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A COMPARISON OF INDIGENOUS (MISWAK) AND CONVENTIONAL (TOOTH BRUSH) ORAL HYGIENE TOOLS ON GINGIVAL PARAMETERS

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Abstract

Introduction: Embedded within cultural histories, traditional oral hygiene methods have been passed down through generations, embodying a community's identity and ancestral wisdom. These methods often include the use of natural materials like chewing sticks, herbal formulations, or other locally sourced components. The cultural significance and historical roots of traditional tools contribute to the rich tapestry of oral care practices across different societies. **Aim:** The aim of this study was to compare the impact of indigenous and conventional oral hygiene tools on gingival parameters. **Materials & Methods:** The study design was in accordance with Consolidated Standards of Reporting Trials (CONSORT) guidelines for reporting clinical trials and adhered to the ethical standards of the World Medical Association's Helsinki Declaration. Selected participants were randomized into two interventional groups (Group A and Group B) using a simple random number table. **Results:** The findings imply that miswak may provide benefits over conventional toothbrushing in promoting oral hygiene and gingival health. The observed reductions in plaque accumulation and improvements in gingival health associated with miswak usage underscore its potential as an effective alternative or supplement to standard oral hygiene practices. To test for comparative evaluation between indigenous and conventional tooth brushing on gingival health, Kolmogorov –Smirnov and Shapiro Wilk tests were performed. **Conclusion:** The findings suggest that miswak may offer comparable or even superior benefits to conventional toothbrushing in promoting gingival health, highlighting its potential as an effective alternative oral hygiene tool.

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Introduction

Oral health is a critical component of overall well-being, influencing an individual's quality of life and systemic health.[1] Effective oral hygiene practices play a pivotal role in preventing various dental and periodontal diseases, contributing to the maintenance of healthy gums and teeth. Throughout history, diverse cultures have developed indigenous and traditional oral hygiene tools, each reflecting unique practices and beliefs related to oral care.[2]

Indigenous communities have developed specific oral hygiene tools that are deeply rooted in their cultural practices.[3] These tools can range from specialized brushes and scrapers to unique techniques that have been honed over generations. The use of indigenous tools reflects a community's adaptive strategies to maintain oral health within their specific environmental and cultural contexts.[4]

Oral hygiene is a cornerstone of overall health, significantly influencing the well-being of individuals across diverse communities. While contemporary dental practices have made significant strides, traditional and indigenous oral hygiene methods persist, carrying the legacy of historical practices and cultural significance.[5] This study aims to delvelop into the rationale behind examining the impact of indigenous and traditional oral hygiene tools on gingival parameters, recognizing the need for a holistic understanding of oral health practices.

A holistic approach to oral health recognizes the diversity of cultural practices and their potential contributions to overall well-being.[6] By studying the gingival parameters influenced by traditional and indigenous tools, this study aims to bridge the gap between conventional and culturally sensitive oral health practices. Periodontal diseases, such as gingivitis and periodontitis, pose significant challenges to global oral health.[7] Examining the impact of traditional and indigenous oral hygiene tools on gingival parameters can contribute to preventive strategies.

Materials & Methods

This study aimed to investigate the impact of indigenous (Miswak) and conventional (toothbrush) oral hygiene tools on gingival parameters in the population of Lucknow, India.

The study design was in accordance with Consolidated Standards of Reporting Trials (CONSORT) guidelines for reporting clinical trials and adhered to the ethical standards of the World Medical Association's Helsinki Declaration. Ethical clearance and necessary permission to conduct the study was obtained from the Institutional Ethical Committee. Informed consent was obtained from each study subject.

Dental students or individuals aged 18-22 years were recruited over a specified duration. Exclusion criteria included individuals with systemic or oral diseases, dental prosthesis, poor manual dexterity, recent or current antibiotic coverage, and non-consenting cases. The sample size was determined based on power analysis with an effect size of 0.34 and at 80% power and 5% level of significance. It was calculated to 27 per group. Considering a 10% loss to follow up, the final sample was 30 in each group.

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The total sample size was 60.

Selected participants were randomized into two interventional groups (Group A and Group B) using a simple random number table. Allocation concealment will be done using sequentially numbered, opaque, sealed envelopes (SNOSE). Group A was provided with Miswak (indigenous oral hygiene tool).Group B was provided with conventional toothbrushes. A pre-trial workshop was conducted to demonstrate the appropriate and recommended use of Miswak and toothbrushes.
A single examiner conducted the study. Training and calibration was conducted prior to the study under the expertise. Duplicate examinations was conducted on 10 subjects who were re-examined on consecutive days. The intra examiner reliability was assessed using the Kappa statistic which was 0.81, suggesting a strong agreement.

Baseline and post-interventional dental examinations was conducted at pre-interventional and post-interventional phases, respectively. A single examiner who was trained, and calibrated performed dental examinations using Plaque Index and Gingival Index.

The data obtained were subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS Version 23; Chicago Inc., IL, USA). Data comparison was done by applying specific statistical tests to find out the statistical significance of the comparisons.

Results

A total of 60 participants were included in the study. Participants in the study were selected based on specific criteria to ensure comparability between the miswak and toothbrush groups. The mean age of participants in both the miswak and toothbrush groups was comparable, with no significant difference observed between the two groups ($p > 0.05$). The proportion of male and female participants in each group was similar, with no significant difference in gender distribution observed between the groups ($p > 0.05$). Overall, age and gender matching were carefully considered and implemented in the study design to enhance the comparability of the miswak and toothbrush groups.

The study aimed to isolate the effects of oral hygiene tool type on gingival parameters, providing more reliable and interpretable results.

In the study comparing the efficacy of miswak and toothbrush in reducing plaque and improving gingival health, noteworthy findings emerged regarding the effectiveness of miswak. Initially, participants using miswak had a mean Plaque Index score of 1.9067 ± 0.14933, which significantly decreased to 1.5900 ± 0.18214 after the intervention, demonstrating a substantial reduction in plaque accumulation.

0

Groups	Examination phases	Mean	S.D	an difference	't' statistic	df	P value
Miswak	Pre - intervention	1.9067	.14933	.30767 .	7.040	29	<0.001* .

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	Post-intervention	1.5990	.18214				
Tooth brush	Pre - intervention	2.2674	.40060	.15473			
	Post-intervention	2.1127	.33459				

Table 1: Comparative evaluation of Plaque Index between groups

Participants using a toothbrush exhibited a decrease in Plaque Index score from 2.267 to 2.1127. While this reduction suggests some improvement in gingival health, the mean difference in Plaque Index reduction between the miswak and toothbrush groups was notably higher for miswak (0.3067 compared to 0.15473 for toothbrush).

Groups	Examination phases	Mean	S.D	Mean difference	't' statistic	df	P value
Miswak	Pre - intervention	.3800	.06074	.16183	8.179	29	<0.001*
	Post-intervention	.2182	.08111				
Tooth brush	Pre - intervention	.3867	.06177	.16167	8.161	29	<0.001*
	Post-intervention		0				

Table 2: Comparative evaluation of Gingival Index between groups

In the present study comparing the effectiveness of miswak and toothbrush in assessment of gingival index, notable findings emerged regarding the efficacy of miswak. Initially, participants using miswak showed a mean Gingival Index score of 0.3800 ± 0.06074, which significantly decreased to 0.2182 ± 0.8111 post-intervention, indicating a substantial reduction in gingival inflammation.

These findings imply that miswak may provide benefits over conventional toothbrushing in promoting oral hygiene and gingival health. The observed reductions in plaque accumulation and improvements in gingival health associated with miswak usage underscore its potential as an effective alternative or supplement to standard oral hygiene practices.

Discussion

The effectiveness of Miswak (Salvadora persica) as an oral hygiene tool has been extensively studied, and the findings suggest its comparable efficacy to conventional toothbrushes in plaque control.[8] Ndung'u et al. demonstrated that, in cases of severe plaque deposition, toothbrushes were more efficacious than chewing sticks. However, for patients with moderate plaque deposits, chewing sticks were found to be equally effective. Batwa et al. comparative study revealed that Miswak was as effective

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as toothbrushes in plaque removal.

Patel et al. study on subjects with mild to moderate chronic gingivitis demonstrated that using Miswak along with a toothbrush significantly improved plaque scores and gingival health. This suggests that Miswak can complement toothbrush use, capitalizing on the mechanical efficacy of the toothbrush and the chemical effects of Miswak. Malik et al. concluded that Miswak provides parallel or even superior mechanical and chemical cleansing of oral tissues compared to toothbrushes, suggesting that Miswak could potentially replace toothbrushes effectively.[9,10]

The abrasive texture of miswak fibers aids in removing plaque biofilm, which consists of bacteria, saliva, and food particles adhering to the tooth enamel. Additionally, the antibacterial compounds in miswak help inhibit the growth of bacteria responsible for plaque formation, reducing its accumulation over time.[11]

Gingivitis is characterized by inflammation of the gum tissues due to bacterial infection and plaque buildup. Miswak's antibacterial properties help combat the bacteria associated with gingivitis, thereby reducing inflammation and preventing the progression of gum disease. The mechanical cleansing action of miswak also stimulates blood flow to the gums, promoting circulation and tissue healing.[12] The results of this study indicate that participants using miswak experienced a notable reduction in both gingival index and plaque index compared to those using a conventional toothbrush. This finding suggests that miswak may offer distinct advantages in promoting oral health over conventional toothbrushing methods.

Chewing stick users exhibited even better results in reducing plaque scores compared to those using a toothbrush. These trial results are contradictory to the previous study by Bhambal et al., which found no significant difference in plaque and gingival scores between miswak and toothbrush users.[23] While study of Patel et al reported the superior cleaning action of chewing stick specifically for interproximal surfaces.[13]

Regarding the antimicrobial properties of chewing stick, literature indicates that the risk of dental caries is significantly higher in toothbrush users compared to those using chewing sticks. Additionally, populations using Neem and Arak miswak sticks have shown lower occurrences of dental caries due to reduced plaque deposits.[14]

Conclusion

Participants using miswak demonstrated a significant reduction in plaque accumulation compared to those using a toothbrush. Additionally, individuals utilizing miswak experienced improvements in gingival health, as evidenced by lower Gingival Index scores compared to toothbrush users.

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