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ABSTRACT

Aim The aim of this study was to investigate paediatricians' actual attitudes towards emergency management of dental injuries, need for potential improvement in their knowledge and motivation for further education.

Materials and Methods This study was a questionnaire-based cross-sectional survey on a sample of 84 respondents from four Croatian counties. A questionnaire of 24 questions was divided into four parts: personal and professional profile; self-assessed perceived knowledge and experience with dental injuries; specific questions on the management of dental injuries and specific questions regarding education about dental injuries. The questionnaires were collected during a 2-month period.

Results A larger percentage (95%) of surveyed paediatricians have at least once encountered trauma in the practice and in this case 90% of them contacted the dentist. Three quarters of participants (76%) would correctly hold completely extruded tooth. In case of tooth or fragment preservation 60% of the subjects would place the tooth in the saline solution, and only 12% of the respondents would use milk as a transport medium. The 19% of the paediatricians

considered that the permanent tooth should not be replanted. Two thirds (62%) of participants did not get any information regarding dental trauma during their past education, but most of them (90%) consider that education about traumatic dental injuries is important, and 86% of the respondents are willing to be educated on the subject in the future. There is no difference in procedures (recommended vs. non-recommended) undertaken during management of dental injuries, according to the participants working place, experience in emergency department or their personal experience of dental trauma.

Conclusion The results revealed insufficient paediatricians' knowledge about emergency procedures in case of dental trauma, but they also point out high awareness of the importance of dental trauma, and willingness for further education.

Keywords Child, Dental trauma, Knowledge, Paediatricians.

Introduction

All injuries involving the orofacial area are considered a serious public health problem, they should be treated as an emergency, and their timely and appropriate emergency management can enhance favourable prognosis and outcome for the injured tissues [Schwartz-Arad et al., 2004; Schwartz-Arad and Levin, 2004; Unal et al., 2014; Oleszkiewicz and Emerich, 2015].

In order to prevent aesthetic, functional, psychological and economic consequences for patients and their families, it is necessary for the injured child to visit the dental office immediately after injury [Andreasen and Andreasen, 2000; Rocha and Cardoso, 2001; Altay and Gungör, 2001; Nik-Hussein, 2001; Levin et al., 2003; Ulusoy et al., 2012].

When dental trauma occurs, parents, guardians, teachers, coaches or persons in a child's vicinity are responsible for helping the injured child, and children are referred to paediatric dentists or paediatric surgeons but also to doctors of various specialties, most often paediatricians [Ulusoy et al., 2012]. In order for paediatricians to act properly in these cases, it is necessary for them to have specific knowledge about the urgent procedure and the importance of the immediate beginning of treatment. Adequate paediatricians' knowledge about the treatment of dental injuries can play a significant role in the outcome of dental trauma in children [Škrinjari et al., 2010; Emerich and Gazda, 2010; Emerich and Wyszowski, 2010; Zampogna et al., 2014; Chanchala et al., 2016]. Prognosis of traumatised teeth highly depends on

immediate and appropriate emergency management of the injured tissues [Ulusoy et al., 2012; Škrinjarić et al., 2010; Zampogna et al., 2014]. Therefore, it is of particular importance that paediatricians are prepared to provide prompt and proper sequence of actions, thus reducing or preventing the possible serious consequences of dental trauma for the patient and his family [Ulusoy et al., 2012; Chanchala et al., 2016; Lin et al., 2006; Da Silva et al., 2004].

As recent literature is not abundant with studies regarding this subject especially from Croatia, the aim of this study was to investigate Croatian paediatricians' actual attitudes towards emergency management of dental injuries and need for potential improvement in their knowledge related to the topic of dental trauma emergency procedures. The further aim was to investigate if their place of work, experience in emergency department (ED) and personal experience of dental trauma influenced their action in case of patient with dental injuries. The aim was also to investigate if they are motivated for further education on the matter if improvement is necessary. Then the results of this report could provide information that can assist in creating instructive guidelines for paediatricians in their continuing education.

Materials and method

This study was conducted as a questionnaire-based cross-sectional survey on a sample of 84 respondents from four Croatian counties: Primorsko-goranska, Istarska, Ličko-senjska and Splitsko-dalmatinska county.

For research purposes, a questionnaire of 24 questions was used. The questionnaire was designed and developed by the authors, and included: general information on respondents, information on education and employment, knowledge of emergency procedures, questions about possible prior education and wishes for further education on the management of dental trauma. To ensure the participants' self-approach in answering the questions and exclude any side intervention or consultation in the course of filling out the questionnaire forms, the investigators were individually present during distribution of the surveys and until the respondents completed the questionnaires. The examination was anonymous and carried out solely with voluntary consent of the respondent. In addition to the survey, an informed consent that described the purpose of the research and guaranteed confidentiality of data and their use for scientific purposes only, was provided. The study was approved by the Ethical Committee of the Faculty of Medicine, University of Rijeka, Croatia.

A total of 86 questionnaires were collected during a 2-month period, starting from January through March, 2014. Of these, 84 questionnaires were properly filled out,

whereas 2 were excluded due to incomplete answers.

Statistical analysis was performed using MedCalc statistical software (MedCalc Software ver. 18, Mariakerke, Belgium). Number and percentage of answer frequency were calculated. Chi-square analysis was performed to test differences in the management

| Question | Answer | n (%) |
|--|--------------------|----------|
| Familiarity with the term tooth avulsion | Yes | 74 (88%) |
| | No | 10 (12%) |
| Personal experience with dental injuries | Yes | 24 (29%) |
| | No | 60 (71%) |
| Have you ever witness the dental injury observed a dental injury in your practice? | Yes, once | 22 (26%) |
| | Yes, several times | 58 (69%) |
| | No | 4 (5%) |

TABLE 1 Knowledge and experience with dental injuries (N=84).

| Question | Answer | n (%) |
|---|--|----------|
| How would you hold a completely extruded tooth | By the crown* | 64 (76%) |
| | Would hold the whole tooth (it is not important how) | 4 (5%) |
| | Would not touch it | 16 (19%) |
| What would you do in case of a completely extruded tooth or with the parts of a broken tooth? | Place the tooth: | |
| | in saline solution* | 50 (60%) |
| | in milk* | 10 (12%) |
| | on clean handkerchief | 12 (14%) |
| | in water | 4 (5%) |
| | in disinfectant | 4 (5%) |
| | in child's saliva* | 2 (2%) |
| Do nothing | 2 (2%) | |
| Would you replant the permanent tooth? | Yes* | 68 (81%) |
| | No | 16 (19%) |
| Would you replant the primary tooth? | Yes | 34 (40%) |
| | No* | 50 (60%) |
| What would you do in case of dental fracture? | Contact the dentist* | 60 (72%) |
| | Advise parents to contact the dentist | 22 (26%) |
| | Do nothing | 2 (2%) |
| What would you do in case of tooth mobility? | Contact the dentist* | 50 (59%) |
| | Advise parents to contact the dentist | 30 (36%) |
| | Do nothing | 4 (5%) |

* recommended procedure

TABLE 1 Management of dental injuries (N=84).

| Dental trauma management | | Working place | | | ED | | Stat. | Personal experience | | Stat. |
|------------------------------|---------------------|------------------|--------------|------------|--------|---------|------------|---------------------|---------|------------|
| | Procedure | Primary care (n) | Hospital (n) | | No (n) | Yes (n) | | No (n) | Yes (n) | |
| Tooth handling | Recommended (n) | 48 | 16 | $X^2=2,01$ | 34 | 30 | $X^2=3,23$ | 46 | 18 | $X^2=0,03$ |
| | Non recommended (n) | 18 | 2 | $P=0.156$ | 6 | 14 | $P=0.072$ | 14 | 6 | $P=0.872$ |
| Tooth transport | Recommended (n) | 49 | 13 | $X^2=0.03$ | 29 | 33 | $X^2=0,07$ | 44 | 18 | $X^2=0,02$ |
| | Non recommended (n) | 17 | 5 | $P=0.864$ | 11 | 11 | $P=0.796$ | 16 | 6 | $P=0.876$ |
| Primary teeth replantation | Recommended (n) | 38 | 12 | $X^2=0.48$ | 24 | 26 | $X^2=0,01$ | 38 | 12 | $X^2=1,25$ |
| | Non recommended (n) | 28 | 6 | $P=0.489$ | 16 | 18 | $P=0.933$ | 22 | 12 | $P=0.264$ |
| Permanent teeth replantation | Recommended (n) | 55 | 13 | $X^2=1,12$ | 32 | 36 | $X^2=0,04$ | 48 | 20 | $X^2=0,12$ |
| | Non recommended (n) | 11 | 5 | $P=0.290$ | 8 | 8 | $P=0.833$ | 12 | 4 | $P=0.727$ |
| Tooth fracture procedure | Recommended (n) | 44 | 16 | $X^2=3,38$ | 32 | 28 | $X^2=2,72$ | 40 | 20 | $X^2=2,31$ |
| | Non recommended (n) | 22 | 2 | $P=0.066$ | 8 | 16 | $P=0.099$ | 20 | 4 | $P=0.129$ |
| Tooth mobility procedure | Recommended (n) | 42 | 8 | $X^2=2,14$ | 28 | 22 | $X^2=3,44$ | 30 | 20 | $X^2=7,81$ |
| | Non recommended (n) | 24 | 10 | $P=0.144$ | 12 | 22 | $P=0.064$ | 30 | 4 | $P=0.005$ |

TABLE 3 Differences in the management of dental trauma according to participants' working characteristics.

of dental trauma according to participants' characteristics e.g. working place, experience in emergency department (ED) and personal experience in dental trauma.

Results

The questionnaire was completed by 84 of 86 respondents. Results were expressed as a number and percentage of question's response. The results regarding: knowledge and experience with dental injuries are shown in Table 1; management of dental trauma in Table 2, differences in the management of dental trauma according to participants' characteristics in Table 3 and education about dental injuries in Table 4.

The median age of the respondents was 51,5, ranging from 25 to 64 years. The study included 72 female (86%) and 12 male (14%) paediatricians. The median of working experience with children was 20 years, range 0,5-40 years. During their professional career 44 (52%) of respondents had the opportunity to work in ED, while 40 (48%) did not. Answers are summarised in Tables 1, 2 and 4 according to three groups of questions (knowledge, management and education regarding dental trauma), and in Table 3 differences in the management of dental trauma according to participants characteristics are presented.

Discussion

Limitations

This cross-sectional study has some limitations; it

| Question | Answer | n (%) |
|--|-----------------------------------|----------|
| Have you ever been educated about dental injuries? | Yes | 32 (38%) |
| | No | 52 (62%) |
| Are you well informed about dental injuries? | Completely | 6 (7%) |
| | Partially | 56 (67%) |
| | Not informed at all | 22 (26%) |
| Is education about dental injuries important? | Yes | 76 (90%) |
| | Neither important nor unimportant | 8 (10%) |
| Are you interested in education about dental trauma? | Yes | 72 (86%) |
| | No | 12 (14%) |

TABLE 4 Education about dental injuries (N=84).

was conducted on a small sample of paediatricians from only 4 out of 21 counties of Croatia, which limits the possibility to generalise the findings to the whole Croatian paediatricians' population. But we consider this sample representative enough to emphasise the fact clearly revealed from the survey; paediatricians lack education in dental injuries and serious actions need to be undertaken to change attitudes and procedures usually done by majority of paediatricians.

Timely and adequate emergency procedures for traumatic injuries of orofacial structures are of crucial importance for optimal therapy success, while untreated traumas can have severe consequences [Andreasen and Andreasen, 2008; Zampogna et al., 2014; Chanchala et al., 2016; Lin et al., 2006; Da Silva et al., 2004].

Recent literature is not abundant with studies

regarding paediatricians' actual attitudes and knowledge towards emergency management of dental injuries. That was one of the strongest motives to conduct this study, to investigate attitudes among paediatricians. We assumed that paediatricians working in hospital rather than those in primary care clinics, those with experience in emergency department and those with personal experience with dental trauma would more often know the recommended procedures in case of dental injury. However, there were no difference between all aforementioned categories, with the exception that paediatricians with personal experience with dental trauma will more likely know recommended procedure in a case of dental mobility than those without personal experience.

Current research point to the importance of education and training of health professionals, including paediatricians, in order to learn how to react promptly in case of dental trauma and prevent losing the precious time that plays a decisive role in dental trauma therapy [Ulusoy et al., 2012; Zampogna et al., 2014; Chanchala et al., 2016; Lin et al., 2006].

The median of working experience with children was 20 years, and during their working life 52% of respondents had the opportunity to work in ED, while 48% did not.

Familiarity with the term tooth avulsion was showed by 88% of the respondents, and this percentage is higher than that found in the studies of Bahammam [2018] and Dali et al. [2014] of 69% and 57%, respectively. A larger percentage of as many as 95% of surveyed paediatricians have at least once encountered trauma in their practice, larger than that the 65% reported by Chanchala et al. [2016].

Seventy-six percent of respondents would correctly hold a completely extruded tooth for the crown, and this percentage is higher than those found in the studies of Bahammam [2018] and Dali et al. [2014], and similar to that of Yothi et al. [2015]. Disappointing is the fact that 19% would not dare to touch the tooth.

In case of tooth or fragment preservation, half of the subjects would place the tooth in saline solution (53.6%), less than in the Chanchala et al. study (90%) [2016], but more than in the Bahammam study (21%) [2018]. Only 15.5% of the respondents would use milk as a transport medium, similarly to Chanchala et al. (10%) [2016], but lesser than in the Bahammam (31%) [2018] and Ulusoy et al. [2012] studies. Others (26%) would do something that generally is not recommended and that immediately reduces the chances of long-term survival of the tooth and periodontal tissues (i.e. wrap the tooth in a clean handkerchief, wash with water, place the tooth in the disinfectant). About 2% of respondents would not do anything. This is indeed a small percentage, nevertheless it is disappointing and unacceptable. Disappointing is also that 19% of the paediatricians considered that the permanent tooth

should not be replanted, a higher percentage than that found by Chanchala et al. (5%) [2016]. Nearly half (40%) of the respondents think that avulsed primary teeth should be replanted. This points out that a child who has experienced a dental trauma has higher chances to lose the permanent teeth or have some complications (e.g. permanent tooth dilaceration) due to replantation of the primary teeth because of inadequate treatment caused by paediatricians' poor knowledge about teeth replantation.

In other types of trauma involving fractures and injuries to periodontal tissues, paediatricians would most likely contact a dentist or advise the parents to contact their dentist. According to the data obtained in the study, 72% of the respondents would contact a dentist in case of dental fractures and will rarely advise parents to contact their dentist, and in the case of tooth mobility 59% of the respondents would contact a dentist. A small percentage of paediatricians would completely ignore this type of trauma (2%) and do nothing (5%). This alerts that some paediatricians as well as other non-dental medical professionals do not recognise the severity of such trauma and do not know how to provide appropriate first-aid in case of dental trauma [Holan and Shmueli, 2003; Abu-Dawoud et al., 2007; Subhashraj, 2009; Qazi and Nasir, 2009; Trivedy et al., 2012].

As far as the differences in the management of dental trauma according to participants characteristics (working place, experience in ED and personal experience in dental trauma) showed no statistically significant difference between recommended and non-recommended procedures in dental trauma management such as: tooth handling and transportation, tooth replantation, tooth fracture and mobility management regarding: working place, ED experience and personal experience with dental trauma. Re et al. [2014] in their study show a slightly better knowledge in professionals working in hospitals but this was the case of dentists employed in hospitals. Only in the case of personal experience and tooth mobility management the statistically significant difference is revealed, and in this case the respondents with personal experience of dental trauma are more likely to apply the correct recommended procedures. Thus, no matter whether they work in primary care or had worked in ED, or they had their own experience with dental trauma, there is no difference between recommended and non recommended procedures that paediatricians would perform in dental trauma management.

Paediatricians' education about dental trauma show some disappointing results. About two thirds of the respondents (62%) did not receive any information regarding dental trauma within their past education. The largest number of paediatricians considered to be partially informed (67%) while more than a quarter was not informed (26%), so the majority of paediatricians

were not adequately educated, similarly to the results of the Bahammam study [Bahammam, 2018].

A positive fact is that most of the respondents (90%) consider education about traumatic dental injuries important and that 86% of them are willing to be educated on the subject in the future, similarly to the findings of previous studies [Chanchala et al., 2016; Bahammam, 2018; Ulusoy et al., 2012; Aren et al., 2018]. The remaining 14% believe that such information is unnecessary.

Conclusion

The results of this research showed insufficient paediatricians' knowledge about emergency procedures in case of dental trauma even though they meet such cases, and they do not recognise its severity. The results also show paediatricians' awareness of the consequences of dental trauma, and their willingness for further education.. Thus, special attention should be given to provide paediatricians additional education on this subject during pre- and post-graduate programmes.

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