Main Outcome Measurements Fatigue expressed as the percentage of jump-loss (10%) was the dependent binary variable. A stepwise logistic regression analysis was used to analyze the relationship between fatigue, covariates, and factors.
Results Previous soreness and the number of jumps performed in practice or competition were the only factors found to be related to a significant level of fatigue experienced by the athletes ($p<0.001$).
Conclusions Although monitoring processes in team sports are today frequent, not all the load markers seem to have the same importance explaining the level of fatigue experienced by the athletes. Pre-practice level of muscle soreness and the number of jumps performed during the activity, a specific expression of external load in volleyball, reveal as the key elements to be controlled by coaches and practitioners to promote an optimal load adaptation.

116 ABSTRACT WITHDRAWN

117 PERCEPTIONS OF TRAINING LOAD AND WELLNESS MONITORING OF STELLENBOSCH UNIVERSITY HIGH PERFORMANCE STUDENT-ATHLETES

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Background The effective monitoring of athletes can assist in optimising their performance. This monitoring is particularly important in university student-athletes who have academic stressors additional to their training. The Stellenbosch University High Performance programme manages the top student-athletes and have implemented a training load and wellness monitoring system to assist with this.
Objective The aim of this study was to investigate the student-athletes' perceptions of this monitoring system and identify potential barriers to their adherence to the programme.
Design Cross-sectional survey.
Setting Students (young adults) who were part of the Stellenbosch University High Performance programme in 2019.
Patients (or Participants) All 156 High Performance athletes across six sporting codes received the survey, of which 146 (96%) submitted a complete survey.
Interventions (or Assessment of Risk Factors) A six-question survey was distributed via the programme manager to the student-athletes (n=156).
Main Outcome Measurements Four of this survey's questions were based upon a study conducted in nine elite U.K. athletes and two additional questions were specific to the Stellenbosch High Performance context. Results were presented as frequencies on the original studies Likert scale.
Results Half (50%, n=74) of all athletes agreed that they received sufficient feedback from the data that they entered. Almost half (46%, n=69) agreed that sufficient action was taken by their Strength and Conditioning trainers when they indicated a meaningful change in their monitoring scores. Almost all (97%, n=144) athletes agreed that they responded honestly to training monitoring questions. About two-thirds (67%, n=100) of athletes agreed that training monitoring and feedback helped to optimise their training performances.
Conclusions The Stellenbosch High Performance student-athletes were substantially more positive about training monitoring than the elite UK athletes. This positivity bodes well for the Stellenbosch High Performance programme, but also highlights the importance of regular feedback to these student-athletes.

118 APPLICATION OF THE ACUTE:CHRONIC WORKLOAD RATIO IN CHILDREN

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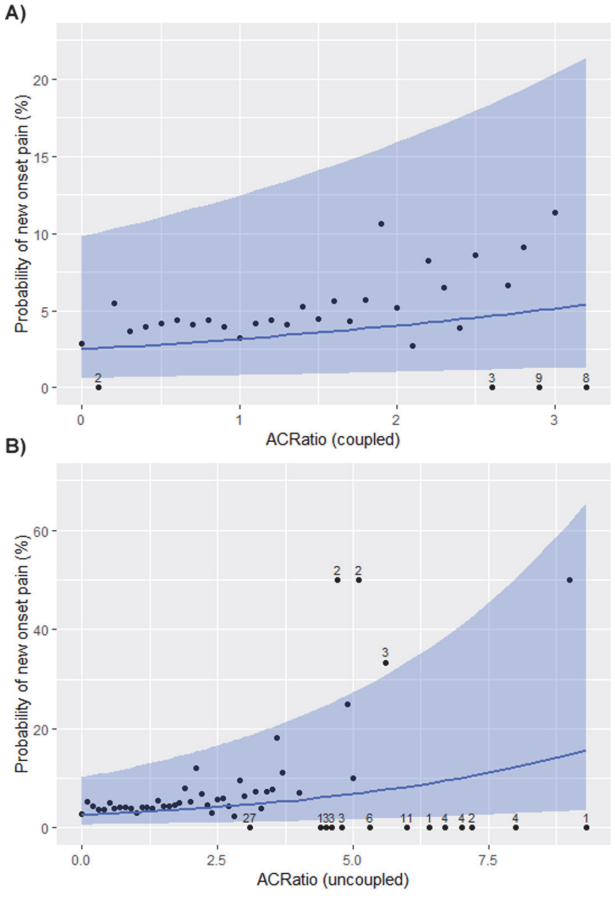
Background The IOC recommends using the acute:chronic workload ratio (ACRatio) to quantify changes in relative activity. The ACRatio has been used in adult and youth but not in children.
Objective Determine the relationship between the ACRatio and new onset pain in children.



Abstract 118 Figure 1 Probability of new onset pain at different A) coupled and B) uncoupled ACRatios. Logistic regression curves with 95% CIs were fitted. The number of observations are shown for outliers

Design We used the CHAMPS-DK data, which includes prospectively collected weekly activity and pain data using SMS-texting in Danish schoolchildren.
Setting Recreational children's sports.
Participants Parents of 1152 schoolchildren aged 5–10 in Svendborg, Denmark provided information on their child's activity and pain during 5.5 years of follow-up.
Interventions/Assessment of Risk Factors We measured the coupled ACRatio using activity in the index week (week of new onset pain) divided by average activity in the index and past 3 weeks (total 4 weeks) and the uncoupled ACRatio using activity in the week before the index week divided by average of the 4 weeks before the index week.
Main Outcome Measurements Development of new onset pain.
Results The total incidence rate of new onset pain was 2 events per person-year. Coupled ACRatios ranged from 0 to 3.20 (mean 1.00) and uncoupled ACRatios ranged from 0 to 9.33 (mean 1.03). The risk ratio for new onset pain using the coupled ACRatio was 1.26 [1.18, 1.36] for each unit increase in ACRatio. The risk ratio using the uncoupled ACRatio was 1.21 [1.16, 1.27]. There was no U-shaped curve, unlike what has previously been observed in injury studies in adults (Figure 1).
Conclusion The risk of new onset pain in children increases relatively linearly with increases in the coupled and uncoupled ACRatio.

119 THE ACUTE:CHRONIC WORKLOAD RATIO: WHY ONE SIZE DOES NOT FIT ALL

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Background The acute: chronic workload ratio (ACWR) is a widely adopted training load aggregation tool to manage injury risk in sport. Recently, methodological concerns have been raised regarding this approach.
Objective To establish best-fit calculation methods for the ACWR when assessing injury risk, and to assess reproducibility of methods between professional Rugby Union teams playing in the same league.
Design Observational cohort study.
Setting Thirteen professional rugby clubs over two seasons.
Patients (or Participants) During two seasons, 433 and 569 players were recruited, meaning 1002 player seasons from 696 unique players.
Interventions (or Assessment of Risk Factors) Calculation methods: rolling averages(RA) versus exponentially-weighted moving averages (EWMA), coupled versus uncoupled, acute time windows (3–9 day), and chronic time windows (14–35 day).
Main Outcome Measurements Akaike Information Criterion (AIC) and Area Under the Curve (AUC) of model fit to injury risk.
Results 129,448 training load values were collected and aggregated into ACWR values to assess and compare their model fit to 1718 recorded injuries. In the 13 clubs there were 8 different 'best fit' ACWR calculations according to AIC score, with 3-day acute loads, 14-day chronic loads, EWMA and coupled approaches being the most common 'best fit' models. When the data was pooled, an EWMA, coupled 3:14 day ACWR provided the best fit; this finding was supported using AUC. Irrespective of the averaging or coupling method used, there was very little support for the commonly cited 7:28 day ACWR values.
Conclusions The commonly described 7:28 day average ACWR value may not be the most appropriate in a rugby setting, with 3:14 day EWMA coupled ACWRs providing better model fits. In addition, the best-fitting ACWR is highly variable across a somewhat homogenous set of clubs. Therefore, teams wishing to use ACWRs should model their own data to identify the version that is most appropriate for their setting, while the limitations of this metric should be understood when interpreting the data produced.

120 ANTIOXIDANT BLOOD PLASMA PROFILES DURING A PERIOD OF HEIGH TRAINING LOADS AT ALTITUDE IN ELITE ATHLETES

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Background Intensive muscular exercise is known to increase oxidative stress, free radical production and, as part of the physiological process of adaptations to adequate training loads.
Objective To evaluate the antioxidant reserve of blood plasma of elite athletes in the period of high training loads at altitude using a new approach based on kinetic chemiluminometry.
Design Prospective intervention study, without control group.
Setting Professional endurance athletes (speed skating).
Patients (or Participants) 13 elite athletes: 8 males (185 (180–186) cm, 84 (81–86) kg, body mass index 24.6 (24.1–25.3) kg/m^2, 26(24–27) yrs, VO2max 60 (61–67) mL/min/kg) and 5 females (164 (164–171) cm, 60 (56–61) kg, body mass index 20.8 (20.6–23.2) kg/m^2, 21(22–32) yrs, VO2max 57 (55–62) mL/min/kg) participated in the study.
Interventions (or Assessment of Risk Factors) Athletes underwent training camp at the altitude 1850 m during 20 days. Blood was taken every four days in the morning on an empty stomach immediately after a day of rest.
Main Outcome Measurements Training impulse and hypoxic impulse were measured to quantify training and hypoxic dose. Measurement of the antioxidant activity of blood plasma by the derivative method of luminol-activated hemiluminescence using 2,2'-azobis (2-amidino-substituted) dihydrochloride (ABAP). The total antioxidant capacity (TAC) andantioxidant capacity by the required proteins were determined.
Results For each athlete a set of antioxidant profiles were obtained. A change in the antioxidant profile for both studied parameters were observed. The indicator that most quickly responds to training load - TAC. In female TAC had a smoother character, which may be associated with lower loads (TRIMP 190(108–242) c.u.in males and 131 (117–185)c.u. females) and/or «hypoxic dose» (M 98 (61–104) c.u. and F 52 (50–75) c.u.) or features of the adaptive response.
Conclusions The proposed technique can help in understanding antioxidant reserve of blood plasma and of elite athletes for future management.