**Name:** Edgar Schwarz

**What did they do?**
In this study 21 elite female footballers completed an intermitted cycling protocol in a heat chamber set to warm (20 °C; 30% rh) and hot (38 °C and 80% rh) conditions and performed a counter movement jump (CMJ) and an anticipation test pre and post cycling.

**Results**
During the cycling protocol performance was lower and heart rate higher when temperature was hot compared to warm. While CMJ performance declined similar in both conditions from pre to post, anticipation accuracy was more impaired after the hot condition compared to the warm.

**Why is it important?**
Compared to the influence of hotter temperatures on running performance, the influence on football specific cognitive tasks is less well understood. This is likely due to the fact, that finding a valid measure for football-specific cognitive performance in a laboratory (heat chamber) setting is hard, if at all possible. This study indicates that a decline in cognitive performance should be expected when competing in hot conditions, which calls for more field-based research potentially based on advanced tracking data enabling comparisons of actual decision making in football matches across a range of different temperatures.

**Things to consider**
It needs to be considered that an intermittent cycling protocol does not represent actual football match demands. Neither does the video-based anticipation task, represent actual decision-making performance. Participants watched ten 5-second match sequences, that paused just before a pass or shot was taken and had to predict the actual outcome (i.e. pass to player XY, shot to the right low corner, etc.). This of course differs strongly from taking a decision under actual game-demands including pressure, fatigue, and other factors. Further, although a sample size calculation deemed 21 players to be a sufficient sample size, this represents only a small sample of 17–19-year-old female footballers from one specific league.

**Take home message**
Cognitive performances of elite female football players might decline in hot environmental conditions. This needs further investigation in more football-specific protocols.

**Why did I choose this article?**
There is a traditional focus in thermoregulatory football research on running performance parameters in a lab-based setting. Although these might be the best reflective of pacing strategies, they are (if at all) only weakly correlated with success in football. Therefore, the influence of hotter temperatures on cognitive performances and players decision making (technical and tactical football performance) might be of more importance and needs to be highlighted and investigated more.

**Reference**

Pompeo A, Afonso J, Rodrigues Cirillo EL, Costa JA, Vilaça-Alves J, Garrido N, González-Víllora, Williams AM, Casanova F. (2024). Impact of temperature on physical and cognitive performance in elite female football players during intermittent exercise. *Scand J Med Sci Sports.* 34:e14646. https://doi.org/10.1111/sms.14646

**Name:** Guangze Zhang

**What did they do?**
This study conducted a detailed video analysis of Achilles tendon ruptures in professional male football players. The researchers systematically identified and analysed in-competition cases from the first and second national leagues. The video footage of Achilles tendon ruptures (80 of 227 cases) was accessed through Wyscout.com and other publicly available sources. Situational patterns such as pitch area, ball possession, direction of movement as well as biomechanical patterns at the time of injury were analysed by reviewers independently using a standardised checklist and motion analysis software (Kinovea v.0.8.15). Consensus was eventually reached among reviewers through panel discussion.

**Results**
In these analysed match injuries, five ruptures were classified as being direct contact, with indirect contact in 11 cases (i.e., contact to any body region except the lower leg or foot), and non-contact in 64 ruptures. Kinematic analysis showed that in most cases the hip joint moved from flexion to extension (83%), with the knee joint moving from flexion to extension (92%) and the foot being mostly pronate/neutral (98%) and abducted/neutral (97%). Stepping back was found to be the most common injury pattern, characterised by a sudden dorsiflexion of the plantarflexed foot. Other identified patterns such as landing, running/sprinting, jumping, and starting shared similar movement with high demand on eccentric contraction.

**Why is it important?**
Achilles tendon ruptures are severe injuries that can result in long absence time and significantly impact players' careers. By identifying common patterns and movements causing ruptures, this study provides valuable insights into the situational and biomechanical factors contributing to these injuries. This knowledge is crucial for developing effective prevention strategies and informing return-to-play process, ultimately enhancing individual and team performance.

**Things to consider**
The study only included publicly available data and videos, which might limit the comprehensiveness and details of the analysis. Most injuries (94%) were non-contact, suggesting that intrinsic factors, such playing position and individual biomechanics are critical areas for further research. The accuracy of the kinematic analysis depends on the quality of the video footage, which could vary in resolution and frame rate.

**Take home message**
The study highlights that most Achilles tendon ruptures in professional male football players occur through non-contact mechanisms involving sudden loading to the plantar-flexor musculotendinous unit. In fact, the triceps surae muscle may possibly load the Achilles tendon concentrically from proximal during the stance phase, which together with a forcefully performed ankle dorsiflexion from distal may exceed the tendon loading capacity.

**Why I chose this article?**
This article provides a comprehensive analysis of the situational and kinematic patterns for Achilles tendon injuries in professional football. Although risk factors

contributing to Achilles tendon ruptures were studied previously, biomechanical issues were rarely investigated in professional football. Utilising video analysis to uncover injury mechanisms and patterns represents a novel approach that can significantly contribute to the development of effective prevention and management strategies in general sports injuries.

**Reference**
Hoenig, T., Gronwald, T., Hollander, K., Klein, C., Frosch, K. H., Ueblacker, P., & Rolvien, T. (2023). Video analysis of Achilles tendon ruptures in professional male football (soccer) reveals underlying injury patterns and provides strategies for injury prevention. Knee surgery, sports traumatology, arthroscopy, 31(6), 2236-2245.

**Name:** Ana Ukaj

**What did they do?**
For the purpose of examining the incidence, causes, and changes over time of sudden cardiac death (SCD) in national collegiate athletes, combination of 4 different databases were used: National Collegiate Athletic Association (NCAA) resolutions list, Parent Heart Watch database and prospective media reports, National Center for Catastrophic Sports Injury Research database, and insurance claims. The data was collected retrospectively for 2002 through 2004 and prospectively from 2005 through 2022. The cause of death was determined using autopsy and other legal documents that provide information about the cause of death, searching the internet, online media reports and obituaries, and emails or phone calls to immediate relatives, coaches, athletic trainers, coroners, medical examiners, scholarship foundations or medical doctors involved in the case.

**Results**
During the 20-year study period, a total of 1102 deaths were recorded in 9,106,516 athlete-years. The overall incidence of SCD among NCAA athletes during the study period was 1:63,682 athlete-years [95% CI, 1:54,065-1:75,010]. The highest incidence of SCD was found in white and black male Division I basketball players (>1:2000 during a typical 4-year college career). The most common cause of death was from accidents (e.g., motor vehicle accidents, falls, n=560, 50.8%).

A definite or probable cardiac cause of SCD was identified in a total of 143 of 1102 cases (13%). The most common post-mortem finding was autopsy-negative sudden unexplained death (AN-SUD, 23 of 118 [19 %]), followed by idiopathic left ventricular hypertrophy/possible cardiomyopathy (20 of 118 [17 %]) and hypertrophic cardiomyopathy (15 of 118 [13 %]).

Of all SCD events (during exercise and in other, non-exercise-related circumstances), 72 of 143 athletes (50%) were diagnosed with exercise-related SCD. All athletes diagnosed with coronary artery anomalies (CAA) died during exercise-related activity (100%, n=8/8). In athletes with arrhythmogenic cardiomyopathy death occurred during exercise in 83% (n=5/6) of cases and in athletes with coronary artery disease in 71% (n=5/7) of cases. No cases of myocarditis were related to COVID-19 infection.

The incidence rate of other, non-cardiovascular deaths showed no significant change over time (5-year IRR, 0.98 [95% CI, 0.94-1.04]), while the incidence rate of SCD decreased significantly over the study period (5-year IRR, 0.71 [95% CI, 0.61-0.82]).

**Why is it important?**
This study shows that multiple methods are needed to detect cases, as a single method fails to identify all SCD cases in the absence of mandatory reporting. It also shows that the reliability of media reports alone was inadequate, especially in lower level of sports.

**Things to consider.**
Although the incidence of SCD has declined over the 20 years of study, the incidence was the highest in white and black male Division I basketball players compared to other populations of college athletes involved in the study. Consistent with previous

studies conducted on a similar topic, AN-SUD remains the most common cause of SCD. The most common cause of exercise- related SCD was CAA and arrhythmogenic cardiomyopathy. There were no cases of COVID-19 infection-related SCD, which was also found in other studies addressing a similar topic.

**Take home message**
Addressing the prevention of SCD in NCAA athletes, it is imperative that SCA in athletes is immediately recognised and medically managed to improve outcomes. Furthermore, this study identifies the highest incidence of SCD in the population of white and black male Division I basketball players among collegiate athletes.

**Why I chose this article?**
This article was selected because it emphasises the importance of a multi–methodological approach to detecting SCD cases and examining the temporal trend in the number of SCD cases over a 20 – year period. This allows overcoming the main limitations of studies addressing similar questions, in particular the lack of mandatory reporting of SCD cases.

**Reference**
Petek, B. J., Churchill, T. W., Moulson, N., Kliethermes, S. A., Baggish, A. L., Drezner, J. A., Patel, M. R., Ackerman, M. J., Kucera, K. L., Siebert, D. M., Salerno, L., Zigman Suchsland, M., Asif, I. M., Maleszewski, J. J., & Harmon, K. G. (2024). Sudden cardiac death in national collegiate athletic association athletes: A 20-year study. *Circulation*, 149(2), 80–90.
https://doi.org/10.1161/CIRCULATIONAHA.123.065908

**Name:** Rina Meha

## What did they do?

The objective of this study was to investigate the effects of motor-cognitive agility training on football performance after a six-week intervention. Participants of this study were forty-two adult amateur football players, and they were assigned into: change of direction, agility and dual task agility training group. The agility, change of direction and football-specific performance was tested before and after intervention using Loughborough Soccer Passing Test (LSPT), the Random Star Run with/without a ball, dribbling test with/without cognitive tasks and the modified T-Test

## Results

This study showed that across the three training groups (change of direction, agility, and dual-task agility) the interventions led to improvements in dribbling and change of direction performance. However, only the agility and dual-task agility groups showed significant improvements in football-specific tasks that involved cognitive challenges, such as multitasking and decision-making.

## Why is it important?

Agility is defended as a crucial performance component in football. The motor-cognitive demands are not considered in most of traditional agility trainings. Therefore, this study results showed the importance of integrating cognitive tasks into agility training by also enhancing the ecological and transferability of intervention effects on game performance. The study used block randomization, assigning participants to one of three groups. A G*Power sample size calculation determined 14 participants per group however, the number was increased to 20 to account for a 30% drop-out rate.

## Things to consider

This study used a different approach for agility training by incorporating cognitive tasks (multiple object tracking) which brings into attention the need for more similar training regimes that incorporate real-game scenarios. However, these study results might not generalize for other population, for example professional players, female football players, as their focus was on healthy male amateur football players. In addition, they used the SKILLCOURT system for training and assessment which might introduce familiarity effects, potentially confounding the results.

## Take home message

Agility training that includes cognitive tasks may enhance performance in football-specific tasks that involve multitasking components and decision-making. Football trainings should consider incorporating cognitive challenges into agility drills as this approach may lead to improved football skills performance.

## Why I chose this article?

This study investigates an under-covered area of how training protocols can be applied in real-world situations and transferred to different contexts. In addition, the results showed that by combining agility and cognitive tasks, we can simultaneously improve both skills in athletes.

**Reference**

Friebe, D., Banzer, W., Giesche, F., Haser, C., Hülsdünker, T., Pfab, F., Rußmann, F., Sieland, J., Spataro, F., & Vogt, L. (2024). Effects of 6-week motor-cognitive agility training on football test performance in adult amateur players – a three-armed randomized controlled trial. *Journal of Sports Science and Medicine*, 276–288. https://doi.org/10.52082/jssm.2024.276

**Name:** Minho Lee

**What did they do?**
The paper proposed a novel machine learning method for action spotting in football (soccer) videos. It developed a method that leverages the temporal context around each action, including goals, cards, and substitutions, rather than focusing solely on the single annotated frame from video footage. This approach applies different levels of importance to frames in the video based on their temporal proximity to the action. It places the highest importance on frames immediately following the action, as they provide critical context for accurately identifying the event. The effectiveness of the proposed method was tested on the SoccerNet dataset, a large-scale collection of soccer videos specifically designed for developing and evaluating algorithms for action spotting in soccer games, and it achieved a 12.8% increase in mean Average Precision (mAP) in action spotting, which measures how accurately the model detects specific actions such as goals, cards, and substitutions within the video frames, compared to other baseline methods.

**Results**
The method achieved a 62.5% mAP, representing a 12.8% improvement over the baseline of 49.7%. This performance boost was driven by three key components: temporal segmentation, context slicing, and an iterative one-to-one matching mechanism. Temporal segmentation allowed the model to focus on relevant time windows around actions, reducing noise from irrelevant frames. Context slicing, which included frames before and after the action, provided important context, leading to better action understanding. Lastly, the iterative one-to-one matching mechanism ensured precise alignment between predicted and ground truth actions. The experiment showed that each of these components contributed significantly to the model's performance, with temporal segmentation and context slicing improving Average-mAP from 57.8% to 62.5%, and the iterative matching mechanism increasing performance from 46.8% to 62.5%.

**Why is it important?**
This paper proposes a method to detect actions accurately such as fouls that lead to injuries or have a high probability of causing injuries in football video data. Furthermore, it improved the performance of the proposed method by considering the temporal context around each action. This proposed method is crucial for analyzing critical moments in football video data, ultimately improving player safety and game analysis.

**Things to consider.**
Validating the proposed method to different football datasets is important, specifically that involve injury-prone situations. While the paper provides a general framework for spotting various actions (goal, card, substitution), my research requires a specialized approach to focus solely on fouls or injury-prone situations. Developing additional techniques to filter and spot only foul situations accurately will be necessary to tailor the method to my specific research needs, ensuring precise identification and analysis of injury-prone situations.

**Take home message.**

The paper demonstrates that considering temporal context is crucial for accurately spotting actions in football videos, including events such as goals, fouls, and substitutions. Additionally, further investigation into methods for identifying players' postures and movements during collision situations from video data will be necessary to develop a comprehensive understanding of injury mechanisms and improve injury prevention strategies.

**Why I chose this article?**
I chose this article because it presents a novel and effective solution to the problem of action spotting in sports videos, which is directly relevant to my research. The innovative use of temporal context to improve action spotting accuracy intrigued me, as it aligns with my goal of accurately detecting foul situations that lead to injuries. Exploring this approach could significantly enhance the precision of my research.

**Reference**
Cioppa, A., Deliege, A., Giancola, S., Ghanem, B., Droogenbroeck, M. V., Gade, R., & Moeslund, T. B. (2020). A context-aware loss function for action spotting in soccer videos. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (pp. 13126-13136).

**Name:** Mahnaz Davarnia

**What did they do?**
This editorial (Optimizing pre-participation screening to prevent tragedy in young athletes: moving from if to how) refers to 'Value of screening for the risk of sudden cardiac death in young, competitive athletes', by P. Sarto et al. As it is an editorial, it discusses and reflects upon existing research, particularly Sarto et al.'s study, which demonstrated the effectiveness of pre-participation screenings in reducing sudden cardiac death in young athletes. It reviews the components of these programs, such as medical history, physical exams, ECGs, and exercise stress tests, and emphasizes the importance of repeated evaluations and improved ECG criteria to reduce false positives. The authors suggest more research to improve cardiovascular screening methods, using new technologies and keeping costs low.

**Results**
The authors emphasize that pre-participation cardiac screening, particularly with the inclusion of ECGs, can save lives. The screening program in Italy significantly reduced the rate of SCD in young athletes. However, questions remain regarding the optimal timing and frequency of screening, as well as the potential inclusion of additional tests. The editorial shifts the focus from whether screening should be done to how it can be optimized. Importantly, most cardiovascular diagnoses were made during repeat evaluations rather than the initial screening, highlighting the critical need for ongoing monitoring during adolescence when conditions such as hypertrophic cardiomyopathy may develop. They also support having Automated External Defibrillator (AED) and emphasizing the importance of robust public emergency response systems including widespread AED availability.

**Why is it important?**
This is important because it addresses the critical need for optimizing pre-participation cardiac screening in athletes to prevent SCD. The article also emphasizes shifting from debating whether these screenings should be done to focus on the most effective methods for implementation. By evaluating extensive data from Italy's mandatory screening program, the article highlights the benefits of including ECGs in screening protocols, the necessity of repeat evaluations, and the ongoing need for cost-effective and accurate screening methods.

**Things to consider.**

1) **Screening Protocols**: Different methods include history, physical exams, ECGs, exercise tests, and echocardiograms. The choice affects detection rates and costs.
2) **Age and Timing**: The best age and frequency for screenings are important.
3) **False Positives**: Improved ECG guidelines have reduced false positives.
4) **Genetic and Regional Differences**: Screening results can vary based on genetics and environment.
5) **Cost and Resources**: It's important to consider the cost-effectiveness of repeated screenings and how resources are used to maximize benefits.
6) **Imperfect Screening**: No screening program is perfect. In the P. Sarto study, which aimed to report the long-term findings of the Italian (PPS) in young, competitive athletes, it was found that one athlete experienced (SCA) despite

passing the initial screening and showing no diagnosable condition upon further examination.

**Take home message.**
It is time to change the question from whether screening is important to determining the best protocols for screening, for preventing SCD in athletes. The focus should be on developing and implementing the most effective screening methods to identify at-risk individuals. Additionally, it is crucial to consider the cost-effectiveness of these protocols to ensure they are accessible to all regions and athletes.

**Why I chose this article?**
This editorial is valuable because it looks at screening from a different angle. Instead of just asking if screening is important, it focuses on finding the best ways to screen athletes. It considers factors like cost, effectiveness, regional differences, and making sure all athletes can be included. This broad approach ensures that the screening methods are practical and beneficial for many athletes. By improving screening protocols, we can better protect athletes and positively impact their professional careers.

**Reference**
Beach, C. M., & Lampert, R. (2023). Optimizing pre-participation screening to prevent tragedy in young athletes: Moving from if to how. *European Heart Journal, 44*(12), 1093–1095. https://doi.org/10.1093/eurheartj/ehad015

**Name:** Rilind Obërtinca & Benedict Gondwe

**What did they do?**
The objective of this study was to explore the beliefs and perceptions of professional female footballers and staff (physiotherapists, team doctors, head coaches, strength and conditioning coaches, managers, and the head of performance) regarding injury prevention and performance protection in professional women's football. This was conducted using semi-structured interviews.

**Results**
According to the study, professional players and staff emphasize that amateurs and semi-professionals have limited resources and lack injury prevention strategies. On the other hand, they perceive the existing preventive measures in the professional setting as good and rely on the value of individualized care and a multidisciplinary approach.

**Why is it important?**
This study highlights the unique perceived injury risks faced by professional female footballers at different stages of their careers. Understanding these perceptions risks and the current state of injury prevention measures is crucial for developing more effective strategies to protect players. The insights gathered can inform improvements in resource allocation, training programs, and support systems, especially at the youth and non-professional levels.

**Things to consider.**
Although the study aimed at the highest levels of players and staff, it was limited to three teams from only two countries. Additionally, only 18 interviews were conducted, resulting in a very small sample size for each staff discipline—such as 5 players, 3 team doctors, and 2 head coaches, 2 physiotherapists, 3 strength and conditioning coaches, 2 managers, and 1 head of performance. This limitation affects the transferability and generalizability of the findings. A larger sample size and inclusion of teams from more countries could provide more comprehensive insights.

**Take home message.**
The participants interviewed in the present study described their previous experiences in amateur and semi-professional women's football as having limited resources and injury prevention strategies compared to their current reality as professionals.

**Why I chose this article?**
This study presents valuable insights from elite professional players and staff on how they perceive injury prevention in women's football. It also describes and compares their experiences during the transition from non-professional to professional football settings.

**Reference**
Bolling, C., Tomás, R., & Verhagen, E. (2024). 'Considering the reality, I am very lucky': how professional players and staff perceive injury prevention and performance protection in women's football. *British journal of sports medicine*, bjsports-2023-106891. Advance online publication. https://doi.org/10.1136/bjsports-2023-106891