



# JOURNAL of FORENSIC ODONTO- STOMATOLOGY

## VOLUME 32 Number 1 July 2014

SECTION JURISPRUDENCE AND LITIGATION

### The impact of tooth avulsion on daily life performance using the Brazilian OIDP index in children and young adults.

Fernanda Bouchardet<sup>1</sup>, Maria Ilma de Souza Gruppioni Cortes<sup>2</sup>, Juliana Vilela Bastos<sup>1</sup>, Ines Alexandra Costa de Moraes Caldas<sup>3</sup>, Ademir Franco<sup>4</sup>, Duarte Nuno Pessoa Vieira<sup>5</sup>

<sup>1</sup>Odontology, Pontifícia Universidade Católica de Minas Gerais, Brazil

<sup>2</sup>MISG; Bastos, JV – Odontology, Federal University of Minas Gerais, Brazil

<sup>3</sup>IACM Legal Medicine, University of Porto, Portugal.

<sup>4</sup>Forensic Odontology, Katholieke Universiteit Leuven, Belgium

<sup>5</sup>National Institute of Legal Medicine and Forensic Science, Portugal.

Corresponding author: [franco.gat@gmail.com](mailto:franco.gat@gmail.com)

The authors declare that they have no conflict of interest

#### ABSTRACT

**Introduction:** The evaluation of orofacial damage is an emerging branch in the forensic sciences, specifically in forensic odontology and medicine. One of the major limitations during the evaluation of forensic orofacial damages is establishing the consolidation date of acquired lesions. The consolidation date is defined as the moment from which orofacial damages are considered irreversible.

**Aim:** To stress the relevance of knowing the consolidation date in children who underwent orofacial trauma, and to enhance forensic expertise on the evaluation of dentomaxillofacial damages.

**Material and methods:** Ninety-six patients, aged between 11 and 31 years old, treated at the dental clinics of the Federal University of Minas Gerais, Brazil, were selected for forensic orofacial evaluation. All the patients presented at least one traumatically avulsed tooth and a temporary partial denture.

**Results:** The mean age for the traumatic avulsion was 10,3 years old. The mean time for the placement of a prosthesis was 2,9 years after the initial consultation. The mean time for the use of prosthesis was 2,2 years. No significant differences were observed regarding orofacial damage outcomes between patients younger or older than 18 years of age. It was observed that patients using temporary removable partial dentures presented a 3,6-fold greater possibility of developing socially significant sequels if compared with patients using temporary fixed partial dentures.

**Conclusion:** Knowing the consolidation date of orofacial damage enables the prediction of the potential development of social sequels in children and adolescents who is a task for victim identification (DVI) is an intensive and demanding task involving specialists from various disciplines. The forensic dentist is one of the key persons who underwent traumatic dental avulsion.

**KEYWORDS:** dental avulsion; orofacial damage; traumatic injury; consolidation date

## INTRODUCTION

Avulsion of permanent teeth corresponds to 0,5-3% of all the dental lesions in this study. This modality represents one the most damaging dental injuries, in which prognosis depends on the decisions and attitudes taken at the time and location of the trauma, and immediately after the dental avulsion.<sup>1,2</sup> Mostly, dental reimplantation is the treatment of choice, but it cannot always be performed immediately. The treatment plan is usually decided by an emergency dental surgeon, who will execute the best approach to achieve optimal prognoses.

Nowadays, violence and vehicle accidents are the main source of facial trauma.<sup>3</sup> Consequently, the stomatognathic system is directly affected. In specific cases, accidents involving orofacial trauma will result in legal repercussions, and forensic expertise will be necessary. In this context, forensic dentists are requested to perform clinical evaluation and to provide forensic reports.

The estimation of the consolidation date during the clinical evaluation of orofacial traumas, such as dental avulsions, enables greater understanding of the trauma process, guiding a further treatment plan and helping to achieve the optimal prognosis. Especially in children and adolescents, dental avulsion implies potential social sequels, both due to the absence of teeth and the use of temporary dentures. Thus, the present study aims to establish the consolidation date in youngsters who underwent dental avulsion.

## MATERIAL AND METHODS

Ninety-six randomly selected male and female patients, aged between 11 and 31 years old, were selected. All the patients were treated for dental avulsion at the dental clinics of the Federal University of

Minas Gerais, Brazil. The patients had suffered dental avulsion, losing at least one tooth, and were using temporary removable or fixed dentures. The clinical choice for the type oral rehabilitation was

based on the patients' age and the feasibility of performing fixed dentures. Limitations were directly related to the necessary time for the completion of dentomaxillofacial growth, and to the stability of the fixed denture considering the status of dental abutments and personal hygiene. The social status of the patients was not a factor because dental treatment was provided pro deo by students at the university dental clinic.

The child Oral Impact on Daily Performance (OIDP) index was applied to assess the oral impact on the performance of the children and adolescents during their daily routine. The OIDP index, previously validated<sup>4</sup>, is an interview-based test which measures the physical, psychological and sociological performance of patients in relation to the presence of oral injuries, providing information regarding quality of life. The interviewed patients were requested to assess their limitations in relation to the frequency and severity of 1) smiling; 2) eating; 3) emotional stability; 4) speaking; 5) mouth cleaning; 6) social contact 7) sleeping; and 8) studies.<sup>5-6</sup> The OIDP index reveals whether dental trauma is present, whether it affects life quality, and whether it hampers daily activities.<sup>7-8</sup>

## RESULTS

In the present survey, there was a sexual bias in the incidence of dental avulsions, with approximately 67% of dental avulsions occurring in males. The main causes of dental trauma were falls to the ground (31%), bicycle falls (23%), and motor vehicle accidents (12%). All the studied children and adolescents were initially treated by performing late reimplantation, followed by endodontic treatment with calcium hydroxide. Later, in

the absence of additional treatments, teeth were extracted and temporary prostheses placed in the space in the dentition. Among the dental prostheses, the temporary removable partial denture was used in 83%

of the cases. The other patients (17%)

**Table 1 – Mean age, expressed in years, of the studied patients at different periods of examination and time lapse for the use of prosthesis.**

	Mean age	SD
1) Age at OIDP application	15,7	3,6
2) Age at dental trauma	10,3	3,4
3) Time lapse until initial prosthesis consultation	2,9	1,9
4) Time using prosthesis	2,2	1,8
5) Period between the accident and the use of prosthesis	3,4	2,3

underwent treatment with temporary fixed partial dentures (Table 1).

Table 2 presents information regarding the potential impacts caused by dental trauma in the quality of life of the studied patients, considering two different age groups: patients younger or older than 18 years old. The correlations between the variables addressed in the OIDP test and the age groups were performed by using Chi-square and Fisher's exact test. P-values were considered statistically significant when less than 0,05.

No statistically significant correlations were observed between the variables addressed in the OIDP test and the age groups of patients (younger than, or equal to 18 years and older than 18 years). Statistically significant correlations between the OIDP-addressed variables and the type of prosthesis used, were revealed (Table 3) Specifically, patients using temporary removable prostheses report a larger number of complaints in relation to eating, social contact and global impact, when compared to the patients using fixed prostheses.

Considering the influence of using removable prostheses on OIDP variables, an Odds Ratio statistical analysis was performed to evaluate the level of impact in the patients' quality of life (Table 4). Temporary removable prostheses have a

3,6 fold higher impact than the temporary fixed prostheses.

## DISCUSSION

The evaluation of temporary injuries in children and adolescents is part of the forensic expertise in the living. Especially in forensic dentistry, the evaluation of dental trauma must be interpreted as a public health issue. Moreover, dental avulsion plays an important psychosocial role in young individuals.<sup>9</sup> Based on that, the evaluation of temporary injuries in the forensic sciences should differ between young individuals and adults.<sup>10</sup>

In the present survey, dental avulsion was selected for investigation because it is one of the most commonly observed lesions caused by dental trauma. Specifically, dental avulsion is predominant in young male patients.<sup>12</sup>

Dental avulsion is most common in anterior teeth, the absence of which has a strong impact in social activities and psychological status. The consolidation date in children who underwent dental avulsion consists of the moment from which damages are irreversible, and the only possible treatments are those that aim to attenuate their effects on quality of life<sup>12, 13</sup>. Specifically in children, the consolidation date is sometimes hampered by skeletal development. Thus, the

consolidation date of dental avulsion is best assessed after the complete arrangement and reshaping of the affected alveolar bone.<sup>10, 13</sup> At this stage, no signs of potential reversibility are observed. Yet in adults, forensic expertise concerning the evaluation of dental damage is often related to the post-traumatic working

capability<sup>15</sup> and possible legal claims are based on dental injuries caused during work. The present study suggests that in children the consolidation date should be properly established from the moment of dental avulsion and prosthesis placement,

because at this stage the lesion would be clinically consolidated. In this context, the skeletal development is not taken into

account for the consolidation date, because no statistical significance was observed for the correlation between patients younger than 18 years old in face of the global impact (Table 2). Thus, after the dental avulsion and placement of a prosthesis, individuals younger or older than 18 years old are able to return to daily activities, even under reduced performance.

**Table 2 – Correlations between ODP variables and age.**

Variables	Age (years)		P value
	<18	≥ 18	
<b>Smiling</b>			
No	38	8	0,062
Yes	26	14	
<b>Eating</b>			
No	47	17	0,722
Yes	17	5	
<b>Emotional stability</b>			
(No) Altered	52	15	0,238
(Yes) Maintained	12	7	
<b>Speaking</b>			
No	57	21	0,674
Yes	7	1	
<b>Mouth cleaning</b>			
No	46	11	0,061
Yes	18	11	
<b>Social contact</b>			
No	29	7	0,268
Yes	35	15	
<b>Sleeping</b>			
No	60	20	0,643
Yes	4	2	
<b>Scholarly work</b>			
No	58	20	1,000
Yes	6	2	
<b>Global impact</b>			
No	14	3	0,541
Yes	50	19	

**Table 3 – Correlations between the ODP variables and the type of dental prosthesis.**

Activities	Type of prostheses		P-value
	Temporary fixed	Temporary removable	
<b>Smiling</b>			
No	9	37	0,578
Yes	6	34	
<b>Eating</b>			
No	15	49	0,009*
Yes	0	22	
<b>Emotional stability</b>			
No	13	54	0,505*
Yes	2	17	
<b>Speaking</b>			
No	14	64	1,000*
Yes	1	7	
<b>Mouth cleaning</b>			
No	13	44	0,066
Yes	2	27	
<b>Social contact</b>			
No	10	26	0,032
Yes	5	45	
<b>Sleeping</b>			
No	15	65	0,585*
Yes	0	6	
<b>Scholarly work</b>			
No	15	63	0,341*
Yes	0	8	
<b>Global impact</b>			
No	6	11	0,030
Yes	9	60	

**Table 4 – The influence of the type of dental prostheses in the global impact, performed by calculating Odds Ratio values.**

	Type	OR	P-value
<b>Prostheses</b>	Fixed	1,000	0,038
	Removable	3,636	



The forensic assessment of dental trauma in the living plays a relevant role in pointing to an optimal treatment, and consequently striving for better prognosis, preventing further sequels and especially indicating whether the damage affects the patient in his global environment. The present study revealed that the global impact, as well as eating and social contact variables, are

strongly affected by the type of temporary prosthesis, or specific removable prosthesis. This finding suggests that fixed prostheses are more suitable for rehabilitating patients who underwent dental avulsion. Thereby the impacts on eating, social contact, and global effects could be reduced.

### REFERENCES

1. Andreasen J, Borum M, Jacobsen H, Andreasen F. Replantation of 400 avulsed permanent incisors: factors related to periodontal ligament healing. *Endod Dent Traumatol* 1995;11(2):76-89.
2. Andreasen JO, Andreasen FM. Root resorption following traumatic dental injuries. *Proc Finn Dent Soc* 1992;88:95-114.
3. Lee K, Snape L, Steenberg L, Worthington J. Comparison between interpersonal violence and motor vehicle accidents in the etiology of maxillofacial fractures. *ANZ J Surg* 2007;77:695-8.
4. Castro RAL, Cortes MIS, Leão AT, Portela MC, Souza IPR, Tsakos G, Marcenes W, Sheiham A. Child-OIDP index in Brazil: Cross-cultural adaptation and validation. *Health Qual Life Outcomes* 2008;6:68.
5. Tesch FC, Oliveira BH, Leão A. Measuring the impact of oral health problems on children's quality of life: conceptual and methodological issues. *Cad Saude Pub* 2007;23(11):2555-64.
6. Hair JF, Anderson RE, Tatham RL. *Multivariate data analysis*. 6<sup>th</sup> ed. Upper Saddle River, New Jersey. Prentice-Hall; 2009.
7. Côrtes MIS, Bastos JV. Traumatismo dentário, In: Estrela C. *Ciência endodôntica*. São Paulo, São Paulo. Artes Médicas; 2004. p 799-918.
8. Adulyanon S, Sheiham A. Oral impacts on daily performances, In: Slade GD. *Measuring oral health and quality of life*. Chapel Hill, North Carolina. Dental Ecology; 1997. p 151-60.
9. Baldwin DC. Appearance and aesthetics in oral health. *Community Dent Oral Epidemiol* 1980;8(5):244-56.
10. Lucas FM. Sequelas traumáticas nas crianças e nos adolescentes, In: Lucas FM. *Avaliação das sequelas em direito civil*. Coimbra, Portugal. Gráfica de Coimbra; 2005. p 249-58.
11. Lopez TA. Conceito de dano estético, In: Lopez TA. *O dano estético – Responsabilidade civil*. 3<sup>rd</sup> ed. São Paulo, São Paulo. Revista dos Tribunais; 2004. p 44-64.
12. Sá FO. *Clínica médico-legal da reparação do dano corporal em direito civil*. Coimbra, Portugal. APADAC; 1992.
13. Vieira DN, Quintero JA. *Aspectos práticos da avaliação do dano corporal em Direito Civil*. Coimbra, Portugal. Caixa Seguros e Imprensa da Universidade de Coimbra; 2008.
14. Bery A, Cantaloube D, Delprat L. L'évaluation des préjudices, In: Bery A, Cantaloube D, Delprat L. *Expertise Dentaire et Maxillo-Faciale: Principes, conduite, indemnisation. L'évaluation des préjudices*. Paris, France. EDP Sciences; 2010. p 159-92.

\*\*\*