Development of an auxiliary interactive presentation for deciding on pulp therapy in deciduous teeth

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ABSTRACT

The objective was to develop an interactive presentation able to help dentists and undergraduates to select the most appropriate pulp therapy for each case, as well as to report the users' experience. Based on the literature, the signs and symptoms associated with pulp involvement in deciduous teeth were listed to cover the possible related clinical situations. Conditions that could contraindicate treatment were also listed, such as the impossibility of restoration. These data were used to create a slideshow, in Microsoft Power Point™, in which it is possible to mark the data collected in the anamnesis as well as the clinical and radiographic signs of the case. From the combination of answers, the user receives a relation of suitable treatment options. The product was evaluated by undergraduates, dentists and pediatric dentists regarding use, content and understanding. They were instructed to report their considerations and encouraged to make suggestions, which were discussed by the researchers and, when relevant, were incorporated. Finally, the interactive presentation consisted of 41 slides that correlate the marked data and inform dentists and undergraduates about the most appropriate treatment options for deciduous teeth that have reversible or irreversible pulpal inflammation or necrosis. Users described the tool as “easy to use”, “very good”, “a great help”, among other positive aspects.

Descriptors: Pediatric dentistry. Tooth, Deciduous. Pulpitis. Education, Dental.

1 INTRODUCTION

The primary dentition is often affected by dental caries and traumatic injuries[1-3]. Untreated carious lesion, following the natural course of the disease, culminates in pulp involvement, while an episode of dental trauma can immediately expose the pulp or even cause long-term pulp alterations[4]. The inherent characteristics of deciduous teeth, such as lower mineralization and thickness of dental tissues, prominence of pulpal horns and relative amplitude of the pulp chamber, favor the progression of this disease[5]. Considering the functions and importance of the deciduous

tooth, pulp therapy is indicated whenever possible.

To carry out this treatment, it is necessary to gather data regarding the patient's and dental condition to select the most appropriate therapy for each case. During the anamnesis, it is necessary to collect data on general health, conditions that contraindicate pulpal therapies, the presence, and characteristics of painful symptoms, such as the stimuli that provoke them, period, location, and duration of pain. Through the clinical exam, it is necessary to identify the compromised tooth, the existence of caries/traumatic lesion, investigate the presence of clinical alterations, such as mobility, edema, fistula, abscess, in addition to the possibility of the tooth being isolated and restored. To plan a pulpal intervention, it is essential to carry out a radiographic evaluation, in which the presence of signs of pulp involvement, such as thickening of the periodontal ligament space, solution of continuity of the lamina dura, areas of bone rarefaction throughout the surrounding region and along the length of the root, internal or external resorption or fracture, should be observed[2,6,7].

The treatment decision is based on the individual combination of signs and symptoms present in each patient[8]. Face of suspected pulp involvement treatment possibilities include - but are not limited to - pulp capping, pulpotomy, pulpectomy and non-instrumental endodontic treatment[2,6,7]. Although the indications for these pulpal therapies are known and widely publicized, there is still a lot of difficulty when deciding on the best treatment for each case of suspected pulp involvement. In an attempt to minimize this problem, it may be interesting to use technology in favor of treatment, especially in the current context in which digital tools have increasingly appeared in teaching strategies[9].

In this sense, this study aims to report the development of an interactive product to help undergraduates, dentists, and pediatric dentists to select the most appropriate treatment in the face of suspected pulp involvement in deciduous teeth. Finally, report the experience of use.

2 EXPERIENCE REPORT

Considering the years of clinical, teaching and investigation experience of the Research Group on Endodontics in Pediatric Dentistry at the Federal University of Rio de Janeiro (from Portuguese *Grupo de Pesquisa em Endodontia em Odontopediatria da Universidade Federal do Rio de Janeiro*, GEdOPED-UFRJ) and the frequent doubts of undergraduates and professionals, it was decided to develop a tool capable of objectively responding to the needs of professionals and students regarding the difficulty of choosing pulp treatment. This difficulty has been pointed out in classes and lectures over the last 20 years. Thus, the research group addresses the university's mission of generating direct benefit to society.

Thus, a consensus meeting was held to define the relevant content to be addressed by the tool, focusing on the most frequently asked questions. At first, we would only include cases with an indication for pulpal therapy. However, reflecting on the needs of a user with little experience and who considers that there is pulpal involvement when in reality there is not, and that would resort to an auxiliary tool, we decided to also include cases that would not have this indication for treatment. Then, if a user accesses the tool mistakenly, they would not be induced to perform pulp therapy due to a limitation of the tool.

This flowchart was inserted into the software Microsoft PowerPoint™ and transformed into an interactive presentation, basically structured in three blocks: the first

with instructions for using the tool (figure 1); the second, in which it is possible to mark the characteristics related to the anamnesis (figure 2), clinical (figure 3) and radiographic signs (figure 4); and the third that indicates the appropriate treatment options for the current case (figure 5). The combination of responses leads to a list of the most appropriate treatment options, according to the data provided by the user. Some of the treatment options suggested for cases in which there is no real pulp involvement are periodontal evaluation, occlusal adjustment and selective removal of carious tissue associated with restoration. While among the options offered for teeth with pulp involvement are pulpotomy, pulpectomy, non-instrumental endodontic treatment and extraction[2-7].

For this, it was necessary to filter the most important information for characterizing the clinical condition, based on literature[2,6]. After listing the possible signs and symptoms presented by the patient, those that would be more pathognomonic were selected, focusing on what would best indicate the pulp condition, such as the presence and characteristics of pain and the presence of signs indicative of necrosis such as fistula and intraosseous lesion seen on radiography. Characteristics that could contraindicate pulp therapy, such as the impossibility of isolation or posterior restoration, were also listed.

During the elaboration of the interactive presentation, a testing phase was carried out with a group of PhD students in Pediatric Dentistry and in Pathology and Oral Diagnosis, through the screen mirroring tool of the Google Meet platform.

The students dictated the information to be entered by the researcher and discussed the content, its validity and reliability, in addition to the visual and operational aspect of the presentation. In a second moment, it was also tested by a group of researchers specialized in pulp therapy in deciduous teeth (GEdOPED-UFRJ) and undergraduates. Thereupon, some adjustments were suggested, such as layout and wording changes to make the instructions clearer.

Once finalized, the tool was transformed into an interactive .pdf file to avoid changes in its content and settings and made available for new testing by undergraduates, general dentists, postgraduates, pediatric dentists, and professors of Pediatric Dentistry, who were encouraged to report their experience of use and give suggestions for the continuous improvement of the material. However, there were no new suggestions to be incorporated.

Hence, a file of less than 2 MB was obtained, enable for use in several electronic devices due to the wide compatibility offered by the .pdf format, and capable of directing the selection of the most adequate treatment for deciduous teeth with suspected pulp involvement, with a mechanism of disambiguation, preventing the suggestion of inappropriate treatments. Regarding the experience, users mentioned expressions such as “easy to use”, “very good”, “a great help”, “interesting”, “cool”, “innovative”, “I would like to use it with my students”, “quite objective”, in addition to suggesting that the same methodology could be replicated for more subjects, generating auxiliary material for other cases of difficult approach, such as dental trauma and molar-incisor hypomineralization.

The intention of this work was to help in the selection of treatment, based on the indications of the case, offering the professional plausible treatment options, giving them the freedom to choose between the appropriate ones and allowing them to resort to their preferred procedure, since there is a diversity of protocols

reported in the literature[10,11] and taught in Brazilian schools[12].

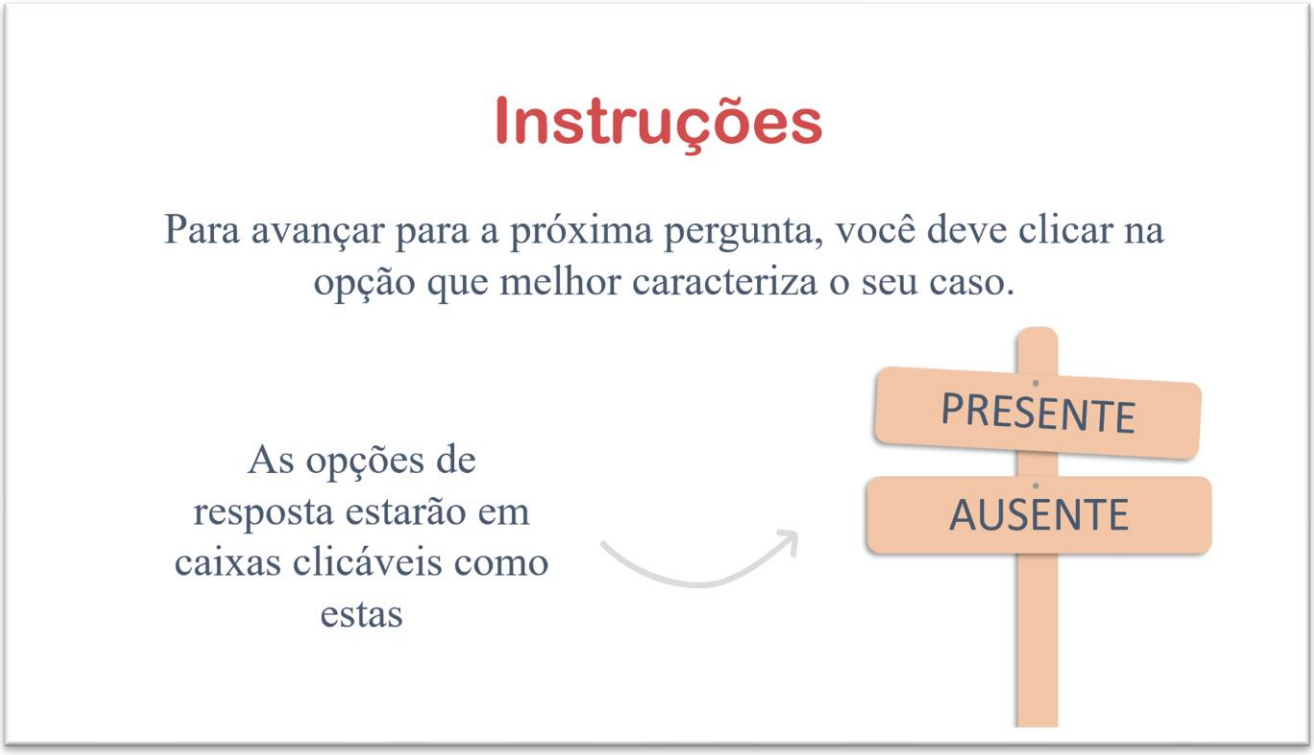

Figure 1. Slide with instructions for use

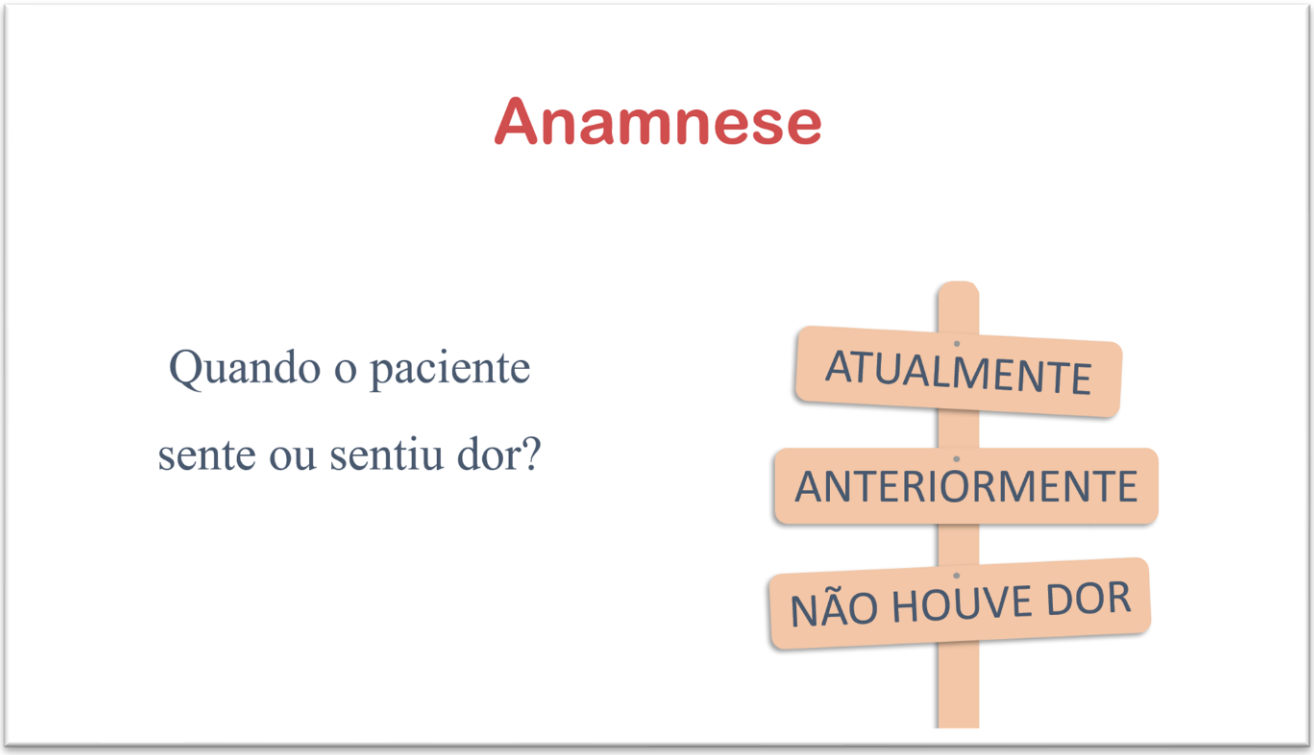

Figure 2. Slide that investigates the history of pain

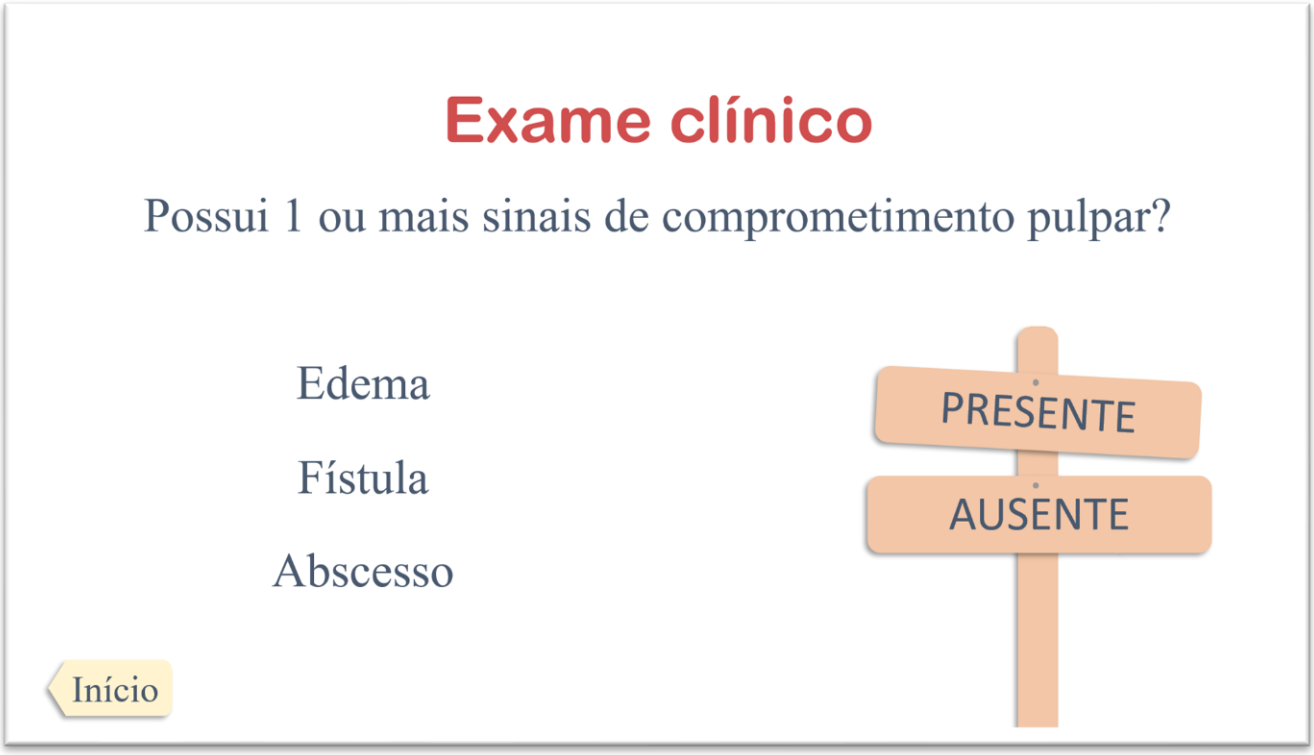

Figure 3. Slide for reporting the clinical condition

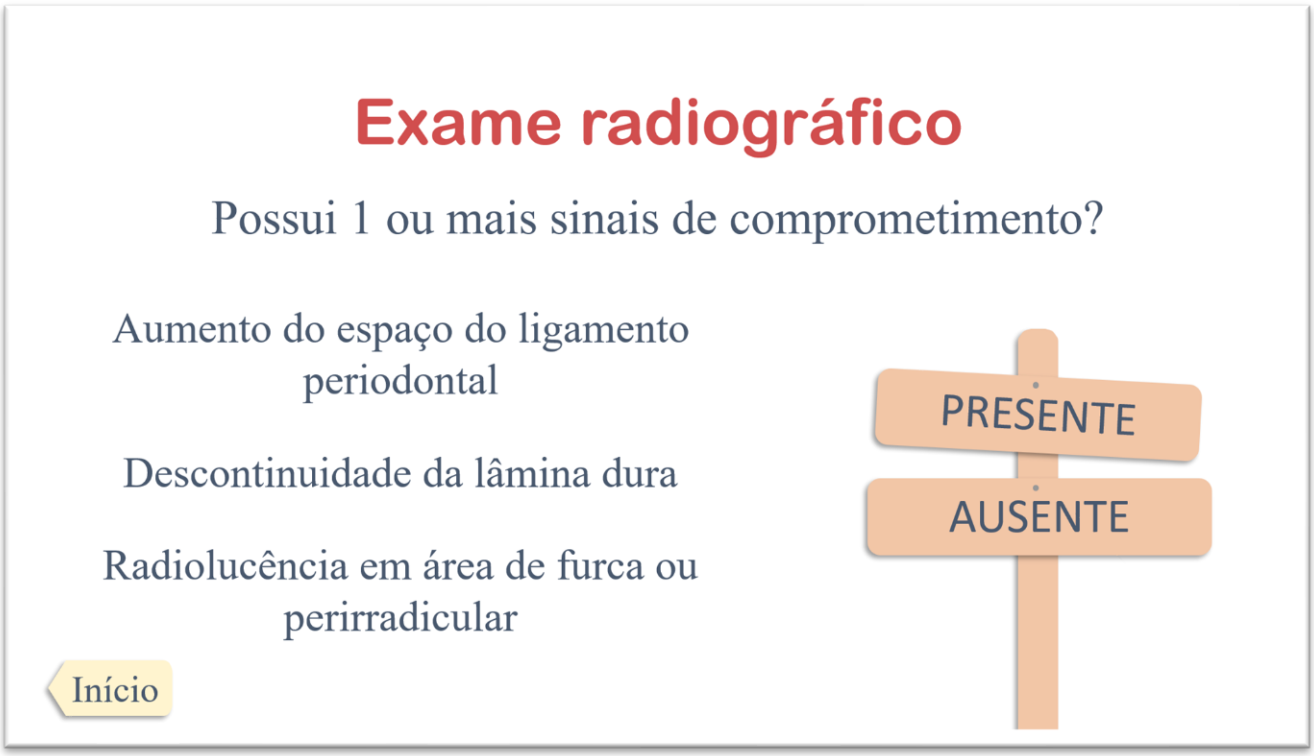

Figure 4. Slide for reporting the radiographic aspects

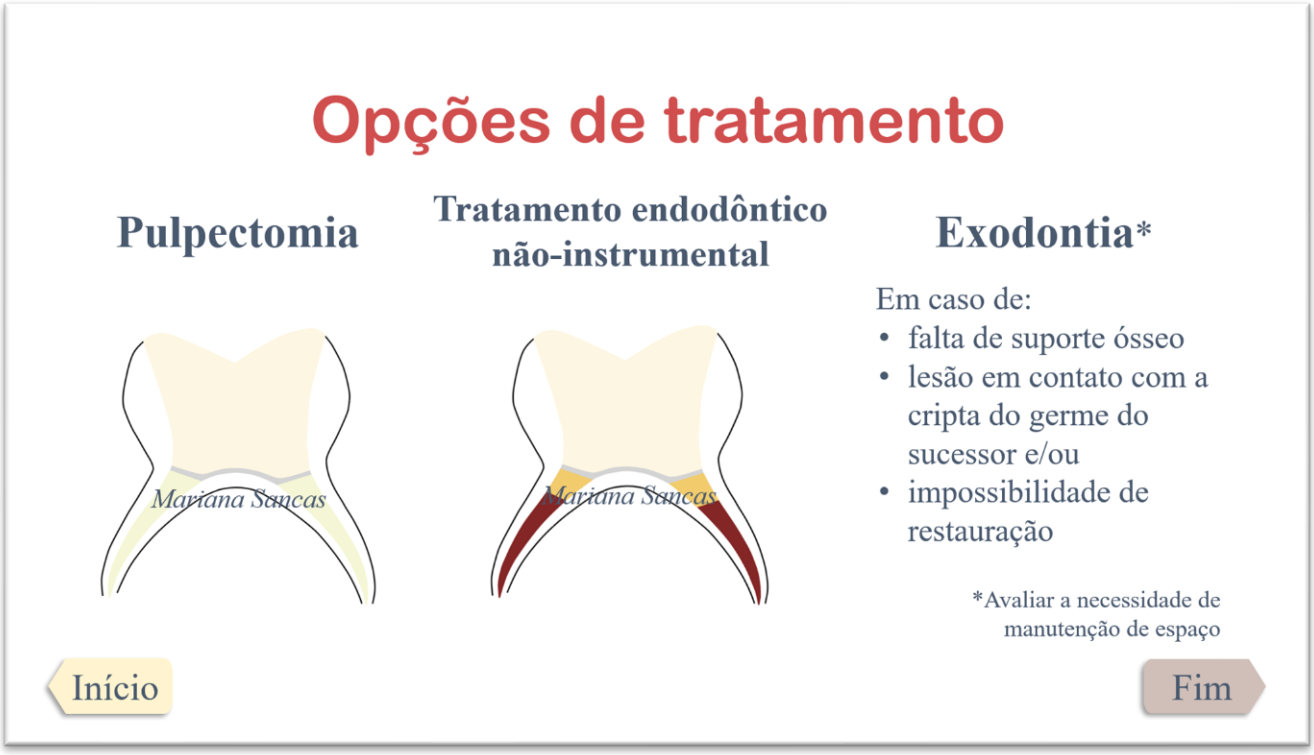

Figure 5. One of the slides for suitable treatment options

Although diverse, the protocol to be adopted was not the target of our presentation, since systematic reviews have shown that most of the materials and techniques used for pulp therapy of deciduous teeth are effective,[10,11,13] giving freedom to the professional to carry out the appropriate treatment using the materials available in their service, whether public or private.

This tool can be used both for treatment decision and for confirming the plan established by the professional. In case of disagreement, it would be able to promote reflection, suggesting the need to update the professional's knowledge. In the educational environment, it can be used within the Problem Based Learning philosophy, for activities in which the teacher simulates a clinical case, to encourage to think about the possible diagnosis, in addition to using the tool as an aid for reinforcement in an autonomous study training session.

In addition, the tool is in line with a change in the educational paradigm provided by the period of social isolation, which naturalized the use of digital tools in the teaching-learning process in Dentistry,[9] bridging the gap between the University and the students, wherever they were, breaking down walls and prejudices, irreversibly changing the way of teaching.

This work was presented at the 39th Annual Meeting of the Brazilian Society for Dental Research (from Portuguese, 39a *Reunião Annual da Sociedade Brasileira de Pesquisa Odontológica*.) and was awarded in the Research in Teaching category and the interactive presentation in .PDF format is available for download on the website of the Faculdade de Odontologia da Universidade Federal do Rio de Janeiro, in the section of the Graduate Program in Dentistry, listed as a technical product (http://www.odontologia.ufrj.br/menu-stricto-sensu-publicacoes/produ

tos-tecnicos). The group is currently working on a mobile application version that will be available in the same site.

3 CONCLUSION

A presentation was developed with the aim of assisting the clinical decision of undergraduates and dentists in cases of teeth with suspected pulp involvement. It was considered a good and accessible alternative for choosing the most appropriate pulpal treatment.

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RESUMO

Desenvolvimento de ferramenta interativa auxiliar para decisão de terapia pulpar em dentes decíduos

Objetivou-se desenvolver uma ferramenta interativa capaz de ajudar profissionais e graduandos de Odontologia a selecionar a terapia pulpar mais adequada para cada caso, bem como relatar a experiência dos usuários. Inicialmente, a partir de literatura consagrada, foram estabelecidos os sinais e sintomas associados ao comprometimento pulpar de dentes decíduos para contemplar as situações clínicas possíveis, além de condições que poderiam contraindicar a realização do tratamento, como a impossibilidade de restauração. Esses dados foram utilizados para elaboração de uma apresentação de slides, em Microsoft Power Point®, em que é possível assinalar os dados colhidos na anamnese bem como as características clínicas e radiográficas do caso, e a partir da combinação de respostas, o usuário recebe a relação de procedimentos adequados. A ferramenta foi avaliada por graduandos, cirurgiões-dentistas e odontopediatras quanto ao uso, conteúdo e compreensão. Esses foram orientados a relatar suas considerações e incentivados a fazer sugestões, que foram discutidas pelos pesquisadores e, quando pertinentes, incorporadas. Ao final, a ferramenta interativa - composta por 41 slides - relaciona as respostas obtidas e informa a cirurgiões-dentistas e graduandos a alternativa de terapia pulpar mais adequada para dentes decíduos que apresentem inflamação pulpar reversível, irreversível ou necrose. Os usuários a descreveram como “fácil de usar”, “muito boa”, “uma grande ajuda”, entre outros aspectos positivos.

Descritores: Odontopediatria. Dente Decíduo. Pulpite. Educação em Odontologia.

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