

Influence of Children's Aerobic Power and Muscle Function on Guided Sport Specific Active Play during Early Childhood

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Abstract

There is a lack of research on the relationships between muscle function (strength and power) and physical activity (PA) during self-paced active playing of sport games during early childhood period (4-7 years). According to Stodden's model, increased PA levels during early childhood drive the development of fitness parameters which later lead to more physical activity in late childhood (Stodden et al., 2008). By identifying the relationships between specific physical activity/fitness parameters from an early age, it could prove beneficial in terms of how sports programs are designed going forward.



Picture Retrieved from KinKids.ca website

Table 1 - Fitness and Anthropometric Group Data of Children Compared by Sex

	Age	Weight(kg)	Aerobic Power	Leg Power (cm)	Grip Strength (kg)
Girl Mean	5.95	28.10	47.81	16.96	9.28
SD	0.89	7.16	1.76	4.78	3.24
Boy Mean	6.55	29.59	47.88	19.47	9.98
SD	0.67	8.00	3.03	6.45	3.17

Purpose

To determine a) children's participation in a guided active play format focused on sport specific game skills over 5 weeks; b) the relationships among muscle strength, leg power, and cardiorespiratory fitness (CRF) with physical activity characteristics during early childhood.

Methods

Participants: 42 children (22boys, 20girls) (ages 6.3±0.8years) were recruited from a community-based summer camp program. All procedures were approved by the HPRC (Ethics) at York

Study and Program Design

- Children participated in a 7-week sport skills program using a guided active play format (i.e., facilitated by experienced UG kinesiology students)
- Weeks 2-6 consisted of different weekly sport skills programming (soccer, football, track/field; basketball and handball) for 5d/week for 60min – each session was progressive and consisted of warm up, skill development and a scrimmage

Results

Table 2 - Energy Expenditure Statistics of Children from Ages 5-7 for "Average Sports Day" Represented By Weekly Average of each Sport

	No. Subjects (N)	Kcal/10sec	Kcal/session	METs	%Sedentary	%MVPA
Soccer	39	0.54 (+/-0.16)	171.4 (+/-53.7)	3.64 (+/-0.48)	15.17 (+/-8.71)	39.72 (+/-10.57)
Football	40	0.54 (+/-0.15)	165.7 (+/-47.4)	3.59 (+/-0.52)	15.87 (+/-6.64)	39.41 (+/-10.40)
Track/Field	36	0.55 (+/- 0.15)	175.4 (+/-48.7)	3.59 (+/-0.46)	17.66 (+/-7.43)	37.10 (+/-9.61)
Basketball	32	0.54 (+/-0.16)	193.2 (+/-53.9)	3.46 (+/-0.43)	15.35 (+/-6.84)	35.34 (+/-10.01)
Handball	32	0.58 (+/-0.17)	205.5 (+/-60.1)	3.80 (+/-0.53)	13.32 (+/-6.30)	42.27 (+/-10.12)
AVERAGE SPORT	35.8	0.55 (+/-0.16)	182.24 (+/-52.76)	3.64 (+/-0.55)	15.47 (+/-7.18)	38.77 (+/-10.16)

Children's PA participation averaged 182±53 kcal/session, and 3.60 ±0.6MET across the 5wks. The proportion of time children spent in sedentary and MVPA were 15±7% and 39±10%, respectively (p<0.05). Minimal differences in PA participation were observed for age (5-7years) (p>0.05).

Conclusion

- Children engaged in adequate amounts of MVPA (moderate-vigorous physical activity) while producing a high level of energy expenditure across all 5 sports
- There are definite advantages behind using a sport-specific guided active play program for improving children's PA participation during the early childhood period (Weisberg et al., 2013)
- Significant relationships do exist for muscle function and CRF (cardio-respiratory fitness) with PA participation, such that improving these parameters from an early age could prove beneficial for PA.

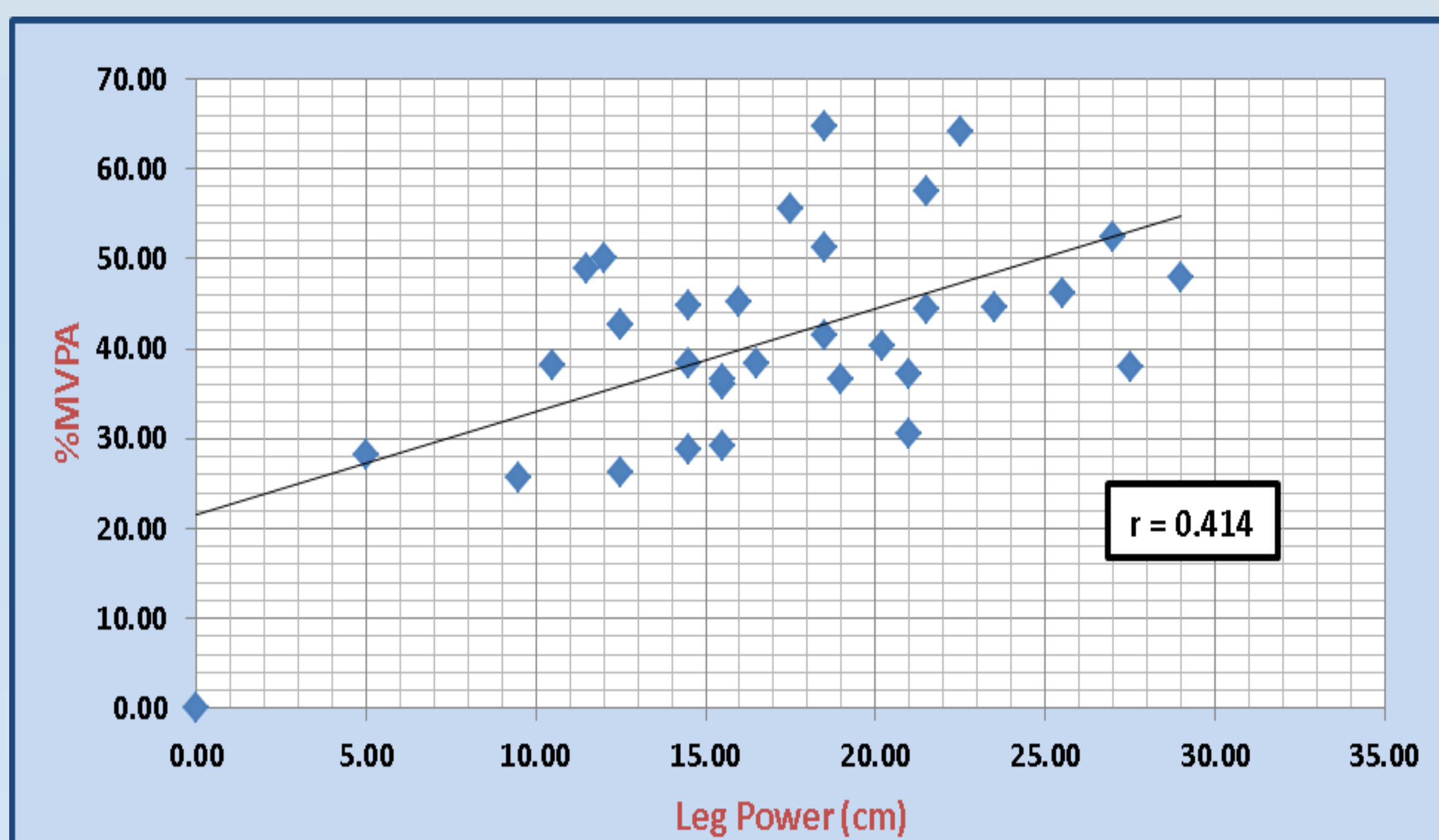


Figure 1 – Correlation between Leg Power(cm) and time spent in MVPA of children ages 5 to 7 during handball