MOUTHGUARDS

Effect of mouthguards on athletic performance

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BACKGROUND

Sports activities increase the risk of suffering traumatic dental injuries, most of which affect the upper jaw and maxillary anterior teeth. An important preventive measure is the wearing of a mouthguard to reduce the frequency and severity of orofacial injuries during sports participation. Mouthguards can be of 3 types: stock, boil-and-bite, or custom-made. The mouthguard should optimally diminish the risk of soft tissue lacerations and dental injuries, fit optimally with good retention, stay in place when the athlete is playing, absorb and dissipate a significant portion of the energy in the impact zone, decrease concussion risk, and facilitate optimal breathing. Custom-made mouthguards tend to meet these criteria more often than the other 2 types. However, data on the impact of mouthguards on athletes' performance are limited, so a systematic review was undertaken to determine if mouthguards affect performance and whether the type of mouthguard influences this performance effect.

METHODS

The PubMed, Web of Science, Scopus, and Cochrane Library databases were searched up to February 10, 2017. The grey literature was accessed through Opensigle. A manual search of reference lists from included articles was also performed. Fifteen articles were analyzed. Most studies were from the United States (33.3%), and the remainder came from countries worldwide.

RESULTS

Methodological Concerns

Nine studies were considered to have a high risk of bias and 6 a low risk of bias. All studies were randomized, but 11 had no explanation of the process. All planned sufficiently long washout periods, but none explained how the allocation concealment and blinding of outcome assessment were done. Just 4 studies blinded both participants and personnel.

The tools used to assess the effect of mouthguards on athletic performance varied widely. For example, the measures focused on many different parameters: cardiopulmonary parameters, lactate level, force-velocity measures, visual reaction time, agility, flexibility, and muscular strength. As a result, no meta-analysis could be done.

Outcomes

Twelve trials compared custom-made mouthguards with a control group using no mouthguard. Three showed improved performance, 7 no interference in performance, and 2 impaired performance in at least one parameter.

Four studies found boil-and-bite mouthguards to be less effective for athletic performance than controls, 2 found them to have similar effectiveness, and 3 found boil-and-bite mouthguards had better results than controls.

Three studies found custom-made mouthguards were associated with better results than boil-and-bite mouthguards. Three studies found the results with the 2 types of mouthguards to be similar.

DISCUSSION

A low level of methological quality in many of the studies analyzed compromised the ability to draw conclusions. Only 15 studies were evaluated, most of which focused on the effect of the mouthguard on the athlete's breathing performance. Good evidence was found to suggest that custom-made mouthguards do not negatively affect athletic performance. Custom-made mouthguards were also found to be better than boil-and-bite mouthguards with respect to athletic performance.

Clinical Significance

The evidence presented in this review can be used by dentists as well as sports professionals to advocate that athletes use custom-made mouthguards to protect against orofacial injury without causing a hindrance to their sports performance. Future studies are needed to consider exposure, awareness, wearability, and acceptance issues by athletes, as well as the efficacy, feasibility, and relevance of using mouthguards in specific sports.

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