

Aspects of Mouth Dryness

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Abstract: The purpose of this study is to examine that a boundary range of mouth dryness symptom objectively divided into dry mouth or not. Eighty-six volunteers over 60 years old participated. Questionnaire for dryness and medication were asked. Dentists performed clinical optical diagnosis. Wetness on tongue and moisture of mucous membrane were examined respectively with Saliva Wet Tester and Moisture Checker. The ratio divided into dryness in the subjective symptom, the clinical diagnosis, Saliva Wet Tester, and Moisture Checker was 19.7%, 4.03%, 34.9%, and 68.6% respectively, and the ratio of normal was 65.8%, 57.0%, 24.4%, and 17.4%. A correct classification rate was 77.9% by the discriminant analysis using clinical diagnosis as criterion variable and the score of Saliva Wet Tester and of Moisture Checker as explanatory variables. Distribution of discriminant score suggested that other factors should be joined to them for classification in a boundary range.

Introduction

The rapidest aging in the world progresses by now in Japan. Mouth dryness symptom is popular in old population. There are differences between the ratio of patient's appeal and that of the doctor's diagnosis, so that some parts of patients were out of treatment. The cause and symptom of mouth dryness is various. Consultation rate in Japan shows that the numbers of patients like cardiovascular disease, increase rapidly near 60 years old¹⁾. Medication for old patients often caused dry mouth. The objective inspection value obtained by improvement of the diagnostics, the inspection tools and the classification of mouth dryness need to promote a correct diagnosis by general dentist. In this study, the difference between patient's appeal and clinical diagnosis, and the relation between each inspection values were discussed.

Materials and methods

Eighty-six of volunteers, who were 60 years old or more (average age, 75.5 years old), were participated. Questionnaire for mouth dryness and medication, an ocular inspection by dentists and mouth wetness and moisture of mouth mucous membrane were performed. When missing data was found, it was excluded from the analysis of item. Subjective dryness symptoms were assessed as either no symptom (0), slight dryness or sometimes (1) and continuous dryness (2). A dentist diagnosed clinically as normal (-), boundary (+/-) or dry (+) for dry mouth by ocular inspection of mouth mucous membrane. Mouth wetness on the tongue was measured with Saliva Wet Tester (Elsalivo, The LION Foundation For Dental Health, Japan) for 10sec. They were classified in normal (3mm or more), boundary (from 1mm to less than 3mm), hyposalivation and mouth dryness (from 0 mm to less than 1 mm) according to Kakinoki *et al.*²⁾ Moisture of mouth mucous membrane of tongue were examined using Moisture Checker for Mucous(Life Ltd, Japan). They were classified in normal (30 or more), boundary (from 29 to less than 30) and dry (29 or less) according to Kakinoki *et al.*²⁾

Results and discussion

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The ratio of either categories in the subjective symptom, the clinical diagnosis, Saliva Wet Tester, and Moisture Checker judged dryness respectively were 19.7%, 43.0%, 34.9%, and 68.6%. The ratio of either categories judged it was normal were 65.8%, 57.0%, 24.4%, and 17.4% (Fig. 1). There was a difference among the assessment techniques of dryness. Especially Moisture Checker assessed as dryness about two-thirds of participants. Distribution of value of Saliva Wet Tester and Moisture Checker for Mucous shows in Fig. 2.

The relation between patient's appeal and clinical diagnosis showed Table. It was obviously corresponding to the clinical diagnosis in the person who had a continuous dryness excluding one case. Therefore, the clinical diagnosis is easy for the patient with continuous dryness. However 41% of the person with no subjective dryness symptom in the mouth was classified dryness by the clinical diagnosis. The half of the patient assessed as boundary by clinical diagnosis have dryness symptom.

Saliva Wet Tester assessed 67% percent of the person with continuous dryness as dryness. Eighty-seven percent of person with both subjective dryness and boundary symptom could be detected. However, 52% of the person assessed as dryness by Saliva Wet Tester was not appealed subjective symptom. While the person with subjective dryness symptom was almost assessed

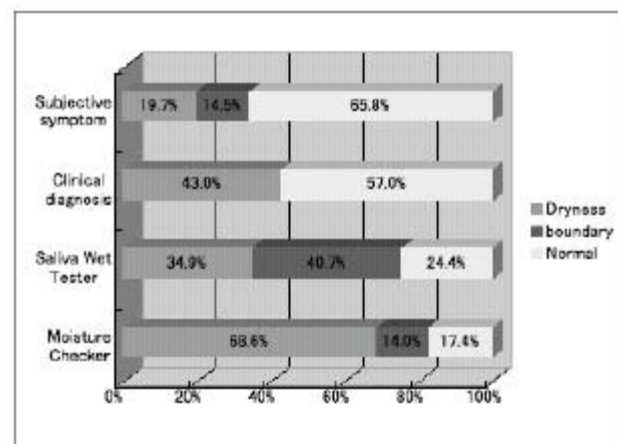


Fig. 1 Percentage of classification by each tools

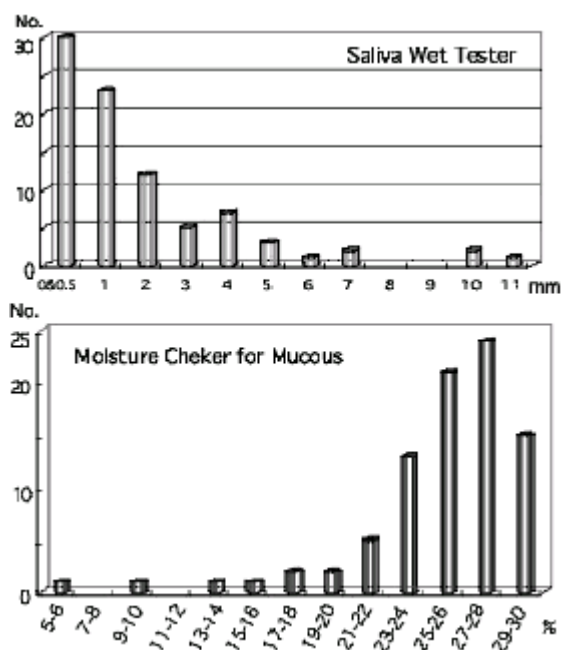


Fig.2 Distribution of value of saliva wet tester and moisture checker for mucous

as dryness by Saliva Wet Tester, more than halves of person assessed as dryness by Saliva Wet Tester have subjectively no symptom.

In the relation between the wetness on tongue and the clinical diagnosis, 62% of the person assessed as dryness by Saliva Wet Tester and 92% of the person assessed as both dryness and boundary were classified as dryness in clinical diagnosis respectively. The relation between the result by Saliva Wet Tester and the clinical diagnosis was tolerable.

In the relation of the wetness on tongue and the moisture of mucous membrane, no person classified as dryness in Saliva Wet Tester was classified as normal in Moisture Checker. On the other hand, 22% of the person classified as dryness with Moisture Checker was classified normal in Saliva wet Tester. These results suggested that Moisture checker and Saliva Wet Tester examine a considerable different condition.

In the relation of the subjective symptom and the moisture of mucous membrane, one person with subjective symptom assessed as normal by Moisture Checker. On the other hand, 63% of person

Table Mouth dryness complaint and clinical diagnosis

| | | Dry mouth complaint | | |
|--------------------|-----|---------------------|---|----|
| | | 0 | 1 | 2 |
| Clinical diagnosis | no | 37 | 6 | 1 |
| | dry | 13 | 5 | 14 |

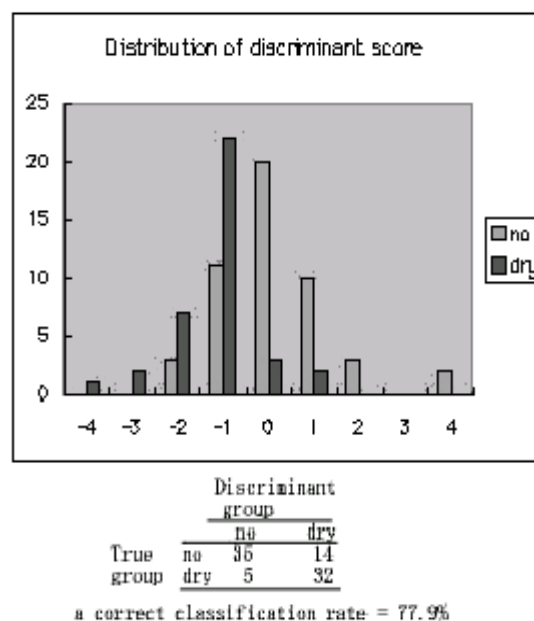


Fig.3 Discriminant analysis of mouth dryness

with no subjective symptom assessed as dryness by Moisture checker.

Saliva Wet Tester is useful objective measurement for patients with a severe mouth dryness and a severe hyposalivation because it is possible to assess for less than 1 minutes. A correct classification rate was 77.9% by the discriminant analysis using clinical diagnosis as criterion variable and the score of Saliva Wet Tester and the score of Moisture Checker as explanatory variable (Fig. 3). The discriminant analysis that uses two or more factors overall because it is complex might be effective to the origin of the mouth dryness feeling.

As the number of taking medicines increased, the ratio of case that clinically diagnosed dry mouth increased similar to the results of Narhi *et al.*³⁾

Acknowledgement

The data collected in collaborated study with Y. Kakinoki and S. Takagi were used in this analysis.

Reference

- 1) Health and Welfare Statistics Association, Annual Statistical Report of National Health Conditions 438-441; 2003.
- 2) Kakinoki Y. The Quintessence 22:55-64; 2003.
- 3) Narhi TO, *et al.* J Dent Res 71:1875-1880; 1992.