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Case Report

A CUSTOMIZED BRACHYTHERAPY RADIATION CARRIER FOR VERRUCOUS CARCINOMA OF TONGUE: A CASE REPORT

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ABSTRACT:

Oral verrucous carcinoma is a rare tumor first described by Ackerman. It is a special form of well differentiated Squamous Cell Carcinoma with specific clinical and histological features. The tumor grows slowly and locally, invasive in nature and unlikely to metastasize. It appears as a painless, thick white plaque resembling a cauliflower. In recent years, brachytherapy has been used in management of neoplasms of head and neck region.¹ This clinical report illustrates a method of customized mould fabrication for a 64 year old patient diagnosed with vertucous carcinoma of dorsum of tongue undergoing brachytherapy treatment and emphasizes the responsibility of a maxillofacial prosthodontist in designing a non-invasive prosthesis which maintains the radiotherapy catheters in the required predetermined position as per the requirement of the radiologist.

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INTRODUCTION

Brachytherapy is a form of intra-operative radiation, wherein sealed radioactive sources are used to deliver predetermined doses of radiation directly onto the affected area. Mould brachytherapy requires construction of specialised carrier for the treatment of superficial lesion and is considered as an excellent treatment option as it allows areas specific dose distribution. This method allows short treatment time and thereby reducing the post radiotherapy sequelae of xerostomia, mucositis, dysphagia, and dysgeusia. However, the method is extremely limited in its application to oral carcinomas because the catheters are not sufficiently flexible to fit along complex anatomically contour of the oral cavity. Brachytherapy is a form of intraoperative radiation, wherein sealed radioactive sources are used to deliver predetermined doses of radiation directly onto the affected area. Mould brachytherapy requires construction of specialised carrier for the treatment of superficial lesion and is considered as an excellent treatment option as it allows areas specific dose distribution. This method allows areas specific dose distribution, wherein sealed radioactive sources are used to deliver predetermined doses of radiation directly onto the affected area. Mould brachytherapy requires construction of specialised carrier for the treatment of superficial lesion and is considered as an excellent treatment option as it allows areas specific dose distribution. This method allows short treatment time and thereby reducing the post radiotherapy sequelae of xerostomia, mucositis, dysphagia, and dysgeusia.¹ The principles of fabricating an intraoral radioactive carrier have been described to treat malignant diseases of the oral cavity The prosthesis provides consistent direction and fixation of the radioactive source into the same location.³

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CASE REPORT

A 64 year old male patient at the Department Of Radiology, Indra Gandhi Medical College, Shimla, Himachal Pradesh with a complaint of a non-healing ulcerative lesion on the dorsum of the tongue since 10 months. On examination a 6x4 cm ulcerative lesion, involving the dorsum of the tongue crossing the midline was seen.⁽¹⁾



DISCUSSION

Pictorial view of the lesion.

Maxillofacial prosthodontist plays a crucial role in the construction of the mould. An impression of the lesion will aid in deciding the location of the catheters for adequate dose distribution. The appliance should have good retention, stability and support which will ensure delivery of radiations to the desired location. The mould should be fabricated such that catheters remain patent without bending as their bending would cause source obstruction thereby hampering the flow of radiation. Previous studies have shown that the thickness of acrylic does not interfere with delivery of radiation. The current case report describes a technique for fabrication of radiation carrier that utilises materials which are accessible to prosthodontist, thereby making it simple and cost-effective.¹

extent of the lesion.

Setting reaction of cold cure generates heat and since catheters are sensitive to the heat, wax rolls were prepared instead of directly in cooperating them into the wax pattern. The parallel placement of catheter and the opening provided in the appliance for each one avoided the risk of bending. Soft liner was used to fill the space between the tongue and the device, and to restrict movement of the prosthesis during treatment, which aided in retention, stability and support. The opening for the tip of tongue provided visual assurance that the tongue was in same position throughout the delivery of radiation. The device was sterilised after each cycle and follow-up was carried out to check for its efficiency. It was noted that custom-made mould is easy to use and it ensured patient comfort.^{9,10}

STEPS IN FABRICATION OF THE BRACHYTHERAPY MOULD



Diagnostic impressions made with Irreversible Hydrocolloid (Alginate) and Poured in Dental Stone.

Wax Pattern Fabrication For making the Special Tray for Secondary Impression.

Special Tray For Making Final Impression.

Final Impression Taken with Putty and Light Body.



Spacer Fabrication

The extent of tumour was marked using an eosin pencil and the impression of tongue was made using putty elastomer material (Aquasil). The tip of the tongue was extended outward in a comfortable position until the material sets.

Spacer With Wax Slots for Catheter Fabrication

Modelling wax of thickness 1.7 mm was adapted onto the cast in order to prevent direct contact of prosthesis with the lesion. Four longitudinal wax rolls of 2 mm diameter, were placed parallel to each other at a distance of approximately 10 mm, which would indicate the position of the catheter.



Final Mould With Catheter In Place.

The number, placement and position of the catheter were consulted with the radiation oncologist and the design of the prosthesis was customised according those requirements. The catheter was secured within the slots (made using four longitudinal wax rolls) using cyanoacrylate adhesive (pidilite).



Sagittal View CT Scan showing Mould in Position with Radioactive Sources.

Sagittal view computed tomography scan showing mould in position with radioactive sources



Undersurface Relined for Securing Catheters In Place.

Finished and polished mould. Soft relining material (GC soft-liner) was placed onto the inner surface of the prosthesis to prevent direct contact of catheter tubes with each other as well as the mucosa. Soft relining of the prosthesis also provided retention stability and patient's comfort.



Brachytherapy Mould Try-In.

After finishing and polishing, the fit of the prosthesis was assessed in the patient's mouth and the patency of the catheter tubes was analysed using lead wire.

In order to stabilise the appliance during administration of radiation (10 minutes) relief was provided around the tip of the tongue.



Healing Lesion After Radiation Using The Carrier.

CONCLUSION:

The current case report describes a method for the fabrication of mould brachytherapy appliance that is simple and non-invasive with good patient acceptability which can be used for treating Verrucous Carcinoma involving lateral border of tongue.

Treatment with brachytherapy provides additional radiation therapy in a conformal pattern that can be accurately distributed to the tumor volume, while minimizing the exposure of adjacent normal structures to external beam radiation.²

- ▶ The report describes a method for the fabrication of mould brachytherapy appliance, that is-
- Simple
- Non- Invasive
- Good patient acceptability
- Good Retention, stability and support
- Area Specific dose distribution
- Hence, it can be used for treating carcinomas involving tongue surfaces.(especially lateral borders and dorsum of tongue)

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