

Nickel-Titanium Endodontic Instruments: The Evolution

Authors : Fadwa Chtioui

Abstract : The field of endodontics has witnessed constant advancements in treatment methods and instrument design, particularly for nickel-titanium (NiTi) files. Despite these developments, it remains crucial for clinicians to have a thorough understanding of their characteristics and behavior to choose the appropriate instruments for different clinical and anatomical situations. **Research Aim:** The aim of this work is to study and discuss the impact of heat treatment developments on the properties of endodontic NiTi files, with the ultimate goal of providing ways to adapt these files to the anatomical features of dental roots. **Methodology:** This study involves both clinical cases and extensive bibliographic research. **Findings:** The study highlights the importance of heat treatment in the design and manufacture of NiTi files, as it significantly affects their physical and mechanical properties. It also provides insights into the ways in which NiTi files can be adapted to the complex geometries of dental roots for more effective endodontic treatments. **Theoretical Importance:** Theoretical implications of this study include a better understanding of the relationship between heat treatment and the properties of NiTi files, leading to improvements in both their manufacturing methods and clinical applications. **Data Collection and Analysis Procedures:** The data for this study was collected through clinical cases and an extensive review of relevant literature. Analysis was performed through qualitative and quantitative methods, examining the impact of heat treatment on the physical and mechanical properties of NiTi files. **Questions Addressed:** This study aims to answer questions concerning the properties of NiTi files and the impact of heat treatment on their behavior. It also seeks to examine ways in which these files can be adapted to complex dental root geometries for more effective endodontic treatments. **Conclusion:** In conclusion, this study emphasizes the importance of heat treatment in the design and manufacture of NiTi files, as it significantly impacts their physical and mechanical properties. Further research is necessary to explore additional methods for adapting NiTi files to the unique anatomies of dental roots to improve endodontic treatments further. Ultimately, this study provides valuable insights into the continued evolution of endodontic treatment and instrument design.

Keywords : endodontic files, nickel-titanium, tooth anatomy, heat treatment

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