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PUBLISHED PAPER'S TITLE : Role of Saliva in Complete Denture Prosthodontics

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Research Paper

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Role of Saliva in Complete Denture Prosthodontics

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Declaration

The Declaration of the author for publication of Research Paper in Asian Journal of Modern and Ayurvedic Medical Science (ISSN 2279-0772) Dr Rajul Vivek 1 Dr Romesh Soni 2 the authors of the research paper entitled Role of Saliva in Complete Denture Prosthodontics declare that ,we take the responsibility of the content and material of my paper as we ourself have written it and also have read the manuscript of our paper carefully. Also, we hereby give our consent to publish our paper in ajmams , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.we authorise the Editorial Board of the Journal to modify and edit the manuscript. we also give our consent to the publisher of ajmams to own the copyright of our research paper.

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ABSTRACT –

Saliva plays a critical role in the maintenance of oral and dental health. Saliva is most valuable oral fluid that is taken for granted. Knowledge of the salivary system and saliva is essential for evaluating prosthodontic problems and for educating patients in what to expect in this phase of denture use. A wealth of evidence suggests that saliva plays a profound role in the maintenance of oral health in the denture wearing patient. Indeed the presence of a thin salivary film layer is essential to the comfort of the mucosa beneath a denture base and for denture retention.

KEY WORDS - Retention, Saliva, Mechanical properties, Complete denture

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Introduction –

The secretions of the major and minor salivary glands, together with gingival crevicular fluid constitute oral fluid which provides chemical milieu of the teeth and oral soft tissue. The environment of the oral cavity is to a large degree created and regulated by saliva. Dentist and dental researchers have been keenly interested in saliva and have made important contributions to the knowledge of the subject. Saliva is a complex biological fluid that plays a very important role in maintaining the overall health of the oral cavity.[1, 3]

It keeps the mouth moist at all times, aids in chewing, swallowing and tasting of food and also helps regulate the oral flora .It defines as Saliva is a clear, tasteless, odourless slightly acidic viscous fluid, consisting of secretions from the parotid, sublingual, submandibular salivary glands and mucous glands of oral cavity". [4]

Saliva secretion –

The average daily secretion of saliva normally ranges from 500-1500 ml.[1] Saliva is produced in, and secreted from, primarily a set of three paired exocrine glands namely the Parotid; Submandibular and Sublingual glands.[1] salivary secretion is primarily of three types, namely serous, mucous or mixed. [1, 2] Serous secretion, which is chiefly secreted by the Parotid gland is thin and watery and contains the enzyme ptyalin for the digestion of starchy foods. Mucous saliva, which is secreted primarily by the minor salivary glands contains glycoprotein called mucins and is viscous and adherent in nature and provides lubrication and protection to the oral tissues. Mixed serous and mucous secretion is produced in the submandibular and sublingual glands. At rest, a small, continuous salivary flow, termed as basal unstimulated secretion, covers, moisturizes, and lubricates the oral tissues.3 Resting saliva plays a very important role in maintenance of oral health and contributes to the bulk of salivary secretion in the diurnal cycle. Different glands contribute differently to unstimulated salivary flow, with the submandibular gland contributing approximately 65–70% of the total volume, and the parotid and sublingual glands contributing 20% and 8% respectively. The numerous minor salivary glands contribute to less than 10% of unstimulated salivary secretion. A healthy person's mean daily saliva production ranges from 1 to 1.5 L; a large proportion of this volume is secreted at meal time when the secretory rate is highest.

Composition of Saliva-

Salivary fluid is an exocrine secretion consisting of approximately 99.6% of water and 0.5% of solids. Cellular components constitute yeast cells, bacteria, protozoa, polymorphonuclear leucocytes, desquamated epithelial cells etc.

Inorganic salts constitute: about 0.2% of solids and consists of sodium chloride, potassium chloride, acid and alkaline phosphatase, calcium carbonate, calcium phosphate, potassium thiocyanate (smokers' saliva is rich in thiocyanate).

Organic components: constitute 0.3% of solids and contain enzymes like ptyalin (salivary amylase), lipase, carbonic anhydrase, bacteriolytic enzyme and lysozome. It also contains immunoglobulins and other antimicrobial factors, mucosal glycoprotein's, traces of albumin and some polypeptides and oligopeptides of importance to oral health. Mucin, urea, amino acids, cholesterol and vitamins, soluble specific blood group substances A, B, O ranging from 10 to 20 mg/L., gases - 1 ml of oxygen, 2.5 ml nitrogen and 50 ml of CO2 per 100 ml. of saliva.5,6.7,8

Functions of Saliva [9, 10]

Saliva is a very important bio fluid which performs the following functions in the oral cavity:

1. Protection: The fluid nature of the saliva provides a washing action that flushes away non adherent bacteria and other debris. Salivary mucins and other glycoprotein provide lubrication, preventing the oral tissues from adhering to each other and also minimize friction. Mucins form a barrier against noxious stimuli, microbial toxins and minor trauma. Salivary proteins protect the tooth surface by binding to calcium and forming a thin protective film called salivary pellicle.

2. Buffering: The resting pH of Saliva is 6 to 7. The bicarbonate contained in saliva provides a buffering action by diffusing into plaque and neutralizing the acidic products of sugars metabolized by cariogenic bacteria. This protects the teeth from demineralization and subsequent dental caries. Also, the metabolism of salivary proteins and peptides by oral micro flora produces ammonia which is basic in nature and further increase the ph.

3. Antimicrobial Action: Saliva has a major ecological influence on the microorganisms that colonize the oral cavity. It contains a spectrum of proteins

which possess antimicrobial properties such as lysozyme, lactoferrin, peroxidase, immunoglobulins and secretory leukocyte protease inhibitor. Some salivary proteins and peptides are also known to exhibit antiviral activity.

4. **Digestion:** The moistening and lubricating action of saliva allows the formation and swallowing of the food bolus. Salivary amylase and lipase are primary enzymes contained in saliva that begin the digestive process in the oral cavity itself.

5. **Taste:** Saliva solubilizes food substances so that they can be sensed by taste receptors located in the taste buds. The saliva produced by the minor salivary glands present in the vicinity of circumvallate papillae contains proteins that are believed to bind to the taste substances and present them to the taste receptor. Saliva also aids in preserving the health of the taste receptor sites protecting them from mechanical and chemical stress or bacterial infection.

6. Maintenance of Tooth Integrity: In addition to its role of a buffer in preventing tooth decay, saliva is also supersaturated with calcium and phosphate ions, which have an important role to play in maintaining the demineralization – remineralisation balance Salivary proteins such as statherin, proline rich proteins and histatins help stabilize the calcium and phosphate salt solutions and bind to hydroxyapatite on the tooth structure increasing its resistance to acid attack. The presence of fluoride ions in saliva also helps in the remineralisation of the initial carious lesion.

Role of Saliva in Complete Denture Prosthodontics ---

The role of saliva in maintaining the overall wellbeing of the oral cavity in dentate individuals is well documented. In edentulous subjects, who have lost all their teeth and are dependent upon artificial prosthesis to carry out the basic oral functions of mastication, the presence of appropriate quantity and quality of saliva becomes even more critical.

Saliva is considered a major factor in evaluating the physical influences that contributes to denture retention.

The physical forces of retention in which saliva s involved are:

1) Adhesion
2) Cohesion
3) Interfacial surface tension
4) Capillarity
5) Atmospheric pressure.

Adhesion: It is the physical force involved in the attraction between unlike molecules. A drop of water introduced on the surface of a solid glass plate will resist movement away from the glass in proportion to the adhesion between the unlike molecules. A layer of saliva between the denture base and the mucosa of the basal seat acts in the same way. The effectiveness of adhesion depends on close adaptation of the denture base to the supporting tissue and is also directly proportional to the area covered by the denture.

Cohesion: Cohesion is the physical factor of electromagnetic force acting between molecules of the same material or otherwise called like molecules. Cohesion occurs in the layer of saliva between the denture base and the mucosa and is effective in direct proportion to the area covered by the denture.[11]

Interfacial Surface Tension: The phenomenon of surface tension is the force that maintains the surface continuity of a fluid. This results from an imbalance in cohesive forces present at the surface of the layer or column of the fluid. All denture base materials have higher surface tension than oral mucosa, but once coated by salivary pellicle, their surface tension is reduced, which promotes maximizing the surface area between saliva and base.

The thin fluid film between the denture base and the mucosa of the basal seat therefore furnishes a retentive force by virtue of the tendency of the saliva to maximize its contact with both surfaces. [12, 13]

Capillarity: Capillary attraction or capillarity is a force developed because of surface tension that causes the surface of a liquid to become elevated or depressed when it is in contact with a solid.[12, 14] When the adaptation of the denture base to the mucosa is sufficiently close the space between the denture base and mucosa usually about 0.1mm or less – filled with a thin film of saliva acts as a capillary tube and helps to retain the dentures.

Atmospheric Pressure: The atmospheric pressure acts as a retentive force when dislodging forces are applied to the denture. Atmospheric pressure itself is supplied by the weight of the atmosphere and amounts to 14.7 lb/inch2. This means that the retentive force supplied by the atmospheric pressure is directly proportional to the area covered by the denture base. A perfect border seal is essential all around the denture base for this force to be effective. Atmospheric pressure is an emergency retentive force which comes into play when the denture is being pulled away from the basal seat and the negative pressure created between the denture and the basal seat helps in retention.

Conclusion:

Saliva is a very important oral fluid that plays a multitude of functions in preserving the integrity of oral tissues and in maintaining the overall health of the oral cavity. In edentulous patients, the role of saliva becomes even more critical. Research in salivary physiology and chemistry is just beginning with the recognition of the significance of saliva to oral and dental health. With a more complete knowledge of the profile of normal saliva in health and with ageing, comparison can be made with disease states or prosthetic intervention to determine which aspects of salivary composition are affected. The prosthodontist must give due attention to the nature of saliva the patient possesses as this can have a lasting effect on denture success.

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