Research Article

A survey on knowledge, attitude, and practice about endodontic mishaps and its management among practicing dentists

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ABSTRACT

Introduction: Endodontic treatment includes procedures that were framed to maintain the health of pulp tissue and periapical portion of the tooth. If the pulp is diseased or injured, the treatment is done to preserve the normal radicular tissues. The aim of this study is to determine the knowledge, attitude, and practice about endodontic mishaps and its management among practicing dentists. **Materials and Methods:** A questionnaire consisting of 15 multiple choice questions was prepared based on etiology, prevention, and management of endodontic mishaps using online software. This study was conducted online which included 100 participants who were general practitioners and specialists working in clinics. The data were collected and analyzed. **Results:** The result shows that only 59% of surveyed dentists are aware of etiology, 58.8% were aware of prevention, and 51.6% aware of the management of endodontic mishaps that occurring during procedure. **Conclusion:** Dentists, being members of health-care profession, should know about endodontic mishaps and its management which may occur during procedure. Only 56.4% are aware of endodontic mishaps and its management according to the study.

KEY WORDS: Apical, Files, Formation, Irrigant, Management, Prevention

INTRODUCTION

Endodontics is the preparatory discipline in which the treatment focuses on conservative or prosthetic restoration of a tooth. Maintaining the integrity of natural dentition is essential for fully functional and esthetic conditions.[1] Endodontic treatment includes procedures that were framed to maintain the health of pulp tissue and periapical portion of the tooth. If the pulp is diseased or injured, the treatment is done to preserve the normal radicular tissues. If the disease has progressed to the periradicular tissues, then the treatment is aimed at restoring them to health.[2] Root canal treatment (RCT) is usually aimed to maintain or restore the health of the dental pulp and periradicular tissues. The outcome of the therapy depends on the operator's ability to perform the whole procedure without making any mistakes.[3] According to Ingle and Bakland, endodontic mishaps can be access related which are due to treating the wrong tooth, missed canals, damage to existing restoration, access cavity perforations, and crown fractures; instrumentation related which are due to ledge formation, cervical canal perforations, midroot perforations, apical perforations, separated instruments and foreign objects, and canal blockage; and obturation related due to over- or under-extended root canal fillings, nerve paresthesia, vertical root fractures, and other forms such as post-space perforation and irrigant related.[4] Some studies demonstrate a reduction in the cutting efficiency of instruments due to autoclaving; this may weaken the instrument as cause breakage while using inside the canal.[5] The irrigants used in root canal procedure sometimes may lead to allergic reactions.[6]

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MATERIALS AND METHODS

This study is conducted to determine the knowledge, attitude, and practice about endodontic mishaps and its management among practicing dentists.

Questionnaire

A questionnaire consisting of 15 multiple choice questions was prepared based on etiology, prevention,

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and management of endodontic mishaps using online software. This study was conducted online which included 100 participants who were general practitioners and specialists working in clinics. The data were collected and analyzed.

Questionnaire on endodontic mishaps:

1. The cause of perforation during access cavity preparation is due to
   a. Improper size of bur
   b. Lack of proper degree of the axial inclination
   c. Additional canals
   d. Debris accumulation.

2. Ledge formation/ledging occurs due to
   a. Over enlargement of small, curved canals
   b. Calcification
   c. Multiple canals
   d. Straight canals.

3. Errors that occur during obturation are due to
   a. Inadequate cleaning and shaping
   b. Forcing and driving instruments into the canal
   c. Extensive irrigation
   d. Poor periodontal status.

4. Most common error that leads to the separation of instrument during RCT
   a. Forcing instruments into canal without proper access
   b. Inadequate lubrication
   c. Increased speed of instrumentation
   d. Improper radiographic examination.

5. Toxicity due to irrigants used may be due to
   a. Systemic illness
   b. Curved canals
   c. Concentration of the irrigants
   d. Isolation.

6. Ledging can be recognized by
   a. Loss of normal tactile sensation of tip of the instrument binding in lumen
   b. Increased tactile sensation of tip of the instrument binding in lumen
   c. Instrument point appears directed toward lumen of canal
   d. None of the above.

7. Irrigant toxicity may be recognized by
   a. Pain, swelling, and interstitial hemorrhage
   b. Loss of sensation
   c. Paralysis of facial muscles
   d. Drooping of the angle of mouth.

8. How errors during obturation can be prevented?
   a. Accurate working length measurement
   b. Proper cleaning and shaping
   c. Proper radiographic examination
   d. All the above.

9. Most commonly used material in the management of perforation
   a. Zinc oxide eugenol
   b. MTA
   c. Dycal
   d. Composite.

10. Ledging can be corrected by
    a. Using teardrop-shaped silicon instrument stopper
    b. Using airotor with long bur
    c. Using EDTA
    d. Extraction of tooth.

11. Correction of obturation errors
    a. Extraction of tooth
    b. Retreatment
    c. Irrigation using NaOCl
    d. Lateral condensation.

12. Management of irrigant toxicity
    a. Antibiotics and analgesics
    b. Intramuscular steroids
    c. Surgical debridement
    d. All of the above.

13. Method of instrument removal
    a. Ingle's method
    b. Grossmann's method
    c. Ruddle's method
    d. Meitrac system.

14. Missed canals during access cavity preparation can be recognized best by
    a. Ultrasonic
    b. Methylene blue
    c. Champagne bubble test
    d. Magnification loupes.

15. Zipping can be prevented by
    a. Using incremental filling technique
    b. Using flexible files
    c. Prevention of the rotation of instruments in curved canals
    d. All of the above.

Statistical Analysis

Questionnaires were manually checked for completion of data. All data were entered in data entry form and tabulated in the form of graph.

RESULTS

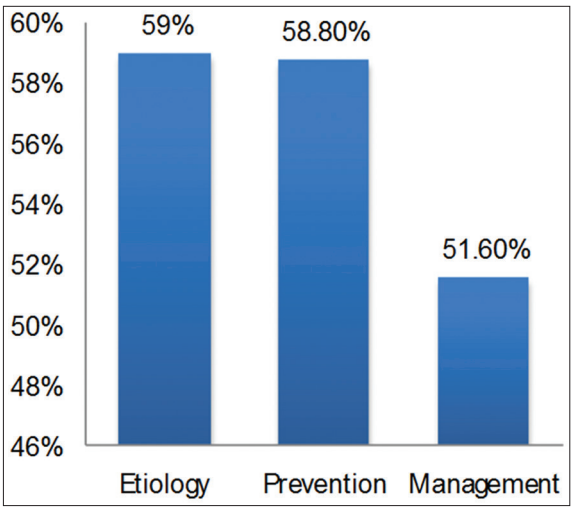
A total of 100 dentists participated in this study. Among the participants, 59% of surveyed dentists were aware of etiology, 59.8% were aware of prevention, and 51.6% aware of the management of endodontic mishaps that occur during procedure. Only 56.7% have overall knowledge about etiology, prevention, and management of endodontic mishaps

occur during procedure [Graph 1]. Based on survey, the dentists are aware of endodontic mishaps that are related to access cavity preparation and obturation. Among the surveyed dentists, most of them were reported to be aware of endodontic mishaps related to access cavity preparation and obturation. Most of them were reported to be unaware about endodontic mishaps that occur during instrumentation. Most of them were unaware of the management of endodontic mishap [Figure 1-3].

DISCUSSION

A total of 100 dentists participated in this study. Among the participants, 59% of surveyed dentists were aware of etiology, 59.8% were aware of prevention, and 51.6% aware of management of endodontic mishaps that occur during procedure. Only 56.7% have overall knowledge about etiology, prevention, and management of endodontic mishaps occur during procedure. Based on survey, the dentists are aware of endodontic mishaps that are related to access cavity preparation and obturation. Among the surveyed dentists, most of them were reported to be aware of endodontic mishaps related to access cavity preparation and obturation. Most of them were reported to be unaware about endodontic mishaps that occur during instrumentation. Most of them were unaware of the management of endodontic mishap. This is comparatively almost similar to the results obtained by a study done in Saudi Arabia by Alhekeir *et al*., which was reported to be 59.3%.[7] However, the results are higher than the results obtained from a study done by Balto *et al*.[8]

In a study, a survey on soft tissue injuries was done among dental practitioners. In that study, about 17% of the participants were reported to answer that they face soft tissue injury during root canal procedure.[9] In another study, mishaps while cleaning and shaping of canals using files were evaluated with stainless steel and NiTi files. It was reported that NiTi wires were better than stainless steel, as the stainless steel files caused almost 10% of perforation among overall cases done under research.[10] An *in vitro* study using scanning electron microscopy analysis has reported that significant cytotoxicity was observed with both commonly used cement and gutta-percha.[11] A study has reported that over extrusion of root filling materials into periapical tissues should be avoided to increase the probability of treatment success.[12] Another study was done on failure of RCT due to procedural errors, it showed that among the total 51 complications



Graph 1: Percentage of the distribution of knowledge about etiology, prevention, and management on endodontic mishaps

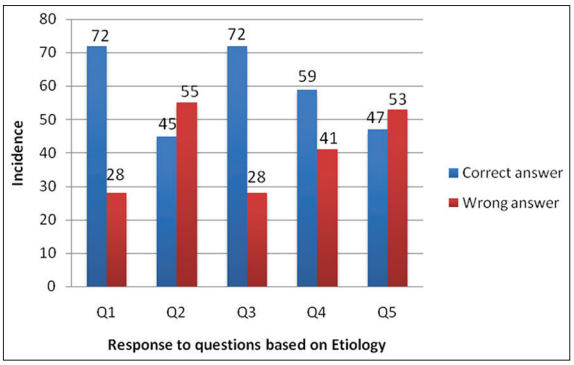


Figure 1: Distribution of responses to questions based on the etiology of endodontic mishaps

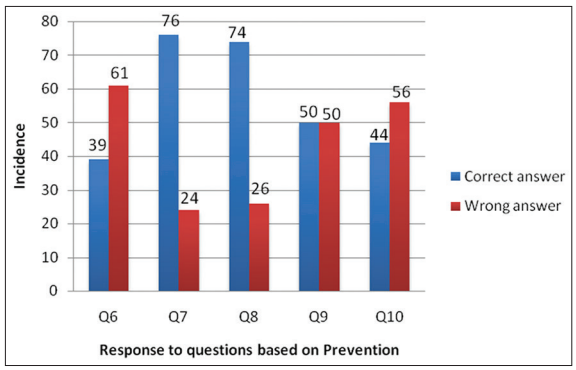


Figure 2: Distribution of responses to questions based on the prevention of endodontic mishaps

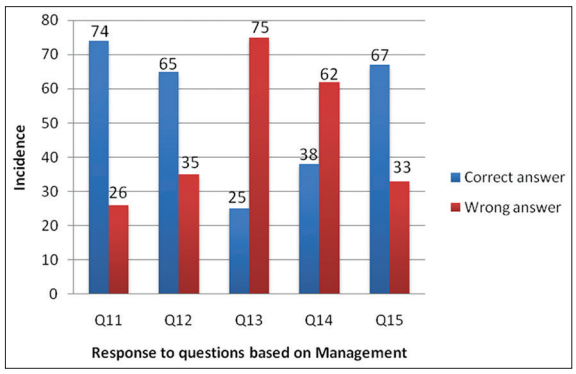


Figure 3: Distribution of responses to questions based on the management of endodontic mishaps

reported, 11 were file breakage that led to 3 failures (27.3%), 18 were perforations with 7 failures (38.9%), and 22 were flare-ups with 4 failures (18.2%).[13] Perforation was noted to be a major mishap reported in a study and was common reason for failure of the treatment on follow-up.[14]

Another study evaluated the prevalence of instrument fracture during procedure among postgraduates. The study showed that the prevalence was reported to be about 1.83% during root canal preparation, instrument breakage was reported to be about 7.41%, and among them, stainless steel instruments were reported more predominant to fracture.[15] A case study showed that overfilling the mandibular root canal with sealer leads to inferior alveolar nerve paresthesia.[16] The foreign body entrapment may lead to neurological complications.[17] A study conducted on frequency of errors done during RCT. The study showed that the most commonly reported error was void formation in canine and incisors; the second common error was reported to be overfilling.[18] While in another study, underfilling was most commonly reported error and the second common error was ledge formation,[19] whereas in another perforation was commonly reported error.[20]

CONCLUSION

RCT presents a great challenge to a dental student where mishaps commonly occurred. The clinician must practice careful and judicious shaping strategies that use multiple confirmations of working length and take serious precaution against over instrumentation. We must recognize that these injuries should encourage reflection on the safe and prudent practice of endodontics that promotes safeguards. Our ethical obligation to protect patients from harm is met when we as a profession can provide advanced and sophisticated therapies in a safe and controlled manner with patient safety as an overriding priority.

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