

### Purpose

The study of fitness, health and well-being of professional sportsmen and women has been a rapidly developing field for many years as it has become clear that maximising performance and achieving success in sports competition is complex and multi-factorial (Brukner & Kahn, 2008). The interplay of biological, psychological and social factors affecting the athlete has been of particular interest to organisations keen to promote and develop success in their respective field of practice. Those sports that benefit from high levels of funding have been able to set up well established evidence-based programmes supported by teams of dedicated professionals. Other sports, such as motorcycle speedway, that are less 'main stream' have been less able to develop this support.

A process of enquiry has been developed through a partnership approach to evidence-based practice between the UEA School of Health Sciences and the Kings Lynn All Stars, utilising the student dissertation assignment as a vehicle for gathering and evaluating data. This purpose of this research is to identify ways to help improve the health and well-being, and ultimately the performance, of speedway riders. As there is currently little or no published research to underpin professional practice in this field, an audit of injuries provides a logical starting point for investigation. A research ethics application was successfully submitted to the UEA Ethics Committee in spring 2018 and student Stefan Deniel-Culshaw was recruited from the 2018 intake of Masters pre-registration physiotherapists to undertake this project.

#### Kings Lynn All Stars Speedway

Motorcycle speedway bikes have no brakes, they have just one gear, and a clutch. They have 500cc engines which run on methanol fuel and can accelerate to 60 mph in less than 2.5 seconds, which is faster than a Formula One car! Riders race around oval circuits of around 300 metres in length, in an anti-clockwise direction. To get around the tight corners at high speed the riders actually have to accelerate to bring the rear wheel out and initiate a "skid"! Speedway meetings usually involve two teams racing against each other. The teams have seven riders each and they race over fifteen heats with two riders from each team in every heat. If a rider wins a race they will earn the team 3 points, second they will earn 2 points, and third they will earn 1 point. There are no points awarded for finishing last in the heat.

There are 3 leagues in the UK: 1)The Premiership (the top league); 2)The Championship (the middle League); 3)The National League (the league that prepares the younger riders). Kings Lynn All Stars race in the Premier League.

#### Partners



**Inset:** Stefan Deniel-Culshaw (Physiotherapy student)  
**Main Photo:** Dr. Jane Cross (Senior Physiotherapy Lecturer & ethics proposal writer), Robin Brundle (Promotor, Kings Lynn All Stars) and Jon Larner (Senior Physiotherapy Lecturer and research supervisor)

#### UEA MSc Pre-registration Physiotherapy

A 2 year accelerated Master's programme leading to eligibility to register as a physiotherapist. Students enter the programme with a BSc degree at 2.1 grade or above.

Early in their programme at the UEA, students are offered the chance to join a member of faculty in addressing a specific research question. This may take the form of a literature review, service evaluation, secondary data analysis or actual empirical research study.

**By the end of the second year students are expected to:**

- Be able to contribute to a culture of enquiry within their profession and more widely in health and social care.
- Have gained direct experience of designing and delivering research, so that they can make a contribution to the future research agenda.
- Submit a 10,000 word research report (research dissertation).



**Systematic Prevention**  
van Mechelen et al, 1992

**Injury Causation Model**  
(Meeuwisse, 1991 / Bahr & Krosshaug, 2003)

### Method

#### Background

Injury is generally accepted to be an unavoidable outcome of sports competition due to the combination of stresses and strains placed upon the human body and the unpredictable nature of sporting events (Brukner & Kahn, 2008). However, alongside maximising performance, injury reduction or prevention is the ultimate goal of all sports/healthcare professionals. Keeping an athlete 'performing' is obviously advantageous to all stakeholders. van Mechelen, Hlobil and Kemper (1992) developed a conceptual model for achieving this aim, which recommends a four-step sequential approach for developing the systematic prevention of injury long term (pictured above).

#### Aims

We recorded all injuries self-reported by speedway riders during the 2018 season. Through a combination of observation and analysis of pre-season fitness data, the report used the injury causation model to draw conclusions on factors affecting the incidence and reporting of injuries. The report aimed to highlight the implications for practice and for future research.

#### Design

This evaluation used new auditable injury data collected by an MSc physiotherapy student for their dissertation project, supported by pre-existing quantitative performance data from all participants who completed the pre-season training. As part of a training intervention, commissioned by Kings Lynn Speedway and delivered by sports scientists, this performance data was already recorded and available for anonymous analysis. No power calculation was performed for a recommended sample size, as this project did not aim to determine an effect size, but reported descriptively on change within individuals.

All riders were formally consented and data was collected via a self-report form, using a standard set of subjective assessment questions. The amount of hours of sport participation lost to injury were recorded once the rider was able to return to competition. As all injuries may potentially impact on participation, this included any injury which occurs in contexts both inside and outside the realm of the speedway activities.

To ensure that the approach to data collection was systematic, we used van Mechelen et al's (1992) model to define incidence and severity of injuries. Incidence is usually defined as the number of injuries per exposure time (e.g. per 1000 hours of sports participation). It is important to note that the useful application of this is highly dependent on the definition of 'sports injury' and 'sports participation' and that a literature search was also conducted to confidently express these terms within this context. The severity of sports injuries is described within this model in relation to six categories: the nature of the injury, the duration and nature of treatment, sporting time lost, working time lost, permanent damage and cost.

#### Data Collection Procedures

Subjective information (self-reported by the rider) was collected using questions selected from a standard Maitland subjective assessment format. Although there are different methods available, the Maitland method (first described by Maitland in 1970) is widely recognised by physiotherapists as a competent and effective method of collecting data that can be used to form a logical and deduced hypothesis about the nature of the origins of the disorder. Due to the student status of the researcher, only the subjective part of the assessment process could be included. The student collected a more detailed summary of the nature and location of this injury from the rider, at the next available home fixture. When this was not possible, data was collected over the phone using the same format. All riders who consented to take part were also asked to provide a verbal summary of their previous medical history to provide context to any injuries that may occur during the season.

### Results

- 13 injuries were reported, 6 of which fulfilled the inclusion criteria and were used in the calculation of injury incidence.
- Five injuries were excluded as they did not meet the definition. These included:
  - three upper extremity injuries reported by participant 1
  - one neck injury from participant 3
  - one upper extremity injury reported by participant 6.
  - two upper extremity injuries reported by participant 2 did fulfil the definition but were excluded as they were sustained when competing for another team.
- Total exposure time for all participants was 517 minutes, equating to a team injury incidence of 696 injuries per 1000 hours of exposure.
- Mean severity of injuries included in the calculation was 2.66 (moderate to serious; AAAM, 2018)
- Total competitive time lost was 139 days.
- Statistical analysis revealed significant correlations between
  - injury incidence and average points per meeting ( $r = -.845, p = .034$ )
  - injury incidence and exposure ( $r = -.868, p = .025$ )
  - exposure and points average ( $r = .900, p = .014$ )
  - severity and injuries meeting the inclusion criteria ( $r = .980, p = .001$ )
  - the severity and total competitive time lost ( $r = .823, p = .044$ )

### Conclusions and Implications

- These findings suggest that Motorcycle Speedway is a high-risk sport. Athletes experience a high incidence of injuries per exposure time when compared to other sports, even those of a motorcycling racing nature.
- **Fractures and contusions are the most common injuries in motorcycle speedway and predominantly affect the extremities.**
- Methodological limitations apparent in this study reduce the reliability and generalisability of the findings. Thus, further injury surveillance research should be undertaken to more convincingly inform any hypothesised injury prevention strategies going forward.
- Investment in physiotherapy input over a competitive season may be a cost-effective strategy for managing time lost to injuries. However, given the nature of the sport and the riders involved, further qualitative research into health beliefs and attitudes to reporting and managing injuries might also be helpful for healthcare professionals aiming to preventing and manage injuries sustained in motorcycle speedway.