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The 30–15 Intermittent Fitness Test Versus the Yo-Yo Intermittent Recovery Test Level 1: Relationship and Sensitivity to Training

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The aim of the current study was to examine the relationship between performance of the Yo-Yo Intermittent Recovery Test Level 1 (Yo-YoIR1) and the 30–15 Intermittent Fitness Test (30-15IFT) and to compare the sensitivity of both tests to training. Fourteen young soccer players performed both tests before and after an 8-wk training intervention, which included 6 sessions/wk: 2 resistance training sessions, 2 high-intensity interval training sessions after technical training (4 sets of 3:30 min of generic running and small-sided games [4v4] during the first and second 4-wk periods, respectively [90–95% maximal HR], interspersed with 3 min at 60–70% maximal HR), and 2 tactical-only training sessions. There was a large correlation between 30-15$_{IFT}$ and Yo-YoIR1 (r = .75, 90% confidence limits [CL] 0.57;0.86). While within-test percentage changes suggested a greater sensitivity to training for the Yo-YoIR1 (+35%, 90%CL 24;45) than for the 30-15$_{IFT}$ (+7%; 4;10), these changes were similarly rated as *almost certain* (with chances for greater/similar/lower values after training of 100/0/0 for both tests) and moderate, ie, standardized difference, ES = +1.2 90%CL (0.9;1.5) for Yo-YoIR1 and ES = +1.1 (0.7;1.5) for 30-15$_{IFT}$. The difference in the change between the 2 tests was clearly trivial (0/100/0, ES = –0.1, 90%CL –0.1;–0.1). Both tests might evaluate slightly different physical capacities, but their sensitivity to training is almost certainly similar. These results also highlight the importance of using standardized differences instead of percentage changes in performance to assess the actual training effect of an intervention.

Keywords: field tests, high-intensity intermittent running performance, training response, youth soccer

Among the various fitness tests used to evaluate players' high-intensity running performance in soccer, the Yo-Yo Intermittent Recovery Test Level 1 (Yo-YoIR1) is probably the most popular.[1] Yo-YoIR1 performance correlates with high-intensity running during games and is sensitive to training.[1]

About a decade ago,[2] the 30–15 Intermittent Fitness Test (30-15$_{IFT}$)[3,4] was developed as an alternative to the Yo-YoIR1. The 30–15$_{IFT}$ also evaluates high-intensity intermittent running capacity, but, in contrast to the Yo-YoIR1,[5] the final speed reached at the end of the test (V_{IFT}) is well suited for training prescription.[3]

It is however still unknown whether both tests measure similar qualities. It is also unknown whether their sensitivity to detect training effects is comparable. The purpose of the current study was to a) examine the relationship between Yo-YoIR1 and 30-15$_{IFT}$ performance and b) compare their sensitivity to an eight-week training intervention in young soccer players.

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Methods

Participants

Fourteen soccer players (mean + SD, 15.4 ± 0.5 y, 61.8 ± 5.9 kg, 173.6 ± 5.6 cm, and 12.4% ± 3.3% body fat) from a U16 Iran premier league team participated. They trained 6 times/wk, 480 minutes (two 60-min resistance-training sessions, four 90-min outdoor technical, tactical, and conditioning sessions).They provided informed consent to participate in the study, which was approved by the local research ethics committee.

Training and Testing

The study was conducted during preseason. Players were familiarized with both tests before the study. Both tests were performed on artificial turf before and after an 8-week training intervention (interspersed with 72 h and in a randomized order), at 10 A.M with similar temperature (31–33°C). The protocols of the Yo-YoIR1[1] and 30-15$_{IFT}$[3] tests have been detailed previously. We also reported the maximal speed reached in the Yo-YoIR1 ($V_{Yo\text{-}YoIR1}$) for easier comparison with the 30-15$_{IFT}$. The 8-week training protocol included 6 sessions/wk: 2 resistance sessions (3 sets of 10 lower-extremity exercises

with 10–12 reps at 40–60% 1RM and 6–8 repetitions of 60–75% 1RM during the first and second 4-wk periods, respectively), 2 high-intensity interval-training sessions after technical training (4 sets of 3:30 min of generic running and small-sided games [4v4] during the first and second 4-week periods, respectively [intensity adjusted for players to reach 90–95% HR], interspersed with 3 min at 60–70% HRmax), and 2 tactical-only sessions. The training period ended with 5 days of reduced volume and intensity.

Statistical Analysis

Pearson correlation coefficients were used to measure the relationships between 30-15$_{IFT}$ and Yo-YoIR1 performance. The magnitude of the correlations (r, 90% confidence limits, CL) was assessed according to the scale of Hopkins.[6] The comparison of the tests' sensitivity was assessed while comparing the within-test changes in performance using standardized differences or effect size (ES).[6] Probabilities were also calculated to establish whether the true difference was lower than, similar to, or higher than the smallest worthwhile difference or change (SWC, 0.2 × between-subjects SD).[6]

Results

Pretraining, players presented values of 1031 ± 257 m, 14.9 ± 0.4 km/h, and 17.4 ± 1.1 km/h for Yo-YoIR1 running distance, $V_{Yo\text{-}YoIR1}$, and V_{IFT}, respectively. There were large to very large correlations between V_{IFT} and $V_{Yo\text{-}YoIR1}$ (Figure 1).

Posttraining, there was an almost certain improvement in performance for both tests (with chances for greater/similar/lower values of 100/0/0 for both tests; Figure 2). The difference in the change between the tests was clearly trivial (0/100/0).

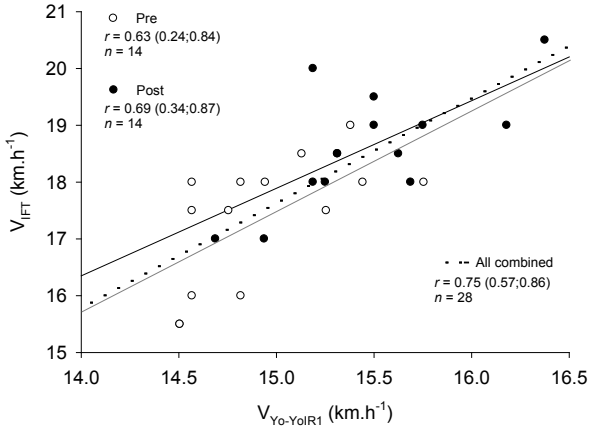

Figure 1 — Relationship (correlation coefficient, r, 90% confidence limits) between the final speeds reached at the end of the Yo-Yo Intermittent Recovery Test Level 1 ($V_{Yo\text{-}YoIR1}$) and the 30–15 Intermittent Fitness Test (V_{IFT}).

Discussion

The correlation coefficients between the 2 tests ranged from .62 to .75 with a shared variance that was only ~50%. This suggests that although both tests evaluate

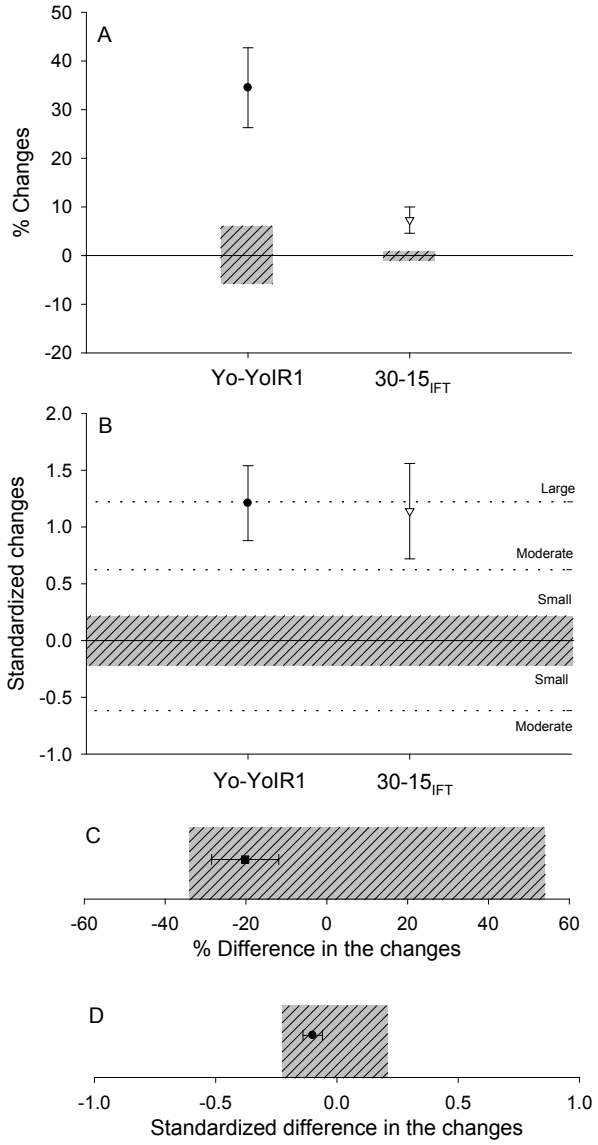

Figure 2 — Training-induced changes (90% confidence intervals) in performance of the Yo-Yo Intermittent Recovery Test Level 1 (Yo-YoIR1) and 30–15 Intermittent Fitness Test (30-15$_{IFT}$) as expressed in (A) percentage or as (B) standardized changes. Differences in the changes (90% confidence intervals) are expressed as (C) percentage or (D) standardized differences. Shaded areas represent the range of trivial change or difference (see Methods).

high-intensity intermittent-running performance, their main determinants might differ slightly. Since V_{IFT} is faster than $V_{Yo\text{-}YoIR1}$, V_{IFT} is likely more related to maximal sprinting speed. Conversely, Yo-YoIR1 performance might be more dependent on aerobic endurance.

The improvement observed in Yo-YoIR1 (+35%, ES: +1.2) was within the 12% to 54% improvements previously reported.[1] Similarly, the 7% change in V_{IFT} (ES: +1.1) was consistent with the 5% to 10% improvements already reported.[2] A first examination of the percentage changes in both tests would suggest a greater sensitivity of the Yo-YoIR1 than the 30-15_{IFT} (Figure 2[A]), which could be related to the protocols of each test. However, when these changes were considered with respect to the SWC, the improvements in both tests appear similar. The between-subjects variability in performance (and hence, the SWC, Figure 2[A]) being greater for the Yo-YoIR1, standardized improvements are in fact similar for both tests (Figure 2[B]). Similarly, the difference in the changes between the 2 tests falls within the SWC, whatever the unit (%, Figure 2[C], or ES, Figure 2[D]).

In conclusion, the decision to use one test or the other is left to practitioners, depending on the main physical quality that is meant to be evaluated (ie, intermittent aerobic power vs endurance). However, both tests are likely equally effective at assessing training effects. Current results also highlight the importance of using standardized differences instead of percentage changes to assess the actual training effects of an intervention.

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