OTIMIZAÇÃO DO TRATAMENTO ENDODÔNTICO EM DENTES DECÍDUOS: UMA REVISÃO DE LITERATURA

Optimizing endodontic treatment in primary teeth: a literature review

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RESUMO

Há diversos fatores que influenciam no sucesso e na eficácia do tratamento endodôntico em Odontopediatria, destacando-se a imprevisibilidade e a complexidade morfológica dos canais. Sendo assim, existe a necessidade de uso de materiais de qualidade para diminuição dos riscos iatrogênicos durante a pulpectomia, sempre objetivando a manutenção dos dentes decíduos no arco dentário até a sua esfoliação fisiológica. Trata-se de um procedimento desafiador e demorado, que pode afetar negativamente o manejo entre o profissional e o paciente infantil. Logo, a busca constante por tecnologias que otimizem este tratamento, bem como a melhora na qualidade de modelagem e sanificação dos canais radiculares é frequente. Mais recentemente, os avanços da endodontia de dentes permanentes, estão sendo trazidos para a Odontopediatria, como o emprego dos localizadores apicais, sistemas de instrumentação mecanizados e uso de instrumentos com liga de NiTi, recursos capazes de diminuir o tempo de duração das sessões, proporcionando maior conforto para o paciente durante o atendimento. Portanto, o objetivo deste artigo é rever o uso destas tecnologias e instrumentos no preparo e tratamento dos canais radiculares de dentes decíduos, enfatizando pontos relevantes ao sucesso do atendimento, principalmente na Odontopediatria.

Palavras-chave: Dente decíduo; Pulpectomia; Endodontia mecanizada.

ABSTRACT

Many factors influence the success and efficacy of endodontic treatment in primary teeth, such as unpredictability and the morphological complexity of the canals. Thus, the quality of the obturation materials should aim at decreasing the iatrogenic risks during pulpectomy to maintain primary teeth until their physiological exfoliation. Pulpectomy of primary teeth is challenging because longer chair-side time may negatively affect the behavioral management of the child. Considering that challenging approach, the professionals frequently search for technologies that optimize the treatment and improve root canal modeling and sanitization. To provide more comfort to the child during the treatment, recently, the advancements in permanent tooth endodontics have been employed in primary tooth pulpectomy such as apical locators, rotary instrumentation, and NiTi instruments. Therefore, this study aimed to review the use of these technologies and instruments in the endodontic treatment of primary teeth, emphasizing the relevant key factors for treatment success.

Keywords: Tooth, Deciduous; Pulpectomy; Endodontics; Technology

INTRODUCTION

Successful root canal treatment depends on the proper chemical-mechanical cleaning and preparation, which have been traditionally obtained in primary tooth with the use of endodontic hand files (COLL et al., 2020; AMORIM et al., 2022), odontometry through radiographic images, and obturation with resorbable pastes (LAKSHMANAN et al., 2020).

The literature agrees that manual instrumentation of primary teeth is the “gold standard”, but it has disadvantages as difficult in accessing curve root canals which results in either non-instrumented areas, steps, excessive weariness, or perforations (SHAH et al., 2021). Child cooperation and complex root canal morphology may result in longer chair-side time which may lead to behavior problems (MANKER et al., 2020). Furthermore, longer instrumentation time may negatively impact on the child behavior during treatment (GOMES et al., 2020). Thus, endodontic treatment of primary tooth is challenging and requires updated techniques.

METHODOLOGY

A search was carried out in Pubmed/ MEDLINE, BVS and SciELO databases in order to identify relevant articles about pulpectomy in primary teeth using the following combination of keywords: “deciduous tooth”, “pulpectomy” and “endodontics”. The inclusion criteria were articles published in English between the years of 2017 and 2022 who provided an abstract and were related to endodontic instrumentation and technologies in pediatric dentistry. Articles meeting the following criteria were excluded from the literature review: studies that did not provide the abstract, that were not in the English language and were not related to the main theme. After applying the inclusion and exclusion criteria of a total of 134 articles, 31 papers were selected.

LITERATURE REVIEW

Major new technological advancements have been observed with the introduction of mechanized instrumentation and ultrasound in the root canal treatment of primary teeth (CHAUHAN et al., 2019; GOMES et al., 2020; CĂPUTĂ, RETSAS, KUIJK, CHÁVEZ DE PAZ et al., 2019). The use of motor-driven instruments in Pediatric Dentistry was first described in 1999 (BARASUOL et al., 2021) with the aim to improve treatment efficacy and speed, decrease chair-side time and dentist’s effort, and provide greater comfort to the child. Motor-driven instruments are safer, more effective, with better quality and design and they avoid

complications (root canal steps, perforations, and deviations), preventing either the weakening of the tooth structure or the risk to the permanent successor (BONCHOO et al., 2020; HARIPRASAD et al., 2021). Moreover, rotary instrumentation of primary root canals results in more conical shaping, more effective removal of infected dentin from the canal walls, and higher clinical success rate (GOMES et al., 2020; HARIDOSS et al., 2022). Mechanized root canal shaping preserves root morphology and maintains the preparation center (MEHLAWAT et al., 2019).

Nickel-titanium (NiTi) alloys were developed to overcome the risk of instruments fracture through thermal treatment, resulting in superelasticity and shape memory effect (IACONO et al., 2017; ZUPANC et al., 2018). The improvement of the mechanical properties and root canal instrumentation have been achieved for the endodontic treatment of permanent teeth; however, Pediatric Dentistry lacks a protocol for rotary instrumentation of primary teeth (MANCHANDA et al., 2020). For now, the use of rotary instruments specifically designed for primary teeth shows smaller root canal wall weariness and shorter chair-side instrumentation time, maintaining the center of the root canal preparation (MOHAMED et al., 2022).

Root canal shaping and cleaning is important for endodontic treatment success. The literature agrees with the use of sodium hypochlorite solutions at different concentrations (FORGHANI et al., 2017; VERMA et al., 2019). Also, literature supports other more effective but less aggressive solutions such as those containing silver nanoparticles (MORADI and HAGHGOO 2018). The adjunctive use of laser has also been effective for primary tooth endodontics. Recent studies point out that low-level laser could be an alternative in Pediatric Dentistry due to absence of toxicity effects compared to those of sodium hypochlorite on permanent tooth buds because laser device tip is placed onto the pulp chamber (OTER et al., 2018; YAVAGAL et al., 2019).

Irrigation tips have already improved by showing a better adaptation towards root canal curvature and accessory canals and better spray formation of the irrigant (SASANAKUL et al., 2019). Moreover, the literature supports the use of ultrasound irrigation in permanent tooth endodontics because it takes the irrigant through agitation towards the most difficult areas such as accessory canals and apical ramifications (FORGHANI et al., 2017).

Working length determination accuracy is another key factor for endodontic treatment. Also, in Pediatric Dentistry the obturation limit is mandatory to avoid damage to the permanent successor (KAYABASI et al., 2020). The traditional method with radiographs has the disadvantages such as exposure to radiation; child's small mouth opening; and low cooperation to take the radiograph, which

increases the chair-side time (SAHNI et al., 2020). Furthermore, radiographic image is two-dimensional and can lead to distortion and error in working length measurement. Considering the above characteristics, apical locators have been employed in Pediatric Dentistry to overcome the drawbacks of working length determination by radiographs (BHAT et al., 2017).

Apical locators are faster because permanent successor superimposition does not make the working length determination difficult and safer because they do not use radiation (SAHNI et al., 2020). The literature reports apical locators' high accuracy in determining working length in primary teeth due to the measurement through electric resistance rather than visual examination of the apical foramen (KAYABASI & OZNURHAN et al., 2020; SHIBIN et al., 2022). Some devices have the locator and rotary motor in the same equipment, which allows the monitoring of the working length during preparation. However, the presence of the physiological resorption in primary teeth may negatively affect this monitored preparation (ADRIANO et al., 2019). Thus, the accurate training of the dentist is mandatory for the success of apical locators in primary tooth endodontic. Despite that, apical locators overcome the disadvantages of radiographs, are more accurate and faster even in the presence of accessory canals and multiradicular teeth (RATHORE et al., 2020).

CONSIDERATIONS

Despite the use of modern technologies in primary tooth endodontics highlighted in this literature review, further studies are necessary to indicate some techniques in Pediatric Dentistry. Even with the inherent differences between permanent and primary tooth, the literature supports the use of these technologies considering the shorter chair-side time and better root canal preparation, which are key points for endodontic treatment success in Pediatric Dentistry.

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