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Evaluation of Physical Exercises on Gymnastic Boys in Shkoder, Albania

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ABSTRACT

Gymnastics training may be beneficial for improving selected aspects of physical function in children over a relatively short period of time. The present study aimed to evaluate the effects of a basic gymnastics training program, conducted for one hour per week over ten weeks, on several physical function variables in boys aged 6–8 years from the city of Shkoder, Albania. A total of twelve male children participating in gymnastics were assessed before and after the ten-week training program. The intervention focused on fundamental movement patterns, including landing, static control, and jumping. Physical function was evaluated using standardized tests of abdominal strength, flexibility, balance, sprint speed, coordination, and lower limb power. Post-intervention results demonstrated improvements in several physical function components. Notable increases were observed in abdominal strength (30-s sit-up test; +16%), flexibility of the waist and thigh muscles (sit-and-reach test; +5.4%), and lower limb power (vertical jump test; +3.6%). Smaller improvements were observed in sprint speed and coordination, while balance performance showed high variability. The findings suggest that a short-term gymnastics training program may represent a potentially effective approach for enhancing selected components of physical function in boys aged 6–8 years. The exploratory age-specific normative range tables derived from baseline testing may be useful to practitioners conducting similar physical function assessments in young children.

Keywords: *Gymnastics, Physical fitness, Motor development, Children aged 6–8 years, Physical education.*

INTRODUCTION

Establishing normative ranges for these physical function tests in children will be valuable to practitioners conducting similar physical function tests in the future, both for identifying talents and for

early identification of children in need of improvement. Physical fitness in children and adolescents has also been associated with positive health outcomes in adults (Kvaavik, Klepp, Tell, Meyer, & Batty, 2008). Encouraging motor skill development and fitness in young children is likely to have significant benefits on health outcomes and potentially on subsequent athletic success in children.

Physical fitness, physical activity behaviour, and motor skill development are important components of physical education curricula and are potential indicators of children's health (Lloyd, Colley, & Tremblay, 2010). Furthermore, motor skills can be used to identify talent to predict athletic success in children (Grice, 2003). Previous research has demonstrated the positive effects of a four-week after-school program that addresses motor skills and fitness in young children (Matvienko & Iradge, 2009).

Understanding the benefits of participating in gymnastics training would provide important information for this field. The purpose of this study was to evaluate the effects of one hour per week for ten weeks of basic movement skills training in gymnastics on several components of physical function in children.

MATERIALS & METHODS

A total of 12 children aged 6-8 years (7.4 ±1.3 years; 1.24 ±0.9 m; 31.9 ±3.9 kg) enrolled in the sport of general gymnastics. The children participated in one hour per week of general gymnastics training that included activities based on basic movement skills. The program focused on the development of 3 main movement patterns: landing, statics, jumping. Data were collected during the sessions, before and after the 10-week gymnastics training program. Body mass and height were measured, along with physical function variables of sprint speed (20 m), balance (stork balance test) (Johnson & Nelson, 1979).

The procedure was explained to all children practicing the sport of gymnastics who agreed to participate in the study, and all participants and their parents/coaches signed a written informed consent, in accordance with the ethical standards of the Declaration of Helsinki.

These tests were chosen because they have been clearly defined and validated in other studies (Beurden et al., 2003; Espana-Romero et al., 2010; Fjortoft, 2000), are easy to administer and time-efficient, and they cover a range of skill components. Performance changes for each test were calculated and expressed as percentages, with 90% confidence limits (90% CL) to indicate the possible range of the true value. Means and standard deviations from baseline testing were used to define performance categories.

Table 1: Categories and definitions of performance based on mean and standard deviations.

Category	Definition
Excellent	More than three standard deviations above mean performance.
Good	Between two and three standard deviations above mean performance.
Above average	Between one and two standard deviations above mean performance.
Average	Within one standard deviation of mean performance.
Below average	Between one and two standard deviations below mean performance.
Poor	Between two and three standard deviations below mean performance.
Very poor	More than three standard deviations below mean performance.

RESULTS

Normative ranges for each component of physical function were calculated based on data from children who participated in the first testing session (see Tables 2). Change scores (expressed as percentages with 90% CL) were calculated for children who completed the testing before and after the intervention.

Table 2: Categories of performance on each physical function test for boys aged 6-8 years.

	20-m sprint	30 s sit- up	Stork test	Sit and reach	Vertical jump
Boys (n=12)	**5.52 ±0.51**	**8.3 ±5.4**	**1.93 ±1.57**	**29.5 ±4.2**	**19.2 ±4.9**
very poor	> 7.04	0*	< 0.50*	< 15.5	< 4.4
poor	6.55 - 7.04	1 - 2*	0.50 - 0.92*	15.5 - 19.5	4.4 - 9.2
below average	6.04 - 6.54	3 - 4*	0.93 - 1.35	20.0 - 24.5	9.3 - 14.2
average	5.02 - 6.03	5-14	1.36 - 3.15	25.0 - 34.5	14.3 - 24.1
above average	4.51 - 5.01	15 – 19	3.16 - 6.37	35.0 - 39.0	24.2 - 29.1
good	4.00- 4.50	20 – 24	6.38 - 8.54	39.5 - 43.5	29.2 - 34.0
excellent	< 4.00	> 24	> 8.54	> 43.5	> 34.0

*These ranges were selected by the authors, as they could not be defined by the data.

Normative values are exploratory and based on baseline testing only. Normative ranges were derived exclusively from baseline measurements and are intended as exploratory reference values.

DISCUSSION

There was a small improvement in 20-meter sprint time, although the true effect size is likely to be insignificant. There was a significant improvement in the 30-second sit-up test, with a 17% increase in the average number of sit-ups that children were able to complete in 30 seconds. This was likely a beneficial effect.

There was a small decline in performance on the stork balance test. However, the large variability in the observed value suggests that the test was not an appropriate measure for this age group. A variant of this test, the flamingo balance test, may be more suitable for future testing (Adam et al., 1988). Significant improvements were seen for the sit-and-reach test, with a mean improvement of 6.4% on baseline scores. This is likely a beneficial effect. Thus, aerobic training probably has a beneficial effect on hip and lower back muscle flexibility in children. There was a mean decrease of 1.3 s (i.e., a small improvement) in the time required to complete the limb speed and coordination test, with an average improvement of -1.79 ± 4.52 s observed in the present sample. Several activities within the gymnastics training program, such as swinging and jumping jacks, may have contributed to this small 5.8% improvement in limb speed and coordination, both of which are important components of motor function.

There was a small but significant improvement (4.6%) in the vertical jump height test for lower limb strength and power. Jumps are a key part of the training program, and thus the improvements

observed are likely the result of practicing and learning such movements. The baseline test results will help determine normative ranges for children completing these physical function tests. The sample size does not allow us to generalize the results to other active children in this age range with a good degree of confidence. These data will be valuable to practitioners conducting similar physical function tests in the future, both for identifying talents and for early identification of children who need improvement. These physical attributes form the basis of other athletic activities (e.g., track and field, diving).

Beyond its role as a competitive sport, gymnastics may be conceptualized as a transferable motor foundation that develops fundamental movement competencies such as strength, coordination, flexibility, and postural control. These capacities are broadly applicable across multiple physical activities and sports, supporting long-term physical literacy rather than sport-specific specialization.

CONCLUSION

The findings of this study indicate that a short-term gymnastics training program can produce measurable improvements in selected components of physical function among boys aged 6–8 years. Following approximately ten weeks of structured gymnastics practice, positive changes were observed primarily in abdominal strength, flexibility, coordination, and lower limb power. These outcomes support the role of gymnastics as an effective foundational activity for promoting motor development during early childhood.

Although improvements in sprint performance and balance were modest and, in some cases, inconsistent, the overall pattern of results suggests that regular exposure to fundamental movement patterns – such as jumping, landing, and static control – contributes positively to physical fitness development in young children. The limited response observed in balance performance highlights the importance of selecting age-appropriate testing instruments and suggests that alternative balance assessments may be more suitable for this population in future research.

The normative range tables generated in this study provide preliminary reference values for practitioners and coaches conducting physical function assessments in children aged 6–8 years. While these reference values should be interpreted with caution due to the small sample size, they may nonetheless assist in early talent identification, monitoring physical development, and identifying children who may benefit from targeted intervention.

Several limitations must be acknowledged. The small sample size and lack of a control group restrict the generalizability of the findings, and the results should therefore be considered exploratory. Future studies should employ larger samples, include both sexes, apply longer intervention periods, and incorporate comparative or randomized designs to strengthen causal inference.

In conclusion, the present study contributes practical evidence supporting the inclusion of gymnastics-based activities in early childhood physical education programs. Gymnastics training appears to be a valuable tool for enhancing fundamental physical capacities that underpin later athletic performance and long-term physical activity participation.

Declaration by Authors

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