rough preparation, Natalia Smyczyńska; writing - review

and editing, Mikołaj Kubik; visualization, Aleksandra Jędras; supervision, Natalia Smyczyńska and Mikołaj Kubik; project administration, Wojciech Pondo; receiving funding, no funding has been received. All authors have read and agreed with the published version of the manuscript.

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