Our line of research tries to rescue out-of-date dental implants and return them for suitable patient placement. The two main goals are re-sterilization, and optimization of surface properties. Expired dental implants were divided into three groups of 9 implants each. The implants differed in terms of surface roughness. Two groups were Hydrogen Peroxide Gas Plasma (H₂O₂ GP) treated MK-III (smooth surfaced implants), and MK-III TiUnite (rough surfaced implants). Third group was as received MK-II samples. The samples were tested for sterility and also test by MTT assay after cell culture with Human Osteoblast. Furthermore, surface analysis by Scanning Electron Microscopy (SEM) and Energy Dispersive X-Ray Spectroscopy (EDS) were conducted. Results showed that implants containing wells were higher in terms of cells’ activity than control cell group. Also, sterilization testing revealed that implants were sterile after (H₂O₂ GP) treatment. In Conclusion our results showed that out-of-date dental implants allow for active cells’ growth and proliferation and at the same time, the broth culture media did not show any bacterial growth.

**INTRODUCTION**
Commerically Pure Titanium (cpTi) dental implant placement become common activity in the dental clinics. In spite of increasing demand for implantation in patients, many dental implants pass their expiration dates on the bench before reaching their intended use. The main challenge is to select the suitable sterilization modality that do not affect implant’s surface properties.

**MATERIALS and METHODS**
**Materials:** used in this study were 26 implants from NobelBiocare. However, they were either MK-II [smooth surface] or MK-III TiUnite [rough surface] implants. They were treated as follows: 1)MK-II Gas Plasma in H₂O₂ for 25 minutes for the whole cycle, 2)MK-II TiUnite Gas Plasma in H₂O₂, and 3)As received MK-II samples.

**Hydrogen Peroxide Gas Plasma:** 50% Hydrogen peroxide liquid introduced into Harrick device to produce H₂O₂ vapor. **STERRAD®** [J&J, Advanced Sterilizations Products (ASP), FDA approved technique] quarter sterilization cycle was followed in this treatment modality.

**Sterilization tests:** Implants in BHI broth media were incubated for at least 24 hrs in 37°C and results were obtained by visual inspection and confirmed by agar plate cultures.

**MTT assay:** results were collected after 72 hrs of incubation of cells.

**SEM and EDS analysis:** SEM pictures after cell fixation and dehydration collected, and also EDS spectra were recorded for each samples.

**Differential Interference Contrast Light Microscopy:** pictures also obtained after cell fixation and dehydration steps.

**RESULTS**

**MTT-Assay:** H₂O₂ GP treated groups [smooth and rough surface] and as received were higher in terms of cells’ activity than control cell group

**Sterilization test:** H₂O₂ GP treated groups did not show any bacterial growth; however, as received implants did remain also sterile. (not all implants were tested for their sterility)

**SEM & EDS Analysis:** It shows that MK-II implant surface is cpTi surface and apparently smooth, while MK-III TiUnite surface is rough and contain phosphorus due to the acid etching step during manufacturing steps.

**REFERENCES**
(4) http://www.harrickplasma.com/

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