



# Dentists' knowledge of dental trauma based on the International Association of Dental Traumatology guidelines: A survey in South Brazil

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## Abstract

**Background/Aim:** Dental trauma is a public health issue with a high prevalence in children. The aim of this study was to evaluate the level of knowledge of dentists in Rio Grande do Sul, Brazil, of the management of traumatic dental injuries, using the International Association of Dental Traumatology (IADT) Guidelines as a reference.

**Materials and Methods:** An electronic questionnaire investigating personal and professional characteristics and 12 questions about dento-alveolar trauma, was sent to all registered dentists of the Regional Council of Dentistry of Rio Grande do Sul (n=14 753). The respondents were grouped according to the sociodemographic and professional profiles and the data were evaluated by the Student-T test or one-way ANOVA, with Tukey's post-hoc, with  $\alpha = 5\%$ .

**Results:** A total of 1414 dentists responded to the survey (9.59% response rate). The overall mean self-reported knowledge of dental trauma was  $5.87 \pm 1.57$ , of a maximum possible score of 12. Some factors associated with a higher knowledge of the IADT guidelines were: female gender, previous clinical experience, years from qualification, self-reported knowledge, and academic postgraduate degree. Dentists who are specialized in endodontics ( $6.58 \pm 1.63$ ) and pediatric dentistry ( $6.05 \pm 1.44$ ) achieved higher levels of knowledge on dental trauma. Analysis of the characteristics (gender, location, and proportion of specialists) of the respondents confirmed that they were representative of the target population.

**Conclusion:** The overall level of knowledge of dentists from Rio Grande do Sul of the IADT guidelines is moderate. These results highlight the need for continuing education on dento-alveolar trauma in this population.

## KEYWORDS

dental trauma, guideline, International Association of Dental Traumatology, knowledge, survey, traumatology

## 1 | INTRODUCTION

Traumatic dental injuries (TDI) are a public health issue with high prevalence in children, with occurrence rates varying from 12.6% to 46%.<sup>1-4</sup> The most affected teeth are the maxillary central incisors, and enamel fracture is the most frequent injury.<sup>3</sup> This type of trauma may cause various esthetic and functional deficiencies.<sup>5,6</sup> TDI are usually related to factors such as traffic accidents, collisions with objects or persons, violence, sporting activities and falls.<sup>4,7-9</sup>

Inadequate treatment after a TDI may result in tooth color changes, mobility, malocclusions, sensitivity, various symptoms, radicular and/or bone resorption, pulp necrosis with infection, and finally, tooth loss. These consequences may lead to difficulties in social interaction, low self-esteem of children and problems with future personal relationships, chewing and consequent nutritional deficiencies.<sup>6,10</sup> Furthermore, shortcomings in the immediate treatment of TDI may increase the long-term treatment costs, especially if more complex procedures are needed.<sup>11</sup> Satisfactory and prompt treatment of TDI, as well as regular and long-term follow-ups, are determining factors for a favorable prognosis of traumatized teeth.<sup>12</sup> Thus, a high level of knowledge by dentists regarding the management of TDI should be considered necessary.<sup>11,12</sup>

The International Association of Dental Traumatology (IADT), based on literature reviews and expert group discussions, has developed protocols to assist dentists, health professionals, and patients with the management of TDI. These guidelines aim to provide the best possible treatment in an efficient manner.<sup>13</sup> Previous studies have demonstrated that there is a worldwide low level of knowledge amongst dentists regarding the protocols for managing TDI.<sup>11,12,14-19</sup> Furthermore, it is concerning that these results contrast with the self-perception of the profession regarding the treatment of TDI.<sup>17</sup>

Studies evaluating the knowledge of dentists on TDI are necessary, since their results may assist decisions on health system policies, including health education strategies. It should be noted that the management of TDI has consequences on the quality of life of the assisted population. The aim of the present study was to evaluate the level of knowledge of dentists from Rio Grande do Sul regarding the management of TDI, based on the IADT Guidelines.

## 2 | MATERIALS AND METHODS

This research was evaluated and approved by the Scientific and Ethic Commissions (CAAE #57091216.0.0000.5336) of the Faculty of Dentistry of the Pontifical Catholic University of Rio Grande do Sul, in Porto Alegre, Brazil. The present research was conducted in full accordance with ethical principles, including the World Medical Association Declaration of Helsinki (version 2008) and the additional requirements of Brazilian law.

An electronic questionnaire was sent by email to all 14 743 registered dentists with the Regional Council of Dentistry of Rio Grande do Sul (CRO-RS), between May and June 2016. The

questionnaire was distributed using the Qualtrics Survey Software ([www.qualtrics.com](http://www.qualtrics.com), Provo, UT, USA; Version 03.2016) to ensure anonymity of the respondents. Participation in the study was voluntary.

The questionnaire was divided into two parts: Part I was used to identify the sociodemographic and professional profiles of respondents (age, gender, years of experience, highest level of post-graduation, area of practice, main practice setting, number of dental trauma cases previously treated and self-reported knowledge of dental trauma (SKDT)). Part II comprised 12 questions about dento-alveolar trauma. These questions refer to The Dental Trauma Guide proposed by the IADT.<sup>13,20</sup> All participants received a 10 point final score of SKDT, which was considered the main outcome of the present study.

The results were initially analyzed by descriptive statistics. The respondents were grouped according to sociodemographic and professional profiles, which were related to their SKDT, carried out by the Student-*T* test (for dichotomous variables) and one-way ANOVA, with Tukey's post-hoc for the other variables. The  $\alpha$  level was set at 5%. All statistical analyses were carried out using the IBM SPSS STATISTICS, version 23 software (IBM Corp, Armonk, NY, USA).

## 3 | RESULTS

A total of 1414 dentists (response rate of 9.59%) answered the survey. Two-thirds (64.4%) of the respondents were female. The mean age was  $35.27 \pm 10.6$  years. Half the sample (49.7%) had less than 10 years of experience, 27.4% had between 10 and 19 years, 13.2% had between 20 and 29 years, and 9.7% had more than 29 years of clinical practice (Table 1), with an overall mean of  $13.02 \pm 10.79$  years of experience.

The majority of respondents had a clinical (residency) postgraduate degree (60.5%), followed by academic (Master and/or PhD) postgraduate degree (22.3%). Regarding the main practice setting of the dentists, 72.5% worked in private practice, while 20.5% worked in public services and 7.0% in teaching. When the participants were questioned regarding their previous clinical experience of dental trauma, 21.8% had never treated any case. Among the others, 14.1% had treated one case, 28.2% treated two to four cases, and the majority (35.9%) had treated more than five cases (Table 1). Only 3.2% of dentists classified their own knowledge about dental traumatology as low, while nearly one-third rated their knowledge as acceptable (34.8%). Half of the participants self-rated their knowledge as good (53.0%) and 9.0% indicated very good knowledge on dental trauma (Table 1).

The main subject of each question, as well as the number of correct answers about the treatment of dental trauma, were formulated according to the IADT guidelines (Table 2). Question 2 (storage solution in case of avulsion) and 10 (crown-root fracture case) had the highest rate of correct answers (88% and 89%, respectively), while Questions 7 (an intrusion case) and 12 (a lateral luxation case) achieved the lowest number of correct replies (28% and 17% respectively).

**TABLE 1** Demographic characteristics of the sample, according to the mean SKDT (N = 1414)

Demographic data	N (%)	SKDT mean ± SD	P-value
Years of experience			
<10 <sup>ab</sup>	703 (49.7)	5.83 ± 1.53	0.031
10-19 <sup>a</sup>	388 (27.4)	6.01 ± 1.63	
20-29 <sup>ab</sup>	186 (13.2)	5.96 ± 1.53	
>29 <sup>b</sup>	137 (9.7)	5.58 ± 1.62	
Highest level of postgraduation			
None <sup>a</sup>	244 (17.2)	5.83 ± 1.56	0.001
Postgraduate (clinical) <sup>a</sup>	855 (60.5)	5.78 ± 1.54	
Postgraduate (academic) <sup>b</sup>	315 (22.3)	6.16 ± 1.65	
Main practices			
Private <sup>a</sup>	973 (72.5)	5.80 ± 1.58	0.005
Public <sup>b</sup>	275 (20.5)	6.07 ± 1.53	
Teaching <sup>b</sup>	94 (7.0)	6.20 ± 1.59	
Not specified (excluded) <sup>*</sup>	72		
Dental trauma cases treated previously			
None <sup>a</sup>	309 (21.8)	5.65 ± 1.69	0.000
1 case <sup>a</sup>	199 (14.1)	5.69 ± 1.56	
2-4 cases <sup>ab</sup>	399 (28.2)	5.87 ± 1.59	
>5 cases <sup>b</sup>	507 (35.9)	6.09 ± 1.46	
Self reported knowledge			
Low <sup>a</sup>	45 (3.2)	5.11 ± 1.94	0.000
Acceptable <sup>a</sup>	495 (34.8)	5.60 ± 1.53	
Good <sup>b</sup>	750 (53.0)	6.00 ± 1.53	
Very good <sup>c</sup>	127 (9.0)	6.45 ± 1.61	

Mean values followed by different superscript letters are significantly different ( $P < 0.05$ ).

\*These respondents were excluded because the survey had an option of other main practices that was not specified.

Regarding the specialty of the respondents, there were orthodontists (16.5%), followed by endodontists (15.80%). This proportion is comparable to the total population of the state. The overall SKDT mean of correct answers for all the questions asked in the questionnaire was  $5.87 \pm 1.57$ , and the specialties that reached the highest mean SKDT were endodontics ( $6.58 \pm 1.63$ ), followed by pediatric dentists ( $6.05 \pm 1.44$ ) (Figure 1).

## 4 | DISCUSSION

The objective of this study was to evaluate the knowledge of dentists registered with the Regional Council of Dentistry of the State of Rio Grande do Sul in 2016, regarding the IADT Guidelines for treatment of traumatic dento-alveolar injuries. This was found to be moderate, and it was influenced by the sociodemographic and profiles

**TABLE 2** Questions about treatment of dental trauma International Association of Dental Traumatology (IADT)

Questions	Case	Correct N (%)	Incorrect N (%)
Q 1	Avulsion	828 (59)	586 (41)
Q 2	Solution in avulsion	1246 (88)	168 (12)
Q 3	Avulsion open apex	721 (51)	693 (49)
Q 4	Avulsion closed apex	672 (48)	742 (52)
Q 5	Bone fracture	672 (48)	742 (52)
Q 6	Root fracture	878 (62)	536 (38)
Q 7	Intrusion	396(28)	1018 (72)
Q 8	Subluxation	996 (70)	418 (30)
Q 9	Enamel, Enamel/dentin fracture, subluxation, concussion	942 (67)	472 (33)
Q 10	Crown-root fracture	1252 (89)	162 (11)
Q 11	Enamel-dentin-pulp fracture	1118 (79)	296 (21)
Q 12	Lateral luxation	245 (17)	1169 (83)

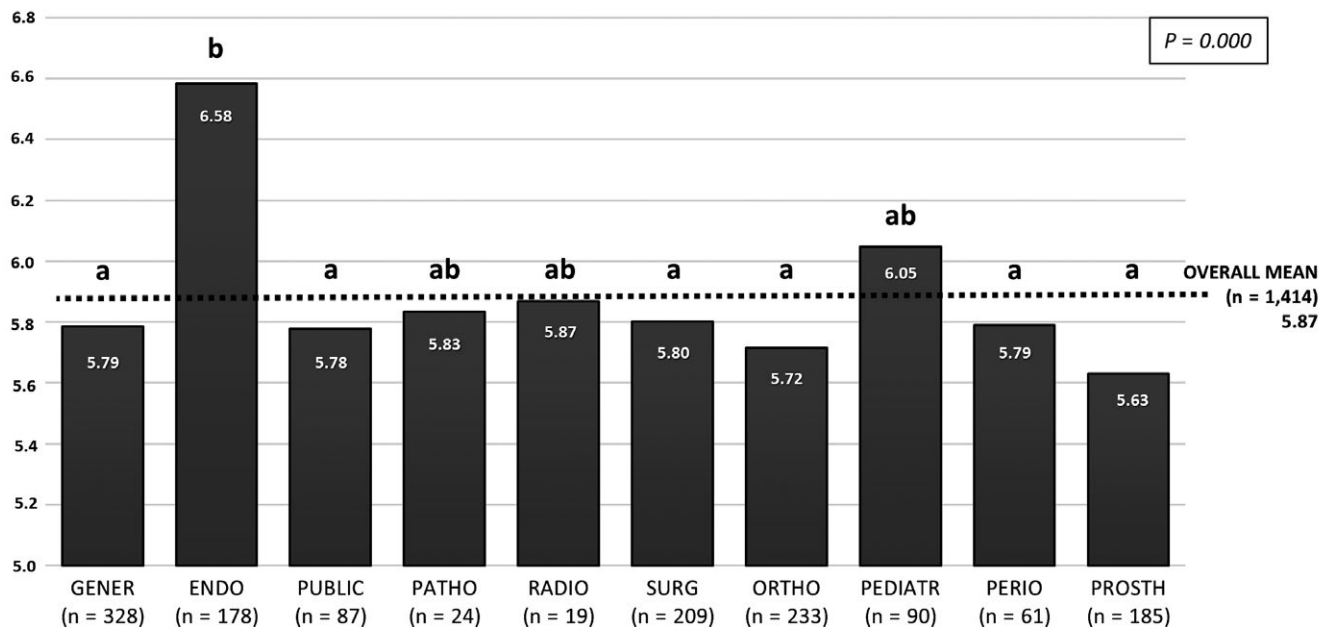
Proportion of correct and incorrect answers.

of the respondents. Of the 14 743 registered dentists, 1414 (approximately 10%) answered the survey. Although the response rate was not high, the total number of participants can be considered a representative number of the total registered dentists as the proportion of respondents were equally distributed through the different parts of the state, plus their gender and the proportion of specialists in the different areas was comparable to the target population, based on data available from the CRO-RS. Thus, the present sample is representative of the dentists registered in Rio Grande do Sul, with consequent external validity of the present findings. Rio Grande do Sul has a population of more than 11 and a half million people, thus being the fifth most populous state in Brazil.<sup>21</sup>

There has been a progressive increase in enrollment of Brazilian women in universities since the 1980s, and a predominance of female dentists can be observed from the late 1990s to the present day, which confirms that the feminization of dentistry is occurring.<sup>14</sup> This was observed in the sample from the current study, and in previous studies.<sup>16,22</sup>

A total of 855 (60.5%) of the respondents had a clinical postgraduate degree. Surprisingly, this characteristic did not reflect a higher SKDT when compared to dentists without specialization. However, professionals with a higher academic degree (Master and/or PhD) achieved significantly better results. This can be explained, in part, by a clinical postgraduate degree being an entry requirement for higher academic degrees in Brazil, thus extending the overall time for theoretical learning and clinical exposure of dentists with higher academic degrees.

### Mean scores on the management of dental trauma according to the area of practice (specialty)



GENER - General dentistry; ENDO - Endodontics; PUBLIC - Public health; PATHO - Oral and maxillofacial pathology; RADIO - Oral and maxillofacial radiology; SURG - Oral and maxillofacial surgery; ORTHO - Orthodontics and dentofacial orthopedics; PEDIATR - Pediatric dentistry; PERIO - Periodontics; PROSTH - Prosthodontics.  
 “a”, “b” and “ab” - Groups identified by different letters indicate statistically significant difference (one-way ANOVA, Tukey's *post hoc*)

**FIGURE 1** Mean scores on the management of dental trauma according to the area of practice (specialty). Groups identified by the same superscript letter indicate no significant differences

The majority of respondents (61%) self-reported having at least a good knowledge about dental traumatology. The present study results revealed that a higher self-reported knowledge was associated with a higher level of competence on dental trauma treatment, which is in accordance with the literature.<sup>14,22</sup>

The current study suggests that the length of clinical experience could have an influence in the mean SKDT. The highest level of knowledge was observed in dentists with 10 to 19 years after qualification and this was higher than dentists with up to 29 years of graduation. This difference may be explained, in part, by younger dentists having a better command of English, and they may more proficiently access websites, such as the IADT site used for the present study, than older colleagues. However, SKDT is also associated with previous clinical experience, since dentists with less than 10 years of experience did not achieve better results compared to older ones, as per a previous study.<sup>23</sup> It must be noted that the proxy “years after graduation” might not be necessarily related to the actual amount of clinical experience, but it was the only way to achieve consistent data, considering the theoretical construct of the questionnaire.

Regarding dental trauma cases treated previously, a proportional association was noted between the number of cases and the SKDT, and this could be related to the clinical experience, which may improve dentists' skills, as observed in previous studies.<sup>16</sup>

The questions related to intrusive and lateral luxation injuries achieved the lowest rate of correct answers in the present sample.

This should be a cause for concern as these are severe TDI presentations with an overall unfavorable prognosis. In fact, intrusive luxation is related to dental ankylosis and external root resorption, and may result in tooth loss.<sup>7,8</sup>

The moderate level of knowledge of dentists regarding the management of TDI observed in some previous studies from Brazil and Norway<sup>16,24,25</sup> was confirmed in the current study, with an overall SKDT mean of 5.87. On the other hand, other studies from Belgium, Brazil, China, Germany, and Lithuania, demonstrated a poor level of knowledge among dentists.<sup>11,12,14,17-19,22</sup> It is worth noting that a comparison between different investigations may be difficult due to differences in their methodology. Studies may not be necessarily generalized to the international dental community, however, their results can be collated to understand the current status of the matter. Therefore, standardized study designs or international survey research should be considered in future. It is worth noting that the latter, which is considered more relevant to the international dental community, is associated with multiple challenges when compared with domestic research. These include, among other things, accurate survey language translation, securing an appropriate sample, survey administration and data collection, and likely differences in response rates between countries.<sup>26</sup>

Most importantly, it appears clear that limitations in knowledge of dentists regarding TDI management is a worldwide problem, and requires the development of public health strategies to improve the

skills in the management of TDI. Dentists, being the main professionals responsible for the management of TDI, must have the highest possible level of knowledge on this topic.<sup>5,27-29</sup>

This survey evaluated the knowledge of dentists about the current IADT protocols, which have been prepared based on consensus among members of discussion committees of different specialties and they are reviewed periodically.<sup>20</sup> Subsequently, the importance of continuous professional development regarding management of TDI should be reiterated. Interestingly, the IADT guidelines have been made available on the Internet for several years, however, knowledge translation for this specific population has been limited. Translation into different languages may improve their dissemination.

In conclusion, the present study highlights that the overall level of knowledge of dentists in Rio Grande do Sul regarding IADT treatment guidelines is moderate. The present findings highlight the need for further education on dento-alveolar trauma in this population.

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## CONFLICT OF INTEREST

No/The authors deny any conflicts of interest related to this study.

## ETHICAL APPROVAL

This research was evaluated and approved by the Scientific and Ethic Commissions (CAAE #57091216.0.0000.5336) of the Faculty of Dentistry of the Pontifical Catholic University of Rio Grande do Sul.

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