Does Vitamin D Deficiency Lead To Early Implant Failure?

The goal of successful dental implant treatment is for osseointegration of the dental implant. Because osseointegration is dependent on bone metabolism, it has been postulated that patients exhibiting Vitamin D deficiency may have adverse healing on bone formation around dental implants.

Vitamin D, in its inactive form (vitamin D3 or cholecalciferol), is a steroid hormone that is acquired through diet or from exposure to the sun (synthesized in the skin from cholesterol). Vitamin D is biologically inert, it must be activated by two hydroxylation’s in the body to become active. The first hydroxylation takes place in the liver and the second hydroxylation occurs in the kidney, resulting in the physiologically active 5-dihydroxyvitamin D [1,25(OH)2D], also known as “calcitriol”.

Vitamin Deficiency

Vitamin D has been associated with the health of the brain, cardiovascular, respiratory, skin, and immune systems. In addition, Vitamin D increases the production of extracellular matrix proteins by osteoblasts. When there exist reduced levels of 1,25 (OH)2D, impaired absorption of calcium and phosphorus will result. This may cause an increased osteoclast activity, resulting in bone resorption and decreased bone mineral density.
Does Vitamin D Deficiency Lead To Early Implant Failure?

Serum 25-hydroxy vitamin D (25-OH) is the most abundant Vitamin D metabolite and primary circulating form of Vitamin D which is considered the best indicator of a patient's Vitamin D status. According to the National Institutes of Health, the following are associated blood levels:

- Deficient: <12 ng/mL
- Insufficient: 12-20 ng/mL
- Ideal: >20 ng/mL

Vitamin D deficiency is most commonly due to inadequate dietary intake and insufficient exposure to sunlight. It is a worldwide public health concern affecting up to 70% of the United States Population and up to 85% of the elderly. At this time, it is currently believed that daily consumption of Vitamin D should be approximately 2000 IU (50 mcg).

STUDIES OF VITAMIN D DEFICIENCY

To date, most documentation showing the relationship between Vitamin D and implant failure in the available literature is with case studies and animal research. There exist very few studies in dental journals evaluating the relationship between Vitamin D deficiency and early implant failure.

Animal Studies:
- Liu et al reported that Vitamin D increases implant integration in mice with chronic kidney disease.
- Kelly et al. placed 1 mm x 2 mm implants in rats and concluded that Vitamin D deficiency results in impaired integration.
- Xiong et al. showed that Vitamin D supplements increase implant integration in mice.

Human Studies:
- Alvim-Pereira et al found no association between vitamin D receptor gene polymorphism and dental implant loss.
- Schulze-Späte U concluded no relationship between Vitamin D deficiency and bone growth in maxillary sinus augmentations.
- Mangano F et al found no significant relation with implant failure in 822 patients that were Vitamin D deficient.
- Mangano F et al. in a second study with 885 patients concluded no significant relationship between implant failure and Vitamin D deficiency.

CONCLUSION

In conclusion, when evaluating studies on Vitamin D deficiency and dental implants, animal studies have shown a correlation with implant failure. However, as of this time, no conclusive human study has shown a relationship. Therefore, much broader, prospective and well-controlled studies are needed. In the interim, the implant clinician should be aware that patients with severe Vitamin D deficiency may possibly have an increased morbidity with respect to dental implant failure, however it is certainly not an absolute contraindication.

PEARLS OF WISDOM

FAILURE TO TIMELY DIAGNOSE:
PERI-IMPLANTITIS VS SQUAMOUS CELL CARCINOMA

Dr. Ronald J. Trevisani is a Board Certified Oral and Maxillofacial Surgeon, Pharmacist, and an Attorney. As a Misch Institute faculty member, he has a passion for teaching clinical dentistry as well as advising dentists from a legal perspective on protecting your assets.

WHAT IS FAILURE TO TIMELY DIAGNOSE?
A cause of action (grounds for a lawsuit) in which the patient asserts that a doctor failed to recognize one or more obvious signs of a treatable disease at an early stage, resulting in a decrease in the patients lifespan, quality of life, loss of consortium (spouses claim that injury resulted in a altered relationship with patient), etc.

Case Example #1:
Recently, OMSNIC (Oral Surgery Malpractice Insurance Company) shared a case report where a general dentist and an oral surgeon were managing a lesion associated with a dental implant. After approximately seven months, the lesion was diagnosed as a neoplasm. Because the final diagnosis was not diagnosed in a timely fashion, comprehensive litigation resulted against the general dentist and oral surgeon.1

Case Example #2:
In my Oral Surgery practice over the last 20 years, I have received many referrals for biopsies of various types of lesions. One example that I would like to share with you is a patient that presented to her general dentist with the chief complaint of “biting her tongue”. An implant was placed in the area “a few years ago.” Clinical exam by the general dentist revealed a sore on her tongue and the gingiva adjacent to the implant #29. The dentist agreed that she was biting her tongue and modified the crown to relieve the malocclusion and noted that there may be “some inflammation underneath the bridge and around the implant.” One week later, symptoms persisted. At this point, chlorhexidine irrigation around the implant (i.e. suspected peri-implantitis) was completed along with an antibiotic prescription. After one week, the lesion on her lateral border of her tongue was larger. Patient was then referred to my office, in which a biopsy was performed with a diagnosis of Squamous Cell Carcinoma. The patient was referred to an ENT surgeon for surgical resection and treatment. In this case, the pathology was diagnosed and treated within a timely fashion (4-6 weeks). Thus, a successful diagnosis and treatment resulted.

Summary:
The recent report shared by OMSNIC revealed a case in which a general dentist and oral surgeon evaluated and re-evaluated the patient with similar circumstances for over seven months. A biopsy was not performed during this time, which resulted in a delay in diagnose and treatment. The patient ultimately went to her primary care physician and ENT, which resulted in aggressive surgery and extensive morbidity. Because of the delay in treatment, both the general dentist and oral surgeon were named in a civil suit and ultimately settled the case out of court.

Take Home Message:
• Even though a lesion associated with an implant may appear to be benign peri-implantitis, if resolution does not occur in a reasonable time period (~ 2 weeks), a biopsy or referral should be considered.
• Remember that Squamous Cell Carcinomas may appear as benign lesions such as inflamed tissue, epulis fissuratum, granulation tissue, pyogenic granulomas, and chronic periodontitis.
• Always schedule patients for continued routine implant maintenance appointments and complete thorough examinations.
• Do not delay in referring or performing a biopsy on questionable lesions.
• If pathology is present, do not hesitate to remove the implant prosthesis for ease of evaluation.
• Always accurately document treatment decisions, referrals, and follow up. More details next month. See ya then!!!

Did You Know?
If you have taken MischResnik courses in the past, you are eligible to sign up and join our “WhatsApp”. This forum allows doctors to present cases and ask questions and is followed by Dr. Resnik and the Faculty.

Follow Dr. Resnik on Instagram for weekly questions and tips!

mischresnik.com

Hold your phone so that the QR code appears in the viewfinder in the Camera app. Your device recognizes the QR code and shows a notification. Tap the notification to open the link associated with the QR code.
1 MEDICATION QUESTION OF THE MONTH?

This adjunct to common analgesics after surgery has been shown to increase PAIN RELIEF by approximately 5-10%?

a. Caffeine  
b. Diet Cola Drinks (e.g. Diet Coke, Diet Pepsi)  
c. Orange Juice  
d. Warm Salt Water Rinses

2 RADIOLOGY QUESTION of the MONTH

This patient suffered from chronic headaches.  
Upon CBCT evaluation, a radiopacity (yellow arrow) was noted which is consistent with?

a. Maxillary Rhinosinusitis  
b. Sphenoid Sinus Sinusitis  
c. Ethmoid Rhinosinistis  
d. Nasal Polyps

3 IMPLANT STUDY of the MONTH

A systematic review and meta-analysis was completed comparing immediate implant placement in infected extraction sockets vs. non-infected extraction sockets in terms of implant survival and function.

Conclusions: There were no significant differences in infected vs. non-infected comparing:

- Implant survival rates
- Marginal bone level
- Marginal gingival level
- Bleeding index
- Probing depth

SOCKET GRAFTING, CBCT TREATMENT PLANNING, and IMPLANT PLACEMENT into ABUNDANT BONE

September 10 -11, 2021
Orlando, Florida

SOCKET GRAFTING PROTOCOL
- Atraumatic Extractions
- Socket Grafting Protocols
- 4 vs 5 Wall Socket Protocol

IMPLANT PLACEMENT
- Osseodentification
- Guided Implant Placement
- Use of CBCT
- Guided Surgery Technique
- Flap Advancement Techniques

CBCT TREATMENT PLANNING
- Anatomy Identification
- Template Design
- 3D Printing

DENTAL IMPLANT COMPLICATIONS

October 15 - 16, 2021
Caesar’s Palace, Las Vegas

The very popular Dental Implant Complications course is back with overwhelming interest and support. This course will be given on October 15-16, 2021 in Las Vegas at the Caesars Palace Resort & Casino. The in-depth curriculum will give the implant clinician the necessary knowledge and tools to effectively determine the etiology, prevention, and management of over 500 different surgical, prosthetic, and peri-implant complications.

- Medical/Medication Complications
- CBCT Related Complications
- Intra-Operative/Implant Positioning Complications
- Bone Grafting Complications
- Sinus Grafting Complications
- Fixed/Removable Prosthesis Complications
- Peri-Implant Complications
- Treatment of Ailing/Failing Implant
- Legal Considerations in Implant Dentistry

This course is a MUST for any clinician or staff member. Reserve your seat now as this course usually sells FAST!
A. Caffeine (>100mg)


B (Right Sphenoid Sinusitis)

ANSWERS to the QUESTIONS of the MONTH

1 MEDICATION QUESTION OF THE MONTH

2 RADIOLOGY QUESTION OF THE MONTH

THE IMPLANT BUSINESS ESSENTIAL CONTINUUM

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October 2021 – January 2022

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+ TWO-DAY IN-PERSON WORKSHOP IN IVINS, UT

EARn CONTINUING EDUCATION (CE) CREDITS

+ 23 CE CREDITS

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+ EARLY BIRD RATE BEFORE JULY 31, 2021: $1,895

+ REGULAR RATE: $2,495

“YOUR WISDOM TEETH Did NOT WHAT YOU WANTED THEM TO DO, BUT IT SURE HELPED THEM GROW!”

ROGER LEVIN, DDS

cont’d from pg 2


9Mangano F, Is low serum vitamin D associated with early dental implant failure? A retrospective evaluation on 1,625 implants placed in 822 patients. Mediators Inflamm. 2016;2016: