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QUALITY OF LIFE IN PATIENTS UNDERGOING MAXILLECTOMY WITH A COMPARISON OF DIFFERENT MODALITIES AVAILABLE FOR REHABILITATION POST RESECTION – A REVIEW OF THE LITERATURE

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ABSTRACT

Oral carcinoma and other tumors of the head, face and neck are known to negatively impact the quality of life of the individual both before and after the surgical resection is performed. The loss of different parts of the orofacial skeleton impacts the normal functioning of the stomatognathic apparatus, debilitates the ability to masticate and effectively deprives the face of its esthetic appeal and value in the human body. The three 'R's in the treatment therapy for oral carcinoma include Resection , Reconstruction , and Rehabilitation. This article aims at reviewing various protocols involved in the surgical treatment of patients with oral carcinoma in the maxillary region and their prosthetic rehabilitation, thereby discussing and debating between the available modalities. The depreciation, in the QoL that follows the diagnosis and treatment of oral carcinoma especially in the region which involves the maxilla, is appreciable and requires adequate and meticulous planning in order to delineate a competent treatment plan to decide the best course for the 3R's of oral carcinoma therapy.

KEYWORDS

Maxillectomy , obturator , rehabilitation , reconstruction , quality of life

INTRODUCTION

Oral carcinoma and other tumors of the head, face and neck are known to negatively impact the quality of life of the individual both before and after the surgical resection is performed. Quality of life (QoL) is defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns[24].

The loss of different parts of the orofacial skeleton impacts the normal functioning of the stomatognathic apparatus debilitating the ability to masticate and effectively depriving the face of its esthetic appeal and value in the human body. A compromise in the social life of the individual is a part of the domino effect which results from the cosmetic, functional and psychological aspects of oral cancer treatment[13].

Poor quality of life is a direct consequence of these effects[7]. Health related Quality of Life is now seen as a valid parameter to measure the success of the treatment for oral carcinoma with a number of questionnaires available which need to be assessed before being put into utility.[14]

The oral health problems involve limited mouth opening, more severe swallowing, chewing, speech and saliva secretion problems [32]. Post-surgical maxillary defects predispose the patient to a hyper-nasal speech, leakage of fluid into the nasal cavity, and impaired masticatory function[4]. Chigurupati et al.[16] in their study concluded that QoL is a valuable outcome measurement that extends beyond the traditional outcome measurements of mortality and morbidity for patients with cancer.

Treatment of Oral carcinoma involves removal of the carcinomatous lesion via surgical resection. The eventual result is the loss of either a part or a complete section of the orofacial structures. Oral cancer has a significant impact on the QoL of the patients. Assessment of QoL should receive adequate attention in treatment planning and rehabilitation. This would definitely help in delivery of better symptom directed therapies and improve the QoL of the patients[30].

The three 'R's in the treatment therapy for Oral Carcinoma include:
1. Resection
2. Reconstruction
3. Rehabilitation

This article aims at reviewing various protocols involved in the surgical treatment of patients with Oral carcinoma in the maxillary region and their prosthetic rehabilitation thereby, discussing and debating between the available modalities.

CLASSIFICATION OF MAXILLARY DEFECTS

Several classification systems have been developed to classify maxillary defects[9]. A few of them are given below:

1. Aramany et al.[5] formed a classification based on the region of the tissues lost in Maxillary resection:

a. Class I: The resection is performed in the anterior midline of the maxilla, with abutment teeth present on one side of the arch.
b. Class II: The defect in this group is unilateral, retaining the anterior teeth on the contralateral side.
c. Class III: The palatal defect occurs in the central portion of the hard palate and may involve part of the soft palate.
d. Class IV: The defect crosses the midline and involves both sides of the maxilla, with abutment teeth present on one side.
e. Class V: The surgical defect is bilateral and lies posterior to the abutment teeth. Labial stabilization may be needed.
f. Class VI: Anterior maxillary defect anterior with abutment teeth with abutment teeth present bilaterally in the posterior segment.

2. Cordoreo's Classification

a. Type I (Limited maxillectomy): One or two walls of Maxilla are resected with the preservation of palate.
b. Type II (Sub-total maxillectomy): 5 out of the 6 walls of Maxilla are removed, preserving orbital floor.
c. Type III (Total maxillectomy): Resection of all six walls of Maxilla. III a: Total Maxillectomy with orbital contents preserved. III b: Total Maxillectomy with orbital exenteration.
d. Type IV (Orbito-maxillectomy): Orbital exenteration with resection of upper 5 walls of Maxilla, preserving the palate.

MEASUREMENT OF THE QUALITY OF LIFE

The quality of life in Oral cancer patients is more than just a qualitative measure. Several attempts have been made at making it more objective and quantitative in order to make it measurable. Valdez and Brennan[42] in their review on the Impact of Oral Cancer on the Quality of life , as shown in figure 1, have mentioned three instruments for the measurement of the quality of life, namely,

1. University of Washington Quality of Life Questionnaire
2. European Organization for Research and Treatment of Cancer Quality of Life Questionnaire
3. Liverpool Oral Rehabilitation Questionnaire

Taking into account the factors which impact life after oral cancer, they have also classified the various aspects of life which get impacted by Oral carcinoma[42]. These are:

1. Physical impact
a. Esthetic
b. Speech

c. Voice
d. Swallowing
2. Psychosocial impact
a. Impact on the patient
b. Impact on the family
c. Impact on the healthcare provider
3. Financial impact
All the above factors combined lead to a depreciation in the overall well being and systemic health of the individual which eventually comes down on the quality of life of the individual.

TREATMENT MODALITIES IN ORAL CARCINOMA

The treatment of Oral carcinoma is tripartite and involves surgical, radiological and prosthetic intervention at various levels of treatment. After being subjected to surgery, the patient is further followed up by immediate, intermediate and definitive prosthetic treatment. Radiotherapy may also follow surgery in cases where deemed necessary.

In most cases of Oral carcinoma which involve the maxillary part of the Orofacial region, maxillectomy is the surgical modality of choice [3]. Adwani D et al.[2] strongly advised timely intervention and surgery with clear margins in order to achieve a better outcome along with adjuvant therapies. Aladelusi et al. [3] in a study conducted at a Nigerian teritary hospital concluded that total maxillectomy was the most frequent procedure conduced and the management of the defect was largely limited to the use of an obturator. According to Bande CR et al.[6] , reconstruction following resection is quite challenging for the reconstructive surgeon as its manner dictates the post operative functioning of the somatognathic apparatus. They further stated that the objectives of optimal functional and structural integrity ought to relate to the mortality and morbidity of all such cases. Gerdzhikov [25] suggested in a review that pain was one of the major factor factors which affected the quality of life following maxillary resection. Bell et al.[8] have suggested the use of Computer Assisted Presurgical Planning(CAPP), Computer-aided design and Computer-aided manufacturing (CAD/CAM) and intraoperative navigation in reconstructive surgeries as safe and predictable in order to achieve orthogonal maxillomandibular relationships. A comparison of the obturator prosthesis with flap reconstruction was studied by Breeze et al.[11] which led to the inference that there was no significant difference in the QoL following either of the restorative modalities. However, Buurman et al.[12] suggested that obturators contributed quite significantly to improving the Oral Health related QoL. Ye W et al. [44] suggested the use of the buccal pad of fat flap for covering small to mid size palatal defects and concluded that radiation did not affect the outcome. Free-tissue transfer offers the most effective and reliable form of reconstruction for complex maxillectomy defects as substantiated by Corderio et al.[17,18] in their study where they used Rectus abdominis and Radial forearm free flaps in combination with immediate bone grafting or as osteocutaneous flaps , thus consistently providing the best functional and aesthetic results. Few authors such as D' Souza et al.[19,20,35] reported that recent developments in rehabilitative techniques for acquired maxillary defects has ensued improvements in the QoL. Reconstructive and rehabilitative techniques involving osseointegration, microvascular free tissue transfer, Virtual Surgical Planning (VSP), and CAD/CAM technology have resulted in improved functional and aesthetic outcomes.

Chen et al.[15] have stated that well-designed obturator prostheses for maxillary defects were not only to maintain durable and good retention, stability, and support, but also to relieve pain and result in ease of use. One of the most crucial parts for application of obturator prosthesis is the retention of prosthesis. With the development of research and improved techniques, there are various strategies, designs and materials to achieve enhanced retention, such as precise attachment supported by implant retentive obturator prosthesis. As suggested by various authors,[1,4,21] , the use of a maxillary obturator post surgery helps to improve the overall functioning of the stomatognathic apparatus. Dholam et al[22] suggested the fabrication of an obturator prosthesis in a particular order consisting of immediate, intermediate and definitive , for effective results following surgical resection. A good obturator improves the QoL as suggested by Irish et al.[21]Pradeep Kumar et al. [38] came to a similar conclusion in their study on the Quality of Life with maxillary obturators , such that it is a highly positive and non invasive approach which contributes to the success of surgical treatment by enhancing function and stability. Kalignan et al.[29] reported that a highly positive association exists between oral health related QoL and Maxillofacial Prosthesis. Seignemartin et al.[40] stated that it was the understandability of speech that predicted the success of Prosthetic modalities. Pogrel[36] suggested that the main disadvantage of an obturator is the leakage of liquids around the appliance into the sinus and nasal cavity. There may also be speech problems. However, even if surgical reconstruction is carried out utilizing both hard and soft tissue, the patient may still have speech problems and still needs to wear a partial denture to fully reconstruct the maxilla. Pool C et al.[37] however suggested that maxillary defects commonly present following surgical resection of oncologic processes. The use of rotational and free flaps has largely replaced the use of prosthetic options for hard palate and maxillary reconstruction, nevertheless, prostheses remain a useful tool. Prosthetic devices may be invaluable in patients considered poor candidates for surgical reconstruction secondary to poor vascularity, need for postoperative radiation, or medical comorbidities that place them at high risk for healing following reconstruction. Obturators may also be considered over soft tissue options if oncologic surveillance via direct visualization of the surgical site is warranted.

Sharma and Beumer[41] suggested that a thorough evaluation by both the surgeon and prosthodontist permits selection of the best method of rehabilitation and allows the patient to make an informed decision concerning the management of the maxillary defect. Surgical reconstruction may be preferable in patients with lacerations or traumatic defect, where tissue loss is minimal. In patients with large defects, particularly those secondary to tumor resection, prosthetic rehabilitation is the treatment of choice; palatal contours can be faithfully restored and teeth can be properly positioned. The oncologist can monitor the defect for tumor recurrence and there is no accumulation of mucous.

In the ongoing debate between clinicians involved in the treatment and rehabilitation of oral cancer patients, there is a diversity of opinion on the various treatment modalities available, their effective application and their post surgical outcome. Though there are conflicting points of view with regard to whether or not rehabilitation with an obturator is efficacious in the restoration of stomatological function, its presence in the spectrum of options available for rehabilitation cannot be ignored. There have been suggestions that the QoL improves significantly with a vascularized bone free flap which nearly covers the lost region as compared to the presence of an obturator at the same site[43]. Most of the literature pointed to an improved quality of life irrespective of the reconstruction and rehabilitation done provided that evidence based treatment protocol was strictly and thoroughly followed leaving no space for iatrogenicity.

We can safely infer from the review performed above that the treatment option will vary with each case and further research needs to be done to develop an accurate algorithm for treatment planning which may be applied universally. As suggested by Peker [34], well-designed clinical, multicenter, longitudinal studies with a larger sample to evaluate the impacts of different reconstruction and retention methods, need to be carried out. Though a variety of treatment modalities are available, the basic prerequisite for successful therapy lies in the skill and knowledge of the practitioner involved in the reconstructive and rehabilitation process as applied to the treatment plan and the ability to execute the same within the range of limiting factors (time, finance, health, habits etc. of the patient) which may affect and impact the outcome.

	UW-QOL	EORTC QLQ-H&N35	Liverpool Oral Rehabilitation
Number of Questions	15	35	25
Scale	Likert (5 point)	Likert (4 point)	Likert (4 point)
Scoring	• Range from 0 to 100. • Composite score is calculated by taking the averaging each domain score.	• Range from 1 to 4. • Composite score is a linear transformation of the sum of individual item scores	• Range from 1 to 4 • Composite score is the simple mean of individual item scores
Measures	• Pain • Appearance • Activity • Recreation • Swallowing • Chewing • Speech • Shoulder Involvement • Taste • Saliva • Mood • Anxiety • Overall QOL	• Pain • Swallowing • Senses • Speech • Social Eating • Social Contact • Sexuality	• Chewing • Swallowing • Oral Dryness • Speech • Drooling • Appearance • Social Life • Food Choice • Denture Issues

Figure 1 : Measurement Of Quality Of Life

CONCLUSION

The depreciation in the QoL that follows the diagnosis and treatment of Oral Carcinoma especially in the region which involves the maxilla is appreciable and requires adequate and meticulous planning in order to delineate a competent treatment plan to decide the best course for the 3R's of Oral Carcinoma therapy (Resection, Reconstruction and Rehabilitation).

ABBREVIATIONS:

- Computer-aided design and Computer-aided manufacturing : CAD/CAM
- Computer Assisted Presurgical Planning : CAPP
- Quality of Life : QoL
- Virtual Surgical Planning : VSP

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