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## CLICKTRAUMA: APP ABOUT TRAUMA IN PRIMARY DENTITION

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### Abstract

The globalisation process and technology advances have led to the development of new strategies and methodologies in the education system. In the area of health, modern databases and research tools are being elaborated as well. Among different technologies, the mobile app is one of the most used because it affords quick information by optimising navigation and time. In current Odontology, dental trauma is one of the principal causes of dental loss and it is frequent in childhood. The diagnoses are very complex and it is very common do some research to get a better understanding. The aim of this study was to develop a mobile app, called ClickTrauma, for Odontology students and dentists with information about dental trauma in primary dentition, using IOS as operational system. For the development of the app Java, JavaScript, Ionic were used, and MySQL as a database. ClickTrauma offers seven different functions: diagnoses, clinical techniques and general information about dental trauma in primary dentition. Furthermore the users have access to information on how to prevent dental trauma, references and a quiz. The app was created to improve the quality of paediatric dentistry care. In addition the tool gives information about dental trauma in primary dentition for the user to get a better comprehension of the subject.

**Keywords:** mobile app; health education; dental trauma; paediatric dentistry

### Introduction

As the world is becoming rapidly connected, it is necessary to re-discuss educational development related to health services,<sup>1</sup> which is still very

traditional. In order for students to obtain solutions to an issue, fast access to information and a lighter workload in the departments of health and technology must evolve together.

Education must be able to conceive a vision of the “whole”, through innovative methods, which allow for an ethical pedagogical practice that is critical, reflective, transformative and dynamic.<sup>2</sup> In order to fulfil these necessities, information and communication technologies are being used. Among the new existing tools, are applications that allow users to spend less time searching for the information they desire.<sup>3,4</sup>

In Dentistry, the relationship between technology and education is still lacking, with few applications being used in aiding diagnostics and clinical conduct that present trustworthy scientific content.<sup>5</sup> The use of applications can provide agility while searching for specific information, which in the area of health is necessary for a thorough diagnosis, prognosis, treatment and improved patient experience.<sup>6</sup>

Among the most discussed subjects in Dentistry, is dental trauma, which is considered a public health issue.<sup>7</sup> It is one of the main causes of the loss of dental elements, mainly affecting infants and adolescents. Trauma to deciduous teeth constitutes a functional aesthetic and psychological issue associated with the child’s and the parents’ emotional involvement,<sup>8</sup> requiring a professional diagnosis and fast and efficient treatment.<sup>9</sup> The Paediatric dentistry clinic, even with many children exhibiting positive behaviour, is famous for its negative connotation. This is due to some of them being incapable of cooperating for different reasons: young age, subjective perception, previous traumatic experiences, invasive procedures on the first consultation and the inadequate management of the professional.<sup>10,11</sup>

Considering its importance and the existing

difficulty in relation to diagnostic and clinical conduct in deciduous teeth trauma cases, the objective of this research was to develop a mobile application, using IOS, for dentistry students, graduates or post graduates, as well as dental surgeons, containing functions such as: summary about trauma in deciduous teeth, diagnostic aids, clinical advice, possible consequences, preventative measures, biographical references, with secure content based on scientific evidence.

## Methods

The app was developed during 2015 and 2016 in the Teledentistry Centre of the Dentistry College of the State University of Rio de Janeiro (UERJ), in partnership with the programme from the Open University of SUS (UNASUS) for the Federal University of Maranhão (UFMA), Brazil. A multi-professional team composed of paediatric dentists, Portuguese teachers, a designer and programmer was recruited to accomplish this.

To create the application, a didactic plan was created based on the following categories: biographical data research, software development and registry. For the technical content, a review deciduous teeth trauma over the last decade was undertaken using the following sources: Lilacs, Medline and Cochrane Library, as well as the *Dental Trauma* guide. After this selection, the layout of the application was created, using direct, required and simple content. The images used were supplied by the Trauma in deciduous teeth Programme from the Paediatric Dentistry Department in the State University of Rio de Janeiro (UERJ) and the graphic schemes were provided by the Dental Traumatology magazine of 2012.<sup>12</sup>

For the product development, a design study was performed to develop the frontend using the following steps: research of similar products, brainstorming to create the name, logo, and a flowchart containing the application structure. For the programming, JavaScript, Ionic and MySQL were employed for the data banks. After production, the application was registered at INPI through the innovation department of UERJ, the INOVAUERJ, under the protocol BR 51 2016 001579 9. The registration of the brand ClickTrauma at INPI was also made, being a distinctive manner to identify the product nominally and figuratively to secure its authentication.

## Results and Discussion

The application is made up of seven functionalities: trauma concept, how to diagnose, clinical conduct, possible consequences, how to avoid, test your knowledge and more information. In the first application Access, the user will select their current occupation from the options: Paediatric dentistry, dental surgeon, professor or student, in order to evaluate the system's users (Figure 1), allowing for new updates in the mobile application based on the active target audience. Subsequently, the user will be directed to the main menu page, where there is access to the application's content. (Figure 2)



Figure 1.



Figure 2.

In the Teeth Trauma area the user will have a brief conceptual text, containing information about the theme and which x-rays are necessary in a dental trauma consultation.

In How to Diagnose, the user will be re-directed to a new page containing a list with all possible dental trauma categories and will then be able to select the type of trauma they wish to consult. (Figure 3) After selecting the desired trauma, the user has access to a brief text containing images and/or x-rays as well as a graphic scheme. (Figure 4) The user will be able to enlarge all of the images as needed by clicking the desired image.

In Conduct the user will have access to information about a specific treatment for each type of trauma and will also be able to access the contents related to what should be performed in the initial emergency care. (Figure 5)



Figure 3.

Figure 4.



Figure 5.

In Possible Consequences there is a list with some changes that can happen in the permanent dentition after a dental trauma. In addition the app offer an area called How to Avoid with information about how to prevent new trauma.

In addition, the product offers following areas: Test your Knowledge and More Information. In Test Your Knowledge, users are able take a quiz that has multiple choices questions about dental trauma in primary dentition. Furthermore, users can also research and consult about that subject at More Information option.

To build an app in the health field is necessary to integrate the entire scientific field. Central to the development of ClickTrauma were the concepts of Teamwork, Interdisciplinarity and Coworking.<sup>13,14</sup> The product was developed in Portuguese and an English version is under construction.

## Conclusions

An app called ClickTrauma was developed about dental trauma in primary dentition, that can be used in smartphones with the IOS operational system. This tool aims to contribute to dentistry by allowing professionals and students quick access to and safe information about this topic.

The application has information about trauma in primary dentition, suggestion about how to avoid dental traumas, references and others functions that allow the users to improve their knowledge and their clinical skills.

This paper highlights the importance of the relationship between health and technology, and how that integration can be used for Odontology. Furthermore, it serves as an incentive and reference for the construction of others applications in the area.

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