ABSTRACT

AIM:

The aim of this study was to estimate the changes in external root surface temperature following final irrigation with cold saline at 2.5°C in the root canal of extracted mandibular premolars (invitro) and thereof to evaluate the effect of this temperature reduction, by using 2.5°C cold saline solution as the final irrigant, on postendodontic pain after single-visit root canal treatment (invivo).

MATERIALS AND METHODS:

20 extracted mandibular premolars were selected and endodontic treatment initiated. Access opening was carried out with a size 4 round bur and working length determined. Canal instrumented upto Protaper Next X3. Instrumentation was accompanied with copious irrigation of saline, 3 % sodium hypochlorite, and 17% EDTA. The samples were mounted on a block and the apical 4 mm of the external root surface was connected to a digital thermometer via Roh thermocouple and initial temperature recorded. Control irrigation with saline at room temperature was done for 5 mins with microcannula of Endovac irrigation system. The change in temperature was recorded. This was followed by experimental irrigation with saline at 2.5°C with Endovac. The changes in temperature on the external root surface were recorded. Values tabulated and statistically analysed using repeated measures ANOVA with Bonferroni correction.
Following this, an invivo study approved by the Institutional Review Board on 40 patients with acute irreversible pulpitis in mandibular premolars was conducted. All patients were asked to record their preoperative pain levels on Heft Parker Visual Analogue Scale. Endodontic treatment was carried out and canals were instrumented upto Protaper Next X3, accompanied with copious irrigation of saline, 3 % sodium hypochlorite, and 17% EDTA. 40 patients were divided into 2 groups- 20 patients as control group (final irrigation with saline at room temperature) and 20 patients as experimental group (final irrigation with saline at 2.5°C). Irrigation was performed with Endovac irrigation system. Obturation was carried out with gutta percha and zinc oxide eugenol sealer. Post operative pain levels were recorded at 6, 12, 24, 48 hours, 4 days and 7 days. Values tabulated and statistically analysed using Chi square test and ANOVA.

RESULTS

Invitro analysis revealed a statistically significant reduction in external root surface temperature upto 9° C following use of cold saline solution as final irrigant in extracted mandibular premolars. The invivo evaluation on intensity of post operative pain revealed a statistically significant difference at 6 hours (p-0.007), 12 hours(p-0.006), 24 hours(p-0.003), 48 hours(p-0.002) and 4 days(p-0.02). There was no statistically significant difference at 7 days post operative pain levels (p-0.5)
CONCLUSION

It was concluded that the use of cold saline solution for final irrigation reduced the external root surface temperature by 9° C in extracted teeth. When this cold saline at 2.5° C is used as final irrigant prior to root canal obturation, it probably lowers the inflammatory reaction around the external root surface. This in turn reduces the post operative pain following root canal treatment and would eliminate the need for analgesics.

Key words: cold saline, endovac irrigation system, microcannula, post operative pain, Heft Parker Visual Analogue scale.