N. Upson

MOUTHGUARDS, AN EVALUATION OF TWO TYPES FOR RUGBY PLAYERS

N. UPSON, LDS, Dorth, DDPHRCs

Kingston and Esher Health Authority, 17 Upper Brighton Road, Surbiton, Surrey

ABSTRACT

At the beginning of the 1983/84 Rugby season a dental examination was carried out on 120 players, 55 of whom were fitted with the mouth-fitted type of mouthguard and 65 the laboratory-made type of mouthguard.

At the end of the season only 98 players were available for the completion of the study. A further dental examination showed that there was no damage to the teeth when either type of mouthguard was worn.

Variations in the attitudes of the players to each type of mouthguard were also recorded.

INTRODUCTION

Mouthguards protect both hard and soft tissues. Damage to cusps and restorations of posterior teeth, and fractures of anteriors can be reduced, whilst the loss of anterior teeth can be avoided. Tongue biting and damage to lips and cheeks from fractured teeth can also be reduced. Pain, reduced masticatory function and an unsightly appearance can also be prevented. In turn, preventive measures can reduce the cost of replacement dentures, crowns and bridges. The wearing of a mouthguard can produce a cushioning effect from blows to the mandible, and act similarly with regards to blows to the base of the skull.

It is important when constructing mouthguards to ensure that they give adequate retention and protection to the teeth and soft tissues. Ideally they should extend over all the tooth surfaces, and to the periphery of the labial and buccal sulci. On the palatal surface they should extend about 1 cm. Extending the mouthguards beyond the first permanent molars is not necessary. If they are extended too far back they can cause a feeling of nausea. The mouthguards should be of sufficient bulk to absorb the force of any reasonable localised blow. A thickness of 4 mm over incisal and occlusal edges is recommended. Mouthguards that are too bulky can "gag" the bite and make breathing and speech difficult. The manufacture of mouthguards with indentations to accommodate the lower incisors should be avoided as they do not allow for the free movement of the mandible against a blow.

Mouthguards should not readily distort as retention is then reduced, and they should be tasteless and odourless. They should be easy to clean and have antiseptic properties. They should be aesthetically acceptable. They should not be expensive to purchase.

There are basically three main groups of mouthguards.

The *stock type* which can be bought from sports shops and are made of thermoplastic material (Fig. 1).

The *mouth-fitted type* are made of preformed shells into which a soft material (obtained from a mixture of powder and liquid) is placed and allowed to set (Figs. 2 and 3).

The *laboratory-made type* are constructed from 4 mm thermoplastic sheets that are vacuum formed over stone

Fig. 1

Fig. 2

models obtained from impressions of the mouth (Figs. 4 and 5).

In a previous paper by the author (Upson, 1982) it was shown that out of a total of 100 players who were interviewed,

Fig. 3

Fig. 4

Fig. 5

66 had at some time worn a mouthguard. Of 28 players who had stopped wearing mouthguards altogether, 24 had worn the stock type. Of the 38 players who wore mouthguards regularly, 16 wore the stock type, 12 the mouth-fitted and 10 the laboratory type. The reason given for the high number of stock type mouthguards was that they were easy to obtain and cheap to purchase.

METHOD

Arrangements were made for a dental examination to be made at four Rugby Union clubs. The examination was limited to the upper and lower labial segments and the presence or absence of each tooth was noted.

Fractured teeth were classified under three headings
Type 1 – involved enamel only
Type 2 – extended into dentine
Type 3 – showed exposure of the pulp.

The presence of crowns and bridges was also recorded.

Impressions for laboratory-made mouthguards and the construction of mouth-fitted Coe Dental Guards (Editorial report, 1983) were carried out at the same time.

The following week both types of guards were returned to the players and examined for fit. Written instructions were given to all players on the care of their mouthguards.

Also at the second visit any players who were not present the previous week had a dental inspection and a mouthguard constructed.

At the end of the season the player's teeth were again examined, and they were asked questions about their mouthguard wear.

RESULTS

120 players had a dental examination, 55 were fitted with the mouth-fitted type of mouthguard (MFT) and 65 had the laboratory-made type of mouthguard (LMT).

At the end of the season only 74 players were available at the clubs for a dental examination and completion of the questionnaire.

Twenty-four players were later contacted by telephone, as shown in Table I.

Table I Final number of players participating in project.

	MFT	LMT	Total
Examined	37	37	74
Telephoned	11	13	24
	48	50	98

Sixteen players had moved from the area and could not be contacted. Four players were injured soon after the season began and did not play again.

One player lost his mouthguard after the first game and did not contact the author for a replacement.

Thus out of a total of 120 players, the results in regard to 98 (82%) were available for analysis. 48 out of 55 (87%) had the MFT and 50 out of 65 (77%) had the LMT. At the initial dental examination the upper and lower labial segments only were examined. Table II indicates the results of the examination of each player.

Some players already had more than one missing or fractured tooth. The results from the initial examination formed the base line for any change that might be found at the final examination. At the final examination and following telephone calls there was no change in the number of missing or fractured teeth.

The players were asked whether they had worn their mouthguard for every game, occasionally or never. The results are shown in Table III.

The main problems which may be associated with the wearing of mouthguards are:—

Inadequate retention
Nausea

Table II Results of the initial dental examination of each player.

	MFT	LMT	Total
Crowns			
Upper	16	8	24
Lower	0	1	1
Missing Teeth			
Upper	6	5	11
Lower	0	3	3
Fractured Teeth			
TYPE 1			
Upper	2	13	15
Lower	9	10	19
TYPE 2			
Upper	3	10	13
Lower	0	13	13
TYPE 3			
Upper	0	0	1
Lower	1	0	1

Table III Periods mouthguards worn by players.

	MFT	LMT	Total
Every Game	39	42	81
Occasionally	8	6	14
Never	1	2	3
	48	50	98

Dryness of mouth
Speech impediment/difficulty
Breathing difficulties

Each player was asked whether he had experienced any of the above problems and the results are tabulated in relation to the amount of time the mouthguard had been worn (Table IV).

Table IV Problems associated with each type of mouthguard.

	MFT			LMT		
	Every Game	Occasionally	Never	Every Game	Occasionally	Never
Total	39	8	1	42	6	2
Inadequate retention	0	2	0	0	0	1
Nausea	0	4	1	1	1	2
Dryness of mouth	2	0	1	1	1	2
Speech	4	4	0	0	2	2
Breathing	0	0	0	0	3	2

Of the players who wore the mouth-fitted type of mouthguard at every game, there were complaints of nausea and dryness of the mouth. These problems were soon overcome, and were not serious enough to warrant not wearing the mouthguard.

It should also be noted that of the players who wore their laboratory-made mouthguard all the time 3 players initially complained of nausea and 1 had difficulty with speaking.

The above comments were not noted in the results since they presented no serious problem once the mouthguard had been worn for a short time.

Also in the same group 1 player complained of "bleeding gums". A dental examination of this player showed a degree of gingival hyperplasia and poor oral hygiene.

All the players were asked whether they had worn a mouthguard before and their comments were noted.

From the results (Table V) most of the players who wore their mouthguards all the time had previously had a mouthguard. The stock type bought from sport shops was the most common type to have been worn by players.

Table V Number of players having previously worn mouthguards.

	MFT			LMT		
	Every Game	Occasionally	Never	Every Game	Occasionally	Never
Total	39	8	1	42	6	2
Had mouthguard before	26	5	0	33	2	0
Type of mouthguard						
Stock	24	2	0	31	2	0
MFT	0	0	0	0	0	0
LMT	2	3	0	2	0	0

The players' comments are discussed in the next section.

DISCUSSION

From the results of the dental examination it would be reasonable to accept that both types of mouthguards had a preventive effect against damage to teeth. At the time it was not necessary to consider a control group who had not been issued with a mouthguard.

An overall assessment of the mouth-fitted mouthguards showed that although speech was a problem with the players who wore their mouthguards all the time it was not sufficient to deter them from wearing the guards, whilst nausea and speech difficulties proved a problem with the occasional wearers. The problems associated with this type of mouthguard may be due to the fact that the shells are all the same size and the shells with the filler are bulky.

The total number of difficulties experienced by the players who wore the laboratory-made mouthguards either every game or occasionally was far less, and this may be due to the fact that these mouthguards are less bulky and can be constructed accurately to the individual model of each player.

With all players, there are different levels of tolerance to the presence of objects in the mouth, and this is shown by the feeling of nausea and dryness of mouth with both types of mouthguards and speech and difficulty with breathing only with the laboratory-made type of mouthguard.

It is interesting to note that out of a total of 81 players who wore their mouthguards all the time 59 had worn a mouthguard previously, with the stock-type of mouthguard being the predominate type. Seven players out of 14 who wore their mouthguards occasionally had a previous mouthguard, with 4 players having had a stock type and 3 a laboratory-made type. Again a degree of tolerance to the presence of objects in the mouth may be an important factor in this group. The players who did not wear their mouthguards reported not having had a previous mouthguard.

When the players were asked for their comments about their mouthguards it was agreed by the players who wore their mouthguards either all the time or occasionally that they were far superior to the stock type with improved retention and a reduction of a feeling of nausea being the main comments.

There were complaints that the mouth-fitted mouthguards soon discoloured and the white appearance of the shells made them too conspicuous.

SUMMARY

Whilst there was no damage to the teeth, a comparison of both types of mouthguards showed that the laboratory-made mouthguards were more acceptable than the mouth-fitted type, although the laboratory-made type was more expensive than the mouth-fitted mouthguard.

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OBITUARY

Henry Noel Cummings Bleasdale, MBE, MB, ChB

We were very saddened to learn of the death of Doctor Bleasdale on 7th May, 1985. He qualified at Liverpool University in 1940, and after various house jobs, specialised in Tuberculosis and Chest Medicine. He held the position of Physician Superintendant at the Cleaver Hospital, Liverpool, and subsequently was a Consultant Physician for the Liverpool Central Chest Services and Occupational Health Services (Chest diseases) for the City of Liverpool.

He joined BASM in 1954, soon after it's foundation, as representative of the Amateur Swimming Association, already being established as one of the Senior Medical Advisers for the ASA and in the middle 1960's he succeeded Dr. Hume Kendall as Chief Medical Adviser to the ASA. He was also a member of the International Swimming Association (FINA) and well-known throughout the world for his knowledge and enthusiasm in this sport. He served many times on the Executive Committee of BASM and was elected Vice-President in 1978.

I first met Noel in 1959 when he was looking after a group of young, potential international swimmers, during the ASA Easter Coaching Course at the then Loughborough College of Education. He had a wonderful manner with these teenage children and showed me what a Team Doctor should do for the physical and mental welfare of his charges, as well as spending a large amount of his time at the pool side, in the gymnasium and the common room, where every swimmer and coach felt they had immediate access for the doctor's help or advice, even regarding the trivialities that upset an athlete so easily. One of Noel's main interests was the supervision and encouragement of the young asthmatic patients and he spent a great deal of time looking after them and other handicapped patients in the swimming pool and elsewhere. Apart from his sound advice at many BASM Executive Meetings where his wisdom and experience proved invaluable, he was one of the most conscientious and efficient book reviewers that this Journal has ever had. I shall miss an old friend of long standing, who throughout his long and painful illness, gave us no indication of its severity. He shall be missed by many of his friends in our Association and in swimming circles world-wide. We extend our sincere condolences to his wife and family.

Henry Robson