

Attitudes and opinions towards the prevention of orofacial injuries among water polo coaches in Catalonia: A cross-sectional study

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Abstract

Background/Aim: Although orofacial injuries are frequent in water polo, fewer than 10% of players use mouthguards. The aim of this study was to determine the degree to which coaches and sports club managers encourage mouthguard use in water polo and to explore their opinions regarding other strategies designed to reduce the prevalence of orofacial injuries.

Material and Methods: This was a cross-sectional study in which the coaches and sports club managers of 16 water polo clubs in Catalonia were invited to participate. An online questionnaire was administered to the coaches to obtain general data, to determine whether they had recommended mouthguard use to their players and to record their opinions on other strategies designed to reduce the prevalence of orofacial injuries. Sports club managers were interviewed about the facilities offered by their clubs for players to obtain mouthguards and about their attitudes regarding the prevention of orofacial injuries.

Results: The questionnaire was administered to 72 coaches who trained 111 teams during the 2019-2020 season, together with 14 sports club managers. Coaches of only 11 teams (10%) recommended mouthguard use to their players. Two clubs (14%) offered some facilities to their players to obtain mouthguards. Interestingly, only 18% of the coaches believed that mouthguard use should be mandatory, in contrast to 50% of the sports club managers ($p = 0.017$; Fisher's exact test). Most coaches and sports club managers believe that a video monitoring system should be used to identify dangerous play and that orofacial injuries should be reported under a surveillance programme.

Conclusions: Few water polo coaches recommend mouthguard use to their players and very few clubs offer facilities to obtain custom-made oral protection. However, most coaches and sports club managers agree that the rules should be modified to protect players from aggressive play.

KEYWORDS

coach, mouthguards, prevention, traumatic dental injury, water polo

1 | INTRODUCTION

More than a billion living people are reported to have sustained a traumatic dental injury, of which a significant percentage are caused while playing sport.^{1,2} Water polo is a contact sport that has seen a growth in popularity not just in Europe but also in the United States, Canada, Asia and Australia. As head injuries are relatively frequent, the sport has been classified as a moderate risk factor for orofacial trauma.³⁻⁶ Recently, it was reported that 20%–60% of water polo players in Croatia, Switzerland and Catalonia had suffered at least one orofacial injury at some point in their careers.⁷⁻⁹ Therefore, adequate preventive measures may enhance players' health and performance. Preventive measures such as the use of mouthguards, encouraging a less aggressive way of playing and the introduction of an orofacial injury surveillance programme might not only reduce the incidence and severity of orofacial injuries, but also improve the understanding of their causes.^{5,10}

The use of an appropriate mouthguard can reduce the prevalence and severity of orofacial injury in contact sports in general.¹¹⁻¹³ Although the American Dental Association has recommended that water polo players use a properly fitted mouthguard,¹⁴ fewer than 10% of players from Croatia, Switzerland and Catalonia actually do so during training or competition.⁷⁻⁹ Players commonly report that mouthguards interfere with breathing, speaking or aesthetics, that they do not consider them necessary, and that they were not advised to wear one.^{7-9,15} It is known that the beliefs and advice of coaches about mouthguard use greatly influence the decisions of players and their parents.^{16,17} The National Athletic Trainers' Association recommends that coaches should be educated regarding the importance of wearing a properly fitted mouthguard and should encourage athletes to wear them during activities associated with an increased risk of orofacial injury.¹⁸ Therefore, the design of effective educational campaigns will depend heavily on the commitment of coaches to supporting mouthguard use. Clubs also play an important role in facilitating access to effective and inexpensive mouthguards.

A review of competition rules for water polo, seeking to minimize aggressive play and to apply these rules strictly, could reduce the incidence and the severity of contact injury.⁵ In addition, the use of a video monitoring system to identify dangerous play during or after the match may act as a deterrent.⁵ In rugby and ice hockey, the mandatory use of oral protection has been associated with a fall in orofacial injuries,^{19,20} and several authors have called for mouthguard use in water polo competitions to be compulsory.^{5,7-9,15} Finally, injury and illness surveillance was conducted successfully during the water polo events organized by the Fédération Internationale de Natation (FINA) World Championships and Olympic Games.⁵ Therefore, prospective injury surveillance in other competitive and non-competitive periods could improve the quality of injury data and help to design more effective prevention strategies.^{5,10}

It is important to record the attitudes and knowledge of water polo coaches and their clubs regarding mouthguard use in order to implement injury surveillance programmes and to possibly also introduce changes in the rules of the sport.²¹ Higher levels of

agreement between coaches and sports club managers would be expected to improve the efficiency of these preventive strategies. The main aim of this study was to determine the degree to which water polo coaches and sports club managers encourage mouthguard use. Secondary aims were to identify the profile of coaches who are most likely to recommend the use of oral protection to their players and to explore the opinions of coaches and sports club managers regarding possible changes in the rules and the implementation of a prospective injury surveillance programme.

2 | MATERIAL AND METHODS

Water polo coaches and sports club managers of 16 Catalan clubs were invited to participate in this cross-sectional study. These 16 clubs were selected because they have a large number of competitive water polo teams and because of their location in and around the metropolitan area of Barcelona. The inclusion criterion for coaches was training at least one team from among the under-10 's, under-12 's, under-14 's, under-16 's, under-18 's or seniors during the 2019-2020 season. The only inclusion criterion for sports club managers was that they had to have held this position during the same season. Participants for whom relevant data were missing were excluded from the study. All coaches and managers were informed in detail about the nature of the study, the goals and the use of personal data. They all gave their consent to participate. The protocol was approved by the local ethics committee (Code 21/2020). All the procedures were carried out in accordance with the principles of the Helsinki Declaration, and the STROBE statement was followed in reporting the study results.²²

The online questionnaire was administered to each coach using the Google Forms platform between 18 April and 22 June 2020 (Table 1). The questionnaire included demographic information (e.g. age, gender and years as a coach) and questions about their own careers as players (i.e. experience with a mouthguard and orofacial injuries) and as coaches (i.e. the education received about orofacial injuries and their prevention), about whether they recommended mouthguard use to their players and the number and types of orofacial injuries they had observed in their players during the 2019-2020 season. Sports club managers were interviewed by phone using a semi-structured interview that recorded general information (e.g. gender, age, and years as a sports club manager) and whether the club offered facilities for their players to obtain mouthguards. Both groups were asked four questions regarding strategies for preventing orofacial injury: (1) whether mouthguard use should be mandatory in water polo competitions, (2) whether aggressive play should be punished more severely, (3) whether video monitoring should be used to identify dangerous play during or after matches, and (4) whether orofacial injury surveillance should be implemented.

The sample size was estimated as 68, with a 95% confidence interval, a precision of $\pm 10\%$, an estimated dropout rate of 10%, an expectation that about half of the coaches would recommend mouthguard use and considering the total number of water polo coaches in Catalonia

TABLE 1 The questionnaire for coaches

Club: _____ Age: _____ years Gender: _____ Years as a coach _____

When you were a player

Did you ever suffer dental trauma while playing water polo? _____

Did you ever see a teammate suffering a dental trauma while playing water polo? _____

| | Prefabricated | Boil and bite | Custom-made |
|--|---------------|---------------|-------------|
| Have you ever tried a mouthguard? Yes or No If yes, which type? | | | |
| Did you usually use it? Yes or No? | | | |

As a coach

Did you receive any type of education regarding orofacial injuries and their prevention with mouthguard? _

How many teams have you coached this 2019-2020 season? _____

FOR EACH TEAM YOU HAVE BEEN COACHING

Category by age: _____ Category by gender: _____ Number of players: _____

Have you recommended mouthguard use to your players? _____

If not, why not? Please check more than one answer if necessary

| | |
|--------------------------|--|
| <input type="checkbox"/> | It didn't cross my mind |
| <input type="checkbox"/> | They aren't necessary |
| <input type="checkbox"/> | They might interfere with athletic performance |
| <input type="checkbox"/> | It's difficult to get one |
| <input type="checkbox"/> | They aren't effective |
| <input type="checkbox"/> | Other _____ |

If yes, which type or types? Which activity?

| | |
|--------------------------|------------------------|
| <input type="checkbox"/> | Prefabricated |
| <input type="checkbox"/> | Boil and Bite |
| <input type="checkbox"/> | Custom-made |
| <input type="checkbox"/> | Training only |
| <input type="checkbox"/> | Competition only |
| <input type="checkbox"/> | Training and competing |

How many orofacial injuries have the players on this team suffered during the season?

| | None | 1-4 | 5 or more |
|--|------|-----|-----------|
| Number of dental fractures | | | |
| Number of dental luxations | | | |
| Number of dental avulsions | | | |
| Soft tissue injuries with bleeding | | | |
| Number of episodes of temporomandibular pain | | | |

How do you feel about changing some of the rules of competition?

| | NO | YES |
|--|----|-----|
| Do you agree that the use of mouthguard should be mandatory? | | |
| Do you agree that the Game Video Monitoring System should be used to identify dangerous conduct during or after matches? | | |
| Do you agree that referees should punish aggressive actions more harshly? | | |
| Do you agree that an orofacial injury surveillance program should be implemented? | | |

to be 180.²¹ Coaches' ages and years of experience were non-normally distributed ($p = 0.004$ and $p = 0.001$, respectively; Shapiro-Wilk). They were categorized into two groups applying cut-off points of 31 years old ($\leq 31 / > 31$ years) and 11 years' experience ($\leq 11 / > 11$ years), respectively, based on the median. Chi-square or Fisher's exact and one-sample binomial tests were used to assess the significance of associations between participants' characteristics and their recommendations on mouthguard use or their opinions on changing the rules. A p value of ≤ 0.05 was considered statistically significant. Data analysis was undertaken using IBM SPSS version 25 (IBM Corp).

3 | RESULTS

Of the 16 clubs invited, 15 agreed to participate in the study and one did not respond (Table 2). In total, 78 completed questionnaires were

received, of which six were excluded due to duplication. Therefore, 72 coaches of the 125 invited were included in this study, constituting a response rate of 57.6%. Fourteen managers of the 15 participating clubs agreed to participate in the interview - one declined but did not provide a reason. The general characteristics of the participants are summarized in Table 2. Coaches and managers had median ages of 31.5 years (interquartile range [IQR] 23-42) and 43 years (IQR 30-52), respectively, and median times of experience of 10 years (IQR 3-20) and 5 years (ICR 3-10), respectively.

All coaches had previously been water polo players. Twenty-six (36%) had suffered dental injuries, and 60 (83%) reported having seen a teammate suffer a dental injury. However, only 17 coaches (24%) had ever tried a mouthguard during their playing career, and only five (7%) had used theirs regularly. During their time as coaches, only five (7%) reported having received information about orofacial injuries and their prevention with mouthguard use. Interestingly, three

TABLE 2 General characteristics and experience of the coaches and sports club managers

| Characteristics | Coaches (n = 72) | Sports club managers (n = 14) |
|--|------------------|-------------------------------|
| Gender | | |
| Male | 62 (86.1) | 14 (100) |
| Female | 10 (13.9) | 0 (0) |
| Age | | |
| 18-31 years old | 36 (50.0) | 5 (35.7) |
| 32-70 years old | 36 (50.0) | 9 (64.3) |
| Experience with traumatic dental injuries^a | | |
| Suffering dental injury as a player | 26 (36.1) | |
| Seeing dental injury as a player | 60 (83.3) | |
| Experience with mouthguard as a player^a | | |
| No | 55 (76.4) | |
| Prefabricated | 0 (0) | |
| Mouth-formed | 9 (12.5) | |
| Custom-made | 8 (11.1) | |
| Club | | |
| CN Rubí | 9 (12.5) | 1 (7.1) |
| CE Mediterrani | 8 (11.1) | 1 (7.1) |
| CN Catalunya | 8 (11.1) | 1 (7.1) |
| CN Mataró | 6 (8.3) | 1 (7.1) |
| CN Sant Feliu | 6 (8.3) | 1 (7.1) |
| CN Sabadell | 5 (6.9) | 1 (7.1) |
| CN Sant Andreu | 5 (6.9) | 1 (7.1) |
| UE Horta | 5 (6.9) | 1 (7.1) |
| CN Poble Nou | 4 (5.6) | 1 (7.1) |
| CN Barcelona | 4 (5.6) | 1 (7.1) |
| CN Sant Adrià | 4 (5.6) | 1 (7.1) |
| CN A Barceloneta | 3 (4.2) | 0 (0) |
| AE Santa Eulàlia | 3 (4.2) | 1 (7.1) |
| CN Terrassa | 2 (2.8) | 1 (7.1) |
| CN Montjuic | 0 (0) | 1 (7.1) |
| CN L'Hospitalet | 0 (0) | 0 (0) |
| Experience as a coach or sports club manager | | |
| 1-10 years | 38 (52.8) | 11 (78.6) |
| 11-40 years | 34 (47.2) | 3 (21.4) |
| Education about orofacial injuries or mouthguard | | |
| No | 67 (93.1%) | |
| Yes | 5 (6.9%) | |

Note: are reported as number (%) of coaches or sports club managers.

^aQuestions about their own careers as players.

of the five coaches (60%) who received information about mouthguards recommended them to their players, compared with four out of 67 (6%) who had received no information ($p = 0.005$; Fisher's exact test). Coaches' age, years of experience, having suffered dental

trauma and having tried a mouthguard were positively associated with recommending mouthguard use ($p = 0.014$; $p = 0.003$; $p = 0.05$; $p = 0.01$; chi-square or Fisher's exact test, respectively).

The 72 coaches who participated reported training 130 teams between them during the 2019-2020 season (1-4 teams per coach). Complete data were available for 111 teams, and for 1666 players, corresponding to 15 categories by age and gender (Table 3). Players of 11 teams (10%; 95% confidence interval 4%-16%) had been advised to use a mouthguard by their coaches while the players of the other 100 teams had not ($p < 0.001$; one-sample Binomial test) (Figure 1). Of the 11 teams that received this advice, three (27%) were encouraged to use an auto-adapted type and 8 (73%) a custom-made mouthguard. Among these 11 teams, five (46%) did so for both training and competition, three (27%) for training only and three (27%) for competition only. The main reasons for not recommending mouthguard use were as follows: the coach had not considered the possibility (63%); it was considered unnecessary (25%); it might have interfered with athletic performance (6%); it was uncomfortable (5%); and it was not effective (5%). Some coaches gave more than one reason for not recommending a mouthguard. Among the 14 clubs, only one had an agreement with a dental clinic to provide mouthguards and another had participated in a research study that provided custom-made protectors. The remaining 12 offered no facilities for their players to obtain a mouthguard.

Table 4 shows the incidence of orofacial injuries in the various teams according to category and age during the 2019-2020 season. The most frequent injury type was an oral laceration, which had been sustained by at least one player in 61 (55%) teams, and episodes of temporomandibular disorder pain, which had affected at least one player in 30 (27%) teams. Traumatic dental injuries included fracture, luxation or avulsion in 11 (10%), seven (6%) and two (2%) teams, respectively.

Table 5 shows the rate of agreement among coaches and sports club managers regarding the possibility of changing certain competition rules in order to reduce the incidence of orofacial injuries. Only 18% of the coaches believed that mouthguard use should be mandatory, in contrast to 50% of sports club managers ($p = 0.017$; Fisher's exact test). In general, both coaches and managers believed that a video monitoring system could be used to identify dangerous play, that referees should punish aggressive acts more severely and that orofacial injuries should be reported under a surveillance programme.

4 | DISCUSSION

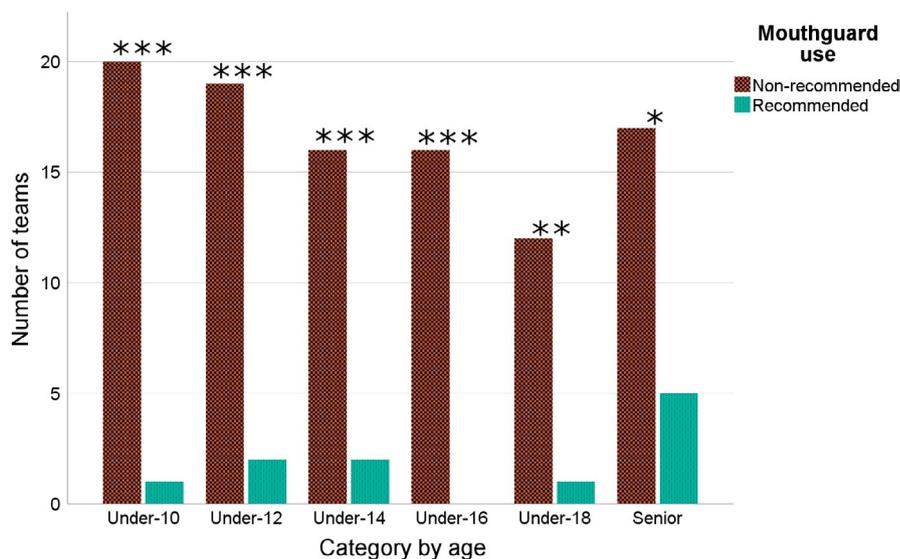
This study's results indicate that only 10% of water polo players in Catalonia had been advised to use a mouthguard by their coach. The main reasons expressed by coaches were that they had not considered the possibility, or, if they had, they deemed mouthguard use unnecessary. Coaches with more than 10 years' experience and who had received information about mouthguards were more likely to recommend their use. These results stress the need to increase

TABLE 3 Number of teams and number of players trained by coaches during the 2019-2020 season, by age and gender.

| | Female | | Male | | Both genders ^a | | TOTAL | |
|----------|--------|---------|-------|---------|---------------------------|---------|-------|---------|
| | Teams | Players | Teams | Players | Teams | Players | Teams | Players |
| Under-10 | 3 | 38 | 1 | 21 | 17 | 282 | 21 | 341 |
| Under-12 | 5 | 63 | 8 | 116 | 8 | 131 | 21 | 310 |
| Under-14 | 6 | 84 | 10 | 142 | 2 | 28 | 18 | 254 |
| Under-16 | 7 | 100 | 9 | 130 | - | - | 16 | 230 |
| Under-18 | 5 | 72 | 8 | 120 | - | - | 13 | 192 |
| Senior | 8 | 118 | 14 | 221 | - | - | 22 | 339 |
| TOTAL | 34 | 475 | 50 | 750 | 27 | 441 | 111 | 1666 |

^aCatalonia and Spain, mixed teams in terms of gender are allowed until the age of 14.

FIGURE 1 Number of water polo teams by age category and advice to use or not to use a mouthguard. *** $p \leq 0.001$; ** $p \leq 0.01$; and * $p \leq 0.05$ (one-sample binomial test).



awareness among coaches (especially younger ones) of the efficacy of mouthguards and of the benefits of custom-made mouthguards.

Coaches have a strong influence on their players' attitudes and behaviours.^{17,23} In the context of concern here, continuous motivational reinforcement by coaches could improve player's compliance with mouthguard use.¹⁶ In Croatia, 69% of water polo coaches recommend mouthguard use,²¹ but these recommendations have had little effect since only 3% of Croatian water polo players regularly wear mouthguards.⁸ It may be that, in isolation, the recommendations of coaches are necessary but not sufficient to achieve regular use. Compliance with mouthguard wearing depends largely on both the perceived efficacy and the comfort.^{24,25} It is known that custom-made mouthguards provide a better fit and offer greater protection than both mouth-formed and prefabricated mouthguards, and they also interfere less with athletic performance.^{26,27} Comfort can also be increased if the palatal margin is extended to 2 mm from the cervical line and tapered and if the buccal peripheries are rounded.^{24,28} Occlusal-accommodated mouthguards could be indicated for athletes who are more motivated to wear them or who are at higher risk of orofacial injury.²⁹

Most clubs did not provide specific facilities for their players to access a suitable mouthguard. Creating agreements between dental

clinics and clubs could make custom-made mouthguards more easily accessible and inexpensive.^{15,30} These agreements would benefit from including educational programmes through which dentists could inform coaches not only about mouthguards but also about first aid after orofacial injuries.^{21,31} In this setting, these agreements will carry greater weight if they are supported at regional level by the Council of Dentists, the two university dental schools and the federation of water polo clubs in Catalonia, with the latter under the leadership of FINA.

Half of the teams had players who had suffered at least one oral laceration during the 2019-2020 season, and almost 10% of the teams had players who had experienced trauma to a tooth. These values are similar to those reported by Catalan players for the 2016-2017 season,⁹ accounting for the interruption of training and competition due to the COVID-19 pandemic in March 2020. In studies carried out in other settings, data of this kind, including the prevalence of orofacial injuries, tend to be gathered from questionnaires administered to players, which means that the data may be biased by their memory or by subjective interpretations.⁷⁻⁹ FINA has published a consensus statement on the methodology of injury and illness surveillance, including reporting guidelines such as the STROBE Sports Injury and Illness Surveillance (STROBE-SIIS).^{10,32} This system

TABLE 4 The incidence of orofacial injury in teams by category and age during the 2019-2020 season

| | Category by age | | | | | | ALL (n = 111) | Significance ^a (p) |
|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|------------------|-------------------------------|
| | Under-10 (n = 21) | Under-12 (n = 21) | Under-16 (n = 18) | Under-18 (n = 16) | Under-18 (n = 13) | Senior (n = 22) | | |
| Crown fracture | | | | | | | | |
| No injuries | 21 (100) | 19 (91) | 15 (83) | 15 (94) | 12 (92) | 18 (82) | 100 (90) | p = 0.598 |
| 1-4 injuries | 0 (0) | 2 (9) | 3 (17) | 1 (6) | 1 (8) | 3 (14) | 10 (9) | |
| 5 or more injuries | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (4) | 1 (1) | |
| Tooth luxation | | | | | | | | |
| No injuries | 21 (100) | 18 (86) | 15 (83) | 16 (100) | 13 (100) | 21 (96) | 104 (94) | p = 0.106 |
| 1-4 injuries | 0 (0) | 3 (14) | 3 (17) | 0 (0) | 0 (0) | 0 (0) | 6 (5) | |
| 5 or more injuries | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (4) | 1 (1) | |
| Tooth avulsion | | | | | | | | |
| No injuries | 21 (100) | 21 (100) | 16 (89) | 16 (100) | 13 (100) | 22 (100) | 109 (98) | p = 0.062 |
| 1-4 injuries | 0 (0) | 0 (0) | 2 (11) | 0 (0) | 0 (0) | 0 (0) | 2 (2) | |
| 5 or more injuries | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | |
| Oral lacerations | | | | | | | | |
| No injuries | 13 (62) | 11 (52) | 6 (33) | 9 (56) | 4 (31) | 7 (32) | 50 (45) | p = 0.411 |
| 1-4 injuries | 7 (33) | 9 (43) | 9 (50) | 4 (25) | 6 (46) | 12 (54) | 47 (42) | |
| 5 or more injuries | 1 (5) | 1 (5) | 3 (17) | 3 (19) | 3 (23) | 3 (14) | 14 (13) | |
| TMD pain | | | | | | | | |
| No injuries | 16 (76) | 21 (100) | 13 (72) | 11 (69) | 8 (61) | 12 (55) | 81 (73) | p = 0.055 |
| 1-4 injuries | 4 (19) | 0 (0) | 4 (22) | 5 (31) | 4 (31) | 10 (45) | 27 (24) | |
| 5 or more injuries | 1 (5) | 0 (0) | 1 (6) | 0 (0) | 1 (8) | 0 (0) | 3 (3) | |

Note: Data are reported as number (%) of teams.

Abbreviation: TMD, temporomandibular disorder.

^aChi-square test.

| | Coaches n = 72 | Sports club manager n = 14 | Significance ^b (p) |
|---|-------------------|-------------------------------|----------------------------------|
| The mouthguard should be mandatory for competition ^a | 13 (18.3) | 7 (50) | 0.017 |
| Use an in-game video monitoring system to identify dangerous conducts during or after matches | 65 (90.3) | 14 (100) | 0.593 |
| Referees should punish aggressive actions more severely ^a | 65 (94.2) | 13 (92.9) | 0.999 |
| An orofacial injury surveillance programme should be implemented ^a | 56 (83.6) | 14 (100) | 0.197 |

Note: Data are reported as number (%) of coaches or sports club managers.

^aSome data were missing.

^bFisher exact test.

TABLE 5 Agreement with changing different rules to prevent orofacial injuries in water polo competitions

ensures the collection of accurate data about the type and location of the injury, the mechanism or causation of injury, and whether it occurred during training or competition.⁵ Assessment of risk factors

in injury surveillance projects would also facilitate the development of preventive interventions. Interestingly, most Catalan coaches and all sports club managers agreed on the need for a surveillance

protocol to be implemented. As such, collaboration with this protocol is likely to be high if it is introduced in Catalonia.

In sports, a video monitoring system can determine whether the ball has crossed the goal line or if a gross offence (e.g. an exclusion foul) has been committed.³³ The more intense the supervision, the better the adherence to the rules should be, leading to a safer environment for players.³⁴ Therefore, this new technology should be applied to make the sport safer and fairer. Coaches and sports club managers also agreed that referees should punish aggressive actions more severely. This position requires that competition rules be reviewed to change the style of the game in order to prioritize intelligent technical-tactical play over strength and aggression. Only then will it be likely that a reduction in the high rate of contact-related match injuries will be seen.^{5,33}

The mandatory use of mouthguards in rugby and ice hockey has been associated with a fall in the number of dento-facial injuries.^{19,20,30} Several authors have therefore recommended making their use mandatory in competitive water polo.^{5,7-9} The results of this study suggest that most coaches oppose this. Therefore, it may be necessary to introduce mouthguard use gradually, starting with senior competitions, especially in men's matches. Analysing subsequent data obtained by the orofacial injury surveillance programme could then lead to the wider implementation of mandatory mouthguard use by considering the causes of the injuries. If elite players start to wear mouthguards regularly, this may encourage compliance among young players.

The 72 coaches who participated in this study represented approximately half of all licensed coaches for the 2019-2020 season in Catalonia, which has a population of some 7,500,000 inhabitants. In addition, the participating water polo clubs are among the best in Spain. Many of their players, both male and female, have won recent international competitions representing clubs or nations. The coaches who participated also train teams of all age and gender categories. Despite the clubs being chosen for convenience, this sample can be considered representative of the population not only at national level but also at international level. This is one of the strengths of the study.

A possible limitation of the study is that the questionnaire was not validated and that certain questions might have been interpreted in different ways. Hence, the data accuracy may have been diminished. Finally, the age and years of experience variables were dichotomized with no specific cut-off points, which implies that it may be difficult to compare the present results with those of other studies.

In conclusion, few water polo coaches recommend mouthguard use among their players and clubs rarely offer easily accessible facilities for inexpensive, custom-made oral protectors. Although most coaches did not agree that mouthguard use should be mandatory, they agreed with sports club managers that other actions may be appropriate - for example applying the rules strictly or modifying them to protect players from aggressive play styles, applying video monitoring systems to identify dangerous conduct during or after matches and implementing an orofacial injury surveillance programme in training and competition. Implementing these measures,

while also urging dentists and clubs to facilitate educational campaigns and improved access to affordable custom-made mouthguards, may help to reduce orofacial injuries. The way to achieve a more widespread adoption of mouthguard use may start by making it mandatory for all senior competitions.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

Natalia Iglesias-Porqueras conceptualised and designed the study, collected and analysed the data, drafted the initial manuscript, and reviewed and revised the manuscript. Carla Zamora-Olave, and Eva Willaert conceptualised and designed the study, coordinated and supervised data collection, and reviewed and revised the manuscript. Jordi Martinez-Gomis conceptualised and designed the study, analysed the data, drafted the initial manuscript and reviewed and revised the manuscript.

DATA AVAILABILITY STATEMENT

Data available on request due to privacy/ethical restrictions.

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