



## Editorial

## Imminent topics in cardiac screening and injury recording



This issue of JSAMS addresses two burning topics of current sports medicine and sport science - mainly from a scientific but also from a practitioner's perspective:

How should cardiac screening look in (junior) athletes?

For injury recording, are there reliable alternatives to reports from the medical staff?

### 1. Cardiac screening

Two articles in this issue deal with cardiac screening<sup>1,2</sup> in athletes. Albiński et al. screened 891 athletes at an average age of 14.8 years from mixed sports whereas MacLachlan et al. carried out their examinations in 1,208 cricketers at an average age of 20.8 years. Both groups generally followed the "European" screening model which is mainly based on Italian procedures and which was shown to be effective in a study covering 26 years.<sup>3</sup> This model consists of a complete medical history, a targeted physical examination and a resting ECG. Only in cases of suspicious findings in one of these parts, further investigations are initiated, among them mostly echocardiography but also Holter monitoring or a cardiac MRI. In recent years, the "screening debate" circled around the specificity of the resting ECG which was felt to be too low by many American sports physicians and cardiologists and thereby creating too many "false positive" findings. Of course, too many false positives create higher follow-up costs than necessary. Due to the predominant indication for an echocardiography in these constellations one can even summarize: The more expensive echocardiography is, the higher the cost per saved life. It must be credited to Jonathan Drezner and his co-workers that this situation has improved vastly. He has led a group of international sports cardiologists and put together the "Seattle Criteria"<sup>4</sup> (which have later been refined) for the assessment of athletes' ECGs which improved the specificity of the resting ECG massively by means of a better identification of benign sport-related changes.

However, this does not eliminate all problems of athlete cardiac screening. Given that very few phenotypes of relevant cardiac diseases are already fully expressed in childhood, the question arises when the optimal age is for the first screening examination. It is striking that Albiński et al. in their young Swiss population identified 19 athletes (about 2%) with ECG abnormalities but finally cleared all of them for competition.<sup>1</sup> In some contrast, 7 athletes were found with major cardiac abnormalities (another 12 with "minor" ones) in the British study from MacLachlan et al. in their 6 years older cohort.<sup>2</sup> Although their follow-up process as well as their choice of screening tools over the study period differed a bit from the Switzerland study it can be stated that the "yield" was larger in older age. Noteworthy, this was not one longitudinal study in a single cohort with two measurement time points but instead two investigations

in independent samples with differing ethnic background. Nevertheless, one can learn from them that the "cost per relevant cardiac diagnosis" ratio is probably lower in older athletes. On the other hand side, we are striving to identify athletes at risk as early as possible to be able to treat them properly or at least to advise them how to avoid hazards. In many countries, initial screening examinations are scheduled at the age of 12–14 years. However, only longitudinal studies in large athlete cohorts which are screened repeatedly will show which is the optimal time point for the first cardiac screening. Fortunately, besides all cardiac screening considerations, all those examinations give sports physicians the opportunity to manage several other health-related topics of importance. For some - among them RED-S, iron deficiency and musculoskeletal issues - there is definitely a good time to address them for the first time in childhood and adolescence. And this is another point in favour of placing initial screening early enough in life.

### 2. Injury recording

Recording of injuries has become a relevant part of most scientific efforts for their prevention. According to van Mechelen's model<sup>5</sup> injury recording serves to describe the extent of a problem as well as to assess the effectiveness of preventive programmes. Several consensus papers<sup>6,7</sup> have been published describing how to optimally register injuries. Most of them regard information from medical staff taking care of the athletes most valid. In fact, this has been established as a "gold standard" in several areas of epidemiological research. Injuries as well as exposure times are reported by clubs and their employees or by the medical teams around individual athletes enabling the calculation of incidence rates. Recently, some downsides of this approach have become obvious:

- Study results are dependent on the willingness of clubs, coaches and athletes to participate. When the aim is to analyze an entire league or a defined population of athletes, it is necessary to have a full or at least a representative sample which may become difficult.
- When results are regularly reported back to clubs and athletes, this may lead to a tendency of underreporting in order to appear in more favourable light, i. e. as a very effective medical team. Such an unwanted (biasing) effect may even result from the publication of average results alone. The more professional a sport is, the more likely is such a behaviour.

Hoening et al.<sup>7</sup> have tried to overcome<sup>8</sup> these problems by use of a "citizen science-based approach", i. e. utilizing a (commercial) public online database which covers several leagues. Remarkably, they have

used the "gold standard" as one of their comparisons and finally arrive at the conclusion that their data source can only be used for the analysis of severe injuries or for the identification of certain injuries for separate analysis. This is interesting because it represents a bit more than a black-or-white recommendation and may guide the way to a more creative approach to injury recording and its epidemiological analysis. However, it needs to be taken into account that such a procedure is only feasible in highly professional leagues with a very good media coverage.

Although not realized in this study, the approach may even be extended to an estimation of incidences as they are calculated according to the Fuller Consensus Statement<sup>6</sup> for the chosen sport of football (soccer), i. e. per 1000 hours of exposure. With training schedules becoming more uniform and predictable among elite clubs, a reliable calculation of training exposure becomes possible. And nobody doubts that match exposure can be obtained reliably from public sources.

## References

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