Objective  After anterior cruciate ligament (ACL) tear, the ACL reconstruction (ACLR) is the standard treatment to return to pivots/contacts sports. The goal of rehabilitation programs is to guide the functional recovery and the safe return to sport without additional knee injury or other injuries. Functional tests, like Hop tests and their side-to-side difference index [limb symmetry index (LSI)], are commonly used following ACLR to help return to sport decision making. However, the most commonly used criterion to return to sport is the postoperative time: return to light activities (RtAA) at 3 or 4 month mark and return to sport with contacts and side-cuttings (RtS) between 6 and 9 month mark. The aim of this study was to analyse the functional recovery after ACLR using the standard hops LSI scores and compare these scores with usual timeline of RtAA and RtS.

Patients and methods  Thirty-one patients with ACLR (19 males) with a mean age of 23 ± 7 years. Functional recovery was evaluated during rehabilitation and return to sports phases (from 3 to 12 months postoperatively), with 2 straight one-legged Hop tests for distance (Single and Triple Hop tests). The LSI was calculated for each test. A non-linear regression was calculated to obtain predictive values of 3, 4, 6 and 9 months postoperatively.

Results  At 3 months, Hop tests LSI was nearly 80%, with great variability [interquartile range (IQR): 75%–95%]. At 4 months, Hop tests LSI was just under 85% but with important variability (IQR: 78%–94%). At 6 months, Hop tests LSI was about 90%, and over 90% at 9 months. From 6 postoperatively, the variability decreased (IQR: 94%–99%).

Discussion/Conclusion  Comparing our results with the usual timeline of RtAA, we can say that the timeline of 3 months postoperatively is a little too short to RtAA. At 4 months postoperatively, the functional recovery can allow a safely RtAA. At 6 months postoperatively, the LSI is greater than 90%, allowing RtS. Given the great variability between patients before 6 months postoperatively, this functional assessment could be used in association with clinical and isokinetic evaluations to individualize the decision to return to sport.

Keywords  Anterior cruciate ligament reconstruction; Return to sport; Hop tests

Disclosure of interest  The authors declare that they have no competing interest.

http://dx.doi.org/10.1016/j.rehab.2016.07.047

CO0294

Aerobic metabolism response in paraspinal muscles of chronic low back pain patients and judo athletes during an isokinetic trunk extension exercise

Agathe Anthierens 1,∗, Nicolas Olivier1, Patrick Mucci1, André Thévenon 2

1 Université de Lille, EA7369, URefPSS : équipe 1, activité physique, muscle, santé, Lille, France
2 Hôpital Swynghedauw, CHRU de Lille, Service de Médecine Physique et de Réadaptation, 59037 Lille, France

∗ Corresponding author.

E-mail address: agathe.anthierens@etu.univ-lille2.fr (A. Anthierens)

Objective  Low back pain is a pathology associated to a trunk extensors muscles weakness. Studies suggested that it could be associated with an inadequacy between oxygen demand and oxygen utilization by paraspinal muscles (Kell and Bhambhani, 2006). In contrast to chronic low back pain (CLBP) patients, judo athletes are characterized by a great trunk extensors muscles endurance, due to their intensive solicitation within sport practice. Our purpose was to compare aerobic metabolism in those muscles of CLBP patients with judo athletes.

Patients and methods  Ten judokas and 11 CLBP completed a submaximal isokinetic trunk extension exercise at 60°/s (70% of the maximal total work performed in Continuous Passive Motion mode during one repetition) during 5 min. The flexion at 30°/s was passive. Oxygenation and muscular blood volume (BVm) were evaluated by using near infrared spectroscopy. Oxygen consumption (VO2) was measured by using metabolic gaz analyser. Total work performed during exercise (TT) was measured by the dynamometer.

Results  TT and VO2 were lower in CLBP (P<0.05), whereas the ratio VO2/TT was greater in CLBP (P<0.05). BVm decreased significantly only for CLBP during exercise (P<0.05). Muscular des-oxygenation increased significantly only for the judokas group (P<0.05).

Discussion/Conclusion  This study brings out the weakness of paraspinal muscle in CLBP, and the diminution of the motor

CO0293

Epidemiological study on injuries and risk factors for injuries in the amateur golfer French high-level

Colin Perron2, Olivier Rouillon2, Pascal Edouard1,∗

1 CHU de Saint-Étienne, Université Jean-Monnet, Service de Physiologie Clinique et de l’Exercice, Unité de Médecine du Sport, Laboratoire Inter-universitaire de Biologie de la Motricité, EA 7424, Saint-Étienne cedex 2, France
2 CHU de Saint-Étienne, Service de Physiologie Clinique et de l’Exercice, Unité de Médecine du Sport, Laboratoire Inter-universitaire de Biologie de la Motricité, EA 7424, Saint-Étienne, France
3 Fédération française de Golf, Commission médicale, Levallois-Perret, France

∗ Corresponding author.

E-mail address: pascal.edouard42@gmail.com (P. Edouard)

Objective  The objective of this study was to determine the incidence, characteristics and risk factors of injuries to French golfers high-level.

Material and methods  It was a national retrospective study by mailing a questionnaire to all the French Golf licensed under ten handicap. The questionnaire collected information on the characteristics of the player, practicing golf, equipment and the occurrence or not of an injury during the season 2015. A descriptive analysis and a comparison between the injured and uninjured golfers were made, followed by univariate and multivariate analysis to investigate potential risk factors.

Results  A total of 1382 golfers returned a full questionnaire and were therefore included in the study. We found 712 injuries (52%) and an incidence of 1.99 injuries per 1000 hours of playing golf. The most frequent injuries were at: lumbar spine (21.2%), the dominant shoulder (7.8%) and the thoracic spine (7.4%). An analysis was also performed by gender who did not find differences in the occurrence of an injury between women and men. The injury number 1 in men was located at the lumbar spine (23.1%) and among women in the dominant shoulder (11%) and lumbar spine (11%). We noted a recurrence in 37% of injuries in women and 44.8% in men. The injury dragged her into 53% of cases in men and 56.1% in women judgment of golf and in 9.4% of men and 8.7% of women work stoppage. Protective factors highlighted were the absence of upper limb overuse or wearing heavy workload, lack of monitoring by a golf professional (P=0.026). Contributing factors were a number of months per year high set (P=0.0127) and recent use of clubs (P=0.0034).

Discussion/Conclusion  Golf is a provider of injuries with a high-level of golfer two injuries in a season. Prevention must be the heart of the management of golfer taking into account the protective factors and risk factors.

Keywords  Sports injury prevention; Epidemiology; Golf
efficiency during a submaximal exercise, compared to judo athletes. Our results suggest that it is associated to a diminution of BVm and a lower O\textsubscript{2} extraction in paraspinal muscles. It could suggest a diminution of the paraspinal muscles aerobic fitness in CLBP patient.

**Keywords** Low back pain; Isokinetic exercise; Aerobic metabolism

**Disclosure of interest** The authors declare that they have no competing interest.

http://dx.doi.org/10.1016/j.rehab.2016.07.049

### Posters

**PO053**

**An injury complaints in the months before the championships is a risk factor for injury during athletics championships**

Pascal Edouard\textsuperscript{4,*}, Jenny Jacobsson\textsuperscript{1}, Toomas Timpka\textsuperscript{1}, Ola Ronsen\textsuperscript{2}, Alma Kajenienne\textsuperscript{2}, Orjan Dahlstrom\textsuperscript{1}, Armin Spresco\textsuperscript{1}, Juan-Malo Alonso\textsuperscript{2}

\textsuperscript{1} Linköping University, Athletics Research Center, Linköping, Sweden
\textsuperscript{2} International Association of Athletics Federations (IAAF), Medical and Anti-doping Commission, Monaco, Monaco
\textsuperscript{3} Linköping University, Department of Behavioural Sciences and Linkoping, Sweden
\textsuperscript{4} CHU of Saint-Étienne, Service de Médecine du sport et Réadaptation, Bordeaux, France

\* corresponding author. E-mail address: pascal.edouard42@gmail.com (P. Edouard)

**Objective** During international athletics championships, the incidence and characteristics of new injuries have been well described: about 10% of registered athletes have a new injury. It seemed also important to understand the complaints of athletes in terms of injuries in the period before and at the start of the championships and potential association with potential new injuries for identification of possible risk factors.

The objective of this study was to determine the health of athletes before the start of an international athletics championships and to identify risk factors for new injuries.

**Patients and methods** In the 2013 World Athletics Championships in Moscow, all athletes enrolled (n = 1784) were asked to complete a pre-participation health questionnaire (PHQ) collecting data on the health status during the months preceding the championships. During the period of the Championships, all new injuries were prospectively recorded.

**Results** The PHQ was completed by 698 (39%) of the athletes; 204 (29.2%) reported suffering such injury complaint during the month before the championships. The most common mode of onset of pain before championships was gradual (43.6%). Forty-nine athletes reported at least one new injury during the championships. Athletes who reported suffering injuries before championships had an increased risk of having a new injury during the championship [odds ratio (OR) = 2.09; 95% confidence interval (95% CI): 1.16–3.77; \(P = 0.014\)] and those who reported suffering injuries complaints before a gradual fashion appearance were at increased risk of almost four times to re-injury with sport stop in the championship (OR = 3.92; 95% CI: 1.69–9.08; \(P = 0.001\)).

**Discussion/Conclusion** Approximately one third of athletes participating in an international athletics championship and involved in this study reported an injury complaint during the month before the championships. This represented a risk factor to suffer a new injury during the championship.

This study highlights the potential importance of a pre-participation health questionnaire as a screening tool to identify athletes at risk of injury before international athletics championships.

**Disclosure of interest** The authors declare that they have no competing interest.

http://dx.doi.org/10.1016/j.rehab.2016.07.050

**PO054**

**Athletic injury prevention:** 

**Epidemiology of injuries during the French Elite championships**

Pascal Edouard\textsuperscript{4,*}, Jean-Michel Serra\textsuperscript{1}, Pierre Hertert\textsuperscript{1}, Emmanuelle Cugy\textsuperscript{2}, Nicolas Morel\textsuperscript{3}, Martine Prevost\textsuperscript{1}, Frédéric Depiesse\textsuperscript{1}

\textsuperscript{1} Fédération Française d’Athlétisme, Commission médicale, Paris, France
\textsuperscript{2} CHU de Bordeaux, Service de Médecine Physique et de Réadaptation, Bordeaux, France
\textsuperscript{3} CHU de Reims, Service d’Orthopédie, Reims, France
\textsuperscript{4} CHU de Saint-Étienne, Université Jean-Monnet, Service de Physiologie Clinique et de l’Exercice, Unité de médecine du sport et Laboratoire Inter-universitaire de Biologie de la Motricité, EA 7424, Saint-Étienne, France

\* Corresponding author. E-mail address: pascal.edouard42@gmail.com (P. Edouard)

**Objective** The epidemiology of injuries is the first step in the sports injuries prevention. In this context, the IAAF and EA have implemented a prospective injury follow-up during their international athletics championships since 2007, and the FFA initiated since the French championships in 2014.

The aim of the study was to determine the incidence and characteristics of injuries during the French Elite championships.

**Patients and methods** During the period of the outdoor and indoor French Elite championships, all newly occurring injuries were recorded by the local medical team.

**Results** During the outdoor French Elite championships (2014 and 2015), an incidence of 40 to 60 injuries per 1000 registered athletes has been reported.

The main diagnoses were: muscle injury hamstring and leg cramps. The injuries occurred mainly in combined events disciplines (20–50%), hurdles (37%), sprint (23–29%) and jumps (19%). It is also interesting to note that 50 athletes (9%) contested the championships and mentioned already present injury (occurred the previous day, weeks or months before the championships and/or recurrent during the championships). At the indoor French Elite championships (2014 and 2015), an incidence of 45–48 injuries per 1000 registered athletes has been reported. The main diagnosis was muscle hamstring injury, followed by knee injuries and ankle sprains. The injuries occurred primarily in jumps (29%), combined events (24%), sprint (17–24%) and hurdles (18%).

**Discussion/Conclusion** It is emphasized that this is the first epidemiological data during the French Elite Athletics championships. This information is fundamental to understanding the risk of injury among Elite athletes at the French national level to develop well-adapted prevention measures to their own problems. The injury is multifactorial, its prevention requires the consideration and management of several parameters such as physical fitness, technical mastery of gesture, lifestyle, psychological aspects, a good course of treatment, exercise and sporting rules.

**Disclosure of interest** The authors declare that they have no competing interest.

http://dx.doi.org/10.1016/j.rehab.2016.07.051