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10-Minute EBD: Are Neoplasms a Risk Factor for Peri-Implantitis?

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Are Neoplasms a Risk Factor for Peri-Implantitis?

By Farah Safieddine, BS, Naama Sleiman, MS, PhD, and Melanie E. Mayberry, DDS, MS-HCM

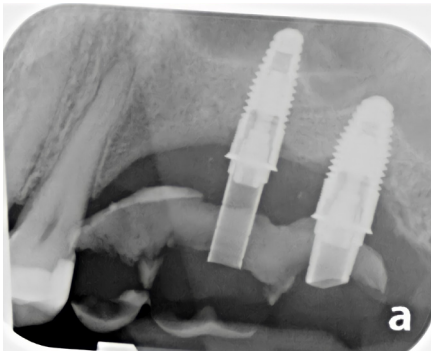
A 58-year-old female presented to the clinic with failing implants in the upper left quadrant due to peri-implantitis, a pathological inflammatory condition surrounding implants resulting in progressive loss of supporting bone.[1] The patient reported a history of a "fibroma" in the upper-left posterior area that was excised and biopsied approximately five years previously. The biopsy was diagnosed as a benign neoplasm, specifically an ossifying fibroma. Teeth #13-#15 were extracted at the time of the biopsy. Two implants were placed six months ago in the area of teeth #14 and #15 by a previous dentist as shown in the radiograph below.

As clinicians, it is important to consider the risk factors associated with the development of peri-implantitis. While the patient had a benign neoplasm, neoplasms can be either a benign or malignant mass of cells that develop when cells unexpectedly divide abnormally. Based on the patient's history of implant placement in an area of a previously excised neoplasm, the question arose if this could have contributed to the risk of implant failure.

In patients with dental implants, does a history of neoplasms compared to healthy tissue increase the risk of peri-implantitis?

Clinical Scenario	Literature Search Strategies	Evidence Summary
		
Patient presents with failing implants in area of previously excised neoplasm specifically an ossifying fibroma. The question arose by the student dentist if this could have contributed to the risk of peri-implantitis and implant failure.	PubMed Mesh terms "dental implants," "fibroma, ossifying," and "Peri-implantitis." Search was refined to include the term "neoplasms" and filtered to the last 10 years.	The EBD literature search concluded with a high level of evidence, a systematic review and meta-analysis, that ossifying fibroma with augmentation is a risk factor for peri-implantitis and that ossifying fibromas alone may or may not cause peri-implantitis.

Figure 1



PICO question

Therefore, a PICO question was developed. The clinical question was formulated into a searchable PICO format: "In patients with dental implants, does a history of neoplasms compared to healthy tissue increase the risk of peri-implantitis?"

The population of interest is patients with dental implants. The intervention or exposure of interest is history of neoplasm. The comparison in this case is healthy tissue. The outcome of interest is risk of peri-implantitis. Thus:

- **P** = Patients with dental implants
- **I** = History of neoplasm
- **C** = Healthy tissue
- **O** = Risk of peri-implantitis

Literature search pathway

For this PICO question only one database was used, PubMed. PubMed is a free resource that contains more than 33 million citations and abstracts.[2] The PubMed search was conducted using the following MeSH terms: "dental implants," "fibroma, ossifying" and "peri-implantitis," which resulted in the retrieval of no articles. The search was refined to include the term "neoplasms" and filtered to the last 10 years, at which a consensus re-

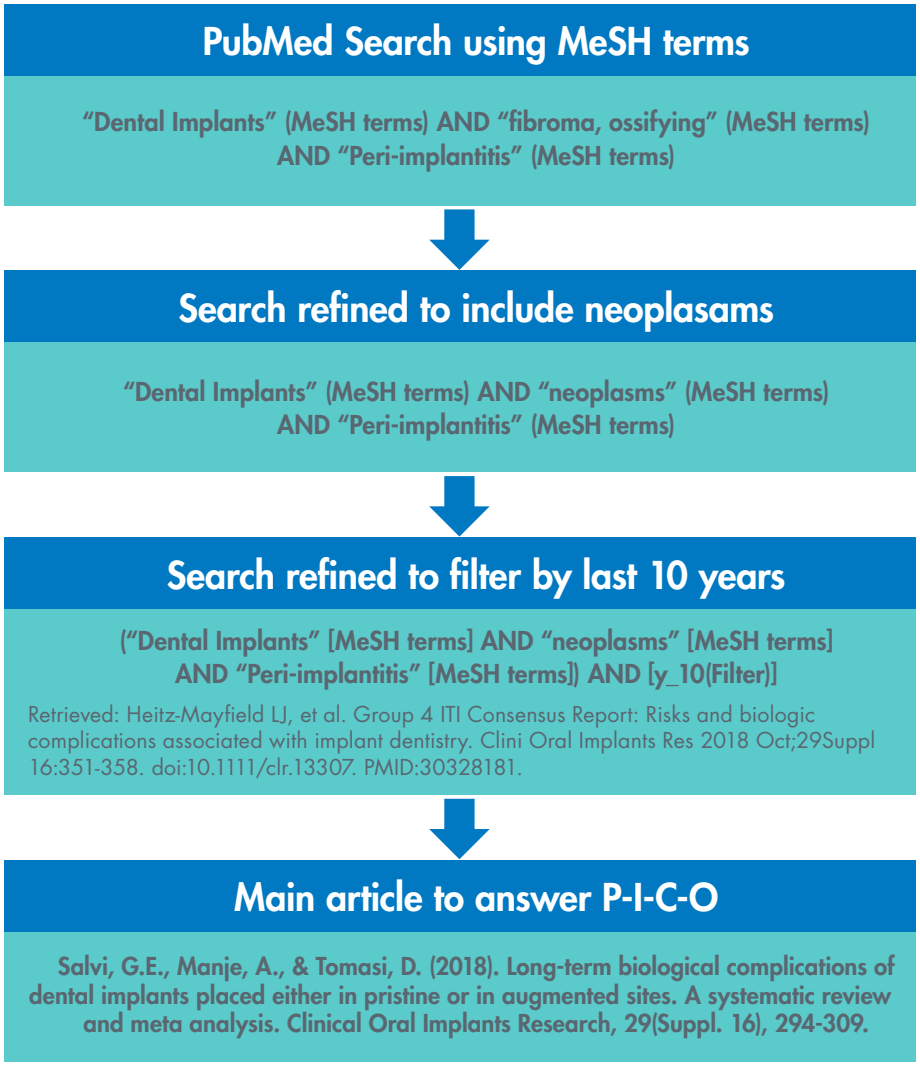
port was identified, Group 4 ITI Consensus Report: "Risks and Biologic Complications Associated with Implant Dentistry," by Heitz-Mayfield, et al. This article also was used to identify additional articles that were relevant to our PICO question. We then identified the article titled "Long-term Biological Complications of Dental Implants Placed Either in Pristine or in Augmented Sites: A Systematic Review and Meta-analysis," by Salvi, et al., to answer the PICO question.

Evidence summary

To determine whether the patient is a prime candidate for implant tooth replacement, it is important to consider the risk factors associated with the development of peri-implantitis. Risk factors that may be associated with the development of peri-implant pathology include, but may not be limited to, a history of periodontitis, the presence of foreign bodies, and/or pathology such as a neoplasm, or augmentation in the future site of an implant. The EBD literature search concluded that ossifying fibroma with augmentation is a risk factor for peri-implantitis, and that ossifying fibromas alone may or may not cause peri-implantitis.

Ossifying fibromas are benign tumors that are composed of "metaplastic bone, fibrous tissue and varying amounts of osteoid."[3] Early diagnosis of ossifying fibromas is important because this neoplasm can be locally aggressive in its growth, and can cause tooth loss, root displacement, and/or perforation.[3] Once the fibroma is excised, the patient is often deficient in bone for sites of implants; therefore, bone grafting would be essential. However, in cases where implants were placed in augmented sites, it was concluded that there was "higher variability and lower predictability in terms of peri-implantitis."[4] Peri-implantitis was 10.3% prevalent in pristine sites, while it was 17.8% prevalent in augmented sites.[4]

Figure 2



Although it was concluded that history of augmented sites in areas of ossifying fibromas are a risk factor for the development of peri-implantitis, it is unclear whether the presence of the neoplasm itself is the cause of peri-implant pathology. Implant failure was also found to be more prevalent in augmented sites vs. pristine sites. However, it was concluded that there were no statistically significant differences between implants placed in pristine vs. augmented sites. It was found that implants that were placed in augmented sites yield a higher risk of developing peri-implantitis and subsequent implant failure.

Additional risk factors were also noted that may be relevant to this case. The pathogens that cause periodontitis have been shown to be similar to the pathogens involved in peri-implantitis infections.[5] Probing depths ≥5 mm and bleeding on probing scores ≥30% indicate a greater risk of

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developing peri-implantitis.[4] This data strengthens the concept that periodontitis is a risk factor for the development of peri-implantitis, and patients with a history of periodontitis have a 2.15 higher chance of developing peri-implantitis.[5] Specifically, periodontitis can cause future increased risk of marginal bone loss, implant loss, and the occurrence of peri-implantitis, which ultimately would decrease the likelihood of long-term successful implants.[5] Along with periodontitis, the presence of foreign bodies, such as dental cement, is also considered a risk factor for the development of peri-implantitis.

Excess dental cement causes inflammation of the gingival tissue, and its neglect can lead to bleeding on probing, suppuration, and implant attachment loss and bone loss.[6] This was concluded after histopathological review of specimens dominated by plasma cells in the inflammatory infiltrate.[6] Although dental cement causing chronic inflammation can lead to peri-implantitis, further research needs to be done to determine its specific role in this process. On the contrary, sinus wall elevation via a lateral wall approach plays a significant role in the development of peri-implantitis.

According to Stacchi, et al., a cross-sectional study with a total of 156 patients was conducted in which patients underwent either a lateral or transcrestal sinus wall augmentation and received implants.[7] It was concluded that a sinus wall augmentation via the lateral wall approach significantly correlated with the occurrence of peri-implantitis ($P<0.001$).[7] Sinus wall augmentation may be a necessary procedure in the case of neoplasms, such as ossifying fibromas, which too are a risk factor for developing peri-implantitis.

In conclusion, factors such as ossifying fibromas, periodontitis, sinus wall elevation via a lateral approach, and the presence of foreign bodies play a role in the initiation of peri-implantitis. In this case, the patient's history of an excised ossifying fibroma may have contributed to the peri-implantitis. More research needs to be done to conclude if foreign bodies, such as dental cement, have a specific role in the development of peri-implantitis.

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