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Level of information concerning dental injuries and their prevention in Swiss basketball – a survey among players and coaches

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Abstract – Basketball carries a medium risk of dental injuries. Swiss data are not available in this respect. Using a standardized questionnaire 302 basketball players from 29 Swiss teams and their 29 coaches were interviewed. The questions focused on the frequency of dental accidents, their prevention and subsequent procedure. The participating 302 players came from three divisions: semi-professional players of National League A and B (102), amateurs of Regional League 2 and 3 (100) and young people of up to the age of 18 (100). The data were evaluated in relation to division, sex and team function. Of the 331 interviewed persons 102 had already seen a dental trauma in basketball and 55 had already had a dental trauma. Only four of the interviewed persons wore mouthguards. The awareness of the procedure following a dental trauma was unsatisfactory. The results of the survey show that significantly more information and education is required in Swiss basketball not only through sports associations but also through coaches and dentists.

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Sports injuries occur frequently. Fast sports with close body contact are particularly prone to face and teeth trauma (1, 2). Up to 35% of all children and adolescents suffer accidents involving permanent teeth (3–6), particularly the front teeth of the upper jaw (7–9). Crown fractures (10–11) are the most frequent dental sports injury. Severe dental trauma requires extensive therapy and incurs substantial treatment costs (12). Most dental sports accidents would be less serious or even avoided if mouthguards were worn.

Numerous studies have shown that wearing mouthguards leads to a significant reduction in dental accidents and yet they are not widely accepted in many types of sport with close body contact. Criticism of mouthguards includes the impairment of communication during the game, breathing problems (12) and irritating aesthetics (13). This criticism is reduced if mouthguards are custom-made by dentists (14). It was possible to show that airway resistance is only insignificantly increased by a custom-made mouthguard (15).

Wearing mouthguards varies from one type of sport to the other (16,17). Basketball carries a medium dental trauma risk (7). Surveys among US basketball players show a high incidence of dental injuries, i.e. above 30% (2, 18). The cause for this high incidence is to be found in the lack of regulations or recommendations for the prevention of orofacial injuries (helmets or other protective gear) (16, 19–22). In other contact sports (ice hockey, rugby, boxing, American football) mouthguards are part of the protective gear while they are only worn occasionally in basketball. Swiss basketball data are

presently not available. Using a questionnaire in interviews with basketball players and coaches from different divisions the objective of this survey was to establish the frequency of injuries, the habit of wearing mouthguards, differences in relation to age and sex as well as the general level of information concerning procedure after dental injury and the resulting consequences.

Material and methods

Standardized interviews were conducted with 302 basketball players from 29 Swiss teams and their 29 coaches. The athletes played in three divisions: semi-professionals of National League A and B (102), amateurs of League 2 and 3 (100) and young people up to the age of 18 (Regional League) (100) (Table 1). The same number of male and female players was interviewed in three groups while the coaches constituted an independent group. The clubs were selected from north-western and central Switzerland and the individuals chosen as they became available at matches. The interview contained 15 questions (Table 2). Response classification (responses stated in brackets) was subsequently performed. The questionnaire had been validated in previous studies (13). Each player was interviewed individually to prevent a team from giving common answers. The interviews were conducted by a dentist involved in basketball coaching.

The statistical evaluation differentiated between division (National League, Amateurs, young people), sex (male/female) and team function (player, coach). The level of significance was determined to be $P < 0.05$. The non-parametric Kruskal–Wallis H-test for significant dependencies employed non-normal distribution and the SPSS/WIN 11.0 (SPSS Inc., Chicago, IL, USA) program was used for analysis.

Results

The average age of interviewed persons was 22.28 years (SD 7.75) and related to the individual groups as follows: semi-professionals/female, 25; semi-professionals/male, 23.8; amateurs/female, 24.7; amateurs/male, 26.6; young people/female, 16.8; young people/male, 17.6.

Table 1. Segmentation of interviewed basketball players according to sex, division and team function

Status	Sex	Division	No. of players
Semi-professionals	Male	National League A/B	51
Semi-professionals	Female	National League A/B	51
Amateurs	Male	League 2/3	50
Amateurs	Female	League 2/3	50
Young people	Male	Regional League	50
Young people	Female	Regional League	50
Coaches	Male/female		29
Total			331

To the question 'Have you ever seen a dental injury in basketball'? (as player/coach, not as a spectator) 102 of 331 interviewed persons replied yes and 229 no (Fig. 1). Coaches (21/29) observed 2.7 times more dental injuries than players (81/302) ($P < 0.001$). The comparison of divisions shows that most of the dental accidents were seen in the men's National League A/B (33/55) ($P < 0.001$). Of the interviewed persons 71 had observed a crown fracture, 14 an avulsion, 11 a dislocation and four a combined injury (Fig. 2).

Of 331 interviewed persons – including coaches as they had been and partly still were active players – 55 (16.6%) had suffered a dental trauma themselves (Fig. 3), i.e. 42 crown fractures, seven dislocations, four combined injuries and two avulsions. Men (38/174) had clearly had more dental accidents than women (17/157) ($P = 0.005$). Players of higher divisions had suffered more dental accidents than amateurs which might be due to the former division practising and playing for longer time periods. The least dental accidents had been experienced by female young people ($P = 0.012$). The coaches (9/29) had had twice as many dental injuries as players (46/302) ($P = 0.029$).

Merely 172 of 331 interviewed persons (51.9%) knew that an avulsed tooth could be replanted. Women (90/157) were altogether better informed than men (82/174) ($P = 0.039$) in this respect. Of 29 coaches 15 were able to answer this question in the affirmative. No statistical difference was found between divisions ($P = 0.449$) or team functions ($P = 0.978$).

The question 'Within which period of time must a tooth be replanted according to your opinion'? prompted an average of 20 h and 15 min. Details of time varied greatly (5 min–2 months, SD 97.8 h, median 2 h). Statistical differences concerning division ($P = 0.079$), sex ($P = 0.199$) and team function ($P = 0.992$) could not be determined.

Of the interviewed persons (238/331) 71.9% knew that the success of replantation depended on immediate action. The coaches were strikingly well informed (22/29). Among the players, those of National League A/B were best informed ($P = 0.031$). The tooth rescue box (Dentosafe®, Medice, Iserlohn, Germany; and EMT Tooth saver, Smartpractice.com, Phoenix, AZ, USA), in which avulsed teeth can be kept cell-physiologically, was more known to coaches (5/29) than players (17/302) ($P = 0.017$). The coaches were also better informed on the local dentist emergency service than the

Table 2. Questionnaire

1. Have you ever seen a dental injury in basketball?
2. If yes, what kind of dental injury? (avulsion, crown fracture, dislocation)
3. Have you ever experienced a dental injury yourself?
4. If yes, what kind of dental injury? (avulsion, crown fracture, dislocation)
5. Do you know that it is possible to replant an avulsed tooth?
6. In your opinion, within which period of time a tooth must be replanted?
7. Are you aware that immediate action is essential for a successful outcome?
8. Do you know a tooth rescue box?
9. Do you know the dentist emergency service?
10. Do you know that an avulsed tooth has to be searched for legal reasons?
11. In your opinion, how high are the life-long subsequent costs for a lost anterior tooth?
12. Do you know a mouthguard?
13. Which kind of mouthguard do you know? (stock, custom-made)
14. Do you wear a mouthguard?
15. If not, why? (communication, breathing, aesthetic, others)

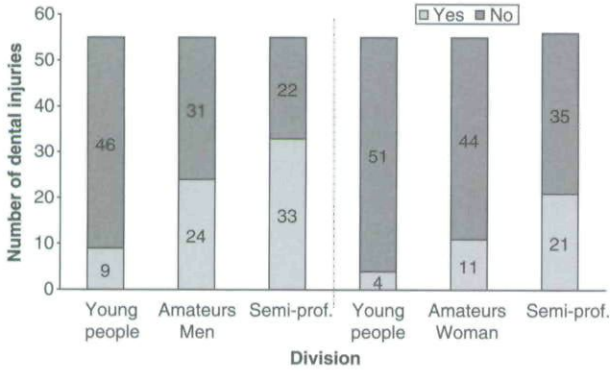

Fig. 1. Players having observed a dental accident.

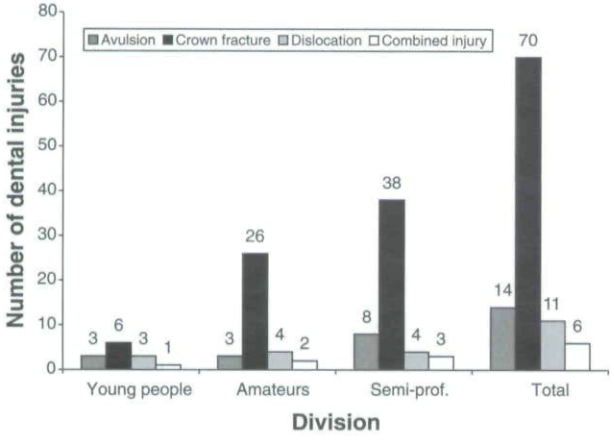

Fig. 2. Type of observed dental accident according to divisions.

players ($P < 0.001$). Only eight of all 331 interviewed persons knew that an avulsed tooth must be recovered for legal reasons as it constitutes part of the body (seven young people, one amateur).

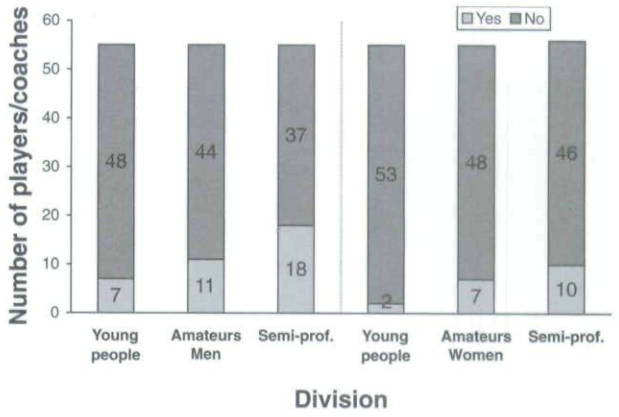

Fig. 3. Players having suffered a dental accident.

The answers to the question concerning life-long follow-up costs in case of the loss of a front tooth varied greatly (Fig. 4). The average value was 3020 USD (median: 2283 USD). Statistical differences in relation to division, sex and team function were not determined.

The mouthguard was not known to 17 (5.1%) of the interviewed persons (Fig. 5) who were all young people ($P < 0.001$) and did not answer the subsequent questions concerning mouthguards. Coaches were more familiar with custom-made mouthguards and players with stock mouthguards ($P < 0.001$). Custom-made mouthguards were better known in higher divisions.

Mouthguards were only worn by four of the interviewed persons who all played in National League A/B (three men, one woman). Different reasons were stated by those who did not wear any mouthguards (Fig. 6). There were marked statistical differences in relation to the division and the reasons why mouthguards were not worn ($P < 0.001$). The most frequent ($n = 173$) answer was 'I have never needed a mouthguard and, therefore, I do not see any need of wearing one', particularly in the group of young people. In higher divisions, the impairment of communication and breathing problems were more important. Aesthetics played a minor part for all interviewed persons. Other answers were financial reasons and psychological aspects. Statistical differences between the sexes ($P = 0.135$) and the team function ($P = 0.112$) were not noted.

Discussion

Dental injuries frequently cause life-long follow-up treatment with corresponding costs. Even if crown fractures (7, 23) are predominant in basketball, serious periodontal damage after dislocation or avulsion can entail losing a tooth, be it through ankylosis or infection-related root resorption (24).

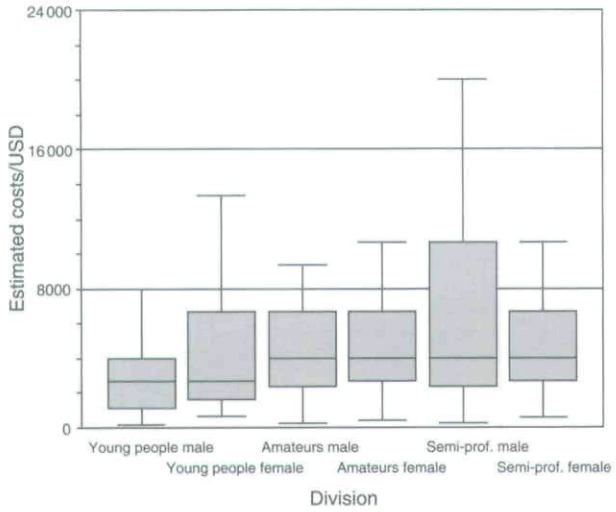

Fig. 4. Estimate of life-long follow-up costs to be expected in case of the loss of a front tooth according to divisions (box and whisker plot shows maximum, 75% quantile, median, 25% quantile and minimum).

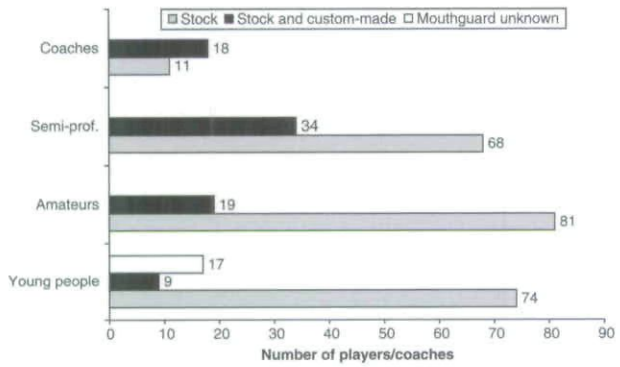

Fig. 5. Awareness of mouthguards according to divisions.

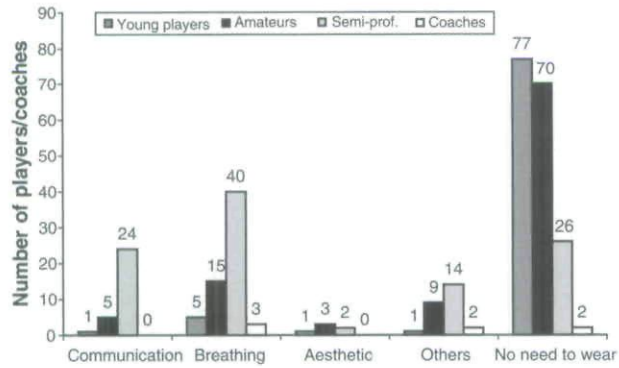

Fig. 6. Reasons for not wearing mouthguards (with multiple statements) according to division.

Basketball players and coaches were asked about dental injuries and their attitude to wearing mouthguards. Their response to and interest in these questions was good which leads to the conclusion that the subject of 'mouthguards' and 'the prevention of dental injuries' is of importance in basketball. Young people and amateurs (league 2/3) considered mouthguards somewhat less important than semi-professionals. This is also confirmed by the results of other surveys (25).

Dental injuries in basketball are mainly caused by hand or elbow blows in the facial area or by a collision with another player. Accidents also result from fast play emphasizing bodily action (23) and close contact to the opponent but may be due to ball contact as well. The impulse force furthers crown fractures (26).

More than half of the interviewed persons (51.9%) knew that avulsed teeth could be replanted. The awareness of coaches and players was similar. This is satisfactory at first glance but shows that not all coaches, who are the responsible persons for the teams, have sufficient information. There is evidence that players get help on dental injuries and mouthguards from their coaches (2, 27).

The awareness of the tooth rescue box is very unsatisfactory with 6.6% (22/331). High and life-long follow-up costs (7, 23, 28, 29), of which a large part of the interviewed persons knew, could be significantly reduced by physiological tooth rescue at the place of the accident. The tooth rescue box is commercially available and should not only be provided at schools but also at public sports facilities in order to improve the prognosis of an avulsed tooth. The rescue box is not only an important link in the rescue chain but also increases the player's and official's awareness of dental accidents (30, 31).

In Switzerland, custom-made mouthguards are only available through private dentists. The health schemes do not provide any government funding and dentists normally do not visit Swiss basketball clubs to make mouthguards. League players do not have special insurance cover for dental injuries or preventive approaches. The fact that 5.1% (17/331) of the interviewed persons did not know what mouthguards were and only 15.5% (80/314) knew custom-made mouthguards shows the need of information campaigns in Swiss basketball. The custom-made mouthguard seems to be better known to coaches than players. This may be the result of more experience and a better level of information of coaches through national sports associations. In higher divisions, custom-made mouthguards were better known than among amateurs, which may be explained by improved medical service. Only four players (1.4%) had mouthguards (one man and three women of National League A/B) which is a low figure compared with US basketball surveys (4.4%) and a Brazilian study (2.1%) (17, 18). The latter value is still low compared with the prevalence of dental accidents in basketball (16.6%) determined in the

same study. Other surveys show a similar prevalence (5.8–36.4%) (2, 7, 17, 25, 27). Better results were noted in Australia (24%) (22). Many of these dental injuries could be avoided by wearing mouthguards (2, 16, 18–21).

The reasons stated for not wearing mouthguards varied and were largely identical with other surveys. The most frequent reason (61.5%) was never having had the need of a mouthguard (16) and, therefore, not seeing any necessity of wearing one (22). This shows a typical human attitude. People will only start thinking about prevention once an accident has happened. Furthermore, breathing problems (32), impairment of communication and irritating aesthetics (33) were mentioned in declining order. Irritating aesthetics and impairment of communication are, however, purely subjective feelings. Athletes often link these irritating factors to a negative influence on their performance. The majority of surveys shows that wearing an exactly fitting mouthguard impairs breathing only in an insignificant manner (12) and thus does not reduce the performance of the athletes (15). Players should only wear custom-made mouthguards today because of their high degree of comfort and acceptance (16, 20, 33–36).

Basketball carries a medium risk of dental trauma (37) and yet there are not any clear regulations or recommendations concerning mouthguards. The significant reduction in dental injuries after the introduction of obligatory mouthguards in sports like American football, rugby and boxing should lead to a certain imitative effect. The use of mouthguards is demanded for most contact sports (2, 38) because it has been shown that a higher number and more severe injuries in the mouth-jaw-face area occur in such sports than in the average population. A team dentist would be the ideal solution for sports with high injury risks (39). Adolescents, in particular, could benefit from information and education in the long run as younger players do not have negative prejudices towards mouthguards. This would make players conscious of tooth protection at the beginning of their career and avoid later harm.

In order to promote the acceptance and awareness of mouthguards among persons active in sports more intensive information and education by national sports associations as well as dentists and all people caring for athletes is required to reduce or possibly avoid permanent harm to the aesthetically important area of the front teeth.

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