

# Comparative study on the shaping ability and cleaning efficiency of rotary M<sub>t</sub>wo<sup>®</sup> instruments

## Part 1. Shaping ability in simulated curved canals

Schäfer E, Erter M, Dammaschke T, *Int Endod J* 2006; 39: 196-202

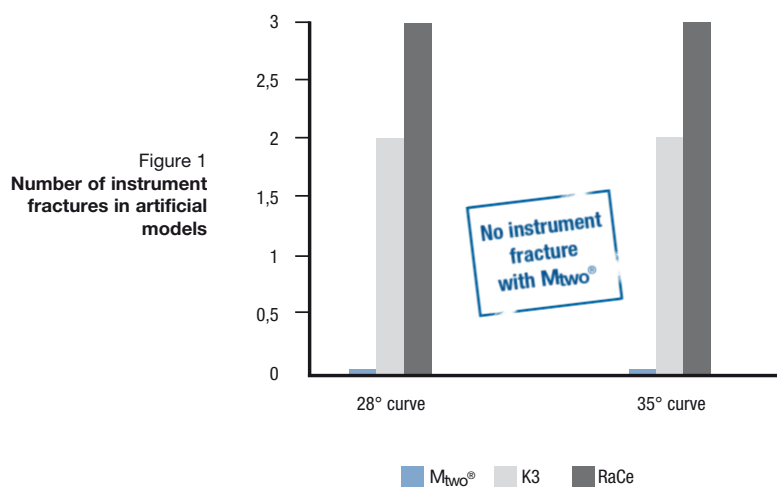
**Aim:** To compare the shaping ability of M<sub>t</sub>wo<sup>®</sup> files (VDW, Munich, Germany) with K3 (Sybron Endo, West Collins Orange, USA) and RaCe (FKG, La Chaux-de-Fonds, Switzerland) instruments in simulated curved root canals.

**Methodology:** Simulated canals with 28° and 35° curves in resin blocks were prepared with M<sub>t</sub>wo<sup>®</sup> files using a single-length technique and with K3 and RaCe instruments using a crown-down preparation technique (n = 20 canals in each case). Pre- and post-instrumentation images were recorded and assessment of canal shape was completed with a computer image analysis program. Material removal was measured at 20 measuring points, beginning 1 mm from the end point of preparation. Incidence of canal aberrations, preparation time, changes of working length and instrument failures were also recorded. The data was analysed statistically using ANOVA and Student-Newman-Keuls-test.

**Results:** On average, canals prepared with M<sub>t</sub>wo<sup>®</sup> instruments remained better centred compared with those enlarged with K3 or RaCe instruments. Six RaCe instruments and four K files fractured during preparation (P > 0.05). No M<sub>t</sub>wo<sup>®</sup> files fractured during preparation. (figure 1) For both canal curvatures, the preparation time was significantly faster (P < 0.001) with M<sub>t</sub>wo<sup>®</sup> than with the other systems. It was possible with all types of instruments to control working length well.

**Conclusions:** M<sub>t</sub>wo<sup>®</sup> instruments prepared curved canals rapidly, respected original canal curvature well and were safe to use.

M<sub>t</sub>wo<sup>®</sup> files remained better centred than K3 or RaCe.  
M<sub>t</sub>wo<sup>®</sup> files did not fracture under the conditions of the study.  
M<sub>t</sub>wo<sup>®</sup> files prepared the canals faster than K3 or RaCe.



# Comparative study on the shaping ability and cleaning efficiency of rotary M<sub>two</sub><sup>®</sup> instruments

## Part 2. Cleaning effectiveness and shaping ability in severely curved root canals of extracted teeth

Schäfer E, Erter M, Dammaschke T, *Int Endod J* 2006; 39: 203-212

**Aim:** To compare the cleaning effectiveness and shaping ability of M<sub>two</sub><sup>®</sup>, K3 and RaCe nickel-titanium rotary instruments during the preparation of curved root canals in extracted human teeth.

**Methodology:** A total of 60 root canals of mandibular and maxillary molars with curvatures ranging between 25° and 35° were divided into three groups of 20 canals. Based on radiographs taken prior to instrumentation with the initial instrument inserted into the canal, the groups were balanced with respect to the angle and the radius of canal curvature. Canals were prepared using a low-torque control motor. Using pre- and post-instrumentation radiographs, straightening of the canal curvatures was determined with a computer image analysis program. The amount of debris and smear layer were quantified on the basis of a numerical evaluation scale. The data established for scoring the debris and the smear-layer was separately recorded and analysed statistically using the Kruskal-Wallis-test.

**Results:** During preparation no instrument separated. Completely clean root canals were never observed. For debris removal M<sub>two</sub><sup>®</sup> instruments achieved significantly better results than K3 and RaCe instruments ( $P < 0.001$ ). The results for remaining smear layer were similar and not significantly different ( $P > 0.05$ ). M<sub>two</sub><sup>®</sup> instruments maintained the original canal curvature significantly better ( $P < 0.05$ ) than the other instruments (figure 2). Instrumentation with M<sub>two</sub><sup>®</sup> files was significantly faster than with K3 or RaCe instruments ( $P < 0.05$ ) (figure 3).

**Conclusions:** Under the conditions of this study, M<sub>two</sub><sup>®</sup> instruments resulted in good cleaning and maintained the original curvature significantly better than K3 or RaCe files.

M<sub>two</sub><sup>®</sup> files removed debris from the canal walls more effectively than K3 or RaCe.  
M<sub>two</sub><sup>®</sup> files maintained canal curvature significantly better than K3 or RaCe.  
Preparation was significantly faster with M<sub>two</sub><sup>®</sup> than with K3 or RaCe.

Figure 2  
Original canal curvature and debris

