

## 소아 안면부 열상 환자의 임상 분석

정용휘 · 황민규 · 황소민 · 임광열 · 안성민 · 송제니퍼김  
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### Clinical Analysis of Pediatric Facial Laceration

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**Purpose:** Pediatric facial laceration takes a huge part of patients visiting emergency room and generates social attention for its proper emergency care. So much more attention should be paid to the proper treatment at emergency care unit, and furthermore, thorough survey of background information of the pediatric facial laceration may offer more proper prevention.

**Methods:** According to annual reports of 2009 and 2010, out of 5149 facial laceration patients who were given primary medical care at our clinic, 1452 patients were aged under 15 years old. Retrospective analysis of each pediatric facial lacerations were evaluated according to gender, age, periodic table, cause of injury, place of injury, sites of injury and so on.

**Results:** Pediatric facial laceration was found to occur mostly at 1 year old as they learn to walk and explore their environment. Evaluated analysis revealed that pediatric facial accidents occurred mostly on forehead region (75%), on Sundays, from 5 p.m. to 8 p.m., at home (61.5%). Most common cause of injury was collision (54.5%).

**Conclusion:** In large group of pediatric facial laceration cases provided us with an surprising fact that accidents most commonly occur under parental supervision. This fact gives an actual understanding regarding pediatric facial laceration and more realistic approach in its prevention strategy.

**Key Words:** Pediatrics, Facial injuries, Lacerations

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### I. INTRODUCTION

Pediatric facial lacerations are the most common single type of childhood injury requiring evaluation by a specialized physician. Proper management of the pediatric facial laceration is critical in its primary management for potential permanent scar formation. Therefore, it is becoming an issue that the treatment plan should focus not only on wound healing but also on the cosmetic aspect.

Due to their lack of attention, lack of decision-making ability and immature athleticism, children are more vulnerable to trauma than adults are. Among pediatric accidents, laceration composes about 32%, which is becoming a huge portion.<sup>1</sup> 67.7% of in-patients of ER are aged under 15 years.<sup>2</sup> Despite the commonplace of its nature, no current report has mentioned its epidemiologic character in domestic incidence of pediatric facial laceration.

Therefore, authors have reviewed and analyzed all the medical records of facial laceration aged under 15 years at 2 years period at our clinic. This act was incorporated to achieve a better understanding regarding thorough background information of pediatric facial lacerations.

### II. MATERIALS AND METHODS

#### A. Materials

For 2 years period from January 2009 to December 2010, among 5149 patients seeking emergency medical care for laceration in our clinic, 1452 patients were aged under 15 years and complained of facial laceration. All of the according patients were enrolled in the study.

#### B. Methods

Retrospective analysis of medical records of each pediatric laceration patients were done in following categories by gender, age, developmental period, time, injury cause, injury site and place.

Developmental period was fragmented and applied to the incidence rate in one year scale, and additionally

sorted by the time-lines of 0~3 years old as infant period, 4~6 years old as preschool period, 7~9 years old as elementary school junior period, 10~12 years old as elementary school senior period and 13~15 years old as middle school period. Laceration incidences were classified monthly, daily and hourly. Causes of pediatric facial laceration were classified as collision, slipping down, falling, traffic accident, biting and etc. Injury sites were categorized by aesthetic unit based on the anatomical unit by Richard et al.<sup>3</sup>

**C. Statistical analysis**

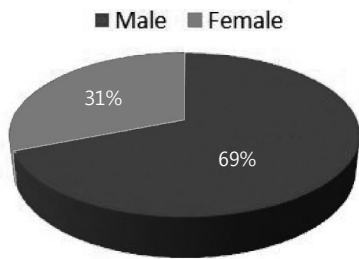
Collected data were processed statistically, using correlation-analysis and one-sample T statistics analysis. The differences were considered to be significant at *p* value below 0.05.

**III. RESULTS**

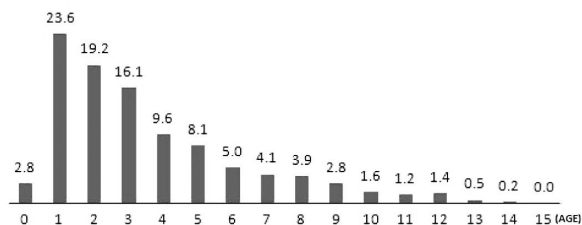
**A. Distribution of pediatric laceration by population**

Among 1,452 pediatric laceration patients, 1,001 were male (69%) and 451 were female (31%). The gender ratio of male to female was 2.2 to 1, showing that pediatric facial laceration was more common in boys (Fig. 1).

Accident occurred in highest incidence rate of 23.6% between the age of 1 and 2 (Fig. 2). Distribution by the developmental periods showed that the highest reach of rapid inclination to 61.7% was during infancy, and declined in progressive manner until it reaches 0.7% at middle school period (*p*=0.04)(Fig. 3).



**Fig. 1.** Distribution of pediatric laceration by gender.



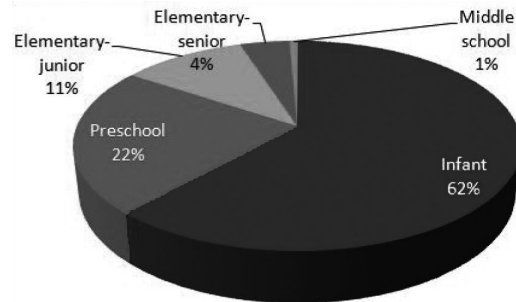
**Fig. 2.** Distribution of pediatric laceration by age.

**B. Distribution of pediatric laceration by time**

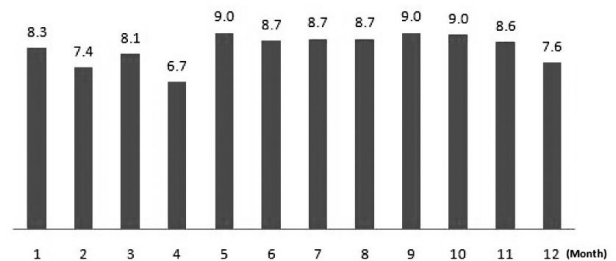
Annual distribution of pediatric facial laceration was analyzed. From December to April, the monthly incidence rate was in the range of 6.7~8.3%. From May to November, the monthly incidence rate observed to in the range of 8.6~9.0% (Fig. 4). Analysis depending on the days of week showed that Sunday presented the highest incidence rate (20.4%), and according to hourly time span, at the evening between 5 to 8 p.m. showed the highest incidence rate (Figs. 5 and 6).

**C. Distribution of pediatric laceration by cause and place**

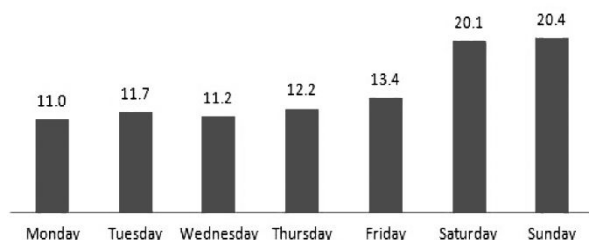
More than half of pediatric facial lacerations (54.5%) were caused by collisional episode. Another noticeable cause included slipping down counting 598 incidences (41.2%). Following orders of minor causes were falling, traffic accidents, penetration, bites and etc (Table I).



**Fig. 3.** Distribution of pediatric laceration by development period.



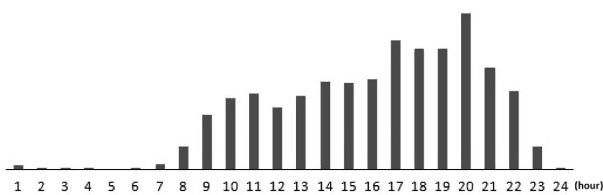
**Fig. 4.** Monthly distribution of pediatric laceration.



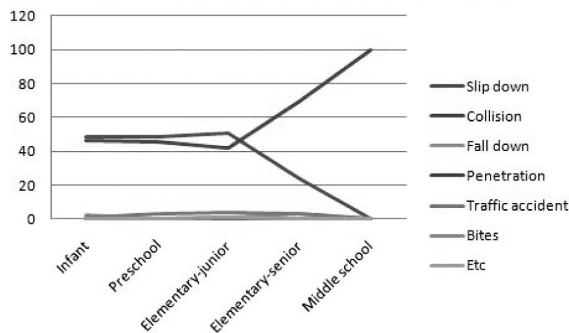
**Fig. 5.** Daily distribution of pediatric laceration.

**Table 1.** Distribution of Pediatric Laceration by Cause

	No. of case (%)
Collision	791 (54.5%)
Slip down	598 (41.2%)
Traffic accident	20 (1.4%)
Fall down	18 (1.2%)
Penetration	6 (0.4%)
Bites	4 (0.3%)
Etc	15 (1.0%)



**Fig. 6.** Hourly distribution of pediatric laceration.

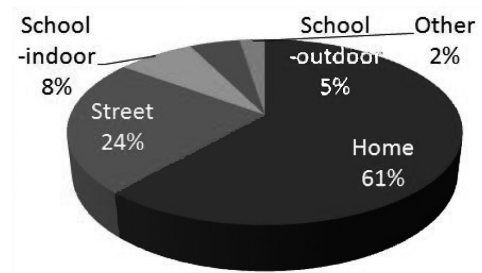


**Fig. 7.** Distribution of pediatric laceration cause by age.

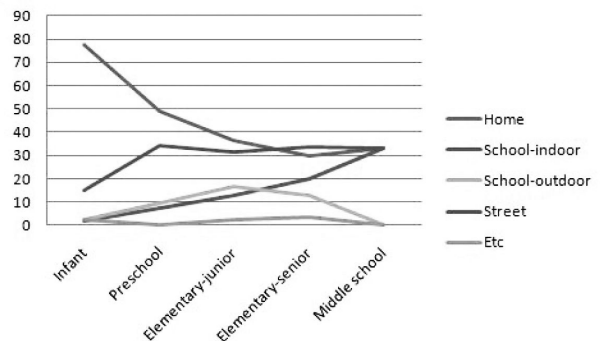
Less than 2% of the total incidence were relevant to these minor causes. According to our study, elementary school period seemed to be the turning point in change of trauma etiology. The portion of incidence due to collision has switched its place with slipping down (Fig. 7). The most frequent place of the pediatric laceration was at home (892 incidences, 61.5%). Others listed in order are street (341 incidences, 23.5%), school (Indoor) (110 incidences, 7.6%), & other ( $p=0.03$ )(Fig. 8). According to the distribution by age, the incidence rate at home presented in rapid decrease as children grows (Fig. 9).

**D. Injury site of pediatric laceration**

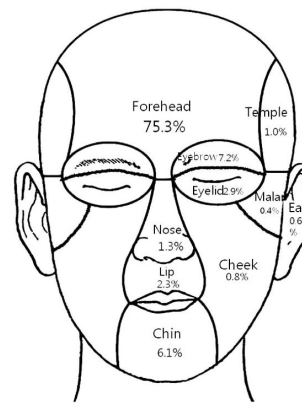
The forehead was most frequently affected (75.3%); eyebrow (7.2%); chin (6.1%); eyelid (2.9%). and etc, as follows (Fig. 10).



**Fig. 8.** Distribution of pediatric laceration by place.



**Fig. 9.** Distribution of pediatric laceration place by age.



**Fig. 10.** Injury site distribution of pediatric laceration.

**E. Treatment method**

For all patients, the primary closure was performed. 28 patients required hospitalization due to accompanied damages, such as fracture or deep laceration. 98.1% of the patients were treated as an outpatient. Accompanied damages with facial laceration included 6 cases of nasal bone fracture and 2 cases of skull fracture. Complications included 17 cases of wound dehiscence and 2 cases of infection around the region of laceration.

**IV. DISCUSSION**

During the time span of 2009 and 2010, the distribution by gender showed 1001 male incidences (68.9%) and 451

female incidences (31%), exhibiting the gender ratio of 2.2: 1. This numerical value is in close proximity with the results of Kim YW et al. (2.4: 1).<sup>4</sup> and Baker et al. (2: 1).<sup>5</sup> The result is thought to be due to more active nature of males compared to females, having higher chances of exposing themselves to dangers and accidents.

Analyzing on the distribution of pediatric laceration by age, when they are newborn under 1 year, incidence rates was only 2.8%. But during the age of 1 to 2, it accelerated upto 23.6%. This is the period when infants learn to walk, showing increased sphere of activity. Since infants still lack in attention and ability of making right judgment, this period shows the highest chances of getting lacerated.<sup>1,2,5,6</sup> Izant et al.<sup>1</sup> and Baker et al.<sup>5</sup> also reported that between the age of 0 and 2 shows the highest incidence rate of laceration. Afterwards, as infants develop their ability to perceive the dangers and exercise ability, a drastic decrease in incidence rate is observed.

Annual distribution of pediatric facial laceration did not show particular noticeable monthly variation, however during May to November, there was an increase in incidence rate compared to that of from December to April. This may be related to the outdoor seasonal influence that there is a higher chance of danger exposure.

The fact that distribution by days of the week, shows higher incidence rate during weekends: Saturday (20.1%) and Sunday (20.4%). This was probably affected by an unroutinely environment during weekend family activity or convey a vias that during weekends, patients are offered with emergency care at ER only at a larger hospital. This is in agreement with results from Kim JH et al.<sup>2</sup> and Kim YW et al.<sup>4</sup> Hourly distribution shows similar chances of incidence from 9 a.m. to 4 p.m., but there is an increase in incidence rate from 5 p.m. to 8 p.m.. Baker et al.<sup>5</sup> also reported the corresponding opinion that the time span between 5 p.m. to 8 p.m. is thought to be the time that infants are under guidance at home and this displays a good evidence for the importance of attentive care by the household guardians to prevent laceration.

Distribution of pediatric laceration by place shows incidence rate at home is noticeably higher compared to other places (61.5%). It is a general misconception that it's much more safer at home. The amount of care provided does not correlate with the fact that children are safer staying in. To think from a different perspective, this result might be due to equip protectors well when children play at outdoor.

The most probable injury site of pediatric facial laceration is forehead (75%). Other probable injury sites

include eyebrow (7%) and chin (6%). This is analogous to the reports by Richard et al.<sup>3</sup> and Koonin et al.<sup>7</sup> This is thought to be due to the greater facial portion relative to whole body in infants than that of the adult. Facial laceration occurs with the frequency in the order of forehead, nasal bone, and mandible in T-shaped distribution with forehead being centrally located.<sup>3,7</sup> Accompanied damages of facial laceration are 6 cases of nasal bone fracture and 2 cases of skull fracture. Since infant's skull is composed with relatively thicker spongy bone compared to adults, it shows stronger resistance against external force due to greater flexibility.<sup>6</sup> Therefore, it is much less prone to fracture, explaining why there has been less number of skull fracture reported as an accompanied damage of facial laceration.

## V. CONCLUSION

This research on pediatric facial laceration was based on analysis of large group of 1,452 children. The results are summarized; Accidents mostly occur on more active male infants from age 1 and 2 years old, as they learn to walk at home during weekend evening. Pediatric facial accidents usually occur at not outdoors, not away from guardians and not when they are running around. By correcting the misconception, authors hope to believe that this report will assist in planning more efficient prevention strategy for pediatric facial lacerations.

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