Should the side-hop test be reduced from 40cm to 30cm when used in developmental athletes?

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Background and Objective

The side-hop test by Gustavsson et al. (2006) can help with RTP decision making after lower extremity injury. It may also be used to establish a baseline value in healthy athletes that can then be referred to in rehabilitation.

We decided to install the side-hop test to determine baseline values as part of our biannual screening, following test procedures as suggested by Gustavsson (2006).

Observations during first trials:
- Athletes seemed to struggle with the assigned width of 40cm and missing length restriction
- Error-rates tended to exceed suggested cut-off value of 25%

Assumptions:
- Reducing the width to 30cm is more suitable for developmental athletes
- Error-rates correlate with age to / from PHV, but also chronological age and body height.

We routinely assess body height, chronological age, and age to / from PHV (as determined by the equation of Mirwald 2002) at least four times a year.

Protocol

- Perform as many jumps as possible in 30 seconds for each width with each leg.
- Sufficient resting time (≥ 4min) granted after each trial.
- Athlete needs to stay within the green corridor and may not touch the lines or the inside of the 40cm (white) or 30cm (blue) area.

We determined the number of total jumps, as well as the number of errors for each attempt.

Setting and Design

- Cross-sectional observational study
- Field setting, indoor court of a school gymnasium.
- All athletes were tested during a regular training session after warming up, all tests conducted within 10 days.
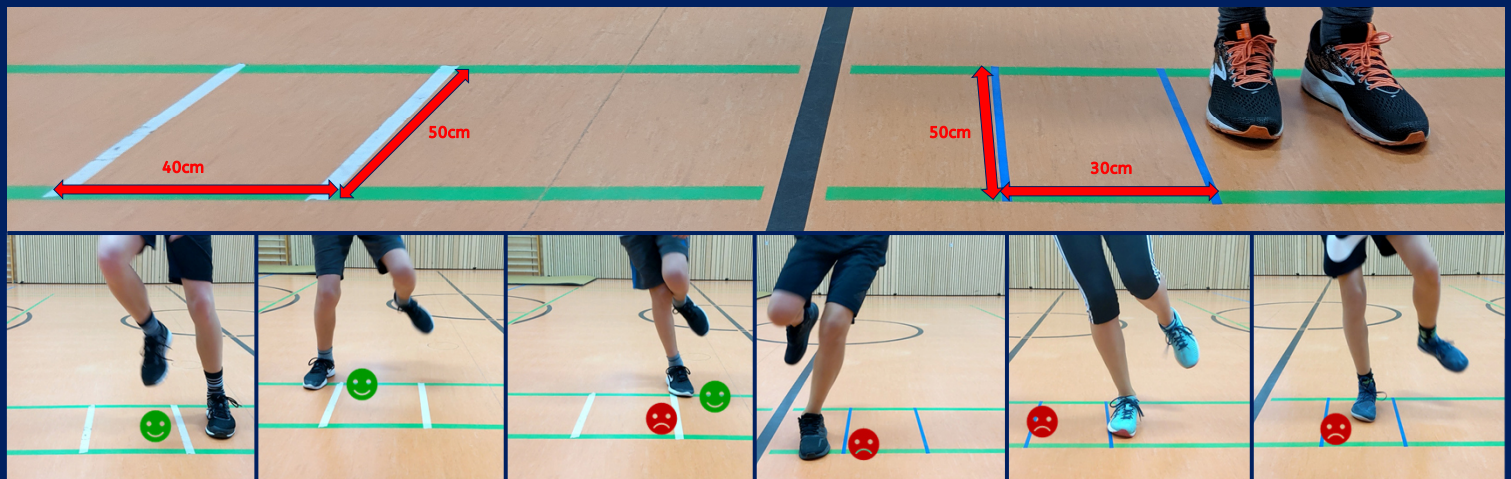
Statistics

n=18 (all of them members of an elite athletics project)
mean age: 13.93 ± 1.37 years, (range 11.9 - 16.3 years)
mean number of jumps: 40cm (59.33 ± 8.66) / 30cm (66.8 ± 9.91)
mean error rates: 40cm (0.27 ± 0.13) / 30cm (0.22 ± 0.12)

significant differences (p<0.02) for both (via paired t-tests)

Effect sizes (based on Cohen's d):
Comparing number of hops: large (d=0.81)
Comparing error-rates: small (d=0.40)

Pearson's correlations of error-rates (r) and their respective effect sizes (based on Cohen's q)

	30cm	40cm	q 30cm/40cm
age	r=-0.664	r=-0.537	q=0.201
height	r=-0.344	r=-0.144	q=0.213
PHV	r=-0.351	r=-0.155	q=0.210

correlations stronger for 30cm than for 40cm but only small respective effect sizes

Limitations

- Small sample size
- Jumps in pre-determined order (40cm R/L – 30cm R/L)
- We did not control for limb differences in this trial
- Small sample size
- Jumps in pre-determined order (40cm R/L – 30cm R/L)
- Limb differences not taken into account in this trial
- Movement quality for possible risk identification not considered
- Athletes' footwear (e.g. shoes not firmly tied) may have influenced results
- Open vs. length restricted corridor not evaluated

Conclusions and Outlook

While results remain statistically inconclusive when comparing 40cm and 30cm hop-tests in developmental athletes, 30cm width may be favourable in a clinical context due to
- a higher number of total jumps
- lower error-rates with stronger correlation

Also, results appear to be more dependant on chronological age, but not on height or PHV as we had initially hypothesized

We consider these results to be clinically relevant and have thus decided to only use 30cm hops in future tests. However, they may not be suitable to be used as general reference values due to small sample size.

Further research is warranted to provide clarity.

Literature

Gustavsson, Alexander et al. (2006): A test battery for evaluating hop performance in patients with an ACL injury and patients who have undergone ACL reconstruction. In: *Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA* 14 (8), S. 778–788. DOI: 10.1007/s00167-006-0045-6.

Mirwald, Robert L. et al. (2002): An assessment of maturity from anthropometric measurements. In: *Medicine and science in sports and exercise* 34 (4), S. 689–694.

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