

PHYSICAL FITNESS CATEGORY PROFILES OF CENTER FIELDBERS AND CATCHERS IN MALE SOFTBALL PLAYERS

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Abstract

Background: Defensive positions in softball place different demands on players, and fitness profiles may differ accordingly. **Objective:** To describe and compare the distributions of performance categories for speed, agility, lower-body strength, and explosive power between male softball players in center field and catcher positions. **Methods:** Thirty male district- and intercollegiate-level players (15 center fielders, 15 catchers) were assessed with the 30-m sprint, Illinois Agility Test, leg dynamometer, and Sargent vertical jump, and each result was classified as high, moderate, or low. Category distributions were compared between positions with the Freeman–Halton exact test, with Cramér's V as effect size and a Bonferroni-adjusted significance level of 0.0125. **Results:** More center fielders than catchers were in the high category for sprint speed (60.0% vs. 13.3%) and agility (53.3% vs. 20.0%), whereas more catchers were in the high category for lower-body strength (66.7% vs. 26.7%) and explosive power (53.3% vs. 33.3%). Only the sprint distribution differed significantly between positions ($p = 0.011$, $V = 0.55$); agility ($p = 0.170$), strength ($p = 0.107$) and explosive power ($p = 0.620$) did not. **Conclusion:** Center fielders showed a more favourable sprint-speed profile than catchers. Differences in agility, strength, and power were in the expected direction but were not statistically supported in this small sample. Larger studies using continuous scores are needed.

Keywords: softball; center field; catcher; physical fitness; speed; agility; strength; explosive power

1. Introduction

Softball is an intermittent sport in which brief, high-intensity actions such as sprinting, changing direction, jumping, and throwing alternate with periods of low activity or recovery. Sprint speed, change-of-direction ability, lower-body strength and explosive power are therefore widely regarded as important physical qualities in intermittent team sports (McArdle et al., 2015; Hoffman, 2014; Farley et al., 2020).

Defensive positions differ in the movements they demand. Center fielders cover large areas of the outfield and must accelerate and change direction quickly to reach batted balls, whereas catchers work from a squatting stance and must rise, transition, and throw rapidly. These contrasting roles provide a rationale for examining whether the fitness profiles of players in the two positions differ, although position alone cannot be assumed to explain any differences observed.

The purpose of this study was to describe and compare the distributions of performance categories for speed, agility, lower-body strength and explosive power between male softball players in center field and catcher positions.

2. Methods

2.1 Participants

Thirty male softball players competing at district and intercollegiate level in Maharashtra, India, participated: 15 center fielders and 15 catchers.

2.2 Measures

Four field tests were administered: the 30-m sprint (speed), the Illinois Agility Test (change-of-direction ability; Hachana et al., 2013), the leg dynamometer test (isometric lower-body strength), and the Sargent vertical jump (explosive power of the lower limbs). Each player's result on each test was classified as high, moderate, or low.

2.3 Statistical analysis

Data are presented as counts and percentages within each position group. For each fitness variable, the distribution across the three categories was compared between center fielders and catchers using the Freeman–Halton exact test, which is appropriate for small samples and sparse cells. Effect size was expressed as Cramér's V. Because four variables were tested, a Bonferroni-adjusted significance level of 0.0125 (0.05/4) was applied.

3. Results

Category distributions are shown in Table 1 and the between-position tests in Table 2. The sprint distribution differed significantly between positions ($p = 0.011$, $V = 0.55$): 60.0% of center fielders

were in the high category compared with 13.3% of catchers, and 46.7% of catchers were in the low category compared with 6.7% of center fielders. For agility, 53.3% of center fielders and 20.0% of catchers were in the high category, but the distributions did not differ significantly ($p = 0.170$, $V = 0.36$). Catchers more often reached the high category for lower-body strength (66.7% vs. 26.7%; $p = 0.107$, $V = 0.42$) and explosive power (53.3% vs. 33.3%; $p = 0.620$, $V = 0.20$), but neither difference was statistically significant.

Table 1. Distribution of physical fitness categories by playing position

Variable	Category	Center field (n = 15), n (%)	Catcher (n = 15), n (%)
30-m sprint	High	9 (60.0)	2 (13.3)
	Moderate	5 (33.3)	6 (40.0)
	Low	1 (6.7)	7 (46.7)
Agility	High	8 (53.3)	3 (20.0)
	Moderate	5 (33.3)	7 (46.7)
	Low	2 (13.3)	5 (33.3)
Lower-body strength	High	4 (26.7)	10 (66.7)
	Moderate	7 (46.7)	4 (26.7)
	Low	4 (26.7)	1 (6.7)
Explosive power	High	5 (33.3)	8 (53.3)
	Moderate	7 (46.7)	5 (33.3)
	Low	3 (20.0)	2 (13.3)

Note. Percentages are within each position group and may not sum to 100 because of rounding.

Table 2. Comparison of category distributions between center fielders and catchers

Variable	Freeman–Halton exact p	Cramér's V	Significant at $\alpha = 0.0125$
30-m sprint	0.011	0.55	Yes
Agility	0.170	0.36	No
Lower-body strength	0.107	0.42	No
Explosive power	0.620	0.20	No

Note. Two-sided exact tests on 2×3 tables (position $\times$ category); $n = 30$.

4. Discussion

Center fielders were more often classified in the high category for sprint speed and agility, whereas catchers were more often classified in the high category for lower-body strength and explosive power. Only the sprint difference was statistically significant after adjustment for four comparisons. The remaining differences were in the expected direction but should be regarded as tentative, since

the sample was small and the tests had limited power.

4.1 Speed and agility

The sprint result is consistent with the demands of the center-field position, in which players must cover large distances quickly. The agility results showed a similar tendency, but this was not statistically supported. The Illinois Agility Test is a pre-planned course and therefore reflects change-of-direction ability rather than the reactive agility, involving perception and decision-making, that defending a batted ball requires (Sheppard & Young, 2006). Conclusions about game-related agility should be drawn with this distinction in mind.

4.2 Lower-body strength and explosive power

A larger share of catchers reached the high category for leg strength and vertical jump, but neither difference was significant. Lower-body strength has been examined in relation to athletic performance tests in softball athletes (Alfaro et al., 2024); however, that work involved female collegiate players, and its findings cannot be assumed to apply to the male players studied here. The present data do not show whether catching duties contribute to higher strength or power, or whether stronger players are selected to catch.

4.3 Practical applications

Coaches may find it useful to assess sprint, change-of-direction, strength and power qualities in each player and to plan training around individual needs and positional demands, within a periodized framework (Bompa & Buzzichelli, 2019). The present results are not sufficient to support a specific position-based training programme.

4.4 Limitations

The sample was small ($n = 30$), included only male players at district and intercollegiate level in one region, and covered only two positions, which limits generalizability. Players were classified into three categories, which discards information contained in the raw test scores and depends on the cut-offs used; analysis of continuous scores would be more informative and more powerful. The design was cross-sectional, so causal relationships between playing position and fitness cannot be established, and no skill or game-performance outcomes were measured. Future studies should use larger and more varied samples, include other positions and female players, report raw scores, and analyse them with appropriate inferential methods and confidence intervals.

5. Conclusion

Among 30 male softball players, center fielders were significantly more likely than catchers to fall in a higher sprint-speed category. Differences in

agility, lower-body strength and explosive power favoured center fielders and catchers respectively, but were not statistically significant in this small sample. Larger studies using continuous measures are needed to confirm whether position-specific fitness profiles exist.

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