

# Promotion of Cells to Close Gaps and Encourage Cell Coverage, by RFGD treatment

Ali, H.; Baier, R.; Dziak, R.; Andreana, S.

School of Dental Medicine, University at Buffalo, Buffalo, NY, USA

## BACKGROUND

It has recently been observed that Radio Frequency Glow Discharge Treatment (RFGDT) of dental materials temporary or permanent) encourages more adhesive and abundant cell growth to implanted materials and may indirectly promote increased cellular activity even at a distance from the specimens. This phenomenon could be applied to clinical benefit by promotion of gapped cell growth towards and to the RFGDT-material and thereby prevent, or at least decrease, the incidence of peri-implantitis.

## HYPOTHESIS

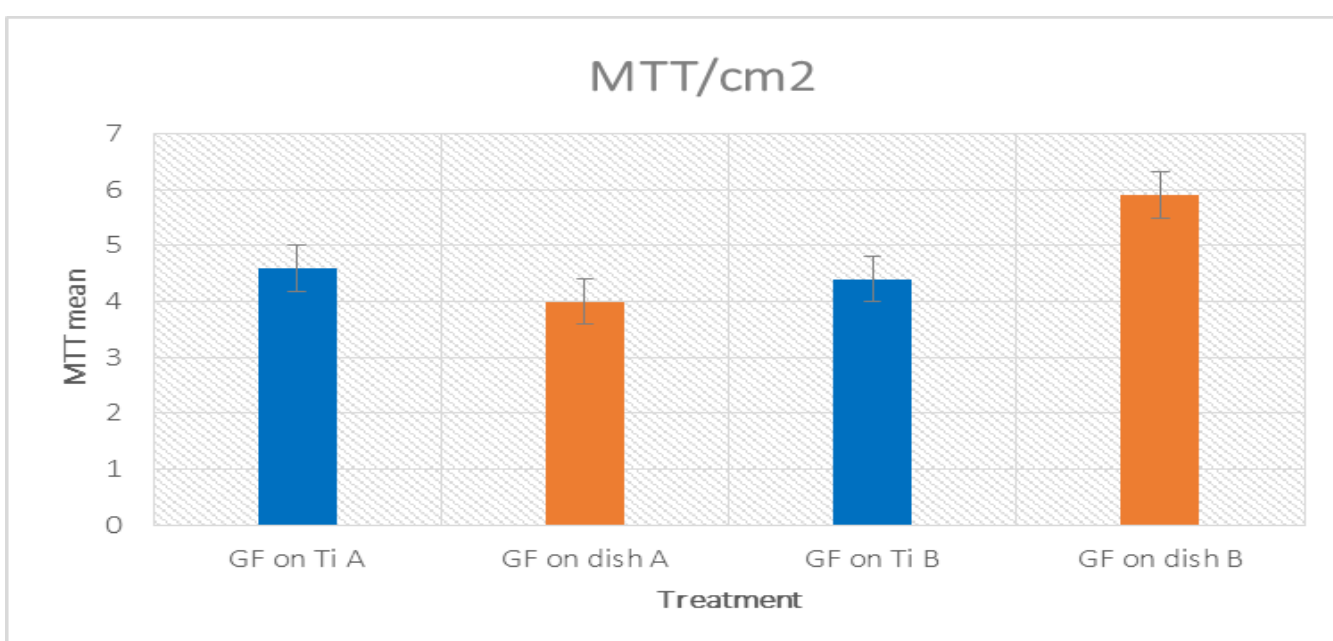
Extra cleaning of dental implant materials (cpTi) with RFGDT for 3 min. will promote Human Gingival Fibroblasts (HGFs), even at distance, to proliferate & attach to the surface of the implant materials.

## MATERIALS AND METHODS

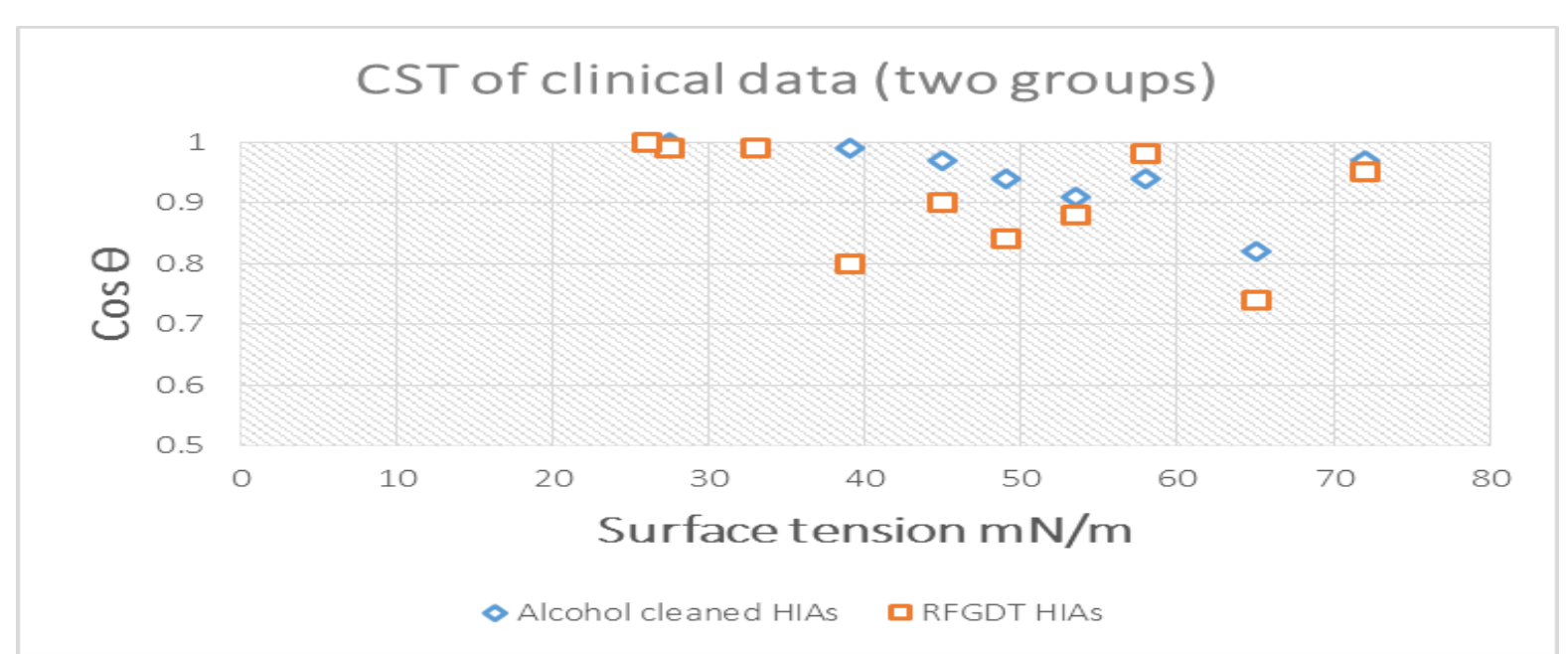
The *in vitro* specimens (cpTi foil) were divided into two groups. The groups were [1] finished and polished followed by ultrasonic cleaning in 95% methanol for 5 minutes and [2] extra cleaning by RFGDT for 3 minutes. Specimens of each group were separately placed into cell culture with HGFs, after which MTT Assay was done to determine viability of cells at distance from the specimens. Light microscopy, along with ImageJ Analysis, were used to inspect for cell shapes, densities and degrees of spreading on the tissue culture polystyrene dishes adjacent to removed test specimens. *Concurrent clinical data*, in accord with an approved IRB protocol (healing implant abutments (HIAs), cleaned in two different ways as designed in the in-vitro part of this study), were screwed in patients' mouths for 8 -14 weeks, and then retrieved from the patients' mouths for laboratory characterization. The clinical abutment specimens' (HIAs) surface layers were characterized by Critical Surface Tension (CST) determination, Scanning Electron Microscopy (SEM) and Multiple Attenuated Internal Reflection Infrared Spectroscopy (MAIR-IR). Also, photographic documentation for HIAs' soft tissue area was done for each subject.

## RESULTS

### in vitro results

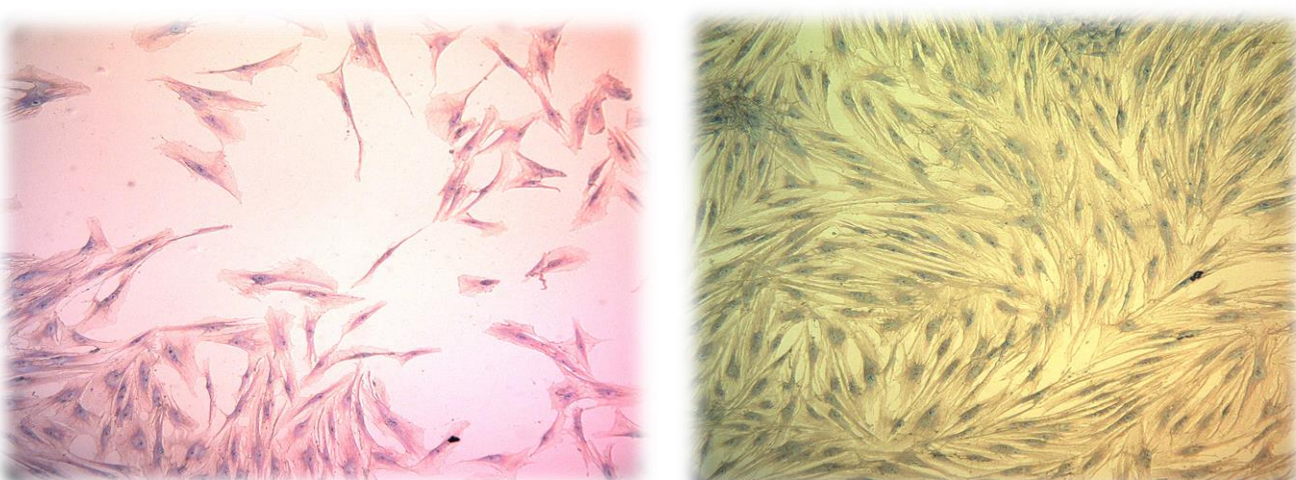


### In vivo results

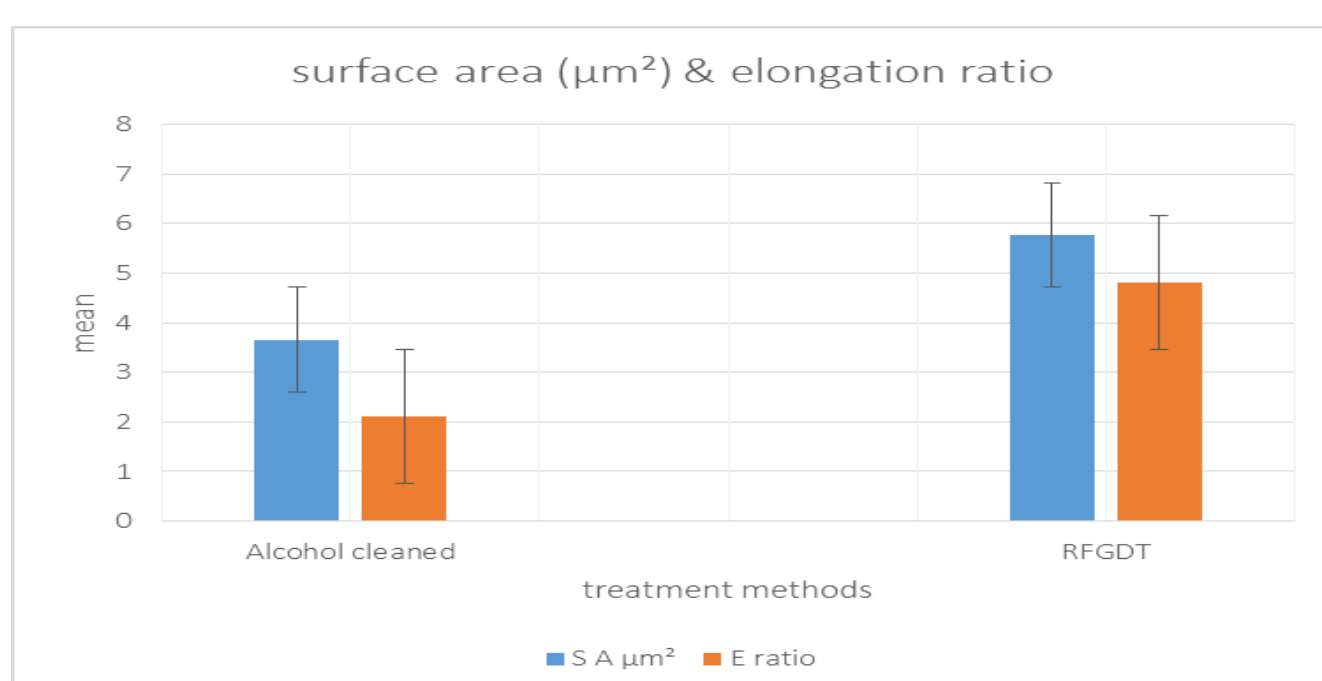
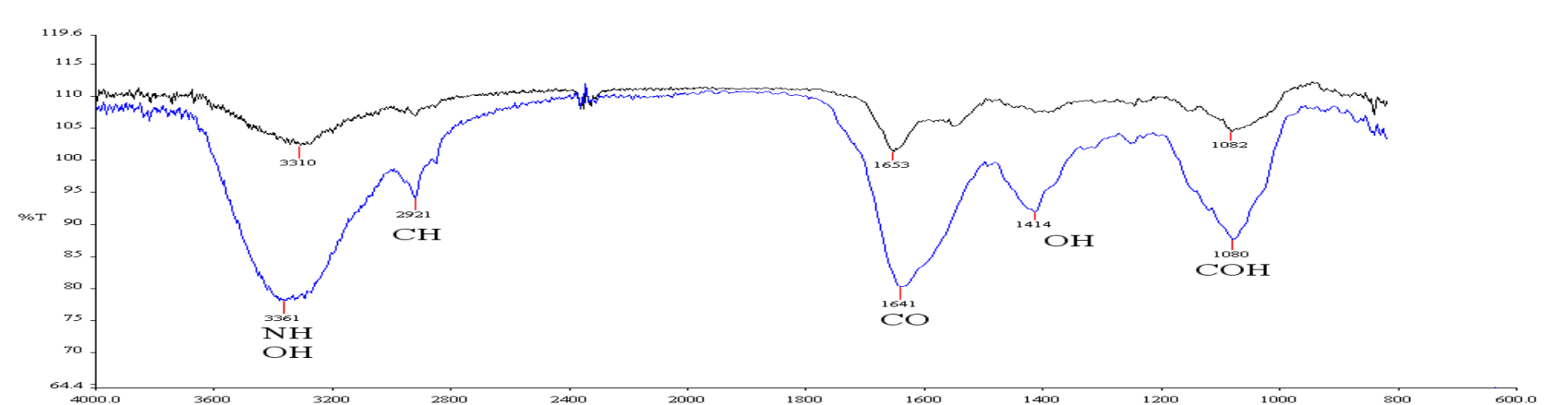


Alcohol cleaned Ti /HGFs

RFGDT Ti /HGFs

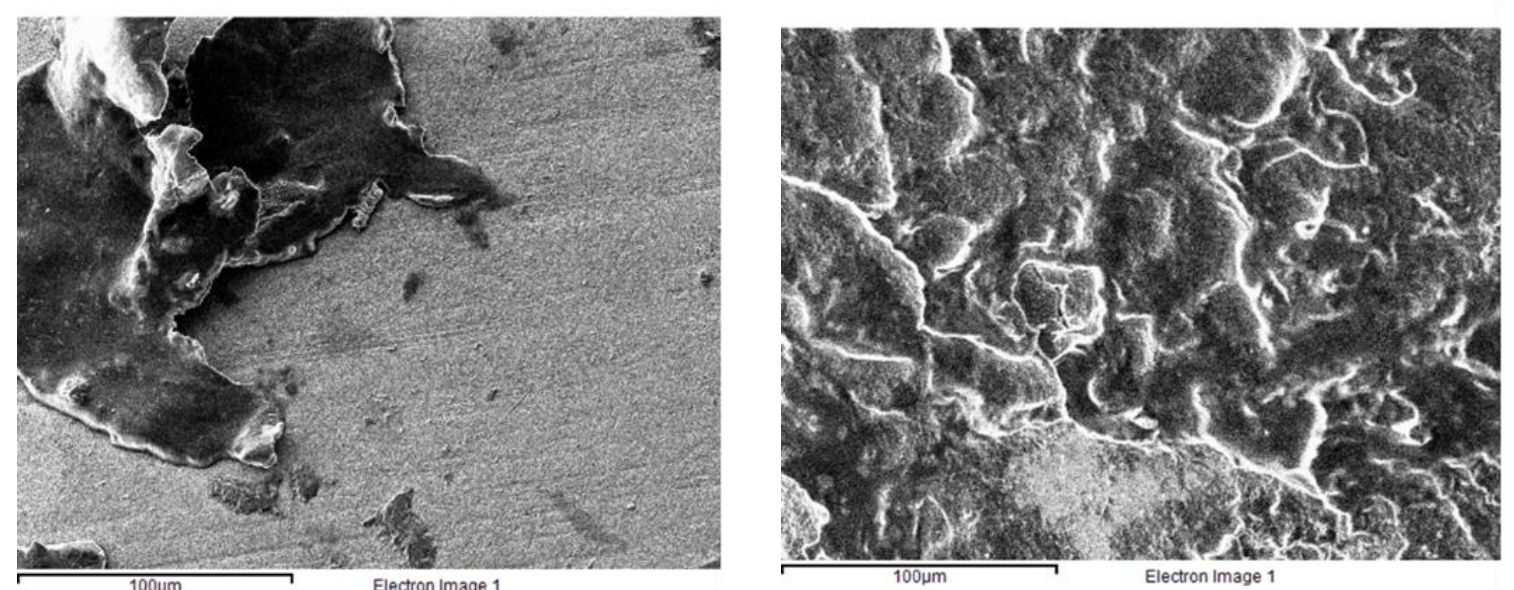


MAIR-IR for retrieved HIAs' extracts



SEM for alcohol cleaned HIA

SEM for RFGDT HIA



## CONCLUSIONS

RFGDT improves:

- Distant cells spreading & attachment
- Metabolic activity
- Marginal integrity

➤ Our newly proposed cleaning protocol demonstrates beneficial effect on the distant cells. The RFGDT recommended as a cleaning and sterilizing standard of care for dental implants

## REFERENCES

- 1- Ali, Rasha. Improvement of marginal integrity around Titanium Alloy and Yttrium-Stabilized Zirconia dental implant abutments. State University of New York at Buffalo. 2013. 9781267945648.
- 2- Alnoury, Arwa. Evaluation of gingival fibroblast response to Radiofrequency Glow Discharge treated (RFGDT) resin composite and PMMA abutment surfaces. State University of New York at Buffalo. 2013. 1539790. Ann Arbor 9781303159046
- 3- Neunzehn, J., Lttenberg, B., & Wiesmann, H. (2012). Investigation of biomaterials by human epithelial gingival cells: an in vitro study. Head & Face Medicine, 8(1), 35-45. doi:10.1186/1746-160X-8-35

## ACKNOWLEDGMENTS

1. Co- Investigator, Dr. Nam, for patients treatment.
2. MESR, Libyan Government, for funding the research.
3. Committee members.

Insert Picture Here

Abstract #