Negative Impact Of COVID-19 Home Confinement On Physical Performance Of Elite Youth Basketball Players

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Headline

Early in 2020 the world witnessed the global outbreak of new virus named coronavirus disease or COVID-19. Sport activities of any kind were abruptly stopped and players, coaches and other personnel were obliged to home confinement together with general population. In Spain, mandatory quarantine was announced on March 14th and players were able to return to train with coaching supervision on May 14th after conducting official medical inspection. During the period of 60 days players were forced to train at home with poor resources of equipment, without adequate communication with coaches, as well as minimal sunlight exposure due to forbidden outdoor activities (1, 10). In the quarantine, many players did not train much, some focused on bodyweight strength while others used stationary bikes for conditioning. Regardless of training type, it was obvious that basketball players will face detraining, a phenomenon defined as decrement in physical performance due to cessation of training activities (3). As jumping, sprinting and change of direction activities were minimized or completely ceased, loss of performance for basketball players was immense. Firstly, significant decrements in power qualities come a result of changes in muscle size and architecture, as well as tendon properties (2, 9) what further leads to reduction in muscle strength, power and rate of force development (11). Secondly, drop in cardiorespiratory function5 lead to impaired aerobic capacity and anaerobic endurance of players (5). Thirdly, players were also challenged to change and adjust their nutritional habits in order to minimize muscle atrophy and avoid excessive gains of body fat.

Aim

In this brief report wanted to share experience from elite junior basketball, where major focus of investigation was the evaluation of negative impact of training cessation on physical performance of players.

Methods

Athletes

A group of 9 youth basketball players (age: 17.5±1.3 years; height: 195.2±7.5 cm; body mass: 79.8±6.3 kg) from a professional club volunteered to participated in the study. After 6 weeks of quarantine, all the players underwent the corresponding medical tests to ensure their safety and avoid possible contagion in the group. Only the players that were detected as negative in PCR and immunology tests could start the individual training. In addition, a complete medical review was required by the medical services before starting the sports activity. All players were notified of the research design and its requirements, as well as the potential risks and benefits. Written and oral consent was obtained from all players participating in the study that was approved by the Ethics Committee of the University of the Basque Country and was carried out in conformity with the ethical standards laid down in the 1975 Declaration of Helsinki.

Methodology

A battery of physical tests was carried out 2 weeks before the state of alarm was proclaimed as a normal procedure for monitoring the physical performance of the players. All tests were repeated on the 2nd day of training after 8 weeks of quarantine. During the quarantine period, the players trained at home consisting of basic exercises in strength, mobility, endurance without equipment. All the players train individually 4 times a week and 2 days a week a group training was carried out by videoconference. The tests chosen to determine the physical state of the players were the corresponding to simulate all the most important actions of basketball demands, such as: vertical jump (Squat jump [SJ] and counter movement jump with arm swing [CMJa]), acceleration (sprint 5, 10 and 20m [5m,10m, 20m]), specific movements (Lane agility test [Lane]) and endurance (YO-YO IRT level 1 [Yo-Yo IRT1]). Players were familiar with the testing procedures as it is used on a monthly basis during their training process in the club.

Statistical Analysis

Descriptive statistics were used (mean ± standard deviation (SD). Paired samples T-test was used to compare pre-post-COVID-19 values. Furthermore, Cohen's d effect size analysis was used for pairwise comparisons. Thresholds for effect size (ES) statistics were <0.2, trivial; <0.6, small; <1.2, moderate; <2.0, large (7). Statistical significance was established at $p < 0.05$.

Results

Table 1 shows mean changes among all physical test performance. All test was significantly ($p<0.05$) lower in post-COVID-19 values with moderate to very large effects. The decrement ranged from -16% (endurance) to -3% (acceleration). The biggest decrement was evident in 20m Sprint (ES=3.21) and Lane test with left COD (ES=2.60). Results for all subject in all test for pre and post COVID-19 testing is presented in Figure 1.

Discussion

The present study described for the first time the detraining produced by the forced COVID-19 home confinement in youth basketball players. Despite at home workouts we performed, the lack of basketball-based specific training provided a drop

Table 1. Mean ± standard deviation (SD) of the changes in all physical test performed.

	Change	% Change	TE	SWC	ES (90% CI)
SJ (cm)	-3.3 ± 2.2	-8.5 ± 5.3	1.52	0.43	1.54 (0.68-2.34)
CMJF (cm)	-4.3 ± 2.7	-8.3 ± 3.8	1.87	0.53	1.63 (0.74-2.45)
One Step Jump L/R (cm)	-4.3 ± 5.1	-7.1 ± 8.3	3.64	1.03	0.84 (0.18-1.47)
5m Sprint (s)	-0.03 ± 0.04	-3.1 ± 4.8	0.03	0.01	0.63 (0.33-1.24)
10m Sprint (s)	-0.06 ± 0.03	-3.9 ± 2.2	0.02	0.01	1.79 (0.85-2.66)
20m Sprint (s)	-0.14 ± 0.04	-4.7 ± 1.5	0.03	0.01	3.21 (1.75-4.56)
Lane Agility Left (s)	-1.2 ± 0.6	-11.01 ± 5.8	0.39	0.11	2.08 (1.04-3.05)
Lane Agility Right (s)	-1.1 ± 0.4	-10.6 ± 4.5	0.31	0.08	2.60 (1.38-3.75)
Yo-Yo IRT1 (m)	-311.1 ± 168.6	-16.2 ± 8.4	119.18	33.71	1.85 (0.89-1.2.74)

SJ: Squat Jump; CMJa: Countermovement jump with arm swing; Lane agility left: Lane agility test with left change of direction; Lane agility right: Lane agility test with right change of direction; Yo-Yo IRT1; Yo-Yo intermittent recovery test level one.

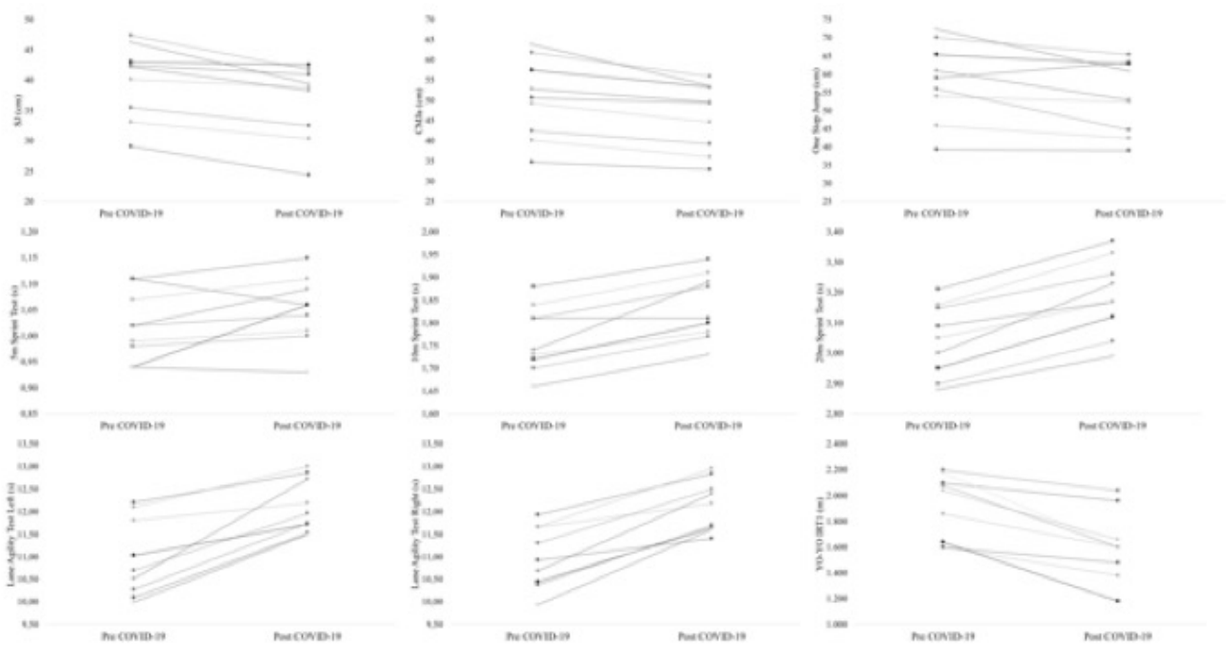

Fig. 1. Pre-Post COVID-19 quarantine values for all physical test among the nine players. Note: SJ: Squat Jump; CMJa: Countermovement jump with arm swing; Lane agility left: Lane agility test with left change of direction; Lane agility right: Lane agility test with right change of direction; Yo-Yo IRT1; Yo-Yo intermittent recovery test level one.

in physical performance values. For all athletes, this situation experienced by COVID-19 is a new and unprecedented situation since the Second World War (14). Previous literature has studied the effects of detraining or reduced training in post-injury situations or during the off-season (8, 15) but there are no precedents regarding the effects of pandemic confinement on sport. Training intensity seemed to be an important factor in adaptation retention on strength-power performance during a detraining period5, however, a sport-specific training intensity movement is needed to maintain the effect. On previous basketball research youth basketball players were able to maintain lower body explosive strength during 8 weeks of detraining (12, 13). However, the detraining phase was consisted on normal basketball practice but a reduction on strength training. Furthermore, professional basketball players significantly decreased their vertical jump power after 10 weeks where no resistance training was applied but maintained this score after another 10 weeks with only basketball practice (6). Maintaining strength and power levels during periods of cessation of strength training has been attributed to basketball training itself. Basketball is a situational court-based sport where the actions of acceleration, deceleration, changes of direction and high intensity jumps necessary to maintain power levels in the players are mainly carried out (4). However, previous research procedures were just the opposite to the ones of current pandemic situation for player were no basketball-based practice can happen and only general levels of specific strength or conditioning at-home training can be applied to the players. The main conclusion of this research note was that despite maintaining physical training at home, the cessation of specific-sports activity specified by the mandatory confinement by COVID-19 reduced physical abilities in basketball youth players. This information can be used by strength and conditioning coaches as a reference for basketball players and

take it into account when planning the return to training after this specific period of inactivity.

Practical Applications

- Strength and conditioning coaches may use this information to understand better the motor abilities that have deteriorated the most during the forced confinement.
- Coaches should be aware of the training volume, where progressive overload is necessary in order to provide safe return to physical performance that players had in weeks prior to the confinement.
- Taking these results into account, coaches are able to prepare training plans more effectively, where individualized programs must be considered.

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