

Original Article

Tissues response and bone-forming capacity of zinc oxide–eugenol sealer following the addition of nanohydroxyapatite-tyrosine amino acid: An *in vivo* animal study

Abstract

Introduction: The zinc oxide–eugenol (ZOE) sealer is used till now in many private dental clinics although many sealers have been developed. The current study aimed to compare the biocompatibility and remineralizing capacity of ZOE sealer following the addition of nanohydroxyapatite-tyrosine amino acid.

Materials and Methods: Twenty rabbits were used in this investigation, and they were divided into four groups based on the test observation period (3, 7, 21, and 28 days) following surgical implantation. General anesthesia was given for each rabbit with a subcutaneous incision of about $1\text{ cm} \pm 0.5\text{ cm}$ made along the symphyseal area of the mandible of each rabbit. Each rabbit had four bone cavities generated in the interdental space of the lower jaw between the central and molar teeth, with one longitudinal subcutaneous incision. The ZOE sealers were mixed and directly inserted within the cavities as follows: ZOE alone on the central area of the right side of the jaw (Group A), 10% nHAp and Tyrosine mixed ZOE at the molar area (Group B), empty cavity (–ve control) located at the central area of the left side of the jaw (Group C) and 20%/nHAp and Tyrosine mixed ZOE located at the molar area on the left side of the jaw (Group D). Animals were scarified and bone biopsy samples from the tested parts were collected. Histological analysis was performed using a low-power light microscope and immunohistochemistry using runt-related transcription factor 2 (Runx2) antibody. Data were statistically analyzed utilizing the SPSS software. One-way analysis of variance was used and the *post hoc* test Duncan's test was utilized to measure the significance among various groups at $P \leq 0.01$.

Results: The inflammatory process decreased over time for all experimental groups, associated with an increase in granulation tissue formation which was gradually decreasing over time to permit an increase in new blood vessels and new bone formation for all experimental groups that increased with time. Group D displayed the highest levels of new bone formation. Runx2 antibody expression declined progressively, particularly in Group D on 28 d

Conclusion: Superior new bone formation and biocompatible properties were demonstrated by the 20% nHAp and tyrosine mixed ZOE sealer