Endodontic preparation of oval root canals: comparison between three techniques

Preparazione endodontica dei canali ovalari: confronto fra tre tecniche.
Malagnino VA, Passariello P, Sorci E, Giornale Italiano di Endodonzia 2004; 18/3: 142-148

Introduction: It is difficult to prepare root canals with oval cross-sections since their irregular shape make steady contact of the instruments with the canal walls a challenge. The literature shows that the filing movement of stainless steel instruments does not shape the canal walls completely in this situation. Circumferential filing movements allow improved contact with the canal wall, although this method does not always guarantee the preparation of the entire root canal. The filing movement of stainless steel instruments may straighten the canal curvature and therefore influence the morphology or even transport the apex.

Aim: The aim of our study was to compare the performance of three different new generation NiTi instruments while preparing oval root canals: M$_{two}$® files which cut laterally and file with a circumferential movement, rotary engine-driven K3 instruments and stainless steel instruments, such as K-Flex and Rispi, which are used with a circumferential movement.

Materials and methods: 27 extracted teeth with oval root canals were selected and divided into three groups. Each tooth was prepared, cut into three sections – the apical, the middle and the coronal third – and examined under a stereo microscope. Further specimens were analysed based on the number of instrumented walls. The canal perimeter was divided into four sections: the mesial, distal, buccal and lingual sections. The treatment results were compared and evaluated on a scale of 0 to 4.

Results: The results of our study confirm that it is not possible to optimally clean and shape oval root canals with mere mechanical rotation of NiTi instruments and that a filing movement allows for a more complete instrumentation of root canals of such anatomical shape.

Conclusion: Our study proved that M$_{two}$® instruments which combine passive and circumferential filing ensured better instrumentation of oval root canals than NiTi instruments with a mere filing movement. Furthermore, M$_{two}$® instruments allowed for a more even preparation and smoother canal walls than stainless steel instruments. Circumferential filing neither causes modifications of the root canal morphology nor a transportation of the apex. All root canal walls appeared to be entirely and evenly cleaned.

M$_{two}$® instruments: working steps in the canal

M$_{two}$® basis sequence