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Comparative Evaluation of Salivary Total Protein Concentration in Male and Female Children in Mixed Dentition Age Group.

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ABSTRACT

As we enter the era of genomic medicine, sialochemistry will play an increasingly important role in the early detection, the monitoring and progression of the systemic and oral diseases and serve as a tearless diagnostic tool. For saliva to play a role as a diagnostic aid it is necessary to examine the consequences of preanalytical physiologic variations with respect to age and sex. Thus the aim of this study was to detect the physiologic levels of salivary total protein concentration with the use of newer biochemical methods like mass spectroscopy and also to do a comparative evaluation of salivary total protein in male and female children in mixed dentition age group. For this study, un-stimulated whole saliva was collected from healthy individuals and were equally divided amongst the gender. The samples were evaluated for the salivary total protein concentration by mass spectrometer. Salivary total protein concentration showed mild variations in concentration in gender in the said group. An overview of this study, showed a increase in salivary total protein concentration in female mixed dentition age group but did not show statistical significance.

Keywords: Saliva, Salivary total protein concentration, mixed dentition, Physiologic levels

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INTRODUCTION

Mouth is a unique, highly complex multifactorial interface between the body and its external environment. It has greater structural and biologic complexity as compared to the other body orifices. Saliva contains multiple biomarkers like electrolytes, proteins, enzymes etc. From recent years, various scientist and researchers are searching for a non-invasive diagnostic tool which is less painful, efficient, easily available, and cost-effective. We found that various studies proved that various abnormalities and diseases can be diagnosed with help of saliva. Very few studies have been found on total salivary protein content of saliva according to age and gender, so our research team is trying to find baseline values of total salivary protein concentration in saliva according to age and gender in Indian population as salivary protein play vital role in maintaining oral health integrity.

MATERIAL AND METHODS

Criteria for patient selection

In the present study, 10 normal healthy children ranging from 6 to 14 years were selected from housing societies in and around Pimpri- Chinchwad area of Pune district who were free from any systemic or local diseases which affect salivary secretions and totally caries free with dmft/DMFT score of 0 [1] in 2015. After assessing and confirming their caries status these children were stratified equally into two groups: 5 male children (ranging from 6-14 years), 5 female children (ranging from 6-14years). Exclusion criteria included patients who were physical or mentally compromised, having developmental delay, auditory or visual dysfunction, known neurological diseases, history of drug intake and patients with arrested carious lesions [2]. Informed consent forms were obtained from the custodial parent or guardian of the subject after explaining the procedure to the parent or guardian.

Method of saliva collection

To minimize the effect of circadian rhythms, all whole saliva samples were collected one hour after lunch for the unstimulated condition [3]. The child was seated in a well-ventilated and well-lit room. The head was kept at 45 degrees flexion with one hand holding onto a 4ml cryo precipitation vial with a funnel inserted into it, in a calm atmosphere to simulate unstimulated conditions. The saliva was allowed to drip into the funnel held to the lower lip. For each trial, the collection continued for 2 minutes but if the saliva sample was insufficient within 2 minutes, the collection was continued until 2 ml of saliva per subject was obtained [2].

Methods of laboratory analysis

For detection of total proteins in saliva, the saliva samples obtained from each subject were diluted with distilled water in a proportion of 1:4. This diluted saliva sample was then subjected to inductively coupled plasma emission spectroscopy for detection of total proteins, light chromatography coupled with mass spectrometry (LCMS) was used. Mass spectrometry (MS) is an analytical technique used for determining masses of particles, for determining the elemental composition of a sample or molecule and for elucidating the chemical structures of molecules, such as peptides and other chemical compounds.

RESULTS

Results were tabulated and statistically analysed using Mann Whitney U Test.

	Male	Female
Sample 1	50	20.05
Sample 2	21.6	42
Sample 3	33	35
Sample 4	22.7	50.5
Sample 5	20.05	48

Table 1: Salivary Total protein concentration (mg/dl) in male and female mixed dentition.

Results are statistically non-significant.

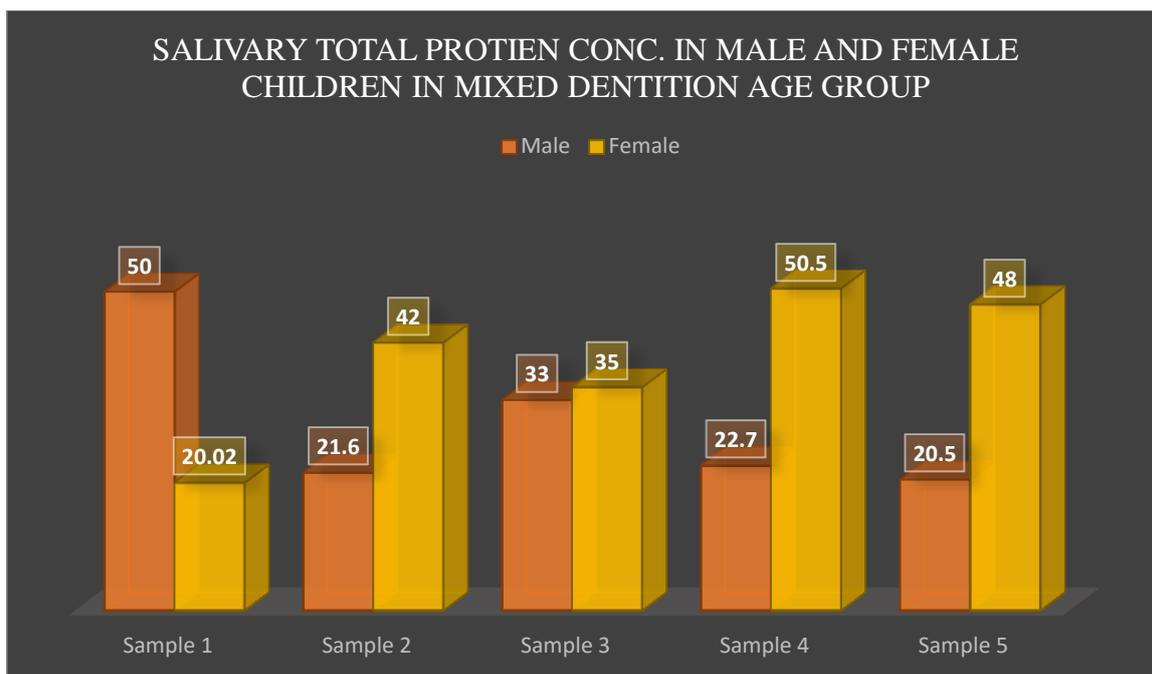


Figure 1: Salivary Total protein concentration (mg/dl) in male and female mixed dentition.

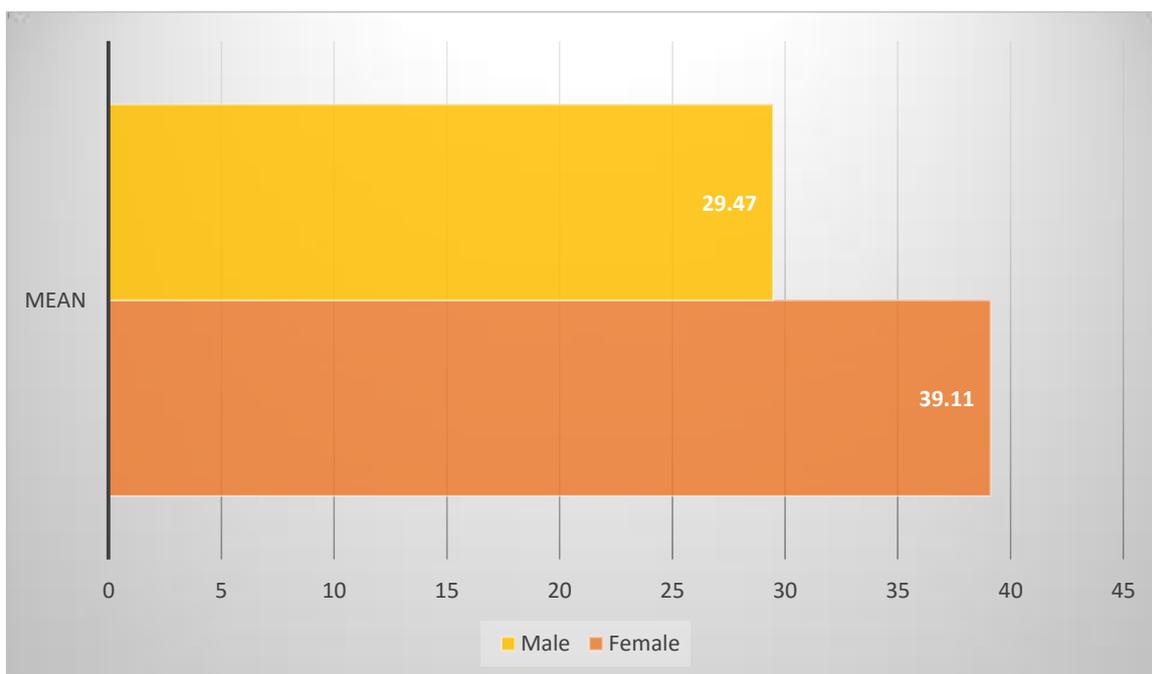


Figure 2: Average Salivary Total protein concentration (mg/dl) in male and female mixed dentition.

DISCUSSION

Total proteins in saliva may have both protective and detrimental properties [4]. Thus salivary proteins can be known as “double-edged swords”. Function of total proteins may depend on molecule’s location or site of action. Some proteins such as antimicrobial and pH modulating proteins play a protective role in the oral cavity, while adhesions and agglutinins play a detrimental role by increasing the colonization of micro-organisms. Thus quantitative and qualitative identification of salivary proteins is a necessary first step in

identifying potential protein biomarkers of disease [5]. The unstimulated salivary total protein concentration in mixed dentition age group shows higher concentration in females.

The major limitation of this study is its small sample size. The data obtained in this study is preliminary and expansion of the subjects is needed to obtain improved valid results.

CONCLUSION

Biological factors that are present within the saliva are essential for the lifelong preservation of the dentition. It has long been recognized that saliva serves as a mirror of body's health as it contains proteins, hormones, antibodies, electrolytes and other molecules that are frequently measured in standard blood tests to monitor health and disease [6]. There is a necessity for constructing a comprehensive catalogue which is physiologic for salivary total protein concentration in mixed dentition in male and female. Thus this study lays a foothold and may serve as a reference value for growing interest in saliva as a diagnostic tool.

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