

**THE IMPACT OF EDUCATIONAL PROGRAM AND DENTAL APPLIANCES IN
REDUCING ORO AND MAXILLO- FACIAL INJURIES AMONG TWO GROUPS OF
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ABSTRACT

Background: Oro-maxillofacial injuries are common in contact sports such as basketball, often resulting in dental trauma, facial fractures, and soft tissue damage. Despite the availability of effective preventive strategies, particularly mouthguard use, awareness and compliance remain low among young athletes. **Aim:** This study aimed to evaluate the impact of an educational program alone versus an educational program combined with dental appliances (mouthguards) in reducing oro-maxillofacial injuries among basketball players. **Methods:** A comparative study was conducted at Pegasus Club, 6th of October City, involving 50 basketball players aged 12-16 years. Participants were divided into two groups: Group A (n=25) received an educational program on prevention and management of oro-maxillofacial injuries, while Group B (n=25) received the same educational program plus ready-made mouthguards. Data were collected using a modified structured questionnaire at baseline (T0), after three months (T1), and after six months (T2). Outcomes measured included knowledge of injury prevention and first aid, preventive practices, and self-reported injury incidence. Statistical analysis was performed using SPSS (version 26), with $p < 0.05$ considered significant. **Results:** Baseline assessments revealed no significant differences between the two groups in demographics, knowledge, or preventive practices. Following intervention, both groups demonstrated improved knowledge scores; however, Group B showed significantly greater improvements in injury awareness, first-aid knowledge, and preventive practices ($p < 0.001$). At 3 and 6 months, Group B exhibited a markedly lower incidence of oro-maxillofacial injuries (44.0% vs. 92.0% in Group A) and significantly higher compliance with mouthguard use (92.0% vs. 0.0% in Group A). **Conclusion:** Educational programs significantly improve knowledge and awareness regarding oro-maxillofacial injury prevention. However, when education is combined with practical preventive measures such as mouthguard use, the impact on reducing injury incidence and promoting long-term compliance is substantially greater. These findings emphasize the need for integrating structured educational interventions with mandatory protective appliance use in youth sports to minimize injury risks and enhance athlete safety.

KEYWORDS: Oro-maxillofacial injuries, basketball, mouthguards, dental trauma, sports dentistry, educational program, injury prevention.

INTRODUCTION

Sports participation offers significant physical, psychological, and social benefits, including improved cardiovascular health, stronger musculoskeletal function, and enhanced teamwork. However, sports also carry inherent risks, with orofacial injuries being among the most concerning. These injuries, affecting the teeth, jaws, and surrounding soft tissues, can lead to long-term functional, esthetic, and psychological complications if not properly managed (Ranalli, 2002).

Basketball, one of the most widely played sports worldwide, involves rapid movements and frequent

physical contact, making players particularly vulnerable to craniofacial trauma. Previous studies consistently report basketball as a leading cause of dental injuries after high-contact sports like boxing and hockey (Flanders & Bhat, 1995; Azodo et al., 2011). Reported injuries include dental fractures, avulsions, luxations, soft tissue lacerations, and maxillofacial fractures (Ma, 2008). Beyond the immediate impact, such trauma can result in lasting esthetic and psychological consequences, particularly among adolescents (Saini, 2011).

Although mouthguards are proven to reduce both the frequency and severity of these injuries, their use among

basketball players remains limited due to discomfort, lack of awareness, and insufficient promotion by coaches or sports authorities. Educational programs have shown potential in improving compliance and awareness, highlighting the role of sports dentistry in prevention (Tiryaki *et al.*, 2017; Esmailpoor *et al.*, 2021).

Given basketball's popularity among youth, prevention of orofacial trauma is a pressing public health issue. Unmanaged injuries impose high treatment costs and negatively affect quality of life. Despite rising recognition of prevention, gaps remain in knowledge and practice, as most studies emphasize prevalence rather than interventions. This dissertation therefore seeks to address this gap by evaluating the combined impact of education and protective appliances in reducing orofacial injuries among basketball players (Singh *et al.*, 2022).

PATIENTS AND METHODS

Study Design and Setting

This comparative study was conducted at Pegasus Club, 6th of October City, Egypt, over a six-month period.

PICOT Framework

- **Population (P):** Fifty basketball players (aged 12–16 years, both sexes) recruited from Pegasus Club.
- **Intervention (I):** A structured educational program on prevention and emergency management of oro-maxillofacial injuries was delivered to both groups. In addition, Group B received ready-made mouthguards with instructions for use.
- **Comparison (C):** Group A received the educational program only, while Group B received the educational program plus mouthguards.
- **Outcome (O):** Improvement in knowledge and practices regarding oro-maxillofacial injuries, and reduction in the self-reported incidence of injuries.
- **Time (T):** Assessments were carried out at baseline (T0), three months post-intervention (T1), and six months post-intervention (T2).

Participants and Sampling

Non-probability convenience sampling was used to select participants. A total of 50 players were included, divided equally into Group A (n = 25) and Group B (n = 25).

Inclusion criteria were basketball players aged 12–16 years with regular attendance at training. **Exclusion criteria** were athletes outside this age range, non-basketball players, and those with low attendance.

Sample size was calculated using G*Power version 3.1.9, based on a previous study (2021) with a significance level of 0.05, statistical power > 80%, and a 95% confidence interval. The final sample size of 50 accounted for potential dropouts.

Intervention and Study Phases

1. Phase 1 (Baseline – T0): Collection of socio-demographic data (age, sex, height, weight, training duration), and administration of a modified semi-structured questionnaire assessing knowledge, practices, and injury history.
2. Phase 2 (Intervention):
 - Both groups received an educational program in Arabic, delivered through presentations and pamphlets with visual illustrations. Content included prevention of oro-maxillofacial injuries, emergency management of traumatic dental injuries (fractures, avulsions, luxations, soft tissue trauma), recognition of mandibular/maxillary fractures, and management of TMJ dislocation.
 - Group B additionally received ready-made mouthguards and training on proper usage during training and matches.
3. Phase 3 (Follow-up at 3 months – T1): Re-administration of the questionnaire and recording of injury incidence.
4. Phase 4 (Follow-up at 6 months – T2): Final reassessment using the same questionnaire.

Data Collection Tools

The questionnaire (adapted from Esmailpoor *et al.*, 2021; Ma, 2008) included sections on:

- Experience of orofacial injuries (yes/no, multiple choice).
- Knowledge of first aid and management of injuries (scored responses).
- Awareness and use of preventive practices (frequency, type of mouthguard, reasons for non-use).
- Recognition of signs and symptoms of mandibular/maxillary fractures and TMJ dislocation. Knowledge scores were calculated by summing correct answers (range: 0–5 per domain). Preventive practices were scored according to mouthguard type (custom-made = 3, mouth-formed = 2, stock = 1, not used = 0).

Ethical Considerations

The study protocol was reviewed and approved by the Ethical Committee of the Military Medical Academy. Informed consent was obtained from all participants and their guardians.

Statistical Analysis

Data were coded and analyzed using SPSS version 26. Descriptive statistics were expressed as mean ± standard deviation (SD) for numerical data, and frequency/percentage for categorical data. Normality was tested using the Shapiro–Wilk test. Between-group comparisons were conducted using Student's *t*-test for continuous variables and Chi-square test for categorical variables. A *p*-value < 0.05 was considered statistically significant, while < 0.001 was considered highly significant.

RESULTS

Table 1: Oro and Maxillo-facial Injuries and Preventive Practices questionnaire responses before education.

		Group A n=25	Group B n=25	Test, p value
Q5.Number of years of basketball experience	3 years or more	20(80.0%)	19(76.0%)	X2: 0.000, p=1.000
	Less than 3 years	5(20.0%)	6(24.0%)	
Q6.Training sessions per week	1–2 hours/week	6(24.0%)	6(24.0%)	X2: 0.000, p=1.000
	3–5 hours/week	19(76.0%)	19(76.0%)	
Q7.Risk evaluation of Oro and Maxillo-facial injuries in basketball	High	5(20.0%)	5(20.0%)	X2: 0.533, p=0.766
	Low	4(16.0%)	6(24.0%)	
	Medium	16(64.0%)	14(56.0%)	
Q8.Experience of soft-tissue or dental injuries during training or competitions	No	12(48.0%)	14(56.0%)	X2: 0.080, p=0.777
	Yes	13(52.0%)	11(44.0%)	
Q9.Type of Oro and Maxillo-facial injuries experienced	Soft-tissue laceration	9(36.0%)	7(28.0%)	X2: 0.404, p=0.939
	TMJ dislocation	1(4.0%)	1(4.0%)	
	Tooth fracture	3(12.0%)	3(12.0%)	
Q10.Knowledge of first aid for Oro and Maxillo-facial injuries	No	23(92.0%)	23(92.0%)	X2: 0.000, p=1.000
	Yes	2(8.0%)	2(8.0%)	
Q11.Management of lacerations	Apply antibiotics only	12(48.0%)	10(40.0%)	X2: 0.348, p=0.840
	Apply antibiotics with bandage	11(44.0%)	13(52.0%)	
	Keep it open	2(8.0%)	2(8.0%)	
Q12.Management of a broken tooth	Come to the dentist with the broken piece	1(4.0%)	1(4.0%)	X2: 0.083, p=0.959
	Go to the dentist without the broken piece	12(48.0%)	13(52.0%)	
	I do not know	12(48.0%)	11(44.0%)	
Q13.Storage of a broken tooth piece	Dry container	6(24.0%)	2(8.0%)	X2: 2.419, p=0.298
	I don't know	11(44.0%)	14(56.0%)	
	Paper tissue	8(32.0%)	9(36.0%)	
Q14.Action if a tooth is completely knocked out	Find the tooth, put it in a napkin, and go to the dentist	14(56.0%)	15(60.0%)	X2: 0.125, p=0.989
	Find the tooth, put it in its place in your mouth, and go to the dentist	2(8.0%)	2(8.0%)	
	Find the tooth, wash it with soap, and go to the dentist	6(24.0%)	5(20.0%)	
	Not look for the tooth and go to the dentist quickly	3(12.0%)	3(12.0%)	
Q15.Time frame to reinsert a knocked-out tooth	1 hour	4(16.0%)	7(28.0%)	X2: 1.088, p=0.580
	15 minutes	10(40.0%)	8(32.0%)	
	I don't know	11(44.0%)	10(40.0%)	
Q16.Substance to store a knocked-out tooth	Milk	20(80.0%)	20(80.0%)	X2: 0.000, p=1.000
	Water	5(20.0%)	5(20.0%)	
Q17.Experience of TMJ disorder	No	24(96.0%)	24(96.0%)	X2: 0.000, p=1.000
	Yes	3(12.0%)	1(12.0%)	
Q18.Type of TMJ disorder	Swelling	2(8.0%)	2(8.0%)	X2: 0.000, p=1.000
	Bleeding	1(4.0%)	1(4.0%)	
Q19.Knowledge of TMJ dislocation management	No	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q20.Knowledge of mandibular fracture signs and symptoms	No	21(84.0%)	21(84.0%)	X2: 0.000, p=1.000
	Yes	4(16.0%)	4(16.0%)	
Q21.Knowledge of maxilla fracture signs and symptoms	No	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q22.Awareness of mouthguards as a preventive device	No	20(80.0%)	20(80.0%)	X2: 0.000, p=1.000
	Yes	5(20.0%)	5(20.0%)	
Q23.Usage of mouthguards during training or matches	Both	1 (4.0%)	5 (20.0%)	X2: 3.876, p=0.144
	Matches only	1 (4.0%)	0 (0.0%)	
	Training only	0 (0.0%)	0 (0.0%)	

	Never use	23 (92.0%)	20 (80.0%)	
Q24.Type of mouthguard used	Custom-made	2 (8.0%)	2 (8.0%)	X ² : 3.209, p=0.201
	Mouth-formed	23 (92.0%)	20 (80.0%)	
	Stock	0 (0.0%)	3 (12.0%)	
Q25.Reasons for not using a mouthguard	I am afraid that it will be uncomfortable to wear the mouthguard	4(16.0%)	6(24.0%)	X ² : 1.686, p=0.793
	I did not know that mouthguards can prevent dental injury	6(24.0%)	8(32.0%)	
	I do not know where I can get the mouthguard	2(8.0%)	2(8.0%)	
	It is unnecessary to wear the mouthguard	10(40.0%)	6(24.0%)	
	The mouthguard is too expensive	3(12.0%)	3(12.0%)	
Q26.Plan to use a custom-made mouthguard after the survey	No	17(68.0%)	17(68.0%)	X ² : 0.000, p=1.000
	Yes	8(32.0%)	8(32.0%)	

X²: Chi square test

Table 2: Oro and Maxillo-facial Injuries and Preventive Practices questionnaire responses 3 and 6 months after education.

		At 3 months			At 6 months		
		Group A	Group B	Test, p value	Group A	Group B	Test, p value
		n=25	n=25		n=25	n=25	
Q7.Risk evaluation of Oro and Maxillo-facial injuries in basketball	Low	16 (64.0%)	24 (96.0%)	X ² : 6.125, p=0.013*	16 (64.0%)	24 (96.0%)	X ² : 6.125, p=0.013*
	Medium	9 (36.0%)	1 (4.0%)		9 (36.0%)	1 (4.0%)	
Q8.Experience of soft-tissue or dental injuries during training or competitions in the last 3 months	No	2(8.0%)	14(56.0%)	X ² : 11.121, p=0.001*	2(8.0%)	14(56.0%)	X ² : 11.121, p=0.001*
	Yes	23(92.0%)	11(44.0%)		23(92.0%)	11(44.0%)	
Q9.Type of Oro and Maxillo-facial injuries experienced	Soft-tissue laceration	6(24.0%)	6(24.0%)	X ² : 2.500, p=0.475	6(24.0%)	6(24.0%)	X ² : 2.500, p=0.475
	TMJ dislocation	0(0.0%)	2(8.0%)		0(0.0%)	2(8.0%)	
	Tooth fracture	5(20.0%)	3(12.0%)		5(20.0%)	3(12.0%)	
Q10.Knowledge of first aid for Oro and Maxillo-facial injuries	No	19(76.0%)	0(0.0%)	X ² : 27.504, p<0.001*	19(76.0%)	0(0.0%)	X ² : 27.504, p<0.001*
	Yes	6(24.0%)	25(100.0%)		6(24.0%)	25(100.0%)	
Q11.Management of lacerations	Apply antibiotics only	2(8.0%)	4(16.0%)	X ² : 2.667, p=0.264	2(8.0%)	4(16.0%)	X ² : 2.667, p=0.264
	Apply antibiotics with bandage	21(84.0%)	21(84.0%)		21(84.0%)	21(84.0%)	
Q12.Management of a broken tooth	Come to the dentist with the broken piece	25(100.0%)	19(76.0%)	X ² : 4.735, p=0.030*	25(100.0%)	19(76.0%)	X ² : 4.735, p=0.030*
	Go to the dentist without the broken piece	0(0.0%)	6(24.0%)		0(0.0%)	6(24.0%)	
Q13.Storage of a broken tooth piece	Dry container	6(24.0%)	0(0.0%)	X ² : 4.735, p=0.030*	6(24.0%)	0(0.0%)	X ² : 4.735, p=0.030*
	Water/milk	19(76.0%)	25(100.0%)		19(76.0%)	25(100.0%)	
Q14.Action if a tooth is completely knocked out	Find the tooth, put it in its place in your mouth, and go to the dentist	5(20.0%)	4(16.0%)	X ² : 3.216, p=0.200	5(20.0%)	4(16.0%)	X ² : 3.216, p=0.200
	Find the tooth,	0(0.0%)	3(12.0%)		0(0.0%)	3(12.0%)	

	wash it with soap, and go to the dentist						
	Not look for the tooth and go to the dentist quickly	20(80.0%)	18(72.0%)		20(80.0%)	18(72.0%)	
Q15.Time frame to reinsert a knocked-out tooth	15 minutes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q16.Substance to store a knocked-out tooth	Milk	19(76.0%)	19(76.0%)	X2: 0.000, p=1.000	19(76.0%)	19(76.0%)	X2: 0.000, p=1.000
	Water	6(24.0%)	6(24.0%)		6(24.0%)	6(24.0%)	
Q17.Experience of TMJ disorder	Yes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q18.Type of TMJ disorder	Bleeding	4(16.0%)	0(0.0%)	X2: 7.516, p=0.057	4(16.0%)	0(0.0%)	X2: 7.516, p=0.057
	Malocclusion	12(48.0%)	9(36.0%)		12(48.0%)	9(36.0%)	
	Missing Teeth	0(0.0%)	2(8.0%)		0(0.0%)	2(8.0%)	
	Swelling	9(36.0%)	14(56.0%)		9(36.0%)	14(56.0%)	
Q19.Knowledge of TMJ dislocation management	Yes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q20.Knowledge of mandibular fracture signs and symptoms	Yes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q21.Knowledge of maxilla fracture signs and symptoms	Yes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q22.Awareness of mouthguards as a preventive device	Yes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q23.Usage of mouthguards during training or matches	Neither	25 (100.0%)	0 (0.0%)	X ² : 50.000, p<0.001*	22 (88.0%)	0 (0.0%)	X ² : 45.200, p<0.001*
	Both	0 (0.0%)	23 (92.0%)		3 (12.0%)	2 (8.0%)	
	Match only	0 (0.0%)	2 (8.0%)		0 (0.0%)	23 (92.0%)	
	Training only	0 (0.0%)	0 (0.0%)		0 (0.0%)	0 (0.0%)	
Q24.Type of mouthguard used	Custom-made	0	0(0.0%)	X ² : 46.080, p<0.001*	0(0.0%)	0(0.0%)	X ² : 35.795, p<0.001*
	Mouth-formed	0	0(0.0%)		0(0.0%)	0(0.0%)	
	Stock	0	25(100.0%)		3 (12.0%)	25 (100.0%)	
Q25.Reasons for not using a mouthguard	I am afraid that it will be uncomfortable to wear the mouthguard	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000
Q26.Plan to use a custom-made mouthguard after the survey	Yes	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000	25(100.0%)	25(100.0%)	X2: 0.000, p=1.000

X2: Chi square test, * for significant p value (<0.05)

Table 3: Oro and Maxillo-facial Injuries and Preventive Practices questionnaire scores 3 and 6 months after education.

	At 3 months			At 6 months		
	Group A	Group B	Test, p value	Group A	Group B	Test, p value
Q7	1.04 ± 0.20	1.36 ± 0.49	t:1.940, p<0.001*	1.04 ± 0.20	1.36 ± 0.49	t:1.940, p<0.001*
Q8	0.08 ± 0.28	0.44 ± 0.51	t: 2.183, p<0.001*	0.08 ± 0.28	0.44 ± 0.51	t: 2.183, p<0.001*
Q9	0.64 ± 0.81	0.72 ± 0.98	t:0.097, p=0.923	0.64 ± 0.81	0.72 ± 0.98	t:0.097, p=0.923
Q10	0.24 ± 0.44	1.00 ± 0.00	t:4.608, p<0.001*	0.24 ± 0.44	1.00 ± 0.00	t:4.608, p<0.001*
Q11	1.76 ± 0.60	1.84 ± 0.37	t:0.078, p=0.915	1.76 ± 0.60	1.84 ± 0.37	t:0.078, p=0.915
Q12	3.00 ± 0.00	2.76 ± 0.44	t:-1.455, p=0.010*	3.00 ± 0.00	2.76 ± 0.44	t:-1.455, p=0.010*
Q13	2.52 ± 0.87	3.00 ± 0.00	t:1.455, p=0.010*	2.52 ± 0.87	3.00 ± 0.00	t:1.455, p=0.010*
Q14	0.60 ± 1.22	0.60 ± 1.12	t:0.340, p=0.658	0.60 ± 1.22	0.60 ± 1.12	t:0.340, p=0.658
Q15	3.00 ± 0.00	3.00 ± 0.00	t: 0.000, p=1.000	3.00 ± 0.00	3.00 ± 0.00	t: 0.000, p=1.000

Q16	2.52 ± 0.87	2.52 ± 0.87	t:0.000, p=1.000	2.52 ± 0.87	2.52 ± 0.87	t:0.000, p=1.000
Q17	0.00 ± 0.00	0.12 ± 0.33	t:0.728, p=0.081	0.00 ± 0.00	0.12 ± 0.33	t:0.728, p=0.081
Q19	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000
Q20	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000
Q21	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000
Q22	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000
Q23	0.00 ± 0.00	2.84 ± 0.55	t: 6.063, p<0.001*	0.00 ± 0.00	2.84 ± 0.55	t: 6.063, p<0.001*
Q24	1.64 ± 0.76	1.00 ± 0.00	t:-2.910, p<0.001*	1.64 ± 0.76	1.00 ± 0.00	t:-2.910, p<0.001*
Q25	2.00 ± 0.00	2.00 ± 0.00	t: 0.000, p=1.000	2.00 ± 0.00	2.00 ± 0.00	t: 0.000, p=1.000
Q26	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000	1.00 ± 0.00	1.00 ± 0.00	t: 0.000, p=1.000
Total score	27.68 ± 3.20	30.88 ± 1.45	t:3.803, p<0.001*	27.68 ± 3.20	30.88 ± 1.45	t:3.803, p<0.001*

T: Student t test, * for significant p value (< 0.05)

Table 4: Oro and Maxillo-facial Injuries and Preventive Practices questionnaire scores before and after education.

	Group A n=25	Group B n=25	P value
Before	19.72 ± 2.53	19.88 ± 2.64	0.827
After 3 months	27.68 ± 3.20	30.88 ± 1.45	<0.001*
After 6 months	27.68 ± 3.20	30.88 ± 1.45	<0.001*

Test: Student t test,* for significant p value (<0.05)

DISCUSSION

The present study evaluated the impact of an educational program alone (Group A) versus education combined with mouthguard use (Group B) in reducing oro-maxillofacial injuries among young basketball players. At baseline, both groups demonstrated low and comparable levels of knowledge, awareness, and preventive practices. Following the intervention, both groups showed improvement; however, Group B consistently exhibited superior outcomes, including higher knowledge retention, more effective first-aid responses, greater compliance with preventive measures, and significantly fewer reported injuries.

These findings support the premise that education alone improves awareness but may not suffice to reduce actual injury rates without the integration of physical preventive strategies. Group A demonstrated improved confidence and knowledge post-intervention, yet their higher injury rates suggest that the absence of mouthguards limited the translation of knowledge into effective protection. This underscores the need for combining theoretical education with practical preventive measures to ensure long-term behavioral change and enhanced safety in sports.

Our results are consistent with prior studies highlighting the importance of integrating educational and protective measures. **Levin and Zadik (2012)** emphasized that education without preventive strategies is insufficient, a conclusion reinforced by **Karande et al. (2013)**, who showed that awareness programs improved knowledge but failed to significantly reduce injuries in the absence of protective tools. Similarly, **Mantri et al. (2014)** and **Gould et al. (2016)** confirmed the effectiveness of mouthguards in reducing the frequency and severity of dental trauma, supporting our observation that Group B

demonstrated both reduced injury incidence and sustained compliance.

The improved perception of risk and better first-aid management observed in Group B further aligns with international findings. Studies such as **Tozoğlu & Tozoğlu (2009)**, **O'Malley et al. (2012)**, and **Horri et al. (2016)** all reported that consistent use of mouthguards significantly reduces sports-related orofacial injuries. However, compliance remains a global challenge, often due to discomfort, cultural perceptions, or lack of enforcement (**Pickering et al., 2020; Priya et al., 2016**). Our results indicate that when education is paired with accessible protective appliances, compliance increases, leading to sustained reductions in injury rates.

Additionally, the findings echo systematic reviews (**Selva Mani et al., 2019**) and epidemiological studies (**Merglova, 2018**) showing that while many orofacial injuries in sports are preventable, lack of awareness and limited adoption of mouthguards continue to be barriers. Group B's outcomes in our study illustrate that distributing mouthguards alongside structured education is an effective, low-cost solution that can be scaled to similar sports settings.

Overall, the study highlights the necessity of a dual approach to injury prevention in sports combining structured education with practical preventive tools. Education alone fosters knowledge, but long-term behavioral change and injury reduction are achieved only when athletes are provided with and encouraged to consistently use protective devices. These findings support the adoption of mandatory mouthguard policies and structured education programs within schools, clubs, and sports federations to safeguard athlete health and performance.

CONCLUSION

This study demonstrates that while educational programs improve awareness of oro-maxillofacial injuries, the integration of mouthguard use is essential for effective prevention. Players who received both education and protective appliances reported fewer injuries, better first-aid knowledge, and sustained preventive practices compared to those who received education alone. These findings highlight the need for structured educational programs combined with mandatory mouthguard policies to ensure lasting safety and well-being of athletes.

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Conflict of interest

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Authorship

All the listed authors contributed significantly to the conception and design of study, acquisition, analysis, and interpretation of data and drafting of the manuscript, to justify authorship.

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