ejpmr, 2014, 1(1), 41-48

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

"A NOVEL APPROACH TO MANAGE DRUG ASSOCIATED XEROSTOMIA IN GERIATRIC EDENTULOUS PATIENTS UTILIZING SALIVARY RESERVOIR IN COMPLETE DENTURE PROSTHESIS"

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Article Received on 10/09/2014 **Article Revised on 04/10/2014** **Article Accepted on 28/10/2014**

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ABSTRACT

Statement of the problem: xerostomia is a common adverse effect of drugs consumed by elderly people. Most of the patients in the geriatric age require some form of denture prosthesis. Prosthesis requires saliva for smooth and normal function in oral cavity. **Aims and objectives:** To utilize the dentures as a vehicle to manage drug associated xerostomia. To find the effect of such modified dentures on patient satisfaction and to determine whether such modification would be effective on the maxillary denture or the mandibular denture. **Materials and methods:** Thirty completely edentulous patients seeking complete denture prosthesis having drug associated Xerostomia were divided into two groups namely Group U and Group P. All the subjects received two different complete dentures over a period of 6 months. The first set of dentures was unmodified (Group U) and the second set of dentures was modified to hold artificial saliva in either the maxillary or the mandibular denture (Group P). At the end of 6 months after wearing two sets of dentures each for 3 months, they were given a questionnaire that determined patient's satisfaction which was later scored on a 5 point unipolar scale. Mean percentage was evaluated for each score. **Results:** Patients who received modified complete dentures were satisfied in the range of extremely satisfied (80%) for maxillary modification and (53%) for mandibular modification. The levels of satisfaction ranged from extremely satisfied to

moderately satisfied when compared with the conventional unmodified dentures. **Conclusion:** Salivary reservoir can be an effective method for delivering artificial saliva in geriatric patients having drug associated xerostomia. Maxillary modification is more effective than mandibular modification.

KEY WORDS: anti-hypertensive, complete denture, artificial saliva, sustained release, denture retention.

INTRODUCTION

Maintaining the function and health of tissues of oral cavity including functions like taste, mastication, speech and deglutition are dependent on presence of saliva. Reduction in the amount of salivary flow can be devastating to oral health, the general well-being and lifestyle of the patient [1,2]. Reduced salivary flow manifests itself in clinical condition called Xerostomia, which is the subjective feeling of oral dryness caused by decrease function of salivary glands but is not, however, necessarily related to decreased salivary flow, since subjective feelings of oral dryness have been reported by individuals with normal flow rates [3, 4, 5]. Old age exaggerates the problem of xerostomia because of age changes in the salivary glands, intake of systemic medications and various other local and systemic factors. In patient with chronic hyposalivation, both resting and stimulated secretion rates have been found to be reduced with increase of dental and oral mucosal disease [6]. There are ample studies that associate xerostomia to systemic medication [7-9]. Studies have also shown that most common etiology of xerostomia amongst patients in dental practice is use of systemic medications [10, 11].

Completely edentulous patients that seek complete denture prosthesis and are utilizing systemic medication encounter difficulty in denture wearing. The prosthesis depends largely on saliva for its retention, stability and adaptation. Without the presence of saliva the prosthesis is prone to injure the mucosa. On the other hand, patients with xerostomia have been managed successfully with artificial saliva substitutes like water, milk and artificial saliva [12-15]. This study was conducted to evaluate the use of complete denture prosthesis as a vehicle to distribute salivary substitute in patients suffering from xerostomia as a result of systemic medication. This study also aims to find whether maxillary or mandibular denture would be more preferable for such modifications.

MATERIALS AND METHODS

Thirty completely edentulous patients (15 males and 15 females) taking medications known to have adverse effect in the form of xerostomia, between age group of 50 to 65 years were selected from the undergraduate section of department of prosthodontics. Ethical clearance was obtained from the ethical committee of the university that falls in accordance to Helsinki declaration for conductingexperimentation and studies on human subjects. Informed consent was obtained from all subjects. Selection criteria included patients having worn dentures earlier, consuming systematic drugs that were known to cause xerostomia, willingly cooperate and come for regular follow up visits. Medical history for all the selected subjects was significant and most of the subjects were suffering from hypertension, diabetes, chronic lung or renal disorders. All the subjects were treated by two groups (Group U and Group P) depending upon the treatment delivered to them. In group U, all the subjects had to undergo fabrication of complete denture prosthesis in the undergraduate section with no modification of complete denture. After wearing the complete denture for a period of three months the same patients received another denture that was fabricated in the post graduate section with modification in the form of a salivary reservoir. The patients then wore the modified denture for another three months and at the end of six months they were asked to compare the two dentures in relation to patient satisfaction.Patient satisfaction was evaluated through the use of a questionnaire on a five point unipolar scale (Table 1). Both the dentures were fabricated simultaneously under the supervision of staff experienced in the field of prosthodontics for more than 8 years. Both set of dentures were evaluated for quality by another team of experienced staff members who were not associated in any way with fabrication of any dentures. Any denture that did not meet the requirements in terms of quality were discarded and new dentures were fabricated.

After selection of the patients, they were allotted to a group of doctors that comprised an intern and a post graduate student. After recording the case history, all the clinical procedures for the patient were simultaneously done. Regular protocol for fabrication of complete dentures was followed during clinical and laboratory procedures. The prosthesis in the post graduate section was modified to include a mechanism to hold artificial substitute like artificial saliva in the denture. 15 subjects received complete denture where maxillary denture was modified and the remaining 15 received mandibular modified dentures. Different methods of salivary reservoir in complete dentures were used (Fig. 1 [1,2and 3] and 2 [1and 2]).Once the dentures were fabricated the subjects whose dentures were fabricated in the

undergraduate section, were asked to wear the dentures for three months period with regular follow up after 1week, 1 month and 3 months. At the end of the three months the same subjects were given the modified dentures along with artificial saliva which was fabricated in the pathology laboratory. The subjects were demonstrated how to use the modified dentures with strict following of the protocol to enhance maximum effectiveness. All the patients were followed up in a similar way in this group also.

RESULTS

Patients who wore modified complete dentures that allowed them to use artificial saliva in a sustained release mode (Group P) were seen to be more satisfied as compared to the same subjects when they wore complete denture that were unmodified (Group U). As can be seen in **Table 2**, about 28 subjects out of 30 (93%) of the subjects in group P were extremely satisfied when they compared to compare the present modified dentures with the previous one. Within group P, 12 subjects who had a salivary reservoir placed in the maxillary denture out of a total of 15 (80%) and 8 subjects out of 15 (53%) were extremely satisfied with modified denture. Only 5 subjects were moderately satisfied within group P and 2 subjects who had mandibular denture modified were slightly satisfied (Table 2).

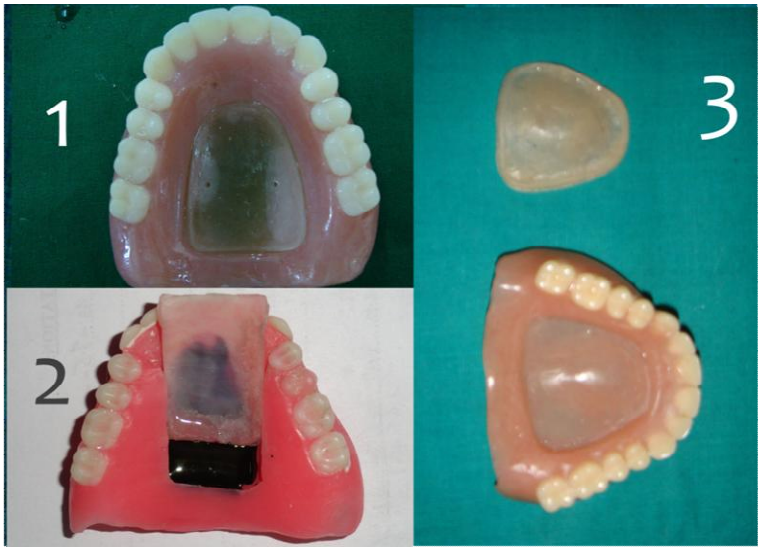
TABLE 1: SCORING CRITERIA FOR OVERALL ASSESSMENT		
5 point unipolar scale for assessing awareness among subjects.		
1.	**25-30**	**Extremely satisfied**
2.	**20-25**	**Very satisfied**
3.	**15-20**	**Moderately satisfied**
4.	**10-15**	**Slightly satisfied**
5.	**<10**	**Not at all satisfied**

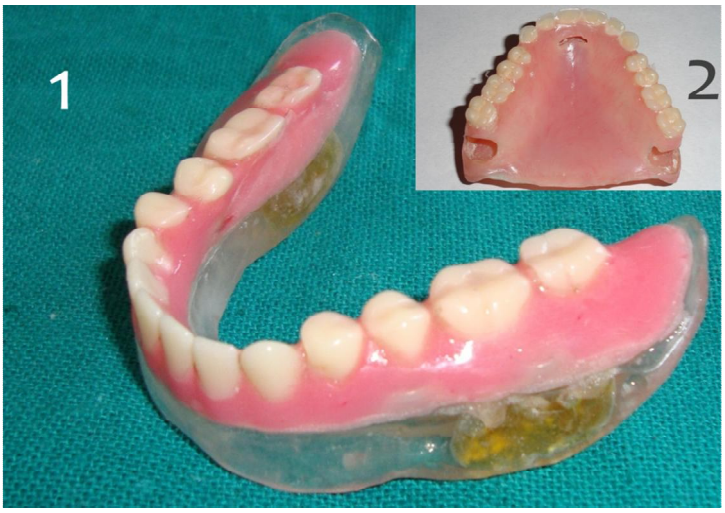
Table 2: Intergroup and intragroup comparisons

Relative satisfaction of subjects in Group P (with modified dentures) as compared to their previous dentures Group U (conventional dentures)

Scores	**Group P**		**Comparison with Group U**
	Maxillary modified (n=15)	Mandibular modified (n=15)	Conventional unmodified complete denture (n=30)
Extremely satisfied	12 (80%)	08 (53%)	28 (93%)
Very satisfied	1 (6%)	02 (12%)	02 (7%)
Moderately satisfied	2 (13%)	03 (23%)	0
Slightly	0	02	0

satisfied			
Not at all satisfied	0	0	0





DISCUSSION

Amongst various drugs that result in decreased salivation, drugs such as Anorexiant, Anti-anxiety, Anticholinergics, Anticonvulsant, Antidepressants, Selective serotonin reuptake inhibitors, Anti-emetics, Antihistamines, Antihypertensives, Antipsychotic, Bronchodilator, Decongestant, Diuretic, Muscle relaxant, Narcotic analgesic and Sedative are mostly encountered in geriatric patients who may or may not require a complete denture prosthesis. While serous saliva mainly contributes to digestion, mucous saliva makes the mucosa supple and protects it by means of its great proportion of mucins [16-20]. Mucosa with a considerably reduced mucus layer shows a deficient resistance against exogenous influences like toxins, acids, bacterial metabolic products, allergic and mechanical irritants [21-24]. Besides other

physiological functions [25-30], it also helps an individual to adapt to prosthesis when he becomes edentulous and has to wear a denture prosthesis.

For patients with xerostomia, salivary substitutes are important pharmacotherapeutic agents and are available as lozenges, rinses, sprays, swabsticks and as reservoirs in dentures [31]. Dentures can be used as effective devices for sustained release of salivary substitute. As can be observed in this study, all the subjects whose maxillary dentures were modified were either extremely moderately satisfied whereas more than 50 percent of subjects whose mandibular dentures were modified were extremely satisfied. As compared to unmodified dentures it can be seen that all the subjects were either moderately or extremely satisfied with modification in the prosthesis. Patients with maxillary modified dentures were more satisfied than with the mandibular dentures. Maxillary dentures provide a mean of sustained release mechanism which is automatic in nature due to the effect of gravity. The problem with the mandibular denture is that due to the presence of tongue there is a constant suction force that tends to draw saliva out of the reservoir. Maxillary modified dentures especially that shown in Fig 1[1] held saliva for a period of 4 to 5 hours whereas that shown in Fig 2[1] was able to hold the saliva for not more than 3 hours. This was one of the reasons for low levels of extremely satisfied patients in Group P. Although the amount of saliva that needs to come out from the denture can be regulated by increasing the size of the openings, it still depends largely on the patient how he uses the reservoir in the denture. More suction force withdraws more saliva whereas release on its own remains efficient for hours.

CONCLUSION

Within the scope and limitation of this study it can be concluded that salivary reservoir in complete dentures improves patients satisfaction as compared to conventional dentures. It can be also concluded that salivary reservoir in the maxillary denture is more effective than when placed in the mandibular in relation to sustained release mechanism. Further studies need to be done to evaluate different mechanisms of sustained release that is not directly dependent on the patient.

REFERENCES

1. Sreebny LM, Banoczy J, Baum BJ, et al. Saliva: Its role in health and disease. Int. Dent J, 1992; 42(Suppl 2): 291-304.
2. Sreebny LM. Saliva: In Health and Disease – an appraisal and update. Int Dent J, 50: 140-161.

3. Fox PC, Busch KA, Baum BJ. Subjective reports of xerostomia and objective measures of salivary gland performance. J Am Dent Assoc, 1987; 115: 581- 584.
4. Field EA, Longman LP, Higham SM, et al. The establishment of a xerostomia clinic; a prospective study. Br Maxillofacial Surg, 1997; 35: 96-103.
5. Longman LP, McCracken CFM, Higham SM, et al. The clinical assessment of oral dryness is a significant predictor of salivary gland hypofunction. Oral Diseases, 2000; 6: 366-370.
6. Fox PC. Management of dry mouth. Dent Clin North Am, 1997; 41: 863-875
7. Locker D. Xerostomia in older adults: a longitudinal study. Gerodontology, 1995; 12: 18-25.
8. Narhi TO, Meurman JH, Ainamo A, et al. Association between salivary flow rate and the use of systemic medication among 76-81, and 86-yearold inhabitants in Helsinki, Finland. J Dent Res 1992; 71: 1875-1880.
9. Hochberg MC, Tielsch J, Munoz B, et al. Prevalence of symptoms of dry mouth and their relationship to saliva production in community dwelling elderly: the SEE project. Salisbury Eye Evaluation. J Rheumatol, 1998; 25(3): 486-491.
10. Nederfors T, Isaksson R, Morestad H, et al. Prevalence of perceived symptoms of dry mouth in an adult Swedish population: relation to age, sex and pharmacotherapy. Community Dent Oral Epidemiol, 1997; 25: 211-216.
11. Daniels TE, Wu AJ. Xerostomia – clinical evaluation and treatment in general practice. J Can Dent Assoc, 2000; 28: 933-941.
12. Baum BJ. Salivary gland fluid secretion during ageing. J Am Geriatr Soc 1989; 37: 453.
13. Smith G, Smith AJ, Shaw L, et al. Artificialsaliva substitutes and mineral dissolution. J Oral Rehabil, 2001; 28: 728-731.
14. Herod GI. The use of milk as a saliva substitute. J Public Health Dent 1994; 54: 184-189.
15. Kielbassa AM, Parichereh Shohadai A, Schulte-Monting J. Effect of saliva substitutes onmineral content of demineralized and sound dentalenamel. Support Care Cancer, 2000; 9: 40-47
16. Basker RM, Sturdee DW, Davenport, JC. Patients with Burning Mouth. A clinical investigation of causative factors, including the climacteric and diabetes. Brit Dent J 1978; 145: 9- 16.
17. Edgerton M, Tabak LA, Levine MJ. Saliva: A significant factor in removable prosthodontic treatment. J Prosthet Dent, 1987; 57: 57-66.

18. Hensten-Petterson A. Some Chemical Characteristics of Human Minor Salivary Gland Secretions. Acta Odontol Scand, 1976; 34: 13-22.
19. Kawazoe Y, Hamada T. The role of saliva in retention of maxillary complete dentures. J Prosthet Dent, 1978; 40: 131-136.
20. Tabak LA, Levine MJ, Mandel ID, et al. Role of salivary mucins in the protection of the oral cavity. J Oral Pathol, 1982; 11: 1 - 17.
21. Sreebny LM. Xerostomia, xerosis, and systemic disease. The Fernule Patient, 1992; 17: 14- 28.
22. Wolff A, Fox PC, Ship JA, et al. Oral mucosal status and major salivary gland function. Oral Surg Oral Med Oral Pathol, 1990; 70: 49-54.
23. Yontchev E, Carlsson GE. Long-term follow up of patients with orofacial discomfort complaints. J Oral Rehabil, 1992: 19: I3- 19.
24. Niedermeier W, Meyer C, Staar S, et al. Secretion of human minor and major salivary glands following radiotherapy. J Dent Res, 1995; 75: 546.
25. De Jong MH, Van der Hoeven JS. The growth of oral bacteria on saliva. J Dent Res, 1987; 66: 498-505.
26. Van der Hoeven JS, Camp PJ. Synergistic degradation of mucin by Streptococcus oralis and Streptococcus sanguis in mixed chemostat cultures. J Dent Res, 1991; 70: 1041-44.
27. Bradshaw DJ, Homer KA, Marsh PD, et al. Metabolic co-operation in microbial communities during growth on mucin. Microbiol, I994; 140: 3407- 3412.
28. Tabak LA. In defense of the oral cavity: structure, biosynthesis, and function of salivary mucins. Ann Rev Phvsiol, 1995; 57: 547-564.
29. Bowen WH. Salivary influences on the oral Microflora. In: Saliva and oral health, eds. Edgar WM and O'Mullane DM (2nd edition), London: Brit Dent J, 1996.
30. Campbell RL. Some clinical observations regarding the role of the fluid film in the retention of dentures. J Am Dent Assoc, 1054; 48: 58-63.
31. Sinclair CF, Frost PM, Walter JD. New design for an artificial saliva reservoir for the mandibular complete denture. J Pros Dent, 1996; 75: 276-280.