Removal of a Separated Nickel-titanium Instrument from a Three-rooted Mandibular First Molar

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Permanent mandibular first molars usually have a mesial root and a distal root and three root canals, but variations in the number of roots and in canal morphology are not uncommon. The additional third root in permanent mandibular first molar variants that have three roots is typically distributed lingually. Herein, we report on a 20-year-old Chinese female who presented with a separated K3 nickel-titanium instrument in the distolingual root canal of her left mandibular first molar. We removed the nickel-titanium fragment using several ultrasonic tips under a dental operating microscope. The root canals were cleaned and shaped thoroughly and then obturated by a warmed gutta-percha compaction method. At 4-month follow-up, the patient was free of symptoms. [Mid Taiwan J Med 2009;14:27-33]

Key words
dental operating microscope, distolingual root canal, nickel-titanium instrument separation, three-rooted mandibular first molar, ultrasonic device

INTRODUCTION

Nickel-titanium (NiTi) instruments were first introduced into endodontics in 1988 [1] and have largely replaced traditional hand files for root canal preparation. Fragmentation of NiTi rotary instrumentation is not unheard of. NiTi instrument breakage is caused by excess torque, or cyclic fatigue, or both. Aggressive movements, such as penetrating the canal too rapidly or forcing an instrument to an arbitrary length or among a sharp curve, can also lead to fracturing without warning [2]. Therefore, a thorough knowledge of root canal morphology is essential before attempting root canal treatment [3]. Being in possession of correct information regarding tooth anatomy, as provided by appropriate radiography, and knowing what combinations of internal anatomy are possible for mandibular first molar teeth, the dentist should be able to determine which type of root-canal configuration is present for teeth requiring dental attention [4]. The major variant of the mandibular first molar is a tooth featuring a supernumerary root, which is usually distributed lingually. This macrostructure is known as radix entomolaris (RE) [5]. This variant has generally been regarded by dental anatomists as resulting from a genetic trait rather than as a developmental anomaly [6,7]. The prevalence of 3-rooted mandibular first molars in Taiwanese Chinese is reportedly 21.1% to 26.9% [8,9].

The present report describes the use of an ultrasonic technique aided by dental operating microscope (DOM) magnification of the surgical