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Case Report

Management of anti-tuberculosis drug induced xerostomia in completely edentulous patient-A case report

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ABSTRACT

Rationale: Tuberculosis (TB) is one of the major systemic conditions which is a preventable and curable infection but remains a significant cause of death and reduced quality of life of patients.
Weight loss, tiredness and loss of appetite are common symptoms that are even more aggravated in geriatric patients affecting the quality of life of the patient.
Edentulism, hyposalivation and dryness of the mouth further contribute to the discomfort in patients wearing dentures that leads to the weight reduction, indigestion and loss of appetite in such patients. Compromised esthetics and speech of the patient just multiply the social trauma and isolation the patient is already facing due to TB.
This paper describes a novel method of managing a patient with active TB on Anti Tuberculosis therapy (ATT) reporting symptoms of xerostomia.
Diagnosis: Completely Edentulous Maxillary and Mandibular Residual Alveolar Ridges: PDI Class II with associated ATT-induced Xerostomia.
Intervention: Split denture with a salivary reservoir in the mandibular denture.
Outcomes: Improved aesthetics & speech, improved mastication and reduced weight loss due to denture wearing.
Lessons: Split dentures with artificial saliva can increase the patient's comfort in wearing dentures which overturns the impact of infection significantly and leads to increased quality of life in edentulous patients on ATT.

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1. Introduction

Tuberculosis (TB) is a major global health problem as a leading cause of mortality worldwide. A total of 1.6 million people died from TB in 2021. TB is the 13th leading cause of death worldwide and the second leading infectious killer after COVID-19 (above HIV and AIDS) [WHO 2023]. The standard treatment regimen lasts a minimum of six months. Tuberculosis patients take three or four drugs, typically isoniazid, rifampicin, pyrazinamide and ethambutol di-hydrochloride in combination for two months (intensive phase), followed by rifampicin and isoniazid for four months (continuation phase).

A significant decrease can be noted in the flow rate and pH of unstimulated saliva and the flow rate and viscosity of stimulated saliva among the patients on antituberculosis medication as compared to healthy individuals.[1]

Xerostomia is the subjective feeling of dryness in the mouth, often referred to as reduced salivary flow. Individuals usually complain about a dry mouth, frequent feelings of thirst, difficulty in using dentures, cracks in the lips, halitosis, fissured tongue, erythematous appearance of

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the tongue affecting general health and decreased quality of life.[2]

This paper presents a case report where a salivary reservoir was used successfully in a complete denture to rehabilitate a completely edentulous patient presenting with anti-tuberculosis therapy-induced xerostomia.

2. Case Report

A 62-year-old male patient reported with a chief complaint of inability to chew food due to the absence of natural teeth, dryness of mouth, and inability to wear dentures because of frequent trauma caused by his old dentures. (Figure 1)

History of the patient revealed that the patient is undergoing treatment for tuberculosis and has been on ATT for the past 6 months. There was no associated deleterious habit or comorbidity present in the patient.

The patient has been completely edentulous for the last 1 year and has been wearing a complete denture for the same. For the last 3 months, the denture was not fitting properly due to an increased dryness in the mouth associated with denture-induced trauma which started 3 months after the commencement of ATT. The patient has stopped wearing old dentures after 9 months of use thus leading to weight loss, indigestion, and compromised speech & esthetics.

Examination of the patient showed cracked lips, dry, irritable & shiny mucosa, and a coated tongue.

As the chief complaint of the patient involved dryness of mouth, subjective and objective evaluation of salivation was performed using Pai S VAS (Table 1) and Mirror test.

As suggested by Navazesh,[3] pre-weighed gauze was also used to quantify the unstimulated salivary flow which was found to be less than 0.1 ml/min.

This established the diagnosis of the patient as Completely Edentulous Maxillary and Mandibular Residual Alveolar Ridges: PDI Class II with associated ATT-induced Xerostomia.

2.1. Treatment plan

The treatment plan included either-

1. Fabrication of conventional upper and lower complete dentures with external use of a salivary substitute in the oral cavity.
2. Fabrication of a complete denture with a salivary reservoir.

The plans were discussed with the patient and an informed consent was obtained for rehabilitation with a complete denture having an artificial salivary reservoir.

2.2. Treatment procedure

Primary impressions using irreversible hydrocolloid impression material was made and primary casts were obtained over which custom trays were fabricated. Border moulding was performed using PVS impression material and the secondary impressions was also made using elastomeric impression material and the secondary casts were obtained.

Assessment of interocclusal space (Figure 2) was done by tentative maxillomandibular relationship and a salivary reservoir was planned on the mandibular complete denture (Figure 3).

The mandibular master cast was duplicated and a clear acrylic base was fabricated with press-fit buttons and plastic Lego blocks kept parallel to each other on either side and at the center and waxed in such a way that only the extensions of the plastic blocks were above the wax rims on the mandibular cast and the reservoir area was carved with wax and filled with PVS putty material (Figure 4). This was processed using the lost wax technique to obtain the lower compartment on the mandibular denture (Figure 5).[4,5]

Over the lower compartment the occlusal rim was fabricated after securing the reservoir space with PVS putty material and mounting was done followed by which teeth arrangement was done and try-in was completed.

The maxillary denture was processed using conventional technique. An aluminium foil was adapted over the lower compartment of the mandibular denture after dewaxing, to avoid any chemical bonding between the 2 compartments. (Figure 6)

The complete denture with a salivary reservoir in the mandibular denture was finished and polished after placing two small holes in the reservoir for easy leaching of the artificial saliva (Figure 7).

The patient was trained to load the artificial saliva in the reservoir of the denture. Instructions for the maintenance of the denture was also given. The patient was recalled periodically for subjective and objective evaluation which showed significant improvement in the patient (Table 2).

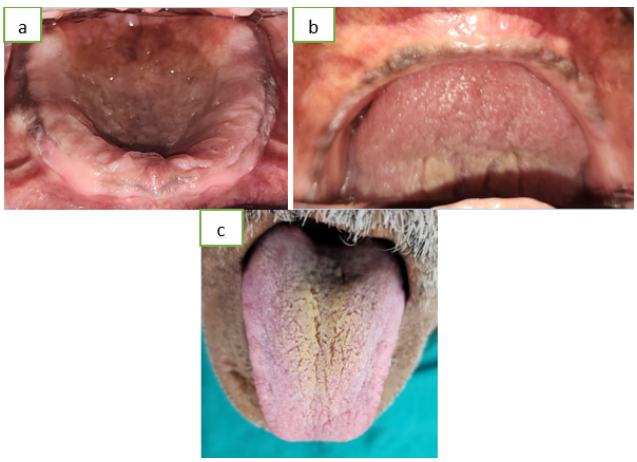

Figure 1: a: Shiny mucosa in maxilla; **b:** Traumatised mandibular mucosa; **c:** Coated and fissured tongue

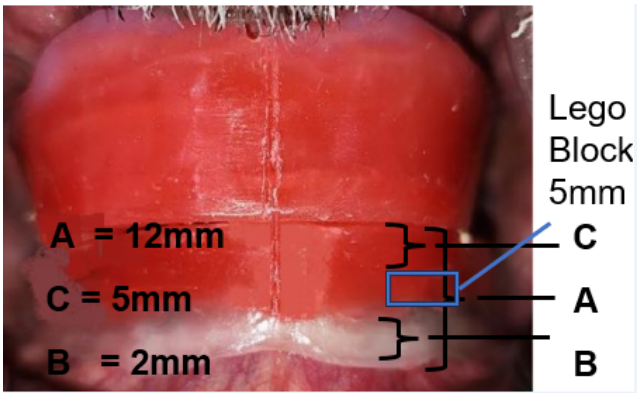

Figure 2: Evaluation of space for reservoir

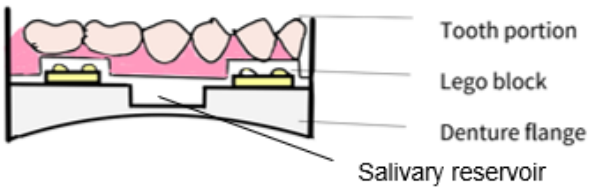

Figure 3: Designing of mandibular salivary reservoir

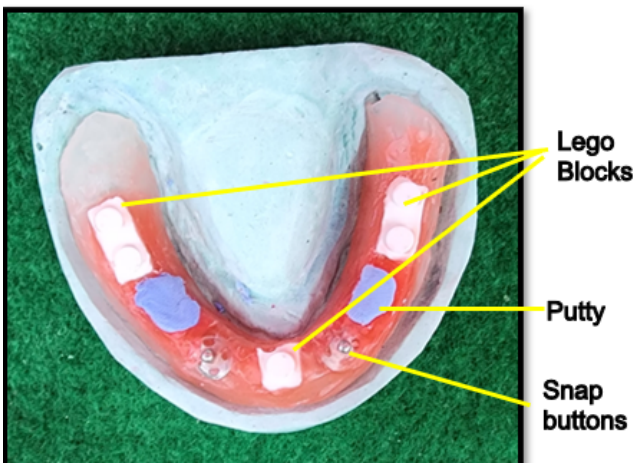

Figure 4: Wax up for reservoir

3. Discussion

Saliva plays a key role in providing essential lubrication, maintenance, digestion, mastication, and speech in a healthy individual.

Hypo-salivation or xerostomia leads to serious oral health and functional problems like caries, infections, and impairment of speech, mastication and swallowing that seriously affect oral health-related quality of life (OHRQoL).[6]

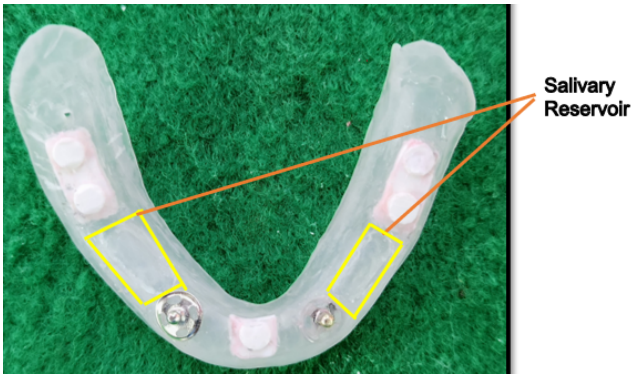

Figure 5: Split denture lower component

Figure 6: Dewaxing after teeth arrangement

Figure 7: Finished and polished denture

Systemic and local medications like Pilocarpine can be effectively used to stimulate saliva flow when there is residual gland function but symptomatic relief of xerostomia is of utmost importance. Saliva substitutes such as carboxymethylcellulose (Wet mouth, ICPA Health Products Ltd.) can be used to reduce the feeling of xerostomia.[7]

Dentures with reservoirs have been successfully developed that allow the release of saliva substitutes into the mouth effectively.

Reservoirs can be given in maxillary or mandibular denture depending on the availability of prosthetic space and the anatomy of oral structures. Patients with intact dexterity and adequate prosthetic space with shallow palatal vault should be considered for fabrication of reservoir with

Table 1:

1. Rate the difficulty you experience in speaking due to dryness (DIFSPK)
Not difficult at all...../.....Very difficult
2. Rate the difficulty you experience in swallowing due to dryness (DIFSWL)
Not difficult at all ...../.....Very difficult
3. Rate how much saliva is in your mouth (SALMOU)
A lot...../.....None
4. Rate the dryness of your mouth (DRYMOU)
Not dry at all...../.....Very dry
5. Rate the dryness of your throat (DRYTHR)
Not dry at all...../.....Very dry
6. Rate the dryness of your lips (DRYLIP)
Not dry at all...../.....Very dry
7. Rate the dryness of your tongue (DRYTNG)
Not dry at all...../.....Very dry
8. Rate the level of your thirst (LVLTHR)
Not thirsty at all...../.....Very thirsty

Table 2:

1. Rate the difficulty you experience in speaking due to dryness (DIFSPK)
Not difficult at all...../.....Very difficult
2. Rate the difficulty you experience in swallowing due to dryness (DIFSWL)
Not difficult at all ...../..... Very difficult
3. Rate how much saliva is in your mouth (SALMOU)
A lot...../.....None
4. Rate the dryness of your mouth (DRYMOU)
Not dry at all...../.....Very dry
5. Rate the dryness of your throat (DRYTHR)
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Not dry at all...../.....Very dry
7. Rate the dryness of your tongue (DRYTNG)
Not dry at all...../.....Very dry
8. Rate the level of your thirst (LVLTHR)
Not thirsty at all...../.....Very thirsty

attachments in mandibular denture rather than in maxillary denture to avoid any speech-related problems.[8]

The advantages of such dentures are easy loading and cleaning of the reservoir area and easy accessibility to the reservoir. However, the limitations are frequent reloading of artificial saliva in the reservoir, the repair is not possible and it requires additional laboratory steps.[9]

Cleaning can be done by the patient with the use of a disposable syringe for flushing with 2% sodium hypochlorite and refilling the chamber.

4. Conclusion

This split salivary reservoir denture offers clinicians a method of treating patients suffering from xerostomia in patients suffering xerostomia due to ATT. Improving quality of life by reducing weight loss, indigestion and improved esthetics.

5. Source of Funding

None.

6. Conflict of Interest

None.

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