



Effects of tongue cleaning on Ayurvedic digestive power and oral health-related quality of life: A randomized cross-over study



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ABSTRACT

Objectives: The effect of tongue cleaning on digestive power is mentioned in Ayurvedic information sources. However, no study has yet evaluated this. We aimed to evaluate the effects of tongue cleaning on digestive power from Ayurvedic viewpoint, and on oral health-related quality of life (OHRQoL) in healthy adults.

Design: Randomized cross-over.

Interventions: We recruited healthy adults aged 20–60 years. After randomization, the immediate intervention group started tongue cleaning with a tongue scraper every morning for 4 weeks, and then waited for 4 weeks. The delayed intervention group initially waited for 4 weeks, and then started tongue cleaning in the same way.

Main outcome measures: We assessed the outcomes using the questionnaire on digestive power from Ayurvedic viewpoint, and the General Oral Health Assessment Index for OHRQoL. We estimated the effects of tongue cleaning using generalized estimating equations (GEE). We also conducted a sensitivity analysis, by comparing the changes in outcomes during the first 4 weeks of both groups.

Results: Of 58 participants, 57 completed the study. In GEE analysis, tongue cleaning showed improvement in some components of Ayurvedic digestive power represented by fecal and body conditions. For example, the odds ratio for improvement of constipation was 2.80 (95% CI: 1.04–7.58). The General Oral Health Assessment Index score was significantly increased by 4.33 points (95% CI: 2.18–6.48) after tongue cleaning. In sensitivity analyses, the trends of the results were similar to the main GEE analyses.

Conclusions: Tongue cleaning may be an effective method to improve digestive power and OHRQoL.

1. Introduction

Ayurveda emphasizes the importance of personal hygiene to maintain and promote health. According to Ayurveda under the chapter of Dinacharya (daily regimen), tongue cleaning in the morning is one of the personal hygiene procedures that should be performed daily.¹ Tongue cleaning is an age-old custom practiced in countries like India as part of a daily routine for oral hygiene.² A classic Ayurveda textbook mentions that the root of the tongue should be scraped regularly to remove the dirt from the tongue that causes a foul smell and the obstruction of expiration.¹ Clinical studies in the dental and oral fields have supported this description of the effects of tongue cleaning, such as reducing halitosis,^{3–6} coated tongue,^{4,6} and bacterial flora in the tongue coating and dental plaque.^{7,8} Websites that provide information on Ayurveda further state that tongue cleaning causes the improvement of digestive power.^{9–12} This is reportedly because tongue cleaning thins

the tongue coating that covers the taste buds, so the sense of taste and satisfaction with meals improves, and accordingly we will not eat more than necessary. By eating properly, digestive power is maintained and undigested food materials, commonly known as Ama in Ayurvedic terminology, are not accumulated in the body.

Previous intervention studies on tongue cleaning have mostly evaluated the effects on reducing halitosis, coated tongue,^{3–6} or bacterial flora in saliva and coated tongue.^{7,8} To the best of our knowledge, no study has prospectively evaluated the effect of tongue cleaning on digestive power. We also assumed that when the oral environment is improved by tongue cleaning, the oral health-related quality of life (OHRQoL) will improve. However, we could not find any previous study that evaluated this. The objective of this randomized, cross-over, controlled trial was to prospectively evaluate the effects of tongue cleaning in healthy adults on digestive power from an Ayurvedic point of view and on OHRQoL.

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2. Methods

2.1. Study design and participants

We employed a randomized, cross-over, controlled design¹³ to examine the effects of tongue cleaning on digestive power and OHRQoL. As this was an exploratory study, pre-calculation of the sample size was not done due to unavailability of information on effect size.

We recruited adult participants aged between 20 and 60 years at the time of recruitment who had experienced lassitude, tiredness, daytime sleepiness, and/or anorexia in the past month. The exclusion criteria were: taking treatment for any underlying disease like diabetes or hypertension; pregnancy; taking or planning to take oral treatment during the study period; history of artificial tooth or dental implant treatment within 6 months, or having any problem arising from such treatment even after 6 months; taking medicines, supplements and/or food continuously every day for at least 1 month that are considered to influence the digestive system by improving the intestinal environment (e.g., yogurt, lactic acid bacteria beverage); antibiotic treatment within the past month; already practicing tongue cleaning; pain or inflammation of the tongue; titanium allergy.

Participants were recruited through posters placed on the noticeboards of Okayama University, flyer distribution in nearby areas, and an announcement placed on our homepage. The participants were fully informed about the study, and all participants provided written informed consent.

After enrollment, participants were randomly allocated to either the immediate intervention group (IIG) or the delayed intervention group (DIG). Allocation was done by block randomization with four participants per block,¹⁴ using a random number table,¹⁵ to enable equal allocation as far as possible. The IIG immediately started the tongue cleaning intervention for 4 weeks, and then stopped performing tongue cleaning for the subsequent 4 weeks. The DIG initially waited for 4 weeks, and then performed the intervention for 4 weeks (Fig. 1). We did not set a washout period. The study period was from July 2016 to March 2017.

Approval for this study was obtained from the institutional ethics

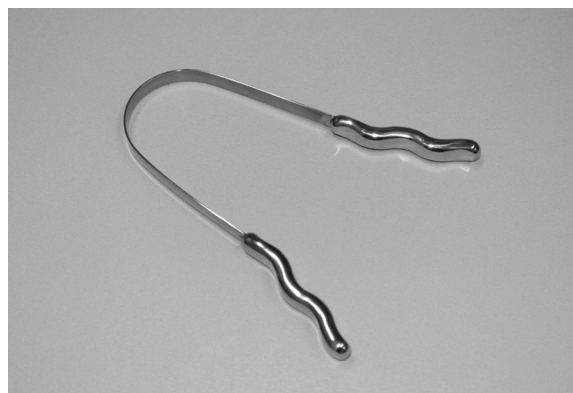


Fig. 2. Photograph of the titanium tongue scraper. The U-shaped center of the scraper was placed on the dorsum of the tongue and pulled forward to the tip of the tongue with gentle force; this was repeated five times to cover the whole tongue surface.

committee of Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences and Okayama University Hospital (R1606-005).

2.2. Tongue cleaning procedure

We asked participants to perform tongue cleaning at their home once daily before breakfast (or before tooth brushing if they did not eat breakfast) for 4 weeks. Tongue cleaning was done using a U-shaped titanium tongue scraper (Centrea Inc., Niigata, Japan) (Fig. 2). Although silver or stainless steel tongue scrapers are conventionally commonly used, we selected a titanium one that is considered more biocompatible,¹⁶ taking into account the possibility of allergy to other metals.

We instructed participants to perform tongue cleaning as follows: 1. grasp both handles at the ends; 2. put the tongue out and place the center of the scraper on the dorsum of the tongue, as far posteriorly as possible, but not to the point that would induce gagging; 3. pull the scraper slowly forward to the tip of the tongue with very gentle force on

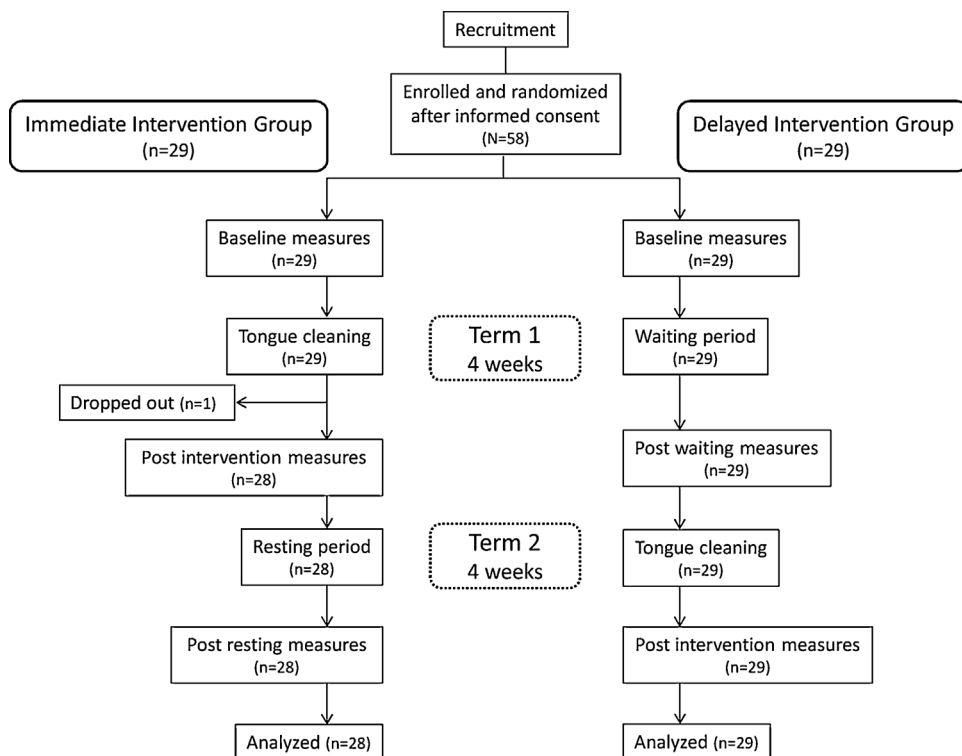


Fig. 1. Flow chart of the 58 participants throughout the trial.

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