

Rehabilitation of Completely Edentulous Patient with Xerostomia Using Novel Technique for Incorporation of Salivary Reservoir with Suction Discs – A Case Report

¹Dr. Lalitha Girish, Department of Prosthodontics and Crown & Bridge, Mahatma Gandhi Postgraduate Institute of Dental Sciences, Puducherry, India.

²Dr. Jeevanandam L, Department of Prosthodontics and Crown & Bridge, Mahatma Gandhi Postgraduate Institute of Dental Sciences, Puducherry, India.

³Dr. Karthi Arivarasan N, Department of Prosthodontics and Crown & Bridge, Mahatma Gandhi Postgraduate Institute of Dental Sciences, Puducherry, India.

⁴Dr. Gowtham Raj T, Department of Prosthodontics and Crown & Bridge, Mahatma Gandhi Postgraduate Institute of Dental Sciences, Puducherry, India.

Corresponding Author: Dr. Lalitha Girish, Department of Prosthodontics and Crown & Bridge, Mahatma Gandhi Postgraduate Institute of Dental Sciences, Puducherry, India.

Citation of this Article: Dr. Lalitha Girish, Dr. Jeevanandam L, Dr. Karthi Arivarasan N, Dr. Gowtham Raj T, “Rehabilitation of Completely Edentulous Patient with Xerostomia Using Novel Technique for Incorporation of Salivary Reservoir with Suction Discs – A Case Report”, IJDSIR- November – 2025, Volume – 8, Issue – 6, P. No. 280 – 286.

Copyright: © 2025, Dr. Lalitha Girish, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution non-commercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given, and the new creations are licensed under the identical terms.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Prosthetic therapy of patients with insufficient salivary flow is complex, as the therapeutic objectives encompass not only the restoration of lost teeth but also the comprehensive rehabilitation of the patient. Dry mouth and its consequences significantly impact patient’s denture experience, comfort and quality of life. This case report presents management of a completely edentulous patient with Trisomy 21 accompanied by xerostomia employing a simplified yet unique method of fabrication of a complete denture prosthesis with a salivary reservoir component in the maxillary denture to aid in salivary flow.

Keywords: Salivary Reservoir, Complete Dentures, Trisomy 21, Salivary Reservoir Prosthesis, Xerostomia, Suction Discs.

Introduction

Xerostomia is defined as a person’s perception and subjective symptom that there is a dryness across the oral cavity; this may occur in the presence or absence of hyposalivation.¹ Interestingly, people who report dry mouth often don’t exhibit any measurable signs of reduced saliva production. Their symptoms can be caused by changes in the quality and/or quantity of the salivary composition.

The normal stimulated salivary flow rate averages 1.5–2.0 mL/min while the unstimulated salivary flow rate is approximately 0.3–0.4 mL/min.²

A diagnosis of hyposalivation is made when the stimulated salivary flow rate is ≤ 0.5 – 0.7 mL/min and the unstimulated salivary flow rate is ≤ 0.1 mL/min. When the rate of saliva flow is lower than the rate of fluid absorption via the oral mucosa plus the rate of fluid evaporation from the mouth, patients with objective hyposalivation are diagnosed with xerostomia.²

For many people, chronic xerostomia continues to be a major issue. Speech, chewing, swallowing, wearing dentures, and overall health may all be impacted. In addition, widespread dental caries, oral fungal infections (such as candidiasis), altered taste, halitosis, or burning of the mouth can be caused by xerostomia brought on by hyposalivation.

The use of certain medications (such as anticoagulants, antidepressants, antihypertensives, antiretrovirals, hypoglycemics, levothyroxine, multivitamins and supplements, non-steroidal anti-inflammatory drugs, and steroid inhalers) has been found to be the most common cause of hyposalivation, followed by Sjögren's syndrome and head and neck radiation. Malnutrition, stress, anxiety, and depression are additional concerns.³

According to the American Dental Association (ADA), estimates for the prevalence of xerostomia (dry mouth) in the general population ranges widely from 0.9% to 64.8%.

This case report presents management of a completely edentulous patient with Trisomy 21 (Down's Syndrome) accompanied by xerostomia employing a simplified yet novel method of fabrication of a complete denture prosthesis with a salivary reservoir component in the maxillary denture using suction discs to aid in salivary flow.

Case Report

A 30-year-old male patient with a chief complaint of missing teeth in his upper and lower arch with accompanied dryness in mouth and reduced salivary flow reported for treatment. Patient was accompanied by his mother. Patient's past medical history revealed that the patient suffers from congenital disorder (Trisomy 21). Patient was also reported to be on anti-hypertensive medication since the last 8 years, which was postulated to be the contributing agent to his condition of dry mouth. Patient reported uneventful extraction of multiple upper and lower teeth since last 10 years due to caries and periodontitis.

Extra-oral and intra-oral examination revealed classic features of Trisomy 21: (figures – 1-3)

- short stature and stocky build
- short limbs and neck
- small low-set ears
- small hands, and feet with stubby fingers
- single line across the palm (clinodactyly) with deep Simian crease
- small head with a flattened back (brachycephaly)
- round face with a flattened nose
- small chin and nose
- flattened bridge of the nose
- upward-slanting, almond-shaped eyes
- narrow roof of the mouth
- proportionally large tongue with deep lines and crevices (furrowed tongue)



Figure 1: Deep Simian crease



Figure 2: Low-set ears



Figure 3: Furrowed tongue

Intra-oral examination also revealed completely edentulous maxillary and mandibular arches with notably reduced salivary flow (figures – 4-7).



Figure 4: Early-onset periodontitis leading to complete loss of teeth



Figures 5 & 6: Micrognathia with mouth mirror sticking to oral mucosa, suggestive of dry mouth



Figure 7: Angular cheilitis due to dryness

Treatment performed

The treatment plan for the patient included fabrication of conventional removable maxillary and mandibular complete dentures with an added salivary reservoir compartment with suction discs bilaterally along the palatal slopes in the maxillary denture.

➤ Fabrication of removable complete dentures

Primary impressions were made using impression compound material (figure – 8) and secondary impression using light-body elastomeric material (figure – 9), followed by jaw relation recording (figure – 10) and try-in (figure – 11) procedures using conventional method of complete denture fabrication.



Figure 8: Preliminary impressions

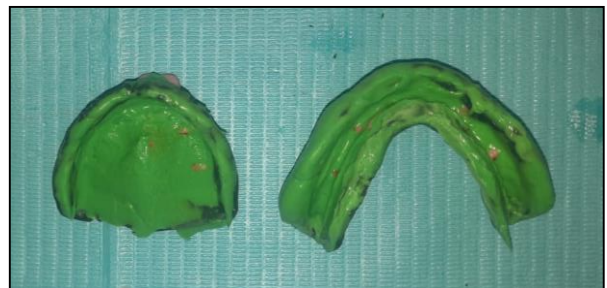


Figure 9: Secondary impressions



Figure 10: Jaw relation completed



Figure 11: Try-in

Once the wax try-in was checked for occlusion and esthetics, the dentures were processed using compression molding technique using heat-cure denture base acrylic material and short curing cycle.

➤ **Incorporation of salivary reservoir**

After processing, a shelf-like rectangular space was hollowed out bilaterally along the palatal slopes of the maxillary denture using a round tungsten carbide bur (figure – 12). The hollow space was then filled with salt (figure – 13) and covered with auto-polymerizing resin material. After setting of the resin material, a small hole was drilled through the resin and water was injected the space to dissolve out the salt to form a hollow space (reservoir).



Figure 12: Dentures processed and reservoir created in maxillary denture



Figure 13: Reservoir sealed with auto-polymerizing resin using lost salt technique

Rubber stops (employed in endodontic files) were inserted bilaterally along the posterior aspect on the outer surface of the hollow shelves and sealed into place using auto-polymerizing resin (figures – 14, 15 & 16).



Figure 14: Rubber discs used to create areas of suction in reservoir



Figures 15 & 16: Rubber suction discs placed bilaterally on maxillary denture and sealed into place using auto-polymerizing resin material

➤ **Rationale for using suction discs**

The rubber stops were added to function as suction discs. As the patient's tongue presses against the maxillary denture during function, the negative suction pressure created would cause a controlled release of the salivary substitute through the reservoir.

➤ **Trimming, finishing and polishing:**

Processed dentures were then trimmed, polished (figure – 17) and tried in the patient's mouth and verified for fit, esthetics and occlusion (figures – 18 & 19)



Figure 17: Finished and polished complete dentures



Figure 18: Post-insertion view (extra-oral)



Figure 19: Post-insertion view (intra-oral)

➤ **Injection of salivary substitute**

Syringe was then used to inject the measured quantity of the salivary substitute through the rubber stops. The

suction discs were positioned in such a way that when the patient applied pressure on the palatal portion of the denture with his tongue during swallowing, the salivary substitute was released through the reservoir.

Patient along with patient party (patient's mother) were educated about the regular denture maintenance and methods of using and refilling the reservoir. Salivary substitute (Wet Mouth) was prescribed to patient (figure – 20).



Figure 20: Salivary substitute prescribed to patient

Patient advised to swish liquid in mouth for 30 seconds before spitting – to be used twice daily

➤ **Patient motivation and instructions**

Patient was advised to swish liquid in mouth for 30 seconds before spitting – to be used twice daily. Additionally, patient was advised to inject and flush commercially available mouth rinse inside the reservoir to render it free from microbes. Patient was recalled periodically to assess maintenance, patient comfort and reinforcement of instructions (figure – 21).



Figure 21: Patient trained on how to inject liquid into reservoir of denture

Discussion

Drinking enough of fluids or changing one's diet to include more citrus fruits are two ways to treat xerostomia, or dry mouth. Salivary stimulants, which come in the form of sugar-free chewing gum or lozenges, can also be used to boost salivary production.⁴ Salivary replacements have also been utilized in some situations to increase patient comfort. Since saliva is essential to the impression making process in order to achieve retention for a complete denture, rehabilitating a patient who is completely edentulous and has decreased salivary flow is challenging.

The existing literature has reported use of salivary reservoirs as part of various types of prosthesis. Toljanic et al reported one of the earliest cases describing the use of a salivary reservoir in the maxillary denture.⁵ Sinclair et al reported one of the earliest technique of a mandibular denture with salivary reservoir.⁶

Singh et al described a technique wherein the salivary reservoir was incorporated into the palatal aspect of the maxillary complete denture.⁷ Mendoza et al and Bikash et al employed a technique of fabrication of a split mandibular complete denture design to incorporate a salivary reservoir.^{8,9} Arora et al reported a technique wherein salivary reservoirs were incorporated into both maxillary complete denture and mandibular cast partial denture.¹⁰

In addition to fabrication of salivary reservoir as a part of conventional maxillary and mandibular dentures, few cases have been reported in literature wherein such reservoirs have been incorporated as a part of maxillofacial prostheses. For instance, Costa et al reported a case of fabrication of salivary reservoir with a cheek plumper prosthesis for a patient with a sunken cheeks to aid in both function and esthetics.¹¹ Gowda et al rehabilitated an acquired mandibular defect with a

mandibular prosthesis using a novel method to incorporate a magnet-retained salivary reservoir.¹² Ahmad et al described the fabrication of a maxillary hollow-bulb obturator with a salivary reservoir component for a patient with an acquired maxillary defect.¹³

Patient motivation and cooperation are critical for successful oral rehabilitation, especially when using salivary reservoirs, because it requires patients to follow instructions for usage and refilling the reservoir with salivary substitutes, as well as meticulous cleaning of dentures and reservoirs.

Conclusion

A salivary reservoir prosthesis is an adjunctive treatment for edentulous patients who experience decreased salivary flow, which is probably caused by a number of metabolic disorders or medical conditions, such as radiotherapy.

This case report describes a straightforward method that can be applied to a variety of clinical situations. The oral cavity can be temporarily moistened by the salivary substitute-filled reservoir, which improves patient comfort and, ultimately, their quality of life.

References

1. The glossary of prosthodontic terms. Tenth edition. *J Prosthet Dent.* 2023;130(4 Suppl 1):e7–126.
2. Glick M, Greenberg MS, Lockhart PB, Challacombe SJ, editors. *Burket's oral medicine.* 13th ed. Hoboken, NJ: Wiley-Blackwell; 2021.
3. Greenberg M, Glick M. *Burket's Oral Medicine Diagnosis and Treatment.* 10th ed. Shelton, CT: B.C. Decker; 2002.
4. Upadhyay SR, Kumar L, Rao J. Fabrication of a functional palatal saliva reservoir by using a resilient liner during processing of a complete denture. *J Prosthet Dent.* 2012 Nov;108(5):332-5.

5. Toljanic JA, Zucuskie TG. Use of a palatal reservoir in denture patients with xerostomia. *J Prosthet Dent.* 1984 Oct;52(4):540-4.
6. Sinclair GF, Frost PM, Walter JD. New design for an artificial saliva reservoir for the mandibular complete denture. *J Prosthet Dent.* 1996 Mar;75(3):276-80.
7. Manas Singh, Anchal Deep, Khurshid A Mattoo and Roma Goswami. Low volume salivary reservoir in complete denture prosthesis for xerostomia. *Journal of Case Reports: Clinical & Medical.* 2019; 2(2):134.
8. Mendoza AR, Tomlinson MJ. The split denture: a new technique for artificial saliva reservoirs in mandibular dentures. *Aust Dent J.* 2003 Sep;48(3):190-4.
9. Bikash P, Seema P. Prosthetic rehabilitation of a xerostomia patient with a mandibular split salivary reservoir denture. *Annals and essences of dentistry.* 2010 Jun 30;2(3):32-5.
10. Arora V, Kumar D, Legha VS, Kumar KV a. Management of xerostomia patient with salivary reservoir designed in upper complete denture and lower cast partial Denture. *J contemp Dent* 2014; 4(1):56-59.
11. Meena Aras GDC. Cheek plumper with a salivary reservoir: an esthetic and functional treatment option for a xerostomic patient with sunken cheeks. *Dentistry.* 2015; 05(05).
12. Gowda EM, Bahri R, Singh K, Sahoo NK. Rehabilitation of acquired mandibular defect with two-piece, magnet-retained salivary reservoir. *Med J Armed Forces India.* 2022 Sep;78(Suppl 1):S308-S311.
13. Ahmad N, Rai M, Khan A, Tiwari AK. Palatal obturator with salivary reservoir- a case report. *Ip*

annals of prosthodontics and restorative dentistry. 2016 Mar 15;1(1):44-6.

Abbreviations

Abbreviation	Explanation
mL	Millilitre
min	Minute
ADA	American Dental Association