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GPS and subjective data do not correlate with muscle damage assessed by blood creatine kinase level following international womens rugby union game

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## INTRODUCTION:

Rugby is an intermittent, high-intensity contact and running sport that causes muscle damage. Biological markers such as creatine kinase are currently used to adapt the training protocols and follow the recovery of athletes after a game. However, the evolution of biological markers follows specific kinetics which peaks up to 48h after the game and delays the choice of the recovery protocol. Therefore, developing new strategies to identify earlier exercise-induced muscle damage would be interesting. With the development of current technologies, a multitude of data is available from the field, such as GPS or subjective questionnaires. The study aimed to identify whether GPS parameters and/or subjective questionnaires will reflect muscle damage values determine using biological assessment.

## METHODS:

Twenty-six french womens rugby union players (mean age:  $26.1 \pm 3.4$  years, mean body mass:  $75.5 \pm 11.6$  kg, mean height:  $172 \pm 6.9$  cm) were monitored using GPS during five matches of the Rugby World Cup in October 2022. Questionnaires and CPK were monitored 36 hours after the match. Only players who played at least 50 minutes of the match were included in the study. At the end of each match, 11 GPS parameters were studied: playing time, total distance, percent walking, maximal aerobic speed percent activity, number of accelerations and decelerations, high-intensity distance, very high-intensity distance, sprint distance, and maximum speed. A video analysis allowed us to quantification 13 high-intensity rugby action parameters: total number of high-intensity actions and number per minute, number of jumps and lifts, first, second and third row pushes, number of mauls, number of times carrying the ball, number of offensive and defensive rucks, number of tackles, tackle assists and accelerations in the game. The rate of perceived exertion (RPE) was measured using Borg Scale modified by Foster.

## RESULTS:

Sixty-nine data were recorded for comparison. The mean CPK post 36h of the match was  $350 \pm 273$  UI/L and a delta of  $308 \pm 250$  UI/L compared to basal values was measured. Among the 35 parameters, only two parameters, tackle and activity, were correlated with CPK level but the relations were characterized by low coefficients of determination ( $<0.1$ ).

## CONCLUSION:

The physical strain of a rugby match induces muscle damage. These results suggest that GPS data and subjective surveys do not reflect muscle damage and, on a larger scale, tools to investigate fatigue in international female rugby players. Further study with other time point measurements of CPK kinetic and other biological parameters needs to be investigated to determine whether there are of interest.

Topic: Training and Testing

Presentation Poster

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