

Prevalence of endodontic mishaps and their management in private and public dental institutes in Punjab, Pakistan

Hammad Hassan,¹ Syed Moiz Ali,² Salman Aziz,² Muhammad Nasir Saleem,² Hina Zafar Raja,² Sidra Riaz³

¹Department of Science of Dental Materials, University College of Medicine and Dentistry, University of Lahore,

²Operative Department, Institute of Dentistry, CMH Lahore Medical College, NUMS, ³Operative Department, de' Montmorency College of Dentistry, Pakistan

Objective: To assess and compare the prevalence of endodontic mishaps and their management in private and public dental institutes in Punjab.

Methodology: This questionnaire-based cross-sectional study was conducted from 8th December 2021 to 1st June 2022 on 255 participants working in operative departments of private and public dental institutes using online questionnaire developed and validated by the authors. Data were analyzed using SPSS version 25. Chi-Square Test was used to compare percentages of categorical variables. P-value less than or equal to 0.05 was taken as significant.

Results: The frequency of errors was highest among the house officers, as 89.4% of the respondents experienced endodontic errors. Over or under extend

obturation (75.3%), ledge formation (63.1%), and perforation (53.3%) were the three most frequently reported errors. There was significant difference between private and public dental institutes regarding notifying mishap to the patient and regarding presence of a system to report and document procedural errors.

Conclusion: Majority of procedural errors occur due to negligence, inappropriate technique and limited knowledge. Endodontic clinics should have a mechanism in place for recording and reporting procedural errors. Significant number of responders from public institutes chose not to report errors to the patient or the department.

Keywords: ADA, dental graduates, endodontic mishap, procedural errors, public institutes.

INTRODUCTION

Endodontic procedures have a relatively higher success rate but, guaranteeing a perfect outcome is in advisable even when the procedure has been done with highest of care.^{1,2} Endodontic mishaps during access opening include missed canals, access cavity perforation and crown fractures. Common errors faced during cleaning, shaping and obturation involve ledge formation, cervical perforations, deviation, separated instruments, obstruction, over or under obturation and root fractures.^{3,4} Other mishaps include post space perforations, irrigant related mishaps and instrument aspiration.

Proper knowledge of these procedural errors, their management as well as good clinical skills play an important role in their management.^{2,3} Studies have shown that meticulously done endodontic therapy raises the success rate up to 94%.⁵ One of the most common errors encountered is instrument separation, which reduces the success rate by 14%.⁶ Under filling and over filling decreases success rate to 68% and 76% respectively, however, failure depends on residual infection, inflammation and the extent of debridement achieved.^{5,6}

Endodontic treatment is a stressful procedure for under graduate students.⁷ The only measure to prevent these procedural complications is the well attentiveness, good knowledge along with clinical skills.^{3,8} Endodontic mishaps and their management have received little attention, especially in Pakistan. The aim of this study was to assess and compare the prevalence of endodontic mishaps and their management in private and public dental institutes in Punjab.

METHODOLOGY

This questionnaire-based cross-sectional study was conducted from 8th December 2021 to 1st June 2022, with the approval of the Institutional Review Board (IRB) of CMH Lahore Medical College (649/ERC/CMH/LMC). Informed consent was obtained from all participants. Online questionnaires were distributed among house officers, demonstrators and post graduate trainees working in the operative departments of five private and three public dental colleges, through E-Mail and WhatsApp. A total of 255 participants took part in the study and a non-probability purposive sampling technique was employed and response rate was 95%.

The questionnaire was developed by the authors after an extensive literature review and was validated by a panel of three research experts. The questionnaire consisted of 12 close ended questions. The first part included demographics. The second part dealt with management and documentation of endodontic mishaps as well as their reporting.

Statistical Analysis: Data were analysed using SPSS version 25. Chi-Square Test was used to compare percentages of categorical variables. p-value less than or equal to 0.05 was taken as significant.

RESULTS

There were 255 participants, out of which 32.5% were males and 67.5% were females; 54.5% were from private institutes, whereas, 45.5% belonged to public institutes. Majority (47.8%) of the respondents were house-officers, followed by post-graduate trainees (34.2%) and demonstrators (18%). We found that 87% of the respondents experienced mishaps (Fig. 1). Table 1 compares the frequencies of endodontic mishaps, whereas Table 2 compares the management of those mishaps. 89.4% of the respondents experienced mishaps during canal preparation, 81.2% during the access opening, 76.5% during obturation, whereas 34.9% experienced other procedural errors (Table 1). The frequency of errors was highest among the house officers.

More than half (53.3%) of the participants experienced perforation during access opening and a significant proportion of them were from private dental institutes (Table 1). There was a significant difference between private and public dental graduates when they were asked whether they notify patients or their department about procedural mishaps. 6.8% of the respondents from public and 4.3% from private institutes never reported mishaps to their department. Furthermore,

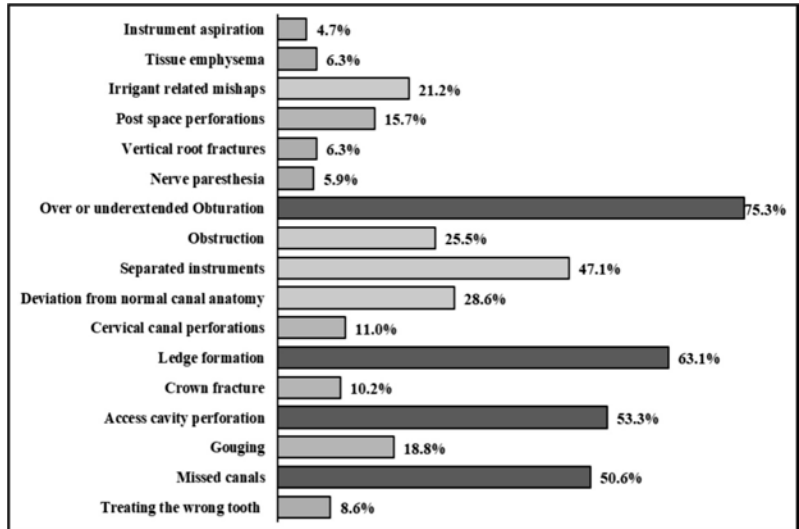


Fig. 1: Occurrences of various endodontic procedural errors.

Table 1: Comparison of various procedural errors among private and public dental institutes.

Procedural Errors	Private Institutes n (%)	Public Institutes n (%)	X ²	P
Access opening	118 (84.8)	90 (77.5)	2.24	0.09
Treating the wrong tooth	11 (7.9)	11 (9.4)	0.19	0.65
Missed canals	73 (52.5)	56 (48.2)	0.45	0.50
Gouging	24 (17.2)	24 (20.6)	0.48	0.48
Access cavity perforation	84 (60.4)	52 (44.8)	6.18	0.01
Crown fracture	18 (12.9)	8 (6.8)	2.53	0.11
Canal Shaping and Cleaning	131 (94)	97 (83.6)	7.53	0.006
Ledge formation	99 (71.2)	62 (53.4)	8.58	0.003
Deviation from normal canal anatomy	53 (38.1)	20 (17.2)	13.50	0.00
Separated instruments	76 (54.6)	44 (37.9)	7.11	0.005
Obstruction	43 (30.9)	22 (18.9)	4.77	0.02
Obturation	109 (78.4)	86 (74.1)	0.64	0.25
Over or under extended Obturation	110 (79.1)	82 (70.6)	2.42	0.11
Voids	18 (12.9)	10 (8.6)	1.21	0.27
Miscellaneous	43 (30.9)	46 (39.6)	2.11	0.14
Post space perforations	17 (12.2)	23 (19.8)	2.76	0.06
Irrigant related mishaps	37 (26.6)	17 (14.6)	5.42	0.02
Tissue emphysema	4 (2.8)	12 (10.3)	5.99	0.01
Instrument aspiration	7 (5)	5 (4.3)	0.07	0.78
Nerve paresthesia	11 (7.9)	4 (3.4)	2.27	0.13
Vertical root fractures	12 (8.6)	4 (3.4)	2.89	0.08
Overall Frequency	119	103	0.56	0.45

Table 2: Comparison of procedural error management, documentation and reporting mechanism in private and public dental institutes.

Statement	Private Institutes n (%)	Public Institutes n (%)	X ²	p
Do you report the endodontic mishaps to your department?				
Always	74 (53.2)	57 (49.1)	7.85	0.04
Sometimes	43 (30.9)	47 (40.5)		
Rarely	16 (11.5)	4 (3.4)		
Never	6 (4.3)	8 (6.8)		
Do you inform your patient about the mishap?				
Always	68 (48.9)	39 (33.6)	12.65	0.005
Sometimes	53 (38.1)	47 (40.5)		
Rarely	4 (2.8)	15 (12.6)		
Never	14 (10.1)	15 (12.6)		
Is there a mechanism to report or document procedural errors in your department?				
Yes	56 (40.2)	20 (17.2)	20.58	0.001
No	57 (41.1)	79 (68.1)		
Unaware	26 (18.7)	17 (14.6)		
Were you taught about managing endodontic mishaps during final year/ house job training?				
Yes	72 (51.7)	49 (42.2)	2.37	0.305
No	56 (40.2)	57 (49.1)		
Don't Remember	11 (7.9)	10 (8.6)		

12.6% of the respondents from public and 10.1% from private institutes never informed patients about the mishap (Table 2). There was a significant difference between private and public dental institutes regarding presence a system for reporting and documenting mishaps. Almost two-thirds (68.1%) of the respondents from public institutes a lacked such mechanism (Table 2).

DISCUSSION

A great proportion of the respondents in this study, with a significant number from public institutes were not taught about management of procedural errors during their training. Previous studies indicated the prevalence of endodontic procedural errors to be between 65 to 83% and the common errors reported were related to obturation and canal preparation; including voids,

over/underfilling, ledge formation, transportation and instrument separation.⁹⁻¹¹ The prevalence of some specific errors in this study was higher when compared to global statistics, particularly when it came to access cavity perforation (53.3%) and missed canals (50.6%). Adequate knowledge about guidelines as well as handling of these procedural errors should be instructed for effective management.

Private dental institutes in Pakistan are more in number, well-funded, better equipped and managed, however, surprisingly in the present study, more procedural errors were reported in private institutes.¹² It might be because they are more equipped to manage errors and hence are more forthright about it when compared to public institutes. Furthermore, deficient experience due to the limited patient flow and presence of a procedural error documentation system in some private institutes,

compelling practitioners to inform both the patient and the department could be another factor.¹³

Dentistry has fallen behind its medical peers in the development of programs that emphasize patient safety. The health department in England, through NPSA and NRLS national error reporting systems, is leading in patient safety.¹⁴ The General Council of Dentists in Spain recognized the lack of organized data about procedural errors, realized the necessity to build a risk management system and initiated several programs.¹⁵ Pakistan, unfortunately, lacks such procedural error reporting systems at departmental, institutional as well as the national level due to an underdeveloped health care sector.¹⁶

Reporting a procedural error is an ethical responsibility in medical practice. Following fundamental legal and ethical dental principles and practices in the event of an endodontic accident is essential, as advised by the standards established by the UK General Dental Council.¹⁷ In the present study, the majority informed patient as well as reported errors to their department. However, a significant number of respondents from public institutes 'rarely' or 'never' informed the patients or their department about mishaps (Table 2). The results are similar to a study from Saudi Arabia.¹⁸ Dentists at undergraduate level should be instructed about reporting and managing a mishap in accordance with the code of ethics recommended by FDI and ADA, to avoid medicolegal fallout.¹⁹

CONCLUSION

Responders from public institutions reported fewer errors. A significant number of responders from public institutes chose not to report errors to the patient or the department. Operators must consider professional development programs to deal effectively with endodontic errors. Endodontic clinics, particularly those that serve public institutions, should have a mechanism in place for documenting and reporting procedural errors.

Author Contributions:

Conception and design: Hammad Hassan, Syed Moiz Ali, Hammad Hassan, Syed Moiz Ali, Salman Aziz.

Collection and assembly of data: Sidra Riaz, Salman Aziz, Muhammad Nasir Saleem, Hina Zafar Raja.

Analysis and interpretation of data: Hammad Hassan.

Drafting of the article: Hammad Hassan.

Critical revision of article for important intellectual content: Hammad Hassan.

Statistical expertise: Hammad Hassan.

Final approval and guarantor of the article: Hammad Hassan.

Corresponding author email: Sidra Riaz: sidrariazofficial@gmail.com

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