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Review Article

Prosthodontic Rehabilitation and Management of Irradiated Edentulous Patients - A Review

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ABSTRACT

It says an individual does not get cancer but family does .Cancer patients or irradiated patients requires special care and consideration from a prosthodontist .Several factors has to be considered while treating a edentulous irradiated patients which includes preprosthetic examination of the edentulous oral cavity, impression materials of choice, assessment of vertical dimension, comfortable occlusal forms, adjustment of denture base, delivery instruction and follow up. Through our paper we are aiming to discuss about the management of edentulous irradiated patient who requires special care.

Introduction

One of the most common cancer by incidence and one of the common cause of death from cancer worldwide is Head and neck cancer. Head and neck cancer treatment comprises surgery, radiotherapy, chemotherapy, or a combination. But, for oral cancer, the treatment of choice is surgery and later followed by radiotherapy in patients with advanced disease.[1]

The psychological ,cosmetic and functional results of oral cancer treatment may combine to have serious effects on the patient's quality of life (QOL). The main aim in cancer treatment is not only on survival but also on rehabilitation, which improves multiple impairments and QOL.

The prosthodontic rehabilitation aims is to minimize morbidity and relieve suffering following treatment of head and neck cancer. During their traumatic psychological adjustments ,it encourages the best possible QOL for patients and enchances their self-image. This paper mainly focus to summarize the role of prosthodontics in oral rehabilitation in irradiated cancer patient.[2]

MATERIALS AND METHODS

Electronic searches were done from PubMed, and Google database with combinations, databases with the key words head and neck cancer , preprosthectic examination of edentulous oral cavity, Impression, assessment of vertical dimensions ,occlusal form, adjustment of denture base , post insertion instruction (1996-2015) was utilized with a strategy to identify the maximum of studies in each base. The aim of this article is to produce an updated literature review for the oral rehabilitation in irradiated edentulous cancer patients.

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DISCUSSION

THE CHALLENGES IN ORAL REHABILITATION FOR THE PROSTHODONTIST

The possible outcomes of radical surgery include alteration in oral anatomy, loss of teeth and surrounding anatomical structures, significant amount scarring and heavy flaps, loss or change of sensation, and reduced mouth opening due to trimus. [1]

EFFECTS OF RADIATION ON TISSUES [3-4]

- The radiation affects body by various complicated processes. The degrees of biological effects, ranges from damage to death of living tissues, which is brought by various pathological changes in human cells.
- When exposed to ionizing radiation, it will cause ionization of huge molecules like proteins and nucleic acid in the cells,which then further affect the metabolism and function of the cells

Even though radiation can cause damage to living tissues, human cells have a natural metabolic processeswhich can repair the damage which depends on following factors such as Individual and genetic factors ,Dose administered, Volume of tissue which expose, Fraction size and Interval b/w the two fraction and Cofactors (wound infection).

Radiation injury can either be direct or indirect type

- *Direct injury*

The susceptible cells are destroyed or damaged which leads to disruption or loss of tissue function. E.g., Salivary glands, mucosa, skin.

- *Indirect injury*

Here decreased vascularity causes the subsequent changes in the tissues. These changes are classified to be based on responses that are: Hypovascular , hypocellular, and hypoxia.General tissue effects of radiation: [5]

Oral mucositis Loss of taste − Dysgeusia/hypogeusia Erythema , Muscle fibrosis , Xerostomia, Radiation caries , Trismus ,TMJ dysfunction, Osteoradionecrosis, Changes in oral flora – candidal infections , gingivitis

Delayed effects

Salivary glands - decreased amount and increases viscosity of saliva , decreased Ph and difficulty in swallowing

DENTAL MANAGEMENT OF IRRADIATED PATIENTS

IMPLICATIONS FOR PROSTHODONTIC ORAL REHABILITATION FROM A PATIENT PERSPECTIVE

After the diagnosis for z patient having oral cancer, their main concern is with survival. Once the cancer treatment is over , their priority changes to having and maintaining a better quality of life (QOL). The most important concerns reported by patients in regard to QOL were mastication, proper speech and swallowing, slightly followed by esthethics or appearance, mostly cases of female patients.

- Treatment divided into 3 stages:
- Pre irradiation treatment plan
- Post irradiation treatment plan
- Prosthodontic treatment plan

PRE IRRADIATION TREATMENT PLAN[5-8]

- A comprehensive oral and dental examination should be taken into consideration prior to surgical intervention. Records which should be obtained prior to surgery are articulated diagnostic cast, jaw relation records, midline of face profile template , tooth shape and shade matchhed, radiographs, photographs of the mouth may be obtained for proper treatment outcome. Any existing local infection have to be excised , modification of oral structures to anticipate the needs of following treatment procedures like gingivoplasty or alveoloplasty which may be required. Existing dental prosthesis may be modified to serve as treatment prosthesis or preparation of radiotherapy stents. Hence, an favourable oral environment should be obtained to way provide freedom from infection and facilitate early recovery of tissues

POST RADIATION TREATMENT

- Conservative or strict oral hygiene rinses with H2O2. or warm saline. Antibiotics or analgesics – in case of infection or pain . Any surgical intervention is contraindicated – in massive tissue loss
- side effect of radiation on tissues:

MUCOSITIS [3-10]

Begins in 2nd week of therapy . Earliest manifestation as whitish discoloration followed by atrophic mucosa which edematous and friable . finally ulcer soon develops which covered yellowish discoloration .Once radiotherapy is over mucositis will subside gradually over 6-8 weeks .For the mild mucositis can be treated by warm saline rinses or equal parts benadryl elixir or keopectate as mouth rinses and in Severe mucositis is treated by use anaesthetic sprays before meals, acetaminophen with codeine elixir

XEROSTOMIA[17,18 ,22-26]

Dry mouth is commmon complication of radiation.The salivary gland are very sensitive to radiationsand it is seen that there is a dramatic decrease in salivary flow in 6 weeks thereby a gradual decrease in 3years.The return of salivary gland to normal is variable and is dose related. Patients are advocated to rinse frequently with sterile water or saline .Use of commercially available artificial saline substitute or salivary stimulant such as sugarless candy .Application of lubricating agents on lips to prevent cracking

OSTEORADIAONECROSIS [4-10 ,19]

It is one of most severe complication of radiation therapy .Radiation damages the osteocytes , microvascular system of bone leaving it hypovascular , hypocellular and hypoxic. Healing period between dental procedure such as extraction and initiation of radiation should minimum of 3 weeks . Conservative treatment is gentle debridement with removal of bony spicules or sharp tissues . Severe condition surgical debridement and hyperbaric oxygen therapy is advised

TRISMUS[12,24,2-36]

Fibrosis of normal soft tissues which fall within the radiation field. It occurs in 3-6 months after conclusion of radiation therapy. Jaw opening is severely limited .Prevention is the best treatment. However once it commences physiotherapy is advised which consist of some of streching excercises or therabite

PROSTHODONTIC PHASE[27-52]

- The cancer patients in the need of prosthodontic rehabilitation,
- Initially they may be treated with conventional appliances.
- Secondary implant-based treatment.

If conventional treatment cannot be implemented because of its anatomical barriers, or in cases where it has been tried and was not successful,

PLACEMENT OF DENTURE OR TIMING

If Patients Is Priorly Denture Wearers new dentures can be made or existing denture can be inserted as soon as mucositis is resolved .If tumor site lies within the extension of denture,pressure sites should be checked with the pressure indicating paste or disclosing agents . If Patients Dentulous Prior To Irradiation .Denture bearing area should be carefully examined for contours irregularities or tengiectasia and scar before proceeding for denture fabrication . If there is preexisting osteoradionecrosis ,the denture fabrication is contraindicated when the bone exposure extends beyond the attached keratinized mucosa and patients are non compliant . In such situation the treatment plan involves diagnosis and removal of denture and in severe cases a course of HBO therapy will accelerate the healing .

PROTHODONTIC PROCEDURE[27-52]

- Primary impression should be made with alginate and not with compound. Patients having trimus sectional trays/ flexible trays can used .
- Border Moulding is done by using low fusing wax or heavy rubber base. Any overextension towards the tumor site should be avoided . Peripheral seal is virtually impossible to obtain in these patients because of reduced salivary flow. Efforts should be to gaining stability and support rather than retention

- Jaw Relation should be recorded in usual manner . A reduction in the vertical dimension may be required for the patients with severe trismus, thereby making the entrance of bolus easier .
- The choices of occlusal forms should be lingualised or monoplane occlusal schemes .In arranging posterior teeth, careful attention should be directed toward attainment of a proper buccal and horizontal overlap. Reduction in the number of posterior teeth by using two molars and one premolar only. Modified anatomical or flat teeth should be used to decrease the horizontal forces.

DELIVERY AND POST INSERTION

Any roughness or sharp angles should be removed. Pressure indicator paste applied to indicate any areas of excessive pressure.Instructions concerning removal of prosthesis should be given like the necessity for periodic return visits if there is any development of soreness ,and initial limited use of prosthesis .The patient follow up performed daily for about 2 weeks then patient follow up performed once in every 3 months.

SOFT LINERS[10,21]

Silicone liners have been suggested in order to reduce the injury to the tissues. But , they causes reduction of wettability of tissues which leads to increased drag, as the slidding of denture easily over the mucosa is not accomplished properly. There is a more rapid degradation of the silicone liners because of increased fungal population due to xerostomia. Silicone liners have thus been proven to be less effective than acrylic resin in the post radiotherapy denture patient.

IMPLANTS IN IRRADIATED PATIENTS[1,56-61]

Irradiation predisposes changes in the bone, mucosa and skin which affects the predictability of osteointegrated implants. Impairment of Osteointegration of implantis seen in bone which have received radiation of > 50Gy. So, careful consideration should be given to the risk of osteoradionecrosis .

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CONCLUSION

- The patient suffering from cancer for whom curative doses of radiation to the head and neck is required its poses an interesting challenge to the dentist.

- For such patients oral function and asthetics are the prime factor which has to be considered.

- So it is of utmost importance to correlate all aspects of dental care between the primary and secondary sectors in order to achieve best outcomes for the patients.

- Care and dental management of the irradiated patient is a grave undertaking as the standard of care for such patient will affect the patient's quality of life.

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