



Helmet And Mouthguard Usage In Pediatric Dental Patients

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Introduction

Head injury is the leading cause of death in bicycle accidents (1). The use of bicycle helmets was found to reduce head injury by 48%, serious head injury by 60%, traumatic brain injury by 53%, face injury by 23%, and the total number of killed or seriously injured cyclists by 34%. (2) In the US approximately 900 people die annually in bicycle crashes, and of those 75% are due to head injury (3). Sacks et.al. (4) estimated that 1 death per day and 1 head injury every 4 minutes could be prevented in the US by a universal helmet use. The American Academy of Pediatric Dentistry writes; “helmets, face masks, and mouthguards have been shown to reduce both the frequency and severity of dental and orofacial trauma” (5). Wearing basic protective devices such as mouthguards and headgear, including helmets and face protectors are a “fundamental method of preventing orofacial injuries during sports” (6).

Barriers to helmet use were explored by Finnoff, et al (7) who surveyed 2,424 people within the public school system. The ages were broken down into children ages 7-10, adolescents aged 11-19 and adults, 19+. The age group found with the lowest rate of bicycle usage was 11-19 (31%). Bicycle helmet usage was highest in those aged 7-10 years old (44%).

Meehan, et al. (3) looked at the legislation and bicycle-related deaths in those aged 0-16. This study found that bicycle helmet safety laws are associated with a lower incidence of fatalities in child cyclists involved in bicycle motor vehicle collisions. The state of Iowa does not currently have any form of helmet law. No recent studies have looked at helmet and mouthguard usage in pediatric dental patients in Iowa. This study would begin to investigate the current utilization of, and possible barriers to the lack of helmet and mouthguard usage amongst the patient population.

Purpose

To assess prevalence and factors associated with helmet and mouthguard usage in pediatric dental patients attending the University of Iowa College of Dentistry.

Methods

An exploratory, retrospective chart audit of the EHR (AxiUm) at the University of Iowa College of Dentistry (UICOD) was used. Inclusion criteria was new patients, ages 5-16 years old whom were seen in the UICOD pre-doctoral pediatric dental clinics over the past 5 years (2017-2021). Subjects were excluded if the parent interview form questions about helmet and mouthguard use were not answered.

Associations between mouth guard and helmet usage and patient characteristics were assessed using chi-squared test, Fishers exact test, and a non-parametric Wilcoxon rank sum test. A p-value of less than 0.05 was used as a criterion for statistical significance.

Results

- There was a statistically significant association between mouthguard usage and helmet usage. Subjects who used a mouthguard were more likely to use a helmet than those who did not wear a mouthguard (44.4% vs. 27.2%; p<0.01).
- Males were more likely to use mouthguards compared to females, which is likely due to requirements in many male dominated sports like football and wrestling.
- The mean or median age for subjects who were wearing helmets was statistically younger than those not wearing a helmet (9.5±3.1\9.0 vs 11.1 ±3.0 \12 years; p<0.01).
- Those with private insurance were more likely to wear a helmet compared to those who were self-pay or who had Medicaid (47.9% vs 29.4% vs 27.7%; p<0.01).
- A significant association between helmet usage and if the subject had ADHD was noted. Those who have a diagnosis of ADHD had a lower utilization of helmets than those without a diagnosis (p=0.023).

Variables	Use of mouth guard (n, %)		Use of helmet (n, %)		Use of mouth guard and helmet (n, %)	
	Yes (n=115)	No (n=863)	Yes (n=323)	No (n=680)	Yes (n=48)	No (n=999)
Sex						
Female	25 (5.2)	459 (94.8)	166 (33.0)	337 (67.0)	12 (2.3)	513 (97.7)
Male	90 (18.3)	401 (81.7)	156 (31.4)	341 (68.6)	36 (6.9)	483 (93.1)
<i>p-value</i>	<0.001*		<i>0.585</i>		<0.001*	
Age group						
5-9 years	31 (9.2)	306 (90.8)	162 (44.3)	204 (55.7)	17 (4.5)	358 (95.5)
10-12 years	43 (14.2)	259 (85.8)	96 (31.4)	210 (68.6)	19 (5.9)	302 (94.1)
13-16 years	41 (12.1)	298 (87.9)	65 (19.6)	266 (80.4)	12 (3.4)	339 (96.6)
<i>p-value</i>	<i>0.139</i>		<0.001*		<i>0.489</i>	
The types of insurance						
Private insurance	33 (16.1)	172 (83.9)	103 (47.9)	112 (52.1)	16 (7.1)	211 (92.9)
Self-pay	7 (8.6)	74 (91.4)	25 (29.4)	60 (70.6)	2 (2.3)	86 (97.7)
Medicaid	75 (10.8)	617 (89.2)	195 (27.7)	508 (72.3)	30 (4.1)	702 (95.9)
<i>p-value</i>	<i>0.081</i>		<0.001*		<i>0.118</i>	
History of dental trauma						
Yes	15 (17.4)	71 (82.6)	27 (31.0)	60 (69.0)	7 (7.8)	83 (92.2)
No	97 (11.1)	774 (88.9)	288 (32.2)	607 (67.8)	38 (4.1)	895 (95.9)
<i>p-value</i>	<i>0.083</i>		<i>0.087</i>		<i>0.102</i>	
Presence of ADHD						
Yes	29 (14.6)	170 (85.4)	51 (25.6)	148 (74.4)	13 (6.2)	196 (93.8)
No	85 (11.2)	677 (88.8)	268 (34.1)	518 (65.9)	35 (4.3)	785 (95.7)
<i>p-value</i>	<i>0.184</i>		0.023*		<i>0.232</i>	

*p-value of less than 0.05 was considered significant

Conclusions

Most children ages 5 to 16 years old seen at the UICOD pediatric clinic do not wear mouthguards (88%) or helmets (68%).

Not using a mouthguard was associated with being female.

Not using a helmet was associated with the following characteristics:

- Older age (teens)
- Having Medicaid
- Not having any dental insurance
- Having a diagnosis of ADHD

Financial barriers may inhibit the use of helmets

Public health initiatives to increase helmet usage should consider these characteristics when identifying populations to help.

Next Steps

Surveying families who are not using helmets or mouthguards to better understand their beliefs and attitudes about using this safety equipment and identify barriers they may face in using them.

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