

## Actinomycotic Oral Infection (Modern Dental Implants and Root Canals)

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### Introduction

If one were to inspect the general research regarding the effectiveness and physiological acceptability and safety of the modern dental implant tooth replacement, one is met with a “mixed bag of information” on their real success rates, systemic biological impacts, and advisability as a method of single or multiple tooth replacement. For example, reported in various credible peer reviewed journals for the years 2016 and 2017 we see that, contrary to the touted 98% success rate asserted about by the implant manufacturers, it is widely held that “success” can vary from about 91 % to 49% over a three to five year period or longer depending on the opinion of the clinical observer(s). The main issue that has been identified for implant degradation and ultimate re-treatment or removal of the implant is **PI—“Peri-Implantitis”**

Charalampakis et al, in their paper of 2013 from Gothenburg titled Periimplantitis from a microbiological perspective, stated it precisely: **“Thus, the prospect of reaching a consensus (regarding PI) is continuously hampered and the magnitude of the incidence of peri-implantitis still remains therefore a matter of academic dispute.”**

#### Charalampakis et al continue

**“Any factor proposed to be a risk factor for...peri-implantitis should not just be an extract of a statistical significant result in a paper but relate to the disease with biological plausibility.”**

We would like to present biological plausibility not only relating to the implant post or fixtures locally but to the **oral systemic biota**—the total human.

We are not “academics” but clinical scientists. We shall not enter discussions of the “life-span” of implants, their functionality, their being the so-called “golden standard” of our tooth replacement in our profession—prosthetic dentistry—but we shall offer a brief clinical scientific review of our observations and research.

The first biological factor is that of microbial infection within the soft tissues and bone about the dental implant. The second biological factor is that of the direct currents (DC electrical currents) generated by the implant fixtures, post, abutment, and replacement

crown. Let us explore both of these factors that fulfill the parameter of **biological plausibility** in the ensuing conversation and be open to our further exploration.

#### Actinomyces and Actinomycosis

In the early 1980s we began to remove infected root canal teeth and associated soft tissue and bone (Odonton) and send them for pathological inspection by a board certified histopathologist. The findings were remarkably revealing to this date.

In brief all of the 349 “odontons” inspected it was found that acute-chronic inflammation—sometimes marked, reactive bone, dead bone, osteomyelitis, granuloma, cyst, abscess and other attending abnormalities were present in the jaw below the tooth in question. Having carried this root canal research on since about 1983, we have also extended this methodology to implant removal due to infections or otherwise.

Background on factors causing “marked acute-chronic inflammation.” As we know the dead tooth has no circulatory system internally—in a sense this is the definition of an endodontically treated tooth. As the dead tooth degrades it gives off various chemicals such as putrescine, cadaverine, thioethers, and what we call “endo-toxins.” This fact is no longer disputed in the scientific clinical profession, not in academia either.

Another factor for inflammation is bacterial presence in tissues where they should not be. As a habit in the early days of our research the pathologist noted what he called “star-like microorganisms” in colonies with rays in the bone and soft tissues. He noted that they were certainly colonies of actinomyces that surrounded the root canal. However, it must be understood that we had not asked for a determination of bacterial review, it was an incidental finding in his pathology reports to me.

Actinomyces is known from the 1800s as the “ray fungus,” mistaken as a fungus until about 1938. It is currently identified a bacterium: Actinomyces is a genus of the Actinobacteria class of bacteria. They are all gram positive. Actinomyces species are facultatively anaerobic and they grow best under anaerobic con-

ditions. Actinomyces species may form endospores, and, while individual bacteria are rodshaped, Actinomyces colonies form fungus-like branched networks of hyphae.

They are implicated in decay and gum or perio disease in the oral cavity since normal residents. However, it is not normal to find actinomyces in bone or connective tissues deep in the other jawbone or in the blood vascular system. If found in the jaw bone it may lead to a condition known as “lumpy jaw”—an abscess from either dental or peri-dental origins, or both. Systemically it may lead to Actinomycosis a condition where abscesses occur—through circulatory migration or facial migration—into jaw, throat, lungs, abdomen, genital areas.

Actinobacteria are normally present in the gums and are the most common cause of infection in dental procedures and oral abscesses. Many Actinomyces species are opportunistic pathogens of humans and other mammals, particularly in the oral cavity. In rare cases, these bacteria can cause actinomycosis, a disease characterized by the formation of abscesses in the mouth, lungs, or the gastrointestinal tract. Actinomycosis is most frequently caused by *A. israelii*, which may also cause endocarditis, though the resulting symptoms may be similar to those resulting from infections by other bacterial species. *Aggregatibacter actinomycetemcomitans* has been identified as being of note in periodontal disease.

The genus is typically the cause oral-cervicofacial disease. It is characterized by a painless “lumpy jaw”. Lymphadenopathy is uncommon in this form of the disease. Another form of actinomycosis is thoracic disease, which is often misdiagnosed as a neoplasm, as it forms a mass that extends to the chest wall. It arises from aspiration of organisms from the oropharynx. Symptoms include chest pain, fever, and weight loss.

Abdominal disease is another manifestation of actinomycosis. This can lead to a sinus tract that drains to the abdominal wall or the perianal area. Symptoms include fever, abdominal pain, and weight loss. Some Actinomyces species have also been shown to infect the nervous system of some animals without apparent trauma.

The bacteria Actinomyces are ubiquitous and abundant in soil. They are known for the important role they play in soil ecology; they produce a number of enzymes that help degrade plant root debris and waste materials. Thus their presence is important in the formation of compost. They are also known for causing diseases in humans and livestock, usually when they get an opportunity to gain access to the body’s interior through wounds. As with other opportunistic infections, people with immunologic issues are at higher risk. In all of the preceding traits and in their branching filament formation, they bear similarities to *Nocardia* causing Nocardiosis a similar illness as Actinomycosis.

It is well established that actinomycosis is an endogenous infec-

tion. The causative Actinomyces species reside on mucosal surfaces and gain access to deeper tissues via trauma, surgical procedures, or foreign bodies, which disrupt the mucosal barrier. Inside the tissue, these bacteria form masses consisting of aggregates of branching, filamentous bacilli. Actinomycosis is defined as a hard mass-type lesion with a specific histopathological structure. There are a large number of case reports of actinomycosis in the literature, but in most cases, diagnosis has been based solely on clinical and histopathological findings. In the majority of early reports, microbiological confirmation of diagnosis was lacking. Even when microbiological assessment was included, culture was typically the only method used. If, however, antimicrobial treatment had been started before sample collection, the results of culture may be falsely negative. The increasing introduction of molecular bacterial detection and identification methods is helping to overcome such problems.

An internal abscess is more difficult to identify, but signs include pain in the affected area, a high temperature, and generally feeling unwell. Internal abscesses rarely heal themselves, so prompt medical attention is indicated if such an abscess is suspected. This is important in the resolution of infected abscessed teeth, that they be surgically removed and bone cleansing—cavitation—accomplished.

### Dental Implant Associated Micro Currents

Rarely mentioned in any research in this day is the impact of direct currents on the tissues around the metal implant—corrosion impact. The human cellular structures operate electrically in all actions in pico-amperes, 10-12 amperes. Tiller related in *Vibrational Medicine* by Gerber 1987 that currents greater than pico-amperes (in the direction of nano-amperes 10<sup>-9</sup> and micro-amperes 10<sup>-6</sup>) will cause cell destruction while currents smaller than pico-amperes stimulate cellular growth. In our measurements of this phenomenon in titanium implants we have recorded amperes -36 uA (uA = micro-amperes) and even higher—over -100uA—when the coupled anode and cathode is to gold crowns, metal bridges, metal partials and amalgam fillings. This is an area ripe for investigation for both titanium and zirconia dental implants. Galvanic impacts on human tissues are well known but little studied. In the removal of infected and problematic dental implants we have found also the deleterious impact associated with deep dental structures beyond the post above the gum, deep in the bone crypt. Again, we have over the past 17 years removed various dental implants (about 30) in 20 patients and sent them to the histopathologist at Queen’s Hospital Honolulu, Hawai’i. We present the data of both the “root canal teeth” study and the “implants” study in two tables. The first table will show implants alone and the second all teeth and implants removed since 1986.

Table1. Dental Implants

Gender	Age	Implant #	Pathology	Bacteria
1. Female	64	Metal implant #29 uA -30 (with 28 DFC decay?)	Periapical granuloma, chronic inflammation, <b>necrotic bone</b>	(+) Actinomyces
2. Female 11/2/15	56	Metal implant #4 (with sinus perforation)	Fibrosis, chronic inflammation, <b>reactive bone lesions</b>	(-)
3. Female 2/2/15	69	Metal Implant #29/30 area	Periapical granuloma (prei-implantitis), acute/chronic inflammation, <b>reactive bone</b>	(-)
4. Male 10/7/14	65	Zirconia Implant Posts #18 and #19 area	Periapical Granuloma with pus, marked acute/chronic inflammation with fibrosis and <b>reactive bone</b>	(+) Actinomyces
5. Male 9/26/14	65	Zirconia Implant Post #30 and #29 area	Periapical Granuloma, marked acute/chronic inflammation...	(+) Actinomyces
6. Male 8/21/14	70	Titanium Implant Posts # 9	Peridental Fibroma / Scar, chronic inflammation, <b>dead bone</b>	(-)
7. Female 9/27/13	76	Titanium Implant Posts #18, #19, #20 c uA -26 and mV -265	Peri-implantitis / Osteosis Marked acute chronic Inflammation <b>Reactive Bone</b>	(+) Actinomyces
8. Female 8/3/13	63	Implant Post #4 #6 (Titanium Metal) with -36 uA Current Density	Peri-implantitis / osteitis Chronic Inflammation <b>Devitalized (Dead) Bone Reactive Bone</b>	(+) Actinomyces
9. Male 2/23/13	72	Titanium Implant Post #14 Area	Granulation Tissue/Fibrosis Marked acute/chronic Inflammation <b>Reactive Bone</b>	(+) Actinomyces
10. Female 8/6/10	60	Titanium Implant #12 and #13	Periapical Granuloma (Fibrous) with marked acute/chronic inflammation. <b>Dead Bone/ reactive bone.</b>	(-)
11. Female 5/16/07	62	Titan Implant # 6	Peri-implantitis, Granulation and Fibrosis, Chronic inflammation, <b>Reactive Bone</b>	(+) Actinomyces
12. Female 7/3/06	59	Titan Imp #8	Granulation tissue, fibrosis, Chronic inflammation	(-)
13. Female 8/9/05	71	Titan Implant #11, #12	Periimplant mucositis, chronic acute inflammation, inflamed granulation tissue (granuloma) <b>Reactive Bone Changes</b>	(-)
14. Male 6/27/05	74	Titan Implant #17, #18	Peri-implantitis, Chronic inflammation, Granulation tissue <b>Reactive Bone</b>	(-)
15. Male 4/4/05	74	Titan Implant #30, #31	Peri-implantitis, Chronic inflammation and fibrosis, <b>hyperostotic bone, reactive bone</b>	(+) Actinomyces
16. Male 3/21/05	54	Titan Implant #20	Peri-implantitis, marked chronic-acute inflammation <b>Reactive Bone</b>	(+) Actinomyces
17. Female 9/29/01	55	Titan Imp #30 #31	Periapical Granuloma, <b>Dead Bone</b> , Chronic inflammation	(-)
18. Female 3/10/01	78	Titanium Post #3	Peri-implantitis Osteitis, Chronic Inflammation granulation tissue/fibrosis <b>Devital (Dead) Bone</b>	(+) Actinomyces
19. Female 6/8/99	22	Titanium Implant # 7	Peri-implantitis, Chronic inflammation, Reactive bone-epithelial changes parakaratosi and acanthosis	(-)
Gender	Age	Tooth	Pathology	Bacteria

**19 patients with 30 implants**

10 of the 19 had (50%) Actinomyces, infecting attachment tissues (bone-ligaments).

Histo-Pathological Studies 1986-2017 of Soft Tissue & Bone About The Roots of Endo Teeth and Metal Implants Done at Queens Hospital Honolulu, Hawaii

Table 2. Endo Teeth and Dental Implants

Gender	Age	Endo Tooth #	Pathology	Bacteria	
Female	5/20/17	68	Titanium Implant #29 Abscess on mental foramen -83uA	Periapical granuloma/abscess, marked chronic inflammation, <b>necrotic bone</b>	(+) Actinomyces
Male	5/19/17	68	18	Periapical abscess/granuloma, marked acute/chronic inflammation, <b>necrotic bone</b>	(+) Actinomyces
Male	12/1/16	29	8,9,10	Periapical abscess/granuloma, marked acute chronic inflammation	(+) Actinomyces
Male	11/13/16	54	13	Periapical scar, fibrosis	(-)
Female	11/11/16	54	18, 19	Radicular Cyst, granulation fibrosis with marked acute/chronic inflammation and <b>reactive bone</b>	(-)
Male	9/26/16	65	19	Periapical Granuloma/Cyst acute choronic inflammation, reactive bone	(+)
Female	8/27/16	88	19	Periapical Granuloma Cyst, marked acute chroinic inflammation, reactive bone	(+) Actinomyces
Male	7/14/16	52	3	Radicular Periapical Cyst, acute/chronic inflammation, granulation/fibrous tissue.	(+) Actinomyces
Female	7/9/16	55	13	Radicular Periapical Cyst, marked acute / chronic inflammation, massive granulation tissue and <b>reactive bone.</b>	(+)
Female	6/23/16	75	20	Radicular Periapical Cyst, granulation fibrous tissue, chronic inflammation	(-)
Female	5/10/16	67	18	Periapical Granuloma (abscess) with marked acute chronic inflammation	(+)
Female	2/29/16	66	18	Radicular (Periapical) Cyst, cystic lesion with granulation tissue and marked acute chornic inflammation	(-)
Male	2/16/16	72	18/19	Radicular Cyst, granulation fibrous tissue acute/chronic inflammation.	(-)
Female	2/15/16	57	18/19	Fibrosis/ <b>Reactive bone lesions</b>	(-)
Female	1/28/16	60	5	Squamous Mucosa with acute and chronic inflammation	(-)
Female	1/8/16	60	4	Periapical radicular cyst, granulation tissue acute/chronic inflammation	(+)
Female	11/12/15	52	9	Periapical fibrosis/scar, acute/chronic inflammation, <b>reactive bone lesions</b>	(-)
Female	11/2/15	56	Metal implant #4 (with sinus perforation) -63 uA	Fibrosis, chronic inflammation, <b>reactive bone lesions</b>	(-)
Female	11/2/15	56	29,30,31	Periapical Granuloma, chronic inflammation, <b>reactive bone lesions</b>	(-)
Female	10/24/15	33	8,9	Periapical Granuloma/Cyst, marked acute chronic inflammation, <b>necrotic bone</b>	(+)
Female	10/24/15	33	4,5	Periapical Granuloma/Scar, chronic inflammation, <b>reactive bone lesions</b>	(-)
Female	8/31/15	60	13	Periapical Granuloma, Cyst chronic inflammation, inflamed mucosa	(+)
Female	8/28/15	48	29	Periapical Granuloma/Cyst, marked acute/chronic inflammation, fibrosis,	(-)

				<b>necrotic bone</b>	
Female	8/27/15	33	2,3	Periapical Granuloma/Cyst, marked acute/chronic inflammation, fibrosis, <b>reactive bone</b>	(-)
Male	7/31/15	64	3	Periapical Granuloma, fibrosis, marked chronic inflammation`	(-)
Female	7/28/15	35	29	Periapical/Radicular Cyst/Granuloma Acute/chronic inflammation, reactive epithelium, <b>reactive bone</b>	(+)
Female	7/16/15	46	15	Periapical Radicular Cyst/Granuloma Chronic inflammation, reactive epithelium, <b>reactive bone</b>	(-)
Female	6/18/15	61	31	Periapical Radicular Cyst, marked acute/chronic inflammation, <b>reactive bone</b> , fibrosis	(+)
Male	6/13/15	77	3,4	Periapical granuloma/cyst, marked acute/chronic inflammation, <b>reactive bone</b>	(+)
Female	6/3/15	67	12	Periapical granuloma, marked chronic/acute inflammation	(-)
Female	5/28/15	61	14	Periapical scar, chronic inflammation, <b>reactive bone</b>	(-)
Female	5/26/15	59	18/19	Periapical Granuloma/Cyst, marked acute chronic inflammation, <b>reactive bone</b>	(-)
Female	5/9/15	54	3	Periapical Granuloma/Cyst, acute chronic inflammation	(+)
Female	4/23/15	64	29	Periapical Granuloma/Cyst, acute/chronic inflammation	(+)
Female	4/17/15	69	19	Periapical Granuloma, acute/chronic inflammation, "devitalized bone" <b>dead bone</b>	(-)
Female	4/14/15	61	2	Periapical Granuloma, acute/chronic inflammation, <b>reactive bone</b>	(-)
Female	3/21/15	73	10	Periapical Granuloma, acute/chronic inflammation	(-)
Female	3/19/15	68	10	Radicular (Periapical) Cyst, granulation tissue with fibrosis, acute / chronic inflammation, <b>reactive bone</b>	(-)
Male	3/10/15	35	19	Radicular (Periapical) Cyst, granulation tissue with fibrosis, acute/chronic inflammation	(-)
Female	2/2/15	69	<a href="#">Metal Implant #29/30 area -45 uA</a>	Periapical granuloma (prei-implantitis, acute/chornic inflammation, <b>reactive bone</b>	(-)
Male	1/31/15	86	2	Radicular (periapical) cyst, acute/chronic inflammation, <b>reactive bone</b>	(+)
Female	1/29/15	69	5, 3	<b>Reactive and Devitalized (dead) bone</b>	(+)
Male	1/19/15	27	13	Periapical Granuloma, fibrosis, acute/chronic inflammation, <b>reactive bone</b>	(+)
Male	1/16.15	86	18	Periapical Granulma/Cyst, fibrosis, acute/chronic inflammation, <b>reactive bone</b>	(-)
Female	1/10/15	83	31	Periapical Granuloma/Cyst fibrosis, acute/chronic inflammmion	(-)
Male	1/9/15	63	9	Periapical Granuloma/Cyst, fibrosis, acute/chronic inflammation	(+)
Female	1/6/15	71	7	Periapical Granuloma/Scar, fibrosis, acute/chronic inflammation	(-)
Female	12/22/14	70	3	Periapical Granuloma/Cyst, fibrosis, marked acute/choronic inflammation, <b>reactive bone</b>	(+)
Male	12/17/14	40	30	Periapical Granuloma/Cyst, Chronic inflammation, fibrosis, <b>reactive bone</b>	(-)
Female	12/17/14	43	19	Radicular (Periapical) Cyst, marked acute/chronic inflammation, fibrosis,	(+)

				granuloma	
Female	12/7/14	70	15	Periapical Granuloma/Cyst, marked chronic and acute inflammation	(-)
Female	11/7/14	70	12	Periapical Granuloma, marked acute/chronic inflammation, <b>reactive bone</b>	(-)
Female	11/5/14	73	3	Radicular Cyst (Periapical) acute/chronic inflammation, fibrosis, <b>reactive bone</b>	(+)
Male	10/7/14	65	Zirconia Implant Posts #18 and #19 area	Periapical Granuloma with pus, marked acute/chronic inflammation with fibrosis and <b>reactive bone</b>	(+)
Female	10/1/14	82	18	Periapical Granuloma with pus, marked acute/chronic inflammation with fibrosis and <b>reactive bone</b>	(-)
Male	9/26/14	65	Zirconia Implant Post #30 and #29 area	Periapical Granuloma, marked acute/chronic inflammation...	(+)
Male	8/21/14	70	Titanium Implant Posts # 9	Periapical Fibroma / Scar, chronic inflammation, <b>dead bone</b>	(-)
Male	8/14/14	51	14	Periapical Granuloma, acute/chronic inflammation, <b>reactive bone</b>	(-)
Female	8/14/14	66	29,31	Periapical Granuloma / Scar, Chronic Inflammation <b>reactive bone</b>	(-)
Male	8/8/14	70	14, 15, 16	Periapical Granulomas, marked acute/chronic inflammation, <b>dead bone</b> , fibrous tissue	(+)
Male	7/28/14	70	30	Periapical Granuloma, chronic inflammation, <b>reactive bone</b>	(-)
Female	6/26/14	23	9	Periapical Granuloma/Scar, Fibrosis, chronic inflammation with <b>reactive bone</b>	(-)
Female	6/22/14	77	4	Periapical Granuloma/Cyst, granulation/fibrous tissue, marked acute/chronic inflammation	(+)
Female	6/22/14	64	6	Periapical Scar, chronic inflammation, <b>reactive bone</b>	(-)
Female	6/16/14	80	14	Periapical Abscess/Granuloma, marked acute/chronic inflammation, <b>Necrotic Bone</b>	(+)
Female	6/16/14	80	12	Periapical Abscess/Granuloma, marked acute/chronic inflammation, <b>Necrotic Bone</b>	(+)
Male	6/12/14	34	29	Periapical Cyst/Granuloma, marked acute/chronic inflammation <b>Reactive Bone</b>	(-)
Female	6/5/14	66	3	Radicular Cyst (Periapical) marked acute chronic inflammation, granulation/fibrous tissue <b>Osteonecrosis (dead bone)</b>	(+)
Female	5/21/14	44	9	Periapical scar/fibrosis, <b>reactive bone</b>	(+)
Female	5/13/14	64	30	Focal Osteonecrosis, <b>necrotic bone</b> , <b>reactive bone</b> , squamous mucosa	(+)
Male	5/5/14	34	18	Periapical granuloma, chronic inflammation, fibrosis, <b>reactive bone</b> , <b>degenerated bone (dead bone)</b>	(-)
Female	4/22/14	59	18	Periapical granuloma/scar, mild chronic inflammation, <b>reactive bone</b>	(-)
Female	4/19/14	68	7	Radicular (Periapical) Cyst, granulation/fibrous tissue with marked acute and chronic inflammation, <b>reactive bone</b>	(+)
Male	4/7/14	47	14	Periapical Granuloma Cyst, granulation/fibrous tissue with marked acute/chronic inflammation, <b>Dead Bone</b>	(-)
Female	4/4/14	64	3	Radicular Periapical Cyst, granulation/fibrous tissue, marked chronic/acute inflammation, <b>Dead Bone</b>	(-)
Female	4/4/14	49	14	Periapical Granuloma/Cyst, granulation/fibrous tissue with chronic inflammation	(-)

Female	3/21/14	42	10	Periapical Granuloma/Abscess, marked acute/chronic inflammation with fibrosis and granulation tissue, <b>Dead bone, reactive bone consistent with "osteomyelitis"</b>	(-)
Male	3/11/14	57	14, 15	Periapical Cyst/Granuloma, marked acute/chronic inflammation, <b>Reactive Bone</b>	(+)
Female	2/22/14	66	6	Periapical abscess/granuloma, marked a/c inflammation, <b>Partially dead and reactive bone</b>	(+)
Male	2/4/14	70	18,19	Cystic Granuloma/ marked acute-chronic inflammation, <b>Reactive Bone</b>	(-)
Female	1/24/14	43	10	Cystic Granuloma/ tissue with marked inflammation, Chronic and Acute <b>Reactive Bone</b>	(-)
Male	1/14/14	61	4	Periapical scar/fibrosis, Osteonecrosis ( <b>Dead Bone</b> ) <b>Patient has bowel cancer—this tooth #4 and two others #12 &amp; #19 on the same meridian were root cadavers. CA dx 6mo ago</b>	(+)
Male	1/13/14	63	29	Periapical granuloma/scar, AC Inflamm, <b>dead dentine/cementum</b> , numerous Actinomyces /Candida	(+) Candida 1st (Actinomyces)
Male	1/11/14	34	30	Periapical granuloma, AC inflammation, <b>Reactive bone, fibrosis</b>	(-)
Female	12/7/13	44	2	Periapical abscess/scar <b>Reactive/Necrotic(dead) bone and fibrous tissue</b>	(+)
Female	11/21/13	66	28	Periapical granuloma/Scar Chronic inflammation, <b>Reactive Bone</b>	(-)
Male	11/11/13	26	10	Periapical granuloma (Fistula with pus) Marked AC inflammation <b>Reactive Bone</b>	(-)
Female	10/7/13	53	19	Periapical granuloma/scar AC Inflammation underlying fibrosis <b>Reactive bone</b>	(-)
Female	9/27/13	76	Titanium Implant Posts 18, 19, 20 with uA -26 and mV -265	Peri-implantitis / Osteosis Marked AC Inflammation <b>Reactive Bone</b>	(+)
Female	9/24/13	53	18/19	Periapical Granuloma Scar Chronic Inflammation <b>Devitalized (Dead) Bone</b>	(-)
Female	9/9/13	37	30	Periapical Scar Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	9/5/13	16	26	Periapical Granuloma Cyst Chronic Inflammation <b>Devitalized (Dead) Bone</b> <b>Reactive Bone</b>	(-)
Male	8/27/13	63	30	Periapical Abscess Granuloma Marked AC Inflammation <b>Devitalized (Dead) Bone</b> <b>Reactive Bone</b>	(-)
Female	8/19/13	80	2	Periapical Granuloma Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	8/3/13	63	Implant Post #4 #6 (Titanium Metal) with -36 uA Current Density	Peri-implantitis / osteitis Chronic Inflammation <b>Devitalized (Dead) Bone</b> <b>Reactive Bone</b>	(+)
Female	7/31/13	58	30	Apical Osteitis <b>Devitalized (Dead) Bone</b> <b>Reactive Bone</b>	(-)
Female	7/11/13	63	5	Periapical Radicular Cyst AC Inflammation	(+)
Male	6/27/13		3	Periapical Granuloma Cyst	(-)

	53		AC Inflammation <b>Reactive Bone</b>	
Female 6/19/13	63	14	Periapical Granuloma Cyst Marked AC Inflammation <b>Reactive Bone</b>	(+)
Female 6/18/13	56	32	Periapical Scar Chronic Inflammation <b>Reactive Bone</b>	(+)
Female 6/6/13	36	13	Periapical Scar <b>Reactive Bone</b>	(+)
Female 6/4/13	66	31	Radicular Cyst Marked AC Inflammation <b>Reactive Bone</b>	(-)
Female 4/8/13	40	18	Periapical Granuloma Chronic Inflammation <b>Reactive Bone</b>	(-)
Female 5/8/13	59	30	Periapical Granuloma Chronic inflamma.	(-)
Female 3/30/13	36	4	Periapical Granuloma Fibroma Chronic Inflamm	(-)
Female 3/28/13	69	31	Periapical Granuloma Fibroma Chronic Inflamm <b>Reactive/Hyperostotic Bone</b>	(+)
Female 3/8/13	61	3	Periapical Radicular Cyst Marked AC Inflammation <b>Reactive Bone</b>	(+)
Male 3/5/13	68	20	Periapical Scar, slight inflammation <b>Devital (Dead) Bone</b>	(+)
Male 2/23/13	72	Titanium Implant Post #14 Area -80uA	Granulation Tissue/Fibrosis Marked AC Inflammation <b>Reactive Bone</b>	(+)
Female 2/19/13	NG	21	Periapical Granuloma Marked Chronic Inflamm.	(-)
Female 2/11/13	76	19	Periapical Scar Slight Chronic Inflamm. <b>Reactive Bone</b>	(+)
Male 2/9/13	66	8	Periapical Granuloma Scar Chronic Inflamm <b>Reactive Bone</b>	(-)
Female 1/31/13	NG	29	Periapical Granuloma Chronic Inflammation <b>Reactive Bone</b>	(-)
Male 1/22/13	82	8	Periapical Radicular Cyst Marked AC Inflammation	(+)
Female 1/14/13	64	14	Periapical Cyst Marked AC Inflammation <b>Reactive Bone</b>	(+)
Female 12/12/12	56	14	Fibroma, Inflammation, <b>Reactive Bone</b>	(+)
Female 12/4/12	73	4/5	Inflammation and <b>Reactive Bone</b>	(-)
Female 12/4/12	49	3	Periapical Granuloma Cyst Marked AC Inflammation <b>Reactive Bone</b>	(+)
Male 11/21/12	60	13	Periapical Granuloma AC Inflammation <b>Devital (Dead) Bone</b>	(+) <Actinomyces>
Female 11/10/12	46	24/25	Periapical Granuloma AC Inflammation <b>Reactive Bone</b>	(-)
Female 11/10/12	46	14	Periapical Granuloma AC Inflammation <b>Reactive Bone</b>	(-)
Female 11/6/12	62	30	Periapical Granuloma <b>Reactive Bone (Condensing Osteitis: non-suppurative Osteomyelitis)</b>	(+)
Male 10/27/12	56	8	Periapical Granuloma Cyst Marked AC Inflammation	(+)
Female 10/4/12		19	<b>Periapical Cem ento-osseous Dysplasia</b>	(-)



		57		<b>Immature bone/cementum</b> fibrous tissue	
Male	9/27/12	66	5	Periapical Granuloma Marked AC Inflammation <b>Devitalized (Dead) Bone</b>	(-)
Female	9/11/12	55	4	Partially <b>Devitalized Bone (Dead Bone)</b> Marked Chronic Inflammation	(+)
Male	8/30/12	51	9	Periapical Granuloma Cyst Marked Acute Chronic Inflammation	(-)
Female	8/6/12	60	19	Chronic Osteomyelitis <b>Dead &amp; Reactive Bone</b> Chronic Inflammation	(-)
Male	7/20/12	58	30	Periapical Granuloma AC Inflammation <b>Reactive Bone</b>	(-)
Male	7/20/12	58	7/8	Periapical Cyst Acute Chronic Inflammation	(-)
Female	5/16/12	77	30	Periapical Granuloma Marked AC Inflammation <b>Reactive Bone</b>	(+)
Male	5/17/12	60	19	Periapical Granuloma Abscess/ Marked Acute Chronic Inflammation <b>Reactive Bone</b>	(-)
Male	5/11/12	31	30	Periapical Granuloma Marked AC Inflammation	(-)
Male	5/2/12	35	18	Periapical Granuloma Scar Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	4/10/12	51	20	Periapical Granuloma Marked Acute Chronic Inflammation	(-)
Female	3/17/12	55	12	Periapical Scar Acute Chronic Inflammation	(-)
Female	2/28/12	60	30	Periapical Scar Chronic Inflammation <b>Reactive Bone</b>	(+)
Female	2/28/12	60	3	Periapical Granuloma Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	1/3/12	42	2	Periapical Radicular Cyst Marked Acute Chronic Inflammation <b>Reactive Bone</b>	(-)
Male	8/17/11	40	8/9	Periapical Granuloma Marked Chronic Inflammation	(+)
Female	7/20/11	29	Vital #29 (PI Test 7.5)	Periapical Granuloma Scar	(+)
Female	6/30/11	64	8/10	Periapical Granuloma Cyst Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	5/4/11	31	4	Periapical Granuloma Scar Chronic Inflammation	(-)
Female	3/2/11	31	19	Periapical Granuloma Scar Granulation/Fibrous Tissue Chronic Inflammation	(-)
Male	11/2/10	68	3	Periapical Granuloma Acute Chronic Inflammation <b>Reactive Bone</b>	(+)
Male	8/13/10	75	30	Periapical Granuloma Marked Acute Chronic Inflammation	(+)
Female	8/6/10	60	<b>Titanium Implant #12 and #13</b>	Periapical Granuloma (Fibrous Tissue) with marked acute/chronic inflammation. <b>Dead Bone, reactive bone.</b>	(-)
Female	8/4/10	66	28/29	Periapical Granuloma Marked Acute Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	4/23/10	51	3	Periapical Granuloma Acute Chronic Inflammation	(-)
Male	4/15/10	56	20	Periapical Granuloma Scar Chronic Inflammation	(-)

Male	2/24/10	48	21	Periapical Scar Chronic Inflammation	(-)
Male	1/19/10	48	29/30	Periapical Granuloma marked Acute Chronic Inflammation <b>Reactive Bone</b>	(+)
Female	1/4/10	55	14/15	Periapical Granuloma Chronic Inflammation <b>Reactive Bone</b>	(-)
Female	1/4/10	61	4	Periapical Granuloma Scar Chronic Inflammation	(-)
Female	7/3/09	46	7	Periapical Marked Acute Chronic Inflammation <b>reactive bone</b>	(+)
Female	7/16/09	60	10	Periapical Granuloma Cyst Chronic inflammation <b>Reactive Bone</b>	(-)
Female	7/7/09	33	3	Periapical Granuloma Scar <b>Reactive Bone</b>	(-)
Male	7/2/09	58	9	Radicular Periapical Cyst Acute Chronic Inflammation	(+)
Female	6/19/09	75	31	Periapical Granuloma Cyst Acute Chronic Inflam.	(+)
Male	6/9/09	69	8,9,10, 11	Periapical Granuloma Cyst <b>Reactive bone</b>	(+)
Male	5/30/09	50	8	Periapical Granuloma, Marked AC Inflammation <b>Reactive Bone</b>	(-)
Female	5/27/09	46	15	Periapical Granuloma/Scar <b>Reactive Bone</b>	(-)
Male	5/20/09	55	3	Periapical Granuloma Moderate C-Inflammation	(+)
Female	5/13/09	64	20	Periapical Granuloma Marked AC Inflammation	(-)
Female	4/10/09	38	18	Periapical Granuloma-Abscess Marked AC Inflammation	(-)
Female	2/26/09	60	18/19	Periapical Granuloma with <b>Osteonecrosis (dead bone)</b>	(+) (Fosamax Person)
Female	2/13/09	63	3	Periapical Granuloma Marked AC Inflammation	(-)
Female	12/13/08	56	9/11	Periapical Granuloma/Scar Chronic Inflammation	(-)
Female	12/9/08	70	5	Radicular Cyst Periapical Marked AC Inflammation	(-)
Male	12/9/08	63	5	Periapical Granuloma/Cyst Marked AC Inflammation	(-)
Female	10/6/08	34	3	Periapical Granuloma/Cyst Chronic Inflammation	(+)
Female	10/1/08	51	30	Periapical Granuloma/Scar <b>Reactive Bone</b>	(-)
Female	9/13/08	60	29/30	Thickened partially <b>devitalized bone</b> and granulation tissue (granuloma)	(-)
Male	8/11/08	29	28	Chronic inflammation/ Periapical Granuloma	(+)
Male	8/11/08	29	8,9	Chronic inflammation/ Periapical Granuloma/Scar	(-)
Female	7/14/08	56	3	Acute and Chronic inflammation with Fibrosis and Granulation Tissue	(-)
Female	7/8/08	54	19	Cystic Ameloblastoma Fibrosis and Inflammation	(-)
Female	6/21/08	66	9	Fibrosis, Periapical Scar	(+)
Female	6/18/08	49	7/9	Periapical Granuloma/Scar Chronic inflammation	(+)
Female	6/2/08	55	4	Periapical Granuloma	(-)
Male	4/22/08	58	9	Apical Fibrosis / Scar	(-)
Female	3/19/08		8, 6	Periapical granuloma/cyst	(+)

		63		marked chronic inflammation	
Female	1/22/08	63	14	Periapical Scar (Fibrosis) with focal bacteria	(+)
Female	1/9/08	50	19	Periapical Granuloma/Cyst, acute/chronic inflammation	(-)
Male	12/5/07	45	5	Granulation tissue/Cyst, chronic inflammation	(-)
Female	12/1/07	34	8/9	Granulation tissue, marked inflammation, fibrosis	(-)
Female	12/1/07	56	12/13	Granulation tissue, partially <b>devitalized bone</b> , chronic inflammation	(+)
Female	11/9/07	68	13	Periapical Scar/Granuloma with chronic inflammation	(+)
Female	11/1/07	70	28/29	Fragments of reactive focally <b>necrotic bone</b> , fibrosis, chronic inflammation	(-)
Male	12/5/07	53	31	Periapical Granuloma/Cyst marked acute/chronic inflammation	(-)
Male	9/27/07	64	14	Radicular Cyst (Periapical) marked acute / chronic inflammation	(+)
Male	9/18/07	64	19	Periapical Abscess/Granuloma	(+)
Male	8/24/07	42	2	Periapical Granuloma/ Cyst chronic inflammation and <b>reactive bone changes</b>	(-)
Male	8/13/07	74	19	Periapical Granuloma marked acute chronic inflammation	(+)
Male	8/13/07	74	2	Periapical Granuloma marked acute chronic inflammation	(-)
Male	8/13/07	74	30	Periapical Granuloma marked acute chronic inflammation	(-)
Female	5/23/07	51	4	Periapical Granuloma/Cyst marked acute/chronic inflammation	(+)
Male	5/12/07	62	18	Periapical Granuloma marked acute/chronic inflammation	(-)
Female	5/16/07	62	<a href="#">Titan Implant 6</a>	Peri-implantitis, Granulation and Fibrosis, Chronic inflammation, <b>Reactive Bone</b>	(+)
Female	4/10/07	32	14	Periapical Granuloma/Scar, chronic inflammation	(+)
Female	3/31/07	59	2	Periapical Granuloma, marked acute/chronic inflammation	(+)
Female	2/1/07	49	29	Periapical Granuloma, marked acute/chronic inflammation	(+)
Female	7/3/06	59	<a href="#">Titan Imp #8</a>	Granulation tissue, fibrosis, Chronic inflammation	(-)
Female	5/19/06	62	4	Periapical Granuloma/Chronic infalm	(+)
Female	5/15/06	30	9&10	Periapical Abscess/Granuloma	(+)
Female	4/11/06	52	24	Apical Periodontitis/ Granulation Tissue with Chronic Inflammation.	(-)
Male	4/1/06	57	31	Periapical Granuloma/Scar— <b>Reactive Bone Changes</b> , Chronic Inflammation.	(-)
Female	2/28/06	42	31, 32	Periapical Granuloma & Cyst— <b>Reactive Bone Changes</b> —Marked Acute/Chronic Inflamm.	(-)
Female	2/23/06	42	18, 20	Periapical Granuloma/Scar Marked Chronic/Acute Inflamm— <b>Reactive Bone Changes</b> .	(-)
Female	2/15/06	42	15	Periapical Granuloma/ Scar— <b>Reactive Bone Changes</b>	(-)
Female	1/26/06	42	2	Periapical Granuloma with Chronic Inflamm. And <b>Reactive Bone Changes</b> .	(-)
Male	1/25/06	60	19	Periapical Abscess/ Granuloma & <b>Reactive Bone Changes</b>	(+)Actinomyces
Female	12/19/05	88	24,25	Granulation Tissue/ Fibrosis with acute/chronic inflamm.	(+)Actinomyces

Female	12/15/05		12	Radicular Cyst (Periapical)	(-)
Male	11/8/05	45	19	Periapical Scar	(+)Actinomyces
Female	10/11/05	83	5	Periapical Granuloma/Cyst	(-)
Female	10/10/05	57			
Female	10/10/05	62	9,10	Periapical Granuloma/Cyst	(-)
Female	8/9/05	71	Titan Implant 11,12	Peri-implant mucositis, chronic acute inflammation, inflamed granulation tissue (granuloma) <b>Reactive Bone Changes</b>	(-)
Female	7/31/05	54	15	Periapical Granuloma <b>Reactive Bone changes</b>	(-)
Female	7/26/05	64	10	Periapical Granuloma/Cyst	(-)
Female	7/24/05		19	Periapical Granuloma/Cyst	(-)
Male	7/16/05	62			
Male	7/16/05	81	5	Granuloma/Scar	(+)Actinomyces
Female	7/06/05		9,10	Periapical Granuloma/Cyst	(-)
Female	7/06/05	52		<b>Reactive bone</b>	
Male	6/27/05	74	Titan Implant 17, 18	Peri-implantitis, Chronic inflammation, Granulation tissue	(-)
Female	6/16/05		4, 5, 3	Fibrosis & Chronic Inflammation	(-)
Female	6/16/05	57			
Male	5/18/05	67	4	Periapical Granuloma/Cyst	(-)
Male	5/10/05	73	19	Fibro-Granuloma	(+)Actinomyces
Male	4/4/05	73	29	Periapical Granuloma Fibrosis, Chronic Inflammation	(+)Actionmyces
Male	4/4/05	74	Titan Implant 30, 31	Peri-implantitis, Chronic inflammation and fibrosis, hyperostotic bone	(+)Actionmyces
Male	3/21/05	54	Titan Implant 20	Peri-implantitis, Chronic acute inflammation	(+)Actionmyces
Male	3/16/05		4	Periapical Granuloma	(-)
Male	3/16/05	56			
Female	2/15/05	41	3	Radicular Cyst	(+)Actinomyces
Female	2/12/05		8,10	Periapical Granulomas	(+)Actinomyces
Female	2/12/05	61			
Male	2/07/05		6	Periapical Granuloma	(-)
Male	2/07/05	56			
Female	1/26/05		4	Periapical Granuloma	(+)Actinomyces
Female	1/26/05	69			
Female	1/24/05		14	Periapical Granuloma	(+)Actinomyces
Female	1/24/05	42			
Female	1/20/05		18	Radicular Cyst	(+)Actinomyces
Female	1/20/05	56			
Male	11/27/04		9	Chronic Inflammation, Fibrosis, Granulation tissue (granuloma)	(-)
Male	11/27/04	54			
Male	11/20/04		5	Apical Periodontitis	(-)
Male	11/20/04	56			
Female	8/31/04	51	9	Periapical Granuloma	(+)Actinomyces
Female	8/16/04	54	3	Periapical Granuloma	(-)
Female	8/16/04	54	30	Periapical Granuloma	(-)
Female	8/04/04	48	19	Periapical Abscess	(+)Actinomyces
Male	7/22/04	45	3	Radicular Cyst	(+)Actinomyces
Male	7/22/04			<b>Reactive bone</b>	
Female	7/17/04	19	19	Periapical Granuloma	(-)
Female	7/12/04	55	30	Periapical Granuloma	(-)
Male	5/03/04	50	10	Periapical Scar/Fibroma	(-)
Female	4/12/04	65	7	Radicular Cyst <b>reactive bone</b>	(+)Actinomyces
Female	1/02/04	61	30	Apical Periodontitis <b>reactive bone</b>	(+)Actinomyces
Female	1/02/04				
Male	12/23/03	55	2	Periapical Granuloma	(-)
Female	10/31/03	32	12	Periapical Granuloma/Cyst	(-)

Female	10/18/03	53	20	Periapical Granuloma/Scar	(-) <b>Biocalex Filled Endo</b>
Female	9/30/03	62	13	Periapical Granuloma/Cyst	(-)
Female	9/19/03	39	14	Aperiapical Granuloma Periapical periodontitis	(-)
Female	8/18/03	69	9	Periapical Granuloma	(-)
Male	7/30/03	44	9	Periapical Granuloma	(-)
Female	7/11/03	42	7, 8, 9, 10	Periapical Granulomas	(+)Actinomyces
Male	6/06/03	38	25	Periapical Granuloma (Chron. Api. Periodon.)	(-)
Female	6/06/03	66	18	Radicular(Periapical) Cyst	(+)Actinomyces
Male	6/04/03	75	7	<b>Devitalized Bone</b> and Fibrosis	(-)
Female	4/01/03	61	20	Apical Fibrosis	(+)Actinomyces
Female	3/18/03	37	20	Periapical Granuloma/Cyst	(+)Actinomyces
Male	3/17/03	66	9	Periapical Granuloma scar	(+)Actinomyces
Female	2/18/03	61	4	Periapical Granuloma	(+)Actinomyces
Female	2/04/03	80	9	Radicular (Periapical) Cyst	(+)Actinomyces
Male	9/11/02	50	18	Radicular (Periapical) Cyst	(-)
Female	8/08/02	73	19	Periapical Abscess/Cyst	(-)
Female	6/22/02	69	28, 29, 30	Periapical Granulomas	(-)
Female	6/17/02	53	28	Periapical Granuloma with Foreign body mat.	(-)
Male	6/15/02	75	13, 15	Radicular (Periapical) Cyst	(+) Actinomyces
Female	6/04/02	73	11	Periapical Granuloma/Cyst	(-)
Female	6/04/02	75	19	Periapical Granuloma/Scar	(-)
Female	5/22/02	65	20	Periapical Granuloma/Cyst (RBC)	(-)
Female	5/07/02	54	15	Radicular (Periapical) Cyst	(+) Actinomyces
Male	5/06/02	43	14, 30	Periapical Granulomas ( <b>Devitalized – Dead – Bone</b> )	(+) Actinomyces
Female	2/02/02	55	18	Periapical Granuloma	(-)
Male	12/03/01	61	2	Fibrosis, Granulation and Chronic Inflamm.	(-)
Male	10/30/01	43	2	Radicular Cyst and <b>Necrotic Bone</b>	(-)
Female	9/29/01	55	<a href="#">Titan Imp #30 #31</a>	Periapical Granuloma, <b>Dead Bone</b> , Chronic inflammation	(-)
Male	9/04/01	62	18	Periapical Granuloma ( <b>RBChanges</b> )	(+) Actinomyces
Female	8/31/01	54	14	Periapical Granuloma & <b>Dead Bone</b>	(-)
Male	8/27/01	51	3	Periapical Granuloma & <b>RBChanges</b>	(+) Actinomyces
Female	8/01/01	31	10	Periapical Granuloma/Cyst	(+) Actinomyces
Male	7/30/01	58	18	Periapical Abscess/Granuloma ( <b>RBChanges</b> )	(-)
Female	6/27/01	58	7, 9	Periapical Granuloma/Cyst with <b>Necrotic Bone</b>	(+) Actinomyces
Female	5/16/01	46	9	Periapical Granuloma and <b>Devitalized (Dead) Bone</b>	(+) Actinomyces
Male	4/30/01	51	4	Periapical Granuloma/Cyst	(+) Actinomyces
Female	4/19/01	31	14	Periapical Granuloma with <b>Reactive Bone changes.</b>	(-)
Female	3/20/01	47	5	Periapical Granuloma	(-)
Female	3/14/01	54	19	Periapical Granuloma/Scar	(-)
Female	3/13/01		14	Radicular (Periapical) Cyst	(+) Actinomyces

Gender	Age	Tooth	Pathology	Bacteria
	50			
Female	3/12/01	13	Periapical Granuloma/Cyst	(+) Actinomyces
	53			
Female	3/10/01	78	Periapical Granuloma Cyst Chronic inflammation <b>Devital (Dead) Bone</b>	(+) Actinomyces
Female	3/10/01	78	<b>Titanium Post #3</b> Peri-implantitis Osteitis, Chronic Inflammation granulation tissue/fibrosis <b>Devital (Dead) Bone</b>	(+) Actinomyces
Female	2/26/01	53	4 Periapical Abscess/Granuloma	(+)Actinomyces
Female	2/26/01	50	29 <b>Necrotic Bone Inflamm</b> . Granulation tissue/fibrosis	(-)
Female	2/17/01	50	3,4 Periapical Granuloma/Cyst	(+) Actinomyces
Female	6/8/99	22	<b>Titanium Implant # 7</b> Peri-implantitis, Chronic inflammation, Reactive epithelial changes parakeratosis and acanthosis <b>reactive bone</b>	(-)
Female	4/7/99	53	10 Periapical Granuloma/Scar with chronic inflammation	(-)
Female	3/1/99	33	14 Periapical Abscess & Granuloma marked acute/chronic inflammation with fibrosis	(-)
Male	3/6/96	37	19 Chronic Osteomyelitis with focal <b>Osteonecrosis</b>	(-)
Male	5/30/95	56	7,8,9,10 Marked chronic acute inflammation, <b>Reactive bone</b>	(-)
Female	5/23/95	35	8 Periapical Abscess & Granuloma marked inflammation	(-)
Male	4/29/89	31	8 Chronic Periodonal abscess Chronic inflammation and Fibrosis	(-)
Male	10/8/87	40	9 Periapical granuloma/ Chronic inflam cells infil	(-)
Female	8/1/87	32	19 Chronic Periapical Abs. Chronic Osteomyelitis	(-)
Male	5/2/87	37	24 Periodontal fibrosis, Chronic Osteomyelitis	(-)
Male	1/31/87	42	4 Periapical granuloma, Chronic osteitis	(-)
Female	12/3/86	?	14 Chronic Osteitis, dental Fibroma	(-)

**Conclusion**

It is commonplace in this year 2017 to read in our dental journals and hear our media extoll the modern advancements of dental implants as being the natural replacement for the failed root canal tooth. It seems that we go from the frying pan to the fire in this regard.

As our two tables reveal the microbiologic factor from both are the presence of actinomyces; and, the mirco-currents from dental metals in these oral tissues that may not only play a significant role in failures of implants and root canals but may migrate to other parts of the human biome and play their mischief.

We as biological dental practitioners caution the misuse of these two methods, root canals or dental implants, for treatment particularly in our youth and seniors who may have compromised immunity.

As Charalampakis notes in his presentation referenced at the start of our inquiry:

**“It is common knowledge that microorganisms are a risk factor for peri-implantitis since disease is bacterially induced... Unfortunately the bacterial role is disease pathogenesis has been underrated because no specific bacteria have been implicated in the apical migration of the ‘barrier’ epithelium, equivalent to the junctional epithelium around teeth.”**

We might now humbly suggest that there may be a specific bacterium present and is prevalent in the oral environment with significant virulence whose primary function in nature is the reclamation of dead and dying matter, including the human biome. Due to the microbiological difficulty of showing actinomyces odontolyticus or any of its family members in peri-implant tissue through testing methods in the lab, we may have a subclinical factor revealed by

this clinical research as presented. We have shown that in over 50% of the implants removed and histologically inspected that colonies of actinomyces were present associated with the pathological picture. One may not conclude that actinomyces alone is a causative agent but that, perhaps, they are one of the elements to be investigated more comprehensively.

The second equally unknown factor not looked at much at all is the implication of electrical currents in tissue surrounding metal dental implants, their corrosion products/toxins. Given the fact that body cells operate on pico-amps in normal states and that the currents generated by metal implants are in the micro-amps range, about three fold higher, this fact may give pause to our understanding of cellular destruction due to corrosion (acid base balance) and the need for immune cell phagocytosis and bacterial phagocytosis in the deep surrounding tissues of implants.

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