Mouthguard use may reduce dentofacial injuries in field hockey players

Abstracted from

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Dentofacial trauma and players' attitude towards mouthguard use in field hockey: a systematic review and meta-analysis.
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Question: In field hockey players, what are the prevalence and characteristics of dentofacial trauma and mouthguard use?

Data sources PubMed, Embase, OvidSP, Web of Science, Cochrane and CINAHL databases were searched up to February 2015 with no language restrictions.

Study selection Two review authors independently assessed tiles and abstracts of the retrieved case-control, cohorts and cross-sectional studies. For the studies to have been included in the meta-analysis, they must have included the total number of hockey players reporting at least one dentofacial injury, the total number of these injuries compared with other types of injuries and quantitative data on characteristics of dentofacial injuries. Recreational and competitive elite level were included.

Data extraction and synthesis The included studies fell into three categories, related to dentofacial injury, mouthguard use or both, and their quality was assessed using the Newcastle-Ottawa Scale (NOS). A random effects model was used to calculate the overall effect size when appropriate; if not, then pooled prevalence was reported. Binary variables were used in order to express the results as Mantel-Haenszel pooled prevalence odds ratios (OR) with 95% confidence intervals (CI) and a p-value of the overall effect. To compare the between-studies differences, a χ^2 test was used. The heterogeneity across the studies was evaluated using the I^2.

Results Eleven studies were included: six related to dentofacial injury, one related to mouthguard use and four to both. The numbers of field hockey players who presented at least one dentofacial injury was 12.7% (95% CI 8.5% to 17.0%) and 45.2% (95% CI 39.3% to 51.0%) in junior/senior players and elite players, respectively. There were no significant differences with respect to sex. After 2000, 84.5% (95% CI 69.3% to 99.7%) of players regularly wore mouthguards, whereas only 31.4% (95% CI 22.7% to 40.1%) wore mouthguards previous to 2000. The mouthguards were commonly depicted as unnecessary and uncomfortable by players.

Conclusions Dentofacial trauma poses a serious problem in field hockey, but a considerable number of players still do not regularly wear mouthguards. The likelihood is that if mouthguard usage were higher, fewer dentofacial injuries would occur during field hockey games and in training.

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Commentary

Mouthguard use is a key element to preventing or mitigating dentofacial trauma among field hockey players. Players participating in stick sports, such as field hockey, face increased risk of trauma due to high-speed stick movement needed to hit the ball. Field hockey players experience higher proportions of facial injuries (25% for males and 20% for females) than even ice hockey players, making mouthguard wearing highly recommended.[1] Meta-analyses are used to combine outcomes from several studies into a single quantitative estimate or summary in order to identify patterns, though homogeneity is difficult due to clinical and methodological differences among selected studies.[2] Vucic *et al*. justified conducting a meta-analysis regarding player attitudes towards mouthguard use by arguing that systematising available evidence would provide four important outcomes: (1) the prevalence and (2) characteristics of dentofacial injuries sustained by field hockey players as well as (3) the prevalence of mouthguard use and (4) the players' attitude towards mouthguard use in field hockey.

Regarding the methodological strengths of this review, the aims and search criteria were clearly defined a priori in the registered protocol. A comprehensive literature search was performed including six databases followed by an additional search of the reference list of relevant studies. Authors of relevant studies and other experts were also contacted via email. Another strength of this meta-analysis is that the characteristics of the 11 included studies were clearly provided in detail. These included the number and type of injuries, how these data were obtained (ie questionnaires or surveillance systems), the competition level of the players (ie elite and semi-elite vs. junior and senior), number and sex of the players. The methods to pool the results of the different studies were appropriate. For example, the heterogeneity across the studies was assessed with I^2 and the between-studies differences were compared with Chi-squared. In addition, a random effects model for the meta-analysis was applied to account for the heterogeneity between studies due to residual confounding. In addition, the investigators tried to minimise the heterogeneity by applying strict inclusion criteria and by controlling for potential confounders (ie gender, competition

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level, years of study and exposure time). The last methodological strength of this review is that there was no potential conflict or a source of support requiring reporting.

This meta-analysis is also noteworthy for its novelty. Prior to this work, there was only one review summarising results from different studies about field hockey injuries which included head and face injuries[3] and Vucic *et al.*'s work represents the first meta-analysis which considers the interaction of dentofacial injury and players' attitude towards mouthguard use in field hockey.

Four key methodological aspects were only partially addressed in this review. One concern is related to study selection and extraction. While it is clear that two investigators performed the study selection independently and a third was involved in case of disagreement, how many investigators participated in the data extraction process was never fully specified. Another concern is presented by quality assessment of the included studies. A positive fact is that the Newcastle-Ottawa Quality Assessment Scale was used for cohort studies and the modifications were stated in the review, while the details were available as supplementary data. However, neither the score for each study nor the score of each item is provided in this review. Furthermore, the scientific quality of this meta-analysis suffers from issues of extreme variability as scores ranged between one to four out of five, averaging 2.8. The formulated conclusions did not adequately outline how the investigators distinguished or weighted between studies with lower and higher scores. Finally, while there was no likelihood of publication bias assessment, a limited number of studies meant that a stratified analysis was chosen instead of a preferable meta-regression.

Additionally, the authors did not adequately explain deviations from some methodological best practices in their work. The authors did not search for grey or unpublished literature but they mentioned contacting study authors and other experts via email. However, the authors did not specify their contribution or impact on the meta-analysis. Regarding the studies chosen for inclusion, there were no language restrictions and the type of studies eligible for inclusion were specified (ie observational) but this review failed to report excluded studies and the reasons for their exclusion.

Structurally, the limitations posed by the limited number of includable studies are apparent in this review. The inclusion of observational studies in the meta-analysis may produce misleading overall estimates due to bias and heterogeneity.[4-7] Another consideration is that seven out of the 11 included studies collected their data through self-administered questionnaires and eight studies failed to report whether the goalkeepers were excluded or not. The amateur players included a broad spectrum of players from different leagues and ages, and experiencing a dentofacial injury can vary between junior and senior players. The review investigators appropriately recommended that there is a need for new studies which control for age, gender, competition level, country, position, cause of injury, trainings per week and type of mouthguard used.

In terms of generalisability, this review adequately controls for potential geographic differences as the field hockey players were from North America (four studies from USA and Canada), Europe (four studies from Germany, the Netherlands and England), Africa (one study from Nigeria) and international (one study). However, five of the included studies in this review dated from 1992 or earlier and may not represent contemporary circumstances. For example, field hockey and dental associations recently made an effort to increase awareness of the importance of wearing mouthguards.[8, 9]

Through the meta-analysis, the authors were able to demonstrate that dentofacial trauma poses a serious problem in field hockey and that a considerable number of players still do not regularly wear mouthguards even though the likelihood is that if mouthguard usage was higher, fewer dentofacial injuries would occur during games and in training. After considering the limitations of the review, it is still safe to recommend mouthguards for the prevention of dentofacial injuries in field hockey players. Patterns of dentofacial injury and mouthguard use in field hockey should be determined in further studies that control for the identified variables and confounders.

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