Critically Appraised Topic (CAT)

Project Team:
1A-1
Project Team Participants:
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Clinical Question:
Should I plan implants or a removable prosthesis for my patient who is a smoker and has diabetes?
PICO Format:
P:
Elderly patients with missing teeth and diabetes
I:
Placing dental implants
C:
Placing dental implants in healthy elderly patients with missing teeth
O:
Best long term prognosis
PICO Formatted Question:
In elderly patients with missing teeth and diabetes, does placing dental implants have a better or worse long term prognosis compared to placing dental implants in healthy elderly patients with missing teeth?
Clinical Bottom Line:
As long as a patient's diabetes is controlled and properly monitored in elderly patients, there is equal long term success of placing dental implants compared to elderly patients without diabetes. Age alone shouldn't be a major factor in determining whether to place dental implants or not. Controlled systemic diseases such as diabetes also does not stand as a significant contraindication to placing dental implants as long as the disease stays controlled.
Date(s) of Search:
10/6/2020
Database(s) Used:
PubMed
Search Strategy/Keywords:
Dental implants, elderly patients, diabetes, systemic disease, long term prognosis, success
MESH terms used:
Age factors, dental implants, diabetes complications, humans, risk factors, survival analysis
Article(s) Cited:
Naujokat H, Kunzendorf B, Wiltfang J. Dental implants and diabetes mellitus-a systematic review. Int J Implant Dent. 2016 Dec;2(1):5. doi: 10.1186/s40729-016-0038-2. Epub 2016 Feb 11. PMID: 27747697; PMCID: PMC5005734.

Schimmel M, Srinivasan M, McKenna G, Müller F. Effect of advanced age and/or systemic medical conditions on dental implant survival: A systematic review and meta-analysis. Clin Oral Implants Res. 2018 Oct;29 Suppl 16:311-330. doi: 10.1111/clr.13288. PMID: 30328186.

Srinivasan M, Meyer S, Mombelli A, Müller F. Dental implants in the elderly population: a systematic review and meta-analysis. Clin Oral Implants Res. 2017 Aug;28(8):920-930. doi: 10.1111/clr.12898. Epub 2016 Jun 7. PMID: 27273468.

Chen H, Liu N, Xu X, Qu X, Lu E. Smoking, radiotherapy, diabetes and osteoporosis as risk factors for dental implant failure: a meta-analysis. PLoS One. 2013 Aug 5;8(8):e71955. doi: 10.1371/journal.pone.0071955. PMID: 23940794; PMCID: PMC3733795.

Study Design(s):

Systematic Review
Systematic Review & Meta-analysis
Systematic Review & Meta-analysis
Meta-analysis

Reason for Article Selection:

The first two articles related to the topic well of placing implants in persons with diabetes and one specifically in elderly patients. The third article was selected because it provided evidence to compare placing dental implants in elderly patients without diabetes. The fourth article discusses the impact of smoking and dental implant prognosis.

Article(s) Synopsis:

Dental implants and diabetes mellitus- a systematic review

- **This study consisted of 22 clinical studies and 20 literate studies to observe whether diabetic patients with dental implants have a poorer long term prognosis compared to healthy controls. This study found that in patients who had poorly controlled diabetes had a higher level of failure than the control group. The failures came from impaired osseointegration and elevated risk of peri-implantitis. The study touched on adjunct therapy to help decrease this risk such as antibiotics and chlorhexidine. Howvever, when diabetes is well controlled, the implant success and long term prognosis was deemed the same as when the dental implants were placed in healthy patients.**

Effect of advanced age and/or systemic medical conditions on dental implant survival: a systematic review and meta-analysis

- **This article evaluated implant survival in elderly patients over the age of 75 and the impact of systemic medical conditions such as diabetes. 6, 983**

studies were assessed, and the study analyzed 60 of them. The overall impant survival in elderly patietns was 97.3% and 96.1% for 1 year and 5 year. The article found other evidence of implant survival rates for diseases such as Parkinson's disease, cardiovascular disease, and patients with cancer. Overall, the article concluded that placing dental implants in geriatric patients was a predictable treatment option to restore missing teeth and that systemic dseases such as diabetes was a non-contributory factor to the long term prognosis.

Dental implants in the elderly population: a systematic review and meta-analysis

- **This article analyzed placing dental implants in healthy elderly patients over the age of 65. This systematic review was completed by identifying studies that placed implants in the partially or completely edentulous jaws of elderly patients. A meta-analysis was also performed on implant survival rates noting peri-implant marginal bone level changes, technical/mechanical complications and biological complications that may lead to failure. 11 studies were included in the statistical analysis and found a 1 year implant survival rate of 97.7%, 96.3%, 96.2%, 91.2% for 3, 5, and 10 year survival rates. These survival rates provide evidence that placing dental implants in the elderly population is a very good long-term treatment option.**

Smoking, radiotherapy, diabetes and osteoporosis as risk factors for dental implant failure: a meta-analysis

- **This article analyzed separately the impacts of smoking, radiotherapy, diabetes and osteoporosis on implant failure. A total of 51 studies were included in this meta-analysis including more than 40,000 dental implants. The study found a direct association between smoking and radiotherapy with an increase in dental implant failure. The article found no adverse impact of diabetes on the dental implants. This study confirmed an increase in risks placing dental implants in patients who are smokers or receiving radiotherapy.**

Levels of Evidence: (For Therapy/Prevention, Etiology/Harm)
See http://www.cebm.net/index.aspx?o=1025

☒ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
☐ **1b** – Individual RCT
☒ **2a** – Systematic Review of Cohort Studies
☐ **2b** – Individual Cohort Study
☐ **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
☐ **4a** – Systematic Review of Case Control Studies
☐ **4b** – Individual Case Control Study
☐ **5** – Case Series, Case Reports
☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
☐ **7** – Animal Research
☐ **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews

See article **J Evid Base Dent Pract 2007;147-150**

☐ **A** – Consistent, good quality patient oriented evidence

☒ **B** – Inconsistent or limited quality patient oriented evidence

☐ **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusion(s):

Overall, the research indicates that there is not a significant difference in survival rates of placing implants in elderly patients with or without diabetes. As long as the disease is controlled, the dental implant should have a great prognosis. There is not enough research (or any) that directly compared using a removable partial or full denture option to placing dental implants. A second analysis would need to be conducted to separately analyze the removable option in healthy elderly patietns compared to in the same population with diabetes. That information was incredibly difficult to find because once the removable option is placed, diabetes would have very little to no impact on the prosthesis. By analyzing the impact of diabetes on implants alone I was able to see that the prognosis was very good. Had the prognosis been poor, this analysis would have been good research to lean towards the removable option for treatment. The fourth study was included as a quick reference to touch on the smoking aspect of this patient. The results confirmed that the diabetes in his medical history is non-contributory to the success or failure of the dental implant; however, being a smoker puts him at a greater risk of implant failure. Perhaps a smoking cessation protocol should be done before placing the implants in this patient for the best long term prognosis.