

# Mouthguard – A Device for Prevention of Dental Trauma Injury in Visually Impaired Individuals: 1-year Follow-up

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## ABSTRACT

**Aim:** To evaluate the prevalence of dental trauma in visually impaired children before and after using mouthguard.

**Materials and methods:** A total of 52 visually impaired children of the age group of 7 to 16 years were selected. A proforma was used to collect data on routine physical activities, and intraoral examination was done. At the end of 1-year follow-up, questionnaire was repeated, which includes the number of children wearing mouthguard and preventing from further traumatic dental injuries. Out of 52 children, 28 wore mouthguards and only 3 children had newer incidence of trauma. The remaining 25 children were prevented from further dental trauma. Data were analyzed using Pearson's chi-square test ( $p < 0.05$ ).

**Results:** The result showed was statistically nonsignificant, but the incidence of dental trauma was reduced after the use of mouthguard.

**Conclusion:** Mouthguard had proven to be an effective device for prevention of dental traumatic injuries in visually impaired children. Further studies are required to assess the problems encountered while wearing mouthguard during physical activities.

**Implication:** Traumatic dental injury is the most common problem faced by visually impaired children. Using the protective device and its awareness of wearing can reduce the prevalence of dental trauma in visually impaired children.

**Keywords:** Dental trauma, Mouthguard, Prevention, Visually impaired children.

**How to cite this article:** Kathal S, Prakash P, Gupta S, Rao A, Pal A, Dixit A. Mouthguard – A Device for Prevention of Dental Trauma Injury in Visually Impaired Individuals: 1-year Follow-up. *Int J Prev Clin Dent Res* 2017;4(1):5-8.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

Blindness is one of the most prevalent handicap conditions worldwide.<sup>1</sup> Visually impaired individuals suffer

from many oral health problems, which consist of mainly orofacial trauma, dental caries, and periodontal diseases. Of this, orofacial trauma results in a number of health hazards in visually impaired individuals.<sup>2</sup> Prevalence of traumatic dental injuries (TDIs) in children with various disabilities is higher than that of normal children.<sup>3</sup>

The most dominant factor to cause dental trauma is sports injuries, falls, and accidents met at home or outside.<sup>4</sup> If the environment is safe, a hyperactive child can express his or her hyperactivity with less risk.<sup>3</sup> Therefore, the prevention of such injuries is extremely important. Several authors showed that wearing a mouthguard can significantly reduce the frequency and severity of orofacial injuries.<sup>5</sup>

Almost since 100 years, mouthguard has been used by boxers.<sup>6</sup> It is a resilient appliance placed in the mouth to reduce injuries, particularly to teeth and surrounding dental structure.<sup>7</sup> There is paucity in the literature that shows the effect of preventive measures, such as use of mouthguards and early oral screening programs to prevent occurrence of TDI.<sup>3</sup> It is important that preventive measures be implemented in visually impaired children. Hence, the study was conducted to evaluate the prevalence of dental trauma in visually impaired children before and after using mouthguard.

## MATERIALS AND METHODS

A prospective study was conducted in government visually impaired schoolchildren in Jabalpur city, Madhya Pradesh, India. A convenience sample of 52 was recruited for the study.

The study population comprised all sports-active children in school. The study was conducted for a period of approximately 1 year, from May 2015 through May 2016. Institutional ethical committee approval for the study was taken from the principal of the school and Hitkarini Dental College & Hospital. A study was carried out after parent consent was obtained.

## Inclusion and Exclusion Criteria

Visually impaired children of the age group of 7 to 16 years and the individuals willing to participate in the study were included. Individuals undergoing or who

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have undergone orthodontic treatment, uncooperative, and also increased overjet children were excluded from the study.

### Study Design

A proforma was used to collect data on demographic variables, such as name, age, gender, residence from parent/guardian/school teacher prior to the child's dental examination. Questions were based on their routine physical activity, duration of sports activity, type of sports they prefer to play, and whether they take any preventive measure for TDI. The intraoral examination was done using diagnostic instruments that are mouth mirror and probe. Using Elli and Davey's classification, a prevalence of dental trauma had been assessed in each child.

A follow-up questionnaire after 1 year repeated the demographic questions and contained the following, which include the duration of wearing mouthguard and the problem they faced while wearing mouthguard.

### Statistical Analysis

Using the statistical analysis suggested, the frequencies and percentage of the variable were calculated. As data were categorical, Pearson's chi-square test was applied for further data analysis. The p-value <0.05 was considered statistically significant. All analyses were performed using version 21.0 of the Statistical Package for Social Science (IBM Corporation, Armonk, New York, USA).

### RESULTS

A total of 52 visually impaired children were examined with age limit ranging from 7 to 16 years. Among those

52 children, 73.08% had dental trauma and 26.92% had no dental trauma (Table 1). Duration of physical activity was statistically nonsignificant. Statistically significant result was seen with contact sports, and hyperactive children had more prevalence of dental trauma (Table 2).

At the end of 1 year, follow-up examination reveals the total number of children who had worn the mouthguard (Table 3).

From those 28 children (53.85%), only 3 (10.7%) children had a new incidence of dental trauma in the 1-year follow-up; the remaining 25 (89.3%) children had been prevented from trauma by using mouthguard (Table 4).

Children not wearing mouthguard was 24 (46.16%) out of 52; 1-year follow-up showed 5 (20.8%) children had incidence of new trauma and remaining 19 (79.2%) had no trauma. The above difference was not statistically significant ( $p < 0.05$ ), but lowered further dental trauma, so mouthguard can be an effective measure to prevent TDI (Table 4).

### DISCUSSION

The TDI will affect several factors that will accumulate throughout life, if not properly treated.<sup>8</sup> Hence, the preventive measure of wearing a mouthguard has become the only form of oral protection during sports, which allows impacts to be absorbed.<sup>9</sup> This prospective study evaluated the effectiveness of mouthguard for preventing anterior teeth trauma among visually impaired individuals. The overall prevalence of trauma before starting the study was 79.08% in 52 children.

Children of the age group of 7 to 16 years have a high prevalence rate of dental traumas because of indulging in a high number of physical activities or outdoor games and their permanent anterior teeth being fully erupted.

Hovland et al<sup>10</sup> showed similar results wherein falls and collisions were the dominating cause of dental trauma in 2,582 children aged from 7 to 15 years in Sweden.

**Table 1:** Prevalence of dental trauma

<i>Dental trauma (n = 52)</i>	
Yes n (%)	No n (%)
38 (73.08)	14 (26.92)

**Table 2:** Association of various risk factors with and dental trauma among visually impaired subjects

<i>Risk factors</i>		<i>Dental trauma</i>		<i>Chi-square test</i>
		Yes n (%)	No n (%)	
Type of sports	Contact sport	32 (80.0)	08 (20.0)	$\chi^2 = 4.223$ , df = 1, p = 0.040 (<0.05), significant difference
	Noncontact sport	06 (50.0)	06 (50.0)	
Duration of physical activity	<2 hours	24 (68.57)	11 (31.43)	$\chi^2 = 1.273$ , df = 2, p = 0.529 (>0.05), not significant
	2–3 hours	13 (81.25)	03 (18.75)	
	4–5 hours	01 (100.0)	00 (0.0)	
Behavioral risk	Hyperactive	32 (91.43)	03 (8.57)	$\chi^2 = 18.326$ , df = 1, p = 0.000 (<0.001), significant difference
	Nonhyperactive	06 (35.29)	11 (64.71)	
Preventive approach	Mouthguard	00 (0.0)	00 (0.0)	Not applicable
	Safe environment	00 (0.0)	00 (0.0)	
	Oral health education	38 (73.08)	14 (26.92)	

**Table 3:** Wearing of mouthguard by study subjects

Wearing of mouthguard	n (%)
Yes	28 (53.85)
No	24 (46.15)
Total	52 (100.0)

**Table 4:** Not wearing mouthguard and having trauma

Trauma	Number of children wearing mouthguard n (%)	Number of children not wearing mouthguard n (%)	Chi-square test
Yes	3 (10.7)	5 (20.8)	$\chi^2 = 0.388$ , df = 1, p = 0.533
No	25 (89.3)	19 (79.2)	(>0.05), not significant
Total	28 (53.85)	24 (46.15)	
Total sample	52 (100)		

This study showed that contact sports have higher prevalence of trauma compared with noncontact sports. Tiwari et al<sup>11</sup> showed that the prevalence of orofacial injuries during sporting activities was 39.1% in contact athletes and 25.3% in noncontact athletes.

Davidson et al<sup>12</sup> reported that hyperactivity in school-aged boys led to subsequent risks of all types of injury, i.e., not only dental trauma, but other injuries also. In this study, 91.43 and 32.29% children were hyperactive and nonhyperactive respectively, and had dental trauma.

Skaare<sup>13</sup> reported on the observations of those dentists who registered and treated the TDIs, as to whether the dental injury is preventable. Their report also suggests recommendations for improved supervision in school yards and the use of intraoral mouthguard protection. It had been observed in this study that both children and guardians were unaware of the extent of protection possible from wearing mouthguards.

This study showed the effectiveness of mouthguards in preventing trauma in visually impaired children in a 1-year follow-up. Results showed that 28 children out of 52 had used mouthguard during physical activities and the remaining 24 children did not use mouthguards because of discomfort while wearing.

At the end of 1 year, follow-up intraoral examination was done in all those 52 children. Out of those 28 (89.3%) children, only 3 (10.7%) new cases of dental trauma were seen after using mouthguard. The incidence of trauma in the remaining 24 children who did not use mouthguard was 5 (20.8%). Hence, this study showed statistically nonsignificant differences, but the incidences of dental trauma had been reduced.

Levin et al<sup>14</sup> reported that wearing mouthguard reduced trauma from 27 to 3% in sports activities in Israel. Several authors showed that wearing mouthguards can

significantly reduce the frequency and severity of orofacial injuries in sports.<sup>15</sup>

This indicates lack of awareness among parents and caretakers in visually impaired schools with regard to dental trauma.<sup>16</sup> This study has certain constraints. There is a need to devise a suitable system for the delivery of preventive measures. Protective devices, i.e., mouthguard, should be utilized during play or other activities. A custom-made mouth protector could also be used to overcome the problem like proper fit, difficulty in closing lips, swallowing being affected, and slipping sensation.<sup>15</sup>

## CONCLUSION

Limited cognition about dental trauma and limited use of mouthguard were observed. Hence, awareness on benefits of mouthguard should be spread, providing more information regarding dental injuries and their prevention in visually impaired children. Further studies are required to overcome the problems associated with prefabricated mouthguards over custom-made mouthguard used to prevent injuries.

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