

MOTION KINEMATICS – “FROM CONFUSION TO CONCLUSION”

An Analytical study

INTRODUCTION - There is a constant evolution of newer file systems with different motion kinematics in attempting to refine the field of endodontics. This has not only revolutionised the way clinicians shape the root canal system, but also confuses the clinician as to which system to choose.

OBJECTIVE - To compare three different motion kinematics – rotary, reciprocation, and self adjusting files on clinically relevant parameters like - post operative pain, shaping ability, and fatigue resistance.

METHODOLOGY – A Pubmed and manual search was conducted for articles from 2010 to 2016 using the key words ‘rotary, reciprocation, WaveOne, reciproc, self adjusting file, cyclic fatigue, torsional fatigue, shaping ability, canal centering ability, post operative pain.

INCLUSION CRITERIA

For post-operative pain - Adequate sample with power calculation, low risk of bias with proper randomisation and blinding.

For fatigue resistance & shaping ability - Articles comparing different kinematics with adequate sample and standardisation.

EXCLUSION CRITERIA

Language other than English, Samples other than human teeth.

PARAMETERS OBSERVED

- *Studies on post-operative pain* - Sample size with power calculation, motion used, tooth type, randomised and blinding done in the studies,
- *Studies on cyclic fatigue and shaping ability*- Specification of tooth type, curvatures, testing model used, sample size, type of motion, results

*** very good, ** good

* average, NA - Not applicable

PARAMETER	STUDIES	RESULTS		
		SAF	ROTARY	RECIPROICATION
Post operative pain	5	**	**	*
Shaping ability	14	***	*	*
Fatigue resistance	12	NA	*	***

DISCUSSION

Post-operative pain The results are controversial. 2 studies concluded that reciprocation motion produced less post-operative pain (1,2). Two other clinical trials reported reciprocation motion produced more pain compared to rotary. (3,4) Saumya et al. (5) compared rotary and self-adjusting files and showed no statistically significant difference in post-operative pain severity.

Shaping ability The self-adjusting file is superior compared to rotary and reciprocation due to its unique design feature that adapts to the shape of the root canal (6-10). Hence, in cases with minimal root dentin, shaping with SAF can avoid strip perforation. However, the results were not statistically significant when comparing rotary and reciprocation motion (11-19).

Fatigue resistance It is well established that reciprocation is superior to all in postponing fatigue compared to rotary (20-24). However, this parameter is not applicable for SAF due to its different working axis.

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