Can dental implants osseointegrate in oral cancer patients?

Abstracted from

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Implant survival rate after oral cancer therapy: a review.
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Questions: Can dental implants osseointegrate and remain functionally stable in patients having undergone oral cancer treatment?

Data sources Medline from 1986 to September 2010. Hand-searching of unspecified journals over an unspecified period of time.

Study selection Clinical studies, though not confined to a particular type (e.g. randomised controlled trial), involving patients having undergone radio- and chemotherapy following oral cancer surgery. Only those articles published in English were included.

Data extraction and synthesis No details are given of the number of reviewers, of any quality assessment of the included papers, nor of how they proposed to synthesise the data or conduct subgroup and sensitivity analysis.

Results A narrative report of findings from 21 included studies. No report is made of the types of study, nor their quality. In 16 studies that examined whether dental implants osseointegrated following radiation, between 68% and 100% did (no confidence intervals reported). Studies ranged in duration from 2 months to 13 years.

Conclusions Dental implants can osseointegrate and remain functionally stable in patients having undergone oral cancer therapy.

Commentary

Oral Oncology is a prestigious scientific journal with one of the top ten impact factors in the dental research literature. It is therefore highly surprising to find such an appallingly poor review in this journal. The only positive aspect of the paper is that the authors' conclusions endorse the conclusions in about 15 previous reviews,[1] which is that dental implants can osseointegrate and remain functionally stable in patients having undergone oral cancer treatment.

It is not uncommon that publications are missed if searches are limited to only one bibliographic database, in this case Medline through Pubmed. However, given that there are currently about 110 clinical trials reporting on intra-oral dental implants in the context of head and neck cancer patients it seems peculiar that only 21 reports were included. First, the authors clearly would have identified more studies if a wider spectrum of search terms had been selected, such as 'hyperbaric oxygen', 'fibular free flap', 'obturator', 'radiation therapy' and 'resection', and also searched alternative databases. Moreover, a systematic review on the exact same focussed topic [2] was not recognised by the authors, in spite of having been cited in one or more of the reference lists that the authors claimed to have hand-searched. Remarkable, since 13 additional clinical studies would have been available for data extraction. Also the excellent systematic review by Barber et al. that came online in 2010[1] would have provided 24 more clinical studies for the authors to contemplate. The many studies cited in the identified papers that are lacking in Table 1 is difficult to reconcile with the authors' claim that these were hand-searched.

Table 1 in the paper summarises the extracted data of 17 clinical studies and four single case reports. The aims as stated are more or less consistently untrue, are made by the authors and seldom reflect the original investigators'. The same holds true for the conclusions. The authors do not present any details about the prosthodontic therapy such as number and intra-oral location of implants placed, as well as fixed versus removable technical solutions. The reported 'osseointegration success rates' must therefore be read with some caution. Some of the data in the table are incorrect eg. Schepers et al.[3] reported on outcomes after one to seven years' observation on about 50% of the participants having received post-implant placement radiotherapy, versus the ones having received no radiotherapy. Not, as stated in the table, nine months post radiotherapy implant insertion and a nine months observation period. Another example of incorrect data citation, which is even elaborated on in the discussion, is an alleged low osseointegration success in non-irradiated bone (68%), when in the original paper it is clear that this number applies to non-irradiated bone graft, while relevant success in the non-irradiated bone was actually 85%.[4] There are multiple other blatant mistakes in the extracted data and examples become too numerous to highlight. Two of the identified studies[5,6] report on the same patient cohort, which the authors failed to recognise. The particular trial report on the outcomes following implant placement done prior to, and not following radiotherapy, as is the case for a few of the other studies in Table 1, which again the authors failed to recognise.

The extracted data from the limited pool of studies seems superficial and of questionable value since they do not detail the variety of different modalities used in the management of oral cancer.[7] Surgery, which is the oldest and perhaps most common form of treatment, is used in different ways such as staging surgery, curative surgery, cytoreductive surgery and reconstructive surgery. Ablative surgery may or may not be combined with regional (level I-III) or modified radical neck dissection (level I-V) depending on tumour size. For the same reason, both surgery as well as radiotherapy is sometimes done in isolation as the sole treatment. Alternatively

the radiotherapy is done before, ie, 'neo-adjuvant radiotherapy' to 'downsize' the tumour, or following the ablative surgery. Typical indications for post-operative radiotherapy, which usually is 60-70 Gray within six weeks of the ablation, are the result of irradical resection or close resection margin (<5mm) and aggressive growth pattern (perineutral and spidery growth) plus multiple metastases. Chemotherapy is sometimes given in conjunction with the radiotherapy for patients at high risk of recurrence, such as patients with positive surgical margins or positive lymph nodes. The cancer treatment is determined by a number of factors such as the TNM (tumour, node, metastasis) stage, patient performance status, patient preference and availability of specific interventions. The current review presents only the ranges of and mean radiotherapy dosages. These show a wide variation suggesting highly heterogeneous patient study material and range of cancer interventions. A more detailed resume of these variables would have improved the scientific merits of this review substantially.

Based on the identified studies the authors discuss the effects of several clinical variables on outcomes. The authors emphasise that the great majority of the reported studies are focussed on restoration of the mandible, but do not discuss whether this is due to cancer location predominance, publication bias or alternative explanations. The risk of osteonecrosis is discussed in context to the timing of the implant placement following the radiotherapy. An interesting and relevant detail in this context is the wide scope of timing of implant placement following the cancer therapy, ranging between six months and six years. The effects of chemotherapy on implant survival is briefly mentioned and appropriately left as an unanswerable question. The discussion on the radiation dosage effect on dental implant integration is speculative and emphasised by a hotchpotch of eight of the 21 identified papers displayed in a figure to support a claim that 100% osseointegration can be achieved in bone exposed to up to 65 Gray. Given the complexity of cancer treatment modalities as a function of patient variables it is the opinion of the undersigned that one needs to be cautious about building up unrealistic expectations for vulnerable cancer patients by quoting such high success rates.

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