THE CRITICAL FACTORS OF OVER-ARM THROWING PERFORMANCE FOR GIRLS AGED 9 BY USING LONGITUDINAL RESEARCH (ONE YEAR)

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INTRODUCTION: The forceful overarm throwing is considered as one of the fundamental movement for many skills. In addition to this, it is also regards as one of the basic motion of child development for the area of development. There are two ways to study development researches. One is cross-sectional research and the other is logitudinal research. The study adapted Burton's (1992) amendment of Development Sequences for Overhand Throwing table to measure throwing patterns . In order to realize the change of the throwing distance and related factors that were associated with throwing distance, we tried to trace the developmental trend for a year.

METHOD: 20 girls, aged 9 years, voluntarily participated in the study. A camera（Sony DV,30Hz ）was used to collect the data of 40 girls aged 9（one subject should test two times）. There was no training or intervention during the year. Each subject threw tennis ball as hard as he/she could toward the forward area. The throwing skills of subjects were graded by three judgers. Each subject was given scores after the three judgers watching their throwing skills. According to the Burton's (1992) amendment of Development Sequences for Overhand Throwing table , the backswing skill（4 grades） , upper-arm skill（3 grades）, forearm skill （3 grades）, Trunk rotation（3 grades） and step skill（3 grades） have different levels respectly. The scores of judges were sum up . The relationship between these critical factors and throwing distance was also examined by Pearson correlation.（$p < .05$）

RESULTS: The only one skill factor which were associated significantly with throwing distance was upper-arm skill at first time. And there were no skill factor which was significantly with throwing distance. There were two reasons to explain the results. One was that the Overhand Throwing table wasn't detailed enough to tell the difference. The other reason was that the throwing skills mayn't be the important factors which affect the throwing distance.

Table 1 The change of relationship between the throwing distance and throwing skill for a year

	First time			Second time		
	M	SD	r	M	SD	r
Throw distance (m)	10.81	3.53		12.16	4.67	
Backswing	10.00	2.17	.023	11.82	0.72	.255
Upperarm	6.07	0.25	.511*	6.75	0.72	.461
Forearm	6.40	1.05	.251	6.17	0.72	.211
Trunk rotation	6.00	0.00	－	6.05	0.24	－
Step	9.00	0.00	－	9.00	0.00	－
Total score	37.47	2.29	.151	39.23	1.88	.414

*$P < .05$.

REFERENCES:

Burton, A. W., Greer, N. L., & Wiese-Bjornstal, D. M. (1992). Changing in overhand throwing patterns could be regarded as a function of ball size. *Pediatric Exercise Science*, *4*, pp.50-67.