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Dentists Can Learn from Mistakes Met During Root Canal Treatment: A Case Report

Miira M. Vehkalahti

Department of Oral and Maxillofacial Diseases, University of Helsinki, P.O. Box 41, FI-00014 Helsinki, Finland

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Corresponding Author:** ***Miira M. Vehkalahti, *Department of Oral and Maxillofacial Diseases, University of Helsinki, P.O. Box 41, FI-00014 Helsinki, Finland.*

Abstract

Aim: *This case report opens two allegations of serious malpractice incidents during the root canal treatment and suggests a dentist to learn from any mistakes, whether own or others' faults.*

Synopsis: *A detailed description of each reported damage that occurred during root canal treatment (RCT) is based on patient documentation and the operator's statement. Case A describes damage during RCT of a lower first molar. The operator failed to stay in the canal and finally penetrated the canal wall in the apical third of the root. Then the file fractured in the mandible/bone. In the end, the tooth was lost and replaced by an implant. Case B is about the RCT of an upper second premolar. A serious mistake in localizing the canals and filling the wrongly stated canal ended in the removal of the tooth. The loss was replaced with a fixed prosthesis, a bridge-construct extending from the canine to the first molar.*

Key learning points: *The cases presented are inevitably serious mistakes. Both resulted in loss of RCT tooth and compensation for its replacement. To develop his/her own practice and skills, every dentist could use this report to consider his/her own clinical way of working with similar RCT cases but without damage. An outline on how the damage could have been avoided suggests working calmly and thoughtfully, learning beforehand about the possible variations in the anatomy of the RCT tooth, and following the guidelines given by endodontic associations and experts.*

Keywords: *Continuous learning; Endodontic injury; Malpractice event; Root canal treatment*

1. Introduction

Endodontic injuries form a considerable proportion of various mistakes reported in dentistry (1–8). Typical damages are perforation and a broken instrument (7). Perforations accounted for 10% of 'technical complications' in Denmark (4), and in opening canals for 37% in Israel (6), while broken instrument (24%) and perforation (22%) were the most common damages in Finland (9). A recent paper about endodontic malpractice litigations in the United States listed as the most frequent mistakes broken instrument and improper instrumentation or obturation (10). Primary topics in root canal treatments are 'finding canals, following canals, and finishing canals', as stated by West (11). To follow good clinical practice, dentists have several guidelines at hand, given by endodontic associations and experts (12–14).

In many countries serious mistakes in health care services will lead to sanctions when dealt with in court (15). Nordic countries, however, have valid insurance systems to follow the 'No Blame/No Fault' rule. No sanction to an operator is imposed but financial compensation to the patient is assigned for such an injury that could have been avoided by following good clinical practice. In Finland, the Patient Insurance Centre (PIC) is an administrative body to handle all patient healthcare claims in the whole country and from any treatment provider, i.e. from single offices to clinics and hospitals, both in private and public sectors (https://www.pvk.fi/en/). A patient can submit a claim easily and free of charge using forms available at service points and online.

This case report opens two claims of serious mistakes during root canal treatment and suggests dentists learn from any mistakes, whether their own or others' faults.

2. Cases and Methods

A detailed description of each reported damage that occurred during root canal treatment (RCT)

is based on patient documentation and the operator's statement. This report includes 2 damage cases (A and B) that led to loss of the tooth and finally resulted in the patient receiving large compensation as fixed prosthetic constructions paid. In both cases, it was clearly seen that the damage could have been avoided.

2.1. Case A

In April 2009, a 48-year-old man experienced severe pain in his lower first molar. The situation led to RCT since the tooth was diagnosed as devital and showed signs of apical periodontitis. The initial radiograph confirms typical anatomy of the tooth (Figure 1a). During the treatment root canals were adequately localized as seen in the radiograph (Figure 1b), and further, the working length was determined. The radiographs show that no rubber dam was used. The anatomical form of root canals can be considered as normal. Canal instrumentation used an engine-driven method. However, the operator failed to stay in the canal and to recognize how the preparation file started stripping and finally penetrated the canal wall in the apical third of the root. The file fractured in the mandible/bone. Thus, there existed two malpractice incidents: a canal perforation and a fractured file (Figure 1c). After filling the root canals, the operator consulted a specialist in surgical dentistry and received instructions to follow the case; if no symptoms or problems appeared, no actions to remove the fractured file were necessary. A one-year control visit was scheduled, but the patient missed it. Two years after the root filling, the patient had severe pain in the area. The operator decided to extract the tooth and, at the same time, instructed the patient to submit a complaint to the PIC. In the end, the PIC decided to pay for an implant to replace the lost tooth.

Figure 1a. *Initial view of the lower first molar when diagnosed with apical periodontitis.*

Figure 1b. *Localization of the canals in the lower first molar during root canal treatment.*

Figure 1c. *During preparation of the canals of the lower first molar a canal perforation occurred, followed by fracture of the instrument in the bone outside the tooth in the alveolar third of the mesial root.*

2.2. Case B

In May 2012, a 60-year-old woman experienced pain in the upper second premolar. The reason for coming to the appointment was diagnosed and recorded as apical periodontitis. The initial radiograph confirms typical anatomy of the tooth (Figure 2a). The next radiograph (Figure 2b) shows the intermediate stage where a cavum perforation is clearly visible. A temporary filling, using calcium-based sealer, was set, and the treatment continued 3 months later. No sign of rubber dam is seen in the radiographs. The end result is seen in the next radiograph (Figure 2c) that verifies a serious mistake in localizing the canals and filling the canals. The dead end was without any options to recover the function for the tooth and consequently, the tooth had to be removed. Finally, this tooth loss was replaced with a fixed prosthesis, a bridge-construct extending from the canine to the first molar.

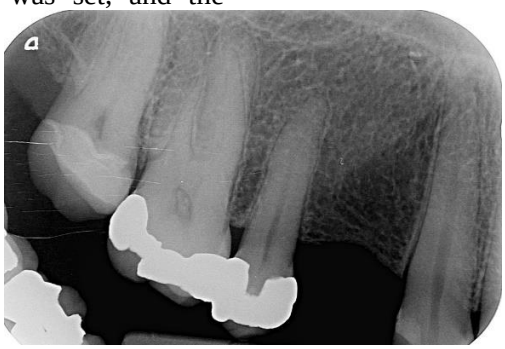

Figure 2a. *Initial view of the upper second premolar when diagnosed with apical periodontitis.*

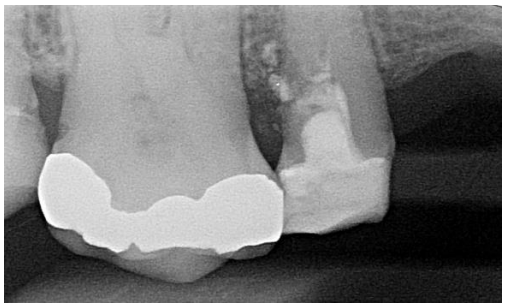

Figure 2b. *Intermediate stage of the upper second premolar with exposed perforation in cavum.*

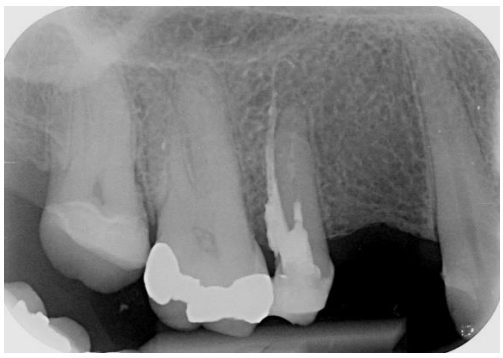

Figure 2c. *This radiograph proved the total failure of the root filling procedure in the upper second premolar.*

3. DISCUSSION

The cases presented are inevitably serious mistakes. Both resulted in loss of RCT tooth and compensation for its replacement. To develop his/her own practice and skills, every dentist could use this report to consider his/her own clinical way of working with similar RCT cases but without damage. Although the cases described here present the most serious damages, the dentist can learn early on to recognize the future threat from even the smallest mistakes.

Improvement of dentists' practices could include, e.g. risk management and fruitful and valuable communication with patients about diagnoses and treatment plans (16).

Together with a patient, a dentist could consider possible outcomes for alternative treatment choices. Increasing patients' trust in a dentist would presumably diminish the dentists' malpractice incidences and adverse events. That again, may reduce patients' need to complain of mistakes in treatment.

A dentist should keep strictly on ethical principles and the standards of good clinical practice always and with each patient during any care process (17). Whenever a dentist ends up to mistakes, adverse events or near misses, the details should be documented and reported and discussed within the profession (18). Also sharing information with colleagues can support dentist's progress in professional skills. Furthermore, avoidance of unnecessary rush in dentist's everyday work can help to withstand time-pressure and, consequently, to improve the quality clinical dental work (19).

For each dentist, it is imperative to minimize various reasons leading to endodontic failure (20). Reflection on malpractice incidents, either alone or with colleagues, may generate a lot of questions to respond and further promote clinical know-how level in the dental care profession.

A recent overview study stated that "Ongoing education and training for healthcare professionals should be prioritized to keep them informed about best practices and emerging risks"(21). To learn more, the cases presented here arise at least the following questions: What kind of damage emerged? How did it happen and how one get into it? Did anatomical blindness rule the practice? Why was rubber dam left unused? Why did a dentist make that mistake and how could he/she have avoided it? Was he/she too busy to recall anatomical details just exactly in this case of a RCT tooth? Why did the dentist rush through the operation without following a peaceful performance when he/she presumably left point by point practice ignored? Was he/she not feeling sound touch and sensations with fingers when using RCT instruments?

4. Conclusion

An outline on how the damage could have been avoided suggests working calmly and thoughtfully, learning beforehand about the possible variations in the anatomy of the RCT tooth, and following the guidelines given by endodontic associations and experts. This report of two treatment damage incidents shows how important it is to be thoroughly familiar with the implementation of root canal treatment before starting it.

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Conflict of interest

The author has no conflicts of interest to declare.

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References

[1] Cohen S, Schwartz S. Endodontic complications and the law. J Endod. 1987;13(4):191–7.

[2] Milgrom P, Fiset L, Whitney C, Conrad D, Cullen T, O'Hara D. Malpractice Claims During 1988–1992: A National Survey of Dentists. J Am Dent Assoc [Internet]. 1994 Apr;125(4):462–9. Available from: https://pubmed.ncbi.nlm.nih.gov/8176082/

[3] Hapcook CP. Dental malpractice claims: Percentages and procedures. J Am Dent Assoc [Internet]. 2006;137(10):1444–5. Available from: http://dx.doi.org/10.14219/jada.archive.2006.0059

[4] Bjørndal L, Reit C. Endodontic malpractice claims in Denmark 1995-2004. Int Endod J. 2008;41(12):1059–65.

[5] Kiani M, Ardeshir S. A five-year survey for dental malpractice claims in Tehran, Iran. J Forensic Leg Med. 2009;16(2):76–82.

[6] Givol N, Rosen E, Taicher S, Tsesis I. Risk management in endodontics. J Endod. 2010; 36(6):982–4.

[7] Pinchi V, Pradella F, Gasparetto L, Norelli GA. Trends in endodontic claims in Italy. Int Dent J. 2013;63(1):43–8.

[8] Manca R, Bruti V, Napoletano S, Marinelli E. A 15 years survey for dental malpractice claims in Rome, Italy. J Forensic Leg Med [Internet]. 2018;58(December 2017):74–7. Available from: https://doi.org/10.1016/j.jflm.2018.05.005

[9] Vehkalahti MM, Swanljung O. Operator-related aspects in endodontic malpractice claims in Finland. Acta Odontol Scand. 2017;75(3).

[10] Wu KJ, Hsieh SC, Yang CN, Chen YW, Lai CL, Lai TJ, et al. Endodontic malpractice litigations in the United States from 2000 to 2021. J Dent Sci [Internet]. 2023;18(1):374–81. Available from: https://doi.org/10.1016/j.jds.2022.11.008

[11] West J. Endodontic update 2006. J Esthet Restor Dent [Internet]. 2006;18(5):280–300. Available from: https://pubmed.ncbi.nlm.nih.gov/16987326/

[12] European Society of Endodontology. Quality guidelines for endodontic treatment: Consensus report of the European Society of Endodontology. Int Endod J. 2006; 39(12):921–30.

[13] Swedish Council on Health Technology Assessment (SBU). Methods of Diagnosis and Treatment in Endodontics: A Systematic

Review [Internet]. 2012.

[14] American Association of Endodontists. Guide to Clinical Endodontics, Sixth Edition [Internet]. 2016. p. 1–40. Available from: https://www.aae.org/specialty/clinical-resources/guide-clinical-endodontics/

[15] AlQahtani S, Bagić I, Manica S, Untoro E, Rosie J, Nuzzolese E. Under the lens: Dental expert witnesses in Brazil, Croatia, Indonesia, Italy, Saudi Arabia, and the United Kingdom. J Forensic Dent Sci. 2018;10(1):8.

[16] Graskemper JP. A new perspective on dental malpractice: practice enhancement through risk management. J Am Dent Assoc [Internet]. 2002;133(6):752–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/ 12083 652

[17] Alrahabi M, Zafar MS, Adanir N. Aspects of Clinical Malpractice in Endodontics. Eur J Dent. 2019;13(3):450–8.

[18] Rasaratnam L. Human factors in dentistry: Part 2. Whose fault is a mistake? Dent Update [Internet]. 2023;50(8):668–74. Available from: https://www.dental-update.co.uk/content/general-dental-practice/human-factors-in-dentistry-part-2-whose-fault-is-a-mistake

[19] Plessas A, Nasser M, Hanoch Y, O'Brien T, Bernardes Delgado M, Moles D. Impact of time pressure on dentists' diagnostic performance. J Dent [Internet]. 2019;82(December 2018):38–44. Available from: https://doi.org/10.1016/j.jdent.2019.01.011

[20] Tabassum S, Khan FR. Failure of endodontic treatment: The usual suspects. Eur J Dent. 2016;10(1):144–7.

[21] Moscoso LEN. Understanding Medical Error : A Comprehensive Overview. Mega J Case Reports. 2024;7(8):2001–6

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