Anthropometric and physical performance requirements to be selected in elite handball academies: is being left-handed an advantage?

Claude Karcher 1,2, Martin Buchheit 3

1 Séléstat Alsace Handball, Séléstat, France; 2 Faculté des sciences du sport, Université de Strasbourg, Strasbourg, France; and 3 Performance Department, Paris Saint Germain, Saint-Germain-En-Laye, France.

Headline

Playing handball requires players to repeat explosive actions such as sprints, jumps, changes of direction and throws at maximal intensity. Game demands are largely playing-positions dependent (1), which explains the large difference in technical, anthropometric (2) and physical performance profile of players representative of each position (3, 4). For playing organization purposes and efficient ball circulation, there need to be at least 2 left-handed players on the court during matches. Since these players need to be substituted like any other players on the court, each team comprises in general at least 4 left-handed players. While this proportion represents ~25% of a handball team, only ~10% of the French population is left-handed (5). There is therefore a feeling that being left-handed may be an advantage with regard to selection, and that they may not need to be as tall, fat or explosive as their right-handed peers. However, this has yet to been examined.

Aim. The aim of this study was to compare the maturity status, anthropometric profile and physical performances of left vs. right-handed young players playing at the same position in an elite academy.

Methods

Athletes. The maturity status, anthropometric profile and physical performances of 74 young male handball players (13.9 ± 0.3 years, with 5.2 ± 0.6 years of playing experience) representative of an elite French academy were examined. Players were pre-selected from 5 regions in France, the best players of each region were then selected for their respective regional academy.


Methodology. Players were grouped in relation to their playing positions and handedness (15 right-handed left wings, 16 left-handed left backs, 21 right-handed left backs and 22 left-handed right backs). Height, sitting height (Stadiometer 217, Seca, Hamburg Germany) and body mass (Scale 761, Seca, Hamburg, Germany) were measured and used to estimate players’ maturity status (6). Ten-m and 30-m sprints (Photocells, Polifemo, Microgate, Bolzano, Italy), counter movement jumps with arms free (CMJ, height, cm) and three 6 rebound jumps (RJ6, estimated jumping power, W/kg) (Optojump, Microgate, Bolzano, Italy) were measured, with the best of three trials used for analysis.

Analyses

Data in the figures are presented as means with 90% confidence limits (CL). All data were first log-transformed to reduce bias arising from non-uniformity error. Between-group standardized differences in the different player characteristics were compared to the smallest worthwhile difference (SWC, 0.2 multiplied by the pooled between-subject deviation, based on Cohen’s d principle) using magnitude based inferences. These probabilities were used to make a qualitative probabilistic mechanistic inference about the true effect: if the probabilities of the effect being substantially positive and negative were both >5%, the effect was reported as unclear; the effect was otherwise clear and reported as the magnitude of the observed value. Threshold values for standardized differences were >0.2 (small), >0.6 (moderate), >1.2 (large) and very large (>2) (7).

Fig. 1. Difference in anthropometric variables, maturation (peak height velocity, PHV), 10 and 30-m sprint time, counter movement jump (CMJ) and rebound jump (RJ) between left- and right-handed wings (upper panel) and backs (lower panel).
Results
Within wing players, right-handed players were likely slightly faster on 30 m, and presented most likely and very likely moderately greater CMJ and RJ performance than left-handed players, respectively. All other differences were unclear. Within back players (Figure 1, lower panel), right-handed players were possibly slightly taller, likely faster on both 10 and 30 m and had a likely greater RJ performance than left-handed players. Conversely, right-handed players were possibly slightly lighter and had a possibly worse CMJ performance. Differences in maturity were unclear.

Discussion
Present results showed that in accordance to our hypothesis, there was a consistent trend for the young right-handed players to outperform their left-handed peers with respect to body dimensions, maturity status and physical performance. More precisely, right-handed wings presented moderately greater jumping performance than left-handed wings, and right-handed backs were slightly taller and faster and had greater RJ performance than left-handed backs. Our findings support the idea that being left-handed may be an advantage regarding selection, and that they may not need to be as tall and explosive as their right-handed peers. It is also interesting to see that the difference in players’ characteristic between right- and left-handed were position-dependent, i.e., with respect to jumping abilities for the wing position, which is the position where jumping abilities matter the most (1), and height and speed for the back positions, where especially height is crucial (8). This is related to the fact that coach have more right-handed players to choose from, and, in turn, select those presenting the best position-specific characteristics. It is however worth noting that the importance of jumping capacities for wingers may not be as high as generally believed. In fact, we couldn’t find any direct correlation between jumping abilities and shooting efficiency, suggesting that skills and decision making may need to be prioritized when it comes to selecting young players (9).

Practical Applications
- Coaches should be aware that the requirement in terms of body dimensions and physical performance is lower for left-handed players when it comes to being selected in academies.
- For right-handed players, coach should therefore prioritize technical requirements for selection, since it may be easier to find the players presenting the required physical performance capacities (more pool to choose from).
- For left-handed players, coaches may need to focus on the overall player profile, and not to overlook their body dimensions and physical performances – those latter needing to be viewed in terms of genetics and possibilities of improvement through training (e.g., strength and plyometric training).

Limitations
- Physical performance tests were limited to jumps and sprints. The impact of handedness on agility, aerobic performance, skills and tactical awareness needs to be examined too.
- Extrapolation of the present results obtained in a subgroup of player in France to other populations needs to be considered with care.

Acknowledgments. We are thankful to the athletes for their participation.

Dataset
Dataset available on SportPerfSci.com

Twitter: Follow Martin Buchheit @Mart1Buch and Claude Karcher @ClaudeKarcher

References

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