

The Clinical Relevance of the SillHa Oral Wellness System When Compared to Clinical Assessments

Introduction

A new salivary multi-test system was developed as a comprehensive oral health screening tool. Seven analytes were chosen as markers for the following conditions: [Dental Caries] cariogenic bacteria, acidity and buffer capacity; [Periodontal disease] protein, blood, leukocyte; [Oral cleanliness] ammonia. The purpose of this study was to evaluate the clinical relevance of this system by examining the correlation between oral conditions and reflectance measured by the SillHa system.

Methods

In a 2012 study conducted by LION Corporation and ARKRAYⁱ oral rinse samples were collected from 231 adults [Male: 93, Female: 138; Age: 40 (20-90)] and tested on the system. After sample collection, subjects were examined for the following oral conditions: [Dental Caries] Decayed, Missing or Filled Teeth (DMFT), [Periodontal Disease] pocket probing depth (PPD), bleeding on probing (BOP%), gingival index (GI) and community periodontal index (CPI), [Oral Cleanliness] total number of bacteria. The correlation between the oral conditions and the reflectance was assessed with the Spearman correlation test ($p < 0.01$). The Spearman correlation test is used to measure the degree of association between two ranked variables. In addition, the subjects were grouped into low, middle, and high based on DMFT, PPD, and total bacteria score. The reflectance of these groups was compared using Tukey's test ($P < 0.05$). The Tukey test is used to determine if the results from one group is significantly different from the results of another group.

Results

Dental Caries: DMFT score was found to be significantly correlated with the reflectance of cariogenic bacteria measured by SillHa. Additionally, when the subjects were grouped by DMFT score (low, middle, high) and compared, a significant difference was found between the low and high groups. DMFT was not found to be significantly correlated with pH and buffer capacity, and no significance was found between the 3 groups. Results displayed in **Tables 1 and 2**.

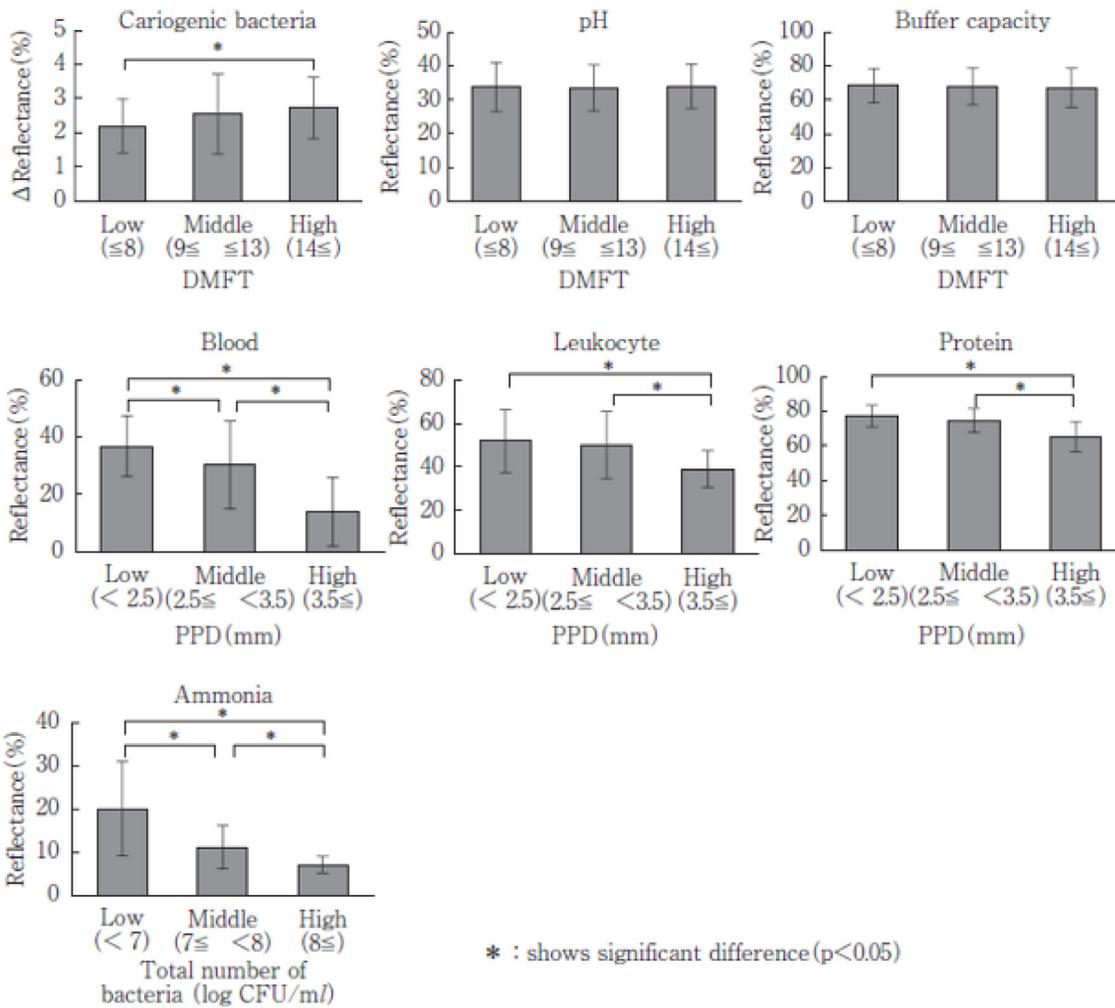
Periodontal Disease: PPD, BOP, GI and CPI were significantly correlated with the reflectance of blood, leukocyte, and protein measured by SillHa. There were significant differences between subjects grouped by BOP (low, middle, high), while subjects grouped by leukocyte and protein exhibited significant differences between high and middle groups and between high and low groups. Results displayed in **Tables 1 and 2**.

Oral Cleanliness: The total number of bacteria was significantly correlated with the reflectance of ammonia measured by SillHa and there were significant differences between subjects grouped by total number of bacteria (low, middle, high). Results displayed in **Tables 1 and 2**.

Table 1: Correlation between Oral Condition and Reflectance Measured by SillHa (Spearman correlation test, $p < 0.01$)

	Dental Caries		Periodontal Disease								Oral Cleanliness			
	Decayed, Missing, Filled Teeth (DMFT)		Probing Pocket Depth (PPD)		Bleeding on Probing (BOP)		Gingival Index (GI)		Community Periodontal Index (CPI)		Total Number of Bacteria			
	r_s	p value	r_s	p value	r_s	p value	r_s	p value	r_s	p value	r_s	p value		
Cariogenic Bacteria	0.25	0.0001	Blood	-0.41	<0.0001	-0.30	<0.0001	-0.33	<0.0001	-0.42	<0.0001			
pH	0.04	0.56	Leukocyte	-0.28	<0.0001	-0.23	0.0005	-0.26	<0.0001	-0.31	<0.0001	Ammonia	-0.61	<0.0001
Buffer Capacity	-0.4	0.51	Protein	-0.36	<0.0001	-0.35	<0.0001	-0.35	<0.0001	-0.39	<0.0001			

Table 2: Group Analysis of Oral Conditions and Reflectance Measured by SillHa (Tukey's test, $p < 0.05$)



Discussion

Dental Caries: Research has provided significant information regarding the association between cariogenic bacteria and dental cariesⁱⁱ and this study further supports the association finding significant correlation between cariogenic bacteria and DMFT. Since DMFT is a cumulated index of dental caries experience, it did not have correlation with pH and buffer capacity, which are considered stronger indicators of current risk of dental caries outbreak influenced by eating and oral hygiene habits. These results demonstrate that SillHa is an effective screening tool to determine the risk of current or future caries.

Periodontal Disease: Studies have shown that periodontal disease stimulates leukocyte and protein changes in saliva^{iii,iv,v} and can lead to blood contamination of saliva^{vi} and this study further supports this association. Significant correlation was demonstrated between PPD, BOP, GI, CPI and blood, leukocyte and protein. This study demonstrates that SillHa can be a useful screening tool for risk assessment of periodontal health.

Oral Cleanliness: Research has demonstrated that ammonia levels in saliva is strongly correlated with total bacterial count^{vii} and the data from this study supports that. This study demonstrates that SillHa can be a useful tool to assess oral cleanliness.

Conclusion

The study revealed that oral conditions associated with dental caries, periodontal disease, and oral cleanliness were correlated with the reflectance measured by the SillHa system. These results indicate the clinical usefulness of this system for assessing oral health.

References

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