FACULDADE DE
MEDICINA DENTÁRIA
UNIVERSIDADE DO PORTO

Master's Degree in Dental Medicine

Dental Medical Research Article for Dissertation

Orofacial Injuries in Roller Hockey Athletes: An analysis of knowledge and attitudes – A Cross-sectional study

Traumatismos Orofaciais em atletas de Hóquei em Patins: Caracterização dos conhecimentos e atitudes – Estudo Transversal

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Porto, May 2026

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Scientific field: Sports Dentistry and Preventive Dentistry

A dissertation submitted to the Faculty of Dental Medicine, University of Porto, as part of the requirements for the attribution of the Master's Degree in Dental Medicine.

Acknowledgments

Aos meus pais, Lina e Victor, pela educação e valores que me transmitiram, a mim e ao meu irmão, pelo apoio incondicional e por todos os esforços feitos ao longo da vida para me permitirem alcançar este sonho e concluir um curso superior. Ficar-vos-ei para sempre agradecida por quem sou hoje e por sempre me terem deixado ser exatamente aquilo que quis ser.

Ao meu irmão, Tiago, o meu melhor amigo, o melhor colega de casa e o meu maior pilar durante estes cinco anos. Obrigada por estares sempre presente, por nunca me deixares desistir e por seres parte fundamental da pessoa que sou hoje.

À minha avó, Manuela, pela força, carinho e exemplo que sempre representou na minha vida.

A toda a minha família, por compreender as minhas ausências e por continuar presente em cada etapa deste percurso. Mesmo quando precisei de me dedicar ao estudo e falhei alguns momentos, nunca me faltou o vosso apoio para chegar até aqui.

À minha Orientadora, Professora Doutora Inês Côrte-Real, por ter aceitado este desafio fora da sua habitual área de investigação, por toda a paciência, orientação e por me permitir conjugar os meus dois mundos ao longo deste projeto.

À minha Coorientadora, Professora Doutora Maria de Lurdes Pereira, por ter aceitado este convite, pela disponibilidade, colaboração e contributo fundamentais para a concretização deste estudo.

Às Nêsperas — Inês, Bárbara e Viola — obrigada por me mostrarem que há sempre outro caminho, por estarem presentes desde o dia zero e por acreditarem em mim, muitas vezes mais do que eu própria.

À Bea, a melhor binómia, obrigada pela paciência, dedicação e por nunca me deixares cair.

À Isabel, a menina que levo desde a primeira gincana de Anatomia e que continuará sempre a ser um exemplo para mim.

À Vivi, a madeirense que veio dar vida ao Porto, obrigada pela tua alegria contagiante e por tornares tudo mais leve.

Ao Rausch, por teres sempre uma palavra certa e por estares presente nos momentos que mais importavam.

À Rita, a amiga que a Dentária me deu e a Medicina não levou.

À Maria Luís e à Rafa, por continuarem a ser casa apesar da distância.

A todos os atletas, equipas técnicas e encarregados de educação que disponibilizaram um pouco do seu tempo para responder ao questionário e colaborar neste estudo, o meu sincero agradecimento.

Por fim, a todos os docentes e não docentes que, de alguma forma, fizeram parte desta caminhada e contribuíram para o meu crescimento académico e pessoal.

“Se queres ser melhor, melhora os que te rodeiam e aceita que te ajudem!”

Purificação Tavares

Abstract

Introduction: Roller Hockey has been recognised as a high-risk sport for orofacial injuries due to the speed of the game, physical contact and the use of sticks and balls during competition. Despite the recognised preventive role of mouthguards and educational interventions, evidence regarding the knowledge and attitudes of those involved in this sport remains limited.

Aims: To characterise the knowledge and attitudes of Roller Hockey athletes, coaching staff and parents/guardians regarding orofacial injuries. Secondary objectives included assessing the formation provided by the clubs and the federations, the preventive practices adopted, emergency management of dental trauma, risk perception and the influence of previous trauma on preventive behaviours.

Materials and Methods: A descriptive, cross-sectional study was conducted using online questionnaires distributed through the LimeSurvey platform between December 2025 and February 2026. The sample included 272 participants: 135 athletes, 37 coaching staff members and 100 parents/guardians. Data were analysed using IBM SPSS Statistics 31.0. Descriptive statistics were computed, and associations between categorical variables were assessed using Pearson's chi-square or Fisher's exact test, with a statistical significance level of 5%.

Results: More than half of athletes (56.5%) reported previous orofacial trauma, with field players presenting a significantly higher prevalence than goalkeepers ($p < 0.001$). Although almost all athletes (98.9%) were familiar with mouthguards, only 40.2% reported using them. Significant associations were observed between mouthguard use and dentist advice ($p < 0.001$) and clubs' advice ($p = 0.019$), although only dentist advice remained significant after Bonferroni correction. Education on orofacial trauma was limited among athletes and parents/guardians, and important gaps were identified regarding emergency management of dental avulsion and fractures.

Conclusions: Despite recognising Roller Hockey as a high-risk sport and demonstrating positive attitudes toward prevention, relevant deficiencies persist in education, emergency management, and adherence to preventive measures. Educational initiatives, greater involvement of oral health professionals, and stronger preventive policies are essential to improve safety and reduce the burden of orofacial injuries in Roller Hockey.

Keywords: Roller Hockey; Orofacial Injuries; Dental Trauma; Mouthguard; Prevention.

Resumo

Introdução: O Hóquei em Patins tem sido reconhecido como um desporto de elevado risco para traumatismos orofaciais devido à elevada velocidade envolvida, ao contacto físico e à utilização do stick e da bola durante a sua prática. Apesar do reconhecido papel preventivo dos protetores bucais e das estratégias educativas, existe ainda evidência limitada relativamente aos conhecimentos e atitudes dos indivíduos envolvidos nesta modalidade.

Objetivos: Caracterizar os conhecimentos e atitudes dos atletas, equipa técnica e encarregados de educação relativamente aos traumatismos orofaciais associados ao Hóquei em Patins. Como objetivos secundários pretendeu-se avaliar a formação disponibilizada pelos clubes e pela federação, as medidas preventivas adotadas, a abordagem ao trauma dentário, a perceção do risco e a influência da experiência prévia de trauma nos comportamentos preventivos.

Material e Métodos: Foi realizado um estudo descritivo transversal recorrendo a questionários online distribuídos na plataforma LimeSurvey entre dezembro de 2025 e fevereiro de 2026. A amostra integrou 272 participantes: 135 atletas, 37 elementos de equipas técnicas e 100 encarregados de educação. Os dados foram analisados através do IBM SPSS Statistics 31.0. Foram calculadas estatísticas descritivas e as associações entre variáveis categóricas foram avaliadas através do teste do qui-quadrado de Pearson ou do teste exato de Fisher, adotando-se um nível de significância de 5%.

Resultados: Mais de metade dos atletas (56,5%) confirmou traumatismo orofacial prévio, verificando-se uma prevalência significativamente superior nos jogadores de campo comparativamente aos guarda-redes ($p < 0,001$). Apesar do elevado conhecimento sobre protetores bucais (98,9%), apenas 40,2% dos atletas referiram utilizá-los. Observaram-se associações significativas entre o uso de protetor bucal e a recomendação por parte do dentista ($p < 0,001$) e do clube (p=0,019), embora apenas a recomendação do dentista se mantivesse significativa após a correção de Bonferroni. A formação sobre traumatismos

orofaciais revelou-se limitada e persistiram lacunas importantes relativamente à abordagem em caso de avulsão e fratura dentária.

Conclusões: Apesar do reconhecimento do Hóquei em Patins como desporto de elevado risco e da existência de atitudes favoráveis à prevenção, persistem lacunas relevantes na educação, na gestão de emergências e na adesão às medidas preventivas. O reforço das estratégias educativas, do envolvimento dos profissionais de saúde oral e da implementação de políticas preventivas poderá contribuir para reduzir a incidência e a gravidade dos traumatismos orofaciais associados à modalidade.

Palavras-chave: Hóquei em Patins; Lesões Orofaciais; Traumatismos Dentários; Protetor Bucal; Prevenção.

Scientifc outputs

Poster presentations at scientific meetings

Rodrigues JC, Pereira ML, Côrte-Real IS. Knowledge and Attitudes of Orofacial Injuries in Roller Hockey Athletes: A Pilot Study. Poster presented at the IJUP 2026; Porto, Portugal.

Abbreviations

RH – Roller Hockey

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Introduction

Rink hockey (RH), also known as roller hockey, quad hockey, or hardball hockey, originated in England in the late 19th century as an adaptation of ice hockey for wooden rinks. (1-3) In Portugal, RH emerged in the 20th century and joined the International Skateboarding Federation in 1929. Nowadays, it is recognized as one of the countries with the greatest dominance in the sport. (2)

RH is a collective, dynamic, and complex sport, played on a rectangular rink with a smooth, flat surface, and contested between two teams of five players each (four outfield players and a goalkeeper), who use classic skates (2 pairs of parallel wheels), and a stick to handle the ball. Each match is divided into two periods of 25 minutes each, and the main objective of the sport is to score a goal in the opposing team's net, using only the stick. (1-5)

As a sport that is increasingly gaining prominence both nationally and internationally, RH has seen a significant rise in the number of participants. Although this sport is well-known for its benefits to athletes' general health, it is a contact sport and therefore carries inherent risks. (6) Its classification as a contact sport is not only due to the direct interaction between players, but also to the presence of dynamic elements, such as the ball and the stick, and static elements, such as the boards and the goals, which increase the risk of collisions. In addition, several factors differentiate RH from other indoor sports, namely the high speeds reached by the players, which may reach as fast as 30 km/h, the unique mechanism of movement and braking associated with inline skates, and the speed of the ball, which can reach approximately 115 km/h. (3) For all the reasons mentioned above, roller hockey can be considered a high-risk sport in terms of musculoskeletal injuries, which can affect athletic performance, return to sport and the overall burden of injury among athletes. (7-10)

Orofacial trauma is of particular significance, with RH being classified by the International Dental Federation as a high-risk sport, not only because of the high prevalence of such injuries, but also because of the functional, aesthetic and psychological impact they can have on athletes. The most common orofacial injuries in this sport include coronal fractures, dislocations and avulsions, as well as injuries to the soft tissues and adjacent structures of the orofacial region. (11-13) In addition to these direct and indirect consequences of orofacial injuries,

there is often a need for further treatment to address side effects, whether these be endodontic problems and the associated pain and infection, or the need for dental implants, procedures that all entail high financial costs. (1, 14, 15)

Although the International Roller Sports Federation's regulations do not specify mouthguards as mandatory protective equipment, the literature shows that their use can significantly reduce the number and severity of orofacial injuries by absorbing and dissipating the force of impact. (1, 15-17) Apart from the fact that investing in a custom-made mouthguard can be up to 26 times more cost-effective than treating orofacial injuries resulting from sports-related trauma. (1, 12, 18) However, the general lack of scientific knowledge about the sport and orofacial injuries sustained during its practice has led to the importance of their use being underestimated, compounded by a lack of understanding of their function, discomfort, and the belief that they are ineffective or may impair sporting performance. (1, 6, 13, 19-22)

As oral health has a significant impact on an athlete's performance in sport, as well as their functional and social well-being, an understanding of the level of knowledge and training available regarding orofacial injuries will help to recognise the need for greater awareness of the risks associated with this sport, thereby preventing such injuries. (11, 12, 23)

This research arises from this need, with the main objective of characterising the literacy of athletes, coaching staff and parents regarding orofacial injuries associated with roller hockey. Secondary objectives include describing the training provided by clubs and the federation, assessing perceptions of the importance of preventing orofacial injuries, identifying the preventive measures adopted, analysing the response to orofacial injuries occurring during matches and training sessions, and evaluating the recognition of roller hockey as a high-risk contact sport. In addition, we sought to determine whether history of orofacial injuries influences individuals' attitudes towards their prevention.

Material and Methods

Study Design and Setting

A cross-sectional, descriptive study was conducted based on responses to an online questionnaire regarding orofacial injuries sustained in roller hockey.

Population

The study sample consisted of 135 athletes practising this sport, 37 members of the coaching staff and 100 parents or guardians.

This study considered all responses provided by current and former federated roller hockey players aged sixteen or over, parents or guardians whose children play or have played roller hockey, and any other members of a club's coaching staff involved in this sport. Any responses provided by participants in sports aged under sixteen, participants in other sports, parents or guardians, or members of technical teams not associated with the sport in question will be excluded.

Data Collection Instrument

A structured, self-administered questionnaire was used as the data-collection instrument. It was developed based on instruments previously used in similar settings and adapted to the specific objectives of this study.

The online questionnaire was shared on the LimeSurvey platform, provided by the University of Porto (UP), between December 2025 and February 2026. After accessing the questionnaire and indicating their role within the sport, each participant was directed to a set of specific questions (APPENDIX 1).

The questionnaire aimed at outfield players and goalkeepers consisted of twenty-two questions, which collected basic sociodemographic data, namely gender and age, the number of years spent playing the sport, frequency of visits to the dentist, the occurrence of orofacial injuries during sporting activities, preventive measures and actions taken before and after the injury occurred, respectively, as well as access to and availability of information on this topic. The questionnaire

for the technical staff, which included coaches, managers, and the medical team, contained six questions that mainly gathered data on knowledge of prevention methods and measures, as well as on the course of action to be taken in the event of orofacial trauma. Finally, the questionnaire addressed to parents and guardians included a total of six questions, through which information was obtained such as the number of years their child had been practising the sport, whether or not a mouthguard was used, the occurrence of any traumatic episode in the facial region, and access to information regarding prevention and action in the event of any injury.

Although the three questionnaires differed, they all ended with a common question asking for suggestions on preventive strategies to reduce the incidence and minimise the severity of injuries associated with the sport.

All questionnaires were developed by the researcher and were based on the scientific literature and other questionnaires used in previous studies relevant to the research. (7, 11, 13, 24) The questionnaires were pre-tested with one individual from each category (athletes, coaching staff and parents/guardians), and no changes were deemed necessary.

Procedures and Ethical Considerations

The questionnaire was shared via a link posted on the author's social media accounts and on several Portuguese roller hockey clubs' accounts. Upon accessing the questionnaire, each participant was provided with written information about the study and could only complete it after giving their consent to participate.

The study was approved by the Committee for Health at the Faculty of Dental Medicine of the University of Porto (FMDUP) (Project no. 6/2026, 12 March 2026) (APPENDIX 2) and by the Data Protection Unit at the University of Porto (A-91/2025) (APPENDIX 3).

During the study, a modification to the dissertation title was requested by the Scientific Committee to improve its characterization. (APPENDIX 4)

All data collected was kept strictly confidential and anonymous and was used exclusively for academic and research purposes.

Statistical Analysis

Data processing and statistical analysis were performed using IBM SPSS Statistics, version 31.0.2.0 (IBM Corp., Armonk, NY, USA).

Descriptive statistics were computed for all variables. Categorical variables were summarised as absolute and relative frequencies.

The participants' ages were grouped into four categories. Missing or ambiguous responses were treated as missing data and excluded from the analysis of the respective variable, with no data imputation being applied.

Associations between categorical variables were tested using the Pearson chi-square test or, when more than 20% of cells presented expected counts below 5, Fisher's exact test. A significance level of 5% was adopted, and results were considered statistically significant when $p < 0.05$. Responses to the open-ended question were reviewed, categorised into thematic groups and analysed descriptively using frequency distribution. These data were used for descriptive purposes only and were not included in the inferential statistical analysis.

Results

The initial sample, shown in Figure I, comprised 272 participants, of whom 135 were athletes, 37 were members of the coaching staff and 100 were parents or guardians. However, some variables had missing responses across questionnaires.

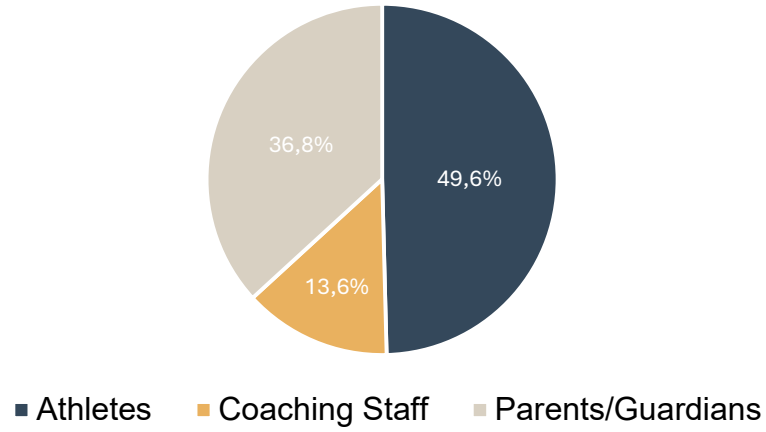

Figure I. Distribution of the study sample.

Athletes

Sociodemographic characteristics of the athletes who participated in the survey are presents in Table I. The breakdown by gender shows that 54.9% of the athletes were male and 77.8% were outfield players. Most of the athletes were aged between 16 and 20, 42.9%, and 88.0% reported having more than 10 years' playing experience.

About dental care, exactly half of the athletes reported visiting the dentist once a year, whilst only 4.3% reported having regular dental check-ups at the club. In 72.8% of cases, the athletes stated that their dentist was aware that they played roller hockey.

More than half of the athletes, 56.5%, reported a history of orofacial trauma, with the most affected areas being the head in general, 30.6%, and the teeth, 28.6%.

Table I. Sociodemographic characteristics of athletes.

Variable	n	%
Sex		
Male	50	54.9
Female	41	45.1
Position		
Field Player	105	77.8
Goalkeeper	30	22.2
Age group		
16-20 years	39	42.9
21-25 years	32	35.2
26-30 years	16	17.6
>30 years	4	4.4
Years of practice		
1-5 years	2	2.2
6-10 years	9	9.8
>10 years	81	88.0
Frequency of dental visits		
Once a month	5	5.4
Every 6 months	29	31.5
Once a year	46	50.0
Only when in pain	8	8.7
Rarely	4	4.3
Regular dental follow-up in the club		
No	88	95.7
Yes	4	4.3
Dentist aware of roller hockey practice		
No	13	14.1
Yes	67	72.8
Do not know	12	13.0
Occurrence of orofacial trauma		
No	40	43.5
Yes	52	56.5
Region of orofacial trauma		
Head	15	30.6
Teeth	14	28.6
Face	12	24.5
Eyes	8	16.3

Table II shows the statistically significant association observed between a player's position on the pitch and the occurrence of orofacial injuries (χ^2 (1) =21.639; p<0.001). Field players had a substantially higher prevalence of orofacial injuries compared with goalkeepers.

Table II. Correlation between the athlete's playing position and the occurrence of orofacial injuries.

Athlete's Position	No Trauma n (%)	Trauma n (%)	Pearson's χ^2 Test
Field Player	21 (30.0)	49 (70.0)	χ^2 (1) = 21.639
Goalkeeper	19 (86.4)	3 (13.6)	p<0.001

Table III presents data on the awareness and use of mouthguards. Almost all athletes (98.9%) were familiar with mouthguards. 63.0% of athletes reported having been advised by a dentist to use a mouthguard, whilst only 37.0% reported having received recommendations from their club.

Regarding mouthguards, 40.2% of athletes reported using them, and among users, the majority reported consistent use during both training sessions and matches (91.9%). Prefabricated mouthguards were the most used type, 78.4%.

Table III. Knowledge and use of mouthguards among roller hockey athletes.

Variable	n	%
Knowledge about mouthguards		
No	1	1.1
Yes	91	98.9
Advice from dentist		
No	34	37.0
Yes	58	63.0
Advice from the club		
No	58	63.0
Yes	34	37.0
Wear a mouthguard		
No	55	59.8
Yes	37	40.2
Training sessions and matches	34	91.9
Training sessions only	1	2.7
Matches only	2	5.4
Started using mouthguard after trauma	6	16.2
Type of mouthguard		
Custom-made mouthguard	8	21.6
Prefabricated	29	78.4

No statistically significant association was found between awareness of mouthguards and their use (χ^2 (1) = 0.680; p = 0.410). However, among athletes who reported using a mouthguard, 16.2% stated that they only started using it after experiencing orofacial trauma.

Figure II presents the limitations reported by athletes while wearing a mouthguard. Among athletes who wear a mouthguard, 43.2%, reported no limitations. The main limitations reported relate to difficulties with communication and breathing.

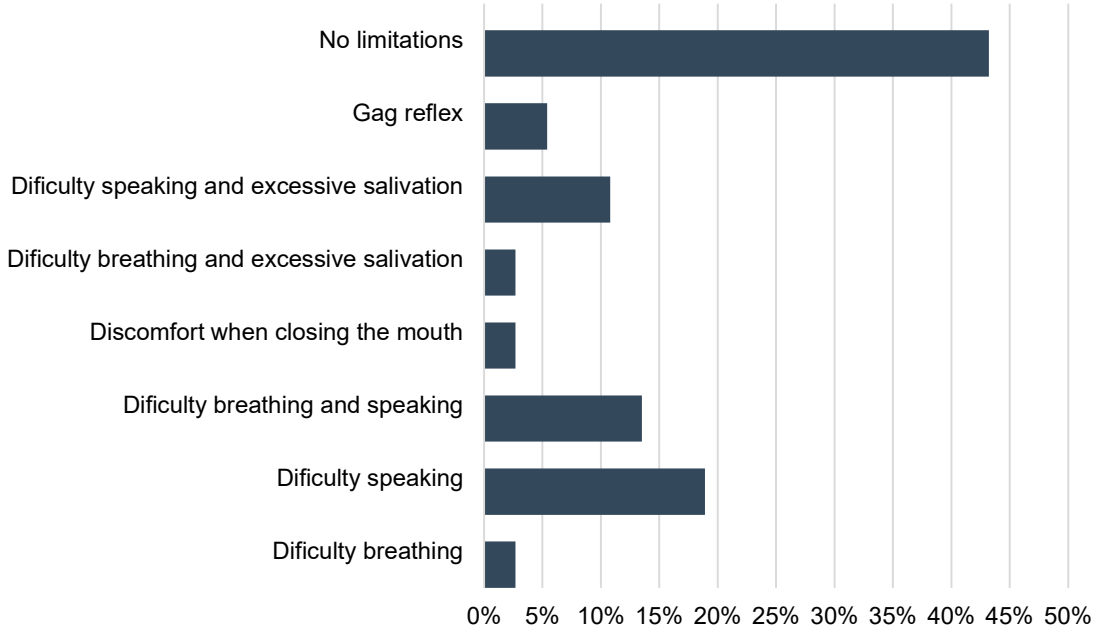

Figure II. Limitations observed when using the mouthguard.

Figure III shows the main reasons athletes give for not wearing a mouthguard. 30.4% of athletes believe that wearing one is unnecessary, followed by difficulty in breathing, 23.2%.

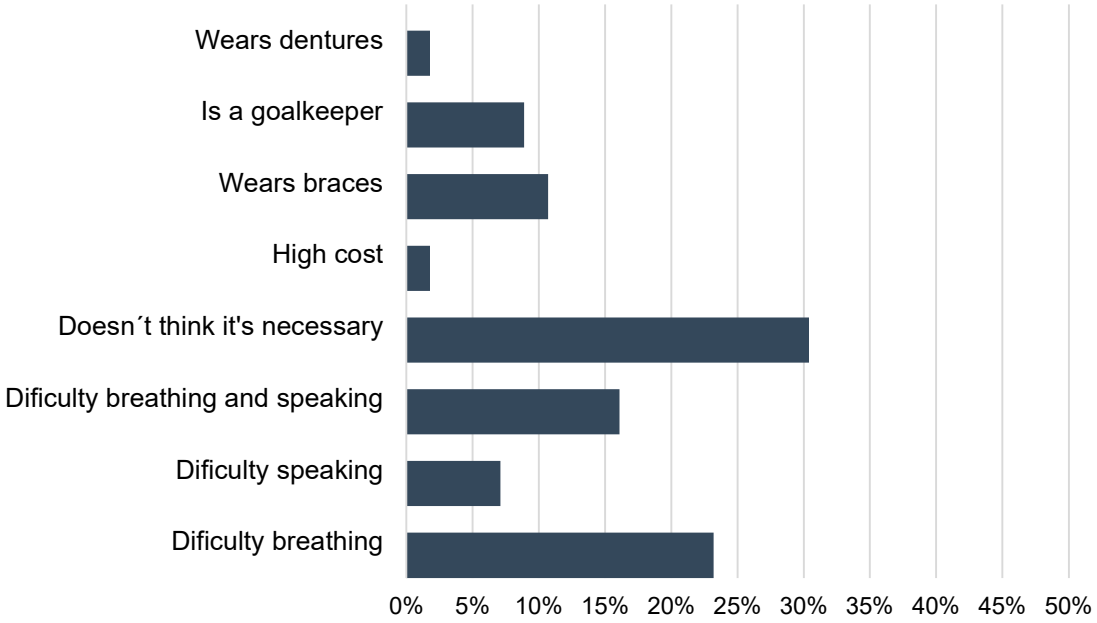

Figure III. Reasons for not wearing a mouthguard.

Table IV presents the associations among previous orofacial trauma, professional advice on mouthguard use, and actual mouthguard use among athletes. No significant association was found between previous orofacial trauma and

mouthguard use (χ^2 (1) = 1.753; p = 0.185). However, significant associations were observed between mouthguard use and both dentist advice (χ^2 (1) = 22.107; p < 0.001) and club recommendations (χ^2 (1) = 5.504; p = 0.019). Athletes who received guidance from dentists or clubs reported higher mouthguard use compared with those who did not receive such recommendations.

Table IV. Association between previous orofacial trauma, professional advice regarding mouthguard use, and mouthguard use among roller hockey athletes.

Variable	Does not use mouthguard n (%)	Uses mouthguard n (%)	Pearson's χ^2 Test
Previous orofacial trauma			
No	27 (67.5)	13 (32.5)	χ^2 (1) = 1.753
Yes	28 (53.8)	24 (46.2)	p = 0.185
Advice from Dentist regarding mouthguard use			
No	31 (91.2)	3 (8.8)	χ^2 (1) = 22.107
Yes	24(41.4)	34 (58.6)	p < 0.001
Advice from the club regarding mouthguard use			
No	40 (69.0)	18 (31.0)	χ^2 (1) = 5.504
Yes	15 (44.1)	19 (55.9)	p = 0.019

After Bonferroni correction for multiple comparisons (adjusted significance level: p < 0.0167), the association between dentist-provided advice and mouthguard use was the only one that remained statistically significant.

Table V presents the data regarding education on orofacial trauma provided to athletes. 95.7% of athletes reported not receiving any training from their club, and none reported receiving education from the federation.

Table V. Education on orofacial trauma prevention is provided to roller hockey athletes by clubs and federations.

Formation given by the club	n	%
No	88	95.7
Yes	4	4.3

Table VI shows the athletes' knowledge and attitudes regarding tooth avulsion and dental fractures. Over half of the athletes (56.5%) stated that they knew tooth

reimplantation was possible. Among those with knowledge of tooth avulsion, 84.3% correctly identified the appropriate method for preserving an avulsed tooth. When it comes to the treatment of tooth fractures, 59.8% reported that they would look for the tooth fragment and seek professional care, whilst 18.5% did not know how to respond appropriately.

Table VI. Athletes' knowledge regarding the management of dental avulsion and tooth fracture.

Variable	n	%
Knowledge in case of dental avulsion		
With knowledge	52	56.5
Without knowledge	40	43.5
Storage of avulsed tooth		
Correct	43	84.3
Incorrect	8	15.7
Attitude in case of tooth fracture		
Look for the fragment and see a Dentist	55	59.8
Simply see a doctor	20	21.7
Don´t know to answer	17	18.5

Technical Staff

Table VII presents the results from the technical staff's responses. The most common participants were club officials (54.1%), followed by coaches (35.1%) and members of the medical team (10.8%). All those surveyed stated that they were familiar with mouthguards.

Regarding club policies on mouthguard use, 69.4% stated that the club recommended their use, whilst only 5.6% reported that mouthguard use was mandatory. About education on orofacial trauma, most participants, 58.3%, reported not having received any training from the club. However, 52.8% reported actively seeking training on this topic.

Table VII. Technical staff characteristics, knowledge about mouthguards, club policies regarding mouthguard use, and education on orofacial trauma.

Variable	n	%
Role in technical staff		
Coach	13	35.1
Medical team	4	10.8
Club official	20	54.1
Knowledge about mouthguards		
Yes	36	100
Club policy regarding mouthguard use		
Recomended	25	69.4
No recomendation	8	22.2
Mandatory	2	5.6
Do not know	1	2.8
Education provided by the club on orofacial trauma		
No	21	58.3
Do not know	2	5.6
Yes	1	2.8
Looking for education on orofacial trauma		
No	17	47.2
Yes	19	52.8

Regarding the management of dental avulsion, the most frequent responses among technical staff were referring the athlete to the club physician (30.6%), directing the athlete to the hospital (27.8%) and storing the tooth in paper or a napkin (25.0%). Less frequent responses included tooth reimplantation and other combined management strategies (16.8%).

Parents and Guardians

Table VIII presents the characteristics of the athletes represented by parents/guardians, including years of roller hockey practice, mouthguard use, occurrence and affected area of orofacial trauma, and risk perception of roller hockey. Most athletes had been practising this sport for 6–10 years (38.6%). More than half of the parents/guardians reported that the athlete did not use a mouthguard, 55.4%, and 40.5% reported a previous history of orofacial trauma.

Among injured athletes, the teeth were the most frequently affected area (42.4%), followed by the face (24.2%) and the eyes (18.2%). Most parents/guardians, 66.3%, considered roller hockey a high-risk sport for orofacial injuries.

Table VIII. Characteristics of athletes represented by parents/guardians.

Variable	n	%
Years of Roller Hockey practice		
<1 year	4	4.8
1-5 years	24	28.9
6-10 years	32	38.6
>10 years	23	27.7
Mouthguard use		
No	46	55.4
During training and matches	29	34.9
Only during matches	8	9.6
Occurance of orofacial trauma		
No	50	59.5
Yes	34	40.5
Affected area		
Teeth	14	42.4
Face	8	24.2
Eyes	6	18.2
Mouth	3	9.1
Head	1	3.0
Neck	1	3.0
Risk perception of Roller Hockey		
Moderate risk	28	33.7
High risk	55	66.3

Regarding education on orofacial trauma among parents/guardians, 85.5% reported not having received any formation provided by the club. Educational initiatives were uncommon, with only 10.8% reporting participation in educational sessions, 6.0% obtaining information through online resources, and very few reporting information through leaflets or other educational methods. Nevertheless, almost all parents/guardians, 96.4%, considered education on orofacial trauma to be important.

The Figure IV shows participants' responses across all groups regarding possible strategies to improve prevention and reduce the incidence of orofacial injuries in roller hockey.

The most frequently suggested measure was making mouthguard compulsory, at 38.0%, followed by helmets or face masks for field players in youth teams, at 34.9%. Educational and awareness-raising initiatives were also frequently suggested (19.8%).

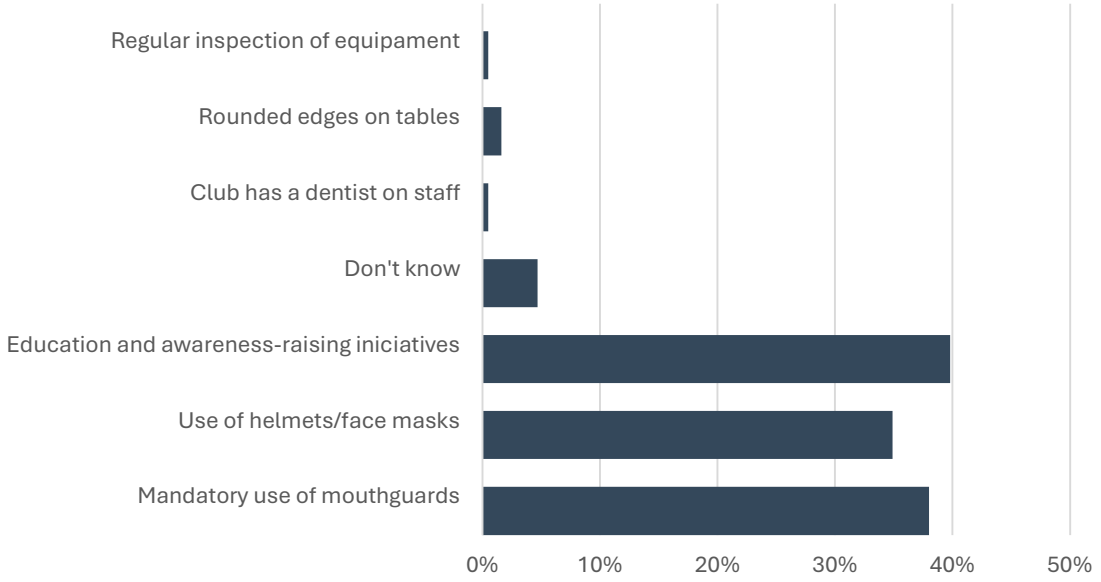

Figure IV. Suggested strategies to improve prevention and reduce the incidence of orofacial injuries in roller hockey.

Discussion

This cross-sectional study was conducted in accordance with the STROBE guidelines (25) and provides evidence to characterise the knowledge and attitudes regarding orofacial injuries among roller hockey athletes, technical staff and parents/guardians. The findings contribute to the growing literature on the prevention of orofacial injuries in roller hockey, highlighting the high prevalence of trauma, the insufficient use of preventive measures and the need for improve education and support strategies involving athletes, technical staff, parents/guardians, clubs and dentists. Although there are few published scientific studies on the population involved in this sport, we can draw comparisons with studies on ice hockey or field hockey, which are similar sports.

A high prevalence of orofacial trauma was demonstrated in this study among roller hockey athletes, with 56.5% reporting a previous history of injury. The finding strengthens the identification of roller hockey as a high-risk sport for orofacial trauma, aligning with previous studies on contact sports and roller hockey athletes. (1, 6, 7, 26) The high prevalence observed may be explained by the dynamic nature of the sport, namely the high speed reached by players and the ball, the use of sticks, and the frequent physical contact between athletes. (1, 12) Dental trauma was one of the most frequently affected areas (26.8%), which is particularly relevant given its potential functional, aesthetic and psychological consequences, as well as the possible need for long-term dental treatment. (1, 7, 19)

A statistically significant association was identified ($p < 0.001$) between the athlete's playing position and the occurrence of orofacial injuries, with field players showing a considerably higher prevalence of injuries (70.0%) compared with goalkeepers (13.6%). This result can be explained by field players' greater exposure to direct contact, sticks and the impact of the ball during active play, whilst goalkeepers benefit from more comprehensive facial protective equipment, such as helmets and face masks. These findings are consistent with previous studies reporting a higher risk of injury among field players in roller hockey and other contact sports. (1, 3, 12)

Although almost all athletes reported being familiar with mouthguards (98.9%), the majority did not use them regularly (59.8%), suggesting that mere awareness

may not be sufficient to promote preventive behaviours. Similar findings have been reported in previous studies of contact-sport athletes. (6, 11, 18) The main reasons given for not using a mouthguard were the perception that its use was unnecessary, as well as difficulties related to breathing and communication. These barriers have also been identified in the literature and may negatively influence athletes' adherence to preventive measures. (6, 18, 27)

Among the athletes who reported using mouthguards, prefabricated mouthguards were the most used type (78.4%). This may partly explain the discomfort reported by some participants, as custom-made mouthguards are generally associated with a better fit, greater comfort and less interference with breathing and communication during sports practice. (19, 27)

One of the most relevant findings of the present study was the significant association between the recommendations made by dentists ($p < 0.001$) and sports clubs ($p = 0.019$) and the use of mouthguards among athletes. Both sources of advice were found to have a positive impact on athletes' adherence to mouthguard use. However, this association appeared stronger among athletes who received guidance from dentists, highlighting the particularly important role of oral health professionals in promoting preventive behaviours and raising awareness of sports-related orofacial injuries. Nevertheless, the influence of clubs was also significant, reinforcing the importance of sports organisations in promoting oral health education and injury prevention strategies. Similar results have been reported in previous studies, which demonstrated that guidance and educational initiatives positively influence the regular use of mouthguards among athletes. (18, 19, 27)

Despite the high prevalence of orofacial injuries observed in this study, almost no athletes reported receiving training or instruction on this topic at their clubs, and no one reported receiving information from the federation. These results reveal a significant gap in preventive and educational initiatives within roller hockey organisations. Similar shortcomings have been described in the literature, where limited education on sport-related orofacial injuries has been associated with lower adherence to preventive measures and inadequate emergency management. (6, 18, 27) In contrast, many parents and guardians considered education on orofacial trauma to be important, demonstrating a positive attitude towards preventive strategies and highlighting the growing awareness of the

need for educational initiatives aimed at athletes, families and coaching staff. These findings agree with previous studies reporting that parents and caregivers generally recognise the importance of prevention an education in reducing the incidence and severity of sports-related orofacial injuries. (12, 23)

Although than half of the athletes reported knowing that an avulsed tooth can be reimplanted (56.5%), important gaps in knowledge regarding the emergency management of dental avulsion were still observed, particularly among members of the technical staff. Several participants reported inappropriate storage methods (15.7%), such as placing the tooth in paper or a napkin, which may compromise periodontal ligament cell viability and negatively affect the prognosis of tooth reimplantation. (28, 29) These findings agree with the study by van Vliet et al., which also reported insufficient knowledge regarding the management of dental avulsion and highlighted the frequent use of incorrect storage methods in sports settings.(30) Since tooth avulsion is considered a true dental emergency, these results reinforce the need for greater practical education and training among athletes, coaching staff and caregivers to ensure an adequate immediate response and improve long-term prognosis. (23, 27, 31)

Most parents and guardians considered roller hockey to be a high-risk sport for orofacial injuries, demonstrating an awareness of the potential dangers associated with playing the sport. Furthermore, the vast majority recognised the importance of education and preventive strategies regarding orofacial trauma. These findings are consistent with previous studies indicating that parents and guardians generally support preventive measures and play an important role in promoting safer behaviour among young athletes. (12, 23)

The suggestions put forward by the participants further emphasised the importance attached to preventive strategies in roller hockey. The most frequently proposed measures included the mandatory use of mouthguards, the introduction of helmets or face masks for outfield players in youth categories, and the development of educational and awareness-raising initiatives on orofacial trauma. These results highlight the growing recognition, among athletes, parents and coaching staff, of the need to strengthen preventive approaches in this sport. In this context, the implementation of regular educational campaigns and practical training programmes can help to improve knowledge and the management of emergencies related to orofacial injuries. Furthermore, the

integration of dentists into sports clubs could play an important role in promoting oral health education, increasing athletes' adherence to the use of mouthguards and supporting the prevention of sports-related injuries. Similar recommendations have been described in the literature, particularly regarding the positive impact of educational interventions and preventive policies in contact sports. (18, 19, 27)

Although this study provides valuable data that help to characterise knowledge and attitudes regarding orofacial injuries in roller hockey, it is important to acknowledge certain limitations. The non-random sampling method used in this study and the moderate sample size (n = 272) may limit its external validity. With the aim of minimising the limitation of sample size and broadening the sample, the questionnaire was distributed via various clubs and social media platforms and included different groups involved in roller hockey, which helped to increase the diversity of the sample. Furthermore, data collection was carried out over a three-month period to maximise participation. Additionally, reliance on a questionnaire and self-reported practices introduces responses bias and recall bias, as participants may not accurately recall previous traumatic events or preventive behaviours.

Despite these limitations, our findings are consistent with and reinforce previous literature, suggesting that roller hockey continues to face significant challenges regarding the prevention and management of orofacial injuries. Our data emphasise the need to strengthen educational programmes targeting athletes, coaching staff and parents/guardians, promote greater involvement of dental professionals in sporting contexts, and encourage the implementation of preventive strategies and policies aimed at improving mouthguard use and emergency management of dental trauma.

Future research should involve larger and more representative samples and explore the effectiveness of educational interventions aimed at improving knowledge and preventive behaviours regarding orofacial trauma in roller hockey. In addition, longitudinal studies are needed to evaluate whether increased education, greater involvement of dental professionals and stronger mouthguard policies may contribute to reducing the incidence and severity of sports-related orofacial injuries.

Conclusions

Despite high awareness of mouthguards and the recognised importance of prevention, this study revealed significant gaps in education, preventive practices and the management of emergencies related to orofacial trauma among athletes, coaching staff and parents involved in roller hockey. Although most participants recognised roller hockey as a high-risk sport and demonstrated positive attitudes towards preventive strategies, the use of mouthguards remained limited and formal education provided by clubs and federations was scarce.

The results highlight the need for interventions that go beyond mere awareness-raising. Educational programmes, practical training on dental emergencies and greater involvement of oral health professionals in the sporting context are essential to improve knowledge and reinforce preventive behaviours. Furthermore, promoting the use of mouthguards and implementing preventive policies can help reduce both the incidence and severity of sport-related orofacial injuries.

Ultimately, strengthening education, prevention and institutional support in roller hockey is essential to promote safer participation in sport and improve the management of orofacial trauma.

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APPENDIX

APPENDIX 1

(Questionnaire)

Traumatismos orofaciais em atletas de hóquei em patins: Caracterização dos conhecimentos e atitudes

O meu nome é Joana Carvalho Rodrigues, sou estudante do Mestrado Integrado em Medicina Dentária, da Faculdade de Medicina Dentária da Universidade do Porto, e, no âmbito da dissertação da minha Tese de Mestrado, estou a realizar um estudo para Caracterizar os Conhecimentos e Atitudes em Traumatismos Orofaciais no Hóquei em Patins.

O presente estudo tem como objetivo caracterizar o conhecimento dos atletas, equipa técnica e encarregados de educação relativamente a traumatismos orofaciais que possam ocorrer durante treinos e jogos de Hóquei em Patins, assim como formas de os prevenir e como intervir.

A participação no estudo é voluntária e anónima, todos os participantes terão de ter uma idade igual ou superior a 16 anos. Os dados recolhidos serão tratados com caráter científico pela estudante.

Ao preencher este questionário consente com o tratamento dos dados recolhidos, podendo interromper a sua participação em qualquer momento do estudo. O questionário encontra-se implementado através da Plataforma LimeSurvey, disponibilizada pela Universidade do Porto.

Ao longo do inquérito não haverá solicitação de dados que o(a) permitam identificar. Agradeço a disponibilidade e cooperação!

Existem 39 perguntas neste questionário.

Categorização dos Participantes

Estou a responder a este questionário porque sou *

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Jogador de Campo
- ◯ Guarda-redes
- ◯ Treinador
- ◯ Dirigente
- ◯ Equipa Médica
- ◯ Encarregado de Educação

Questionário para Atletas

Idade *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Por favor, escreva aqui a sua resposta:

Sexo *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Feminino
- ◯ Masculino
- ◯ Prefiro não revelar
- ◯ Outro

Há quantos anos pratica Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Menos de 1 ano
- ◯ 1 a 5 anos
- ◯ 5 a 10 anos
- ◯ Mais de 10 anos

Com que frequência visita o seu Médico Dentista? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ De 6 em 6 meses
- ◯ 1 vez por ano
- ◯ Apenas quando sinto alguma dor
- ◯ Raramente
- ◯ Outro [ ]

Tem acompanhamento regular por um Médico Dentista no seu Clube? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

O seu Médico Dentista tem conhecimento que pratica Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não
◯ Não sei

Já sofreu alguma lesão na região da face, cabeça ou dentes durante um treino ou jogo de Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Introduza comentários apenas quando escolher uma resposta
Por favor, selecione todas as que se aplicam e forneça um comentário:

☐ Sim. Qual a(s) região(ões)?

☐ Não

Sabe o que é um protetor bucal (goteira de proteção)? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

Alguma vez foi aconselhado pelo seu Médico Dentista a utilizar um protetor bucal? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

Alguma vez foi aconselhado pelo seu clube a utilizar um protetor bucal? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

Se sim, qual o tipo de protetor bucal que utiliza? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Individualizado, feito em consultório dentário
- ◯ Pré-fabricado, adquirido numa loja de desporto
- ◯ Não utilizo

Durante a utilização do protetor bucal qual(ais) a(s) principal(ais) limitação(ões) que identifica? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Assinale todas as que se aplicam
Por favor, selecione **todas** as que se aplicam:

- ☐ Dificuldade na respiração
- ☐ Dificuldade na comunicação
- ☐ Desconforto ao fechar a boca
- ☐ Salivação excessiva
- ☐ Nenhuma
- ☐ Não utilizo
- ☐ Outro: _____

Costuma higienizar o seu protetor bucal? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Nunca
- ◯ Uma vez por semana
- ◯ Raramente
- ◯ Após cada utilização

Se perder um dente durante um treino ou jogo, onde se deve dirigir? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Hospital
- ◯ Médico Dentista
- ◯ Enfermeiro do Clube
- ◯ Outro [ ]

Se durante um jogo ou treino perder um dente íntegro acha possível voltar a colocá-lo no mesmo local? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Sim
- ◯ Não
- ◯ Não sei responder

Se respondeu sim, onde e como o guardaria? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Assinale todas as que se aplicam
Por favor, selecione **todas** as que se aplicam:

- ☐ Não é necessário guardar, pois não é possível voltar a colocá-lo
- ☐ Guardaria o dente num papel ou guardanapo
- ☐ Lavaria e desinfetava o dente
- ☐ Colocava o dente num recipiente com leite
- ☐ Colocaria o dente na boca no mesmo local
- ☐ Não sei responder
- ☐ Outro: _____

Se durante um treino ou jogo fraturar um dente, qual a atitude que considera mais correta? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Não fazer nada e visitar o Médico Dentista para restaurar o dente
- ◯ Procurar o fragmento e levá-lo ao Médico Dentista
- ◯ Nenhuma das atitudes é correta
- ◯ Não sei responder

Alguma vez recebeu formação sobre como atuar ou prevenir lesões na região da face? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Sim
- ◯ Não

Se sim, obteve: *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Assinale todas as que se aplicam
Por favor, selecione **todas** as que se aplicam:

- [ ] Por parte do Clube
- [ ] Por parte da Federação
- [ ] Online
- [ ] Através de um Médico Dentista
- [ ] Nunca recebi qualquer formação
- [ ] Outro:

De forma breve, indique estratégias que poderiam ser aplicadas para melhorar a prevenção e reduzir a ocorrência de lesões orofaciais durante a prática da modalidade. *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
(G02Q02.NAOK == "AO01" or G02Q02.NAOK == "AO02")

Por favor, escreva aqui a sua resposta:

Questionário para Equipa Técnica

Sabe o que é um protetor bucal? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Treinador' *ou* 'Dirigente' *ou* 'Equipa Médica' na pergunta ' [G02Q02]'
(Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

Relativamente ao uso de protetores bucais, o clube a que pertence: *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Treinador' *ou* 'Dirigente' *ou* 'Equipa Médica' na pergunta ' [G02Q02]'
(Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Obriga os atletas a usarem
◯ Recomenda os atletas a usarem
◯ Não obriga nem recomenda os atletas a usarem
◯ Não tenho conhecimento

O Clube a que pertence já ofereceu alguma formação sobre a importância do uso de protetor bucal? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Treinador' *ou* 'Dirigente' *ou* 'Equipa Médica' na pergunta ' [G02Q02]'
(Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não
◯ Não tenho conhecimento

Já procurou saber mais informações sobre protetores bucais para consciencializar os seus atletas sobre a saúde oral e a sua prevenção? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Treinador' *ou* 'Dirigente' *ou* 'Equipa Médica' na pergunta ' [G02Q02]'
(Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

Se durante um jogo ou treino, um dos atletas perdesse um dente, o que lhe aconselharia a fazer? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Treinador' *ou* 'Dirigente' *ou* 'Equipa Médica' na pergunta ' [G02Q02]'
(Estou a responder a este questionário porque sou)

Assinale todas as que se aplicam
Por favor, selecione **todas** as que se aplicam:

- [ ] Chamar a equipa médica do clube
- [ ] Guardar o dente num papel ou guardanapo e encaminhar o atleta para um Médico Dentista
- [ ] Pedir ao atleta que coloque o dente na boca no mesmo local
- [ ] Direcionar o atleta para um Hospital o mais rápido possível
- [ ] Não saberia como atuar
- [ ] Outro: _____

De forma breve, indique estratégias que poderiam ser aplicadas para melhorar a prevenção e reduzir a ocorrência de lesões orofaciais durante a prática da modalidade. *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Treinador' *ou* 'Dirigente' *ou* 'Equipa Médica' na pergunta ' [G02Q02]'
(Estou a responder a este questionário porque sou)

Por favor, escreva aqui a sua resposta:

Questionário para Encarregados de Educação

Há quantos anos o(a) seu (sua) filho(a) pratica Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Há menos de 1 ano
◯ Há 1 a 5 anos
◯ Há 5 a 10 anos
◯ Há mais de 10 anos

O Médico Dentista do(a) seu(sua) filho(a) tem conhecimento que o mesmo pratica Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não
◯ Não sei

O (A) seu (sua) filho(a) utiliza protetor bucal durante os treinos e jogos de Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Não utiliza
◯ Apenas durante os treinos
◯ Apenas durante os jogos
◯ Durante os treinos e os jogos

O(A) seu(sua) filho(a) já sofreu alguma lesão na região da face, cabeça ou dentes durante um treino ou jogo de Hóquei em Patins? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Introduza comentários apenas quando escolher uma resposta
Por favor, selecione todas as que se aplicam e forneça um comentário:

☐ Sim. Qual a(s) região(ões)?

☐ Não

No que diz respeito às lesões orofaciais, considera que o Hóquei em Patins é um desporto: *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ De baixo risco
◯ De risco moderado
◯ De risco elevado

Já recebeu informações por parte do clube do(a) seu(sua) filho(a) sobre a prevenção de lesões orofaciais durante a prática da modalidade? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

◯ Sim
◯ Não

Se respondeu sim, em que formato? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Assinale todas as que se aplicam
Por favor, selecione **todas** as que se aplicam:

- ☐ Sessão formativa
- ☐ Folheto/Cartazes informativos
- ☐ Online (email, redes sociais, etc)
- ☐ Não recebi qualquer formação
- ☐ Outro: _____

Considera importante que os atletas recebam mais informação sobre a prevenção de lesões orofaciais? *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Escolha uma das seguintes respostas
Por favor, selecione **apenas uma** das seguintes opções:

- ◯ Sim, os atletas têm pouco conhecimento
- ◯ Não, já têm informação suficiente

De forma breve, indique estratégias que poderiam ser aplicadas para melhorar a prevenção e reduzir a incidência de lesões orofaciais durante a prática da modalidade. *

Responda a esta pergunta apenas se as seguintes condições são verdadeiras:
A resposta for 'Encarregado de Educação' na pergunta ' [G02Q02]' (Estou a responder a este questionário porque sou)

Por favor, escreva aqui a sua resposta:

Entrega do questionário

Pretende submeter a(s) sua(s) resposta(s)? *

Assinale todas as que se aplicam
Por favor, selecione **todas** as que se aplicam:

☐ Sim

Obrigada pela disponibilidade e cooperação!

Submeta o seu inquérito.
Obrigado por ter concluído este inquérito.