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CLINICAL PROSPECTIVE AND PATIENT-CENTERED DENTAL IMPLANT EFFECTS IN PATIENTS WITH ORAL CANCER

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ABSTRACT

Introduction: Investigating the clinical future and patient-defined outcomes of dental implants for individuals with mouth cancer was the goal in this research.

Methodology: The clinical results of 711 dental implants placed by skilled surgeons from the Department of Periodontology at Indraprastha Dental College and Hospital in 164 patients with oral cancer were examined in this retrospective study. OHRQoL, or oral health-related quality of life, was assessed.

Results-All analysed implants had cumulative 5-year and 10-year survival rates of 87.3% and 80.0%, respectively. Yet, implants placed in irradiated bone that underwent augmentation procedures had a statistically significant decreased implant survival ($p < 0.001$) in terms of implant site (original bone vs. augmented bone) and radiation therapy (non-irradiated bone vs. irradiated bone). OHRQoL significantly improved, according to patient reports.

Conclusions: Promising long-term survival rates of dental implants in patients after treatment of oral cancer were seen.

Keywords: *Ohrqol, Oral Cancer, Implants, Radiation*

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1. INTRODUCTION

The general treatment timeline for oral cancer patients consists of diagnostics, surgical treatment followed by postoperative (chemo)radiation therapy depending on the surgical margins and specific tumor properties, or solely (chemo)radiation therapy. Traditionally, oral rehabilitation comes last, that is, after the oncologic treatment when the oral mucosa is completely healed. Oral function after treatment for a malignancy in the oral cavity is often compromised due to changed anatomy after surgery and/or the oral sequelae of radiotherapy like xerostomia and trismus.[1] Sometimes, teeth need to be extracted during ablative surgery because of their location in proximity to the tumour or as part of a preradiation screening examination. This compromised oral condition also leads to a decrease in oral function and possible a negative effect on nutritional status and quality of life. Fabrication of functional prostheses, frames, and conventional partial dentures is often difficult to achieve after oncologic treatment and in some cases even impossible. [2]

Overall, implant placement in oncology patients is a predictable procedure. A recent review of the literature showed a 97.16% success rate in healthy patients vs. a success rate of 93.02% in oncological patients.[3] Although, a large number of confounding parameters should be considered. Thus, the aim of the retrospective study was to investigate prognostic parameters for the clinical and patient-reported long-term outcome of dental implants in patients with intraoral squamous

cell carcinoma. The null hypothesis was that dental implants in the irradiated and augmented area have a worse long-term outcome

2. MATERIALS AND METHODS

Information of patients with intraoral squamous cell carcinoma and dental implants placed due to malignancy were included in the current investigation. The patients received care at the Indraprastha Dental College and Hospital's Department of Periodontology in Ghaziabad. The study comprised patients with intraoral squamous cell carcinoma who were treated in the department and were at least eighteen years old. Individuals who lacked comprehensive baseline medical records were not included. The questionnaire was utilised to measure oral health-related quality of life (OHRQoL). 164 individuals with oral cancer and 711 dental implants have been included in the current retrospective analysis. The patients' average age was 67.3 years. There were 54 female patients (33%) and 100 male patients (67%). The patients included were classified as T1 (n = 53), T2 (n = 62), T3 (n = 11), T4 (n = 38), N0 (n = 101), N1 (n = 27), N2 (n = 34), N3 (n = 2), M0 (n = 163), and M1 (n = 1). 117 individuals had dental implants following the completion of oncologic therapies according to the timing of implant placement. The implants were inserted immediately following ablative surgery in 47 patients

Every patient who had radiation therapy had their dental implants inserted according to standard guidelines. Before surgery, prophylactic antibiotics were started and taken for three days. Clindamycin 600 mg was administered in the event of a penicillin allergy or intolerant. Implants were placed in accordance with the company's surgical protocol following the fabrication of a muco-periosteal flap. Implants were allowed to recover underwater for a minimum of three months following insertion. 72 patients (44%) had radiation therapy administered, while 86 subjects (52%) did not. Retrospective evaluation of radiation data was not possible for six individuals (4%). In the instance of radiation therapy, IMRT typically administered a dose of 64 Gy in 30 fractions to the primary tumour location. In terms of augmentation methods, 42 implants were placed in iliac crest bone grafts and 31 implants in fibula grafts.

Thirteen implants were placed in conjunction with distraction osteogenesis, eight implants were placed in conjunction with sinuslift operations, and four implants were placed in conjunction with guided bone formation. Fibula and iliac bone transplants were mixed in two instances. In terms of radiation treatment and implant placement, 273 implants (38.4%) were implanted in native/non-irradiated bone, 316 implants (44.4%) in native-irradiated bone, 45 implants (6.3%) in augmented/non-irradiated bone, and 50 implants (7.0%) in radiated/augmented bone.

In all, 477 implants were implanted in the mandible and 234 implants were placed in the maxilla. For edentulous individuals, bars were the most common prosthetic superstructures. Single crowns and permanent dental prostheses were the most common treatments for patients who were partially edentulous. At the time of the assessment, intraoral or orthopantomogram imaging was performed. The distance from the implant-abutment perimeter to the implant's apex was measured using the most recent and postoperative radiographs, as previously mentioned.

Statistical analysis was performed using SPSS V23 and implant-related data were calculated. The null hypothesis was that dental implants in the irradiated and augmented area have a worse long-term out- come. No adjustment to multiple testing was performed.

3. RESULTS

The mean examination for every patient and implants was 45 ± 40 months (range 0 to 227 months). 70 implants failed throughout the subsequent period, yielding a 90.2% survival rate. Primary failures (n = 6), periimplant disease (n = 42), tumour recurrence (n = 17), and osteoradionecrosis (n = 3) were the causes of implant removal. The cumulative five-year and ten-year implant survival rates were 87.3% and 80.0%, respectively. In terms of implant diameter, typical diameter implants (diameter > 3.5 mm, 88.7% vs. 90.5%, p = 0.316) had a worse implant outcome than narrow diameter implants (diameter < 3.5 mm).

When contrasted with conventional length dental implants (length > 6 mm, 86.7% vs. 90.2%, p = 0.062), short dental implants (length ≤ 6 mm) demonstrated a tendency towards a shorter implant survival rate. Yet, the validity of this outcome remains unclear because just thirty short implants were placed. The upper jaw had a substantially greater implant longevity than the lower jaw (94.0% vs. 88.3%, p = 0.027).

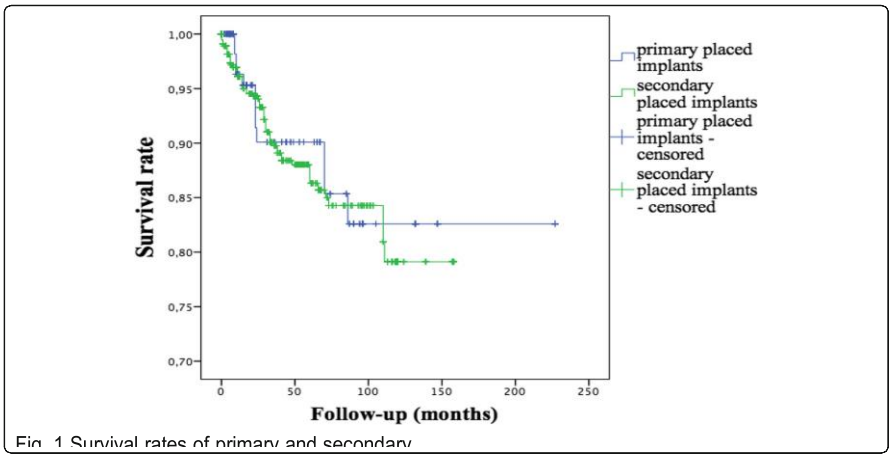
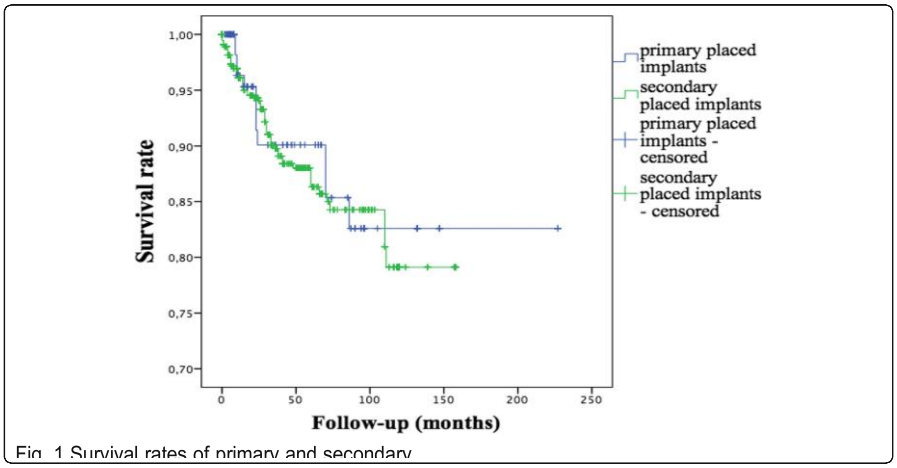


Fig. 1 Survival rates of primary and secondary



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According to the Mueller et al.[4] survey responses 78% of patients reported feeling better at ease with their implant-supported dentures. Improved chewing skills was reported by 66% of the patients. Sixty-two percent of the patients reported improved speech, and seventy-six percent said they had started laughing uncontrollably once more. Of the patients surveyed, 74% thought they were able to interact with others more frequently.

4. DISCUSSION

Irradiation did not significantly affect implant survival in our investigation. According to the investigations, implants placed in irradiated bone tissue had an 84.3% survival rate. The success rates of implants put in irradiated areas and those placed in non-irradiated areas differed substantially statistically, according to the meta-analysis. The results of implants inserted during ablative surgery in patients with head and neck cancer who received postoperative radiation therapy were examined by Koudougou et al.[5] This evaluation did not include implants implanted in rebuilt jaws or implants implanted following radiation therapy.

89.6% of the individuals who received post-implantation radiotherapy survived, compared to 98.6% of those who did not get any extra radiation. Patients who had radiation therapy after implantation had a combined success rate of 67.4% for implant-retained overdentures, compared to 93.1% for patients who had implant surgery one year before radiation therapy was finished. Five instances of jaw osteoradionecrosis were reported. The results for implant survival rates appear to be favourable for irradiation implants, the scientists stated. In conclusion, dental implants placed in the irradiated jaw have great survival rates; however, close observation is required to avoid problems and lower the likelihood of failure.

While Granström et al. recommend doing dental implantation procedures 6–18 months after radiation, Colella et al. observed no difference between implants before and after radiation.[7] According to Sammartino et al., a period of time longer than 12 months separating the last irradiation and the implant insertion does not appear to improve clinical outcomes.[8]

5. CONCLUSION

Following therapy for oral cancer, dental implants showed encouraging long-term survival rates. Individuals also gain from an enhanced OHRQoL. However, the prognosis of implants may be compromised by bone augmentation treatments in irradiated marrow

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