

Postoperative Pain Comparison: Manual K-Files vs Pedoflex Rotary Files in Primary Molar Root Canals

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Abstract

This study evaluated postoperative pain in pediatric patients after root canal treatment with two file systems: Manual K-files and Pedoflex Rotary files. Sixty children, aged 6-10, were randomized into two groups of 30. Pain was assessed using a Visual Analog Scale (VAS) at 6, 12, 24, and 48 hours post-treatment. Results showed significantly lower pain levels in the Pedoflex Rotary file group at all time points (mean VAS at 6 hours: 2.4 vs. 3.8; at 12 hours: 1.8 vs. 3.2; at 24 hours: 1.2 vs. 2.5; at 48 hours: 0.6 vs. 1.8). Pedoflex Rotary files provide a more comfortable postoperative experience.

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1. INTRODUCTION

Postoperative pain is a common concern in pediatric dentistry, particularly following root canal procedures in primary molars. Managing and minimizing pain is crucial for improving the overall treatment experience for young patients and ensuring their comfort and cooperation in future dental visits. The choice of instrumentation system in root canal treatments can significantly impact the level of postoperative pain experienced by patients.¹

Traditional manual instrumentation using K-files has been a longstanding method for root canal procedures. While effective, manual K-files are often associated with extended treatment times and greater postoperative discomfort due to the physical nature of the instrumentation and the potential for more extensive manipulation within the root canal.^{2,3}

Recent advancements in endodontic technology have introduced rotary file systems, such as the Pedoflex Rotary files, which are specifically designed for pediatric use. These systems promise efficiency and improved cleanliness within the root canals with the purported benefit of reduced postoperative pain due to less invasive and quicker procedures.⁴

This study aims to evaluate postoperative pain levels in pediatric patients aged 6-10 years following root canal treatment in primary molars, comparing the Manual K-files and Pedoflex Rotary files. By providing empirical data on the effectiveness and patient comfort associated with these two different instrumentation systems, the study seeks to inform best practices in pediatric endodontic care.

2. MATERIALS AND METHODS

This randomized clinical trial included 60 pediatric patients, aged 6-10 years, requiring root canal treatment on primary molars. Patients were selected based on specific inclusion criteria: no systemic illnesses, cooperative behavior, and no previous endodontic treatment on the involved tooth. Written consent was obtained from parents/guardians.

Participants were randomly assigned into two groups (n=30 each) using a computer-generated randomization sequence. Group 1 received treatments with Manual K-files, while Group 2 was treated with Pedoflex Rotary files.

Both groups underwent standardized endodontic procedures. Local anesthesia was administered, followed by rubber dam isolation. Access cavities were prepared, and working length was determined using an apex locator and confirmed radiographically.

For Group 1, root canals were instrumented manually using K-files, following a step-back technique. Group 2 had canals prepared with Pedoflex Rotary files, utilizing a crown-down technique as specified by the manufacturer's guidelines. Irrigation was constantly performed with a solution of sodium hypochlorite (2.5%) throughout the procedure for both groups.

After the completion of the root canal treatment, postoperative pain was evaluated using a Visual Analog Scale (VAS). This scale ranges from 0 (no pain) to 10 (worst imaginable pain). Assessments were recorded at 6, 12, 24, and 48 hours post-treatment. Parents/guardians were instructed on how to help their child mark the level of pain at each specified interval.

Data were analyzed using SPSS software. Mean VAS scores were compared between the groups at each time interval using Independent Samples t-tests. Statistical significance was set at $p < 0.05$.

3. RESULTS

The study highlights the importance of managing postoperative pain, which critically affects a patient's comfort and overall experience with dental procedures. The use of the Visual Analog Scale at multiple postoperative intervals (6, 12, 24, 48 hours) is an effective method to quantify pain levels and thus allows for a clear comparison between the two instrumentation methods. The data indicated significant differences in postoperative pain levels between the two groups. At 6 hours post-treatment, Group 2 (Pedoflex Rotary files) reported lower pain scores (mean VAS: 2.4) compared to Group 1 (Manual K-files, mean VAS: 3.8). This trend continued at 12, 24, and 48 hours, with Group 2 consistently showing lower pain levels (mean VAS at 12 hours: 1.9 vs. 3.2; at 24 hours: 1.2 vs. 2.5; at 48 hours: 0.6 vs. 1.8).

Table 1: Comparison of mean VAS Score at different time

Time	Groups	Mean Pain Score	t value	p value
After 6 hours	I	3.8 ± 0.15	1.00	<0.05*
	II	2.4 ± 0.11		
After 12 hours	I	3.2 ± 0.15	1.08	<0.05*
	II	1.9 ± 0.15		
After 24 hours	I	2.5 ± 0.10	1.11	<0.05*
	II	1.2 ± 0.11		

After 48 hours	I	1.8 ± 0.30	1.03	<0.05*
	II	0.6 ± 0.27		

*significant

4. DISCUSSION

The study offers significant insights into the management of postoperative pain in pediatric dentistry, emphasizing the comparison between two root canal instrumentation techniques. By assessing the effectiveness of pain quantification through the Visual Analog Scale at several postoperative intervals—specifically 6, 12, 24, and 48 hours—the study underscores the crucial role of precise pain assessment. This detailed monitoring allows for a comprehensive understanding of patient comfort and overall experience during the postoperative period.

The results indicate a consistent trend of lower postoperative pain scores in patients treated with Pedoflex Rotary files compared to those treated with traditional Manual K-files. This suggests several advantages inherent to the Pedoflex Rotary system. One notable advantage is the increased efficiency and speed it brings to root canal preparation. The reduced treatment time associated with the use of rotary files directly correlates with decreased patient discomfort, likely due to shorter exposure to invasive procedures. Result of our study in accordance the study conducted by to Govindaraju L et al. (2018)⁵, Jeevanandan G et al. (2021)⁶ and Panchal V et al. (2019)⁷. Additionally, the Pedoflex Rotary system provides more uniform canal shaping. This uniformity is achieved with less manual pressure, which can minimize irritation to the peri-apical tissues. The reduced irritation is significant because it leads to less swelling and inflammation, conditions often responsible for postoperative pain. Furthermore, the use of rotary files helps alleviate operator fatigue due to easier file manipulation, promoting more precise and gentle canal preparation. This precision and gentleness reduce perioperative trauma, a key factor in minimizing postoperative pain.

The findings from this study carry substantial clinical implications. They suggest that dental practitioners should consider adopting rotary file systems like Pedoflex for pediatric root canal treatments to enhance patient comfort. The reduction in pain not only facilitates better patient cooperation during and after the procedure but also has a positive impact on adherence to follow-up appointments. This is crucial for ensuring better long-term outcomes and enhancing overall patient satisfaction.

In summary, the study highlights the benefits of using Pedoflex Rotary files over traditional Manual K-files in pediatric root canal treatments. The advantages include reduced postoperative pain, more efficient procedures, less perioperative trauma,

and better overall patient experiences. These insights encourage a shift towards the use of advanced rotary systems in pediatric dentistry, aiming for improved patient care and satisfaction

5. CONCLUSION

The study reinforces the importance of exploring advanced techniques in pediatric dentistry to improve patient outcomes. Pedoflex Rotary files represent a promising option for reducing postoperative pain, thus enhancing the overall treatment experience for young patients.

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