



**FDI World Dental Federation**  
13, chemin du Levant, l'Avant Centre  
F-01210 Ferney-Voltaire, France  
Tel: +33 4 50 40 50 50  
Fax: +33 4 50 40 55 55

## **Mouthguard for use in sports**

I have been instructed by the FDI executive director to submit some information to you regarding the CEN work item 00162249, Mouthguard for use in sports - Safety requirements and test methods, which comes under the Personal Protective Equipment Directive 89/686/EEC.

"In participating, could you provide any help on  
- dangerous forms of mouthguards . . from our failures, hopefully we learn !  
- evidence that mouth guards provide significant reduction in harm . . injury, disablement  
- valid requirements and test methods that clinically, in the field so to speak, prevent and reduce harm levels  
- harm statistics in particular situations such as American football, rugby, hockey which may have special requirements in the standards  
- scientific experts with plenty or real experience in mouthguards and although, it is primarily a sports committee, also in the work place, situations where mouthguards are required such as the military.. this may be useful for funding . . do any anti-terrorist squads in the world need mouthguards ?

Specifically, as regards your questions:

1. Dangerous forms of mouthguards . . from our failures, hopefully we learn !  
There are about 70 papers on adverse effects from the use of mouthguards. These range from lip and tongue trauma, to possible fragmentation and aspiration.

2. Evidence that mouth guards provide significant reduction in harm . . injury, disablement

There are again about a hundred papers that document this. Three recent papers that I find are well written and above average are:

- Patrick DG, van Noort R, Found MS. Scale of protection and the various types of sports mouthguard. Br J Sports Med 2005;39(5):278-81
- Tschan JD, Rothlisberger B, Hegg L, von Arx T. [Frequency and nature of anterior tooth injuries and the use of mouth protectors in sports clubs in Bern] Schweiz Monatsschr Zahnmed 2003;113(1):20-6.
- Bemelmans P, Pfeiffer P. [Incidence of dental, mouth, and jaw injuries and the efficacy of mouthguards in top ranking athletes]. Sportverletz Sportschaden 2000;14(4):139-43

3. Valid requirements and test methods that clinically, in the field so to speak, prevent and reduce harm levels.

There are no international requirements as regards design nor to testing. The standards that I'm aware of are:

American National Standards Institute/American Dental Association Specification 99 Athletic Mouth Protectors and Materials (2001):  
(<http://webstore.ansi.org/ansidocstore/product.asp?sku=ANSI%2FADA+Specification+No.+99-2001>).

Australian Standard issued a document titled "Guidelines for the fabrication, use and maintenance of sports mouthguards" in 2003 (HB209-2003). The document was produced jointly by the Australian Dental Association and Standards Australia and contains design criteria for single and bi-maxillary mouthguards, recommendations on fabrication and instructions for care.  
(<http://www.saiglobal.com/shop/Script/Details.asp?DocN=AS428009728836>)

There is also an American Society for Testing and Materials document F697-00 Standard Practice for Care and Use of Athletic Mouth Protectors. . This was developed by the ASTM Technical Committee F08.53 on Headgear and Helmets:  
([http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE\\_PAGES/F697.htm?L+mystore+tehr7237+1145851673](http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE_PAGES/F697.htm?L+mystore+tehr7237+1145851673))

Finally, The UK-based company SATRA Technology Centre advertise that they conduct mouth guard impact tests according to some tests they describe as MG1, MG2 and IRB Provisional Standard 16.10.98, Clauses 5 and 7. I'm unfamiliar with these tests.  
([http://www.satra.co.uk/index.php/content/download/490/3288/file/WW\\_tests\\_Nov04.pdf](http://www.satra.co.uk/index.php/content/download/490/3288/file/WW_tests_Nov04.pdf))

4. Harm statistics in particular situations such as American football, rugby, hockey which may have special requirements in the standards.  
Refer to question 2.

Moreover, one of the best reviews on this topic is on page 420 to 425 in a review paper by: Biasca N, Wirth S, Tegner Y titled: The avoidability of head and neck injuries in ice hockey: an historical review. Br J Sports Med2002;36:410–427. I have attached this paper for your convenience.

5. Scientific experts with plenty or real experience in mouthguards and although, it is primarily a sports committee, also in the work place, situations where mouthguards are required such as the military.. this may be useful for funding . . do any anti-terrorist squads in the world need mouthguards ?

As this work item is proposed by DIN, which is also the secretariat for CEN/TC 55, Dentistry, I assume Mr Kappert and Dr Keller in DIN are being consulted regarding the progress of this work item. They have long experience with developing dental standards and can advise on potential experts in the field. I have copied them in on this email to notify them about the developments.  
(<http://www.cenorm.be/CENORM/BusinessDomains/TechnicalCommitteesWorkshops/CENTechnicalCommittees/TCStruc.asp?param=6039&title=CEN%2FTC+55>)

I would also suggest that you can consult with ISO/TC 83/SC 5 Ice hockey equipment and facilities. Although they currently don't work on mouthguard designs

they are certainly involved into looking at this from a concussion-preventive perspective.

(<http://www.iso.org/iso/en/stdsdevelopment/tc/tclist/TechnicalCommitteeDetailPage.TechnicalCommitteeDetail?COMMID=2446>)

Hope this information may be of any value for your further work.  
Good luck with the development of this standard.

***Prepared by: Professor Asbjørn Jokstad, DDS, PhD  
FDI Scientific Affairs Manager  
[science@fdiworldental.org](mailto:science@fdiworldental.org)***

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