

RP2

S. Lottanti*, T.T. Taubock & M. Zehnder

Preventive Dentistry, Periodontology and Cariology, University of Zurich, Zurich, Switzerland

Intracanal temperature and real-time shrinkage of thermoplasticized gutta-percha

Aim To measure the temperature change in human root canals when thermoplasticized gutta-percha was injected using a heat gun. Based on this data, the real-time linear shrinkage of gutta-percha was determined.

Methodology Fully developed, extracted mandibular premolars ($n = 8$) were used. Root canals were instrumented, the apices opened, and micrometric thermocouples were sealed into the canal space from the apex, reaching 3–4 mm into the root canals. The roots were then placed in a water bath of 37°C.

Canals were filled with heated gutta-percha using an endodontic filling device (Obtura II) set to 200°C. Temperature changes were measured in real-time using a data logger with an infrared sensor. Linear shrinkage of gutta-percha specimens from 60 to 37°C was then measured in a modified polymerisation shrinkage device with an infrared sensor at an ambient temperature of 37°C.

Results The thermoplasticized gutta-percha temperature in the canal was $61 \pm 2^\circ\text{C}$. It reached body temperature in 84 ± 28 s. The temperature drop from 60 to 37°C in the testing device for linear shrinkage took 105 ± 45 s. The mean linear shrinkage during that time was $0.9 \pm 0.2\%$, and reached $1.1 \pm 0.1\%$ after 5 min.

Conclusions The basic data presented here have never been evaluated in real time. Gutta-percha shrinks quickly upon cooling. It remains to be seen whether current compaction techniques or sealers can compensate for this phenomenon.