



Faciomaxillary prosthesis in rehabilitation

After maxillectomy

A clinical study

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Abstract

This is a study done in the Department of Dental Surgery, Govt. Stanley Medical College Chennai, on prosthetic rehabilitation of patients with a residual defect on the face following treatment of maxillary tumours with maxillectomy. The study aimed at analyzing the tissue changes from the preoperative condition of the patient to the post-operative state followed by post-radiotherapy state and the materials used in fabrication of the prosthesis.

It was found that there was a progressive decrease in mouth opening and the resilience of the buccal mucosa following surgery and radiotherapy which adversely affected the impression and fabrication of the prosthesis. This necessitates the use of advanced impression materials like elastomers, and lining of the obturator with soft liner to prevent stress on the mucosa which in turn adds to the cost of the procedure.

This study also took into consideration the important factors which affect the retention of the obturator such as the size of the defect present postoperatively, and the presence of teeth. If there are sufficient numbers of healthy teeth, the obturator can be effectively clasped to increase its functional efficiency. In case of a completely edentulous maxilla, where there are no teeth to help in retention, the obturator will have to be fixed to the maxilla by circumzygomatic wiring. In spite of all these factors the success of an obturator depends on its acceptance and usage by the patient. So we analysed the psychological impact the obturator has on the patient. We concluded that initially, the patients experience a lot of difficulty in wearing an obturator because of the sudden change in the pattern of eating and swallowing. But they overcome it gradually and successfully and learn to make the best use of the obturator.

After analyzing the pros and cons we have formulated a protocol beginning from pre surgical assessment to post-operative rehabilitation, as every case has got its own variations on the design as well as in the material used.

Introduction

Living a life with defect is as cruel as living with the disease itself, especially if the defect is on the face. With recent advances in the early detection in oral malignancies and availability of highly skilled surgical specialists, the management of malignancies has improved by leaps and bounds. Not all defects can be reconstructed on the table with bone graft by the surgeon. So the patient is forced to live the rest of his life with an irreparable defect in the face. This difficulty can be overcome by using a maxillary prosthesis.

Total maxillectomy which is considered the treatment of choice for treating malignancies of the maxilla is one of the surgeries which create a residual defect that is too large and complicated to be reconstructed by surgery alone.

Almost all the patients after maxillectomy would opt for some type of prosthetic rehabilitation to help in normal eating and speech. Based on this, we in our Department of Dental Surgery in Govt Stanley Medical College Chennai planned a study and formulated a protocol beginning from pre surgical assessment to post-operative rehabilitation as every case has its own variations on the design as well as in the material used.

Aim of the study

1. To analyse the tissue changes from the preoperative condition to the post-operative state followed by post-radiotherapy state.
2. The condition of the tissue at the time of fabrication of prosthesis which in turn influences the materials used for taking impression of the tissue.
3. The materials used for fabrication of the temporary and definitive prosthesis.
4. To analyze the design which helps in retention of the prosthesis and the impact it will have on facial esthetics.
5. To study the pschycological impact the obturator will have on the patient.

Materials and methods

This is a clinical study done in the Department of Dental surgery, Govt.Stanley Medical College on cases which were referred for prosthetic rehabilitation after maxillectomy from the Department of Otolaryngology of Govt.Stanley.Medical.College headed by Prof. **Balasubramanian MS.DLO**.

First the patients were assessed preoperatively with study models and photographs to understand the supporting tissue and teeth before making the temporary obturator.



Pre –operative view.

Impression of the tissue was recorded using Dental alginate (irreversible agar).

Then plaster of paris models were made



Impression



Model

Discussion was done, regarding placement of anticipated cut margins, and accordingly, the portion of the cast corresponding to the tissues to be removed surgically was marked and then chipped off from the cast. Now we have a mock surgically prepared plaster of paris model, for fabrication of temporary prosthesis. This model is lined with a separating agent and a wax pattern is made.



Wax pattern

We keep another model for future references. Then the final process is fabricated using acrylic. Metal spikes are placed in the superior aspect projecting towards the floor of the orbit to retain the surgical dressing. This obturator is fixed intra operatively to cover the surgical defect.



Temporary obturator

Minor adjustments are made on the table. The tissue loss is made up by packing the wound with impression compound covering with sterile antibiotic coated gauze. This temporary obturator is worn by the patient till wound healing is complete. It is cleaned at regular intervals.

DEFINITIVE OBTURATOR

A definitive obturator for the patient can be made only after the surgical site has completely healed and become dimensionally stable with not much shrinkage of the tissue margins. The patient has to be prepared physically and emotionally for the restorative care.

This transition from temporary to definitive obturator takes about 2-3 months and it depends upon

- Size of the defect
- Progress of healing
- Achieving disease free margins.

The design and fabrication of the final prosthesis is dependent on the progress of the disease.

The size of the final defect influences the design of the obturator. Usually in total maxillectomy cases the defect is big. In these cases we prefer the hollow bulb obturator. The part covering the defect is lined by a hollow bulb made of acrylic and the rest of the portion is covered by a palatal plate. The advantage of the hollow bulb is that it reduces the weight of the obturator. Facial contour is maintained.

Procedure

Impression making.

Before making the impression, the patient is thoroughly analyzed for any unhealed margins and all the internal defects where the impression material might get trapped are blocked with Vaseline coated gauze. Then the impression is made.



Impression of the surgical defect

Fabrication of the models

Using these impressions plaster of Paris models are made.



Plaster of paris models – with the defect.



Positive replica in the form of Hollow bulb



Hollow bulb portion is fitted to the palatal plate

Trial of the hollow bulb portion in the patient's mouth

The trial in the patient's mouth ensures that the hollow bulb portion of the obturator fits correctly into the defect area. It is then fitted to a palatal plate.



Hollow bulb portion is checked in the patient's



Patient with the hollow bulb obturator

Results

Our study found that the sequence of tissue changes from the preoperative time until after completion of radiotherapy was a progressive decrease in mouth opening and the resilience of the buccal mucosa which adversely affected the impression and fabrication of the prosthesis. It was found that preoperatively the mouth opening was good thus providing enough access for recording the impression.

But postoperatively the mouth opening was restricted, and also the buccal mucosa on the surgical side becomes unyielding and stiff because of the obliteration of the buccal sulcus.

After radiotherapy, the stiffness of the buccal mucosa increases, associated with presence of mucosal blisters, mucositis, and the easy bleeding tendency of the mucosa

This makes the impression recording procedure very difficult and cumbersome for the patient as well as for the operator.

Preoperatively the impression can be made with simple materials like dental alginate [irreversible agar], because of the easy access and the presence of resilient and yielding buccal mucosa, whereas impression making during the post-operative and post radiotherapy stages require use of elastic impression materials which are very expensive. All the unfavourable small undercuts have to be blocked with Vaseline gauze to prevent trapping of the material inside.

In addition to these, radiotherapy causes inflammation and atrophy of the minor salivary glands resulting in reduced salivary secretion and eventual dryness of the mucosa. This makes the mucosa very fragile and less tolerant to the presence of any foreign body. So now the obturator

has to be lined with a special material called soft liner. The soft liner is a special type of acrylic which does not exert pressure on the underlying soft tissue.

Apart from this, other important factors which affect the retention of the obturator are the size of the defect present postoperatively, and the presence of teeth. If there are sufficient numbers of healthy teeth, the obturator can be effectively clasped to increase its functional efficiency. In case of a completely edentulous maxilla, where there are no teeth to help in retention, the obturator will have to be fixed to the maxilla by circumzygomatic wiring.

Lastly we also analyzed the psychological impact created by wearing an obturator. It was observed that the patients initially have an aversion towards the presence of foreign body in the mouth especially during the immediate post-operative period, when feeding is done using ryles tube and there is no oral intake .When the ryles tube is removed and the patient starts taking oral feeds then he develops nasal regurgitation of fluids and food. This is when the patient feels the need for something which will separate the nasal cavity from the mouth and prevent nasal regurgitation. From this point the patient starts accepting the obturator. Slowly they get adapted to it and also feel comfortable to eat and drink with its help.

However there are still some persistent issues which continue to bother them. This is mainly due to the altered taste sensation felt by the patients as the tongue articulates against a plastic plate instead of the palate as in normal swallowing. The secretions of removed palatal portion are lost, and the secretions from the existing palate are also blocked by the obturator. There is loss of taste sensations from the palate because it does not come into contact with the food. The pleasure of eating is lost to a great extent. The perception of swallowing is totally changed, some patients develop avulsion towards foods, have sense of vomiting. This difficulty is much pronounced especially when the defect extends into the soft palate.

DISSCUSION

The advancement of early diagnostic methods in malignancies has resulted in increasing number of people who undergo surgery for tumours of the maxilla. After maxillectomy, patients experience major dysfunctions in speech, swallowing and mastication, creating a very negative psychological impact on them.

This is because maxillectomy creates an anatomic defect that allows the oral cavity, maxillary sinus and the nasal cavity to become one compartment. This creates abrupt

alterations with sudden impairment of deglutition, speech, mastication and esthetics which cause the patients to become very anxious. Early rehabilitation of these patients is very essential for their speedy recovery.

Prosthetic rehabilitation with an obturator prosthesis helps to restore the functional capabilities of speech, oral food intake, and deglutition by recreating the anatomic barrier. An obturator also extends possible support of the orbital contents to prevent enophthalmos and diplopia. It supports the soft tissue and thus helps to restore the mid facial contour, and produces an acceptable aesthetic result.

In spite of all these advantages, the success of the obturator is limited by many factors like the size of the defect, the nature of the lining tissue, and the quality of the supporting tissue and teeth that are available to retain the prosthesis.

Our study found that there is progressive increase in trismus and in the stiffness of the buccal mucosa on the affected side which results in reduced mouth opening. So the impression making for the definitive obturator becomes difficult which is overcome by using elastic impression materials, like rubber base impression materials.

After radiotherapy there is decreased salivation which makes the mucosa very dry. So the tissue is not able to tolerate the obturator which is made of acrylic - a hard plastic. In these conditions the obturator is lined with a soft liner which reduces the stress on the mucosa. Although a soft liner adds to the cost of the prosthesis it helps in reducing the mucosal irritation.

Psychologically, the patient has an aversion to the obturator initially. But they overcome it and also learn to make the best use of it.

Adding teeth on the facial aspect of the obturator increases its aesthetic value and makes it more acceptable for the patient and it also boosts their self-confidence



Conclusion

Despite all the hardships in the fabrication and use of maxillary obturators, a thorough understanding of the anatomy, and histology of the oral tissues together with an update on the recent advancement of the materials available helps in fabricating a successful maxillofacial prosthesis which is very crucial in overcoming the defect and to maintain the essential functions of for good physiologic and psychological health so that the patient can then become a functioning member of the society. We in our department of dental surgery in Govt Stanley Medical College are able to address to every aspect and to formulate a protocol for rehabilitation of maxillectomy patients.

Reference

The evolution of the obturator framework design. (J Prosthet Dent 2003 ; 89 ; 608 -10)