

After two years of preparations, we are proud to announce the creation of our new online curriculum portal which will go live in April 2023

*Randolph Resnik, DMD, MDS
Director*

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CAN PATIENTS BE ALLERGIC TO TITANIUM DENTAL IMPLANTS?

Randolph R. Resnik DMD, MDS

Hypersensitivity to titanium is an ever-increasing reportable complication in medicine today. There exist many case reports of titanium alloy hypersensitivity including failed total hip prostheses **1**, titanium-implanted cardiac pacemakers, **2** surgical clips, **3** and dental implants. With respect to dental implants, there appears to be an allergic correlation with titanium implants, which unfortunately is not fully understood with minimal research.

Dental Implants vs. Medical Titanium Devices

Most of the clinical studies and evidence of titanium hypersensitivity is derived from the orthopedic literature, which has been shown to be statistically significant. Orthopedic sensitivity appears to occur with a higher risk in comparison to dental implants for many reasons. First, bone has been shown to have a rather low reactivity potential and the intraosseous contact of dental implants is much smaller than in orthopedic implants. Secondly, the oral mucosa has many benefits as it is less permeable than skin and contains less antigen acting Langerhans' cells. Studies have shown that the antigen concentrations of the oral mucosa have to be 5-12 times greater than skin to cause a hypersensitivity reaction. **4** And lastly, it has been shown that dental implants and prostheses in the oral cavity are coated with a layer of salivary glycoprotein, which act as a protective barrier. **5** (cont'd page 2)





THE RESNIK IMPLANT INSTITUTE

Exciting updates to the institute coming in the next few months.

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Studies

In the dental literature, reports of allergic reactions to titanium implants are rather minimal. However, many authors recently have suggested a higher incidence of titanium alloy allergy with respect to dental implants. It is widely accepted that the true incidence of titanium hypersensitivity is underreported, mainly from a poor understanding of failure or allergy. Sicilia et. al. evaluated over 1500 patients and reported a 0.6 % prevalence of titanium failure. **6**

Possible Etiology

The use of titanium alloys (aluminum, beryllium, palladium, vanadium, etc.) are most commonly used in oral implantology today because of the higher strength in comparison to the lower strength pure titanium. It has been postulated that small amounts of titanium alloys may act systemically as "impurities", which may lead to triggering allergic reactions. **7** Because all metal alloys undergo a slow release of ions from their implant surface, corrosion risks and detrimental effects from the byproducts are possible. The sensitivity to the titanium ions has been shown to be directly related to the presence of macrophages and T-lymphocytes, which may result in a type IV hypersensitivity reaction.

Clinical Symptoms

Titanium hypersensitivity is usually diagnosed by signs and symptoms which may include a rash urticaria, pruritus, localized soft tissue inflammation, swelling in the orofacial region, oral or facial erythema, eczema lesions of the face, or hyperplastic peri-implant mucosa. In some cases, implant failure may result, usually as early implant failure (rapid exfoliation). Clinical reports have associated titanium allergy with multiple implant failure in the same patient (cluster phenomenon). **8**



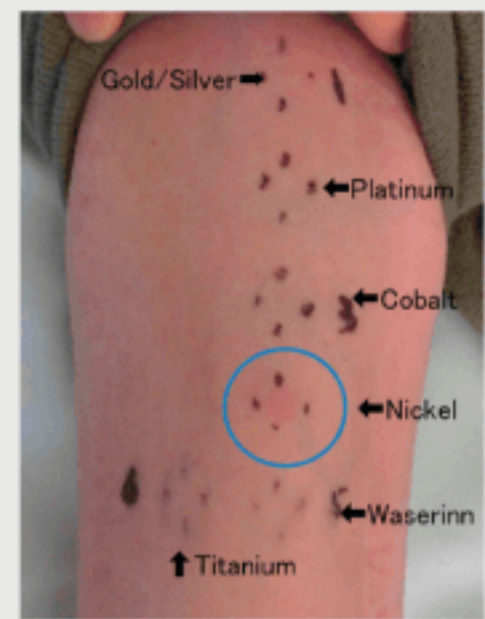
Suspected association of an allergic reaction with titanium dental implants: A clinical report, Hiroshi Egusa, DDS, PhD, J Prosthet Dent 2008;100:344-347

Hypersensitivity Testing

Patients who present with a history of metal or titanium allergy, a hypersensitivity evaluation is suggested. At this time, two tests are available.

1. Patch Test:

Titanium hypersensitivity may be diagnosed using a 'patch-test', where various metal allergens are applied to the skin for 3-4 days. Usually an erythematous reaction is considered positive. However, patch tests have been associated with false-positive or false-negative results. Current patch tests have been shown to be approximately 75% accurate for type IV metal allergy. **9**



Muller, K.E. (2006) Hypersensitivity to titanium: Clinical and laboratory evidence. Neuro Endocrinology Letters 27 (Suppl. 1): 31-35.

2. Blood Test

The lymphocyte transformation test (LTT) or Memory Lymphocyte Immuno-Stimulation Assay (MELISA) has been shown to detect sensitization to titanium in some patients. In addition, the MELISA test is capable of determining which metals may be tolerated and initiate undesirable immune responses.†

Treatment

If a known hypersensitivity is determined, an alternative dental implant material should be utilized. The most common alternatives today are zirconia and polyetheretherketone (PEEK) dental implants. Currently, zirconia is an accepted material, which has been shown to have high success rates along with recent improvements in physical properties, osseointegration, and clinical applications. PEEK implants have a similar elastic modulus to that of bone, therefore have numerous biomechanical advantages. Currently not clinically available, they are currently being studied with numerous clinical studies.

How prevalent titanium dental implant titanium hypersensitivity is in oral implantology today is a contentious issue. More studies are required to establish the incidence and associated complications with these types of hypersensitivity reactions. The biologic effects of the dental implant corrosion and the presence of ions/particles systemically is becoming a more commonly discussed subject. Until then, clinicians must be conscious of the signs and symptoms of potential titanium hypersensitivity and be able to utilize alternative dental implant materials if needed.

References

- 1 Granchi D, Sensitivity to implant materials in patients undergoing total hip replacement. *J Biomed Mater Res B Appl Biomater* 2006;77:257-64

Wyndam at Bonnet Creek
Orlando, FL

ORLANDO 2022-2023 SCHEDULE

DEC 1-2, 2022

Patient Evaluation, CBCT
Treatment Planning, Socket
Grafting and Implant
Placement

JAN 13-14, 2023

Multiple Implant Placement
and the treatment of the
Edentulous Ridge

MAR 2, 2023

CBCT FOR TAMP

MAR 3-4, 2023

Bone Augmentation and
Implant Placement into
Compromised Sites

MAY 19-20, 2023

Treatment of the Posterior
Maxilla: Osteotome and
Lateral Wall Technique

JULY 21-22, 2023

Immediate Placement and
Loading, Treatment of Peri-
Implant Disease

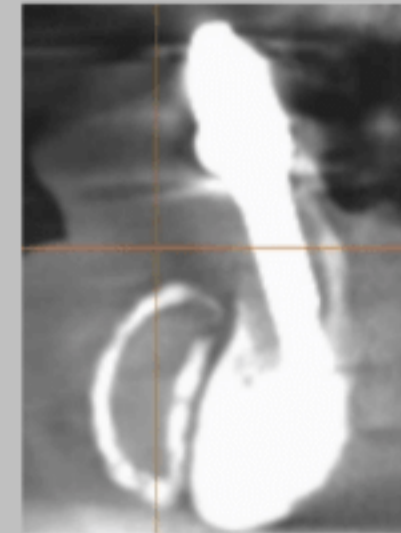


*"98% of our
graduates are
placing Implants."*

CBCT QUESTION OF THE MONTH

On this cross-sectional CBCT image of a failing implant, an artifact/object is noted on the buccal aspect of the anterior mandible.

What is this artifact/object?



IMPLANT STUDY OF THE MONTH

In a recent 3D finite stress analysis study evaluating splinted (Bar) vs. unsplinted (Independent Attachments) maxillary implants for an overdenture, which showed less stress at the implant and abutment interface?

PROSTHETIC STUDY OF THE MONTH

Monolithic Zirconia has become very popular in implant dentistry because of the material's excellent mechanical properties, flexural strength, fracture toughness, and biocompatibility. One major concern with the use of monolithic zirconia as a restorative material is the abrasive nature against opposing enamel because of this material's hardness and surface roughness. Esquiuevel-Upshaw et. al (University of Florida) completed an in vivo research study evaluating the maximum wear of enamel opposing (1) Monolithic Zirconia, (2) Porcelain Fused to Metal, and (3) Enamel.

QUESTION: Which opposing material exhibited the most enamel (antagonistic) wear?

- a. Monolithic Zirconia
- b. Porcelain Fused to Metal
- c. Enamel



CBCT QUESTION OF THE MONTH

Silicone Chin Implant used in chin augmentation procedures.



IMPLANT STUDY OF THE MONTH

1. Higher values of STRESS in the implants, abutments, and the crestal bone along a path between the implants are associated with non-splint design.
2. Regardless of the type of support (splinted and unsplinted), the most distal implants endured higher values of stress.
3. The prosthetic attachment system over a non-splinted maxillary overdenture experiences more stress values than a splinted design.

Geramy, Allahyar, and Sareh Habibzadeh. "Stress distribution in splinted and unsplinted implant-supported maxillary overdentures: a 3D finite element analysis." Implant dentistry 27.1 (2018): 56-62.

PROSTHETIC STUDY OF THE MONTH

All three materials exhibited the SAME amount of wear. Therefore, polished monolithic zirconia demonstrated the same wear as enamel vs. enamel.

Esquivel-Upshaw, J. F., et al. "Randomized clinical study of wear of enamel antagonists against polished monolithic zirconia crowns." Journal of dentistry 68 (2018): 19-27.

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- 2 Yamauchi R, Morita A, Tsuji T. Pacemaker dermatitis from titanium. *Contact Dermatitis* 2000;42:52-3.
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- 5 Bass JK, Fine H, Cisneros GJ. Nickel hypersensitivity in the orthodontic patient. *Am J Orthod Dentofacial Orthop* 1993;103:280-5.
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- 7 Chaturvedi, T. P. "Allergy related to dental implant and its clinical significance." *Clinical, cosmetic and investigational dentistry* 5 (2013): 57.
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- 9 Forte G, Petrucci F, Bocca B. Metal allergens of growing significance: epidemiology, immunotoxicology, strategies for testing and prevention. *Inflamm Allergy Drug Targets*. 2008;7(3):145-162.

Hilton Garden Inn at
Silverlake Crossing
Grapevine, TX



DALLAS 2023-2024 SCHEDULE

SEPT 8-9, 2023

Patient Evaluation, CBCT
Treatment Planning, Socket
Grafting, and Implant
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CBCT BOOTCAMP

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*"Our graduates show a
22.5% increase
in income in their first
year after the course."*



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NEW EXHIBITOR

Spotlight



IMPLANT DESIGN STUDIO

Dr. Christopher Resnik, DMD, MDS, a prosthodontist and Tara Resnik, DMD started IDS because they saw a disconnect in the designing of full arch prosthetics as well as a lag in the time it takes to receive and print digital designs for their patients. They created their design service with the goal of allowing the dentist to be able to print and deliver same day, high quality, implant restorations. They are both faculty at the Resnik Implant Institute and utilize these concepts to provide digitally designed prostheses with the ideal esthetics and contours. To learn more about how to submit a case for a digitally designed prosthesis visit implantdesignstudio.com.

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See what past graduates are saying...

Dr. Resnik and his team are amazing! I took an extensive implant curriculum about 12 years ago and only placed the straight forward single or double implants since then. If you want to raise your implant game for your patients, your practice, and yourself - you don't have a choice: SIGN UP TODAY and you won't regret it! Cheers! -- **Dr. Chad Yenchesky**

The course gives you the confidence you need to place dental implants and allows you to meet like minded colleagues and instructors. \ Dr. Resnik is a great lecturer, keeps things interesting and presents scientific research to back up his claims. Most importantly the course will provide you with cook book instructions and protocols for everything you will encounter during your implant journey, from placement, to suture line opening to dealing with infections, consent form templates, medical clearance templates...etc. \. Strongly recommend! -- **Dr. J Chen**

This course gives you a comprehensive introduction to placing single, multi, and full arch implants mostly using guided techniques. This course is for anyone at any level. The audience is made up of beginners who have never placed an implant (like myself) to the well seasoned general dentists/ OMFS who has had years of experience placing implants. Best money I have spent to forward my career. -- **Dr. Natalie Sigwart**

I finished the 5-course curriculum just this past year. Dr. Resnik and the faculty are hands down the best in the business. The Misch/Resnik program gives you the education, tools, and the confidence to be proficient at implant dentistry. This curriculum gives you the knowledge and the skills to take your practice to the next level! -- **Dr Michael Buck**

Many thanks to Dr. Resnik and the Misch/Resnik Institute for their excellence and the quality of the surgical and prosthetic implant courses. I have gone through most of the courses a second time to my advantage, because they are always updated with new labs and lectures. THANK YOU! -- **Dr. Barb Leadbeater**

After 30 years of practicing dentistry, my only regret is that I did not get involved with implant dentistry earlier in my career, specifically with the Misch Institute. I never realized how rewarding and exciting for both me and my practice this could be. Dr. Randy Resnik and his entire staff are a major factor in this testimony! -- **Dr. Douglas Adel**

Dr. Resnik has an amazing depth of scientific based knowledge concerning his subject. He builds a very large zone of safety. If one stays within this zone the success rate will be maximized and complications will be extremely rare. -- **Dr. Terry Rigdon**

Join the Family!



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