

EPIDEMIOLOGICAL STUDY ON TRAUMATIC ORAL AND MAXILLOFACIAL INJURIES IN VICTIMS OF CHILD PHYSICAL ABUSE

Anamaria-Violeta Țuțuianu¹, Simona Cheregi², Ligia Luminita Vaida³, Abel-Emanuel Moca³, Bianca Maria Negrutiu³, Bianca Hanganu^{4*}, Andreea Alexandra Hleșcu⁴, Fotios Chatzinikoalou⁵, Antonia Sioga⁶

¹PhD Student, University of Oradea, Faculty of Medicine and Pharmacy

²University of Oradea, Faculty of Medicine and Pharmacy, Department of Medical Disciplines

³University of Oradea, Faculty of Medicine and Pharmacy, Department of Dental Medicine

⁴“Grigore T. Popa” University of Medicine and Pharmacy, Department of Legal Medicine, Iași, Romania

⁵“Aristotle” University of Thessaloniki, School of Medicine, Laboratory of Forensic Medicine and Toxicology, Greece

⁶“Aristotle” University of Thessaloniki, School of Medicine, Department of Histology-Embriology, Greece

* Correspondence: bianca_h_no1@yahoo.com

Abstract

Introduction: Physical abuse against children must be reported to the General Directorate for Social Assistance and Child Protection or to the District Police Departments by all specialists in the medical field, including dentists. The aim of this study was to analyze the traumatic injuries of the oral cavity as well as the injuries located on other parts of the body, resulting from the physical abuse inflicted by various means in children. **Material and methods:** We performed a retrospective cohort study on a group with 67 patients aged between 3 months and 18 years, namely 49 boys and 18 girls, residing in Bihor County, in rural and urban areas, victims of physical violence, between 2014-2018. The data were retrieved from the archives of the Bihor County Forensic Medicine Service, the Municipal Clinical Hospital “Dr. Gavril Curteanu” Oradea, Pediatrics Department, as well as a private dental practice in Oradea. We have analyzed the parameters related both to the victim and the aggressor. The data collected were statistically analyzed and processed and the results were rendered with the help of descriptive and correlational studies. **Results:** Following the child physical abuse, during the analyzed period, the most affected soft tissues in the oral and dental field were the lips (71.6%) and the cheeks (71.6%), whereas teeth (29.9%) and jaw bones (7.5%) were the most affected hard tissues. The most common associated injuries were located in the cephalic extremity (26.9%) and limbs (10.4%), and the average number of detected lesions was 2.31 ± 1.427 , ranging between 1 and 7. The average age was 6.63 ± 3.7409 years, most of the victims being boys (73.1%) living in rural areas (64.2%). **Conclusion:** Physical abuse in children is a sensitive topic that must be properly addressed, given its long term consequences. The results of our study are in accordance with the majority of published data in terms on the most vulnerable categories of children and the most often encountered injuries. Given that cases of physical abuse are underreported by dentists, most often because they do not know how to proceed, it is required that all dentists be trained in diagnosing the most accurate forms of physical abuse and be notified of the ethical obligation to report any suspicion of physical abuse.

Keywords: child, physical abuse, aggressor, oral and maxillofacial traumatic injuries.

INTRODUCTION

Child physical abuse is a widespread phenomenon throughout the world, affecting children of all ages. For a long time, the family was idealized and considered a

micro- universe with a strong emotional solidarity, which must be protected from prying eyes. However, modern family research has revealed a world full of tensions and conflicts, in which abuse is

often present under the guise of children's love or desire for 'good education' [1-3].

Injuries of the head occur in more than 50% of child abuse cases [4,5]. The oral cavity is one of the potential focus of the physical abuse, due to its significant role in communication and nutrition [6,7]. The importance of this region is reinforced by the fact that, at the level of the face, both lips and teeth play an important role in how a person is perceived by his/her entourage, their harmony having psychological and social consequences on every human being and also an important role in the forensic identification, representing craniofacial landmarks [8-12].

In most cases, oral injuries are inflicted by blunt or sharp objects (such as cutlery or glass bottles during forced feeding), by compression with fingers or hands, toxic solutions, hot liquids etc. [7]. In cases of child physical abuse, the clinical examination of the head may reveal: injuries of the soft tissues- bruises, burns, lacerations of the tongue, lips, soft and hard palate, gums, alveolar mucosa or frenulum; dental injuries- fractures, dislocations, avulsions; bone injuries- fractures of the jaws [13-16]. Nevertheless, some traumatic injuries may be caused by dysfunction, parafunctions, vicious oral habits, certain malocclusions or by the wearing of orthodontic appliances (mobile or fixed intraoral orthodontic appliances, extraoral orthodontic appliances, mini-implants, etc.), thereby the dentist must be able to establish a correct etiological diagnosis of the injuries [17,18].

Injuries to the head are often accompanied by other injuries localized in other parts of the body. Any injuries which disrupt the tissues have an increased potential for infection. In the case of more serious, polymorphic injuries, with complex jaw fractures inflicted in a victim with a weakened immune system, local or general septic complications with variable evolution can occur, sometimes followed by the victim's death [19-23]. In other cases, oral and facial injuries are minor, death being likely to occur due to injuries concerning

other anatomical regions [24-26]. Furthermore, during the general clinical examination and the patient's anamnesis, the following should be taken into account: the child's general health condition, the child's family of origin, the vulnerabilities of the parents/guardians (poor health condition, alcohol or drug use, low level of education) [27,28]. Alcohol or drug use represents a risk factor for hetero-aggression and self-aggression, increasing aggressive behavior, self-harm and suicide risk rate [29-31].

There are certain key factors that the dentist should know and identify in the event of a suspected physical abuse, careful intraoral and extraoral examination being required. Dentists, especially pediatric dentists and oral surgeons, are among the first specialists to diagnose "battered child syndrome", as injuries caused by physical abuse are often more easily identified. It is shown that abusers rarely take their children to the same general practitioner, but they are not as cautious about the dentist. However, the reporting of child physical abuse by the dentists remains low [14,32].

The aim of this study was to analyze the traumatic injuries of the oral cavity, which result from different forms of physical abuse on children, as well as the lesions caused by violence associated with these.

MATERIAL AND METHODS

We conducted a retrospective cohort study based on child physical abuse cases which were registered between 2014-2018. Data were retrieved from the archives of the Bihor County Forensic Medicine Service, the Municipal Clinical Hospital "Dr. Gavril Curteanu" Oradea, Pediatrics Department and of a private dental practice in Oradea.

The statistical analysis was carried out using IBM SPSS Statistics version 20 and Microsoft Office Excel/Word 2013. Quantitative variables were tested for distribution using the Shapiro-Wilk test and were expressed as mean with standard deviations. Categorical variables were expressed as absolute value or percentage. Independent quantitative variables were tested using Student T-Test/Mann-Whitney

U/Kruskal Wallis H in relation to their distribution and the existing correlations have been proved using the Spearman's Rho correlation coefficient, while the qualitative variables were tested using Fisher's Exact Test. Z tests with Bonferroni correction were performed in order to present in detail the results obtained in testing the qualitative variables. Dunn-Bonferroni tests have represented post-hoc tests carried out to detail the results obtained in testing the independent quantitative variables.

RESULTS

The study group included 67 children (49 boys and 18 girls), victims of physical abuse, aged between 3 months and 18 years, of various nationalities: Roma

(40.3%), Hungarian (25.4%), Romanian (23.9%), Slovak (10.4%).

Most children are boys (73.1%), firstborn (40%), with an average age of 6.63 ± 3.7409 years, ranging from 0.3 to 17 years, most from rural areas (64.2%). They were predominantly abused in the spring (37.3%) or winter (31.3%) and, also, predominantly at noon (54%) or in the evening (30%). Most children were clinically healthy (73.2%). The share of children living in organized families (49.3%) is approximately similar to that of children living in disorganized families (50.7%). In the disorganized families we found mostly situations of cohabitation (61.8%), followed by divorce of the parents (29.4%); death of one of the parents (5.9%) or single motherhood (2.9%) were more rarely encountered (table 1).

Table 1. Distribution of cases according to socio-demographic and general health data of the victims and the temporal characteristics of abuse

| Items | Valid case No. | Value | | | | |
|--|----------------|---|----------------------------------|----------------------------------|--------------------------|------------------------|
| Child's sex (No./%) | 67 | 49 (73.1%) M / 18 (26.9%) F | | | | |
| Child's position (No./%) | 40 | 16 (40%) First | 8 (20%) Second | 12 (30%) Third | 3 (7.5%) Fourth | 1 (2.5%) Fifth |
| Child's age (Mean \pm SD years) | 67 | 6.63 \pm 3.7409 (Min = 0.3, Max=17, Median=6) | | | | |
| Age group (No./%) | 67 | 2 (3%) 0-1 years | 7 (10.4%) 1-2 years | 25 (37.3%) 3-6 years | 26 (38.8%) 7-11 years | 7 (10.4%) >11 years |
| Child's health condition (No./%) | 67 | 49 (73.1%) Healthy | 13 (19.4%) With acute illness | 5 (7.5%) With chronic illness | | |
| Child's nationality (No./%) | 67 | 17 (25.4%) Hungarian | 27 (40.3%) Rroma | 16 (23.9%) Romanian | | 7 (10.4%) Slovak |
| Family type (No./%) | 67 | 33 (49.3%) Organized / 34 (50.7%) Disorganized | | | | |
| Living area (No./%) | 67 | 24 (35.8%) Urban / 43 (64.2%) Rural | | | | |
| The season in which the aggression occurred (No./%) | 67 | 21 (31.3%) Winter | 25 (37.3%) Spring | 9 (13.4%) Summer | | 12 (17.9%) Autumn |
| The time of the day when the aggression occurred (No./%) | 50 | 8 (16%) In the morning | 27 (54%) At noon | 15 (30%) In the evening | | |

Concerning the type, location and severity of the injuries, we observed that the oro-dental injuries of the soft tissues were located mainly on the lips (71.6%) and cheeks (71.6%), while

injuries of the hard tissues mainly affected the teeth (29.9%) and the maxillary bones (7.5%) (table 2).

Table 2. Location and severity of the injuries

| Location | Valid case No. | Frequency of the injuries (No./%) | | | |
|-------------------------------|----------------|---|----------------------|--------------------|-----------------------|
| Orodonal field - Soft tissues | 67 | 48 (71.6%) Lips | 6 (9%) Gums | 1 (1.5%) Tongue | 48 (71.6%) Cheek |
| Orodonal field - Soft tissues | 65 | 20 (29.9%) Teeth | 1 (1.5%) Palate | | 5 (7.5%) Maxillary |
| Associated Injuries | 67 | 18 (26.9%) Cephalic extremity | 1 (1.5%) Abdomen | 7 (10.4%) Limbs | |
| No. of injuries (Mean ± SD) | 67 | 2.31 ± 1.427 (Min = 1, Max=7, Median=2) | | | |
| Severity of injuries (No./%) | 67 | 59 (88.1%) Low | 3 (4.5%) Moderate | 5 (7.5%) High | |

Fisher's Exact Tests showed significant differences in the victims' distribution in relation to their nationality and living area (p=0.013) or their nationality and the aggressors' level of education (p<0.001). Z tests with Bonferroni correction subsequently performed show that the

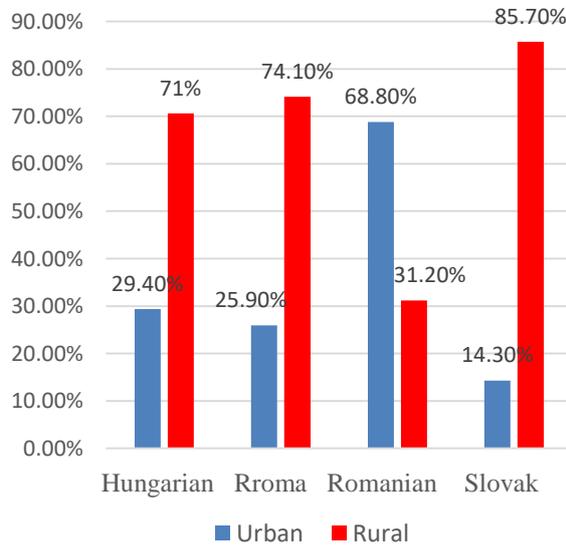
victims living in urban area were significantly more frequently Romanians (68.8%) than Rroma (25.9%), while the victims living in rural area were significantly more frequently Rroma (74.1%) than Romanian (31.3%) (table 3, figure 1).

Table 3. Victims' distribution according to their nationality and living area and abusers' distribution according to their education and nationality

| Victims Nationality | Victims - Living area- | | | | p* |
|------------------------|------------------------|-----------------------------|---------------------------------|---------------------|------------------|
| | Urban | | Rural | | |
| | No. (%) | No. (%) | No. (%) | No. (%) | |
| Hungarian | 5 (29.4%) | 12 (70.6%) | | | 0.013 |
| Rroma | 7 (25.9%) | 20 (74.1%) | | | |
| Romanian | 11 (68.8%) | 5 (31.2%) | | | |
| Slovak | 1 (14.3%) | 6 (85.7%) | | | |
| Aggressors Nationality | Aggressors- Education | | | | p* |
| | Illiteracy | Primary education completed | Primary education not completed | Secondary education | |
| Hungarian | 2 (11.8%) | 6 (35.3%) | 7 (41.2%) | 2 (11.8%) | <0.001 |
| Rroma | 20 (74.1%) | 0 (0%) | 7 (25.9%) | 0 (0%) | |
| Romanian | 2 (12.5%) | 4 (25%) | 1 (6.3%) | 9 (56.3%) | |
| Slovak | 0 (0%) | 0 (0%) | 5 (71.4%) | 2 (28.6%) | |

***Fisher’s Exact Test**

Figure 1. Patient distribution according to the living area and nationality



Age distribution was nonparametric in most groups ($p < 0.05$) according to Shapiro-Wilk test. In accordance with Kruskal-Wallis H test, the age differences related to the severity of the injuries are significant ($p = 0.019$) and Dunn-Bonfferoni

post-hoc tests show that children with highly severe injuries were significantly older (mid-ranking = 53.4) than children with mild injuries (mid-ranking = 31.55) ($p = 0.047$) (table 4, figure 2).

Table 4. The victims’ age in relation to the severity of the injuries

| Severity | Mean \pm SD | Median (IQR) | Mid-ranking | p* |
|-------------------------------|-------------------|--------------|-------------|--------------|
| Low ($p = 0.009^{**}$) | 6.224 \pm 3.71 | 6 (3-8) | 31.55 | 0.019 |
| Moderate ($p < 0.001^{**}$) | 8.667 \pm 0.577 | 9 | 49.83 | |
| High ($p = 0.985^{**}$) | 10.2 \pm 3.033 | 10 (7.5-13) | 53.4 | |

*Kruskal-Wallis H Test, **Shapiro-Wilk Test

Figure 2. Victims’ age in relation to the severity of the injuries

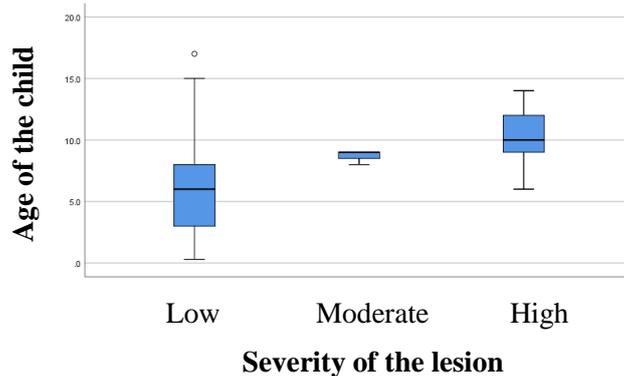
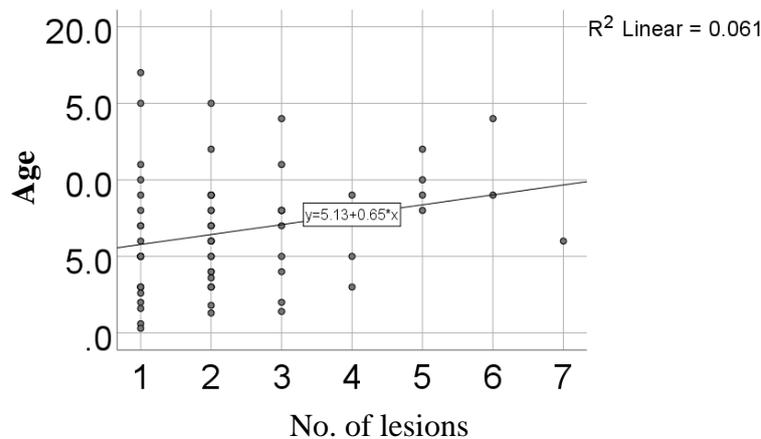


Table 5. Correlation between the victim's age and the number of injuries

| Correlation | p* |
|---|----------------|
| Age (p=0.032**) x No. of lesions (p<0.001**) | 0.033, R=0.261 |

*Spearman's rho Correlation Coefficient, **Shapiro-Wilk Test

**Figure 3. Correlation between the victim's age and the number of injuries**

We also investigated the correlation between the victim's age and the number of injuries. The distribution of both parameters was nonparametric ($p < 0.05$) according to the Shapiro-Wilk test. The correlation observed by using Spearman's rho correlation coefficient is significant and slightly positive ($p = 0.033$, $R = 0.261$) which shows that, within this study, older children have a significantly higher number of injuries (table 5, figure 3).

DISCUSSIONS

Our study showed that the victims of physical abuse have an average age of 6.63 ± 3.7409 years, i.e. most of them are under 10. This result is similar to that reported by Zins [33] where 95% of the victims were less than 10 years old. Moreover, other studies also show a predominance of age group 0-4 years (52.9%), followed by the age group 12-16 years (20.4%) [14, 34-40].

On the other hand, in the studies carried out by Savin et al., 2010 [41] and Enache et al., 2007 [42] the prevalence of physical abuse was in the age range 13-18 years and 11-18 years respectively. Children under the age of 10 are prone to abuse because they are defenseless in the context of physical frailty, inability to escape an angry parent and lack of social contacts, which could keep them away from the abuser at least for a while [14].

We found that boys (73.1%) were more frequently abused than girls (26.9%). This result is similar to the one reported by other studies [37, 43-46]. For instance, in the study conducted by Bălan & Balan [43] it was found a boys/girls ratio of almost 3.4 (77.2% in boys and 22.8% in girls). The explication of the higher incidence of physical abuse in boys could be that boys are more undisciplined than girls, but girls up to the age of 2 often complain of colic abdominal pain, which results in an

increased prevalence of physical abuse of girls up to the age of 2. On the contrary, other studies showed that there are no differences in casuistry depending on the victim's gender [14,35,36,42].

The distribution of cases in relation to the living area shows a higher incidence of physical abuse in rural areas (64.2%) compared to the urban areas (35.8%), similar to the results of other studies [43]. The low socio-cultural level and the lack of social authorities in the rural area are predisposing factors for child abuse. The results of other studies show that the distribution of ill-treatment cases against children according to the living area is almost equal in the rural (49%) and urban (51%) area [42].

The results of our study show that the oro-dental injuries are most frequently located in the soft tissues (71.6%), followed by dental and periodontal injuries (29.9%) and maxillary bone fractures (7.5%). These results are consistent with the results of the study carried out by Savin et al. in 2010 which showed that soft tissues were affected in 62.11% of the cases, dental and periodontal trauma represented 19.47% of the injuries and mandibular fractures counted for 7.89% of the injuries [41]. Another study performed by Becker et al. in 1978 shows that the traumatic injuries of the mouth are represented by contusions and bruises- 43%, abrasions and lacerations- 28.5% and dental trauma- 28.5% [47,48].

Regarding the severity of injuries assessed according to the number of days of medical care necessary for healing, we found that the highest share consists of low-severity injuries (88.1%), the majority of them being represented by: bruising, lacerations, lip and tongue abrasions, and dental contusions. These data are consistent with the results of the study carried out by Enache et al. which found 94% mild lesions [42].

The oral cavity has an essential role in nutrition and communication. Therefore, it is frequently a target for the abuser, who is

probably trying to get the child to shut up, to listen or to eat.

Given the psychological condition of the patient who has suffered an abuse or an aggression, his/her increased level of stress and anxiety correlated with the clinical environment and the presence of the dentist investigating the case, we consider that the dental specialist needs to pay special attention to the physician-patient relationship, in terms of optimal verbal and non-verbal communication with the patient, a warm, friendly, empathic approach, all of which aim to reduce the patient's level of stress and anxiety, to increase the patient's confidence in the physician so that the patient is encouraged towards an open and honest communication with the dentist regarding the context of trauma [11,12].

CONCLUSIONS

Child physical abuse is a widespread phenomenon throughout the world. It has long term psycho-somatic consequences which negatively influence the development of the victims. The results of our study are in accordance with other similar studies, showing that the boys aged less than 10 years of age and living in rural areas are the most vulnerable to physical abuse. The injuries are mostly located on the lips and cheeks and the severity and the number of the injuries is higher in older children

Dentists are in a key position to diagnose the oro-dental injuries which result from physical abuse, often being the first or only professionals to examine the victims. However, cases of child physical abuse are underreported by the dentists, most of the time because they do not have the appropriate knowledge about these issues. Therefore, this reality must be changed by informing and educating the dentists in early diagnosis of physical abuse. Moreover, the dentists should be aware that they have the obligation to report any suspicion of child physical abuse to the General Directorate for Social Assistance and Child Protection or the Police Departments.

REFERENCES

1. Florian G, Pușcaș M. Abuzurile asupra copilului, formă, motivație, consecințe [Child abuses, type, motivation, consequences]. *Revista Română de Sociologie [The Romanian Journal of Sociology]*, 2008, 19(5-6):381-393.
2. Hanganu B, Crauciuc D, Petre-Ciudin V, Velnic AA, Manoilescu I, Ioan BG. Domestic Violence in the Postmodern Society: Ethical and Forensic Aspects. *Postmodern Openings*. 2017;8(3):46-58.
3. Ioan BG, Hanganu B, Velnic AA, Petre-Ciudin V, Damian SI. When you seed violence you harvest violence-adolescent parricide. Case presentation. *Forensic Sci Int*. 2017;277(Supplement: 1):208-209.
4. Fisher-Owens SA, Lukefahr JL, Rao Tate A. Oral and Dental Aspects of Child Abuse and Neglect. *Pediatrics*. 2017,140(2)e20171487; doi: <https://doi.org/10.1542/peds.2017-1487>
5. Cameron JM, Johnson HRM, Camps FE. The Battered Child Syndrome. *Med Sci Law*. 1966;6(1):2-21.
6. Busuttill A, Keeling JW. *Paediatric forensic medicine and pathology*, 2nd Edition, CRC Press, 2008.
7. American Academy of Pediatric Dentistry. Guideline on Oral and Dental Aspects of Child Abuse and Neglect, 2012, Reference manual V 37, no 6, 15/16: 166-171.
8. Negruțiu BM, Vaida LL, Todor BI, Judea AS, Lile IE, Moca AE, Judea-Pusta CT. An important morphological feature of the face: upper lip length. *Rom J Morphol Embryol*. 2019;60(2):537-541.
9. Judea-Pusta C, Lazau F, Camarasan A, Row B. Multidisciplinary Approach in Identifying a Missing Person Based on Craniofacial Skeleton. *Proceedings of the 35th Balkan Medical Week*; 2018, pp. 559-565. Filodiritto Publisher, Editor Diaconu C.
10. Crisan C, Judea-Pusta CT, Mihalache G, Bungau S, Maghiar AM, Buhas BA, Judea AS, Hlescu AA, Buhas CL. Difficulties and limits in forensic expertise of a fatal aircraft accident. *Rom J Leg Med*. 2019;27(1):33-37. doi: 10.4323/rjlm.2019.33
11. Vaida L, Todor BI, Bertossi D, Corega C. Correlations between Stress, Anxiety and Coping Mechanisms in Orthodontic Patients. *Iran J Public Health*. 2015;44(1):147-149.
12. Vaida L, Corega C, Roșeanu G. Letter to editor: Researches regarding current self-related cognitions in patients with orthodontic treatment. *J Cogn Behav Psychother*. 2009;9(2):131-133.
13. Mathur S, Chopra R. Combating Child Abuse: The Role of a Dentist, *Oral Health Prev Dent*. 2013;11(3):243-50.
14. da Fonseca MA, Feigel RJ, ten Benschel RW. Dental aspects of 1248 cases of child maltreatment on file at a major county hospital, *Pediatric Dentistry*. 1992,14(3):152-157.
15. Ioan BG, Alexa T, Alexa I. A medico-legal view on the importance of the external examination of the traumatized patient. *Rom J Leg Med*. 2014;22(2):127-132.
16. Hanganu B, Stratulat TA, Hleșcu AA, Manoilescu IS, Gafton B, Ioan, BG. Ante mortem CT aspects versus autopsy findings in head trauma. *Rom J Leg Med*. 2019;27(2):103-108.
17. Vaida LL, Moca AE, Negruțiu BM, Precup A, Bumbu BA, Scrobotă I, Bran S. Correction of class III malocclusions through morphological changes of the maxilla using the protraction face mask by three different therapeutic approaches. *Rom J Morphol Embryol*. 2019;60(2):605-615.
18. Vaida L, Todor BI, Corega C, Băciuț M, Băciuț G. A rare case of canine anomaly – a possible algorithm for treating it, *Rom J Morphol Embryol*. 2014;55(3 suppl):1197-1202.
19. Judea Pusta CT, Bungau S, Buhas CL, Popa AR, Vesa CM, Buhas BA, Bardaca (Urducea) C, Tit DM, Daim MA, Judea AS. Experimental Study Upon the Virulence of Infectious Microbial Agents Involved in Violent Deaths Presenting Septic States. *Rev Chim*. 2019;70(8): 2720-2726. <https://doi.org/10.37358/RC.19.8.7415>
20. Reil PM, Maghiar TT, Seidl K, Borza C, Nunkoo V, Buhas CL, Bungau S, Stanescu AMA, Pop

- OL, Pusta CTJ. The Role of BCL2 Protein and Tumour Protein p53 in Septic Cardiomyopathy. *Rev Chim.* 2019;70(11):3842-3846. <https://doi.org/10.37358/RC.70.19.11.7656>
21. Endres L, Uivarosan D, Tit DM, Pop O, Bungau S, Buhas C. Demographic and Pathologic Characteristics of Malignant Melanoma in West Part of Romania. *Iran J Public Health.* 2018;47(4):606-607.
 22. Velnic AA, Hanganu B, Petre-Ciudin V, Ioan BG. Clinical diagnosis versus autopsy diagnosis in head trauma. *Forensic Science International.* 2017;277(Supplement: 1):209.
 23. Hanganu B, Bîrlescu AE, Hleşcu AA, Manoilescu IS, Ionescu S, Ioan BG. Death in Dental Medicine- Literature Data. *Rom J Oral Rehab.* 2019;11(1):125-133.
 24. Buhas CL, Mihalache G, Judea-Pusta CT, Buhaş B, Jurca MC, Iovan C. Lethal cranio-cerebral traumatism resulting through a very rare mechanism. *Rom J Leg Med.* 2018;26(3):249-252.
 25. Buhas CL, Mihalache GC, Judea-Pusta CT, Daina LG, Mutiu G, Buhas BA, Popa AR, Jurca MC, Nicoara ND, Maghiar AM. The importance of the histopathological examination in establishing the diagnosis of delayed splenic rupture. Report of a case and literature review. *Rom J Morphol Embryol.* 2019;60(1):281-286.
 26. Petre-Ciudin V, Hanganu B, Velnic AA, Ioan BG. Epidemiology of spinal trauma in North-Eastern part of Romania. *Forensic Science International.* 2017;277 (Supplement: 1):220-221.
 27. Taillieu TL, Cheung K, Sareen J, Katz LY, Tonmyr L, Afifi TO. Caregiver Vulnerabilities Associated with the Perpetration of Substantiated Child Maltreatment in Canada: Examining the Canadian Incidence Study of Reported Child Abuse and Neglect (CIS). 2008. *J Interpers Violence.* 886260519889941. PMID 31771400 DOI: 10.1177/0886260519889941
 28. Judea-Pusta CT, Mutiu G, Pascalau AV, Buhas CL, Ciursas AN, Nistor-Cseppento CD, Bodea A, Judea AS, Vicas RM, Dobjanschi L, Pop OL. The importance of the histopathological examination in lethal acute intoxication with ethylene glycol. Case report. *Rom J Morphol Embryol.* 2018;59(3):965-969.
 29. Judea-Pusta C, Rusu A, Camarasan A. Suicide by abdominal wounds suggesting seppuku: Case reports from Romania and an international literature review. *Aggress Violent Behav.* 2019;47:68-73 <https://doi.org/10.1016/j.avb.2019.03.006>
 30. Buhas CL, Buhas BA, Daina LG, Hanganu B, Manoilescu IS, Judea Pusta CT, Hlescu AA, Mircea C, Somlea MC, Marian P, Ioan BG. Multiple Fatal Intoxications Caused by Improper Consumption of an Alcoholic Para-Pharmaceutical Product. *Rev Chimie.* 2019;70(7):2471-2476. <https://doi.org/10.37358/RC.19.7.7363>
 31. Mihalache G, Buhaş C, Rahotă D. Medical and social implications of suicide in youth. Holistic study of cases in Bihor county 2007-2009. *Rom J Leg Med.* 2011;19(1):69-72.
 32. Nanu A, Georgescu D, Voicu V, Ioan B. Locul și relevanța prevederilor legale în contextul practicii medicale din România. *Revista Română de Bioetică.* 2011;9(4):31-43.
 33. Zins ZP, Wheeler KK, Brink F, Armstrong M, Shi J, Groner JI, Xiang H. Trends in US Physician diagnosis of child physical abuse and neglect injuries, 2006-2014. *Child Abuse Negl.* 2019;98:104179.
 34. Adelson L. Slaughter of the innocents- a study of forty-six homicides in which the victims were children. *N Engl J Med.* 1961;254:1345-1349.
 35. Cameron JM, Johnson HRM, Camps FE. The battered child syndrome. *Med Sci Law.* 1966;6:2-21.
 36. Macyntire DR, Jones GM, Pinckney RCN. The role of the dental practitioner in the management of non-accidental injury to children. *Br Dent J.* 1986;161:108-110.
 37. Sperber N. The dual responsibility of dentistry in child abuse. *Int J Orthod.* 1981;19:21-28.
 38. Ten Bensel RW. Physical maltreatment of children, in *Trauma - Clinical and Biological Aspects.* S Day ed. New York: Plenum Medical Book Co, 1975, 249-272.

39. Neill Jr JA, Meacham WF, Griffin PP, Sawyers JL. Patterns of injury in the battered child syndrome. *J trauma*. 1973;13:332-339.
40. Symons AL, Rowe PV, Romaniuk K. Dental aspects of child abuse: review and case reports. *Aust Dent J*, 1987, 32:42-47.
41. Savin C, Bălan A, Petcu A, Maxim A, Earar K, Bălan Gh. Child physical abuse from the perspective of pediatric dentistry. *Rom J Oral Rehabil*, 2010, 2(3):12-15.
42. Enache A, Dressler ML, Petcu M, Ciocani M, Matei V, Cioban V, Ciobanu M, Gavriliță M, Belei V, Berinde AM, Chatzinikolaou F. Triada simptomatică în diagnosticul copilului maltratat [The symptomatic triad in the abused child diagnosis], *Rom J Leg Med*. 2007;15(2):106-111.
43. Bălan A, Bălan G. Epidemiological aspects related to the dental health of children victims of abuse, violence and dental neglect, *Rom J Oral Rehabil*. 2012;4 (1):70-73.
44. Neil DW, Clark MV, Lowe JW, Harrington MS. Oral trauma in children: a hospital survey. *Oral Surg*. 1989,68:691-696.
45. Ten Bensel RW, King KJ. Neglect and abuse of children: historical aspects, identification and management. *J Dent Child*. 1975,42:348-58.
46. Miller CA, Fine A, Adams-Taylor S. *Monitoring Children's Health: Key Indicators* 2nd ed. Washington, DC: American Public Health Association, 1989, 144-52.
47. Costacurta M, Benavoli D, Arcudi G, Docimo R. Oral and dental signs of child abuse and neglect, *Oral Implantol (Rome)*. 2015;8(2-3):68-73.
48. Becker DB, Needleman HL, Kotelchuck M. Child abuse and dentistry: orofacial trauma and its recognition by dentists. *J Am Dent Assoc*. 1978;97(1):24-28.