الرضوض السنية والنفسية عند الأطفال: هل اضطراب الشدة ما بعد الرض عامل خطورة للإصابة بالأذيات الرضية السنية؟

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ملخص:

الأذيات الرضية السنية (TDI) إحدى أهم مشكلات الصحة السنية التي تؤثّر على الأطفال، وتتطلّب اهتماماً خاصاً. اضطراب الشدة ما بعد الرض (PTSD) أيضاً أحد أهم مشكلات الصحة النفسية التي تؤثّر على الأطفال في أوقات الحرب. تحري انتشار الأذيات الرضية السنية عند الأطفال المصابين باضطراب الشدة ما بعد الرض وبعض عوامل الخطورة للإصابة بها ومقارنة النتائج مع مثلائهم من الأطفال الأصحاء. شملت الدراسة 118 طفلاً من المصابين باضطراب الشدة ما بعد الرض ويمثلون مجموعة الدراسة، و121 طفلاً آخرين من الأصحاء الذين يمثلون المجموعة الشاهدة. جميع الأطفال المشاركين كانوا يقيمون في مراكز إيواء مؤقتة مع عائلاتهم أو الأوصياء عليهم. كان الأطفال المشاركون في كلتا المجموعتين ينتمون للمجموعة العمرية بين 9–14 عاماً. تم جمع معلومات تتعلّق بالخصائص الديموغرافية–الاجتماعية للمشاركين، كالعمر، والجنس، وعدد أفراد العائلة، وفقدان أحد أو كلا الوالدين خلال الحرب. تم إجراء الفحص السريري لتقييم وجود أو غياب الأذية الرضية السنية. تم استخدام اختبار كاي مربع والانحدار اللوجيستي المتعدد (نسب الخطورة) لتحليل البيانات.شارك في الدراسة الحالية 239 طفلاً. تضمّنت مجموعة الدراسة 118 طفلاً تم تشخيص إصابتهم باضطراب الشدة ما بعد الرض (الإناث=63.6%، والذكور=36.4%)، في حين تضمّنت المجموعة الشاهدة 121 طفلاً من الأصحّاء (الإناث=59.5%، والذكور=40.5%). أظهر الأطفال المصابون باضطراب الشدة ما بعد الرض انتشاراً أعلى للأذيات الرضية السنية من الأطفال الأصحاء بنسبة احتمالية حدوث (OR) بلغت (OR=17.45، CI=8.91–34.17). أظهر تحليل الانحدار اللوجستي المتعدد أنّ الأطفال المصابين باضطراب الشدة ما بعد الرض من الفئة 9–10 سنوات لديهم احتمالية أعلى لحدوث الإصابات الرضية السنية (OR=5.64، CI=2.11–15.06، p=0.000)، وكذلك الأطفال المصابون الذين ينتمون إلى عائلات كبيرة (OR=3.34، CI=1.31–8.51، p=0.011)، والذين فقدوا أحد أو كلا الوالدين خلال الأزمة (OR=2.76، CI=1.21–6.28، p=0.015). كما أن الإناث المصابات بالـ PTSD كانت لديهن احتمالية إصابة أعلى من الذكور المصابين (OR=1.57، CI=0.69–3.56) بدون أي دلالة إحصائية هامة بين كلا الجنسين (p=0.272). أظهرت نسب الاحتمالية المعدلة أنّ العمر فقط هو المرتبط بشكل مباشر مع الأذيات الرضية السنية عند الأطفال المصابين باضطراب الشدة ما بعد الرض (OR=3.64، CI=0.50–4.40، p=0.020).كانت الأذيات الرضية السنية أكثر انتشاراً عند الأطفال المصابين باضطراب الشدة ما بعد الرض. كانت الفئة العمرية بين 9–10 سنوات هي عامل الخطورة التنبؤي الأقوى لحدوث الأذيات الرضية السنية لدى الأطفال المصابين باضطراب الشدة ما بعد الرض. ينبغي تأسيس استراتيجيات فعّالة للوقاية من الإصابات الرضية السنية خاصة لدى الأطفال الصغار المصابين باضطراب الشدة ما بعد الرض.

الكلمات المفتاحية: الرضوض السنية، الرضوض النفسية، اضطراب الشدة ما بعد الرض، الأذيات الرضية السنية، عامل خطورة، الأطفال.

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Dental and Mental Trauma in Children: Is Post-Traumatic Stress Disorder a Risk Factor for Traumatic Dental Injuries?

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Abstract:

Traumatic dental injuries (TDIs) are a serious dental health problem affecting children and need special attention. Post-Traumatic Stress Disorder (PTSD) is also a serious mental health problem affecting children in wartimes.To investigate the prevalence and some risk factors of TDIs in children with PTSD and compare results with healthy peers. The study included 118 children with PTSD (study group) and 121 healthy children (control group). All children were living in Temporary Accommodation Centers (TACs) with their families or guardians. Participated children in both groups were in the 9–14 year age group. Information on socio-demographic characteristics of the respondents like age, gender, number of the family members and loss of one or both of parents during the crisis were collected. The clinical examination was carried out to evaluate the presence or absence of TDI. Chi-square Test and Multinominal logistic regression (Odds Ratio) were carried out to for data analysis.

Results: A total of 239 children participated in the current study. The study group included 118 children diagnosed with PTSD (girls=63.6%, boys=36.4%), whilst the control group included 121 healthy children (girls=59.5%, boys=40.5%). PTSD children showed higher prevalence (p=0.000) of TDIs than healthy children with an (OR=17.45; CI=8.91-34.17). Logistic regression analysis showed that there was a significantly higher tendency for PTSD children aged between 9-10 years old (OR=5.64; CI=2.11-15.06; p=0.000), from a large family (OR=3.34; CI=1.31-8.51; p=0.011) and who lost one or two parents during the crisis (OR=2.76; CI= 1.21-6.28; p=0.015) to develop injuries. Moreover, PTSD girls had more tendency to develop TDI (OR=1.57; CI=0.69-3.56) with no significance reported between both genders (p=0.272). Adjusted Odds ratio showed that only age is directly connected to TDI in PTSD children (OR=3.64; CI= 0.50-4.40; p=0.020).

Conclusion: TDIs were more prevalent in children with PTSD. In PTSD children, age between 9-10 was the strongest risk predictor for having TDI. Effective policies need to be established in the aim of TDI prevention especially for PTSD younger children.

Key words: Dental trauma, mental trauma, PTSD, TDI, risk factor, children.

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1-Introduction:

Traumatic Dental Injuries (TDI) are very frequent in the society and comprise 85% of patients presenting with injuries in the oral region (Locker 2007). TDIs are also a serious dental health problem affecting children and adolescents and need special attention (Kumar & Dixit 2016). Injuries to the key areas of the face like the eyes, ears and dental injuries often increase vulnerability to stress and impede recovery (Shaikh & Worall 2002). Moreover, facial and dental trauma patients also report higher rates of body image issues: stigmatization, lower quality of life, lower overall satisfaction with life and even PTSD symptoms (Shepherd 1992). PTSD is an anxiety disorder that results from exposure to an event that is threatening to one's life or physical integrity and is reflected in 3 clusters of symptoms: 1) re-experiencing (e.g., nightmares, flashbacks, etc.), 2) avoidance/ numbing (e.g., avoidance of reminders of the event, feelings of detachment, etc.), and 3) hyper vigilance (e.g., irritability, sleep disturbances, etc.) (APA 2013).

In Syria, after seven years of ongoing conflict, the number of psychiatric inpatients have significantly increased (Latifeh & Dashash 2016). Syrian children have been particularly affected psychologically. Unsurprisingly, some children developed PTSD because of the exposure to war stress as well as adults.

Sadly, the ongoing violence, accidents, and increased number of school leavers because of the current situation in Syria have increased the number of cases with traumatic dental injuries (TDI) with no or limited data estimating the exact prevalence of the problem (Dashash & Omar 2016).

Mental distress has been found to be a risk factor in dental trauma in adults (Perheentupa et al. 2001). However, no previous studies have been conducted to assess the prevalence and risk factors for TDIs in PTSD children. Hence, this study was conducted to first: Determine and compare the prevalence of TDIs in children with and without PTSD. Second: To determine other risk factors for having TDI among PTSD children.

2-Materials and Methods:

Ethics Approval and Consent to participate:

The study was approved by the Ethical Committee of the Institutional Review Board of the Faculty of Dentistry in Damascus University in May-16-2016 (Ethics approval #2039). Children were given a written consent form. Only children with signed consents from parent(s) or guardian(s) were enrolled in this study.

Population and Design:

A case-control study was carried out on all children aged 9-14 years old living in TACs in Damascus city. Those centers were set up by the government during the late Syrian crisis in

order to be a safe haven for families fled from hot areas in Damascus suburbs. The socioeconomic conditions in these centers were presumed to be similar. The parents of the children were informed in a letter about the study design, the need to fill out the questionnaire, and the planned dental examinations. The questionnaire was used to determine demographic characteristic and mental health status. Demographics included age, gender, number of family members and loss of parents during the crisis, if any.

Diagnosis of PTSD:

Child Post-Traumatic Stress Disorder Reaction Index (CPTSD-RI):

CPTSD-RI was used to assess PTSD reactions in children and adolescents. This Index is the most widely self-report method used in children aged 6 to 16 years old after an exposure to traumatic events such as war (Pynoos et al. 1993). The scale showed validity in diagnosing PTSD according to psychiatric diagnostic classification (APA 1994). The 20-item scale has been translated and validated in Arabic (Thabet & Vostanis 1999). The instrument has been used internationally and in two Middle Eastern countries (Egypt and Palestine) (Thabet et al. 2005). In the recent study, Children then were diagnosed with PTSD throughout this self-reported questionnaire. Children who were healthy and had a 0 score in CPTSD-RI served as a control group.

Clinical examination:

Children were examined in the TACs' clinic. Only subjects whose parents consented to their participation were examined. The examination was conducted by one examiner. The intraoral examination was carried out under flash light and regular room light to asses any tooth fracture resulting from injury. Only TDIs happened after the traumatic experience of the child were included in the recent study. Teeth affected by dental trauma are coded according to WHO ((WHO) 2013) as follows:

0 = No sign of injury

1 = Treated injury

2 = Enamel fracture only

3 = Enamel and dentine fracture

4 = Pulp involvement

5 = Missing tooth due to trauma

Codes from 1-5 indicated presence of TDI, while code 0 indicated absence.

Data analysis:

Statistical analysis was carried out using SPSS (statistical package for social sciences) version 20.0 (SPSS IBM. Chicago, IL, USA). Significance level was set at the 5% level. For analysis in the present study, the dichotomization of the data was given a (0=not existed) and

(1=existed), with no concern as to its intensity or type. Descriptive statistics were displayed as frequencies and percent for qualitative variables. All the qualitative variables were compared using chi-squared test (or Fisher exact test as indicated). Logistic regression analysis was performed to identify the predictors of TDI. The final regression model was carried out to calculate the adjusted odds ratio after controlling for the confounders (age, gender, family members and loss of parent(s) during the crisis). Variables with a p value > 0.05 were removed from the final model. A P-value of < 0.05 was considered to be statistically significant.

3-Results:

A total of 239 children participated in the current study. The study group included 118 children diagnosed with PTSD (girls=63.6%, boys=36.4%), whilst the control group included 121 healthy children (girls=59.5%, boys=40.5%). The mean age of PTSD children was (11±1.4) and was (10.8±1.5) for the controls (Table 1).

Table 1: Distribution of children in both groups according to age and gender

Demographics		PTSD		Controls	
		n	%	n	%
Age	9->10	51	43.2	58	47.9
	10-14	67	56.8	63	52.1
Mean age ±SD		11±1.4		10.8±1.5	
Gender	Boys	43	36.4	49	40.5
	Girls	75	63.6	72	59.5
Total		118	100%	121	100%

Children with PTSD showed higher prevalence of TDI (46.6%), while it was (12.4%) among healthy children. Findings revealed that PTSD children had an OR=17.45 (p=0.000; CI=8.91-34.17) to have TDI compared to the controls (Table 2).

Table 2: Frequency of TDI in PTSD and control group						
Variables		PTSD		Controls		*P*-value
		n	%	n	%	
TDI	Yes	84	71.2	15	12.4	0.000***
	No	34	28.8	106	87.6	
	Total	118	100	121	100	
Odds ratio (95%CI)		17.45 (8.91-34.17)				

PTSD: Post-Traumatic Stress Disorder; **TDI:** Traumatic Dental Injuries. ***Significance at the 0.001; Chi-Square Test.

According to **Table 3**, TDI prevalence was associated with PTSD severity (p=0.003). Half of PTSD children (50%) having TDI were suffering from severe PTSD symptoms. While (21.4%) of PTSD children having TDI had moderate symptoms (Table 3).

Table 3: Frequency of TDI in PTSD group according to PTSD severity					
Variables	TDI				*P*-value
	Yes		No		
	n	%	n	%	
Mild (12-24)	12	14.3%	0	0%	0.003**
Moderate (25-39)	18	21.4%	10	29.4%	
Sever (40-59)	42	50%	11	32.3%	
Very sever (60-80)	12	14.3%	13	38.3%	
Total TDI in PTSD group	84	100%	34	100%	

PTSD: Post-Traumatic Stress Disorder. **TDI:** Traumatic Dental Injuries; **Significance at the 0.01 level; Chi-Square Test.

All study variables (gender, age group, family members and loss of parent(s) during the crisis) achieved p-values <0.05 and were therefore included in the multiple regression model. PTSD girls had an (OR=1.57; CI=0.69-3.56) with no significance reported between both genders

(p=0.272). Younger PTSD children between 9-10 years old also were more vulnerable to have TDI (OR=5.64; CI=2.11-15.06; p=0.001). Moreover, PTSD children coming from a large family had three times probability to have TDI (OR=3.34; CI=1.31-8.51; p=0.011) compared to children from small families. PTSD children who lost one or both parents at the war were also very vulnerable (OR= OR=2.76; CI= 1.21-6.28; p=0.015) to develop injuries (Table 4).

Table 4: Odds Ratio (Multinomial Logistic Regression) for the prevalence TDI in PTSD group

Variable	Group	OR	95% CI	*P*-value
Gender	Boys	1‡	0.69-3.56	0.272
	Girls	1.57		
Age	>10-14	1‡	2.11-15.06	0.000***
	9-10	5.64		
Family member	Large	1‡	1.31-8.51	0.011*
	small	3.34		
Loss of Parent	No loss	1‡	1.21-6.28	0.015*
	Loss	2.76		

PTSD: Post-Traumatic Stress Disorder. **TDI**: Traumatic Dental Injuries; **OR**: Odds Ratio; **CI**: Confidence Interval; ‡Reference category

The linear regression model revealed that all study variables were confounders (age, family members and loss of parent(s) during the crisis). Therefore, after adjusting of the confounders, Odds ratio showed that only age is directly connected to TDI in PTSD children. Younger children (9-10 years old) had more than 3 times probability (OR=3.64; CI= 0.50-4.40; p=0.020) to have TDI compared to children over 10 years old. Similarly, children coming from small families and children who lost one or both parents were more vulnerable to TDI. However, there were no statistical significance (p >0.05) regarding number of family members and loss of parents during the war (Table 5).

Table 5: Adjusted Odds Ratio (Multinomial Logistic Regression) for the prevalence TDI in PTSD group

Variable	Group	Adjusted OR	95% CI	*P*-value
Age	>10-14	1‡	0.50-4.40	0.020*
	9-10	3.64		
Family member	Large	1‡	0.21-7.81	0.781
	Small	1.29		
Loss of Parent	No loss	1‡	0.13-4.68	0.892
	Loss	1.05		

PTSD: Post-Traumatic Stress Disorder. **TDI**: Traumatic Dental Injuries; **OR**: Odds Ratio; **CI**: Confidence Interval; ‡Reference category

4-Discussion:

Trauma can cause severe and long-term impairment and consequences, the most studied of which are post-traumatic stress disorder (PTSD) Without treatment, PTSD can become chronic and have an impact on normal psychosocial development and functioning in adulthood (Kolaitis 2017). In the other hand, Facial and dental injuries constitute a significant portion of war-related trauma. Moreover, Dental trauma has been linked to emotionally stressful conditions (Glendor 2009).

This study was the first to study the prevalence of TDI in children and adolescents suffering from PTSD. Findings revealed that this population had more than 17 times tendency to TDI exposure compared to healthy children. Moreover, the more the severity of PTSD, the more the tendency of having TDI gets. No previous studies in the literature were found to support this result. However, a possible explanation of our result may be that Childhood PTSD may include agitated and hyperactive behaviors for some children (APA 2013). Adverse psychosocial environment also was found to predispose dental injuries (Nicolau et al. 2003). Nicolau et al. applying the life-course approach to elucidate the causes of dental trauma, concluded that adolescents who experienced adverse psychosocial environments along the life course had more dental trauma than adolescents who experienced more favorable environments (Nicolau et al. 2003). Another explanation may be violence. Since the psychological stress and anxiety may increase the violence and aggression between children (Alsadhan et al. 2016). Therefore, the dramatic increase in the severity of violence among

individuals concerning TDIs (intentional trauma) is another alarming factor (Glendor 2009) especially during the conditions of war.

The unique living conditions in TACs in the recent study may also have an impact on TDI prevalence. Overcrowding, for instance have proved to be one of the factors that influence TDI exposure. Marcenes and Murray observed in two separate studies in the UK that overcrowding was the major environmental factor related to dental injuries (Marcenes & Murray 2001; Marcenes & Murray 2002). This finding seems logical as deprived areas have more unsafe playgrounds and sport facilities that can exacerbate falls and collisions (Glendor 2009).

The results of logistic regression analysis showed that PTSD girls were more likely to develop traumatic injuries than males with no significance between both genders. A Meta-analysis study in world TDI prevalence showed different results where the global prevalence of TDI suggests that males were more likely to develop TDI than females (Petti et al. 2018). However, this Meta analysis include healthy school children without PTSD symptoms.

PTSD children who participated in the study and were in the 9-10 year age group had increased risk of TDI compared to older children. An epidemiological study have also found that children in this age group are more prone to traumatic injuries due to increased outdoor activities (Patel & Sujan 2012). Another possible explanation may be hyperactivity in younger children. Lalloo reported that hyperactive children were injured more often than non-hyperactive children (Lalloo 2003).

Results from the current study also suggested that PTSD children coming from small families were more vulnerable to have TDI. Findings from the recent study also showed that PTSD children who lost one or both parent(s) during the crisis had more TDI compared to their peer who did not loss parents. Previous studies also revealed that prevalence of dental trauma were higher among orphans compared to controls (Alsadhan et al. 2016; Al-Maweri et al. 2014). Authors explained that dental trauma caused by violence, beating and child abuse is characteristic for dysfunctional families or institutionalized children (Alsadhan et al. 2016; Cairns et al. 2005).

5-Conclusion:

TDIs were more prevalent in children with PTSD compared to healthy peers. In PTSD children, being a 9-10 year old emerged as the strongest risk predictor for having TDI.

6-Recommendations and Suggestions:

The field of pediatric dental traumatology still has much to learn about connection between young patients' experiences and mental health issues. Therefore, there is a need for action and consider a public health approach with regard to children trauma exposure. Longitudinal

studies with a larger sample size are suggested. Moreover, effective policies need to be established in the aim of TDI prevention especially for PTSD younger children

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