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## EDITORIAL

# The importance of epidemiological research in sports medicine

## Importancia de la epidemiología en medicina del deporte

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Although the positive health effects of physical activity are well documented, sports participation is associated with a certain injury risk. Hence, prevention of injury is of utmost importance, and epidemiological research is the fundamental first step in the sequence of prevention<sup>1</sup>. In some sports the incidence, patterns and severity of injuries are well described. For instance, the Union of European Football Associations (UEFA) has ongoing injury surveillance in professional and international football since 2001<sup>2–4</sup>. In other sports, however, this information is lacking and there is an urgent need for more studies. In this editorial, we will briefly highlight some cornerstones of sports epidemiological research.

Historically, there have been considerable methodological variations making comparisons between studies difficult. In 2006, a methodological consensus for studies of football injury was published<sup>5</sup> and has since then been followed by some other team sports<sup>6</sup> and recently also one individual sport (tennis)<sup>7</sup>. A novel approach in the latter paper was the recommendation to record other medical conditions than injury, such as illnesses. This should prove an important step to get a complete picture of the medical problems of a specific sport, although it will put more demand on the data suppliers.

The main outcome in epidemiological sports injury research is usually injury incidence, expressed as a ratio between adequate numerator and denominator data. Common numerator data are the number of injuries/conditions or the number of injured/ill players during a defined period, and denominator data the number of athletes at risk, the number of athlete-exposures, or the time of sports participation. In team sports, injury incidence is usually (and preferably) expressed as the number of injuries per 1000 hours of participation. The injury incidence reported in a study thus fully depends on the definitions of injury and exposure used. In practice, injury is usually defined based on the athlete seeking medical attention, or the athlete being absent from sports participation, i.e. time loss<sup>5,7</sup>. In many sports, defining match or competition exposure is fairly easy and manageable to record. However, to accurately capture training exposure can be more difficult, in particular in individual sports. In football, training exposure is defined as “team based and individual physical activities under the control or guidance of the team’s coaching or fitness staff that are aimed at maintaining or improving players’ football skills or physical condition”<sup>5</sup>, and this should be applicable also in many other team sports. However, to date, most studies report only team based activities and exclude individual activities performed by the athletes. Consequently, they will under report the true training exposure and the most plausible reason is that individual training is more difficult to

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supervise and standardise compared to training carried out with the team. In many individual sports, e.g. alpine skiing, track and field, etc., recording training exposure may thus pose a considerable challenge for the data collector. Another key issue is to clearly define and separate between training exposure and any alternative or partial training performed due to an existing injury/medical condition.

The current recommendations for conducting high quality epidemiological sports injury research put great demands on medical practitioners and other data recorders on the field. To be successful in such research it is therefore important to establish a win-win situation between researchers and data providers in order to increase compliance and accuracy of data collection. A prerequisite is that the research questions are up-to-date and relevant for the medical personnel attending to the athletes and that they are given useful feedback to be able to work proactively to prevent injuries. For example, clubs can be provided with team specific injury statistics in relation to average values of the total sample. A key issue for the UEFA research group has therefore been to establish a close collaboration with the medical teams of the participating top clubs, including FC Barcelona and Real Madrid CF, during the course of the study. We believe that this working model has developed the study further and also ensured a dual exchange of knowledge about injury prevention.

Performing a well-conducted prevention study is even more difficult, and many of the existing studies have been under powered or have significant methodological limitations. To make proceedings transparent and to subject methodology to external review it is recommended that the design and planned outcomes are published a priori<sup>8</sup>.

## Conclusions and future recommendations

- Solid epidemiological research is currently lacking in several sports. Therefore, more studies are urgently needed to establish the extent of the injury problem as well as the underlying risk factors and mechanisms of injury.
- We recommend that the consensus proposal for football injury can be used in future studies of other team sports, such as team handball and basketball.
- In accordance with the recent consensus statement for tennis, we suggest that other medical conditions than injury are also included in sports epidemiological studies in order to get a complete overview of the health hazards for the athletes.
- In addition to collecting team based training exposure, researchers should strive to collect additional individual training exposure also in team sports, but to report this separately to facilitate comparison with previous studies.
- Finally, the ultimate goal of all sports injury research is injury prevention. Much of the prevention research published so far has been under powered and associated with other more or less severe limitations. It is therefore an obvious strength of a study if the protocol, sample size calculation and planned statistical analyses according to the main outcome are subjected to external review and published before data collection starts. (Figs. 1–4)



Fig. 1 Martin Hägglund.



Fig. 2 Markus Waldén.



Fig. 3 Lluís Til.



Fig. 4 Ricard Pruna.

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