

## Through the Eye of the Beholder: Oral Health- Related Quality of Life of Children with Traumatic Dental Injuries during the Syrian Crisis

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### □ ABSTRACT □

**Objective:** Health care providers in emergency settings encounter emotional issues in treating traumatic dental injuries TDIs which may have a significant negative impact on the quality of life. Assessing OHRQoL of children with TDIs, in emergency, promote a shift from traditional dental management to a more supportive care that focuses on a person's social and emotional status and physical functioning in which appropriate health care and optimal outcomes can be obtained. The objective of this study is to investigate the impact of TDIs on the quality of life of 7 to 16-year-old Syrian school children and to test whether treatment of TDI will improve their OHRQoL.

**Basic research design:** A case-control study was carried out involving 147 children aged 7 to 16 years attending the Department of Pediatric Dentistry in Damascus University. Andreasen classification was adopted for TDI diagnosis. CPQ<sub>11-14</sub> instrument was utilized to assess OHRQoL.

**Results:** Findings of this study revealed significant differences in OHRQoL items before and after treatment of participating children. There were no statistically significant differences between healthy children and those who were treated with TDI in regard to the overall OHRQoL ( $P > 0.05$ ).

**Conclusions:** OHRQoL was significantly improved in children with TDIs after treatment. Oral symptoms, functional limitations, emotional and social well-being were similar to healthy children. Health professionals in Syria should put efforts to make war less damaging for children and their parents. Dentistry during the crisis goes beyond filling and drilling of injured teeth to a moral commitment within a supportive and caring context.

**Keywords:** Traumatic Dental Injuries, Syrian, school children, OHRQoL, Oral Health-Related Quality of Life.

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## بعين الناظر: صحة الفم المرتبطة بنوعية الحياة عند الأطفال المصابين بالأذيات الرضوية السنوية خلال الأزمة السورية

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### □ ملخص □

**الهدف:** يصادف مقدمو الرعاية الصحية في قسم الإسعاف أموراً عاطفية التي من شأنها أن تعكس تأثيراً سلبياً على نوعية الحياة أثناء معالجة الأذيات الرضوية السنوية. وإنّ تقييم صحة الفم المرتبطة بنوعية الحياة أثناء المعالجة وتدبير الأذيات الرضوية السنوية في الحالات الإسعافية يعزز ويحول عملية التدبير من سنية تقليدية إلى رعاية داعمة تركز على الحالات الاجتماعية والعاطفية والجسدية للفرد، بحيث يتم تحقيق رعاية صحية مناسبة ونتائج مثالية. كان الهدف من هذه الدراسة تحري تأثير الأذيات الرضوية السنوية علنوعية الحياة لدى أطفال المدارس السوريين بين عمري 7-16 عاماً واختبار ما إذا كان معالجة هذه الأذيات يحسن من صحة الفم المرتبطة بنوعية الحياة.

**التصميم الأساسي للبحث:** أجريت دراسة حالة-شاهد بمشاركة 147 طفلاً بين عمري 7-16 عاماً من المراجعين لقسم طب أسنان الأطفال في جامعة دمشق. تم اعتماد تصنيف Andreasen لتشخيص الأذيات الرضوية السنوية. وتم استخدام استبيان إدراك الطفل CPQ11-14 لتقييم صحة الفم المرتبطة بنوعية الحياة ( $P > 0.05$ ).

**الخلاصة:** تحسنت صحة الفم المرتبطة بنوعية الحياة بشكل واضح عند الأطفال المصابين بالأذيات الرضوية السنوية بعد المعالجة. وكانت الأعراض الفموية والقصور الوظيفي والحالتين العاطفية والاجتماعية جميعها مشابهة لتلك الموجودة عند الأطفال الأصحاء. لذا يتوجب على اختصاصي الصحة في سوريا بذل المزيد من الجهود لتخفيف وطأة وأثر الحرب على الأطفال وذويهم. وعلى طب الأسنان في الأزمات أن يتجاوز تحضير وترميم السن المصابة إلى التزامات أخرى أخلاقية تشمل من خلالها مفهومي الرعاية والدعم معاً.

**الكلمات المفتاحية:** الأذيات الرضوية السنوية، السوريين، أطفال المدارس، صحة الفم المرتبطة بنوعية الحياة.

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## **Introduction:**

War greatly influences the presence, quality and quantity of dental services provided to children [1]. Conditions of children health deteriorate in war in which nutrition, water, safety, sanitation, housing and access to health care are all affected. Traumatic dental injuries are unscheduled (and often urgent) events, for the unlucky patient and for the dentist asked to manage the problem [2].

It is of critical value to facilitate children's access to dental care services, when dealing with dental injuries especially for those who are forced to move into different places or displaced person camps as they had bad experience because of their exposure to terror and horror that can leave enduring impacts in posttraumatic stress disorder [3,4]

Oral health affects people physically and psychologically and influences how they grow, enjoy life, look, speak, chew, taste food and socialize, as well as their feelings of social well-being [5]. Contemporary concepts of health suggest that oral health should be defined in general physical, psychological and social well-being in relation to oral status. According to Cohen and Jago (1976), the greatest contribution of dentistry is to improve quality of life [6].

TDI can result in pain, loss of function, emotional distress, and can adversely affect the developing occlusion as well as dental esthetics, with a negative impact on the lives of children [3,7]. Children develop a concern for their esthetic appearance at a very young age which may later affect their personality development [8]. Research has indicated that a fracture of one anterior tooth can affect the behavior of a child, his/her progress in school, daily life, and that of his/her family [9].

The quality of life of the Syrian people was seriously affected by the conflict and the health sector itself suffered the negative impacts of the violence and became increasingly a direct victim of the different actors of the conflict.

Different studies and reports are calling attention to TDIs in Syria during the crisis due to violence and accidents, and their negative impact on life and health of the Syrian people.

Health care providers in emergency settings encounter emotional issues in treating diseases and injuries, especially in managing the consequences of TDIs. Therefore, knowing that severe TDIs can adversely affect the quality of life of children and that the proper management could improve their emotional and social well-being, it is important to prepare dental professionals to provide optimal oral health care in the hope to facilitate social healing and quality of life of children and their family in such a traumatic situation [9].

To our knowledge, the information and data related to dental trauma in Syria, its type, etiology, prevalence and impacts are very limited. The aim of the present study is to investigate the impact of TDIs on the quality of life of 7 to 16-year-old school children during the Syrian Crisis and to test whether the treatment of TDI could improve the OHRQoL.

## **Materials and methods**

This study was approved by the Ethical Committee of Damascus University. Informed consent was obtained from the parents of each child in order to take part in the study. A total of 147 children aged 7 - 16 years old, being treated at the department of Pediatric Dentistry in the Faculty of Dentistry, Damascus University, were included in this study. About 60 participants had TDI and 87 of the children were healthy and considered as

controls. All children were clinically examined to investigate signs of previous dental trauma to their permanent teeth.

The Andreasen classification was used to record evidence of TDI [10]. The clinical examination was undertaken to evaluate persistent dental trauma, teeth involved and the type of injury. Previous dental trauma was categorized as fracture, avulsion, soft tissue injuries and multiple injuries.

A questionnaire was designed by the investigator to record the classification of trauma (according to trauma cause classified into fall, sport, traffic and fight), place where it happened (home, school, street or other places), the age of child when the teeth were traumatized, treatment for trauma, residential area, and medical history were also recorded in a predesigned questionnaire.

The OHRQoL questionnaire [11], which is composed of 36 items and distributed into four subscales; oral symptoms, functional limitations, emotional well-being and social well-being, were utilized. Each item addressed the frequency of events as applied to the teeth, lips, jaws and mouth in the previous three months. The impact on OHRQoL was classified as absent ( $CPQ_{11-14} = 0$ ) or present ( $CPQ_{11-14} \geq 1$ ), based on previous OHRQoL studies [12].

During the crisis, the Faculty of Dentistry has been in a high state of alert and readiness to treat patients with different diseases and injuries.

Most of the Children attended the pediatric clinic, were those who came from harboring centers who took part in a campaign called "A Smile and an Apple" (Dehke wa Toufaha in Arabic) which aims to create a smile on the face of child coming from sheltered housing and to maintain oral health despite all difficulties and circumstances of the daily life [13]. TDIs were diagnosed radiographically and clinically by the same dentist and then treated according to its type and severity. Flexible splinting was applied and endodontic treatment was performed when necessary.

Data management and statistical analysis were carried out using statistical package, SPSS version 20.0. (SPSS Inc., Chicago, IL, USA) In addition to prevalence rates and descriptive statistics, McNemar test was performed to determine statistical significance before and after TDI treatment and for each item of OHRQoL questionnaire. Chi-square and fisher exact tests were also performed to assess the relationship between treated TDI subjects and controls. The probability level,  $P < 0.05$  was considered significant.

## Results:

A total of 147 children (84 of boys and 63 of girls), aged 7 to 16-year-old were included in the study. Demographic characteristics are presented in Table 1. About 87 children (59.7%) who included in this study were healthy and did not have any type of TDI. The prevalence of dental trauma according to the type of trauma per child in relation to the etiology and location is presented in Table 2.

**Table 1: Demographic characteristics of study(TDI) and control groups**

Sample	Age	Gender				Total	
		Male		female		N	%
		N	%	N	%		
TDI	8-10	12	33.4	6	25	18	30
	10-12	5	13.9	6	25	11	18.3
	12-16	19	52.7	12	50	31	51.7
	Total	36	100	24	100	60	100
Control	8-10	12	25	10	25.6	22	25.3
	10-12	12	25	9	23	21	24.2
	12-16	24	50	20	51.4	44	50.5
	Total	48	100	39	100	87	100

**Table 2. Type of trauma per child in relation to cause and location**

Type of trauma	Cause				Location			Total
	Traffic	Sports	Fights	Falls	School	Home	Street	
Avulsion	2	1	1	4	2	3	3	8
Fractures	1	5	8	34	24	20	4	48
Both	0	0	1	3	1	2	1	4
Total	3	6	10	41	27	25	8	60

The most frequent cases of dental trauma occurred at school (n = 27, 45%) followed by cases which happened at home (n = 25, 41.6%) and about 8cases (13.4%) happened at street. The most common reason for dental trauma was falling (n = 41, 68.4%) followed by fights, sports and traffic (16.6%, 10%, 5% respectively). Most of the TDIs were tooth fractures only (n=48, 80%) rather than avulsion (n=8, 13.4%) or complex injury (fractures and luxation)(n=4, 6.6%).

Results of this study revealed significant differences in OHRQoL items before and after treatment of participated children. High significance was found regarding pain, difficulty chewing and embarrassment (P= 0.000). Furthermore, before treatment, TDI children were more likely to have “avoided smiling/laughing”, “concerned with what others think”, “Teased/called names” and were suffering from “Other children asked questions about their oral appearance”, these findings achieved high statistical significance (P= 0.000). Results are shown in Table 3.

There were no statistically significant differences between children with treated with TDI and healthy children with regard to the overall OHRQoL (P> 0.05), except for “Gum Bleeding” which was significantly higher in treated children (P= 0.020).

Items such as “avoiding smiling/laughing”, “concerned with what others think” and “Other children asked questions” were also more prevalent among children with treated teeth than those with no TDI, but no significant differences were found (P>0.05). Table 4 presents a comparison between healthy children and children with TDIs after treatment with regard to OHRQoL.

**Table 3: Frequency distribution of OHRQoL among children with TDI before and after treatment**

Variables		TDI				P- value	
		Before (n=60)		After (n=60)			
		n	%	n	%		
Oral symptoms	Pain	<b>CPQ <math>\geq</math> 1</b>	47	78.3	17	34	<u>0.000</u>
		<b>CPQ = 0</b>	13	21.7	33	66	
	Mouth sores	<b>CPQ <math>\geq</math> 1</b>	30	50	18	30	<u>0.012</u>
		<b>CPQ = 0</b>	30	50	42	70	
	Gum Bleeding	<b>CPQ <math>\geq</math> 1</b>	35	58.3	17	34	<u>0.002</u>
		<b>CPQ = 0</b>	25	41.7	33	66	
	Bad Breath	<b>CPQ <math>\geq</math> 1</b>	30	50	15	30	<u>0.012</u>
		<b>CPQ = 0</b>	30	50	35	70	
Functional limitations	Difficulty chewing	<b>CPQ <math>\geq</math> 1</b>	43	71.7	12	24	<u>0.000</u>
		<b>CPQ = 0</b>	17	28.3	38	76	
	Sleeping Difficulty	<b>CPQ <math>\geq</math> 1</b>	18	30	5	10	<u>0.006</u>
		<b>CPQ = 0</b>	42	70	45	90	
	Difficulty eating/ drinking hot/cold foods	<b>CPQ <math>\geq</math> 1</b>	36	60	29	48	<u>0.022</u>
		<b>CPQ = 0</b>	24	40	31	52	
	Speaking Difficulty	<b>CPQ <math>\geq</math> 1</b>	22	36.7	8	16	<u>0.005</u>
		<b>CPQ = 0</b>	38	63.3	42	84	
Emotional wellbeing	Felt irritable/frustrated	<b>CPQ <math>\geq</math> 1</b>	33	54	32	53.3	1
		<b>CPQ = 0</b>	27	46	28	46.7	
	Embarrassment	<b>CPQ <math>\geq</math> 1</b>	39	65	7	14	<u>0.000</u>
		<b>CPQ = 0</b>	21	35	43	86	
Upset	<b>CPQ <math>\geq</math> 1</b>	35	54	32	53.3	1	
	<b>CPQ = 0</b>	25	46	28	46.7		
Social wellbeing	Concerned with what others think	<b>CPQ <math>\geq</math> 1</b>	42	70	7	14	<u>0.000</u>
		<b>CPQ = 0</b>	18	30	43	86	
	Avoided smiling/laughing	<b>CPQ <math>\geq</math> 1</b>	41	68.3	3	6	<u>0.000</u>
		<b>CPQ = 0</b>	19	31.7	47	94	
	Not wanted to spend time with others	<b>CPQ <math>\geq</math> 1</b>	26	44	9	15	<u>0.031</u>
		<b>CPQ = 0</b>	34	56	51	85	
	Teased/called names	<b>CPQ <math>\geq</math> 1</b>	33	55	26	44	<u>0.000</u>
		<b>CPQ = 0</b>	27	45	34	56	
Other children asked questions	<b>CPQ <math>\geq</math> 1</b>	46	76.7	23	16	<u>0.000</u>	
	<b>CPQ = 0</b>	14	23.3	37	84		

McNemar test was used to calculate p-value

CPQ  $\geq$  1 impact of OH on QoL

CPQ = 0 no impact of OH on QoL

**Table 4: Frequency distribution of OHRQoL among children after treating TDI and control group**

Variables	TDI				P- value		
	Control (n=87) (absence of TDI)		After (n=60)				
	N	%	N	%			
Oral symptoms	Pain	CPQ ≥ 1	34	39.1	17	34	0.586
		CPQ = 0	53	60.9	33	66	
	Mouth sores	CPQ ≥ 1	32	36.7	18	30	0.124
		CPQ = 0	55	63.3	42	70	
	Gum Bleeding	CPQ ≥ 1	14	16.1	17	34	0.020
		CPQ = 0	73	83.9	33	66	
Bad Breath	CPQ ≥ 1	22	25.3	15	30	0.555	
	CPQ = 0	65	74.7	35	70		
Functional limitations	Difficulty chewing	CPQ ≥ 1	22	25.3	12	24	1
		CPQ = 0	65	74.7	38	76	
	Sleeping Difficulty	CPQ ≥ 1	6	6.7	5	10	0.058
		CPQ = 0	81	93.3	45	90	
	Difficulty eating/ drinking hot/cold foods	CPQ ≥ 1	47	54	29	48	0.507
		CPQ = 0	40	46	31	52	
Emotional wellbeing	Speaking Difficulty	CPQ ≥ 1	7	8	8	16	0.165
		CPQ = 0	80	92	42	84	
	Felt irritable/frustrated	CPQ ≥ 1	47	54	32	53.3	1
		CPQ = 0	40	46	28	46.7	
	Shy or Embarrassed	CPQ ≥ 1	11	12.6	7	14	0.987
		CPQ = 0	76	87.4	43	86	
Social wellbeing	Upset	CPQ ≥ 1	41	47.1	32	53.3	0.239
		CPQ = 0	46	52.9	28	46.7	
	Concerned with what others think	CPQ ≥ 1	14	16	7	14	0.198
		CPQ = 0	73	84	43	86	
	Avoided smiling/laughing	CPQ ≥ 1	10	11.5	3	6	0.373
		CPQ = 0	77	88.5	47	94	
Not wanted to spend time with others	CPQ ≥ 1	27	31	9	15	0.162	
	CPQ = 0	60	69	51	85		
Teased/called names	CPQ ≥ 1	36	41.4	26	44	0.865	
	CPQ = 0	51	58.6	34	56		
Other children asked questions	CPQ ≥ 1	17	19.5	23	16	0.276	
	CPQ = 0	70	80.5	37	84		

Chi-Square test was used to calculate p-value

CPQ ≥ 1 impact of OH on QoL

CPQ = 0 no impact of OH on QoL

## Discussion:

Perheentupa et al (2001) reported that personal, social and physical factors played a role in the occurrence of dental trauma[14].

For Syrian Children, this is not the case. The onset of the civil war led to the complete deterioration of the health infrastructure through the wide destruction of facilities, shortage in health care personnel and medicines, and the lack of secure routes and transportation[15].

There is no data about the prevalence of oral injuries during Syrian Crisis. Oral injuries are most frequent during the first 10 years of life, decreasing gradually with age, and are very rare after the age of 30 [16]. However, the majority of injuries that can affect the oral region are dental[17].

Nonetheless, the lack of security and mobility to seek care all contribute to the growing number of untreated TDI. In the permanent dentition, most studies cite figures at approximately 20% in children and adolescents [18–20]. Paediatric Dentistry Department has witnessed several cases of TDI through the past 5 years of the conflict. Most children participated in the present study live in families that are under tremendous pressure because of poverty, death of relatives, violence, stress, or destruction of accommodation and belongings. Most children were actually late in seeking treatment because of poverty, violence, severe road damage and increased numbers of checkpoints. Some reported pain of a complicated crown fractures (fig.1). Others came from siege areas, and were treated by physicians, not dentists.



Fig. 1: A13 year-old boy having TDI (Complicated crown Fracture) due to a fight between children in harboring center. A-B: Before treatment. C-D-E: During Treatment. F: After Treatment.

Stone-Brown et al (2013) revealed the fact that surgeons are forced to manage everything during the crisis including war injuries[21]. Patients from rural areas reported lack of safe roads and transportation made thinking about seeking treatment of TDI impossible “One father said: one-fractured tooth is not a big deal, this is a luxury”. However, Piovesan et al showed that the fracture of an anterior tooth can affect the behavior of a child, their progress in school [22].

In dental conditions that have a strong aesthetic, functional component or cause adverse health consequences, such as severe trauma, the use of normative assessments combined with measures of quality of life should be considered [9].

Many studies that assess the relationship between oral health-related quality of life OHRQoL and TDI in permanent teeth, included children aged 11–14, and were Brazil-based studies [9].

This study is the first in Syria investigating the type of dental trauma and the leading causes of permanent teeth among Syrian schoolchildren with a wide range of age groups (between 7-16 years old), as well as, improvements of OHRQoL before and after TDI treatment during painful conditions of the Syrian Crisis.

Contrary to the findings of Onetto et al (1994) who reported that injuries mostly happened at home[23], majority of dental trauma in our study occurred at school(n = 27, 46.5%) followed by injuries occurred at home (n = 25, 43.1%) or at street (n = 6, 10.4%).

The most common cause of oral trauma was falls (n = 41, 70.6%) followed by fights, sports then traffic (15.5%, 8.6%, 5.1% respectively).

Similarly, a study carried out by Dua and Sharma[24]and other previous studies found that falls have been the most frequent cause of TDI in all age groups[10,16,19,25]. Ajayi et al(2012) also found that falls were the most common cause of trauma and recorded 34.3% of the causes[26].

Similar to Dua and Sharma[24], most of the TDI were fractures regardless of the cause or the location of Injury (n=48, 82.7%).

Our study has also indicated a significant improvement in OHRQoL in children before and after treatment of TDI. Findings indicated that TDI children, before treatment, were more likely to “avoid smiling/laughing”, were “concerned with what others think” and were “Teased/called names” than after treatment of TDI. These findings achieved statistical significance.

Golai et al (2015) found similar results concluding that children with untreated traumatic injuries to anterior teeth were more likely to experience a negative impact on social well-being, especially with regard to avoiding smiling or laughing and being more concerned about what other people may think or comment [8].

Ramos-Jorge et al (2014) have indicated that untreated TDI was associated with a negative impact on the quality of life of schoolchildren, whereas treated TDI and absence of TDI were not associated with impact on quality of life [27].

Others studies have shown no association between quality of life and TDI in other age groups[28,29] or have found an association only with some specific domains of quality of life in Brazil-based studies which have found that children with TDI in the anterior teeth experienced a negative impact on social well-being, mainly with regard to avoiding smiling or laughing and being concerned about what other people may think or say[12,27,30].

### **Conclusions:**

Children suffering from traumatized dental injuries had more effects on the emotions, and social interaction than children without any traumatic injuries during crisis. These results can help clinicians in their attempts to improve oral health outcomes for children especially during tough conditions under conflicts. Professional of schools (teachers, caregivers) should also be prepared to assist these children and promote well-being in schools.

Findings of this study provided evidence that health professionals in Syria should exert their efforts to make war less damaging for children and their parents. The treatment provided to poor injured children have helped improve the quality of life of children who received free optimal treatment. The role of health professional goes beyond playing the traditional role of a pediatric dentist. It is being a caring gardener providing the nutrients, soil and water [31] in the hope that all flowers will thrive despite the rain, winds and storms. Dentistry during the Syrian crisis goes beyond filling and drilling of injured tooth to a moral commitment within a supportive and caring context. This will facilitate developmentally sensitive, and meaningful, life that meet specific needs of the individual child despite problems related to food, clothing, medicine, education, and family reunion.

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