A COMPARATIVE EVALUATION OF CHITOSAN HYDROGEL AND CONCENTRATED GROWTH FACTOR ON ALVEOLAR BONE HEALING - A RANDOMISED CLINICAL TRIAL

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Introduction

Bony defects cause severe aesthetic or functional problems; although bone has good healing capacity, it lacks regeneration potential. The use of bone grafts or substitutes promote healing and regeneration. Chitosan, a natural polymer, is biodegradable, biocompatible, and helps in bone regeneration.

Aim

To evaluate and compare the effect of chitosan hydrogel and concentrated growth factor (CGF) on alveolar bone healing after third molar extractions.

Materials and Methods

A randomised split mouth design was applied

16 Subjects with bilaterally impacted mandibular third molars

Study Setting: OPD of **K.L.E Society's Institute of Dental Sciences, Bangalore.**

Chitosan Hydrogel (3% with PLGA & Hydroxyapatite)

Concentrated Growth Factor (10ml blood centrifuged 3000 RPM for 12 minutes)

After surgical extraction, chitosan hydrogel was placed on one side and CGF on the other side of the same subject.

Wound closure using interrupted sutures and standard post-operative instructions was given

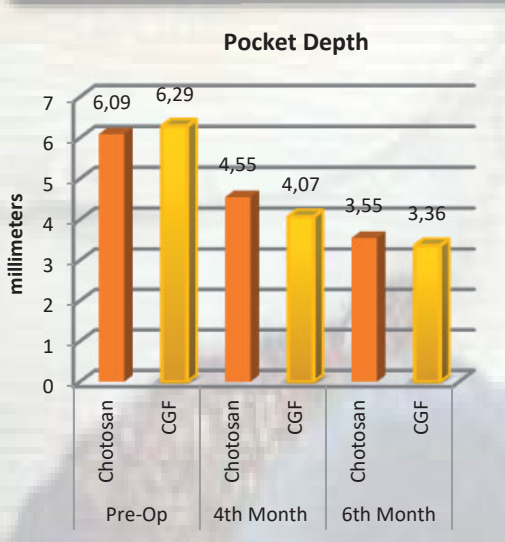
Evaluation

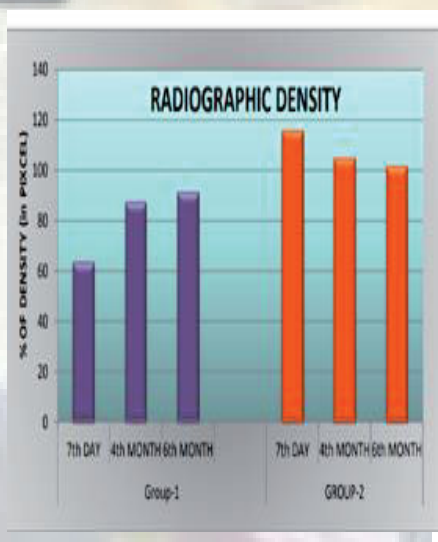
Clinical – pain, edema, mouth opening, pocket depth

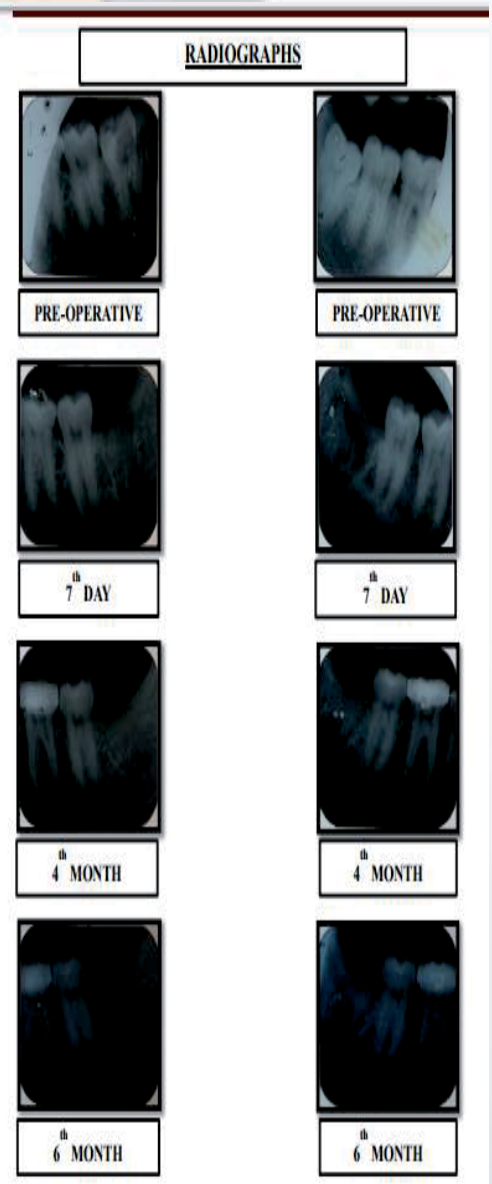
Radiological – bone density using HLImage++ v PCM 18.0.0..c Software

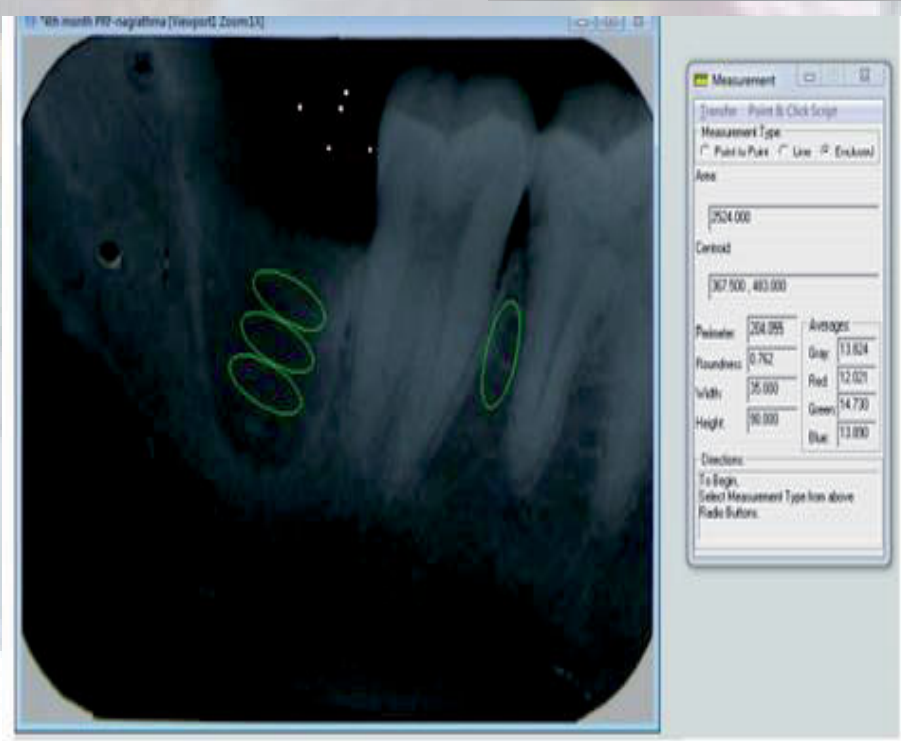
Examinations: 1 week, 4 months, and 6 months

Results









Discussion

- Pain, swelling, and mouth opening reduced significantly by the seventh day.
- Bony sockets with chitosan hydrogel experienced statistically significantly less pain, swelling, and mouth opening (Simon et al), Kedarnath et al, Olufemi K et al.).
- Probing depth – Both Chitosan and CGF played a vital role in PD reduction, showing significant changes at the 4th and sixth month. However, there was no statistically significant difference between the groups (Anil kumar et al., Thorat et al.).
- There was a statistically significant increase in percentage of bone density over a period of 6 months compared to CGF ($p<0.01$). (Paired t test)

Conclusion

Study results indicate that chitosan and CGF could be successfully used for socket grafting in dentistry, but the results obtained with chitosan in bone regeneration were significantly better than the CGF. Hence, chitosan may be considered in bony defects where long term regeneration is a concern.

Limitations: Based on the results of the present clinical investigations, further histo-morphometric analysis and long term study with large samples are warranted.

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Scope

Chitosan is believed to be magic natural polymer and has multiple applications in the biomedical field due to its efficient biological properties. Considering the study results, chitosan can be used as a bone-regenerative graft material. Along with the biocomposites and nanofillers, it will yield the osteogenic and osteo-conductive nature of the bone.

References

- Effects of chitosan on dental bone repair .F. Ezoddini-Ardakan et al. Health 2011;3(4): 200-205.
- Simon D, Pezzetti F, Geetha V, Naik BR. Potential for osseous regeneration of PRP – A comparative studt in mandibular third molar. Indian J Dent Res 2004;15(4):133-6.