ORAL INJURY AND THE USE OF MOUTH GUARDS — SOCCER, RUGBY, BASKETBALL PLAYER IN JAPANESE HIGH SCHOOL —

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Abstract

The use of mouth guards in contact sports effectively prevents oral injuries and preserves oral structures. Many contact sports in which a high impact collision could easily cause oral injury do not require athletes to use mouth guards. We discuss the circumstance of oral injury and awareness concerning the use of mouth guards in Japanese high school soccer and rugby and basketball teams.

During an interview, each athlete was asked a series of questions concerning their history of oral injury while participating in sports and actual circumstances of using a mouth guard.

The incidence of oral injuries was 32.3% in soccer, and 56.5% in rugby, 46.6% in basketball while 0.8% of athletes possessed some type of mouth guard in soccer, 24.1% in rugby and 1.3% in basketball. Although 81.8% of soccer athletes and 81.2% of basketball athletes thought mouth guards were unnecessary, only 26.2% of rugby athletes shared this opinion. Many athletes playing soccer and basketball had insufficient knowledge about mouth guards, and were not interested in preventing oral injury. Due to the diversity of sports that can produce oral injury, it is recommended that mouth guards be worn by all individuals participating in rugby, soccer and basketball.

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key words : contact sports, oral injury, mouth guards,

1. Introduction

Increased competitiveness in sports and more widespread participation have lead to an increase in sports-related injuries^{1,2)}. Especially, dental and oral injury, the commonest type of orofacial injury, can easily occur in contact sports. Mouth guards have been proven to greatly reduce the number and severity of traumatic oral injuries sustained by participants in contact sports³⁻⁷⁾.

Historically, since the 1950s, football has led the way in the use of mouth guard at both the high school and college levels in the United States⁸⁾. The need for adequate mouth protection while participating in athletics came to the forefront in 1962 when the National Alliance Football Rules Committee passed mandatory legislation that all high school and collegiate football participants must wear some form of mouth protector⁹⁾. College football participants were protected when The National Collegiate Athletic Association later

passed a similar rule⁶⁾.

Many contact sports, such as basketball, soccer, baseball, wrestling, rugby, hockey, lacrosse, and water polo, in which a high impact collision could easily cause a dental and oral injury do not require athletes to use mouth guards⁸⁾. It was reported that all coaches required their athletes to wear mouth guards while playing football, but only 16% of coaches require participants to wear a mouth guard in other sports⁶⁾, although these other sports have a high potential for oral injury.

In Japan, mouth guards have not become much more widespread in sports other than karate, boxing etc, and most contact sports do not require young athletes to use a mouth guard. Students do not seem to have much interest in prevention of oral injury and mouth guard.

This article examined the circumstance of oral injury and awareness concerning mouth guard in Japanese senior high schools. As rugby, soccer and basketball are especially popular in Japan, we

interviewed these players concerning the use of mouth guard.

II. Materials and Methods

Most high schools in Japan are members of various sports associations and as members, their athletic teams participate in competitions administered by the league. Soccer and rugby are highly popular among Japanese student sports. Basketball is also popular among them. For the purpose of the present study, a questionnaire was sent to 63 male soccer, 87 male rugby, and 84 male basketball teams within Aichi prefecture whose teams participated in the domestic league. Interviews were taken from individuals who participated in each sport during one or both of the 1993 and 1994 seasons. A questionnaire was developed with the input of our department, as well as from previous surveys evaluating the use of mouth guards and incidence of oral injuries. Each athlete was asked a series of questions concerning their history of oral injury while participating in sports and actual circumstances surrounding the use of the mouth guard.

The distribution and collection of the questionnaire were intended to solicit cooperation from high school coaches in completing and returning the questionnaire. The deadline for returning

questionnaires was May 30, 1995. The data were evaluated statistically using analyses of percentage, accepting $P < 0.001$ as significant.

III. Results

Of the selected 234 (soccer 63, rugby 87, basketball 84) questionnaires distributed to high schools at Aichi prefecture, 195 (83.3%) (soccer 90.5%, rugby 89.7%, basketball 71.4%) were completed and returned. Overall, 3435 athletes covered by the survey (soccer 1478, rugby 1192, basketball 765). Athletes ranged in age from 16 to 17 years, and all were male (Table 1).

There were 1415 oral injuries noted, indicating that 44.1% of all players sustained some form of oral injury while participating in a sport, of total oral injuries 477 were noted (32.3%) in soccer, 673 (56.5%) in rugby and 265 (34.6%) in basketball. There was a significant difference in the incidence of oral injuries between soccer and rugby, also between basketball and rugby (Table 2). Types of oral injury are shown (Table 3). This list is incurred by athletes, with lacerations, fractured teeth, and luxated teeth being the most common. Table 3 also compares the numbers of oral injury among soccer, rugby and basketball. Laceration was the most frequent injury in each sports. We asked students whether they knew

Table 1. Materials
high schools at Aichi Pref.

		<u>soccer</u>	<u>rugby</u>	<u>basketball</u>
selected	234	63	87	84
returned	195	57	78	60
	(83.3%)	(90.5%)	(89.7%)	(71.4%)
total number of athletes	3435	1478	1192	765
age	16 or 17			
sex	male			

Table 2. Total oral injury

The number of athletes (%)

	soccer	rugby	basketball	total
yes	477 (32.3%)	673 (56.5%) ^{***}	265 (34.6%) ^{***}	1415
no	990 (67.7%)	517 (43.5%)	500 (65.4%)	2007

*** Significant difference between soccer and rugby

Significant difference between rugby and basketball

P<0.001

Table 3. Types of oral injury

No. of athletes

	soccer	rugby	basketball
laceration (intra oral)	325	494	170
laceration (extra oral)	189	356	125
fractured teeth	45	100	57
luxated	42	76	25
mandibular dislocation	11	5	5
mandibular fracture	0	6	2
other	9	16	8

Some athletes indicated multiple oral injuries.

about mouth guards, however, many soccer and basketball players unexpectedly unaware of mouth guards, 401 (27.1%) in soccer, 154 (20.1%) in basketball compared to 55 (4.6%) in rugby. There was a significant difference between soccer and rugby players, and also between basketball and rugby players (Table 4).

The total number of athletes possessing some type of mouth guard was only 9 (0.8%) in soccer, 10 (1.6%) in basketball and 269 (24.1%) in rugby among athletes who knew about mouth guards. There was a significant difference between soccer and rugby, also between basketball and rugby (Table 5).

Table 4. Knowledge about mouth guard

No. of athletes (%)

	soccer	rugby	basketball
aware	1071 (72.5%)	1117 (93.7%)	609 (79.6%)
unaware	401 (27.1%)	55 (4.6%) ^{***}	154 (20.1%) ^{***}
no ans.	6 (0.4%)	20 (1.7%)	2 (0.3%)

*** Significant difference between soccer and rugby

Significant difference between rugby and basketball

P<0.001

Table 5. Possessing some types of mouth guard
No. of athletes (%)

	soccer	rugby	basketball
yes	9 (0.8%)	269 (24.1%) ^{***}	10 (1.6%) ^{***}
no	1061 (99.1%)	842 (75.3%)	599 (98.0%)
no ans.	1 (0.1%)	6 (0.6%)	2 (0.3%)

*** Significant difference between soccer and rugby
Significant difference between rugby and basketball $P < 0.001$

The athletes who do not have mouth guards were asked the reason why they do not have mouth guards. Almost all soccer (81.8%) and basketball players (81.2%) answered "unnecessary", however, almost rugby players (73.8%) indicated "necessary" but did not have mouth guards for various reasons (Table 6).

Students were also asked whether they would

like to use mouth guards if there were no associated problems. Although 325 (30.6%) soccer players and 179 (29.9%) basketball players answered yes, 629 (74.7%) rugby players answered yes. There was a significant difference between soccer and rugby players, and also between basketball and rugby players (Table 7).

Of athletes who owned mouth guards, 288

Table 6. Necessity of mouth guard
No. of athletes (%)

	soccer	rugby	basketball
necessary[#]	178 (18.2%)	687 (73.8%) ^{***}	132 (21.4%) ^{***}
unnecessary	800 (81.8%)	244 (26.2%)	486 (78.6%)

[#] Necessary but teammates do not have mouth guards
Necessary but they do not know how to get or make mouth guards
Necessary but they cause discomfort etc
Some athletes indicated multiple reasons.

*** Significant difference between soccer and rugby
Significant difference between rugby and basketball $P < 0.001$

Table 7. Personal feeling as to use mouth guard
No. of athletes (%)

	soccer	rugby	basketball
favorable	325 (30.6%)	629 (74.7%) ^{***}	179 (29.9%) ^{***}
dislike	732 (69.0%)	205 (24.3%)	410 (68.4%)
no ans.	4 (0.4%)	8 (1.0%)	10 (1.7%)

*** Significant difference between soccer and rugby
Significant difference between rugby and basketball $P < 0.001$

(soccer 9, rugby 269, basketball 10), were asked which type of mouth guards they own, stock, mouth-formed, or custom-made. Eight athletes (2.8%) had the stock type, 254 (88.2%) had the mouth-formed type and 26 (9.7%) had the custom-made type (Table 8). Then, they were

Table 8. Types of mouth guard
No. of athletes (%)

type	No.	(%)
stock	8	(2.8)
mouth formed	254	(88.2)
custom made	26	(9.0)
	288	(100)

Table 9. The use of mouth guard
No. of athletes (%)

when	No.	(%)
all times (games and practices)	15	(5.2)
games only	51	(17.8)
practices only	5	(1.7)
sometimes	33	(11.5)
not using	182	(63.6)

Table 10. Complaints or problems encountered

	No. of athletes
speech	194
breathing	152
comfort	138
saliva	107
gagging	69
concentration	70
bad taste	59
fit	46
durability	34
tooth pain	27
none	8
other	8

Some athletes indicated multiple complaints or problems.

asked when they used their mouth guards. Only 15 (5.2%) athletes use mouth guards "at all times" when participating in the sports, 182 (63.6%) athletes answered "not currently using" (Table 9).

Complaints or problems associated with mouth guards are indicated in Table 10. The most commonly identified problems were speech, breathing, and comfort. Only 8 of the athletes owning mouth guards reported no complaints or problems.

IV. Discussion

There have been no previous reports that discuss oral injury and mouth protector use in soccer, rugby and basketball. In this study, each player was asked a series of questions concerning any history of oral injury while participating in sports. Rugby showed a high incidence of oral injury. Although there were significantly fewer oral injuries in soccer and basketball, 32.3% of soccer and 34.6% of basketball athletes had a history of oral injury. Most oral injuries involved laceration, but some athletes also experienced fractured teeth in soccer and basketball. Distribution of types of oral injury was similar to that in rugby. Mouth guards have been proven to greatly reduce the number and severity of traumatic oral injuries to participants in contact sports³⁻⁷⁾. Currently in Japan, yet mouth guards are not required in almost any contact sport other than boxing and football. Moreover, their acceptance in many sports has been almost non-existent. In this study, many athletes playing soccer and basketball had not been given sufficient information about mouth guards. The percentage of students possessing mouth guards was lower in soccer and basketball. It can be said that soccer and basketball has been never considered a sport in which a mouth guard is required in Japan. However, since there are actually numerous contact injuries that occur while participating in soccer and basketball, preventing oral injury becomes more and more

important.

In rugby, one of the most severe sports, mouth guards are becoming more widely used than before, the percentage of students possessing a mouth guard is still low. The mouth guards students have are almost always ones they can buy easily at a store, and few athletes use the mouth guard every time they play. It is clear that there is still insufficient knowledge about oral injury and its prevention even among rugby players. This must be due to poor quality mouth guards and numerous problems and complaints associated with their use.

Custom-made mouth guards will improve those problems. There is a report that the mouth guard used by most football players was a stock type with the primary reason for its selection being cost⁶⁾. So it would be difficult for the use of custom-made mouth guards to become wide spread. However, we have a professional responsibility to prevent sports-related oral injuries, and should make a great effort to increase the use of custom-made mouth guards. Moreover contact sports athletes are also confronted with the possibility of more severe maxillofacial injury. Josell and Abrams⁴⁾ report that mouth guards may help prevent concussions, cerebral hemorrhage, and possibly death, by separating the jaws, thus preventing the condyles from being displaced up and backward against the wall of the glenoid fossa. Athletes as well as coaches must be made aware of the high potential for oral injury in sports such as rugby, soccer, basketball, and other contact

sports, which do not have mandatory mouth guard rules.

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