Academy of Osseointegration 2026

Debriding Internal Aspect Of Dental Implants

(What's Hiding Inside Your Implant?)

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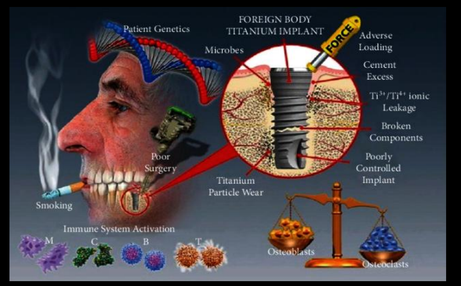
1 . Statement of the problem: Biocompatibility of Titanium as an Acceptable Implantable Material >8,000 articles (Pubmed 2026)
Titanium Provoking a Negative Immune Response, (e.g. Metallosis) > 680 articles (Pubmed 2026)

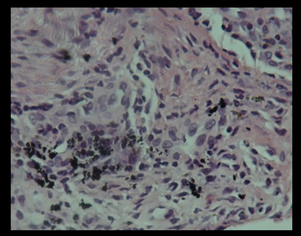
2 . Statement of the Problem: Implant Restoration- Common Complication in : Abutment Screw Complications >647 (Pubmed 2026)

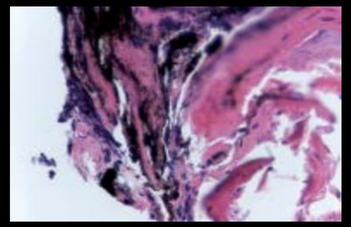
18 Million Dental Implants Placed World Wide (2025)
Success Rates 28-51% (Disease States)
Disease Only Bacterial ????-... Or Immune Response ?

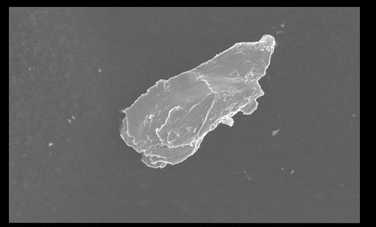


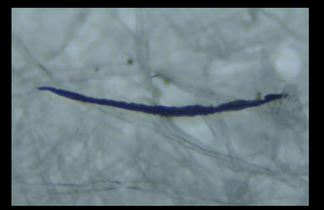
An Imbalance of the Immune System Instead of a Disease Behind Marginal Bone Loss Around Oral Implants: Position Paper

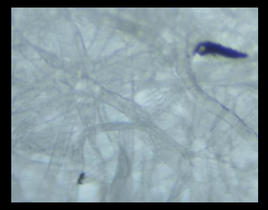
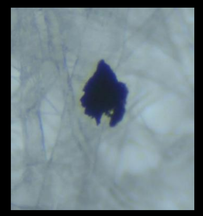
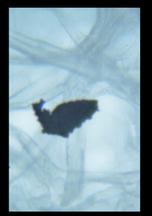
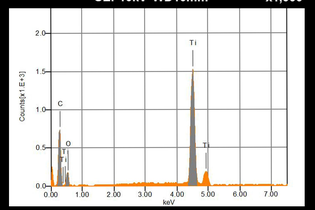
Titanium Particles Common Issue ?





Wakuda. 2025 J DS. Titanium particle induced inflammasome in human gingival tissues
Albrektsson 2016 Peri-implantitis : Complication of Foreign body ?
Shafizadeh. 2021 A.OB Histopath. Peri-implant disease- Association with Titanium particles
Lawton, Taylor 2014 JPD. Titanium Soft Tissue Tattoo
Burbano, Wilson, Wadhwani et al 2015 IJOMI _ ... Titanium particles associated with failed Implants.

Berryman, 2020 SDJ. Titanium particles: Risk peri-implant bone loss
Lawton, Taylor 2014 JPD. Titanium Soft Tissue Tattoo
Goodacre, Goodacre. Implant Complication 2018. 12.9% Screw Issues
Hsiao. Screw loosening . 2020 14% Screw Issues
Katsavochristou. 2019 J Oral Rehab 12.6% Screw loosening

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External Surfaces of Implants Routine & Independently Scrutinized:

… What about the INSIDE THE IMPLANT?

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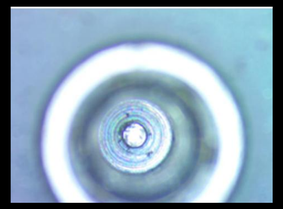
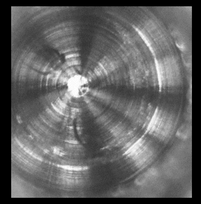




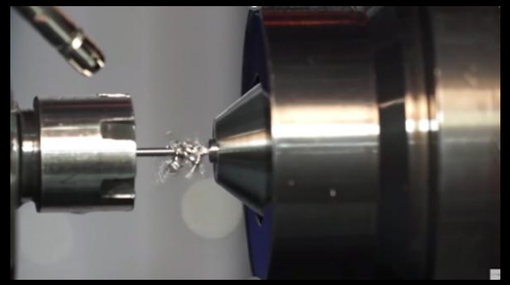
NEW IMPLANTS - 100% Titanium Machining Debris

2025 JOMI The International Journal of ORAL & MAXILLOFACIAL IMPLANTS

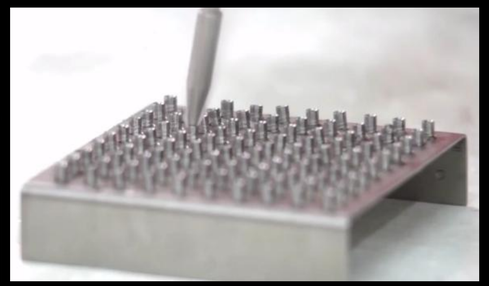
Wadhwani et al: 16 Brand New Implants : Cleaned / Brushes and paper Points

Implant Brand	Type	Debris Visible	
		x30	Swab
Astra	Osseospeed	Yes	Yes
Osseotite	Certain	Yes	Yes
Straumann	BLX	No	Yes
NobelBiocare	N1	No	Yes
Biohorizons	TLXP	No	Yes
Neodent	Titamax GM	Yes	Yes
Hiossen	ET	Yes	Yes

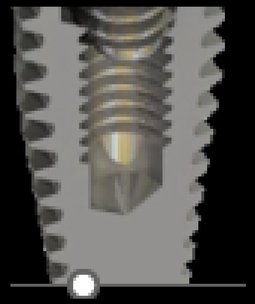
IMPLANT MANUFACTURING ISSUE



Inside : Machined ‘Dry”-
(Elsewhere Lubricated)



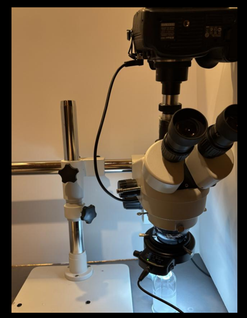
Cleaning: Air or Steam Blast

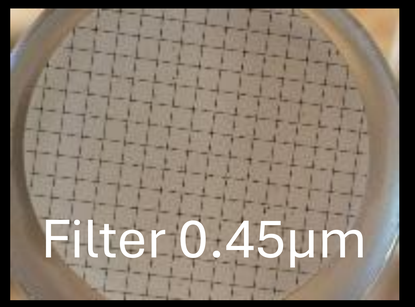


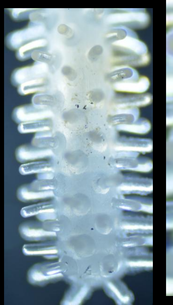
Steam/ Air Cannot Clean inside of Screw Thread in Blind ended tube!

Impression New Implant

STUDY MATERIALS: INTERROGATION: IMPLANTS INTERNAL SURFACES

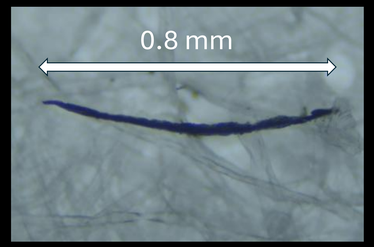






TI Particles: Mechanical and Biological Behavior : Debris Size Matters

MECHANICAL: LARGER PARTICLES IN SCREW THREADS

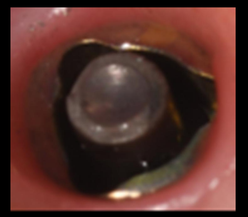


Friction Effects: Ti Particles

Torque = Friction + Preload

If Friction ↑ .... ↑ Screw Loosening

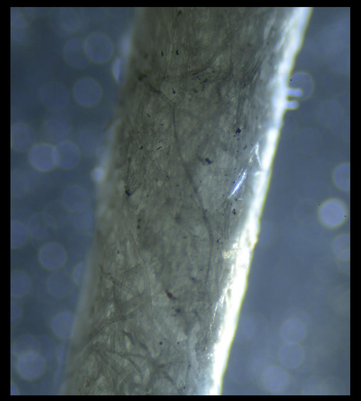
Material Wear- Friction Effect : Tribo-Corrosion



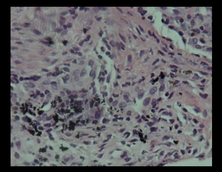
Vickers Hardness : Implants	:	Ti cp	250 VHN
		$TiAlV_4$	340 VHN
Screws	:	Ti ELI	370 VHN
		Anodized	350VHN
		Gold	25 VHN
		DLC	1500 VHN

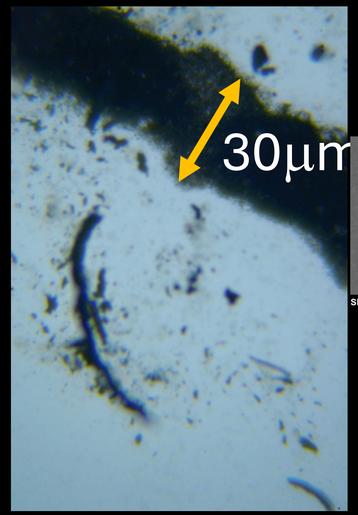
SciELO Brasil

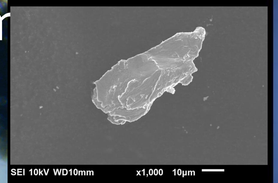
BIOLOGICAL : SMALL (< 5μm) PARTICLES IN TISSUES

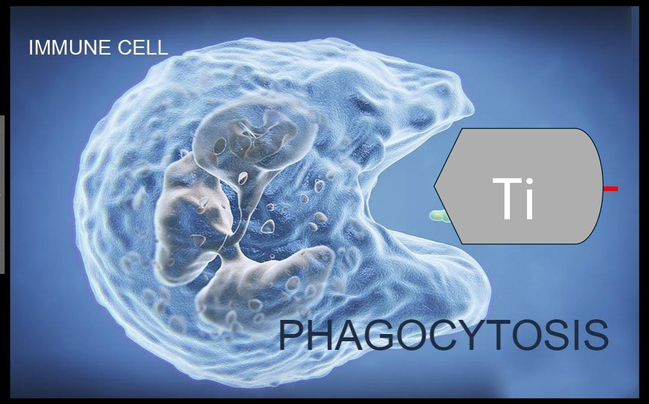


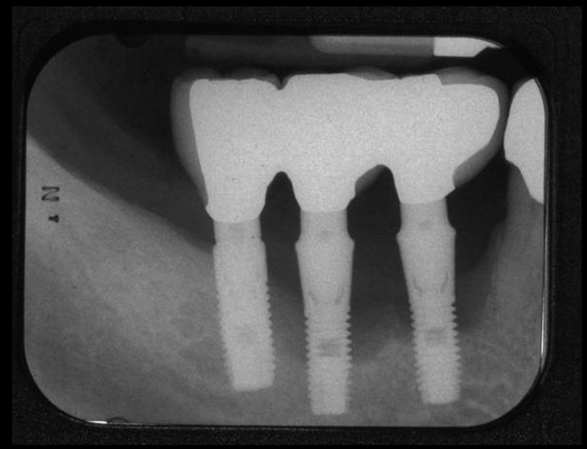
< 5 μm











M2 (Repair) Shift to M1 (Pro-inflammatory)

Bone Resorption/ Osteolysis

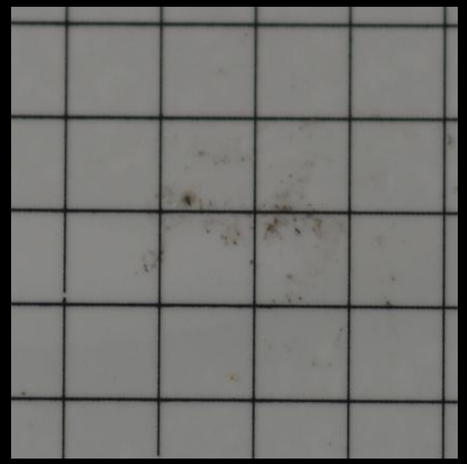
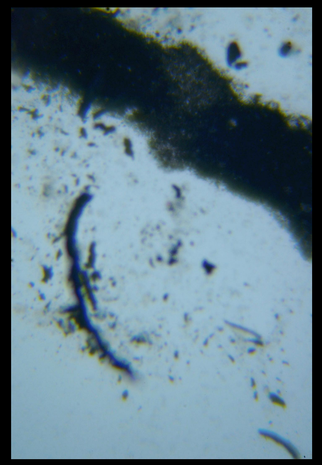
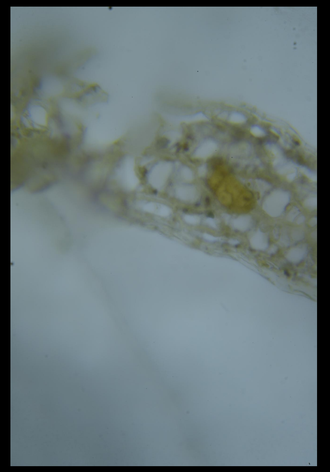
Synergy with Infection and Corrosion Products

Sampling : New, Surgery Placement, Pre-Impression, Final Restoration, Lab Analogs

Results: At All Stages Particulate Debris Was Confirmed- SEM Selected Material

Loose Screw Debris H_2O_2 Wash Filter Examine

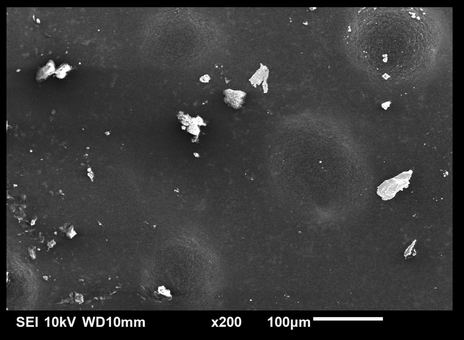



Material Was subjectively quantified : By Far Loose Screw presented with most material. Both biological and mechanical wear titanium identified.

Laboratory Analog Re-use

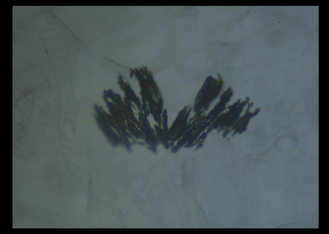


Of Note: Re-used laboratory analogs : Large Amounts of All Types of Debris, Suggesting One-Time Use Only
Final Screws Should Never be Used for Any Trial Restoration.

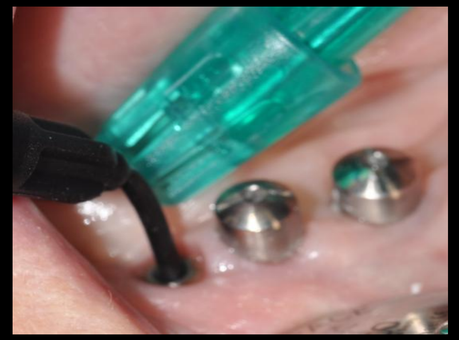
Limitations of This study: - 40 Implants were sampled at varies stages without the ability to quantify debris. Although Titanium found in most tissues of diseased Implants it is impossible to state where this came from and its impact on health. Screw loosening a common event again may be attributed in part to larger particles of titanium.

If the Goal is to have a clean environment to aid the health and longevity of these medical devices it behooves us to improve all clinical stages of implant work.



Clinical Management: Wash, Brush, Dry, Protect

Wash: Saline/ Water



Debride :Brushes & Paper Points

Protect: PTFE (Multiple Sites)

Conclusion: Implant Manufacturers Routinely Leave Titanium Debris Inside the Implant. Clinical Processes Require Clean, New Components. Components Wear Due to Friction. Simple Cleaning Protocols Should be Employed at All Stages of Implant Placement and Restoration to Minimize Effects of Titanium Metal particles Affecting Implant Success