

ABSTRACT

An experimental study on a new formulation of sealer had been carried out. The substances required were available and generally used in the sealer making. They were binding and were mutually producing positive effects. So far, no report showed that these substances were carcinogen or prohibited. The compounds employed consisted of Zinc Oxide, Resorcin, Eugenol, Glycerin and Hydrochloride acid; thus, the new seal formulation was called OREGA. The OREGA sealer was then compared with the ordinary ones, i.e. the N_2 and Z_nOC_hKM in its (1) biocompatibility, (2) setting time, (3) hardness and (4) apical seal. In addition to the type of sealers; temperature and storage time were other factors that effected the binding variables.

The objective of the research was to analyze the biocompatibility, setting time, hardness and apical seal of the OREGA, N_2 and Z_nOC_hKM sealers.

Tissue culture technique was applied in the biocompatibility test. There were 8 groups based on temperature and storage time. Each group of sealers contained 40 ml of 7.83×10^5 of fibroblast cells of BHK-21 and 360 ml Eagle media which were distributed into 40 petri dish that were prepared for the test. Thus, 10 petri dish, respectively, was applied to test the OREGA, N_2 and Z_nOC_hKM sealers as well as the sealer of the control group. After being incubated for 24 hours, the fibroblast cells were calculated by using a hemositometer, afterwards the percentage of the living cells were calculated.

When carrying out the setting time test; there were 8 groups based on temperature and storage time of the OREGA and N_2 sealer components. Each group was given similar treatment; the OREGA sealers were placed into plastic rings on glass plates. The hardness time was calculated in seconds by using the Gillmore needle. This method was conducted 10 times to test the setting time of the OREGA sealer, the method was also applied to the N_2 sealer.

The hardness test was divided into 8 groups based on the temperature and storage time of the OREGA and N_2 sealer components. Each group obtained equal treatment, the OREGA sealers were placed into plastic rings on glass plates until they were hardened, then the sealers were taken out of the plastic rings and calculated with a hardness tester. The test conducted to examine the hardness of both the OREGA and N_2 sealers were carried out 10 times respectively.

The apical seal test was divided into 8 groups based on the temperature and storage time of the OREGA, N_2 and Z_nOC_hKM sealer components. Each group was given similar treatment, i.e. the OREGA sealers were placed into the root canals in the vertical condensation technique. Except for the foramen apical, the root canals were covered with wax. These were soaked in methylene blue for two weeks. Later, they were uncovered and cut into two in mesio distal direction. The methylene blue color substances permeated into the root canals were calculated by using a traveling microscope. The parameter applied was methylene blue permeability. The apical sealer test was conducted 10 times, respectively, for the OREGA, N_2 and Z_nOC_hKM sealers.

The results of the research were as follows:

1. There were significant differences of biocompatibility of the OREGA sealer against the N_2 and Z_nOC_hKM sealers and there were significant differences of the storage time of the OREGA sealer compared to the N_2 and Z_nOC_hKM sealers against the biocompatibility ($p < 0.05$).
2. There were significant differences of the setting time of the OREGA sealer compared to the N_2 sealer ($p < 0.05$).
3. There were significant differences of the hardness of the OREGA sealer compared to the N_2 sealer and there were significant differences of temperature and the storage time of the OREGA sealer compared to the N_2 sealer against the hardness ($p < 0.05$).
4. There were significant differences of apical seal of the OREGA sealer compared to the N_2 and Z_nOC_hKM sealers; and there were significant differences of the temperature storage of the OREGA sealer compared to the N_2 and Z_nOC_hKM sealers against the apical seal ($p < 0.05$).

Keywords: New formulation, biocompatibility, setting time, hardness, apical seal.