

1 **Submission Type:** Technical report

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3 **30-15 Intermittent Fitness Test vs. Yo-Yo Intermittent Recovery**
4 **Test Level 1: relationship and sensitivity to training**

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6 **Running Head:** 30-15_{IFT} vs. Yo-Yo_{IR1}

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31 **Abstract:**

32 The aim of the present study was to a) examine the relationship between performance of the Yo-
33 Yo Intermittent Recovery Test Level 1 (Yo-YoIR1) and the 30-15 Intermittent Fitness Test (30-
34 15IFT) and b) compare the sensitivity of both tests to training. Fourteen young soccer players
35 performed both tests before and after an eight-week training intervention, which included six
36 sessions/week: two resistance training sessions, two high-intensity interval training sessions after
37 technical training (four sets of 3:30 min of generic running and small sided games (4v4) during
38 the first and second four-week periods, respectively, [90-95% maximal HR], interspersed with 3
39 min at 60-70% maximal HR) and two tactical-only training sessions. There was a large
40 correlation between 30-15_{IFT} and Yo-YoIR1 ($r = 0.75$, 90% confidence limits, CL 0.57;0.86).
41 While within-test % changes suggested a greater sensitivity to training for the Yo-YoIR1 (+35%,
42 90%CL 24;45) compared with the 30-15_{IFT} (+7%; 4;10), these changes were similarly rated as
43 'almost certain' (with chances for greater/similar/lower values after training of 100/0/0 for both
44 tests) and moderate, i.e., standardized difference, ES = +1.2 90%CL (0.9;1.5) for Yo-YoIR1 and
45 ES = +1.1 (0.7;1.5) for 30-15_{IFT}. The difference in the change between both tests was clearly
46 trivial (0/100/0, ES = -0.1, 90%CL -0.1;-0.1). Both tests might evaluate slightly different
47 physical capacities, but their sensitivity to training is almost certainly similar. These results also
48 highlight the importance of using standardized differences instead of % changes in performance
49 to assess the actual training effect of an intervention.

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51 **Key words:** field tests; high-intensity intermittent running performance; training response;
52 youth soccer.

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54 Introduction

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

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

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

67 Methods

68 **Participants.** Fourteen soccer players (mean \pm SD, 15.4 \pm 0.5 yr, 61.8 \pm 5.9 kg, 173.6 \pm 5.6 cm
69 and 12.4 \pm 3.3% body fat) from an U16 Iran premier league team participated. They trained 6
70 times/ week, 480 min (two 60-min resistance training sessions, four outdoor technical, tactical
71 and conditioning 90-min sessions). They provided informed consent to participate in the study,
72 which was approved by the local research ethics committee.

73 **Training and testing.** The study was conducted during the pre-season phase. Players were
74 familiarized with both tests before the study. Both tests were performed on artificial turf before
75 and after an eight-week training intervention (interspersed with 72 h and in a randomized order),
76 at 10:00 A.M with similar temperature (31-33 °C). The protocols of the Yo-YoIR1¹ and 30-15_{IFT}³
77 tests have been detailed previously. We also reported the maximal speed reached at the Yo-
78 YoIR1 ($V_{Yo-YoIR1}$) for easier comparison with the 30-15_{IFT}. The eight -week training protocol
79 included 6 sessions/week: 2 resistance sessions (3 sets of 10 lower-extremities exercises with 10-
80 12 reps at 40-60% 1RM and six- eight reps of 60-75% 1RM during the first and second four-
81 week periods, respectively), two high-intensity interval training sessions after technical training
82 (four sets of 3:30 min of generic running and small sided games (4v4) during the first and second
83 four-week periods, respectively [intensity adjusted for players to reach 90-95% HR], interspersed
84 with three min at 60-70% HRmax) and two tactical-only sessions. The training period ended
85 with five days of reduced volume and intensity.

86
87 **Statistical analysis.** Pearson correlation coefficients were used to measure the relationships
88 between 30-15_{IFT} and Yo-YoIR1 performance. The magnitude of the correlations (r , 90%
89 confidence limits, CL) was assessed according to Hopkins scale.⁶ The comparison of the
90 sensitivity of both tests was assessed while comparing the within-test changes in performance
91 using standardized differences or effect size (ES).⁶ Probabilities were also calculated to establish

92 whether the true difference was lower, similar or higher than the smallest worthwhile difference
93 or change (SWC, 0.2 x between-subject SD).⁶

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96 **Results**

97 Pre-training, players presented values of 1031 ± 257 m, 14.9 ± 0.4 km.h⁻¹ and 17.4 ± 1.1 km.h⁻¹
98 for Yo-YoIR1 running distance, $V_{Yo-YoIR1}$ and V_{IFT} , respectively.

99 There were large to very-large correlations between V_{IFT} and $V_{Yo-YoIR1}$ (Figure 1).

100

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

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106 **Discussion**

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108 The correlation coefficients between the two tests ranged from 0.62 to 0.75 with a shared
109 variance was only ~50%. This suggests that although both tests evaluate high-intensity
110 intermittent running performance, their main determinants might differ slightly. Since V_{IFT} is
111 faster than $V_{Yo-YoIR1}$, V_{IFT} is likely more related to maximal sprinting speed. Conversely, Yo-
112 YoIR1 performance might be more dependent on aerobic endurance.

113

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

124

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

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136 initiation of the study.

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138 **References**

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Figure legends

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

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 percentage (panel A) or as standardized changes (panel B). Differences in the changes (90% confidence intervals) are expressed as % (panel C) or standardized differences (panel D). Shaded areas represent the range of trivial change/difference (see methods).

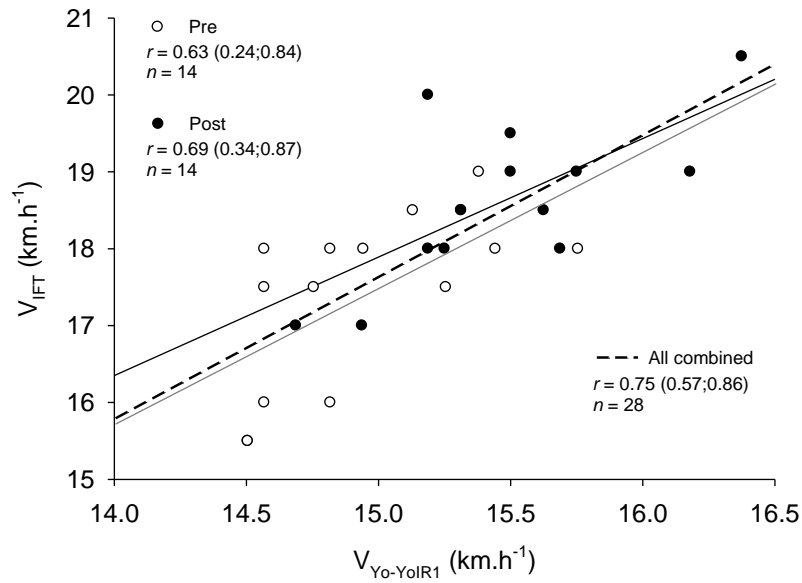


Figure 1. Relationship (correlation coefficient, r , 90% confidence limits) between the final speeds reached at the end of the Yo-Yo Intermittent Recovery Test Level 1 ($V_{Yo-YoIR1}$) and the 30-15 Intermittent Fitness Test (V_{IFT}).

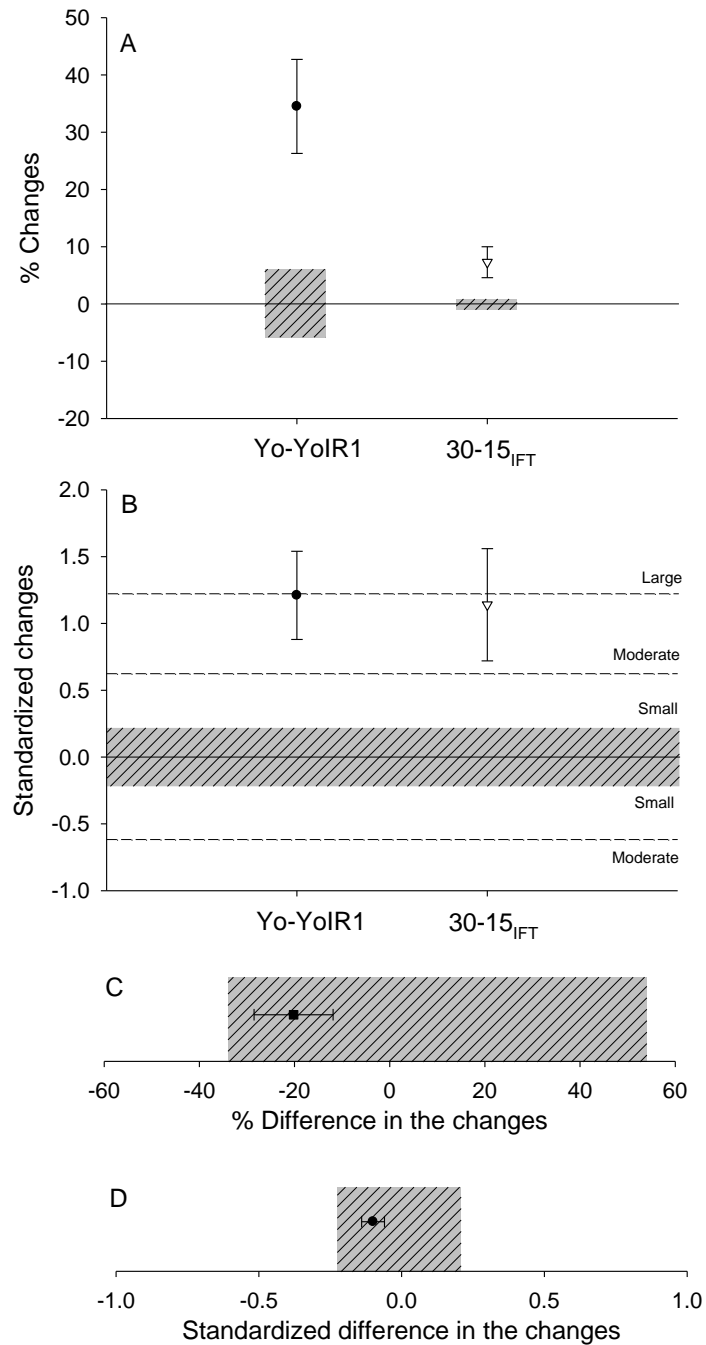


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