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Where Traditional Medicine Meets Modern Dentistry: A Narrative Review of Evidence, Safety and Integration into Clinical Practice

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ABSTRACT :

Background: Traditional and complementary remedies remain widely used for oral self-care across Africa, Asia and the Middle East, and are increasingly encountered by dentists in multicultural settings such as South Africa. Patients frequently combine these remedies with conventional care, often without disclosure. **Objective:** To critically review the evidence for commonly used traditional oral health practices, compare them with conventional agents, and propose a safe framework for their integration into contemporary dental practice. **Methods:** A narrative review of peer-reviewed literature and international policy documents was undertaken, focusing on miswak (*Salvadora persica*), oil pulling, clove (eugenol), turmeric, green tea, neem and propolis. **Results:** Miswak shows plaque-reducing and antimicrobial effects broadly comparable to toothbrushing in some studies, supported by identifiable bioactive compounds. Oil pulling and several botanical rinses report reductions in plaque and gingival indices, but trials are generally small, short and at risk of bias. Eugenol has well-characterised analgesic and antimicrobial properties but is cytotoxic at higher concentrations. Systematic evidence indicates herbal products can reduce plaque and gingivitis, though certainty is limited, and chlorhexidine remains the benchmark antiplaque agent. Safety concerns include allergy, herb–drug interactions, inconsistent product quality and clearly harmful practices such as areca-nut chewing. **Conclusion:** Selected traditional practices may serve as low-cost adjuncts to, but not replacements for, mechanical plaque control, fluoride and professional care. A respectful, evidence-informed and non-judgemental approach, including routine enquiry about traditional remedy use, is recommended. Higher-quality trials and standardised formulations are needed.

Keywords: traditional medicine; dentistry; miswak; oil pulling; herbal oral care; integrative dentistry

1. Introduction

The World Health Organization (WHO) defines traditional medicine as the sum of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health and in the prevention, diagnosis and treatment of illness [1]. The WHO global report on traditional and complementary medicine documents that the large majority of Member States recognise the use of such practices within their populations, and that demand for integration with national health systems is growing [2]. Dentistry is not exempt from this trend. Oral diseases affect an estimated 3.5 billion people worldwide, with untreated caries and periodontal disease among the most prevalent conditions globally [3], and in many communities, traditional remedies are the first, and sometimes the only, form of oral self-care accessible to patients.

Natural products have historically been an important source of therapeutic agents, and they continue to inform modern drug discovery [4]. Several compounds now used in conventional dentistry, such as eugenol in restorative and endodontic materials, originate from traditional botanical practice. In South Africa, the traditional health sector is large and formally recognised, with the Traditional Health Practitioners Act providing a regulatory framework for practitioners [5]. The trade in medicinal plants is economically significant and involves a large number of species [6,7]. Dentists in private practice in such a setting regularly see patients who use chewing sticks, oils, spices, herbal rinses and other preparations, yet clinical training rarely equips practitioners to discuss these practices critically.

The research problem is therefore twofold. First, the evidence for traditional oral health practices is scattered across diverse study designs of variable quality. Second, there is little practical guidance on how clinicians should respond to patients who use them. The objective of this review is to appraise the current evidence for commonly used traditional oral health practices, to compare them with established conventional approaches, and to propose a practical, safety-focused framework for integration into modern dental practice.

2. Materials and Methods

2.1 Study design

This study is a narrative review. Because the aim was to synthesise a heterogeneous body of evidence spanning laboratory, clinical, anthropological and policy literature, a formal systematic review with meta-analysis was not undertaken. The PRISMA 2020 guideline was therefore not applied formally, although its principles of transparent reporting guided the selection and presentation of evidence [8].

2.2 Literature identification

Peer-reviewed literature was identified through searches of PubMed/MEDLINE, Scopus and Google Scholar using combinations of terms relating to traditional medicine, herbal medicine, dentistry, oral health, miswak, chewing sticks, oil pulling, clove, eugenol, curcumin, green tea, neem, propolis, plaque, gingivitis and chlorhexidine. Policy documents from the WHO and relevant South African legislation were also consulted. The reference lists of key articles and systematic reviews were hand-searched for additional sources.

2.3 Selection and appraisal

Priority was given to systematic reviews, randomised controlled trials and authoritative narrative reviews published in English. Laboratory and observational studies were included where they clarified mechanisms or safety. Practices were selected for discussion on the basis of widespread use, relevance to the South African and wider Muslim, African and Asian patient populations, and availability of published dental evidence. Evidence was appraised qualitatively, with attention to sample size, study duration, comparator used and risk of bias. No quantitative pooling was performed.

2.4 Ethical considerations

This review was based exclusively on published literature and involved no human participants, patient data or animal experimentation. Ethical approval and informed consent were therefore not required.

3. Results and Discussion

3.1 Overview of traditional oral health practices

Traditional oral health practices fall broadly into three groups: mechanical cleaning aids (chewing sticks), topical or rinsing preparations (oils, herbal rinses and pastes) and locally applied analgesic or antimicrobial agents (clove and propolis). The principal practices, their reported dental use and the strength of supporting evidence are summarised in Table 1 at the end of Section 3.5 and discussed individually below.

3.2 Miswak (*Salvadora persica*) and chewing sticks

Chewing sticks are among the oldest oral hygiene tools in the world and remain in daily use in parts of Africa, the Middle East and South Asia [9,10]. The miswak, prepared from the roots, twigs or stems of *Salvadora persica*, holds particular cultural and religious significance in Islamic tradition, which encourages its regular use [9,12]. Its use is also acknowledged by international health bodies as a practical option where access to conventional toothbrushes is limited [9,10].

Studies conducted among Saudi Arabian populations reported that miswak users exhibited plaque and gingival indices comparable to, and in some outcomes better than, those of toothbrush users, although outcomes depended heavily on technique and frequency of use [11]. A review of the literature by Halawany concluded that miswak has demonstrable antibacterial and plaque-reducing effects, but noted heterogeneity in study design and a need for better-controlled trials [12]. Mechanistic work has identified benzyl isothiocyanate as a major antimicrobial compound in *S. persica* roots, with notable activity against Gram-negative bacteria associated with periodontal disease [13].

From a clinical standpoint, miswak should be regarded as a legitimate mechanical and chemical adjunct rather than a substitute for fluoride toothpaste, since the fluoride delivered by conventional dentifrices remains central to caries prevention. Patients should be advised to trim and renew the working end regularly, to avoid excessive force that may cause gingival trauma, and to avoid sharing sticks. Where a patient prefers miswak for cultural or religious reasons, it can be respectfully combined with fluoride toothpaste use.

3.3 Oil pulling

Oil pulling, an Ayurvedic practice, involves swishing edible oil, most commonly sesame or coconut, in the mouth for several minutes before expectoration. A randomised, triple-blind study reported reductions in plaque and gingival scores in adolescents with plaque-induced gingivitis following daily oil pulling [14]. A preliminary study of coconut oil reached a similar conclusion [15]. However, a systematic review of coconut oil pulling concluded that the available trials were small, short in duration and at risk of methodological bias, and that the evidence was insufficient to support firm recommendations [16].

Proposed mechanisms include mechanical disruption of plaque, reduced bacterial adhesion and a saponification-like effect of oil on salivary components, although these remain incompletely substantiated. Oil pulling appears to carry low risk when practised correctly, though patients should be warned not to swallow the oil and should be advised that the practice must never replace brushing or interdental cleaning. Reports of lipoid pneumonia from aspiration are rare but illustrate the need for sensible instruction.

3.4 Clove and eugenol

Clove (*Syzygium aromaticum*) is perhaps the clearest example of a traditional remedy that has been absorbed into mainstream dentistry. Its principal constituent, eugenol, has well-characterised analgesic, anti-inflammatory and antimicrobial properties and has been used for centuries for toothache [17]. Eugenol-containing materials remain in use in dentistry as temporary restorations, root-canal sealers and medicated dressings [18], and eugenol-impregnated dressings are among the agents used in the management of alveolar osteitis [19].

The pharmacology of eugenol also illustrates the need for caution. Experimental work shows that eugenol and zinc oxide–eugenol have biologically useful analgesic and antimicrobial effects at low concentrations but can be cytotoxic and irritating to soft tissues at higher concentrations [18]. Patients who apply whole cloves or undiluted clove oil directly to gingival tissue or into carious cavities may therefore cause mucosal burns or pulpal irritation. A balanced message is that clove oil may offer short-term symptomatic relief, but it does not treat the underlying cause of dental pain, and such patients still require timely clinical assessment.

3.5 Other botanical agents: turmeric, green tea, neem and propolis

Several other botanicals have been studied as adjuncts in the management of gingivitis and periodontitis. A pilot study of curcumin, the principal active compound of turmeric, in patients with chronic gingivitis reported reductions in plaque and gingival scores [20]. Local delivery of green tea catechins as an adjunct in periodontal treatment has been associated with improvements in periodontal parameters in a small clinical pilot study [21]. A randomised trial of a neem (*Azadirachta indica*) mouthrinse reported reductions in plaque and gingivitis in patients with plaque-induced gingivitis [22]. Propolis, a resinous material collected by bees, has been investigated for antimicrobial, anti-inflammatory and wound-healing applications across several areas of oral health [23].

Collectively, these findings are encouraging but preliminary. Most studies involve small samples, short follow-up and non-standardised preparations, which limits comparability and clinical generalisation. Table 1 summarises the principal practices and the strength of the available evidence.

Table 1. Summary of selected traditional oral health practices, reported dental use and strength of evidence.

Practice	Key constituents or mechanism	Reported dental use	Evidence and caveats
Miswak (<i>Salvadora persica</i>)	Mechanical action; benzyl isothiocyanate and other phytochemicals	Daily oral hygiene aid; plaque and gingivitis control	Moderate to limited; small clinical studies; technique-dependent [9–13]
Oil pulling (sesame, coconut)	Edible oils; mechanism incompletely understood	Adjunct for plaque and gingivitis	Limited; small, low-quality trials [14–16]
Clove (<i>Syzygium aromaticum</i>)	Eugenol	Topical analgesia; antimicrobial; dressings	Established pharmacology; cytotoxic at high concentration [17–19]
Turmeric	Curcumin	Adjunct in gingivitis	Preliminary; pilot data [20]
Green tea	Catechins	Adjunct in periodontal therapy	Preliminary; pilot data [21]

Practice	Key constituents or mechanism	Reported dental use	Evidence and caveats
Neem (<i>Azadirachta indica</i>)	Plant extracts	Mouthrinse for gingivitis	Preliminary; limited trials [22]
Propolis	Bee resin flavonoids	Antimicrobial; wound healing	Preliminary; allergy risk [23]

3.6 Comparison with conventional agents

Chlorhexidine remains the benchmark chemical antiplaque agent, although its long-term use is limited by extrinsic tooth staining, altered taste and, with prolonged use, mucosal desquamation [24]. A systematic review and meta-analysis of herbal oral care products found that they can reduce plaque and gingivitis compared with placebo, but the certainty of this evidence was limited and heterogeneity between products was considerable [25]. Herbal agents have therefore not displaced established chemical or mechanical methods. Their most defensible role is as acceptable, low-cost adjuncts, particularly for patients who value natural or culturally familiar products and who may therefore be more likely to adhere to oral hygiene advice.

3.7 Safety, quality and regulation

The perception that natural products are inherently safe is an important misconception. Herbal products may cause allergic reactions, may interact with prescription medicines and are subject to variable quality, contamination and adulteration, particularly where regulation and pharmacovigilance are weak [26]. Dentists should be alert to interactions relevant to dental care, for example products with antiplatelet or anticoagulant activity before surgical procedures, and to the possibility of unreported use of herbal remedies by patients who fear a negative reaction from the clinician.

Some traditional practices are clearly harmful. Betel-quid and areca-nut chewing, widespread in parts of Asia and among diaspora communities, has been classified as carcinogenic to humans and is associated with oral submucous fibrosis and oral cancer [27]. Dentists should therefore distinguish between practices that can be supported, those that can be tolerated with advice and those that must be actively discouraged. In South Africa, the Traditional Health Practitioners Act establishes a framework for regulating practitioners [5], but the quality and standardisation of individual traditional products remain a matter of concern, and WHO strategy documents likewise emphasise the need for evidence, quality assurance and safe practice [1,2].

3.8 A practical framework for integration

Based on the evidence reviewed, a pragmatic approach for the dental practitioner is proposed. First, clinicians should routinely and non-judgementally ask patients about the use of traditional and herbal remedies, including chewing sticks, oils, rinses and ingested products, and record them in the clinical notes. Second, practices with plausible benefit and low risk, such as miswak and oil pulling, can be accommodated as adjuncts, provided patients continue to brush with fluoride toothpaste and clean interdentally. Third, practices with known harm, such as areca-nut use, or which delay necessary treatment, such as repeated reliance on clove oil for persistent pain, should be addressed with clear and respectful advice. Fourth, clinicians should consider potential interactions and allergies before prescribing or performing surgical procedures. Finally, where appropriate, collaboration and mutual respect between dental practitioners and traditional health practitioners may improve referral pathways and patient outcomes.

Culturally sensitive communication is central to this framework. Dismissing a patient's traditional practices may damage trust and drive disclosure underground, whereas respectful enquiry allows the clinician to reinforce evidence-based preventive measures while minimising harm.

3.9 Limitations and research gaps

This review has several limitations. As a narrative review, it is subject to selection bias, and the literature search was not exhaustive or registered. Only English-language sources were prioritised, which may under-represent regional traditional practices documented elsewhere. The underlying clinical studies are generally small, short and heterogeneous, which constrains the strength of any conclusion. Future research should prioritise adequately powered randomised trials with standardised preparations, defined comparators and clinically meaningful outcomes, studies of interaction with conventional care and research that documents traditional oral health practices in African populations, including South African communities, where published dental evidence remains limited.

4. Conclusion

Traditional medicine and modern dentistry are not opposing systems but overlapping ones, with a shared interest in reducing the burden of oral disease.

Miswak, oil pulling and several botanical agents show biologically plausible and, in some cases, clinically supported benefits, whereas eugenol demonstrates how traditional knowledge can become established dental practice. However, the clinical evidence is mostly of limited quality, and traditional remedies carry real risks if used uncritically. Selected practices can reasonably be supported as adjuncts to, but not replacements for, mechanical plaque control, fluoride and regular professional care. Dentists should adopt an open, culturally sensitive and evidence-informed approach, and the research community should prioritise rigorous trials and standardised formulations.

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7. Conflict of Interest

The author declares no conflict of interest.

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