COVID-19, quarantine and progressive return to play delay sprint performance enhancement of young female rugby players

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Headline

Despite the fact that athletes do not belong to the risk group for severe complications, many people, and sometimes entire sports teams, have been affected by Coronavirus disease 2019 (COVID-19)(1,2). All managers, scientists and medical staff are worried about the effects of prolonged quarantines and postponements of matches on the players' health and performance levels. Regarding "return to play", the World Rugby Board is very cautious and developed a set of safe Return to Play (RTP) guidelines for rugby activities during the pandemic (3), and several World Rugby-affiliated protocols for preparation of return to training and competition (4,5). However, the effect of COVID-19 on performance has not been described. In this perspective, understanding how COVID-19 and its related training strategies affect performance will help staff to avoid performance decreases as much as possible.

Aim

This study aimed to describe the longitudinal changes in sprint performances in young women rugby players following a COVID-19 cluster.

Methods

Athletes

Thirteen French women rugby players (mean±SD; age: 17±1 years, body mass: 73.4±12.4 kg, height: 1.71±0.05 m) were involved in a federal training structure with daily training. These players were defined as "young elite sportswomen" because they played in the best category of their generation and were identified as future talent by the French Rugby Federation. All subjects signed written consents. The experiments were performed according to Helsinki Declaration and approved by the local ethic committee (#2021-328 of University of Lille).

Design

During this cross-sectional study, the players were tested four times: i) at the start of the preseason, ii) after the COVID-19 fortnight, iii) one month after the reopening of the structure, and iv) three months after the reopening of the structure. During the fortnight, COVID-19 subjects were led to independently perform sessions at home and with a strength and conditioning coach during videoconference. The subjects trained nine times per week during 60 min and the training sessions included physical training gym sessions to maintained strength and/or aerobic capacities.

Methodology

The players completed three 10 m, 20 m and two 50 m sprints on synthetic turf using infrared timing gates (Brower Timing Systems, Draper, Utah, USA). The timing gates were placed at hip height approximately 90 cm above the ground, at 0, 10, 20 and 50 m, respectively. The players used rugby cleats and started from a standing position with their front foot positioned 0.5 m behind the start line. They were instructed to perform all sprints with maximum effort. The best performance was chosen for the analysis.

Statistics

Statistical analysis was performed using Prism 8.4.1. (GraphPad Software, San Diego, CA, USA). Quantitative data are expressed as mean±standard deviation. A 95% confidence interval (95% CI) was determined with the mean difference and Cohen's effect sizes (ES) is presented for all variables as negligible (< 0.2); small (0.2–0.6); moderate (0.6–1.2); large (1.2–2.0); and very large (> 2.0) (6). Normality tests (Shapiro-Wilk test) was performed to verify the normality of the data. A one-way analysis of variance (ANOVA) was used to detect a time effect for each parametre and a Tukey post hoc test was used to identify differences when applicable. Significance level was set at $p \leq 0.05$.

Results

Thirteen participants were involved in this study: 10 had COVID-19-related symptoms and three players were asymptomatic. ANOVA revealed that COVID-19 altered all sprint performances with moderate to large effects (pre- vs. post-values: 10 m: $p < 0.001$, ES: 1.51; 20 m: $p < 0.001$, ES: 1.25; 50 m: $p < 0.014$, ES: 0.88). COVID-19 was associated with an alteration of the 10 m performances between pre- vs. post-COVID-19 (1.97±0.11 sec [95% CI: 1.90–2.03] vs. 2.21±0.12 sec [95% CI: 2.14–2.28], respectively; $p < 0.001$, ES: 1.51; Fig. 1A). A greater alteration was observed in 10-m performance compared to 20-m and 50-m (respectively: +12.5±4.9%; +8.6±4.1%; +6.0±5.6%, $p<0.01$). The performances progressively returned to baseline after three months of training. A similar pattern was observed for the 20 m and 50 m performances (Fig 1B and 1C, respectively). Indeed, the 20 m and 50 m performances were reduced by 8.6±4.1% [95% CI: 6.1–11.1] ($p < 0.001$; ES: 1.25) and 6.0±5.7% [CI: 2.4–9.6] ($p < 0.05$; ES: 0.88), respectively, after COVID-19 quarantine.

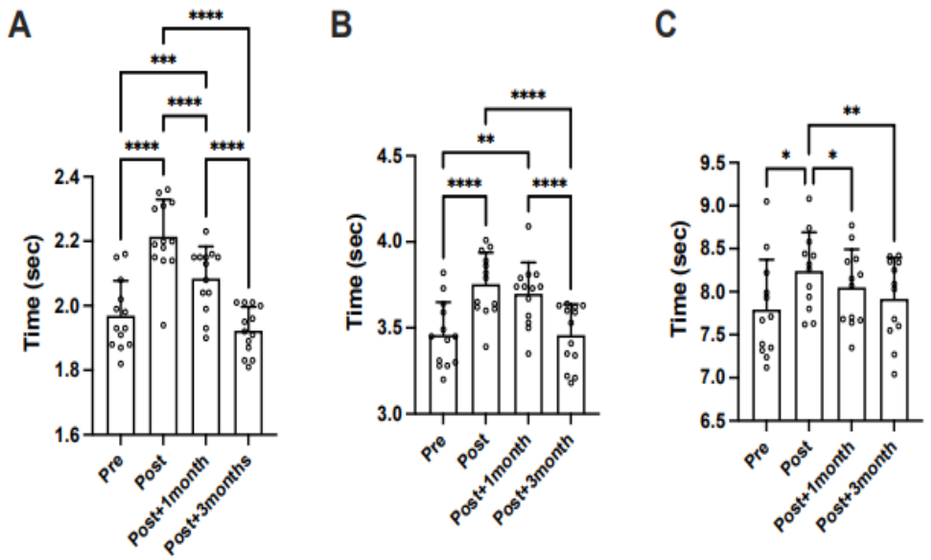

Fig. 1. **Sprint performances (A) 10 m sprint performances (B) 20 m performances (C) 50 m performances; Note: *p < 0.05, **p < 0.01, ***p < 0.001, ****p < 0.0001**

Discussion

This is the first study to report the effect of COVID-19 combined with a quarantine period on running speed abilities. We observed a decrease in performance in the 10, 20 and 50-m tests with a return to baseline values delayed to three months. Coaches should be aware that alterations in speed capacity can be expected after COVID-19 contraction, leading to long-term cessation or reduction of training for team sports players. De-training can be defined as a partial reduction or total interruption of training loads, leading to a series of physical and physiological adaptations (7). Discrepancies has been previously reported as some showed no change or even an increase in certain strength, speed and power qualities after periods of inactivity (8,9), while others detected a significant reduction in strength and power performance in athletes with a training history after long-term de-training (i.e., periods longer than four weeks) (10). In this ongoing study, players took approximately three months to return to their pre-COVID-19 values. This is a similar result to the Christensen's study that found that after two weeks without training, three weeks of re-training was not sufficient to recover to baseline performance. It seems difficult to know, however, whether the performance decreases were due to de-training and/or SARS-CoV-2 infection. Further analysis is needed to observe a causal link.

Practical Applications

- For a return to baseline values of sprint performances prior to the onset of the COVID-19, the timescales were approximately three months.
- The evaluation of neuromuscular abilities via tests or daily monitoring would make it possible to identify the losses that occur if practice is unfortunately stopped.
- Training strategies for sprint acceleration should be implemented as soon as practice is resumed in order to limit and recover initial sprint performances as quickly as possible.

Limitations

- There is no control group, we cannot rule out that changes in physical fitness occurs.
- The small number of asymptomatic players (three players) did not allow us to discriminate a specific effect associated to symptoms.

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