

Comparison of Gentlefile with Protaper universal and Revo-S file systems

Rotations to fracture

When comparing the different file systems we found that the GF needed significantly more rotations to fracture when compared to the other systems. No significant difference was found when comparing the PT and the RS systems. ($P < 0.001$) (Figure 1)

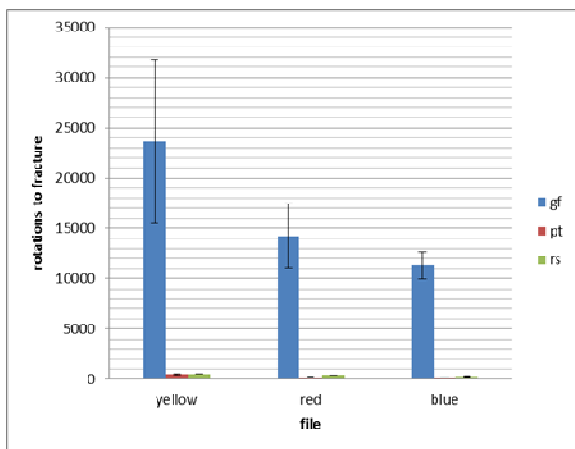


Fig.1: The number of rotations leading to fracture of the different file types inside 90° simulated canals: Gentlefile. ProTaper (PT) X1 (yellow), X2 (red) and X3 (blue). Revo-S (RS) SC2 (yellow), SC3 (red) and AS30

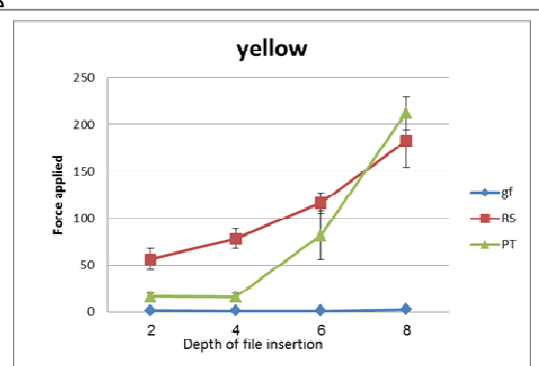
When comparing the different files within the GF system we found that the number of rotations needed in order to break the yellow GF was significantly higher than the red and blue GF ($P < 0.01$ and $P < 0.001$ respectively). No significant difference was found between red and blue GF.

Vertical force

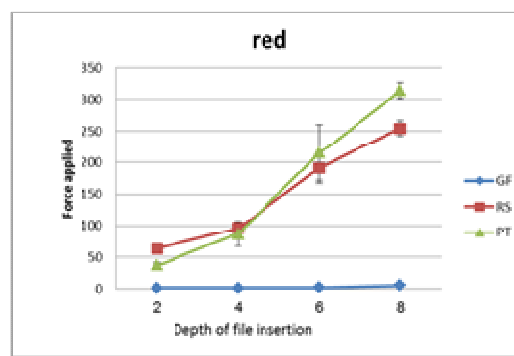
The analysis showed a highly significant difference ($p < 0.001$) between all 3 files, between all three systems as well as differences derived from the four sizes. All the interactions were also highly significant ($p < 0.001$) (Figure 3).

When comparing only two systems (GF and RS), we found the same highly significant differences ($p < 0.001$). When comparing two systems (GF and PT), we found the same highly significant differences ($p < 0.001$). However, when comparing two systems (RS and PT), the difference was significant at the 0.01 level.

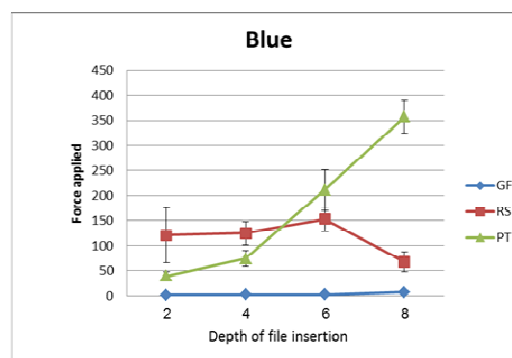
Fig.3 Vertical force



The force applied by the different file types as measured by the analytic scale at 2,4,6 and 8 mm from the beginning of the curvature. The measurement was done in a 60° simulated curved canal. Gentlefile (gf) yellow. ProTaper (PT) X1. RevoS (RS) SC2.



The force applied by the different file types as measured by the analytic scale at 2,4,6 and 8 mm from the beginning of the curvature. The measurement was done in a 60° simulated curved canal. Gentlefile (gf) red. ProTaper (PT) X2. Revo-S (RS) SC3.



The force applied by the different file types as measured by the analytic scale at 2,4,6 and 8 mm from the beginning of the curvature. The measurement was done in a 60° simulated curved canal. Gentlefile (gf) blue. ProTaper (PT) X2. Revo-S (RS) SC3.

The results show : that the stainless steel Gentlefile generated far less forces on the canal when compared to the NiTi files. Due to this fact it is conceivable to assume that using the Gentlefile in curved canals may result in less damage to dentin of the root canal wall.

Conclusions

This study showed that Gentlefile system had better mechanical properties when compared to ProTaper-next and - Revo-S. Further studies are needed in order to assess the clinical meaning of this findings.