



## Galvanic corrosion in titanium and stainless steel implant

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### INTRODUCTION:

Corrosion is the deterioration of a structure by chemical reaction with its environment. It is a natural process that occurs because highly reactive materials want to achieve a more stable state as a compound. Galvanic corrosion occurs when two metals with significantly different electrochemical potentials have a physical or electrical contact with a common environment

### REPORT:

47 years old gentleman, left hand dominant underlying DM, HPT, HPL, history of pulmonary tuberculosis on 2019, completed treatment for 6 months antibiotic

Alleged motor vehicle accident on 2016 sustained open comminuted fracture distal end of left radius and ulna, done open reduction and cross left wrist external fixation, subsequently done open reduction locking plate of left radius (titanium) and 1/3<sup>rd</sup> tubular plate of left ulna (stainless steel) on 2016

Presented to hospital Kemaman on 7/12/2021, complaint discharge over previous operative wound site for 2 days associated with swelling and left forearm pain for 1 week and no fever

Xray: loosening of screw and prolonged screw fixation noted at 1/3<sup>rd</sup> tubular plating, no osteomyelitic changes.

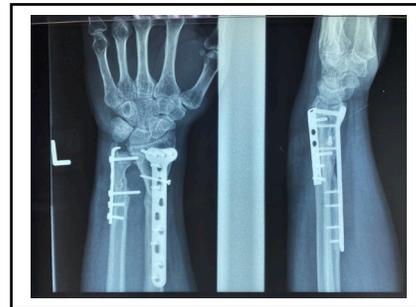
Septic parameter: total white cell 12.8  
Esr: 5, CRP: 3.65

Done removal of implant of left radius and ulna on 8/12/2021. Intraoperative noted united fracture over left radius and ulna, loosening of screw of left ulna 1/3<sup>rd</sup> tubular plate. no pus or biofilm. sinus over left ulna debrided.

Corrosion can cause aseptic loosening of implant [1] Galvanic corrosion occurs when metals with different electrochemical potential located nearby or in an electrolytic solution. Mixing implant of different metal classes is

worried to cause galvanic corrosion. literature review suggested mixing stainless steel and titanium alloy as implant does not cause galvanic corrosion. However, there's insufficient in vivo data to support this point, requiring more research attention [2]. study also shows mixing implants with differing metallic compositions the treatment of fractures of same bone does not affect bone healing [3]

### Figure 1: xray before removal of implant



### Figure 2: xray after removal of implant



### CONCLUSION:

There's lack of in vivo study to suggest mixing different metal classes implant is clinically safe.

### REFERENCES:

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3. Acevedo, D., Loy, B. N., Lee, B., Omid, R., & Itamura, J. (2013). Mixing implants of differing metallic composition in the treatment of upper-extremity fractures. *Orthopedics*, 36(9). <https://doi.org/10.3928/01477447-20130821-21>