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Research Paper :

Effect of physical training on accuracy of dexterous

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ABSTRACT

The purpose of the study was to find out the effect of physical training on accuracy of dexterous. For the propose, 40 right hand dominance men students from Department of Engineering and Technology, Annamalai University, Tamil Nadu, India were selected as subjects at random and their age ranged between 18-21 years, the selected subjects were divided in to two equal groups of twenty subjects each namely physical training (n=20) and control (n=20). The physical training group underwent training for fifteen weeks, four days per week and sixty minutes per day including warming up and cooling down exercises. The hand peg accuracy (grooved peg board test) and throwing accuracy (throw for accuracy) were selected as dependent variables and tested before and after the experimental period for both the groups. The collected data were analyzed by using ANCOVA. Further, independent 't' was calculated to find out the difference between left and right hand and the magnitude of improvement was also calculated to find out the level of improvement on dexterous. Level of confidence was fixed at 0.05. The result of the study showed that the physical training improved the accuracy level (hand accuracy and throwing accuracy) compared to control group. The difference between right and left hand on accuracy level was significant. However, the percentage of improvement for both the variables (hand accuracy and throwing accuracy) was in favour of left hand compared to right. Hence, it was concluded that physical training may be given to improve the dexterous (use of hands) level and quality.

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Key words : Physical training, Accuracy, Dexterous

Physical training has been shown to be an effective way to improve the force-producing capacity of hand muscles and to partially reverse the changes observed in the muscle architecture (Izquierdo, 2003). Mysterious reasons, the right hand significantly gains on the left hand, it is many times superior in accuracy and the facility to dominate coordination. Trough dexterity testing is usually provided the result that shows the both quickness and accuracy of the subject in performing any kind of dexterity task. Dexterity testing products examine a person's motor skills with regards to the fingers, hand and arms Bernstein, (1991).

Various exam in actions exist to measure such performance abilities as eye-hand coordination, quickness at performing assembly tasks, and overall motor skill development. The dexterity naturally involve the use of some combination of fingers on both hands to follow some designated testing procedure, such as placing pegs into a pegboard, accuracy of throwing the ball, and so on. Some dexterity tests check for the subject's ability to use not only the hands, but also test arms and shoulders more extensively as well Starosta, (1990). Manual speed and accuracy tests are designed to measure an individual's manual dexterity. Manual dexterity is all about that ability to make fine finger movements, repetitively, rapidly and accurately. Relevant for roles that need accurate fine finger movements such as machine operators, jewellers, sports persons and surgeons.

Handedness is an attribute of humans defined by their unequal distribution of fine motor skill between the left and right hands. An individual who is more dexterous with the right hand is called right-handed (sinistralists), and one who is more skilled with the left is said to be left-handed (dextralists). Minorities of people are equally skilled with both hands, and are termed ambidextrous (Kabbash, 1994).

METHODOLOGY

For the propose of the study, 40 right hand dominance men students from the Department of Engineering and Technology, Annamalai University, Tamil Nadu, India were selected as subjects at random and their aged between

18-21 years, were divided into two groups of twenty subjects each namely, physical training group (n=20) and control group (n=20). The physical training group underwent training on Bouncing the basketball (right and left hand alternatively), Wall catching the ball (right and left hand alternatively), Ball juggling (right to left hand), Ball juggling (left to right hand), Screwing right and left hand alternatively, Pec dec (right and left hand simultaneously) and Arm pullover(right and left hand alternatively) as physical training, for fifteen weeks, four days per week and sixty minutes per day including warming up and cooling down exercises. The hand accuracy (grooved peg board test) and throwing accuracy (throw for accuracy) were selected as dependent variables and tested before and after the experimental periods for both the groups. The collected data were analyzed by using ANCOVA to find out the significant difference. Further, independent 't' was calculated to find out the difference between left and right hand and the magnitude of improvement was also calculated to find out the level of improvement on dexterous. Level of confidence was fixed at 0.05.

OBSERVATIONS AND DISCUSSION

Table 1 shows that there was significant difference between the adjusted posttest means of physical training group and control group on right and left hand accuracy and throwing accuracy. To find out the improvement on dexterous level, independent 't' ratio was calculated with the magnitude of improvement(%).

The result of the 't' shows significant difference between right hand and left hand on hand accuracy and throwing accuracy due to selected physical training. The magnitude of improvement was higher for left hand when compared to right hand on both hand accuracy and throwing accuracy. Hence, it was concluded that the selected physical training improved the dexterous level.

The findings confirmed that physical training has a significant impact on accuracy on dexterous. The Grooved pegboard test of the least affected arm as a progression biomarker, would limit its sensitivity. Rocha and Yael Abreu-Villaca, (2007), studied the performance on the Grooved pegboard test upon repeated trials and transfer of training between the hands in the first trial. The classification of handedness was based on the writing hand. For the three trials combined, women were faster than men. It is speculated that a larger corpus callosum in left-handed men allows for the greater transfer of training between the hands. This test requires more complex visual-motor coordination than most pegboard tests, and is also influenced by the subject's fine motor skills. Bryden and Roy (2005) examined the influences of sex and handedness on manual performance on the Grooved pegboard test, and secondly to provide normative data for two versions (place and remove tasks) of the Grooved pegboard test, the remove task of the Grooved pegboard may provide a purer measure of motor speed of the two hands than the standard administration of the Grooved Pegboard Test. There was significant performance differences between the hands which were also noted for the remove task. Findings also indicated that the remove task was sensitive to sex and handedness effects. Hanna *et al.,* (1997) compared the psychomotor aptitudes relevant to endoscopic manipulations between right-handed and left-handed subjects. A significant difference in the error rate and first time accuracy was observed between subjects and between the dominant and non-dominant hands, Right-handed subjects performed less errors and exhibited better first time accuracy.

According to Hore *et al.* (1996) overarm throws made with the non-dominant arm were usually less

Table 1: ANCOVA for accuracy

Variables	Dexterous	Adjusted post test mean		sov	Sum of squares	d.f.	Mean squares	'F' Ratio
		Physical training group	Control group					
Eye hand accuracy	Right hand	39.08	43.66	B	207.49	1	207.49	80.84*
				W	94.97	37	2.57	
	Left hand	39.07	44.87	B	318.25	1	318.25	55.12*
				W	213.62	37	5.77	
Throwing accuracy	Right hand	11.66	7.49	B	167.34	1	167.34	113.88*
				W	54.37	37	1.47	
	Left hand	4.72	2.03	B	68.61	1	68.61	143.23*
				W	17.72	37	0.48	

(SOV – Source of Variance, B –Between, W – With-in, d.f. – Degree of Freedom)

* indicates significance of value at P=0.05 level of confidence.

(The table values required for significance at 0.05 level of confidence for 1 and 37 is 4.11).

Table 2: Dexterous 't' value and magnitude of improvement

Variables	Dexterous	Mean	SD	't' Value	Magnitude of Improvement in %
Eye hand accuracy	Right hand	4.01	1.90	2.37*	10.43 %
	Left hand	6.36	3.98		15.71 %
Throwing accuracy	Right hand	3.85	1.66	3.01*	34.68 %
	Left hand	2.60	0.82		59.09 %

(RH – Right hand, LH – Left hand)
* indicates significane of value at P=0.05 level of confidence.
(The table values required for significance at 0.05 level of confidence for 38 is 2.03, respectively).

accurate than those made with the dominant arm. The objective was to determine the errors in the joint rotations associated with this inaccuracy and thereby to gain insight into the neural mechanisms that contribute to skill in overarm throwing.

Motor control has historically been an important discipline, it runs the risk of being overshadowed by other newer areas of neuroscience. It remains to be determined whether the decreased accuracy in throwing in cerebellar patients is caused by an increase in this error or from disorder in some other multijoint coordinating mechanism (Hore *et al.,*1996).

Conclusion:

It was concluded that the physical training improves right hand and left hand on hand accuracy and throwing accuracy of dexterous (hands). The non-dominant hand shows better improvement on hand accuracy and throwing accuracy. Hence, non-dominant has improved accuracy when compared to base level.

Implication:

If an individual having better dexterity, can be able to do any sort of work with both hands simultaneously without having any tired. Accuracy on dexterous leads major role in fine motor activity such as drawing, painting, curving sculpture and so on. In sports, the accuracy plays important role in ball games while throwing accurately for example in cricket bowling and fielding. Therefore, the finding of the study will be helpful to the coaches and physical educationists to enhance the dexterity of players who are involved in the various sports activities. The physical training on dexterity is helpful to the players to use their both dominant and non-dominant hands effectively. Being ambidextrous (using both hands) in sports activity is especially helpful during the competition.

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