Actinomycotic Oral Infection (Modern Dental Implants and Root Canals)

R.S. Carlson DDS
Inventor of the Carlson Bridge®, Honolulu, Hawaii, USA

Corresponding Author: R.S. Carlson, Inventor of the Carlson Bridge®, Honolulu, Hawaii, USA. Email: ddscarlson@hawaiiante.net

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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 in know 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-
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 peri 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 Actinomyces 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 Israeli, 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 Norcardia causing Norcardiosis a similar illness as Actinomyces.

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-amps, 10-12 amperes. Tiller related in Vibrational Medicine by Gerbber1987 that currents greater than pico-amps (in the direction of nano-amps 10-9 and micro-amps 10-6) will cause cell destruction while currents smaller than pico-amps stimulate cellular growth. In our measurements of this phenomenon in titanium implants we have recorded amps -36 uA (uA = micro-amps) 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.
## Table 1. Dental Implants

| Gender | Age | Implant # | Pathology                                      | Bacteria              |
|--------|-----|-----------|------------------------------------------------|-----------------------|
| 1.     | 64  | Metal Implant #29sA -30 (with 28 DFC decay?)   | Periapical granuloma, chronic inflammation, necrotic bone | (+) Actinomyces       |
| 2.     | 56  | Metal Implant #4 (with sinus perforation)      | Fibrosis, chronic inflammation, reactive bone lesions | (-)                  |
| 3.     | 59  | Metal Implant #29/30 area                      | Periapical granuloma (peri-implantitis), acute/chronic inflammation, reactive bone | (-)                  |
| 4.     | 65  | Zirconia Implant Posts #18 and #19 area        | Periapical Granuloma with pus, marked acute/chronic inflammation with fibrosis and reactive bone | (+) Actinomyces       |
| 5.     | 63  | Zirconia Implant Post #30 and #29 area         | Periapical Granuloma, marked acute/chronic inflammation... | (-)                  |
| 6.     | 70  | Titanium Implant Posts #9                      | Peridental Fibroma / Scar, chronic inflammation, dead bone | (-)                  |
| 7.     | 76  | Titanium Implant Posts #18, #19, #20 c sA -26 and mV -265 | Peri-implantitis / Osteosis Marked acute chronic inflammation Reactive Bone | (+) Actinomyces       |
| 8.     | 53  | Implant Post #4 #5 (Titanium Metal) with -36 sA Current Density | Peri-implantitis / osteitis Chronic Inflammation Devitalized (Dead) Bone Reactive Bone | (+) Actinomyces       |
| 9.     | 72  | Titanium Implant Post #14 Area                 | Granulation Tissue/Fibrosis Maried acute/chronic Inflammation Reactive Bone | (+) Actinomyces       |
| 10.    | 50  | Titanium Implant #12 and #13                   | Periapical Granuloma (Fibrosis) with marked acute/chronic inflammations. Dead Bone reactive bone. | (-)                  |
| 11.    | 56  | Titanium Implant #6                           | Peri-implantitis, Granulation and Fibrosis, Chronic inflammation, Reactive Bone | (+) Actinomyces       |
| 12.    | 59  | Titan Imp #8                                  | Granulation tissue, fibrosis, Chronic inflammation | (-)                  |
| 13.    | 71  | Titan Implant #11, #12                       | Periaplast mucositis, chronic acute inflammation, intimated granulomas tissue(granuloma) Reactive Bone Changes | (-)                  |
| 14.    | 74  | Titan Implant #17, #18                        | Peri-implantitis, Chronic inflammation, Granulation tissue Reactive Bone | (-)                  |
| 15.    | 74  | Titan Implant #30, #31                       | Peri-implantitis, Chronic inflammation and fibrosis, hyperostotic bone, reactive bone | (+) Actinomyces       |
| 16.    | 54  | Titan Implant #20                            | Peri-implantitis, marked chronic-acute inflammation Reactive Bone | (+) Actinomyces       |
| 17.    | 55  | Titan Implant #10, #31                       | Periapical Granuloma, Dead Bone, Chronic inflammation | (-)                  |
| 18.    | 78  | Titanium Post #3                             | Periaplastitis Osteitis, Chronic Inflammation granulation tissue/fibrosis Devital (Dead) Bone | (+) Actinomyces       |
| 19.    | 22  | Titanium Implant #7                           | Peri-implantitis, Chronic inflammation, Reactive bone-epithelial changes paracarcinosis and acanthosis | (-)                  |

**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, 29 | Periapical abscess, marked chronic inflammation, necrotic bone | (+) Actinomycetes |
| Male   | 5/19/17 | 68, 18 | Periapical abscess/granuloma, marked acute/chronic inflammation, necrotic bone | (+) Actinomycetes |
| Male   | 12/1/16 | 29, 8, 9, 10 | Periapical abscess/granuloma, marked acute chronic inflammation | (+) Actinomycetes |
| Male   | 11/13/16 | 54, 13 | Periapical scar, fibrosis | (-) |
| Female | 11/11/10 | 54, 18, 19 | Radicular Cyst, granulation fibrosis with marked acute/chronic inflammation and reactive bone | (-) |
| Male   | 9/26/16 | 65, 19 | Periapical Granuloma/Cyst acute choonic inflammation, reactive bone | (+) |
| Female | 8/27/16 | 68, 19 | Periapical Granuloma Cyst, marked acute chronic inflammation, reactive bone | (+) Actinomycetes |
| Male   | 7/14/16 | 52, 3 | Radicular Periapical Cyst, acute/chronic inflammation, granulation/fibrous tissue | (+) Actinomycetes |
| Female | 7/9/16 | 55, 13 | Radicular Periapical Cyst, marked acute/chronic inflammation, massive granulation tissue and reactive bone | (+) |
| Female | 6/23/16 | 75, 20 | Radicular Periapical Cyst, granulation fibrous tissue, chronic inflammation | (-) |
| Male   | 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 chronic inflammation | (-) |
| Male   | 2/16/16 | 72, 18/19 | Radicular Cyst, granulation fibrous tissue acute/chronic inflammation | (-) |
| Female | 2/15/16 | 57, 18/19 | Fibrosis/ Reactive bone lesions | (-) |
| Female | 1/28/16 | 60, 18 | Squamous Mucosa with acute and chronic inflammation | (-) |
| Female | 1/8/16 | 60, 18 | Periapical radicular cyst, granulation tissue acute/chronic inflammation | (+) |
| Female | 1/12/15 | 52, 18 | Periapical fibrosis/scar, acute/chronic inflammation, reactive bone lesions | (-) |
| Female | 1/12/15 | 56, 18 | Metal implant #4 (with sinus perforation) - 63 uA | Fibrosis, chronic inflammation, reactive bone lesions | (-) |
| Female | 1/2/15 | 56, 29, 30, 31 | Periapical Granuloma, chronic inflammation, reactive bone lesions | (-) |
| Female | 10/24/15 | 33, 18 | Periapical Granuloma/Cyst, marked acute chronic inflammation, necrotic bone | (+) |
| Female | 10/24/15 | 33, 4.5 | Periapical Granuloma/Scar, chronic inflammation, reactive bone lesions | (-) |
| 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, | (-) |
| Gender | Date   | Age | Score | Description                                                                 |
|--------|--------|-----|-------|----------------------------------------------------------------------------|
| Female | 8/27/15| 33  | 2.3   | Necrotic bone, Periapical Granuloma/Cyst, marked acute/chronic inflammation, fibrosis, reactive bone |
| Male   | 7/31/15| 04  | 3     | Necrotic bone, Periapical Granuloma, fibrosis, marked chronic inflammation |
| Female | 7/28/15| 35  | 29    | Necrotic bone, Periapical/Radicular Cyst/Granuloma Acute/chronic inflammation, reactive epithelium, reactive bone |
| Female | 7/16/15| 46  | 15    | Necrotic bone, Periapical/Radicular Cyst/Granuloma Chronic inflammation, reactive epithelium, reactive bone |
| Female | 6/18/15| 61  | 31    | Necrotic bone, Periapical/Radicular Cyst, marked acute/chronic inflammation, reactive bone, fibrosis |
| Male   | 6/13/15| 77  | 3.4   | Necrotic bone, Periapical granuloma/cyst, marked acute/chronic inflammation, reactive bone |
| Female | 6/3/15 | 07  | 12    | Necrotic bone, Periapical granuloma, marked chronic/acute inflammation |
| Female | 5/28/15| 61  | 14    | Necrotic bone, Periapical granuloma, marked chronic/acute inflammation, reactive bone |
| Female | 5/26/15| 59  | 18/19 | Necrotic bone, Periapical Granuloma/Cyst, marked acute chronic inflammation, reactive bone |
| Female | 5/9/15 | 54  | 3     | Necrotic bone, Periapical Granuloma/Cyst, acute chronic inflammation |
| Female | 4/23/15| 64  | 29    | Necrotic bone, Periapical Granuloma/Cyst, acute/chronic inflammation |
| Female | 4/17/15| 60  | 19    | Necrotic bone, Periapical Granuloma, acute/chronic inflammation, “devitalized bone” dead bone |
| Female | 4/14/15| 61  | 2     | Necrotic bone, Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Female | 3/21/15| 73  | 10    | Necrotic bone, Periapical Granuloma, acute/chronic inflammation |
| Male   | 3/19/15| 68  | 10    | Necrotic bone, Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Male   | 3/10/15| 35  | 15    | Necrotic bone, Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Female | 2/2/15 | 60  | 19    | Necrotic bone, Periapical granuloma (pre-implantitis), acute/chronic inflammation, reactive bone |
| Male   | 1/31/15| 86  | 2     | Necrotic bone, Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Female | 1/29/15| 09  | 5, 3  | Necrotic bone, Periapical Granuloma, fibrosis, acute/chronic inflammation, reactive bone |
| Male   | 1/19/15| 27  | 11    | Necrotic bone, Periapical Granuloma, fibrosis, acute/chronic inflammation, reactive bone |
| Male   | 1/16/15| 86  | 18    | Necrotic bone, Periapical Granuloma, fibrosis, acute/chronic inflammation, reactive bone |
| Female | 1/10/15| 83  | 31    | Necrotic bone, Periapical Granuloma, fibrosis, acute/chronic inflammation |
| Male   | 1/9/15 | 63  | 9     | Necrotic bone, Periapical Granuloma, fibrosis, acute/chronic inflammation |
| Female | 1/8/15 | 71  | 7     | Necrotic bone, Periapical Granuloma, fibrosis, acute/chronic inflammation |
| Female | 12/22/14| 70  | 3     | Necrotic bone, Periapical Granuloma, fibrosis, marked acute/chronic inflammation, reactive bone |
| Male   | 12/17/14| 40  | 30    | Necrotic bone, Periapical Granuloma, fibrosis, reactive bone |
| Female | 12/17/14| 43  | 19    | Necrotic bone, Periapical Granuloma, fibrosis, reactive bone |
| Gender | Date   | Age | Diagnosis                                                                 |
|--------|--------|-----|---------------------------------------------------------------------------|
| Female | 12/7/14| 70  | Periapical Granuloma/Cyst, marked acute/chronic inflammation              |
| Female | 11/7/14| 70  | Periapical Granuloma, marked acute/chronic inflammation, reactive bone    |
| Female | 11/5/14| 73  | Radicular Cyst (Periapical) acute/chronic inflammation, fibrosis, reactive bone |
| Male   | 10/7/14| 65  | Zirconia Implant Posts #18 and #19 area Periapical Granuloma with pus, marked acute/chronic inflammation with fibrosis and reactive bone |
| Female | 10/1/14| 82  | Periapical Granuloma with pus, marked acute/chronic inflammation with fibrosis and reactive bone |
| Male   | 9/20/14| 65  | Zirconia Implant Port #30 and #29 area Periapical Granuloma, marked acute/chronic inflammation |
| Male   | 8/21/14| 70  | Titanium Implant Posts #9 Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Male   | 8/14/14| 51  | Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Female | 8/1/14 | 66  | Periapical Granuloma, acute/chronic inflammation, reactive bone |
| Male   | 8/8/14 | 70  | Periapical Granuloma, marked acute/chronic inflammation, dead bone, fibrous tissue |
| Male   | 7/28/14| 70  | Periapical Granuloma, chronic inflammation, reactive bone |
| Female | 6/20/14| 23  | Periapical Granuloma/Scar, Fibrosis, chronic inflammation with reactive bone |
| Female | 6/22/14| 77  | Periapical Granuloma/Cyst, granuloma/fibrous tissue, marked acute/chronic inflammation |
| Female | 6/22/14| 64  | Periapical Scar, chronic inflammation, reactive bone |
| Female | 6/16/14| 80  | Periapical Abscess/Granuloma, marked acute/chronic inflammation, Necrotic Bone |
| Female | 6/16/14| 80  | Periapical Abscess/Granuloma, marked acute/chronic inflammation, Necrotic Bone |
| Male   | 6/12/14| 34  | Periapical Cyst/Granuloma, marked acute/chronic inflammation Reactive Bone |
| Female | 6/5/14 | 66  | Radicular Cyst (Periapical) marked acute chronic inflammation, granuloma/fibrous tissue Osteosclerosis (dead bone) |
| Female | 5/21/14| 44  | Periapical scar/fibrosis, reactive bone |
| Female | 5/13/14| 64  | Focal Osteosclerosis, necrotic bone, reactive bone, squamous mucosa |
| Male   | 5/13/14| 34  | Periapical granuloma, chronic inflammation, fibrosis, reactive bone, degenerated bone (dead bone) |
| Female | 4/22/14| 39  | Periapical granuloma/scar, mild chronic inflammation, reactive bone |
| Female | 4/19/14| 68  | Radicular Cyst (Periapical) Cyst, granuloma/fibrous tissue with marked acute and chronic inflammation, reactive bone |
| Male   | 4/7/14 | 47  | Periapical Granuloma, Cyst, granuloma/fibrous tissue with marked acute/chronic inflammation, Dead Bone |
| Female | 4/4/14 | 64  | Radicular Periapical Cyst, granuloma/fibrous tissue, marked chronic/acute inflammation, Dead Bone |
| Female | 4/4/14 | 49  | Periapical Granuloma/Cyst, granuloma/fibrous tissue with chronic inflammation |
| Gender | Date   | Age | Lesion Description                                                                 | Notes |
|--------|--------|-----|------------------------------------------------------------------------------------|-------|
| Female | 3/21/14| 42  | Papillary Granuloma/Abscess, marked acute-chronic inflammation with fibrosis and granulation tissue, **Dead bone**, reactive bone consistent with "osteomyelitis" | (-)   |
| Male   | 3/11/14| 57  | Papillary Cyst/Granuloma, marked acute-chronic inflammation, **Reactive Bone**      | (+)   |
| Female | 2/22/14| 56  | Papillary abscess/granuloma, marked acute inflammation, Partially dead and reactive bone | (-)   |
| Male   | 2/4/14 | 70  | Cystic Granuloma marked acute-chronic inflammation, **Reactive Bone**             | (-)   |
| Female | 1/24/14| 43  | Cystic Granuloma tissue with marked inflammation, Chronic and Acute Reactive Bone   | (-)   |
| Male   | 1/14/14| 51  | Papillary scar/fibrosis, Osteonecrosis (Dead Bone) Patient has bowel cancer—this tooth #4 and two others #17 & #19 on the same meridian were root canals, CA dx 4 mo ago | (+)   |
| Male   | 1/13/14| 63  | Papillary granuloma/scar, AC Inflamm, dead dentin/entumis , numerous Actinomycyes/Candida | (±)   |
| Female | 1/11/14| 54  | Papillary granuloma, AC inflammation, **Reactive bone, fibrosis**                | (-)   |
| Female | 12/13/14| 44  | Papillary abscess-scar Reactive/Necrotic(dead) bone and fibrous tissue            | (+)   |
| Female | 11/23/13| 66  | Papillary granuloma/Scar Chronic inflammation, **Reactive Bone**                  | (-)   |
| Female | 11/11/13| 26  | Papillary granuloma (Fistula with pus) Marked AC inflammation **Reactive Bone**  | (-)   |
| Female | 10/7/13 | 53  | Papillary granuloma/scar AC Inflammation underlying fibrosis Reactive bone        | (-)   |
| Female | 9/27/13 | 76  | Titanium Implant Posts 18, 19, 20 with uA -25 and mV -265                       | (+)   |
| Female | 9/24/13 | 53  | Papillary Granuloma Scar Chronic Inflammation Devitalized (Dead) Bone            | (-)   |
| Female | 9/10/13 | 57  | Papillary Scar Chronic Inflammation Reactive Bone                               | (-)   |
| Female | 9/8/13 | 50  | Papillary Granuloma Cyst Chronic Inflammation Devitalized (Dead) Bone            | (-)   |
| Male   | 8/27/13| 63  | Papillary Abscess Granuloma Marked AC Inflammation Devitalized (Dead) Bone Reactive Bone | (-)   |
| Female | 8/19/13| 50  | Papillary Granuloma Chronic Inflammation Reactive Bone                           | (-)   |
| Female | 8/3/13 | 63  | Implant Post #4 #6 (Titanium Meal) with .364 mm Correct Density                  | (+)   |
| Female | 7/31/13| 58  | Apical Osteitis Devitalized (Dead) Bone Reactive Bone                            | (-)   |
| Female | 7/11/13| 63  | Papillary Radiating Cyst AC Inflammation                                        | (+)   |
| Male   | 6/27/13| 5   | Papillary Granuloma Cyst                                                        | (-)   |
| Date     | ID | Duration | Diagnosis                              | Notes                  |
|----------|----|----------|----------------------------------------|------------------------|
| 6/19/13  | 63| 14       | Periapical Granuloma Cyst               | Reactive Bone (+)      |
|          |   |          | Reactive Bone                          |                        |
| 6/18/13  | 56| 32       | Periapical Scar                         | Chronic Inflammation   |
|          |   |          | Reactive Bone                          | (+)                    |
| 6/6/13   | 56| 11       | Periapical Scar                         | Reactive Bone (+)      |
| 6/4/13   | 66| 31       | Radicular Cyst                          | Masked AC Inflammation|
|          |   |          | Reactive Bone                          | (-)                    |
| 4/8/13   | 40| 18       | Periapical Granuloma                    | Chronic Inflammation   |
|          |   |          | Reactive Bone                          | (-)                    |
| 5/8/13   | 50| 30       | Periapical Granuloma Chronic inflammation|                        |
| 3/30/13  | 36| 4        | Periapical Granuloma Fibroma            | Chronic Inflammation   |
| 3/28/13  | 60| 31       | Periapical Granuloma Fibroma            | Chronic Inflammation   |
|          |   |          | Reactive/ Hyperostotic Bone             | (+)                    |
| 3/3/13   | 01| 3        | Periapical Radicular Cyst               | Masked AC Inflammation|
|          |   |          | Reactive Bone                          | (+)                    |
| 3/5/13   | 68| 20       | Periapical Scar, slight inflammation    | Devital (Dead) Bone    |
| 2/23/13  | 72| 2        | Granulation Tissue/Fibrosis             | Masked AC Inflammation|
|          |   |          | Reactive Bone                          | (+)                    |
| 2/19/13  | N0| 21       | Periapical Granuloma                    | Masked Chronic Inflammation|
| 2/11/13  | 76| 19       | Periapical Scar                         | Slight Chronic Inflammation|
|          |   |          | Reactive Bone                          | (+)                    |
| 2/9/13   | 66| 8        | Periapical Granuloma Scar               | Chronic Inflammation   |
|          |   |          | Reactive Bone                          | (-)                    |
| 1/31/13  | N0| 29       | Periapical Granuloma                    | Chronic Inflammation   |
|          |   |          | Reactive Bone                          | (-)                    |
| 1/22/13  | 82| 8        | Periapical Radicular Cyst               | Masked AC Inflammation|
| 1/14/13  | 64| 14       | Periapical Cyst                         | Masked AC Inflammation|
|          |   |          | Reactive Bone                          | (+)                    |
| 12/12/12 | 56| 14       | Fibroma, Inflammation                   | Reactive Bone (+)      |
| 12/4/12  | 73| 4/5      | Inflammation and                        | Reactive Bone (-)      |
| 12/4/12  | 49| 3        | Periapical Granuloma Cyst               | Masked AC Inflammation|
|          |   |          | Reactive Bone                          | (+)                    |
| 11/21/12 | 60| 13       | Periapical Granuloma                    | AC Inflammation        |
|          |   |          | Reactive Bone                          | (+)                    |
| 11/10/12 | 46| 24/25    | Periapical Granuloma                    | AC Inflammation        |
|          |   |          | Reactive Bone                          | (-)                    |
| 11/10/12 | 46| 14       | Periapical Granuloma                    | AC Inflammation        |
|          |   |          | Reactive Bone                          | (-)                    |
| 11/6/12  | 62| 30       | Periapical Granuloma                    | Reactive Bone (+)      |
|          |   |          | Condensing Osteitis                     | (non-suppurative Osteitis) |
| 10/27/12 | 56| 8        | Periapical Granuloma Cyst               | Masked AC Inflammation|
| 10/4/12  | 19| 19       | Periapical Cements-osteous Dysplasia    | (-)                    |
|   |   | Patient ID | Sex | Date of Birth | Age | Lesion Description | Diagnosis |
|---|---|------------|-----|---------------|-----|--------------------|-----------|
| Male | 9/27/12 | 56 | 5 | Periodontal Granuloma Marked AC Inflammation | Devitalized (Dead) Bone | (-) |
| Female | 9/11/12 | 35 | 4 | Partially Devitalized Bone (Dead Bone) Marked Chronic inflammation | (+) |
| Male | 8/30/12 | 51 | 9 | Periodontal Granuloma Cyst Marked Acute Chronic Inflammation | (-) |
| Female | 8/6/12 | 60 | 19 | Chronic Osteomyelitis Dead & Reactive Bone Chronic inflammation | (-) |
| Male | 7/20/12 | 58 | 30 | Periodontal Granuloma AC Inflammation Reactive Bone | (-) |
| Male | 7/20/12 | 58 | 7/8 | Periodontal Cyst Acute Chronic Inflammation | (-) |
| Female | 5/10/12 | 77 | 30 | Periodontal Granuloma Marked AC Inflammation Reactive Bone | (+) |
| Male | 5/17/12 | 60 | 19 | Periodontal Granuloma Abscess Marked Acute Chronic Inflammation | (-) |
| Male | 5/11/12 | 31 | 30 | Periodontal Granuloma Marked AC Inflammation Reactive Bone | (-) |
| Female | 5/2/12 | 55 | 18 | Periodontal Granuloma Scar Chronic inflammation | Reactive Bone | (-) |
| Female | 4/10/12 | 51 | 20 | Periodontal Granuloma Marked Acute Chronic Inflammation | (-) |
| Female | 3/17/12 | 51 | 12 | Periodontal Scar Acute Chronic Inflammation | (-) |
| Female | 2/24/12 | 60 | 30 | Periodontal Scar Chronic Inflammation Reactive Bone | (+) |
| Female | 2/24/12 | 60 | 3 | Periodontal Granuloma Chronic inflammation Reactive Bone | (-) |
| Female | 1/3/12 | 42 | 2 | Periodontal Fibrin Cyst Marked Acute Chronic Inflammation Reactive Bone | (-) |
| Male | 8/17/11 | 40 | 8/9 | Periodontal Granuloma Marked Chronic Inflammation | (+) |
| Female | 7/20/11 | 29 | Vital #29 (PI Test 7.5) | Periodontal Granuloma Scar | (+) |
| Female | 6/30/11 | 64 | 8/10 | Periodontal Granuloma Cyst Chronic inflammation | Reactive Bone | (-) |
| Female | 5/4/11 | 31 | 4 | Periodontal Granuloma Scar Chronic inflammation | (-) |
| Female | 3/2/11 | 31 | 19 | Periodontal Granuloma Scar Granulation/Fibrous Tissue Chronic inflammation | (-) |
| Male | 11/2/10 | 98 | 3 | Periodontal Granuloma Acute Chronic Inflammation Reactive Bone | (+) |
| Male | 8/13/10 | 75 | 30 | Periodontal Granuloma Marked Acute Chronic inflammation | (+) |
| Female | 8/6/10 | 50 | Titanium Implant #12 and #13 | Periodontal Granuloma (Fibrous Tissue) with marked acute/chronic inflammation. Dead Bone, reactive bone. | (-) |
| Female | 8/4/10 | 66 | 28/29 | Periodontal Granuloma Marked Acute Chronic Inflammation Reactive Bone | (-) |
| Female | 4/23/10 | 51 | 3 | Periodontal Granuloma Acute Chronic Inflammation | (-) |
| Male | 4/15/10 | 56 | 20 | Periodontal Granuloma Scar Chronic inflammation | (-) |
| Sex  | Date   | Age | Value  | Description                                                                 |
|------|--------|-----|--------|------------------------------------------------------------------------------|
| Male | 2/24/10| 21  | 48     | Persistent Scar Chronic Inflammation                                           |
| Male | 1/19/10| 30  | 48     | Persistent Granuloma marked Acute Chronic Inflammation                        |
|     |        |     | 29/30  | Reactive Bone                                                                 |
| Female | 1/4/10 | 35  | 14/15  | Persistent Granuloma Chronic Inflammation                                    |
|     | 1/4/10 | 61  | 4      | Persistent Granuloma Scar Chronic Inflammation                               |
|     | 7/3/09 | 46  | 7      | Persistent Marked Acute Chronic Inflammation reactive bone                    |
| Female | 7/16/08| 60  | 10     | Persistent Granuloma Cyst Chronic inflammation                               |
|     | 7/7/09 | 33  | 3      | Persistent Granuloma Scar Reactive Bone                                       |
| Male | 7/2/09 | 38  | 9      | Radicular Periapical Cyst Acute Chronic Inflammation                          |
| Female | 6/10/09| 75  | 11     | Persistent Granuloma Cyst Acute Chronic Inflammation                         |
|     | 6/10/09| 69  | 9,10,11| Persistent Granuloma Cyst Reactive bone                                       |
| Male | 5/30/00| 50  | 1      | Persistent Granuloma, Marked AC Inflammation                                 |
|     | 5/27/09| 45  | 15     | Persistent Granuloma/Scar Reactive Bone                                       |
| Male | 5/20/09| 55  | 3      | Persistent Granuloma Moderate C-Inflammation                                 |
| Female | 5/15/09| 64  | 20     | Persistent Granuloma Marked AC Inflammation                                  |
| Female | 4/10/09| 38  | 12     | Persistent Granuloma Abscess Marked AC Inflammation                          |
| Female | 2/26/09| 60  | 18/10  | Persistent Granuloma with Osteonectin (dead bone)                            |
|     | 2/13/09| 63  | 3      | Persistent Granuloma Marked AC Inflammation                                  |
| Female | 12/13/08| 56  | 9/11   | Persistent Granuloma/Scar Chronic Inflammation                               |
| Female | 12/9/06| 70  | 5      | Radicular Cyst Periapical Marked AC Inflammation                             |
| Male | 12/9/08| 63  | 5      | Persistent Granuloma/Cyst Marked AC Inflammation                             |
| Female | 10/6/08| 34  | 3      | Persistent Granuloma/Cyst Chronic inflammation                               |
| Female | 10/1/08| 51  | 30     | Persistent Granuloma/Scar Reactive Bone                                       |
| Female | 9/13/08| 60  | 20/30  | Thickened partially devitalized bone and granulation tissue (granuloma)      |
| Male | 8/1/08 | 29  | 22     | Chronic inflammation/ Persistent Granuloma                                   |
| Male | 8/1/08 | 29  | 2,5    | Chronic inflammation/ Periapical Granuloma/Scar                              |
| Female | 7/11/08| 57  | 1      | Acute and Chronic inflammation with Fibrosis and Osteolization Tissue         |
| Female | 7/8/08 | 54  | 19     | Cystic Ameloblastoma Fibrosis and Inflammation                               |
| Female | 6/2/08 | 66  | 9      | Fibrosis, Periapical Scar                                                     |
| Female | 5/18/08| 49  | 7/9    | Persistent Granuloma/Scar Chronic inflammation                               |
| Female | 5/2/08 | 55  | 4      | Persistent Granuloma                                                          |
| Male  | 4/22/08| 58  | 9      | Apical Fibrosis/Scar                                                          |
| Female | 3/19/08| 58  | 8,6    | Persistent Granuloma/cyst                                                     |
| Female | 1/2/03 | 14 | Periapical Scar (Fibrosis) with focal bacteria | (+) |
| --- | --- | --- | --- | --- |
| Female | 1/2/08 | 19 | Periapical Granuloma/Cyst, acute/chronic inflammation | (-) |
| Male | 12/5/07 | 5 | Granulation tissue/Cyst, chronic inflammation | (-) |
| Female | 12/1/07 | 8/9 | Granulation tissue, marked inflammation, fibrosis | (-) |
| Female | 12/1/07 | 12/13 | Granulation tissue, partially devitalized bone, chronic inflammation | (+) |
| Female | 11/9/07 | 13 | Periapical Scar/Granuloma with chronic inflammation | (+) |
| Female | 11/1/07 | 28/29 | Fragmentation of reactive locally necrotic bone, fibrosis, chronic inflammation | (-) |
| Male | 12/5/07 | 53 | Periapical Granuloma/Cyst marked acute/chronic inflammation | (-) |
| Male | 9/27/07 | 14 | Periapical Scar/Granuloma with chronic inflammation | (+) |
| Male | 9/18/07 | 64 | Periapical Abscess/Granuloma | (-) |
| Male | 8/24/07 | 2 | Periapical Granuloma/Cyst chronic inflammation and reactive bone changes | (-) |
| Male | 8/18/07 | 19 | Periapical Granuloma marked acute chronic inflammation | (-) |
| Male | 8/13/07 | 2 | Periapical Granuloma marked acute chronic inflammation | (-) |
| Male | 8/13/07 | 30 | Periapical Granuloma marked acute chronic inflammation | (-) |
| Female | 5/23/07 | 4 | Periapical Granuloma/Cyst marked acute/chronic inflammation | (-) |
| Male | 5/12/07 | 62 | Periapical Granuloma marked acute/chronic inflammation | (-) |
| Female | 5/10/07 | 6 | Titan implant | Periapical granuloma, Granuloma and Fibrosis. Chronic inflammation, Reactive Bone | (+) |
| Female | 4/10/07 | 14 | Periapical Granuloma/Scar, chronic inflammation | (+) |
| Female | 3/31/07 | 2 | Periapical Granuloma, marked acute/chronic inflammation | (+) |
| Female | 2/1/07 | 10 | Granulation tissue, fibrosis, Chronic inflammation | (-) |
| Female | 7/4/06 | 59 | Titan imp #8 | Granulation tissue fibrosis, Chronic inflammation | (-) |
| Female | 5/18/06 | 4 | Granulation tissue, chronic inflam. | (+) |
| Female | 5/15/06 | 48 | Periapical Abscess/Granuloma | (+) |
| Female | 4/11/05 | 24 | Apical Periodontitis/ Granulomatous Tissue with Chronic Inflammation | (-) |
| Male | 4/1/06 | 31 | Periapical Granuloma/Scar — Reactive Bone Changes, Chronic Inflammation | (-) |
| Female | 2/28/06 | 31, 52 | Periapical Granuloma & Cyst — Reactive Bone Changes — Marked Acute/Chronic Inflamm. | (-) |
| Female | 2/23/06 | 14, 20 | Periapical Granuloma/Scar marked Chronic/Acute inflammation — Reactive Bone Changes. | (-) |
| Female | 2/15/05 | 15 | Periapical Granuloma/Scar — Reactive Bone Changes | (-) |
| Female | 1/26/06 | 2 | Periapical Granuloma with Chronic Inflamm. And Reactive Bone Changes. | (-) |
| Male | 1/25/06 | 19 | Periapical Abscess/ Granuloma & Reactive Bone Changes | (+) Acinomyces |
| Female | 12/19/05 | 24, 25 | Granulation Tissue/ Fibrosis with acute/chronic inflammation | (+) Acinomyces |
| Gender | Date   | Number | Age | Diagnosis                                      | Reference          |
|--------|--------|--------|-----|-----------------------------------------------|--------------------|
| Female | 12/15/05 | 45     | 12  | Radicular Cyst (Periapical)                    |                    |
| Male   | 11/8/05  | 83     | 19  | Periapical Scar                               | (+)Actinomyces     |
| Female | 10/11/05 | 57     | 5   | Periapical Granuloma/Cyst                      | (-)                |
| Female | 10/10/05 | 52     | 9  | Periapical Granuloma/Cyst                      | (-)                |
| Female | 8/9/05   | 71     | Titan Implant 11,12 | Peri-implant mucositis, chronic acute inflammation, inflamed granulation tissue(Granuloma) Reactive Bone Changes | (-)                |
| Female | 7/31/05  | 54     | 15  | Periapical Granuloma Reactive Bone Changes     | (-)                |
| Female | 7/26/05  | 64     | 10  | Periapical Granuloma/Cyst                      | (-)                |
| Female | 7/24/05  | 62     | 19  | Periapical Granuloma/Cyst                      | (-)                |
| Male   | 7/16/05  | 81     | 5   | Granuloma/Scal                               | (+)Actinomyces     |
| Female | 7/6/05   | 52     | 9,10 | Periapical Granuloma/Cyst Reactive bone       | (-)                |
| Male   | 6/27/05  | 74     | Titan Implant 17, 18 | Peri-implantitis, Chronic inflammation, Granulation tissue Reactive Bone | (-)                |
| Female | 6/16/05  | 57     | 4,5,3 Fibrosis & Chronic Inflammation         | (-)                |
| 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 | (+)Actinomyces    |
| Male   | 4/4/05   | 74     | Titan Implant 30, 31 | Peri-implantitis, Chronic inflammation and fibrosis, hyperostotic bone | (+)Actinomyces |
| Male   | 2/21/05  | 54     | Titan Implant 20 | Peri-implantitis, Chronic acute inflammation Reactive Bone | (+)Actinomyces |
| Male   | 3/16/05  | 56     | 4   | Periapical Granuloma                          | (-)                |
| Female | 2/15/05  | 41     | 3   | Radicular Cyst                                | (+)Actinomyces     |
| Female | 2/12/05  | 61     | 8,10 | Periapical Granulomas                         | (+)Actinomyces     |
| Male   | 2/7/05   | 56     | 6   | Periapical Granuloma                          | (-)                |
| Female | 2/2/05   | 69     | 4   | Periapical Granuloma                          | (+)Actinomyces     |
| Female | 1/24/05  | 42     | 14  | Periapical Granuloma                          | (+)Actinomyces     |
| Female | 1/20/05  | 56     | 18  | Radicular Cyst                                | (+)Actinomyces     |
| Male   | 11/27/04 | 54     | 9   | Chronic Inflammation, Fibrosis, Granulation tissue (granuloma) | (-)                |
| Male   | 11/20/04 | 56     | 5   | Apical Periodontitis                          | (-)                |
| 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 | 8/4/04   | 48     | 19  | Periapical Abscess                            | (-)Actinomyces     |
| Male   | 7/22/04  | 45     | 3   | Radicular Cyst Reactive bone                  | (-)Actinomyces     |
| Female | 7/17/04  | 19     | 19  | Periapical Granuloma                          | (+)                |
| Female | 7/12/04  | 19     | 30  | Periapical Granuloma                          | (-)                |
| Male   | 5/3/04   | 50     | 10  | Radicular Cyst reactive bone                  | (-)                |
| Female | 4/12/04  | 65     | 7   | Radicular Cyst reactive bone                  | (+)Actinomyces     |
| Female | 1/2/04   | 61     | 30  | Apical Periodontitis reactive bone            | (+)Actinomyces     |
| Male   | 12/23/03 | 55     | 2   | Periapical Granuloma                          | (-)                |
| Female | 10/31/03 | 32     | 12  | Periapical Granuloma/Cyst                     | (-)                |
| Diagnosis                      | Bioalex Filled Endo |
|--------------------------------|---------------------|
| Periapical Granuloma/Scar      | (-)                |
| Periapical Granuloma/Cyst      | (-)                |
| Aperiapical Granuloma          | (-)                |
| Periapical Periodontitis       | (-)                |
| Periapical Granuloma           | (-)                |
| Periapical Granulomas          | (-)                |
| Periapical Granuloma (Caron. Api. Periodon.) | (-) |
| Radicular (Periapical) Cyst    | (-)                |
| Devitalized Bone and Fibrosis  | (-)                |
| Apical Fibrosis                | (-)                |
| Periapical Granuloma/Cyst      | (-)                |
| Periapical Granuloma scar      | (-)                |
| Periapical Granuloma           | (-)                |
| Radicular (Periapical) Cyst    | (-)                |
| Radicular (Periapical) Cyst    | (-)                |
| Radicular Abcess/Cyst          | (-)                |
| Periapical Granulomas          | (-)                |
| Periapical Granuloma with Foreign body mat. | (-) |
| Radicular (Periapical) Cyst    | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Radicular (Periapical) Cyst    | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Titan Imp #30 #31              | Periapical Granuloma, Dead Bone, Chronic inflammation | (+) |
| Periapical Granuloma (RBC)     | (+) Actinomyces    |
| Periapical Granuloma & Dead Bone | (+) Actinomyces    |
| Periapical Granuloma with Reactive Bone changes | (+) Actinomyces |
| Periapical Granuloma/Cyst with Necrotic Bone | (+) Actinomyces |
| Periapical Granuloma and Devitalized (Dead) Bone | (+) Actinomyces |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
| Periapical Granuloma/Cyst      | (+) Actinomyces    |
### 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 micro-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

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| Gender | Age | Tooth | Pathology | Bacteria |
|--------|-----|-------|-----------|----------|
| Female | 3/12/01 | 53 | 13 | Periapical Granuloma/Cyst | (+) Actinomycetes |
| Female | 3/10/01 | 78 | 4 | Periapical Granuloma/Cyst, Chronic inflammation | (+) Actinomycetes |
| Female | 3/10/01 | 78 | | Periapical Granuloma, Chronic inflammation | (+) Actinomycetes |
| Female | 2/26/01 | 53 | 4 | Periapical Abscess/Granuloma | (+) Actinomycetes |
| Female | 2/20/01 | 50 | 19 | Necrotic Bone Inflammation, Granulation tissue/fibrosis | (-) |
| Female | 2/17/01 | 50 | 3,4 | Periapical Granuloma/Cyst | (+) Actinomycetes |
| Female | 5/8/99 | 22 | Tissue Implant #7 | Periapical Inflammation, Chronic inflammation | (+) Actinomycetes |
| Female | 4/7/99 | 53 | 10 | Periapical Granuloma/Scal with chronic inflammation | (-) |
| Female | 3/1/99 | 53 | 14 | Periapical Abscess & Granuloma marked acute/chronic inflammation with fibrosis | (-) |
| Male | 3/0/90 | 37 | 19 | Chronic Osteomyelitis with focal Osteonecrosis | (-) |
| Male | 5/30/95 | 56 | 7,8,9,10 | Marked chronic acute inflammation, Reactive bone | (-) |
| Female | 5/23/95 | 35 | 8 | Periapical Abscess & Granuloma marked inflammation | (-) |
| Male | 4/29/99 | 31 | 8 | Chronic Periodontal abscess Chronic inflammation and Fibrosis | (-) |
| Male | 10/8/87 | 40 | 9 | Periapical granuloma Chronic inflam cells inl | (-) |
| Female | 8/1/87 | 32 | 19 | Chronic Periapical Abs, Chronic Osteomyelitis | (-) |
| Male | 3/2/87 | 37 | 24 | Periodontal fibrosis, Chronic Osteomyelitis | (-) |
| Male | 1/31/87 | 42 | 4 | Periapical granuloma, Chronic osteitis | (-) |
| Female | 12/3/86 | 50 | 14 | Chronic Osteitis, dental Fibroma | (-) |
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.

Dr. RS Carlson graduated from the University of Michigan School of Dentistry in 1969 and completed Post Graduate training in pediatric dentistry with Strong-Carter Dental Clinic, Honolulu, Hawaii, 1970—71. He is a founder of Kokua Kalihi Valley Dental Clinic in 1973 (http://www.kkv.net/index.php/history) and volunteered from 1973 to 1980 serving low-income families and immigrant populations from the South Pacific Islands and Asia. He has maintained a private practice in Honolulu since 1971 emphasizing Bio-Logical Dentistry. He can be reached at (808) 735-0282, ddscarlson@hawaiiantel.net or carlsonbiologicaldentistry.com. Disclosure: Dr. Carlson is the inventor of the Carlson Bridge® “Winged Pontic” tooth replacement system, a noninvasive approach to replacing missing teeth, with patents issued in November 1999 and October 2001.