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Journal Name:	**International Journal of Research and Reports in Dentistry**
Manuscript Number:	**Ms_IJRRD_97701**
Title of the Manuscript:	**Prosthetic rehabilitation in carcinoma of the tongue and oral pelvis: Presentation of a clinical case and literature review**
Type of the Article	**Case study**

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PART 1: Review Comments

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments **1. Is the manuscript important for scientific community?** (Please write few sentences on this manuscript) **2. Is the title of the article suitable?** (If not please suggest an alternative title) **3. Is the abstract of the article comprehensive?** **4. Are subsections and structure of the manuscript appropriate?** **5. Do you think the manuscript is scientifically correct?** **6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.** **(Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)**	**1. The article is beneficial for community with a lot of effects.** **2. The title is well defined and suitable** **3. The abstract needs to be modified and more comprehensive** **4. The subsections are competing and well organised** **5. It is scientifically correct** **6. References are enough** **7. I add some comments down with full details;-** - This is an interesting study and the authors have collected a unique dataset using cutting edge methodology, literature reviews. - The paper is generally well written and structured. - However, in my opinion the paper has some shortcomings in regards to some data analyses and text, and I feel this unique dataset has not been utilized to its full extent -it needs alphabetical review, adjust fonts, spaces, paragraphs, do all same font with same design -adjust abstract as in form of introduction, methods, result, and conclusion. -remove all graphs, tables, legends or figures from inside article and put all after references at end of article -review all references and adjust font, design for all references and organize in numerical order -review discussion paragraph as a whole -the research Is relevant and interesting -the paper is well written, the text is clear and easy to read but needs some font, design and alphabetical review with corrections -the conclusion is consistent with the evidence and arguments presented - Maximum 1000 words allowed per research	
Minor REVISION comments **1. Is language/English quality of the article suitable for scholarly communications?**	1. I think English language is well adjusted and suitable for the article. - Where improvements are needed, a recommendation for major revision is typical. - I am ready to do the post-revision review too.	

	-Review title as first. -Add name of author, affiliation, qualifications abbreviations after title -the English is understandable but the paper has some typographical and grammatical errors -Add any conflict of interest -Add any acknowledgements -Add any sponsorship or financial support - Keep images, graphs and data tables in clear view at end of article - You need to check referencing for accuracy, adequacy and balance. -limit research article to maximum 1000 words. -add more keywords.	

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Optional/General comments	- Good research, worthy for study - the Abstract highlights the important findings of the review of fertilizers. -the tables or figures, aid understanding and superfluous - the research Is relevant and interesting - good sampling in analytical papers -clarify the validity of questions, the use of a detailed methodology and the data analysis being done systematically (in qualitative research) - good reviews of all types and modalities of fertilizers used for agriculture in India - the paper's premise is interesting and important - the methods used are appropriate - the data support the conclusions **Article after Grammar corrections:-** *Case study* Prosthetic rehabilitation in carcinoma of the tongue and oral pelvis: presentation of a clinical case and literature review Abstract Objectives With this paper, the authors want to describe a case of prosthetic rehabilitation on a 50-year-old woman with an anamnesis of smoking and alcohol consumption who has undergone a removal surgery of a neoplastic lesion that involved the oral pelvis and the lingual border. The inherent literature regarding the prosthetic rehabilitation of post-irradiated bones is also evaluated. Materials and methods The patient’s clinical, radiological, and anamnestic data enabled the preoperative staging of the neoplasm of the oral cavity, which has been treated with a transmandibular conservative surgical resection of the lesion associated with a functional and bilateral neck dissection; this was then followed by an immediate surgical reconstruction with a radial antebrachial bundle-cutaneous free flap. Results and conclusions One year after surgery, excluding the presence of recurrences through MR with contrast, the dental residues have been removed, and rehabilitation with an implanted prosthesis has been completed. The aesthetic outcome was remarkable. Both the preoperative multi-specialist evaluation and the definition of a common rehabilitation program represent essential prerequisites in order to avoid some possible and serious complications of the treatment. Postoperative radiotherapy for oral	

cancer is now universally associated with implant-prosthetic rehabilitation therapy.

Key words: oral cancer, forearm free flap, reconstruction, radiotherapy, oral implantology

1.Introduction

Oral cavity reconstruction secondary to removal surgery of neoplastic lesions has undergone significant changes over the last twenty years (Chandu, 2002). This is because the purpose of this kind of surgery is not only to preserve the patient's life, but it also has the achievement of granting an acceptable quality of life in terms of oral functionality and facial aesthetics, especially for what concerns the three main functions of the oral cavity: phonation, chewing, and swallowing. Surgical reconstruction and prosthetic rehabilitation in patients affected by oral cavity cancer tend to restore, to the best possible levels, the patient's anatomy, aesthetics, and physiological function. In order to reach this important objective, the introduction of two main factors will surely play an important role: revascularized free flaps and the use of osseointegrated dental implants.

The radial antebrachial bundle-cutaneous free flap represents one of the most commonly used revascularized free flaps for oral cavity reconstruction (Avery, 2010 parts 1 and 2). This flap was first described by Yang et al. in 1981 (Yang, 1981), but only in 1983 did Soutar et al. (Soutar, 1983) define it as a versatile solution for reconstruction of soft tissues and mucosal defects of the oral cavity. This kind of flap has gained popularity over the years (Genden, 2004; Dean, 2012) due to the fact that it provides a large amount of thin skin that also results in being well vascularized and plicable with minimum encumbrance and can also be used as an osteocutaneous flap if a radial segment of 10–12 cm is associated, with even the possibility of anastomosing a receiving sensory nerve with the lateral antebrachial cutaneous nerve (Urken et al., 1990; Bigliol, 2006) the latter method, which however, does not give a good level of reliability.

Prosthetic rehabilitation following oral cancer surgery is often difficult without using endosseous implants, which are able to ensure stabilization and retention of the prostheses. This is a very important point because after the surgical approach, the patient undergoes radiotherapy treatment, which may compromise salivary production, which is one of the main mechanisms that allow adequate prosthesis retention. Endosseous implants are also very useful because the resections themselves often amputate, in whole or in part, important regions of bone or oral mucosa that may be used for prosthetic anchorage. The use of dental implantology during the reconstructive phase of oral cancer surgery can be divided into two categories: retention of a removable prosthesis or steady prosthetic rehabilitation with or without maxillary bone reconstruction. The reliability of dental implantology in irradiated bone has been a major point of debate in the recent literature.

The authors propose a paradigmatic clinical chase of oral cancer carcinoma treated with surgical ablation combined with adjuvant radiotherapy, reconstruction with radial antebrachial free flap, and consistent prosthetic rehabilitation on implants based on an accurate review of recent inherent literature.

2. Clinical case

A 50-year-old caucasian woman with a history of smoking (20 cigarettes per day) and alcohol consumption (less than 1 liter per day) has come to our attention at the Complex Structure of Otorhinolaryngology and Maxillo-Facial Surgery of San Giovanni Bosco Hospital of Turin with an

	ulcerative lesion of the left lingual pelvis (Fig. 1a and 1b). This lesion involved also the left lingual border, evoking pain and functional impotence due to a blockage of the lingual body, which was also infiltrated deeply up to involve the cortical bone of the mandibula. 1. 1. a) preoperative aesthetic appearance of the patient; b) view of the oral lesion Through RM (Fig. 2), it is clearly visible the involvement of the hyoglossus muscle, the whole left part of the tongue, and the presence of an homolateral lymph node lesion with a diameter smaller than 3 cm. Thanks to radiological imaging and the clinical history, it was possible to define a preoperative staging of T4N1M0. 1. 2. Preoperative MR examination: a) axial view; b) coronal view; c) sagittal view. The patient's neoplasm has been treated with a conservative transmandibular removal surgery through a translabyrinthine approach with an *en bloc* hemiglossectomy associated with a bone mandibular dowel and bilateral mRND (LV I to III). Reconstruction has been performed by using an antebrachial bundle skin flap vascularized from the radial artery and its *venae comitantes* and cefalic. Arterial and venous anastomoses were performed between the facial and radial arteries and between the brachial venous axis and the internal jugular vein on the left, respectively (Fig. 3a). Before doing osteotomies, preplating was performed, i.e., the positioning of the synthesis plates before performing the osteotomies in order to facilitate the reconstruction. The osteotomy was performed in steps to increase the bone-facing surface and improve the stability of the subsequent fixation. Furthermore, the dentition not related to the lesion was partially preserved in order to have an extra occlusal reference. The resection monoblock includes the hemitongue, the ipsilateral oral floor, the mandibular plug, and the laterocervical dissections. b 2. 3. a) vascular anastomoses; b) exeresis monoblock The examination of the surgical specimen confirmed the clinical staging and indicated the postoperative RT (67 Gy, about one month after the operation). Fig. 4a shows the result of the surgery in the immediate post-operative period with x-ray control (Fig. 4b), which highlights the bone plug and the reconstruction. The postoperative period was regular. 3. 4. Postoperative outcome: b) Control X-ray 12 months after surgery, an MR with contrast study has been done (Fig. 5a), which confirmed the absence of recurrences. The removal of the residual dental elements was performed, followed by the removal of most of the coronal synthesis plate in order to obtain a gain in available bone height. Six submerged implants for prosthetic purposes were then positioned. 4. 5. a) RMN who has been NED for 12 months; b) position of 6 fixtures. An x-ray control was performed at 5 months (Fig. 6) and eventually the second surgical time for uncovering the implants. The prosthetic load was performed after about 1 month in order to permit	

	adequate recovery of the soft tissues around the healing abutments (Fig. 6b). 5. 6. a) X-ray after 5 months from fixture placement; b) oral cavity In Fig. 7, it is possible to observe the presence of a provisional prosthesis in the patient's mouth, with large cleaning spaces. In this case, we opted for a fixed prosthesis without mucosal support screwed onto the posterior implants and cemented on a metal structure screwed to the three anterior implants, which are therefore joined together. In this way, it was decided to obtain a better distribution of the prosthetic load across the osteotomy, a particularly critical point following the administration of postoperative radiotherapy treatment. 6. 7. provisional prosthesis with large cleaning spaces. In Fig. 8, we can appreciate the good esthetical outcome (a) with the preservation of the vertical dimension and good projection of the lips in spite of the translabiotomy access (b). 7. 8. a) Facial aesthetics; b) Oral aesthetics 3. Discussion In the literature, success rates in the surgical treatment of oral carcinomas with dental rehabilitation associated with the use of free tissue grafts and radiotherapy treatment present variable percentages. Among the main factors that oppose an effective prosthetic rehabilitation are a clear reduction of the neutral zone, a reduced lingual functionality that is difficult to compensate for by remaining soft tissues and mandibular bone, and a reduced salivary production. Using these endosseous implants can partially reduce the impact of these factors; it also promotes adequate stabilization of the prostheses and intercepts the main part of occlusal loss, thus determining a considerable improvement in the quality of life of these patients (Schoen, 2008). One of the main problems encountered during the literature review arises from the difficulty of determining the exact placement of implants considering the site of radiotherapy and from differences in the various studies regarding the length of the follow-up, the implant systems used, retention mechanisms, and prostheses used, as well as other variables such as systemic diseases, smoking, advanced age, an inadequate number of implants, and other variables related to implant success. Results are better in the mandible than in the maxilla, probably due to differences in bone structure (Schoen, 2004). Recent reports find higher success rates with native bone (90%) than grafted bone (70–80%) (Granstrom, 2005; Klein, 2009; Dholam and Gurav, 2012). According to some authors (Nelson 2007), the high percentage of implant survival failures would be related to the high percentage of patient mortality rather than the loss of osseointegration. Implant failure in radiation-treated patients is related to radiation-induced changes in both soft and hard tissues. At the bone level, vessels of the Haversian canals may become obliterated, and the periosteum could lose cellularity, vascularization, and osteoid formation. The hematopoietic proliferation becomes scattered in the bone marrow, and the sinusoids assume an irregular configuration and distribution (Knospe, 1966). The late effects of radiotherapy may cause a prevalence of the catabolic processes over the anabolic ones in bone formation, with a clear reduction of the mineral content in the radio-treated bone (Finston, 1966). On the other hand, at the soft tissue level, the main problem	

	seems to be related to the reduction of salivation and, therefore, to a reduced ability to cleanse the oral cavity. There is debate in the literature about the optimal timing of implant placement in patients requiring radiotherapy. A systematic review (Colella, 2007) over a period of 16 years demonstrated a comparable failure rate between implants placed before or after radiotherapy treatment (3.2% versus 5.4%, respectively). Most of the failures were recorded between 1 and 12 months after surgery. Substantial failure rates are related to radiation therapy doses exceeding 45 Gy (Kanchan, 2012). Some authors believe that the implants should be placed immediately after the ablative procedure, in the same surgical session, in order to obtain better osseointegration before irradiation, thus eliminating the need for further surgery or additional therapy with hyperbaric oxygen and enabling adequate rehabilitation of speech and swallowing (Chang, 1998; Korfage, 2010). A combined surgical approach in a single stage seems, according to these authors, to be easy and effective, allowing total mandibular rehabilitation. Another advantage of this approach is the wide access to bone segments with considerable surgical exposure, which allows for accurate alignment of implants with the corresponding maxillary dentition (Chim, 2010). This approach cannot be done without a meticulous presurgical examination and a careful multidisciplinary evaluation with well-defined treatment planning (Schoen, 2003). The major disadvantage of the immediate insertion of the implants is the risk of improper positioning in cases of gross anatomical alterations, which has a negative influence on rehabilitation. It is also necessary to consider the risk of interference with or delay of cancer therapy, including radiotherapy, in the event of the development of postoperative complications related to the implants, as well as the risk that an early tumor recurrence could render implants useless. Other authors are against the placement of implants in the first phase of surgery. Oral reconstruction and rehabilitation could be divided into primary and secondary reconstruction. Patients who have undergone partial mandibulectomy without bone reconstruction may require secondary reconstruction before implant placement in the site of the bone defect. Due to the frequency of recurrences and metastases in the first two years following the primary treatment, it has been suggested to carry out costly treatments only after this period of high risk, since it is not appropriate to implant patients with an uncertain prognosis in the first instance (Werkmeister, 1999). Proponents of this approach believe that blood supply to the bone flap may be compromised during the first stage of surgery due to osteotomies, so implant placement is less accurate at this time as bone and soft tissue healing is not yet complete (Gurlek, 1998). Others have proposed to delay implant placement from 6 to 12 months after radiotherapy and then observe an integration period of 5 to 6 months before the second surgical stage and prosthetic loading (Brogniea, 1998; Oelgiesser, 2004; Kanchan, 2012). This period seems necessary to achieve appropriate osseointegration after the administration of radiotherapy. There are authors who, on the other hand, favor short healing times for implants in order to substantially prevent bone resorption (Shirota, 1991). It has also been proposed to use hyperbaric oxygen therapy in order to promote bone and tissue healing, but the results in the literature are not clear. Hyperbaric oxygen therapy inhibits leukocyte adhesion to endothelium, reducing tissue damage, improving leukocyte motility, and increasing microcirculation (Mortensen, 2008). In the early stages, there is vasoconstriction, reduction of edema, activation of phagocytes, and an anti-inflammatory effect (Spiegelberg, 2010), while in the long term, neovascularization, osteogenesis, and stimulation of collagen production by fibroblasts are obtained, which favor wound healing. Marx in 1983 had proposed a protocol consisting of 20 sessions before and 10 after therapy with osteointegrated implants, supported by Larsen in 1997. Some authors have shown themselves in favor of hyperbaric therapy as an aid to the osseointegration of the implants (Barber, 1995; Arcuri, 1997; Granhstrom, 2006), while others (Keller, 1997) have opposed this practice for economic reasons or potential complications. A single randomized trial (Schoen, 2007), reported in a Cochrane review (Couldthard, 2008), does not show substantial interferences of hyperbaric therapy on the implant's success rate.	

	In the case under examination, the choice made was a result of a mindful multidisciplinary preoperative evaluation associated with the patient's requests. It would have been possible to carry out a rehabilitation with a removable prosthesis on implants, but this prosthesis would have given considerable mucosal support with mechanical interference from the antebrachial flap, which, although pliable and thin, does not have the typical characteristics of oral cavity mucosa. Furthermore, this problematic mucosal support could probably have led to decubitus either on the residual mucosa or on the flap itself, both due to the mechanical interference with the flap and irregularities of the residual bone surface after the surgery, which are difficult to compensate for prosthetically; these two factors are also associated with an increased occurrence of oral cancer. Radiotherapy basically causes a salivary reduction with gingival tissue damage that is poorly suited to mobile prostheses. In our case, a large cleansing space was left between the posts in order to facilitate cleaning and make the implants last longer, avoiding dangerous peri-implantitis. Furthermore, the patient wanted a fixed prosthesis at all costs in order to consolidate a new aesthetic appearance associated with modified voluptuous habits (smoking and alcohol cessation) in the context of a total improvement in the overall quality of life. 4. Conclusion In cases of surgical success in maintaining or reconstructing a sufficient amount of bone in order to obtain a favorable anatomical set, rehabilitation on implants is, in our opinion, the best solution for patients with oral cavity neoplasms, even following combined radio-surgical treatment. Up until a few decades ago, prosthesis on implants with radiotreated bone was considered incompatible, while today it is known that it is relatively reliable to insert endosseous implants after a suitable waiting period or even at the same time as ablative surgery. Present dental problems must be eliminated before oncological surgery in order to avoid osteonecrosis and infections. After the surgeon has completed the initial surgical demolition phase, it is the dentist's task to deal with an optimal prosthetic rehabilitation, but a strong integration between the two professional figures is necessary in the preparatory phase of evaluation in order to obtain a personalized treatment plan, whose aim is to maintain the swallowing, masticatory, and phonatory functions at the highest possible level without neglecting the cosmetic-aesthetic aspect in the context of attention to the patient's quality of life.	

PART 2:

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

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