Factors associated with mouthguard use and discontinuation among rugby players in Malaysia

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Abstract – Aims: To assess rugby players’ preferences for using a mouthguard and to determine the factors contributing to the use and discontinuation of a mouthguard. Methods: A cross-sectional study was conducted in two rugby tournaments from 2009 to 2010. Samples were selected by convenience sampling. Participants were required to complete a self-administered questionnaire, which inquired about awareness and pattern of mouthguard use, as well as reasons if discontinued. Results: Completed questionnaires were returned by 456 participants, with an estimated response rate of 77.8%. All participants were male (mean age = 22.73, SD = 3.98). Median duration of playing was 6 years, and median frequency was 6 h per week. Overall mouthguard use was low (31.1%, n = 142), especially for custom-fitted mouthguard (1.8%, n = 8), followed by stock mouthguard (7.7%, n = 35). Boil-and-bite type was most commonly used (21.1%, n = 96). Of those who wore a mouthguard before, only 28% continued using it. The discontinuation rate for each type was as follows: stock, 57.1% (P = 0.032); boil-and-bite, 80.2% (P = 0.002); and custom, 37.5% (P = 0.04). Age was a significant factor for mouthguard use (P = 0.007, OR = 1.10, 95% CI = 1.03–1.17). Breathing disturbance (OR = 3.36, 95% CI = 1.17–9.72) and general discomfort (OR = 3.71, 95% CI = 1.68–8.20) were significant factors in discontinuing mouthguard use. Conclusions: The use of mouthguard was low among rugby players. Custom-made was the least worn type, possibly due to limited availability. The use of mouthguard increased slightly with age but was discouraged by breathing interference and general discomfort. Therefore, preventive effort should focus on early education and reinforcement, as well as on the improvement of wearability and accessibility.

Introduction

Sports participants are susceptible to dental trauma. The literature reports that the percentage of sport-related dental injuries worldwide varies from 0.2% to 33.5% (1–3) but is likely to be underreported (4). The risk of injuries has been shown to increase with the age of athletes, particularly among those who take part in contact sports, in competitive matches, or long hours of training (5, 6).

Injuries involving the tooth structure, periodontal tissue, oral mucosa, and temporo-mandibular joints were usually reported (7, 8). Majority of the injuries affected the upper jaw, with the maxillary incisors being the most vulnerable (9). These injuries could have a detrimental psychological effect (10). Further, appropriate rehabilitation of this type of injury often required extensive dental procedures at very high prices with long-term care (11–14).

The rationale of mouthguard use is to provide a resilient surface for shock absorption and dissipation of impact over a wider area (15). Over decades, the use of a mouthguard has been suggested for the protection of the teeth, oral soft tissues, and jaws in athletes (15–21), but evidence is lacking in proving such claims. In a prospective study, lowered risk of dental injuries was observed when basketball players used custom-fitted mouthguards, but there was no significant effect on concussions or oral soft tissue injuries (21).

Mouthguards are typically composed of a thermoplastic copolymer, designed to fit over the occlusal surfaces of the maxillary teeth and extending near to the vestibular reflection (20). Three types of mouthguard are available in the market: stock, mouth-formed/boil-and-bite, and custom-fitted mouthguard (15, 17). Among these, boil-and-bite mouthguard is the most commonly used and widely distributed at sporting goods stores (15). However, custom-fitted mouthguards were found to be superior due to its maintenance of oral moistness and adaptation, hence causing less interference with respiration and speech, while improving comfort and limiting the nauseating effect (15, 22, 23).
Inappropriate fit and inadequate care of mouthguards could result in discomfort. In the worst case scenario, oral lesions such as erythema and hyperkeratosis are associated with direct contact between the soft tissue and the mouthguard (24).

The use of mouthguard in sports has been heavily promoted, if not mandated, especially in developed countries (25–28). The reduction of sports-related dental injuries has been documented in various reports in the United States after the National Collegiate Athletic Association mandated the use of mouthguards in five sports: boxing, football, ice hockey, men’s lacrosse, and women’s field hockey (1).

The extent and compliance of mouthguard use vary among countries (29, 30). Although many complaints were reported regarding mouthguards, the exact causes of not using a mouthguard have not been determined. Hence, the objective of this study is to assess the rugby players’ preferences for using mouthguards. The factors that contribute to the uptake and the reasons for the discontinuation of use are also presented.

Materials and Methods

Study population

This study was approved by the University Kebangsaan Malaysia’s Faculty of Dentistry Research Committee (DD/036/2009). We carried out a cross-sectional study from 2009 to 2010. The study population was rugby players in Malaysia. The samples were obtained from two tournaments organized by or affiliated to the Malaysian Rugby Union, namely COBRA Rugby 10s and Malaysian University Sports Council (MASUM) Rugby 7s. All Malaysian teams playing in the tournaments were approached. Convenience sampling was carried out. All players aged 16 or above and willing to participate in this study were included.

To avoid duplication, each team was approached only once during the entire tournament. Subjects who were playing in more than one tournament were allowed to submit only one copy of the completed questionnaire. At the data entry stage, the researchers verified from the name list that there was no repeated participation.

Data collection

Players who consented to participate in this study were given self-administered questionnaires. The questionnaire consisted of 22 questions divided into four parts: (i) demographic data, (ii) experience of dental trauma, (iii) use of a mouthguard, and (iv) knowledge on the management of dental trauma. This questionnaire set was validated and pretested in a previous study (31). The questionnaires were printed in English and Malay, the national language of Malaysia.

This paper only reports the findings on mouthguard use. Subjects were asked on the following aspects:

1. Awareness on the protective effect and types of mouthguard.
2. Experience in using a mouthguard (including frequency, occasions, and types).
3. Current use of a mouthguard and reasons if discontinued.

Awareness on the protective effect of a mouthguard was addressed by the question ‘Are you aware that mouthguard can protect you from tooth injuries? Yes or No’. Definition for each type of mouthguard was given—that is, stock (mouthguard that has been formed and cannot be modified), boil-and-bite (mouthguard that can be formed according to the shape of the arch by soaking in hot water), and custom-made (mouthguard that can only be made by the dentist).

When the participants were asked about different types of mouthguard, multiple selections were allowed as an individual player could have known about or used more than one type of mouthguard. Similarly, they could state more than one occasion of use and frequency of use at these occasions (sometimes and/or always, during practice and/or competition). The reasons for the discontinuation listed included ‘too expensive, disturb speech, uncomfortable, cause drooling, too tight, disturb breathing, nauseating, hurt gums and teeth’.

Two questions were asked to distinguish previous and current users: ‘Have you used a mouthguard before? Yes or No’ followed by ‘Are you still using a mouthguard? Yes or No’.

Statistical analysis

Data collected were analyzed using SPSS 21 (IBM Corporation, Armonk, NY, USA). First, descriptive analysis was performed for demographic data to have a general view of the sample’s age, frequency, and duration of playing, as well as highest level of representation.

Then, the pattern of use was analyzed using descriptive analysis. The purpose was to summarize the awareness on the protective effect of a mouthguard, awareness on the types of mouthguard, experience of using a mouthguard before, types of mouthguard used before, and current use.

Cross-tabulation and Fisher’s exact test were carried out to compare the discontinuation rates of different mouthguard types, using types of mouthguard used before as independent variable and current use as dependent variable. The level of significance was set at $P < 0.05$.

Logistic regression was carried out to identify the factors that predict use. Age, duration, frequency, and positions of playing were used as predictors, as identified in previous literature (5, 6). However, because of difficulty in quantitating the cross-product of frequency of use (sometimes vs always) and occasion of use (during practice vs during competition), these were not included in the model.

The players who used a mouthguard at some point in their lives were selected for subsequent analysis. The outcome of interest was binary, that is, whether or not the player continued to wear a mouthguard up to the period of study. The association between the selected reasons and the discontinuation was tested using logistic regression entry method and backward (conditional) method.

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Results

At the COBRA Rugby 10s tournament, there were 10 Malaysian teams. Using an estimated average of 17 persons per team (including five substitutes and two trainers), it was anticipated that there were 170 players from the local teams. Of these, we managed to obtain 128 participants. On the other hand, for the MASUM Rugby 7s, using an average of 13 persons per team (including four substitutes and two trainers), the probable total number of players was 416, of which 328 participated in this study. Hence, there were 456 study participants out of a projected total of 586 players, with an estimated response rate of 77.8%.

The players were all male. The mean age of the rugby players examined was 22.73 (SD = 3.98) years old. Overall median years of active playing was 6.0 (range = 1–30), and median hours playing per week was 6.0 (range = 1–40). The highest levels that players represented mostly were state level (35.7%) and inter-varsity level (29.8%).

The majority of the players (88.4%, n = 403) were aware of the protective effects of a mouthguard in reducing the impact of dental injuries. In spite of this high percentage of awareness, only about a third (n = 42) of the players reported actual use of a mouthguard.

In particular, the boil-and-bite type was most well-known (41.7%, n = 190), but actual use was at 21.1% (n = 96). Meanwhile, a total of 139 (30.5%) players reported awareness of a stock mouthguard, but only 35 (7.7%) players reported actual use of a stock mouthguard. The least known type was custom-fitted mouthguard. Only 7.0% (n = 32) of the players were aware of it, while 1.8% (n = 8) actually used it. There were 11 players (2.4%) who could not identify the type of mouthguard they used.

During competition, only 4.6% (n = 21) of the players wore a mouthguard at all times, and 23.0% (n = 105) wore it occasionally. Mouthguard use was lower during practice, in which 0.9% (n = 4) of players always wore a mouthguard, while 3.7% (n = 17) used it occasionally.

Those who have worn a mouthguard before (n = 142), 33.8% reported previous dental trauma, while 23.2% of those who have never worn a mouthguard before (n = 314) reported history of rugby-related dental injuries.

Of the players who have worn a mouthguard before, a mere 28% (n = 40) continued using mouthguard at the point of the study. For each type of mouthguard, the discontinuation rate was as follows: stock, 57.1% (P = 0.032); boil-and-bite, 80.2% (P = 0.002); custom, 37.5% (P = 0.04); and unknown, 81.8% (P = 0.728).

The distribution of players according to mouthguard use was summarized in Table 1. Logistic regression analysis was conducted to predict the current use of mouthguard, using age, duration, frequency, and positions of playing as predictors (Table 2). Further analysis using backward stepwise (conditional) method produced a more parsimonious model with only age and constant remaining in the model. The equation generated was as follows:

\[
\text{Predicted logit of (Mouthguard use)} = -4.483 + 0.091 \times \text{(Age)}
\]

Wald test demonstrated age as the only significant predictor. Between 16 and 47 years old, every year increment of age increased the odds of wearing a mouthguard about 1.09 times (95% CI = 1.03–1.17).

Predictability remained at 91.4% correct with or without the predictor. The overall test of the full model against a constant-only model was statistically significant, suggesting that the predictors as a set could be reliably distinguished between wearers and non-wearers (P = 0.011). However, the predictors did not improve the predictability of the model, as evidenced by the non-significant score test (P = 0.307). Although the non-significant Hosmer & Lemeshow goodness-of-fit test indicated that the model has adequate fit (P = 0.256), Nagelkerke’s pseudo R² was only 0.058, indicating poor fit. So, even though age was a significant predictor, it was a weak predictor of mouthguard use.

The reasons given by the 102 players who discontinued using a mouthguard are tabulated in Table 3. Breathing disturbance and general discomfort were statistically significant factors in discontinuing mouthguard use (Table 4). Breathing disturbance increased the odds of not using a mouthguard (OR = 3.36, 95% CI = 1.16–9.72). Similarly, those who complained of general discomfort had 3.71 times the odds of discontinuation (95% CI = 1.68–8.20). The parsimonious model by the backward (conditional) method was selected as it showed better fit. Thus, the equation generated was as follows:

\[
\text{Predicted logit of (Discontinuation of mouthguard use)} = -0.141 + 1.213 \times \text{(Breathing disturbance)} + 1.312 \times \text{(General discomfort)}
\]

The percentage of correct prediction was 71.8% with the null model and improved to 76.1% with the addition of these two predictors. The overall test of the model was statistically significant, indicating that the predictors as a set could reliably distinguish between current users and those who discontinued (P < 0.001). Significant score test (P = 0.011) indicated sufficient predictability, and non-significant Hosmer & Lemeshow goodness-of-fit test showed that the model has
adequate fit ($P = 0.148$), while Nagelkerke's pseudo $R^2$ was 0.159.

**Discussion**

Boil-and-bite mouthguards were better known and more widely used among the players in this study. Boil-and-bite type was popular mainly because it was commonly available and easily obtainable from sporting goods stores (16). Stock mouthguards could also be purchased; however, their restricted use might be due to limited choices of mouthguard size. On the other hand, unlike boil-and-bite and stock mouthguards, custom-fitted mouthguards require the service of a dentist. Nonetheless, it is uncertain whether such prescription is a common practice among Malaysian dentists, and the exact number of dentists who provide this service is unknown.

Stock and boil-and-bite mouthguards have major drawbacks in terms of comfort and retention. Not surprisingly, discontinuation rates are high for these two types. Custom-fitted mouthguards are superior in comfort, adaptability, and stability, at the same time creating less interference in speech and breathing (23). Hence, this explains the lower discontinuation rate of custom-fitted mouthguards. Also, it emphasizes the importance of having well-adapted mouthguards to encourage long-term compliance.

In general, it was evident that mouthguard use was low among the players, especially during practice. Also, the discontinuation rate was high (72%). Malaysian Rugby Union's rules and regulations permit, but do not enforce, the use of a mouthguard, in accordance with the International Rugby Board's laws of the game (32). It is worth knowing that when mouthguards became compulsory in New Zealand, self-reported rate

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Still using a mouthguard ($n = 40$) (%)</th>
<th>Discontinue using a mouthguard ($n = 102$) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too expensive</td>
<td>5 (12.5)</td>
<td>5 (4.9)</td>
</tr>
<tr>
<td>Disturbs speech</td>
<td>14 (35.0)</td>
<td>33 (32.4)</td>
</tr>
<tr>
<td>Disturbs breathing</td>
<td>5 (12.5)</td>
<td>32 (31.4)</td>
</tr>
<tr>
<td>General discomfort</td>
<td>19 (47.5)</td>
<td>78 (76.5)</td>
</tr>
<tr>
<td>Causes drooling</td>
<td>3 (7.5)</td>
<td>26 (25.5)</td>
</tr>
<tr>
<td>Nauseating</td>
<td>4 (10.0)</td>
<td>13 (12.7)</td>
</tr>
<tr>
<td>Hurts teeth and gums</td>
<td>1 (2.5)</td>
<td>2 (2.0)</td>
</tr>
<tr>
<td>Too tight</td>
<td>1 (2.5)</td>
<td>4 (3.9)</td>
</tr>
</tbody>
</table>

**Table 2.** Logistic regression analysis of rugby players and the use of mouthguard

<table>
<thead>
<tr>
<th>Method: entry</th>
<th>$\beta$</th>
<th>SE $\beta$</th>
<th>Wald $\chi^2$</th>
<th>df</th>
<th>$P$</th>
<th>Adjusted odds ratio $\exp(\beta)$</th>
<th>95% CI for $\exp(\beta)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-3.995</td>
<td>1.016</td>
<td>15.465</td>
<td>1</td>
<td>&lt;0.001**</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.091</td>
<td>0.041</td>
<td>4.945</td>
<td>1</td>
<td>0.025*</td>
<td>1.095</td>
<td>1.011 - 1.187</td>
</tr>
<tr>
<td>Years of playing</td>
<td>-0.002</td>
<td>0.049</td>
<td>0.001</td>
<td>1</td>
<td>0.974</td>
<td>0.998</td>
<td>0.907 - 1.099</td>
</tr>
<tr>
<td>Hours playing per week</td>
<td>-0.033</td>
<td>0.031</td>
<td>1.64</td>
<td>1</td>
<td>0.281</td>
<td>0.967</td>
<td>0.910 - 1.028</td>
</tr>
<tr>
<td>Play position</td>
<td>3.982</td>
<td>2</td>
<td>0.137</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play as Forwards</td>
<td>0.147</td>
<td>0.594</td>
<td>0.061</td>
<td>1</td>
<td>0.805</td>
<td>1.158</td>
<td>0.362 - 3.707</td>
</tr>
<tr>
<td>Play as Backs</td>
<td>-0.604</td>
<td>0.617</td>
<td>0.959</td>
<td>1</td>
<td>0.328</td>
<td>0.547</td>
<td>0.163 - 1.831</td>
</tr>
</tbody>
</table>

**Table 3.** Reasons for discontinuing mouthguard use

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Still using a mouthguard ($n = 40$) (%)</th>
<th>Discontinue using a mouthguard ($n = 102$) (%)</th>
</tr>
</thead>
</table>

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of mouthguard use improved by 26%, and a 43% reduction of rugby-related dental injury claims was reported (27). Therefore, the enforcement of such preventive measure should be considered to increase compliance and reduce morbidity. Nonetheless, this effort requires shared responsibility from officials, coaches, trainers, dentists, health-care providers, and the players (33-35).

Although dental injuries were reported more frequently among mouthguard wearers, the findings should be interpreted cautiously because the main limitation of cross-sectional study is temporality. At the point of study, the questionnaire did not distinguish between injuries obtained prior to mouthguard use and injuries during mouthguard use. Hence, causality between mouthguard use and dental trauma could not be established in this study. Mouthguard use could also be prompted after sustaining an injury. For instance, when examining use of headgear among rugby players, players who had injury within the last 2 years were more likely than their uninjured peers to cite a previous injury as a motivating factor for wearing headgear (36).

With increasing age, players would be more exposed to the idea of wearing a mouthguard. This would then increase a player’s chances of trying to use it at some point. Hence, albeit weak, age was found to be a significant factor for using a mouthguard. This finding concurred with Boffano et al. (30), which found that young players were less likely to use a mouthguard. Hence, this highlights the importance of educating players at a young age so that injury prevention can become part of the practice.

Among the players who discontinued mouthguard use, general discomfort and breathing disturbance were significant factors. Thus, the concerns for comfort and respiration should be taken into serious consideration when developing a mouthguard. Comfort might be achieved by reducing bulkiness. Also, having margins with appropriate extension and rounded smooth edge could reduce irritation of the gingival margin and oral mucosa. Respiratory interference could be reduced by creating satisfactory adaptation and inclusion of air space for breathing. Although speech disturbance, drooling and nauseating were also widely reported,

### Table 4. Logistic regression analysis of reasons for discontinuation of mouthguard use

<table>
<thead>
<tr>
<th>Method: entry</th>
<th>β</th>
<th>SE β</th>
<th>Wald χ²</th>
<th>df</th>
<th>P</th>
<th>Adjusted odds ratio exp(b)</th>
<th>95% CI for exp(b)</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.161</td>
<td>0.243</td>
<td>0.032</td>
<td>1</td>
<td>0.630</td>
<td>3.193</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too expensive</td>
<td>-0.281</td>
<td>0.074</td>
<td>0.144</td>
<td>1</td>
<td>0.704</td>
<td>0.755</td>
<td>0.177</td>
<td>3.217</td>
<td></td>
</tr>
<tr>
<td>Disturbs speech</td>
<td>-0.384</td>
<td>0.497</td>
<td>0.598</td>
<td>1</td>
<td>0.439</td>
<td>0.681</td>
<td>0.257</td>
<td>1.804</td>
<td></td>
</tr>
<tr>
<td>Disturbs breathing</td>
<td>1.224</td>
<td>0.579</td>
<td>4.471</td>
<td>1</td>
<td>0.043</td>
<td>3.399</td>
<td>1.084</td>
<td>10.566</td>
<td></td>
</tr>
<tr>
<td>General discomfort</td>
<td>1.199</td>
<td>0.458</td>
<td>6.854</td>
<td>1</td>
<td>0.009</td>
<td>3.316</td>
<td>1.352</td>
<td>8.133</td>
<td></td>
</tr>
<tr>
<td>Causes drooling</td>
<td>1.214</td>
<td>0.709</td>
<td>2.936</td>
<td>1</td>
<td>0.087</td>
<td>3.367</td>
<td>0.840</td>
<td>13.501</td>
<td></td>
</tr>
<tr>
<td>Nauseating</td>
<td>-0.683</td>
<td>0.764</td>
<td>0.799</td>
<td>1</td>
<td>0.371</td>
<td>0.505</td>
<td>0.113</td>
<td>2.257</td>
<td></td>
</tr>
<tr>
<td>Hurts teeth and gum</td>
<td>0.411</td>
<td>1.308</td>
<td>0.099</td>
<td>1</td>
<td>0.753</td>
<td>1.508</td>
<td>0.116</td>
<td>19.577</td>
<td></td>
</tr>
<tr>
<td>Too tight</td>
<td>-0.609</td>
<td>1.240</td>
<td>0.241</td>
<td>1</td>
<td>0.623</td>
<td>0.544</td>
<td>0.048</td>
<td>6.176</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method: backward (Conditional)</th>
<th>β</th>
<th>SE β</th>
<th>Wald χ²</th>
<th>df</th>
<th>P</th>
<th>Adjusted odds ratio exp(b)</th>
<th>95% CI for exp(b)</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.141</td>
<td>0.326</td>
<td>0.187</td>
<td>1</td>
<td>0.666</td>
<td>0.869</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbs breathing</td>
<td>1.213</td>
<td>0.541</td>
<td>5.021</td>
<td>1</td>
<td>0.025</td>
<td>3.363</td>
<td>1.164</td>
<td>9.716</td>
<td></td>
</tr>
<tr>
<td>General discomfort</td>
<td>1.312</td>
<td>0.404</td>
<td>10.533</td>
<td>1</td>
<td>0.001</td>
<td>3.713</td>
<td>1.681</td>
<td>8.188</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>χ²</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood ratio test</td>
<td></td>
<td>8</td>
<td>0.006**</td>
</tr>
<tr>
<td>Score test</td>
<td></td>
<td>8</td>
<td>0.011*</td>
</tr>
<tr>
<td>Goodness-of-fit test</td>
<td></td>
<td>6</td>
<td>0.026*</td>
</tr>
<tr>
<td>Hosmer &amp; Lemeshow test</td>
<td></td>
<td>6</td>
<td>0.026*</td>
</tr>
<tr>
<td>Cox and Snell R² = 0.140</td>
<td></td>
<td>6</td>
<td>0.026*</td>
</tr>
<tr>
<td>Nagelkerke R² = 0.202</td>
<td></td>
<td>6</td>
<td>0.026*</td>
</tr>
</tbody>
</table>

*P < 0.05, **P < 0.01.
these were not statistically significant factors in our sample.

The strength of this study was its attempt to quantitate and statistically test for factors contributing to uptake of mouthguard, as well as the association between reasons discouraging use and actual discontinuation. It is our hope that this information would aid in the making of evidence-based public health policies and guidelines in the future.

Nevertheless, we recognized that the cross-sectional design limited the inferences on causality. Also, the representativeness of our sample to the target population could not be ascertained. As we did not collect information on those who refused to participate, self-selection bias could not be ruled out. In addition, the models produced were far from ideal, as the fit was compromised and percentages of correct predictability were high even with the null models.

Future studies may need to test other variables to improve our understanding of the various factors affecting mouthguard use and discontinuation. Apart from that, further studies using qualitative methods such as focus groups and interviews would improve our understanding of the acceptability of such intervention (37). It would be of interest to discern the issues associated with preferences, particularly the underlying knowledge, values, and attitudes that drive decision making on the use of a mouthguard, or the lack thereof.

In conclusion, mouthguard use is low among rugby players in Malaysia. Custom-made is the least worn type, possibly because of limited availability. The use of mouthguard increases slightly with age but is discouraged by breathing interference and general discomfort. Therefore, preventive efforts should focus on early education and the reinforcement of the importance of using a mouthguard among athletes, as well as on improving wearability and accessibility to this protective equipment so that the impact of rugby-related dental injuries would be reduced.

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