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Effect Of Inspiratory Muscle Training On Agility In 7-12 Years School Going Children

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Abstract

Background and Aim:- Agility is defined as "a skill-related component of physical fitness that relates to the ability to rapidly change the position of the entire body in space with speed and accuracy."A child that displays good agility will most likely possess other qualities such as, dynamic balance, spatial awareness, rhythm, as well as visual processing. IMT has been applied to different populations, ranging from low-fitness groups, such as patients with cardiopulmonary disorders, to high-fitness groups, such as elite athletes. The purpose of IMT is mostly to increase exercise performance, but the effects are inconsistent due to the variant outcomes measured, the task required, and subjects from different levels of breathing fitness. Respiratory muscle fatigue limit exercise performance by increased sympathetic vasoconstrictor outflow to limb muscles and the sensation of dyspnea. The aim of the study is to find out the effect of inspiratory muscle training on agility among school going children.

Methodology :- This is an experimental study design in which 100 school going children with age group 7-12yr are taken. Scored value of agility t-test and quadrant jump test is compared with pre , mid and post inspiratory muscle training.

Result:-The significant results were seen in the following variables on the basis of comparison between mean value of pre test [QJT-10.85,T-test-15.60] mid test [QJT-12.89,T-test- 14.98] post test[QJT-14.67, T-test-13.83]

Conclusion :- In this study we found that there is significant changes in Agility among childrens after inspiratory muscle training.

Keywords:- Agility, Inspiratory muscle training (IMT) , Quadrant jump test (QJT) ,Agility t-test

INTRODUCTION

Agility is defined as "a skill-related component of physical fitness that relates to the ability to rapidly change the position of the entire body in space with speed and accuracy."

Agility may be defined as the ability to change direction in response to a sport-specific stimulus, incorporating physical, technical, perceptual and decision-making skills. Unless the athlete responds to a sport-specific stimulus, agility should be defined as change of direction speed [1]

The five components of fitness are as follows:

• Cardiorespiratory fitness (the ability of the heart, lungs, and vascular network to deliver oxygen to the working muscles)

• Muscle strength (the ability of the musculoskeletal system to move a heavy load) and muscle endurance (the ability to move a moderate load repeatedly)

• Flexibility (an index of joint range of motion)

• Body composition (typically, the level of body fat, but a measure of fat-free body mass [FFB] is of equal clinical significance)

• Balance and agility[3]

A child that displays good agility will most likely possess other qualities such as, dynamic balance, spatial awareness, rhythm, as well as visual processing. So while agility can be simply defined as an ability to quickly stop and re-start motion, there is a high degree of complexity to this motor skill (Jason D. Vescovi2003).

Inspiratory muscle training has been applied to different populations, ranging from low-fitness groups, such as patients with cardiopulmonary disorders, to high-fitness groups, such as elite athletes. The purpose of inspiratory muscle training is mostly to increase exercise performance, but the effects are inconsistent due to the variant outcomes measured, the task required, and subjects from different levels of breathing fitness. Respiratory muscle fatigue is found during high-intensity exercise (>85% VO2max) and would further limit exercise performance by increased sympathetic vasoconstrictor outflow to limb muscles and the sensation of dyspnea[2]

Maintaining an appropriate level of cardiorespiratory fitness reduces the risk of disease and increases the ability to work efficiently and to participate in and enjoy physical activity (Gulati M, Pandey DK, Arnsdorf MF, et al.)[6]A high cardio respiratory fitness level has a positive impact on optimum health and prevents the onset of problem associated with inactivity at all age

Physical fitness is a tremendously important topic for school aged children today. Curriculum must stress the importance of a healthy, active lifestyle that has become crucial now more than ever. Schools, due to budgetary constraints, many 4 school districts are forced to drastically cut or completely eliminate school based physical activity program. If children learn proper physical fitness education they will build healthy habits for the rest of their lives.[4]

Studies concerning physical fitness of children had been done various countries around the World like U.S.A ,China and many European countries But in India there are only few studies had done on the basis of physical fitness in children, even though India is second largest Populated country in Kerala there is a study conducted by educational board in the year 2009.They founded that only 14% children have minimum recommended standard on fitness(TPFP report 2009)[5]

AIM

The aim of the study is to improve the agility among school going children.

OBJECTIVE

- To achieve the improvement in inspiratory muscle strength.
- To achieve the improvement in agility with inspiratory muscle training.

METHODOLOGY

METHOD- Quadrant jump test[7,8,9] and Agility t-test[9,10] is used for agility.

STUDY DESIGN- It is an Experimental study design.

SAMPLING TECHNIQUE**-** Non-Probability convenient sampling technique.
SAMPLE SIZE**-** 100 school going children.
STUDY CENTRE- Diwakar Model School , Ghaziabad.
STUDY DURATION **-** 1 year.

INTERVENTION DURATION - 1 Month

INCLUSION CRITERIA[9]
- Age group 7-12 yrs.
- Boys and girls both
- Able to follow commands
- Children with normal BMI

EXCLUSION CRITERIA[9]
- May not able to jump
- Children with any orthopedic problem of lower limb (Deformity, Fracture)
- Fear of doing , fall , hesitation
- Childrens who are receiving any sports specific training.

RESULT:-

Table: Comparison of pretest, mid test and posttest treatment time points with Spo2 scores by dependent t test

Time points	Mean	SD	Mean Diff.	SD Diff.	% of change	t-value	p-value
Pretest	97.40	1.48					
Midtest	83.63	5.36	13.77	5.17	14.14	26.6468	0.0001*
Pretest	97.40	1.48					
Posttest	85.53	5.26	11.87	5.26	12.19	22.5574	0.0001*
Midtest	83.63	5.36					
Posttest	85.53	5.26	-1.90	6.25	-2.27	-3.0401	0.0030*

*p<0.05

Figure: Comparison of pretest, mid test and posttest treatment time points with Spo2 scores

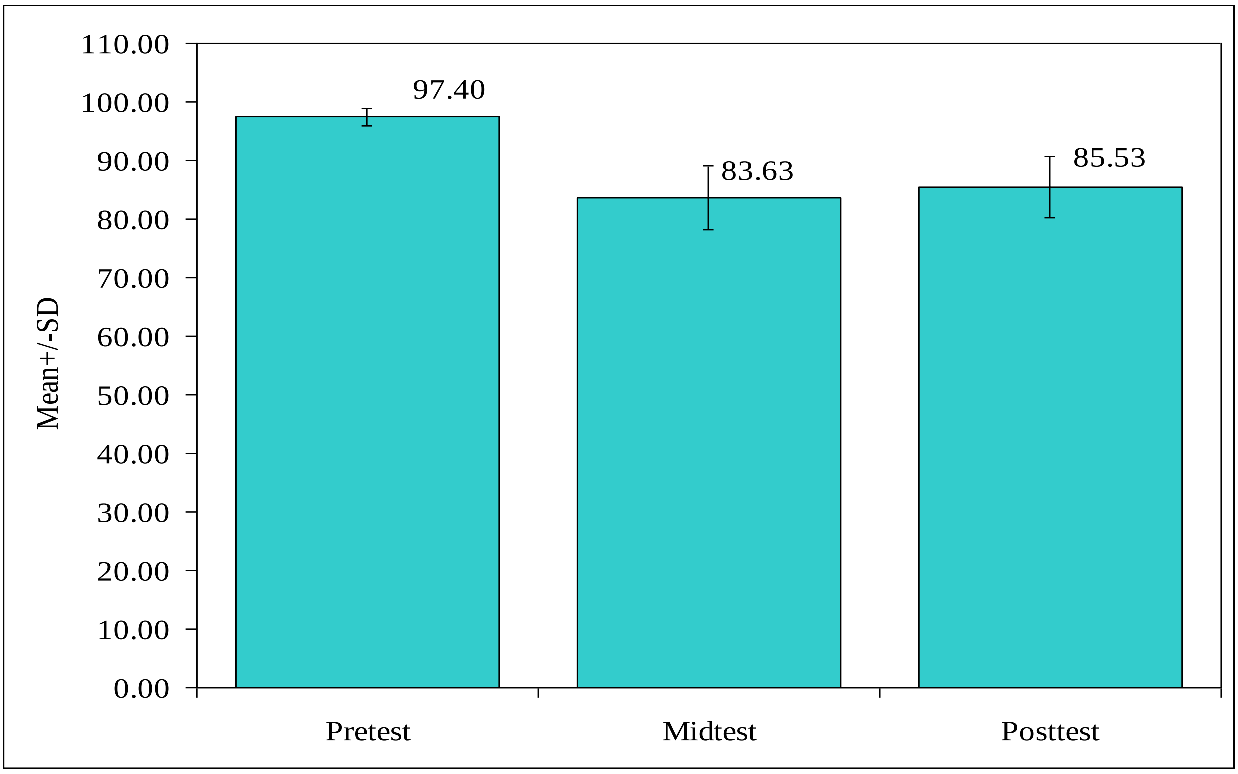


Table: Comparison of pretest, mid test and posttest treatment time points with pulse rate scores by dependent t test

Time points	Mean	SD	Mean Diff.	SD Diff.	% of change	t-value	p-value
Pretest	79.59	10.24					
Midtest	108.36	16.45	-28.77	17.13	-36.15	-16.7999	0.0001*
Pretest	79.59	10.24					
Posttest	106.64	14.76	-27.05	16.24	-33.99	-16.6549	0.0001*
Midtest	108.36	16.45					
Posttest	106.64	14.76	1.72	15.17	1.59	1.1335	0.2597

*p<0.05

Figure: Comparison of pretest, mid test and posttest treatment time points with pulse rate scores

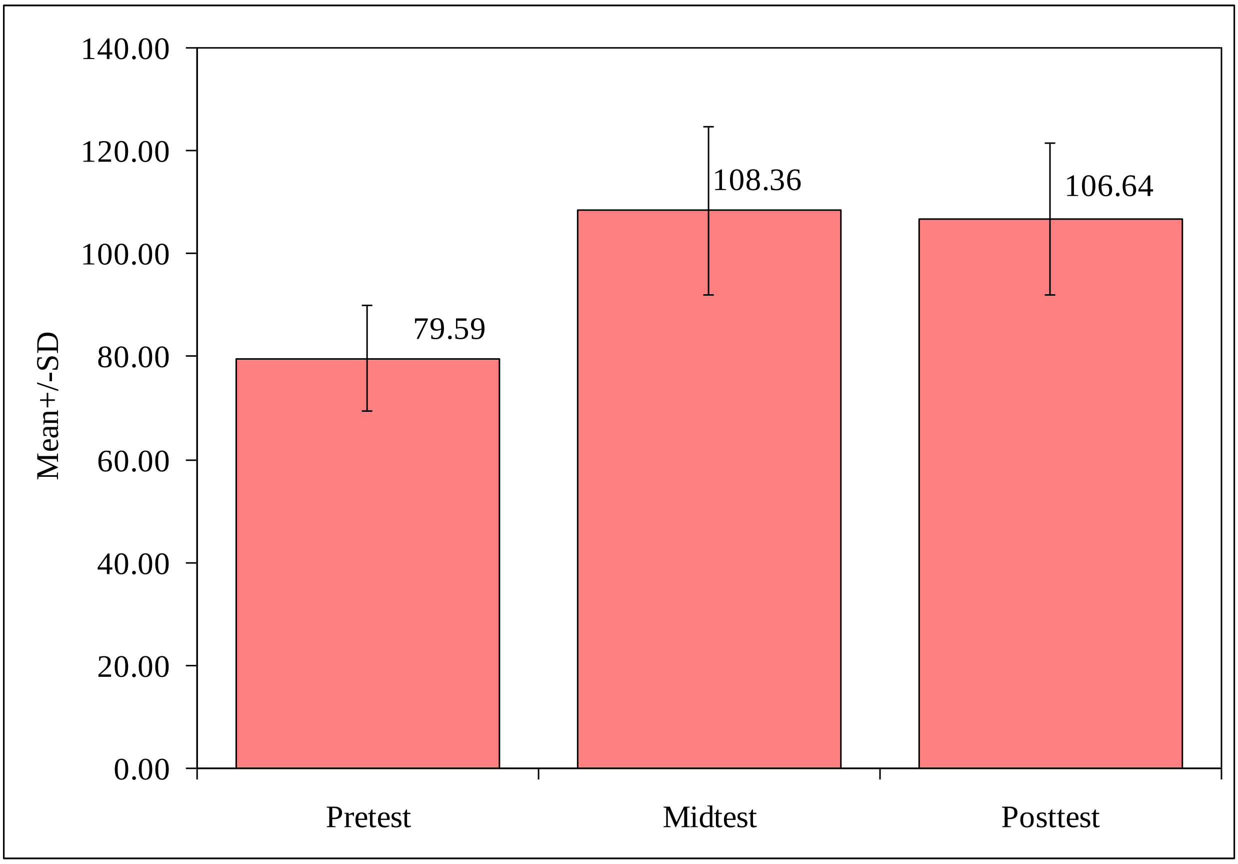


Table: Comparison of pretest, mid test and posttest treatment time points with QJT scores by dependent t test

Time points	Mean	SD	Mean Diff.	SD Diff.	% of change	t-value	p-value
Pretest	10.85	5.07					
Midtest	12.89	4.53	-2.04	3.51	-18.77	-5.7976	0.0001*
Pretest	10.85	5.07					
Posttest	14.67	5.89	-3.82	4.71	-35.17	-8.1110	0.0001*
Midtest	12.89	4.53					
Posttest	14.67	5.89	-1.78	3.52	-13.81	-5.0625	0.0001*

*p<0.05

Figure: Comparison of pretest, mid test and posttest treatment time points with QJT scores

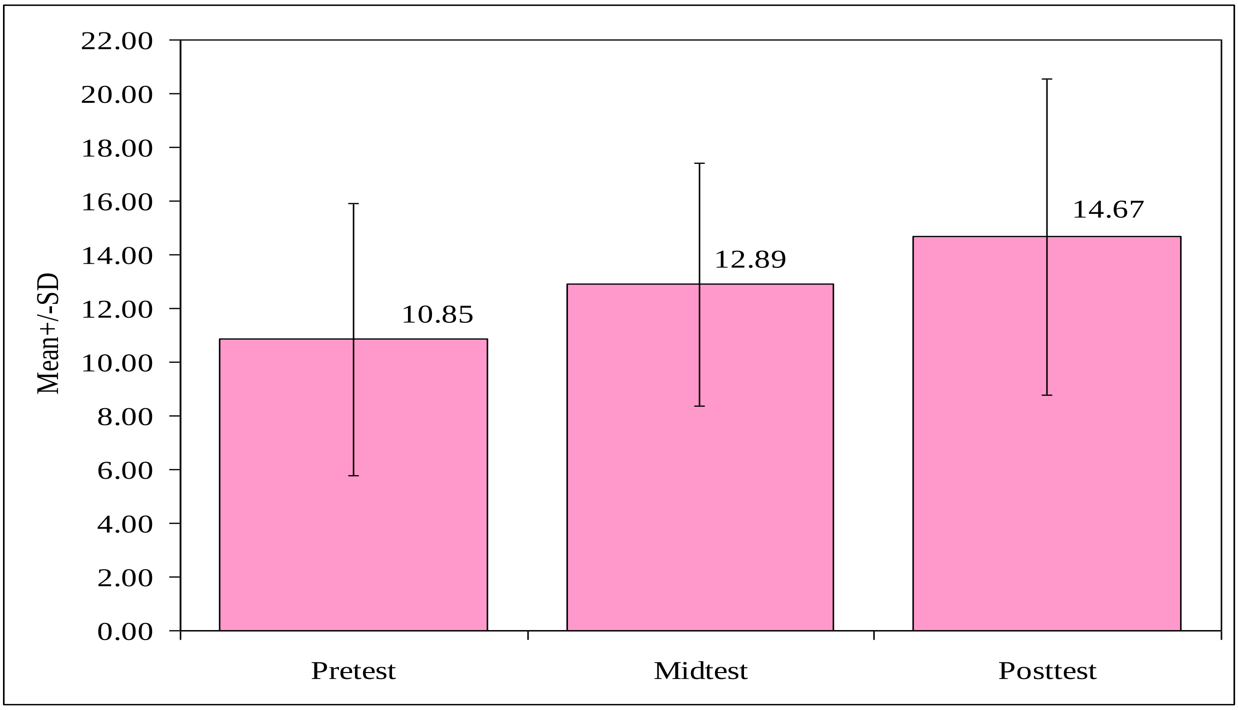
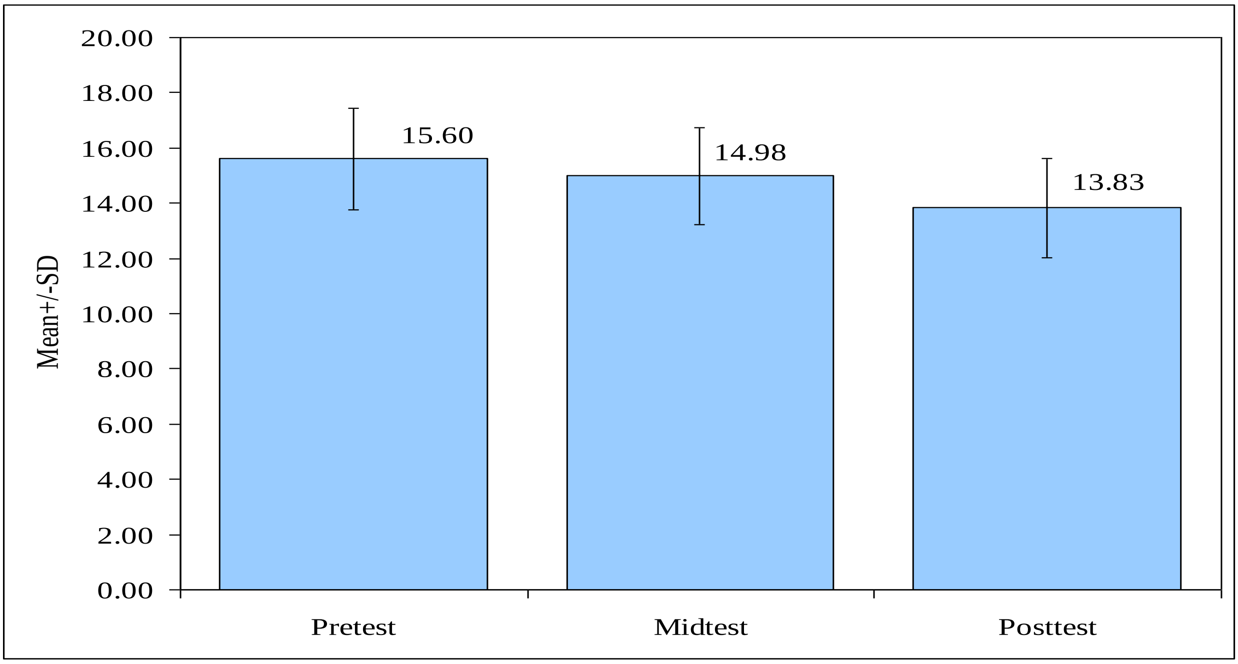


Table: Comparison of pretest, mid test and posttest treatment time points with T test scores by dependent t test

Time points	Mean	SD	Mean Diff.	SD Diff.	% of change	t-value	p-value
Pretest	15.60	1.85	0.62	1.27	4.00	4.9293	0.0001*
Midtest	14.98	1.77					
Pretest	15.60	1.85	1.77	1.37	11.33	12.8990	0.0001*
Posttest	13.83	1.80					
Midtest	14.98	1.77	1.14	1.23	7.64	9.3351	0.0001*
Posttest	13.83	1.80					

*p<0.05

Figure: Comparison of pretest, mid test and posttest treatment time points with T test scores



DISCUSSION:-

The observed improvement in agility can be attributed to several factors. Firstly, IMT likely led to enhanced respiratory muscle strength and endurance, which may have contributed to improved overall physical performance. Stronger respiratory muscles enable more efficient breathing during physical activities, allowing children to sustain higher-intensity movements for longer durations without experiencing respiratory fatigue.

Furthermore, improved respiratory function may have indirectly influenced agility by optimizing oxygen delivery to working muscles. Adequate oxygen supply is essential for energy production during physical exertion, and enhanced respiratory efficiency can delay the onset of fatigue, thereby improving performance in agility-related tasks.

Additionally, the structured nature of the IMT program may have contributed to the observed improvements in agility. Regular training sessions focusing on specific inspiratory muscle exercises likely led to progressive adaptations in respiratory muscle strength and endurance over time, ultimately translating into enhanced agility performance.
The findings of this study have important implications for promoting physical fitness and sports participation among school-aged children. Incorporating IMT into physical education programs or athletic training regimens may offer a novel approach to improving agility and overall athletic performance in this population.

Future research should aim to further elucidate the mechanisms underlying the relationship between IMT and agility in children. Longitudinal studies investigating the sustained effects of IMT on agility over time would provide valuable insights into the long-term benefits of inspiratory muscle strengthening. Additionally, exploring potential moderators, such as age, sex, and baseline fitness levels, could help tailor IMT interventions to specific subgroups for optimal outcomes.

CONCLUSION:-

In conclusion, the findings of this study suggest that inspiratory muscle training holds promise as a strategy for enhancing agility in school-aged children. By improving respiratory muscle strength and endurance, IMT may positively impact overall physical performance, thereby promoting a healthier and more active lifestyle among children. Further research is warranted to fully understand the potential benefits of IMT on agility and to inform evidence-based interventions aimed at optimizing physical fitness in this population.

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