

# Evaluation of a Roller Skating Performance Test

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**Abstract:** The study aimed to evaluate recently developed roller skating performance test. Groups of recreational and competitive skaters first self-assessed their roller skating skill and then repeated the test in four separate occasions. No significant changes in performance time were evident between any of four trials. The test had low mean within-individual variation and high inter-sessions correlation. In addition, it discriminated skating performances of competitive and recreational skaters. Besides, moderate correlations were recorded between skater's self-rating and achieved test results. Finally, results suggest that evaluated test is reliable, valid and sufficiently sensitive to be applied in amateur roller skating practice.

## 1 OBJECTIVES

Despite the mass popularity of roller (or "inline") skating sports, the reproducible methods for testing specific skill in roller skating are still lacking. Hence, the aim of this study was to examine the retest reliability and discriminant validity of a newly developed roller skating performance test.

## 2 METHODS

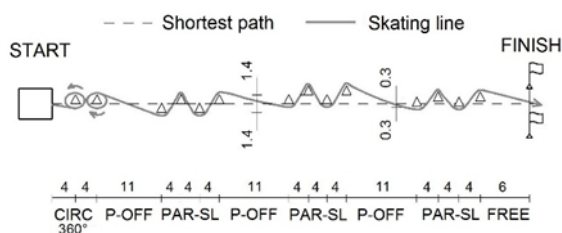


Figure 1: Layout of the roller skating performance test  
Note: CIRC<sub>360°</sub> = circles 360 degrees; P-OFF = push-off technique; PAR-SL = parallel slalom technique; FREE = free technique.

Based on the skating experience, 42 amateur skaters (26 female and 16 male; age 21.5±8.7 years) were allocated in either competitive or recreational group.

The subjects completed performance test 4 times with a passive pause of 45 minutes between the tests. Before testing, the subjects classified their roller skating skill on the scale ranging from 1 to 10. Test roller skating performance was judged based on time to complete an 83 m course and the ability to combine typical skating techniques such as start, circling and S-turning, push-off technique, acceleration, direction changes, and parallel technique. In particular, the testing course encompassed two tasks involving skating in 360° circles around cones, three 11 m long accelerations using the push-off technique and each of those followed by parallel skating through the four cones positioned for slalom. As illustrated in Figure 1, the aim was to skate the skating line linking the start zone and finish line, as fast as possible. The performance time was measured by an electronic system using light barriers for speed-measurement (Newtest Powertimer, Finland, EU). The main instructions for subjects were (i) to skate as fast as possible, following the skating course; (ii) when skating circles, to complete 360° of the circle with all wheels on the surface; (iii) when skating slalom, not to cut over the cones but to skate around them. Once in ready position, subjects were allowed to start at self-selected time. The whole procedure was led and controlled by two examiners. Please

remember that all the papers must be in English and without orthographic errors.

For the purpose of data analysis, software package Statistica for Windows 12.0 was used. Systematic bias, within-individual variation and re-test correlation were applied to evaluate reliability of the subsequent tests. Results were reported as means and standard deviations and the  $p < 0.05$  was set as the criteria for reaching statistical significance. In addition, 95% confidence intervals were reported for all values representing the components of reliability. The practical usefulness of the test was assessed by comparing typical errors of subsequent pairs of tests to the smallest worthwhile change (given by standard deviation  $\times 0.2$ ) in performance time across the tests. Differences in performance times among groups were compared by one-way ANOVA while Spearman's correlation coefficients ( $\rho$ ) were applied to determine relations between subjects' self-evaluation and test results for each trial.

### 3 RESULTS

The mean performance time during 4 repeated tests ranged between  $22.5 \pm 2.3$  s and  $22.9 \pm 2.4$  s in competitive group, and between  $30.3 \pm 7.8$  s and  $30.5 \pm 8.4$  s in recreational group. No significant changes in performance time were found among 4 subsequent tests neither in competitive nor in recreational skaters ( $-1.7\%$  [95% CI:  $-5.8$ – $2.6\%$ ] –  $2.2\%$  [95% CI:  $0.0$ – $4.5\%$ ]). Evaluated test had low mean within-individual variation ( $1.6\%$  [95% CI:  $1.2$ – $2.4\%$ ] –  $2.7\%$  [95% CI:  $2.1$ – $4.0\%$ ]) and high inter-sessions correlation (ICC =  $0.97$  [95% CI:  $0.92$ – $0.99$ ] –  $0.99$  [95% CI:  $0.98$ – $1.00$ ]). For each pair of subsequent tests, the mean typical error was lower ( $0.10$  [95% CI:  $0.08$ – $0.15$ ] –  $0.25$  [95% CI:  $0.18$ – $0.47$ ]) than the smallest worthwhile change ( $0.39$  –  $1.86$ ). In addition, the test positively discriminated roller skating performances of competitive and recreational skaters ( $24.4$ – $26.4\%$ ;  $F=10.0$ – $11.2$ ; all  $p < 0.01$ ). Besides, moderate correlation ( $\rho=0.80$ – $0.82$ ; all  $p < 0.01$ ) were recorded between skater's self-rating and achieved test results.

### 4 DISCUSSION AND CONCLUSIONS

This study first evaluated the reliability of roller skating performances across four subsequent tests

and second, it assessed the discriminative ability of the performance tests with respect to roller skaters' proficiency level. The mean values of the ICCs above  $0.70$  and CV below  $5\%$  for the present roller skating test are consistent with the reliability data of comparable change-of-direction tests (Wilkinson et al., 2009; Lockie et al., 2013). Obtained results suggest a high standard of reliability for evaluated performance test. In addition, the comparison of observed measurement errors and smallest important changes demonstrated a "good" grade of the test's usefulness according to the rating proposed by Hopkins (2004). Second analysis indicated a shorter time needed for competitive level skaters to complete the test in comparison to recreational level skaters, as well as moderate associations of skaters' self-ratings with the performance test outcomes. In line with previous research, where advanced skaters overperformed intermediate level skaters (Parrington et al., 2013), present results also confirmed discriminative validity of this roller skating test.

In conclusion, results have shown that evaluated performance test is reliable and valid method for testing roller skating performance in amateur skaters. Moreover, it proved to be sensitive for tracking changes in performance of amateur level roller skaters.

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