Reliability, Accuracy, and Use Frequency of Evaluation Methods for Amount of Tongue Coating*

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ABSTRACT Objective: To classify the evaluation methods for amount of tongue coating (TC) and investigate their reliability, accuracy, and frequency of use. Methods: Articles published from 1985 to 2015 were searched for evaluation methods for the amount of TC in PubMed and the Cochrane Library. Only clinical researches were included except protocol articles. The methods were classified according to their characteristics. Results: Finally, 113 articles were selected. The evaluation method for the amount of TC from the articles was classified into 4 types: intuitive, specificative, computerized, and weighing TC. The reliability in the intuitive and specificative methods (κ =0.33–0.92) showed varying levels among the studies. In general, the amount of TC calculated by the specificative method (Spearman’s r=0.68–0.80) was more strongly related to the directly measured value than to the value estimated by the computerized method (Pearson’s r=0.442). The number of articles published on this topic has increased consistently, and the specificative method was the most frequently used. Despite the higher reliability of the computerized method, it has not been widely used. Conclusions: The high prevalence of the specificative method would continue in clinical practice because of its convenience and accuracy. However, to establish higher reliability, the limitation of the subjectivity of the assessors should be overcome through calibration training. In the computerized method, novel algorithms are needed to obtain a higher accuracy so that it can help the practitioners confidently estimate the amount of TC.

KEYWORDS tongue coating, evaluation methods, reliability, accuracy, frequency

Tongue diagnosis is used as an important diagnostic method in traditional Korean medicine (TKM) and Chinese medicine (CM) because the tongue rapidly reflects physiological and pathological changes in the human body.

The tongue is classified into tongue body and tongue coating when it is examined. Tongue coating (TC) is the fur-like matter attached to the dorsum of the tongue; it consists of bacteria, metabolites, exfoliated epithelium, leukocytes, and food waste. When the practitioner examines the TC, its amount, color, humidity, and exfoliation are considered. Among these factors, the amount of tongue coating (ATC) is one of the primary diagnostic points. In TKM and CM, TC is related to the internal organs, especially digestive organs, and the ATC reflects the severity of disease. In Western medicine, the main reason for evaluating TC is to assess the sanitary conditions in the oral cavity; the ATC influences the severity of halitosis and might be a risk factor for diseases such as pneumonia.

For these clinical uses, various methods have been developed for evaluating ATC. Until now, researchers have used different methods for evaluating ATC; however, their reliability and accuracy have not been consistent in terms of study results. This has hindered researchers from discussing their findings with a high degree of accuracy.

There are some previous reviews dealing with the evaluation of TC; however, they did not focus on evaluating TC, especially the ATC. Therefore, the purpose of this study was to classify the methods of evaluating ATC, and to investigate their reliability and accuracy, and the frequency of their use. Additionally, we want to present ideas to improve the evaluation methods for ATC on the basis of the information from our investigation.

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*Supported by the New Researcher Support Program through the National Research Foundation of Korea Funded by the Ministry of Science, ICT & Future Planning, Republic of Korea (No. NRF-2013R1A1A0599550)

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DOI: https://doi.org/10.1007/s11655-018-2552-y
METHODS

In January 2016, we searched for articles involving the evaluation methods for ATC, published during the past 30 years, from two online databases, PubMed and the Cochrane Library. The search words were ‘tongue coating’ or ‘tongue coat’ or ‘tongue fur’, accompanied by words such as ‘thickness’, ‘amount’, ‘evaluation’, ‘assessment’, ‘score’, and ‘index’. Only articles written in English were included. We finally selected a total of 113 articles. The earliest of the selected articles was published in 1992; we could find no article matching the criteria before 1992. In some articles in the final selection, the authors did not describe the details of the method they used, but cited other papers using the evaluation methods for ATC; in those cases, we reviewed the cited papers to ascertain the details of the methods, although these articles were not included in the selection criteria. The search process is outlined in Figure 1. The methods were classified according to their characteristics, and then their reliability, accuracy, and frequency of use were investigated.

RESULTS

Classifications of Evaluation Methods for ATC

The evaluation method for ATC from the articles was classified into 4 types: (1) the intuitive method; (2) the specificative method; (3) the computerized method; and (4) the weighing TC method, i.e., scraping the TC and then measuring its physical weight. The criteria for more detailed classification were the following: ways and numbers of division; range of the score; and evaluation indices (thickness/distribution/both thickness and distribution). The summary of each method for evaluating ATC is illustrated as Figure 2.

Intuitive Method

This method involved practitioners observing the