



Parental attitudes toward mouthguards

Nadia Diab, DMD Arthur P. Mourino, DDS, MSD

Abstract

An 11-item, one-page questionnaire was mailed to 1800 parents chosen at random in the Henrico County, VA public school system. Parents were asked questions such as "who should be responsible for mouthguard wear?" "what sports should require mouthguards?" and "has [their] child ever sustained an oral or facial injury?" The parental responses indicate that mouthguard enforcement is the responsibility of both parents and coaches. Of the total injuries reported, 19% were sustained in basketball, 17% in baseball, and 11% in soccer. Despite these high injury rates, however, there was a lack of perceived need for mouthguard use in these sports. When asked which sports should require a mouthguard rule, the sports that generated the most responses were, in decreasing order, football, boxing, ice hockey, wrestling, field hockey, and karate. Parents were more likely to require mouthguards for their sons than daughters, and more likely to require them for their children who participated in a mandatory mouthguard sport, a contact sport, or who had been previously injured. The authors conclude that because parents view themselves as equally responsible as coaches for maintaining mouthguard use, both groups should be targeted and approached as a possible source for the recommendation of mandatory mouthguard rules in basketball, baseball, and soccer. (Pediatr Dent 19:455-60, 1997)

Empirical evidence indicates that using a mouthguard during contact sports reduces the frequency and severity of most oral injuries. The mouthguard reduces the potential harm to the face and head areas by absorbing and diffusing the force from a traumatic blow.¹⁻⁸

Studying the effects of such traumas on human cadavers, Hickey et al. found a statistically significant decrease in the amount of intracranial pressure and bone deformation in the skull when a mouthguard was in place.⁹ Several authors also concluded that mouthguards reduce the number of concussions, cerebral hemorrhages, and incidents of unconsciousness ("knock-outs"), as well as general neck problems.^{3, 4, 10}

Mouthguards have also been shown to reduce the number of jaw fractures by preventing the mandibular condyle from being displaced upward and backward against the wall of the glenoid fossae.¹⁰ Moreover,

Josell and Abrams reported mouthguards to be effective in moving the soft tissue in the oral cavity away from the teeth, and thus preventing laceration and bruising of the lips and cheeks.⁸

Yet despite these and other findings, athletes still do not wear their mouthguards on a regular basis. According to several studies, players often claim that mouthguards are uncomfortable, interfere with breathing and speech, or else have poor retention because of a loose fit.^{7, 10, 11} Such complaints, though valid, are more attributable to improper fabrication and design of the mouthguard itself than to its usefulness as a protective device. On the other hand, there are complaints relating to a mouthguard's unsightliness and to its "sissy factor." However lacking in merit, such strong and entrenched thinking can prevent players from wearing their protective mouthguards.¹⁰

Who is responsible for changing these attitudes? For many years, numerous athletic associations have resisted the American Dental Association's (ADA) and the Academy for Sports Dentistry's recommendations for a mandatory mouthguard policy.¹¹ Presently, all high school and college football programs require mouthguard use.^{4, 11, 12} Amateur sports such as boxing, football, ice hockey, and lacrosse also require mouthguards. Conversely, in women's sports, only field hockey currently requires its participants to use mouthguards.⁴

Lancaster and Ranalli, in a survey of college football officials' attitudes toward NCAA mouthguard regulations, concluded that coaches, not officials, should be held more responsible for players wearing their mouthguards.¹ Current research directed toward high school and college players agrees; coaches exert the greatest influence on their players, so they are in a unique position to guarantee compliance with a mouthguard policy if one exists, or to advocate the use of a mouthguard on a more general basis.^{1, 13, 14}

It is not only coaches who are in a special relationship with America's young athletes, but also parents, as well. Whether simply concerned fans, or more closely associated as volunteer coaches and administrators, parents are likely to have a great interest in, and influence on, the health of young athletes. This study, therefore, was designed to evaluate and critique parental attitudes toward mouthguard use in order to promote education in this area.

Methods and Materials

A one-page questionnaire was developed based on previous surveys that evaluated attitudes toward mouthguards.^{12,13} The questionnaire was designed to be short, simple, and applicable to parents with children between the fourth and ninth grades. The survey was field tested by distributing it to parents of children being treated in the Virginia Commonwealth University–Medical College of Virginia (VCU/MCV) dental school clinic. The comments collected were used to construct the final survey. The parents tested commented that the term “mouth protector” was more descriptive than the term mouthguard. Therefore the term mouth protector was used in the survey, but the two terms are interchangeable.

The survey was mailed to 1800 parents of children between the fourth and ninth grades (9–14 years old), chosen at random, in Henrico County, a suburb of Richmond, VA. The survey was conducted through cooperation and endorsement of Virginia Commonwealth University–School of Dentistry and the Department of Education in Henrico County. The authors’ decision to target this age group is based on the previous findings that this age group tends to participate in athletic activities and sustains a significant number of injuries.⁷ A self-addressed, stamped envelope was included with each survey. Parents were instructed to complete and return the survey to the department within 2 weeks.

Responses to the questionnaire were tabulated and percentages computed. The data were tested by chi-square analysis utilizing the program SPSS.¹⁵

Results

Of 1800 surveys mailed to parents of the Henrico County public school system, 365 were returned, of which 359 were usable. Six surveys were discarded because they were incomplete. This represents a return rate of 20%. A second mailing was not done. The majority of the respondents were mothers (80%), 17% of the surveys were completed by fathers, and the remainder were completed by the child’s guardian (3%). The parents/guardians ranged in age from younger than 20 to older than 50, with 58% between the ages of 40 and 49. The majority of the respondents (77%) were white (Fig 1). Three-fourths (75% of the parents/guardians had some level of college education.

The children ranged in age from 7 to 18 years old, with a mean age of 13. Of the children surveyed, 61% were males and 39% were females.

When asked if anyone had ever purchased a

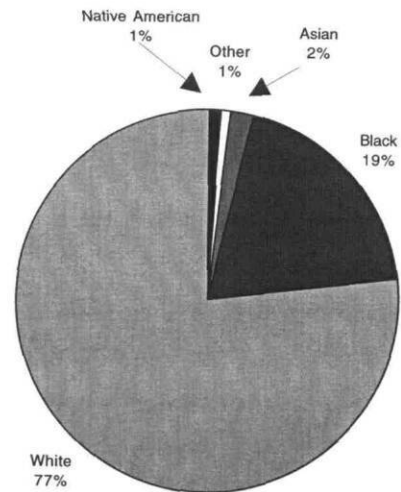


Fig 1. Racial distribution of the parents.

mouth protector for their child, 42% of the parents/guardians responded that they had and 87% of the children who had had a mouth protector purchased for them wore it. The most frequent reason cited for a child not wearing a mouthguard was “Didn’t think of it” (41%), followed by uncomfortable (14%), and (10%) difficulty with speaking (Fig 2). Of the total respondents, 15.4% had worn a mouthguard themselves, and 55.7% thought that their child should be required to wear a mouthguard. A chi-square analysis showed no relationship between parents who wore mouthguards themselves and those who thought their child should be required to wear a mouthguard ($P < .19$). The gender of the parents was not related ($P < .25$) to whether a mouthguard should be required.

The respondents were asked to list the athletic activities that their children played. They were given the opportunity to list as many as five different sports, were asked whether the sport was supervised by a coach, and whether the child wore a mouthguard. In descending order, basketball, football, baseball, and soccer were the most frequent athletic activities (Fig 3). Children participated in a total of 527 athletic activities.

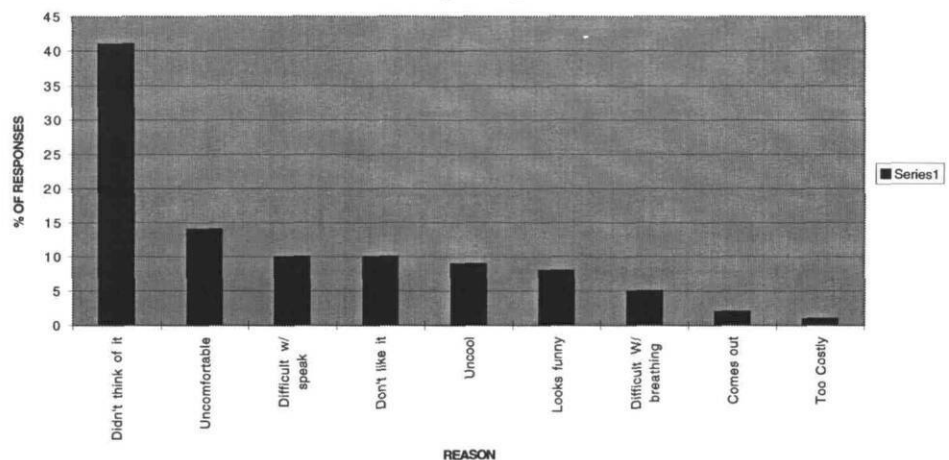


Fig 2. Reasons for a child not wearing a mouthguard.

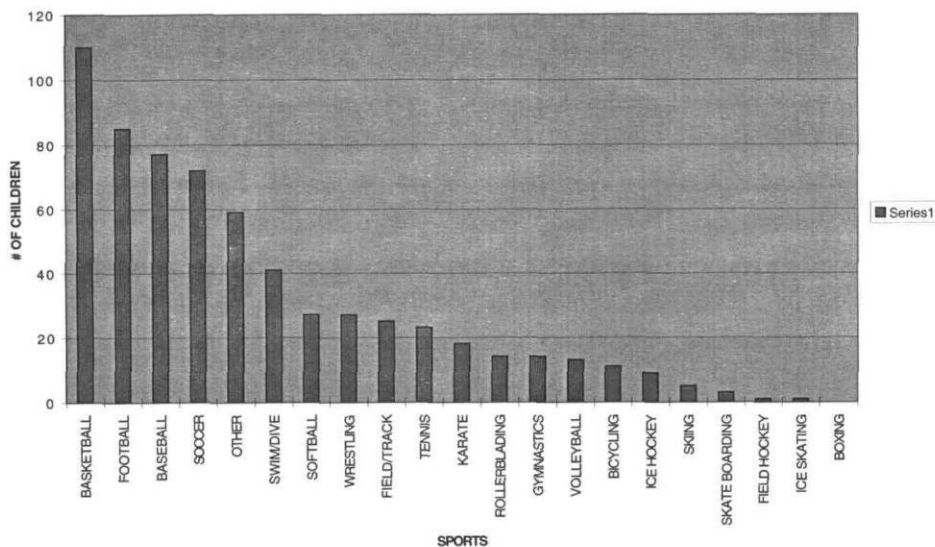


Fig 3. The sports children play.

The athletic activities were supervised 82% (430) of the time while 18% (97) were unsupervised. Mouthguards were worn in 133 (25%) activities, 124 of which were supervised and 9 were not. Thus 29% (124/430) of the children who participated in a supervised sport wore a mouthguard and 9% (9/97) of the children who participated in unsupervised sports wore a mouthguard.

In order to examine whether the type of sports that the children played affected the parents' attitude toward requiring the use of a mouthguard, two categories were defined.

The first category was "mandatory" sport, which are sports such as football, boxing, ice hockey, lacrosse, and field hockey. These sports have mandatory mouthguard rules. Parents of children who played a mandatory sport were 41% more likely to think that mouthguards should be required than those of children who did not participate in a mandatory sport ($P < .001$).

The second category was "contact" sport. These sports have two or more players contacting each other at some time during the activity. The contact-sport category included baseball, basketball, boxing, football, field hockey, ice hockey, karate, soccer, softball, and wrestling. Parents of children who play contact sports were more than twice as likely to think that mouth-

guards should be required ($P < .001$) than parents of children who do not.

There were 206 reported injuries, 12% (24) of which occurred with a mouthguard in place and 88% (128) that occurred without one. Medical treatment was sought for 43 injuries, 31 of which were treated by a dentist and 14 that were treated in the emergency room. Two injuries were treated by a dentist in the emergency room. The injury most frequently sustained was a cut lip (40%), followed by a bruise to the face (37%), chipped tooth (12%), loose

tooth (10%), and (< 1%) fractured jaw (Table 1). Soft-tissue injuries accounted for 77% of the injuries. If the injury was a cut lip or bruise to the face, the parent sought medical attention at the emergency room. All other injuries were treated by a dentist. Of the total injuries sustained, 19% were in basketball, 17% in baseball, and 11% in soccer (Fig 4). A new variable was created called "injury". If the child was ever injured they were labeled as being injured. The parents of children who had been injured were more likely to favor mouthguard requirements ($P < .05$).

A three-way cross-tabulation was performed to determine if injury would remain a significant factor when controlling for the child playing a sport that required mouthguards. For parents of children who were injured, whether or not the child played a mouthguard-mandatory sport had less of an effect on their attitudes toward mouthguard use than for parents of children who were not injured ($P < .01$). In fact, parents of children who play a mandatory-mouthguard sport and have not been injured are more likely to think that mouthguards should be required than parents of children who played a mandatory mouthguard sport and were injured ($P < .05$). And, parents were more likely to require mouthguards for their sons than their daughters ($P < .001$).

TABLE. TYPES OF ORAL TRAUMA

Injures	# of Injuries	With MG	With out MG	Seeked Medical Tx	Tx by ER	Tx by Dentist
Cut lips, tongue, cheek	83	8	75	8	5	3
Bruise to the face	77	12	65	7	6*	2
Chipped or broken tooth	25	1	24	17	1*	17
Loosened tooth	20	2	18	10	1	9
Fractured jaw	1	1	0	1	1	0
Total	206	24	182	43	14	31

* One injury treated by a dentist in the ER

Respondents were given the option to circle all that applied in answering the question, "Who should be responsible for enforcing mouthguard wear?" Mouthguard enforcement was thought to be the responsibility of the coaches by 271 parents, 260 respondents thought it was the responsibility of the parents, 199 thought it was the leagues,

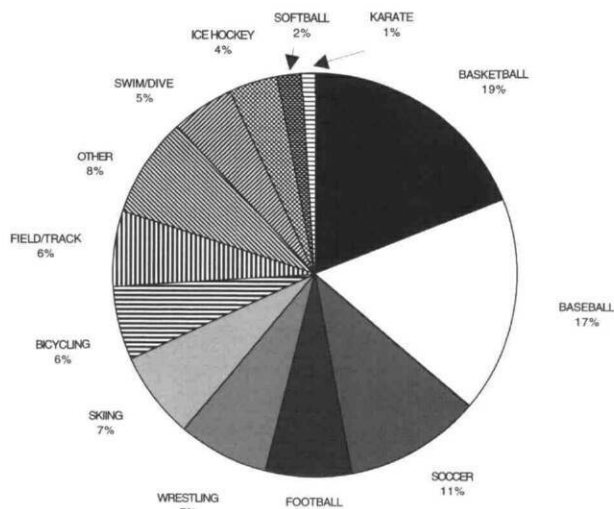


Fig 4. The percentage of injuries sustained in various sports

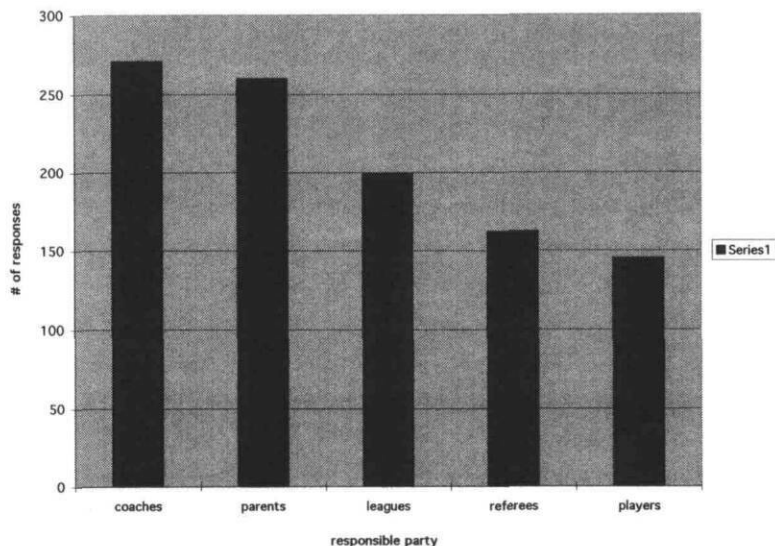


Fig 5. Parties responsible for mouthguard enforcement.

162 the referees, and 145 the players (Fig 5). Of those who thought mouthguard enforcement is the responsibility of the parents, there was no significant relationship ($P = .51$) between their responses and whether a mouthguard was purchased for a child. When asked which sports should require a mandatory mouthguard rule, the sports that generated the most responses were, in decreasing order, football, boxing, ice hockey, wrestling, field hockey, and karate.

Discussion

There is clear consensus among dental professionals that mouthguard use by young athletes during sports greatly reduces the risk of oral trauma. Despite their obvious benefit, however, mouthguards continue to have only a minor presence on America's playing fields. Unlike the baseball helmet or the soccer shinpad, which have become integral parts of most team uniforms, the mouth-

guard remains an underused piece of safety equipment.

In attempting to explain this apparent paradox, many studies have focused on the attitudes of those who can influence the choice of which safety apparel is worn by children. Thus, while some have investigated the roles of coaches, officials, and other regulators in organized sports settings, others have probed the attitudes of the players themselves.^{4,10,12,16} Although the results have been quite informative, there is consistently one viewpoint missing from the data: parents' attitudes. As much as any other person involved in the shaping of youth athletics, parents have tremendous influence over the type of equipment their children use during sports. Our study addressed this void by questioning parents' views and understanding on the subject of mouthguard use.

The demographic profile of the respondents tended to be college-educated, white mothers in the 40–49 age group, which is representative of this school district. The

20% return rate is representative of the usual return rate of other surveys conducted in this school district. The type of player most often cited by parents was a 13-year-old male child. This aged child participated most often in basketball, football, baseball, and soccer. These sports, with the exception of football, resulted in a high risk of oral injury. The exception of football appears to be the result of a mandatory mouthguard rule. However, why were other sports that involve much of the same risk as football not cited by parents as needing mouthguard use?

The need for mouthguards was clear. While 88% of the reported oral traumatic injuries occurred when a mouthguard was not being worn, only 12% resulted despite its use. These figures are slightly different than those reported by McNutt et al.³ Their rates were 75% and 25% respectively. How-

ever, the typical parental view held that not all sports raise a red flag when it comes to mouthguards. Traditional contact sports such as football, boxing, ice and field hockey, wrestling, and karate were all cited by more than half of the responding parents—without regard to gender—as ones in which mouthguard use ought to be mandatory. Also, if a child had previously suffered an oral injury, it tended to make the parent more prone to encourage and advocate mouthguard use.

On the other hand, sports such as basketball, baseball, and soccer, which contribute significantly to the injury rate cited, did not illicit the same concern. A possible explanation is that, more than the actual risk of injury, the perceived danger in the sport was the dominant factor in forming a parents' view towards mouthguards. If the child had actually lost a tooth while playing a sport, the danger was obviously highlighted. If the child played a sport not traditionally as-

sociated with injury, such as soccer or baseball, and especially if they had not been hurt, a mouthguard was less likely to be used.

Whatever their opinion as to its utility, moreover, parents generally followed their children's opinions as to the practicality of mouthguards. Thus, the criticism of discomfort cited by the young athletes themselves was adopted by their parents. Our most frequently cited reasons for not wearing a mouthguard are in line with those in Johnsen and Winters' review article.¹⁰ They reported that the main reasons for not wearing a mouthguard was that it was "uncomfortable", followed by "poor retention and loose fit", and then by "gagging and nausea".¹⁰ However, it should be noted that though these criticisms are valid, parental attitudes may change if they are informed of measures that can eliminate the discomfort factor. For example, although no data were collected regarding how many of the children were wearing stock or mouthformed mouthguards as opposed to custom-made mouthguards, the latter type is clearly not as prone to these complaints as the former, as suggested by several studies.^{11,17,18} We can speculate that the cost of the mouthguard does not appear to be a main factor, but this could be a misrepresentation, as the parents we tested tended to be middle- to upper-middle-class families.

As to gender, parents were more likely to require mouthguard use for their sons than daughters. Again, this may be linked to a perceived notion, not supported by empirical evidence, that males are involved in more oral-injury causing sports than are females. Other studies have reported that orofacial injuries to female athletes exceeds those in the male sample even when compared with football.^{11,19}

In this survey, most parents felt that enforcement should rest primarily with parents and coaches. In a study presented by Lancaster and Ranalli,¹ enforcement was also noted as being the responsibility of the coaches and officials. Likewise, Seals et al.¹³ highlighted the efficiency inherent in coach-enforced policies, as they are the most likely to guarantee mouthguard use in practices and games. The coach's attitude towards mouthguards and ability to convince the players of its efficacy, obviously, can complement enforcement of these policies.

The low level of information that parents have at their disposal as to the propensity of a particular sport for oral injuries is a possible explanation for their somewhat contradictory attitudes. Three-quarters of the parents surveyed have never received any mouthguard information. Of those who have, most obtained the information through informational sessions sponsored by their children's sports programs or by dentists as part of treatment plans.

Fortunately, not all the news is bad. Although 76% of the parents have never formally received any mouthguard-related information, 42% have nonetheless purchased a mouthguard for their child. This may be explained by the participation of the child in a sport which required a mouthguard, such as football. How-

ever, the supervision of the athletic activity did not significantly increase the level of mouthguard use. While only 29% of the children involved in a supervised activity wore mouthguards, a significant 9% who engaged in unsupervised activities also wore mouthguards. More than supervision or level of organization, the athletic activity must be one that both parents and coaches believe should require oral protection.

As to injury type, our study found that 77% were soft-tissue injuries. This agrees with the findings of Maestrello-deMoya and Primosch,¹² who investigated injuries suffered during basketball games. Moreover, twice as many patients were treated by dentists than in an emergency room. In Soporowski et al.,⁷ 94% of the injuries were treated in a dental office. The results reported in the latter study are high, as dentists reported the injuries through a survey returned to the author.

Most children's lives involve significant participation in athletics that invariably include a serious risk of injury to their oral and facial structures. Moreover, there is no debating the efficacy of mouthguards in reducing both the severity and number of these injuries. Nonetheless, the mouthguard remains an underused piece of equipment, especially for sports like basketball, baseball, and soccer. These three sports in particular showed the highest frequencies of participation, injury, and lack of perceived need for the mouthguard. Therefore, we recommend a mandatory mouthguard policy for basketball, baseball, and soccer.

Conclusions

1. Parents' attitudes suggest that mouthguard enforcement is the responsibility of both parents and coaches
2. Parents are in favor of requiring a mandatory mouthguard rule for football, boxing, ice hockey, field hockey, wrestling, and karate
3. There is a lack of perceived need for mouthguards in sports such as basketball, baseball, and soccer, although these are the sports with the most frequently reported injuries
4. There is a lack of perceived need for mouthguards unless the child had sustained an injury previously or played a contact sport or mandatory mouthguard sport
5. Parents felt mouthguards should be required more for their sons than for their daughters who participated in sports.

The authors would like to thank Alan Saiz and Dr. David Tesini for their support and guidance in completing this study.

1. Lancaster DM, Ranalli DN: Comparative evaluation of college football officials' attitudes toward NCAA mouthguard regulations and player compliance. *Pediatr Dent* 15:398-402, 1993.
2. Castaldi CR: Sports-related oral and facial injuries in the young athlete: a new challenge for the pediatric dentist. *Pediatr Dent* 8:311-16, 1986.
3. McNutt T, Shannon SW Jr, Wright JT, Feinstein RA: Oral trauma in adolescent athletes: a study of mouth protectors. *Pediatr Dent* 11:209-213, 1989.

4. Ranalli DN, Lancaster DM: Attitudes of college football officials regarding NCAA mouthguard regulations and player compliance. *J Public Health Dent* 53:96-100, 1993.
5. Garon MW, Merkle A, Wright JT: Mouth protectors and oral trauma: a study of adolescent football players. *J Am Dent Assoc* 112:663-65, 1986.
6. Francis KT, Brasher J: Physiological effects of wearing mouthguards. *Br J Sports Med* 25:227-31, 1991.
7. Soporowski NJ, Tesini DA, Weiss AI: Survey of orofacial sports-related injuries. *Journal of the Massachusetts Dental Society* 43:16-20, 1994.
8. Josell SD, Abrams RG: Traumatic injuries to the dentition and its supporting structures. *Pediatr Clin North Am* 29:717-41, 1982.
9. Hickey JC, Morris AL, Carlson LD, Seward TE: The relation of mouth protectors to cranial pressure and deformation. *J Am Dent Assoc* 74:735-40, 1967.
10. Johnsen DC, Winters JE: Prevention of intraoral trauma in sports. *Dent Clin North Am* 35: 657-66, 1991.
11. Kumamoto DP: Sports dentistry. *Compendium* 14:492, 1993.
12. Maestrello-deMoya MG, Primosch RE: Orofacial trauma and mouth-protector wear among high school varsity basketball players. *ASDC J Dent Child* 56:36-39, 1989.
13. Seals RR Jr, Morrow RM, Kuebker WA, Farney WD: An evaluation of mouthguard programs in Texas high school football. *J Am Dent Assoc* 110:904-909, 1985.
14. McCarthy MF: Sports and mouth protection. *Gen Dent* 38:343-46, 1990.
15. Norusis, MJ: *SPSS Introductory Statistics Student Guide*, Chicago: SPSS Inc., 1990.
16. Ranalli DN, Lancaster DM: Attitudes of college football coaches regarding NCAA mouthguard regulations and player compliance. *J Public Health Dent* 55:139-42, 1995.
17. Schmidtke MA, Medford HM: An inflammatory fibroma of the gingiva secondary to a poorly fitted athletic mouth protector. *Physician Sportsmedicine* 14:85-88, 1986.
18. Bass EH, Williams FA: A comparison of custom vs. standard mouth guards. A preliminary study. *NY State Dent J* 55:74-76, 1989.
19. Morrow RM, Boci T: A survey of oral injuries in female college and university athletes. *Athletic Training JNARA* 24:236-37, 1989.

MEDLINE on the Web

Literature searches are at your fingertips, from the National Library of Medicine. Choose "Search MEDLINE Free" and you have full, FREE access to both PubMed and Internet Grateful Med. It's fast, it's easy, and now, it's free. Visit NLM's homepage at <http://www.nlm.nih.gov>

