

LITERATURE REVIEW

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Presentation:

This document contains the results of a literature review focused on understanding knowledge and practices on dental treatment protocols that researchers at Zonguldak Bulent Ecevit University, Faculty of Dentistry, Department of Endodontics plan to standardise, including those published by professional organisations, government agencies, and academic institutions in Türkiye. The reviewed literature covers documents from the last 15 years. While it provides a general overview of European Union or nation-wide best practice studies conducted across Europe or United States to reflect the European perspective, the literature review mostly focuses on documents produced in Türkiye. The literature includes studies published in English.

According to the structure proposed in the application form, this review is made up of three sections:

- 1) An overview of the dental treatment protocols in Europe and Türkiye
- 2) Review of the best practices and evidence-based recommendations in Europe and Türkiye to help ensure that the dental treatment protocols are based on the latest research and knowledge in the field
- 3) Review of the improvement areas evident from the literature.

A similar strategy was used in each of the sub-topics of the literature review addressed in sections 1, 2 and 3 as follows.

FIRST SECTION

The similarity of treatment protocols in the field of endodontics in Europe and Turkey. Endodontic treatments in Turkey are based on the guidelines of the European and American Academies of Endodontics, and are carried out in accordance with the main principles displayed in these documents. The aim of this project is to develop a tool to support dental students in learning to recognise the most appropriate treatment options for deep dental caries.

This statement was to summarize current best evidence on the diagnosis and classification of deep caries and caries-induced pulpal disease, as well as indicating appropriate clinical management strategies for avoiding and treating pulp exposure in permanent teeth with deep or extremely deep caries. Contemporary management strategies for the cariously exposed pulp have seen the re-emergence and extension of vital pulp treatment techniques such as partial and complete pulpotom. Preservation of pulpal health maintains to continue the pulp's developmental (primary and secondary dentinogenesis) and defensive.

Developments in understanding of the defensive response of the dentine-pulp complex and a drive to develop minimally invasive treatment solutions in Endodontics have created significant interest in vital pulp treatment.

In deep caries; Carious hard dentin is present in the periphery of the cavity, irrespective of the method of caries removal employed. It is imperative that soft or firm dentin is confined to the pulpal surface.

The use of calcium silicate to the dentin barrier on the pulpal surface prior to the application of a composite restoration is advised. Alternatively, the utilisation of glass ionomer cement is advised.

In pulp exposure with caries; Ideally, cotton pellets soaked in sodium hypochlorite (0.5%-5%) or chlorhexidine (0.2%-2%) are used to ensure haemostasis and disinfection. Saline can be used, but it has no disinfecting properties. If haemostasis is not achieved within 5 min, more pulpal tissue should be removed (partial or total pulpotomy). In cases of irreversible pulpitis in the coronal pulp tissue, a full coronal pulpotomy can be performed up to the root canal orifices. When

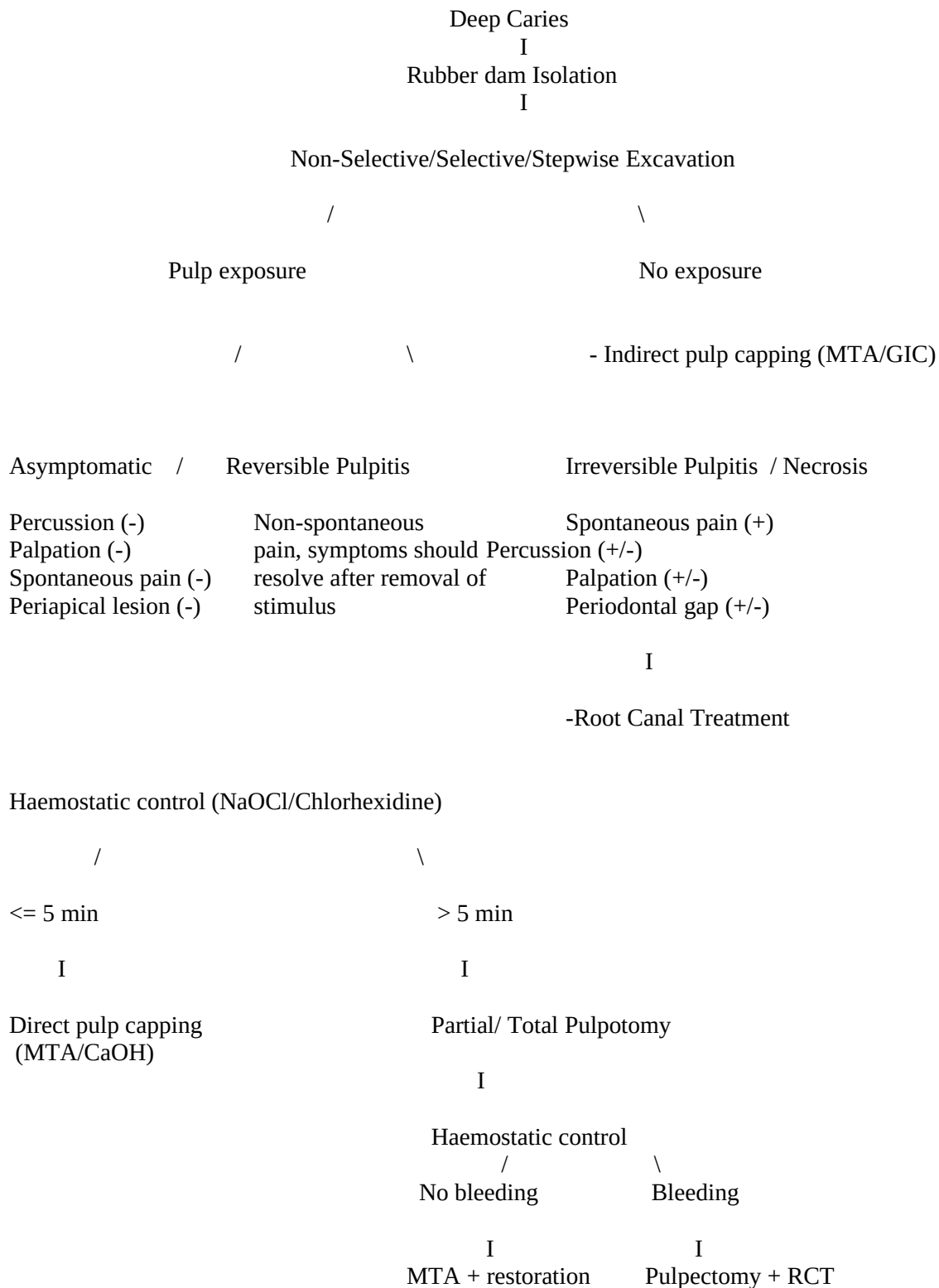
haemostasis is achieved, calcium silicate cement should be placed directly on the pulp tissue and the tooth should be restored as soon as possible to prevent microleakage (Al-Hiyasat et al. 2006, Mente et al. 2010, Harms et al. 2019) If haemostasis is still not achieved after total pulpotomy, pulpectomy and root canal treatment should be performed.

Endodontic treatment is based on an analysis of all diagnostic information. Treatment planning should include a determination of the strategic importance of the tooth or teeth considered for treatment, the prognosis and the urgency of treatment. Diagnostic evaluation of pulpal and periradicular status must be performed for every tooth to be treated. Treatment is also planned according to the patient's symptoms.

Enough roof of the pulp chamber is removed to visualize the entire pulpal floor. Cleaning, shaping, disinfection and obturation of all canals is accomplished using an aseptic technique with dental dam isolation. The tooth must be restored prevent coronal leakage into the root canal system.

Despite the absence of a formal guideline for the management of teeth with deep caries in Turkey, it is acknowledged that such interventions are frequently undertaken in accordance with the standards and recommendations established by the ESE (European Society of Endodontology) and AAE (American Academy of Endodontics). Furthermore, it is important to note that national and international studies on this subject are published.

It is concluded that a systematic review of the literature is important for accurate diagnosis and selection of treatment methods for deep caries. Although dentistry students learn about many treatment options for deep carious teeth during their theoretical education in the faculty, they cannot apply their theoretical knowledge to patients completely. This study aims to teach students how to apply treatment options to patients according to the presence of different dental symptoms. The digital tool is designed to help students learn more effectively by putting their theoretical knowledge into practice.



Those include the title structure as follows:

European Society of Endodontology position statement: Management of deep caries and the exposed pulp

(European Society of Endodontology position statement: Management of deep caries and the exposed pulp. International Endodontic Journal, 52, 923–934, 2019.)

- **Title of the document** European Society of Endodontology position statement: Management of deep caries and the exposed pulp
- **Journal:** International Endodontic Journal
- **Year of publication:** 52, 923–934, 2019.
- **Authors:** Duncan HF, Galler KM, Tomson PL, Simon S, El-Karim I, Kundzina R, Krastl G, Dammaschke T, Fransson H, Markvart M, Zehnder M., Bjørndal L. E
- **Link:**
- **Extended summary** This position statement on the management of deep caries and the exposed pulp represents the consensus of an expert committee, convened by the European Society of Endodontology (ESE). Preserving the pulp in a healthy state with sustained vitality, preventing apical periodontitis and developing minimally invasive biologically based therapies are key themes within contemporary clinical endodontics. The aim of this statement was to summarize current best evidence on the diagnosis and classification of deep caries and caries-induced pulpal disease, as well as indicating appropriate clinical management strategies for avoiding and treating pulp exposure in permanent teeth with deep or extremely deep caries. In presenting these findings, areas of controversy, low-quality evidence and uncertainties are highlighted, prior to recommendations for each area of interest. A recently published review article provides more detailed information and was the basis for this position statement (Bjørndal et al. 2019, International Endodontic Journal, doi:10.1111/iej.13128). The intention of this position statement is to provide the practitioner with relevant clinical guidance in this rapidly developing area. An update will be provided within 5 years as further evidence emerges.

- **Title of the document** Guide to Clinical Endodontics
 - **Journal, Year of publication:** 2019
 - **Authors:** AAE Clinical Practice Committee Patrick E. Dahlkemper, Chair Dan B. Ang Robert A. Goldberg Richard L. Rubin, Board Liaison Gary B. Schultz Beth A. Sheridan Joel B. Slingbaum Michael G. Stevens William D. Powell, Consultant.
 - **Link:** aae.org
 - **Extended summary** The AAE developed the Guide to Clinical Endodontics for use by endodontists, and it reflects current clinical considerations in the specialty. AAE members can also share the Guide with general dentists to highlight the importance of appropriately referring cases to an endodontist for treatment.
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- **Title of the document** Endodontik tedavinin gizli silahı:İrrigasyon
 - **Journal:** Roots (journal of Turkish Endodontic Society)
 - **Year of publication:** 2019;2: 26-33.
 - **Authors:** Sezgin PG, Gündogar M.
 - **Link:**
 - **Extended summary** Effective and reliable flushing of root canals with irrigation solutions is of great importance for the success of endodontic treatment. Mechanical shaping of the root canals results in a decrease in the bacterial population.
 - However, the elimination of bacteria is not completely successful without the use of irrigation solutions. Among these irrigation solutions, sodium hypochlorite is the most widely used today.
 - and still retains its value. Various methods and tools have been developed in recent years to increase the effectiveness of sodium hypochlorite solution in root canal shaping and post-root canal use. Root canal disinfection using various irrigation activation systems and new technologies is known to increase the success of endodontic treatment.

In this review, the known and emerging root canal irrigants and the methods used to improve the efficacy of these irrigants are analysed. New techniques and systems are reviewed in the light of current literature.

SECOND SECTION

A systematic review of the literature is important for the selection of canal filling methods. Despite the fact that dental students learn numerous root canal filling techniques during their theoretical education at the faculty, they are unable to visualise the situations in which they should apply their theoretical knowledge.

The objective of this digital tool is to provide students with the necessary knowledge and understanding of the circumstances in which different canal filling methods should be employed. The digital tool has been designed to assist students in enhancing their learning efficacy by facilitating the application of their theoretical knowledge in a digital environment.

Success of endodontic therapy is dependent on many factors including proper diagnosis, treatment planning, knowledge of canal anatomy and morphology, debridement and obturation of root canal. Obturation is the process of three-dimensional filling of entire root canal system with the help of root canal sealers. Root canal anatomy includes auxiliary canals, loops and fins which are often difficult to obturate. To protect against apical and coronal leakage, which are frequently causes of failure, a three-dimensional obturation of the root canal system is essential. Thus the thermoplasticized obturation systems were introduced to overcome the drawbacks of the cold condensation techniques. Based on the technique used thermoplasticized obturation systems can be classified under two categories Injection systems and Carrier based systems.

The aim of endodontic treatment is thorough debridement and cleaning of the root canal system of any infected pulp tissue so the canal space can be shaped and prepared to be filled with an inert material thus preventing or minimizing any chances of reinfection.

It is concluded that a systematic literature review is important for the selection of root canal filling methods. Although dental students learn root canal filling methods during their theoretical

education at the faculty, they may be undecided about which technique to apply their theoretical knowledge according to the case. This study aims to teach students which method of root canal filling methods to apply according to the case. The digital tool is designed to assist to dentistry students to learn more effectively by putting their theoretical knowledge into practice.

- **Title of the document** Endodontic obturation techniques: A review
- **Journal:** International Journal of Health Sciences
- **Year of publication:** 2024;8(1):1033-40.
- **Author:** Kapoor, K.
- **Link:** <https://doi.org/10.53730/ijhs.v8nS1.14995>
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Extended summary

Obturation in endodontics is one step which is of utmost importance. For success of endodontic process a tight seal should be achieved which is necessary for successful treatment. Over the past few years, advanced obturation materials and techniques have been introduced for endodontic therapy. Among the different obturating materials available, gutta percha is one of the most widely used. Various techniques available for condensing gutta percha are available. Newer devices are being introduced some of which are heat, injection, vibration, compaction & carrier based systems. This article aims to present the different techniques available for root canal filling materials.

