

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Comparative Evaluation of Salivary Total Protein Concentration in Male and Female Children in Deciduous Dentition.

Vishwas Patil¹, Rahul R Deshpande^{1,2}, Rajdeep Singh Chhabra¹, Ananth Kamath¹, Dipti Patil¹, Pranav Dungarwal^{1*}, Komal K Bagde¹, Snehal Shep¹, Vaishnavi Kotwal¹.

¹Dr. D.Y. Patil Dental College And Hospital, Pimpri, Pune-411018, Maharashtra, India.

²Deenanath Mangeshkar Hospital, Pune-411004, Maharashtra, India.

ABSTRACT

Salivary concentrations of many substances provide an accurate index of blood free concentrations of these same substances. Saliva has many advantages as a body fluid subject to examination because it can be easily and painlessly collected and can be sampled repeatedly. However, despite such advantages the use of saliva in the diagnosis of disease states has received very little attention primarily because of the lack of understanding of the factors that control salivary flow rate and composition in health and disease. 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 deciduous dentition. For this study un-stimulated 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 male deciduous dentition age group but did not show statistical significance.

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

**Corresponding author*

INTRODUCTION

Salivary concentrations of many substances provide an accurate index of blood free concentrations of these same substances. Saliva has many advantages as a body fluid subject to examination because it can be easily and painlessly collected and can be sampled repeatedly. However, despite such advantages the use of saliva in the diagnosis of disease states has received very little attention primarily because of the lack of understanding of the factors that control salivary flow rate and composition in health and disease. Diet, exercise and one's state of one's health are known to affect the rate of secretion and composition of saliva [1].

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

MATERIAL AND METHODS

Criteria for patient selection

In the present study, 10 normal healthy children ranging from 2 to 5 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 [2] in 2015. After assessing and confirming their caries status these children were stratified equally into two groups: 5 male children (ranging from 2-5 years), 5 female children (ranging from 2-5years). 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 [3]. 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 [4]. 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 [3].

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 statically analysed Mann Whitney U Test. Results are statistically non-significant

	Male	Female
Sample 1	78.0	40.0
Sample 2	48.0	25.60
Sample 3	0.24	49.20
Sample 4	21.30	23.50
Sample 5	48.50	0.15

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

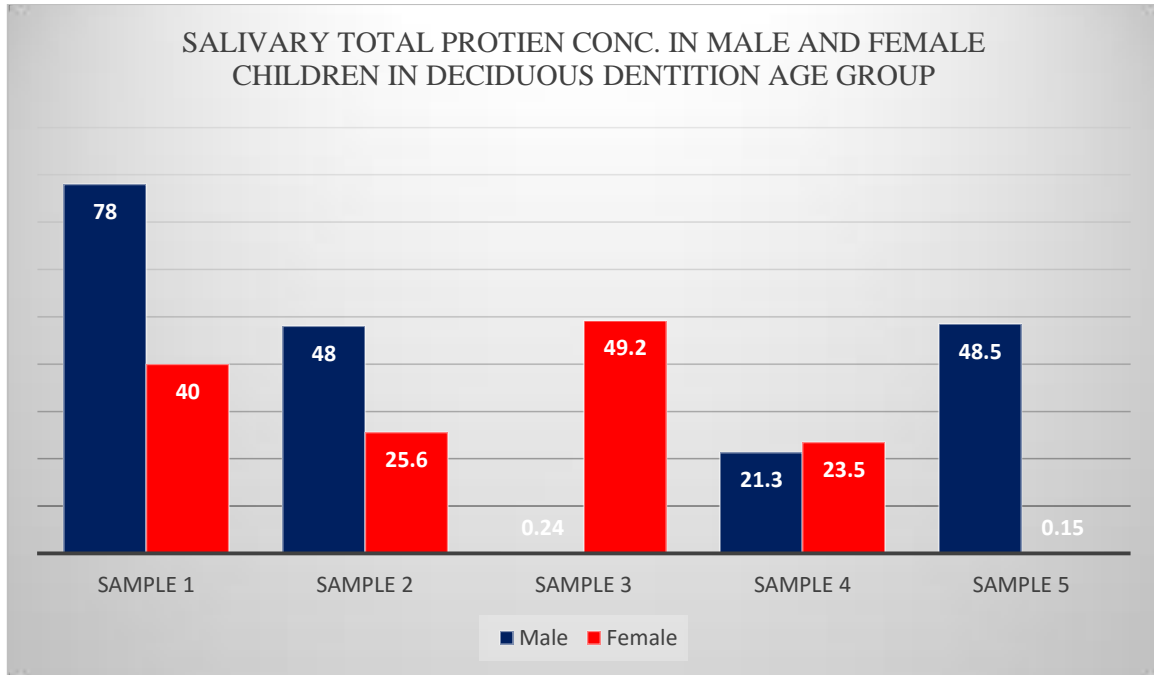


Figure 1: Salivary Total protein concentration (mg/dl) in male and female deciduous dentition.

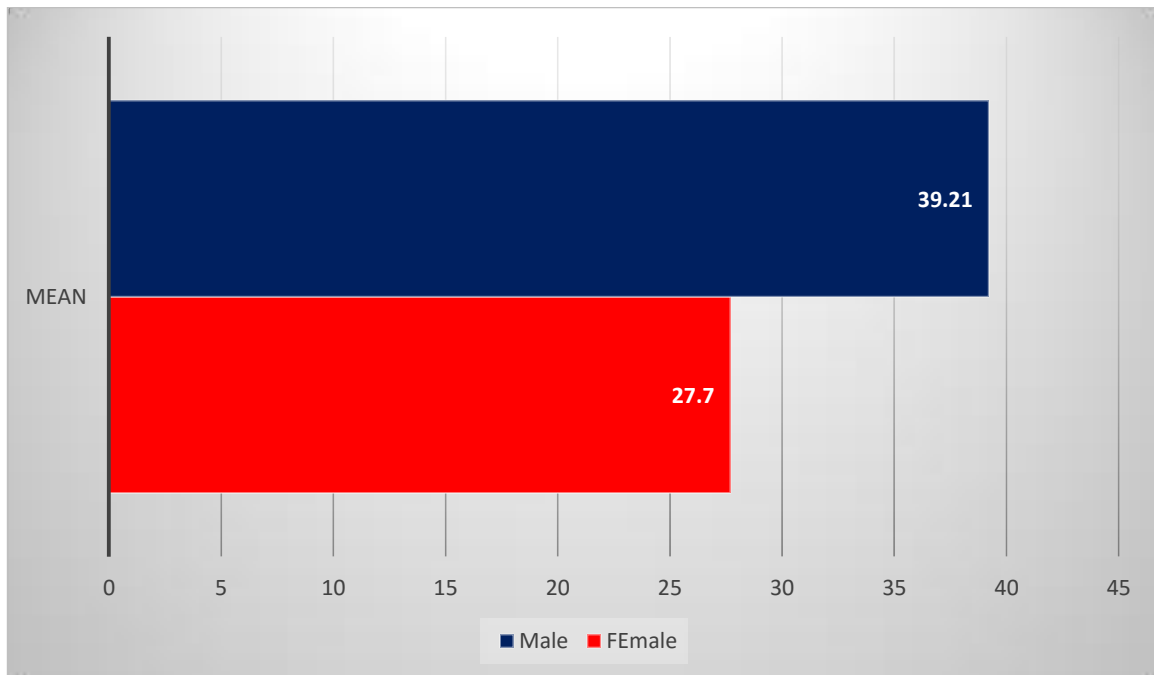


Figure 2: Average Salivary Total protein concentration (mg/dl) in male and female deciduous dentition.

The result of our study showing there is higher concentration of salivary total protein in male of deciduous dentition age group.

DISCUSSION

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 composition of saliva is known to vary with the nature and type of stimulation used.[6] In order to establish baseline values in of salivary total protein concentration in male and female children's of deciduous dentition age group saliva was collected in unstimulated state by passive drooling method and analysed by using light chromatography coupled with mass spectrometry.

The result of our study showing that out of five male and five female children's salivary total protein concentration, three male samples have more total protein concentration in deciduous dentition age group. 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

The result of our study showing there is higher concentration of salivary total protein in male of deciduous dentition age group.

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 [7]. 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.

ACKNOWLEDGEMENT

This research project was carried out by Vaishnavi Kotwal, then, final year BDS student and was funded by ICMR.

REFERENCES

- [1] FERGUSON, D.B.: Physiological, pathological and pharmacologic variations in salivary composition. *Front. Oral.Physiol.* 1981; 3: 138-153.
- [2] Vieira AR, Marazita ML, Goldstein-McHenry T. *J Dental Res* 2008; 87(5): 435-439
- [3] Katie P Wu. *Chang Gung Med J* 2008;31:281-6.
- [4] Betul Kargul, Aysen Yarat, Ilknur Tanboga. *The Saudi Dental J* 1998;10(3):100-106.
- [5] Hongwei Xie, Nelson L Rhodus, Robert J Griffin, John V Carlis, Timothy J Griffin. *Mol Cell Proteom* 2005;4(11):1826-1830.
- [6] CALDWELL, R.C.; PIGMAN, W.: Changes in protein and glycoprotein concentrations in human submaxillary saliva under various stimulatory conditions. *Arch. Oral. Bio/.* 1966; 2: 437-449.
- [7] Priya S Panvalkar, Rahul R Deshpande, Ankur A Kulkarni, Tushar V Gadkari *Salivary Investigations - The Art of Balance.*