Theories & Applications, the International Edition
Printed Version: (ISSN 2090-5262)
Online Version: (ISSN 2090-5270)
November 2013, Volume 3, No. 3 Pages (115 - 121)

An Analysis of the Use of Proprioceptive Neuromuscular Facilitated Stretching Methods on Explosive Strength Performance in Wrestling

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Abstract
This paper is trying to analyze how proprioceptive neuromuscular facilitation (PNF) methods can improve muscular diastolic capacity. The research aims to identify the effect of using one of PNF method (Hold – Relax with agonist contraction) on explosive strength for wrestlers, and the Efficiency of the Reverse Body Lift skill performance for 16 volunteered healthy male wrestlers. Subjects classified into two Groups: Experimental and Control Group. Results reveal that post-measurement of 3 times of Bridge up test (Sec) significantly decreased (7.17±0.33, 6.4±0.37) for post and pre-measurements respectively. Flexible of spine (cm) significantly decreased (22.3±0.93, 20.57±1.01) for post and pre-measurements respectively, with improvement percentage of (7.09%) .Vertical distance (cm) significantly increased (18.61±0.90, 20.33±1.02) for pre and post-measurements respectively, with improvement percentage of (8.46%). Explosive strength (Sec) significantly decreased (13.61±1.41, 11.7±0.71) for post and pre-measurements respectively, with improvement percentage of (14.03%). Reverse Body Lift skill (cm) significantly increased (6.03 ± 0.57, 7.76 ± 0.97) for pre and post-measurements respectively, with improvement percentage of (22.29%), the most important conclusion was that applying training program that contains PNF exercises lead to an improvement of all physical variables, and led to the significant improvement in performance.

Introduction

Developing wrestling sport technical performance is related to many Sciences such as anatomy, physiology, mechanics; which contribute significantly to improve joints movement range. That may lead to development of speed performance, explosive power and reduce muscle injuries during the process of stretching or flexibility motor range allowed by muscle or joint according to skill technical performance requirements. (Saleh Abdelejaber, 2008: p4).

The Reverse Body Lift skill is an important skill; which is executed in ground wrestling position, and gives a good opportunity for attacker wrestler to lose the defender his balance. So it became easy to hook him, and award points, also to execute shoulders touch. (Mohamed El-Ruby, 2005:p128)

The wrestling experts in FILA modified the wrestling rules and give much interest in the Reverse Body Lift skill, that where if a round ends without a win for either wrestlers. The wrestler with fewest points is in the ground position of the defending wrestler and the other one is the attacked wrestler. He tries to control the defending wrestler in the Reverse Body Lift skill, and if he does not execute this action or other during 30 seconds; the defending wrestler will award 1 point to resist the attacked wrestler and give him no opportunity to execute the action; then wrestlers exchange attacker and defender positions. That emphasize the importance of Reverse Body Lift skill training and find exercises to enhance the efficiency of wrestler's muscles, to perform the skill efficiently, also to achieve shoulders touching or awarded high points.

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Stretching has long been touted as an important adjunct to a physical fitness program, and a variety of stretching techniques exist to enhance flexibility and range of motion (ROM). However, debate exists as to the type of stretching that should be included. Traditionally, static stretching has been performed prior to competition; however, there is evidence in the literature that static stretching may have a detrimental effect on sports performance (Fletcher, 2010, p2097, Gelen E., 2010, p951). Static stretching is a type of stretch that involves holding a stretch at the end position for 30 seconds and includes both relaxation and concurrent elongation of the stretched muscle (3). More recently, dynamic stretching has been proposed to be a better method of stretching prior to competition and has been shown to have a positive or neutral impact on performance (Gelen E., 2010, p951). Dynamic stretching is a type of stretching that involves sport-specific movements to prepare the athlete for activity (National Strength and Conditioning Association, 2008)). Both dynamic and static stretching have the advantage of being performed individually, however they may not elicit the greater gains in range of motion (ROM).

Proprioceptive Neuromuscular Facilitated (PNF) stretching is also a common mode of stretching. PNF stretching techniques are commonly used in both athletic and clinical settings to enhance both active and passive ROM to optimize motor performance and rehabilitation (Sharman MJ et al , 2006, p931). While static, ballistic, dynamic, and PNF stretching are all effective at enhancing joint ROM, PNF stretching produces a greater enhancement (Ferber R, 2006, p393, Funk DC et al, 2003, p491). PNF stretching is thought to be superior to other stretching methods because it facilitates muscular inhibition. PNF stretching involves three specific muscle actions to facilitate the passive stretch (National Strength and Conditioning Association, 2008.).

Research Objectives

The research aims to identify the effect of using one of PNF method (Hold – Relax with agonist contraction) on explosive strength for wrestlers, and the Efficiency of the Reverse Body Lift skill performance for wrestlers

Material and Methods

Subjects

16 volunteered healthy male wrestler, aged 19 ± 0.69 years, height 163.3 ± 6.8m and weight 58.87 ± 6.05 kg .They have 6.62 ± 1.24 Training Age. Subjects classified to two equal groups: Experimental and Control Group.

Protocol

After homogeneity between the two groups was confirmed, Subjects were tested pre and post program implantation in Five Measurements (Flexible of spine, 3 time of bridge up test performance, Vertical distance, Explosive strength, Efficiency of Reverse Body Lift skill performance). The researcher conducted an implementation of the proposed exercise from June 9th, 2012 until August 1st, 2012.

Data analysis

T test was used to determine significance of differences between pre and post-measurements of variables under discussion. Researcher adopted 0.05 significance level while analyzing data.

Tools

Medical scales to measure weight in kilograms, Dynamometer to measure grip strength, strength of legs and back muscles, Stopwatch, Goniometer to measure motor spine motor range, Wrestling mat to execute the training program and physical and fitness tests, measure tape to measure height bridge vertical distance

Table (1)
Measurements of basic, physical and Skills variables before PNF Program for Experimental and Control group Subjects.

Measurements Variables	Measurement Unit	Experimental group (n=8)		control group (n=8)		T-test	Level of significance
		Mean	±SD	Mean	±SD		
Age	Year	18.96	0.69	19.15	0.66	0.09	Not significant
Training age	Year	6.62	1.24	6.7	0.80	0.40	
Weight	Kg	58087	6.85	59.5	6.34	0.16	
Length	Cm	163.37	6.80	162.62	6.04	0.33	
3 time of Bridge up test	Sec	7.17	0.37	7.02	0.42	0.43	
Flexible of spine	Cm	22.03	0.93	22.13	0.86	0.24	
Vertical distance	Cm	18.61	0.90	18.41	0.81	0.01	
Explosive strength	Sec	13.61	0.41	14.13	0.40	0.01	
The Reverse Body Lift skill	Num	5.77	0.35	5.91	0.32	0.21	

T significance at 0.05 level = 2.145

Table (1) results reveal no significant differences between experimental and control group in basic, physical and skill variables before experiments which confirm homogeneity between the two groups

Results

Table (2)
Differences of physical and Skills variables between before and after PNF Program for Experimental group Subjects. (n=8)

Measurements Variables	Measurement unit	Pre (Mean ± SD)	Post (Mean ± SD)	Improvement percentage	T-test	Level of significance
3 time of Bridge up test	Sec	7.17 ±0.33	6.4±0.37	10.73	6.93	significant
Flexible of spine	cm	22.3±0.93	20.57±1.01	7.09	7.81	
Vertical distance	cm	18.61±0.90	20.33±1.02	8.46	7.80	
Explosive strength	Sec	13.61±1.41	11.7±0.71	14.03	7.83	
The Reverse Body Lift skill	Num	6.03±0.57	7.76±0.97	22.29	9.95	

T significance at 0.05 level = 2.365

Figure (1)
Variables measurements before and after PNF Program for Experimental group Subject

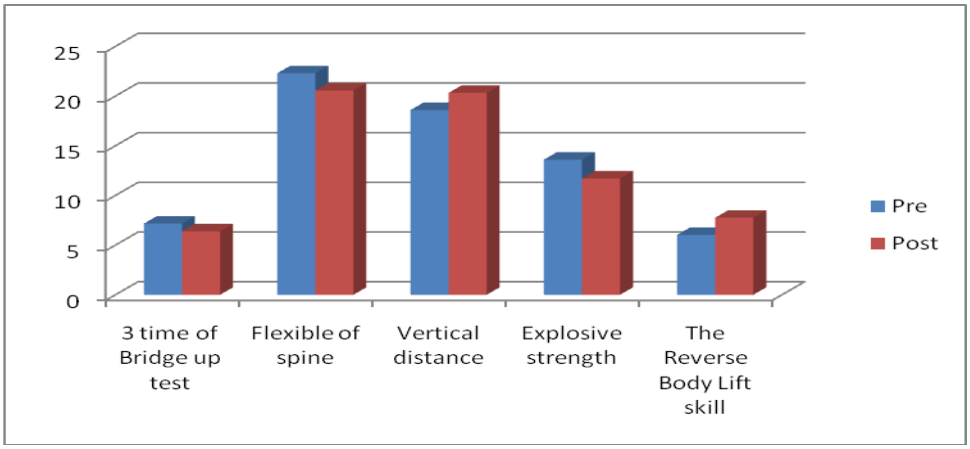

Table (2) ND figure (1) reveal significant differences in physical and Skills variables before and after PNF Program for Experimental group Subjects: The 3 time of Bridge up test (Sec) significantly decreased after PNF Program (7.17 ± 0.33, 6.4±0.37 $p < 0.05$). The Flexible of spine (cm) significantly decreased after PNF Program (22.3 ± 0.93, 20.57 ± 1.01 ($p < 0.05$), with improvement percentage (7.09%) ($p < 0.05$) .The Vertical distance (cm) significantly

Increased after PNF Program (18.61 ± 0.90, 20.33±1.02($p < 0.05$), with improvement percentage (8.46%) ($p < 0.05$).The Explosive strength (Sec) significantly decreased after PNF Program (13.61 ± 1.41, 11.7 ± 0.71 ($p < 0.05$), with improvement percentage (14.03%) ($p < 0.05$).The The Reverse Body Lift skill (cm) significantly increased after PNF Program (6.03 ± 0.57, 7.76 ± 0.97 ($p < 0.05$), with improvement percentage (22.29%) ($p < 0.05$).

Table (3)
Differences of physical and Skills variables after PNF Program between Experimental and control group Subjects. (n=8)

Measurements Variables	Measurement unit	control group n=8 (Mean ±SD)	Experimental group n=8 (Mean ±SD)	The difference	T-test	Level of significance
3 time of Bridge up test	sec	7.25±0.38	6.4±0.37	0.85	9.58	significant
Flexible of spine	cm	22.67±0.91	20.57±1.01	2.1	6.05	
Vertical distance	cm	18.83±0.69	20.33±1.02	1.5	4.64	
Explosive strength	Sec	13.15±0.88	11.7±0.71	1.38	8.70	
the Reverse Body Lift skill	Num	6.7±1.40	7.76±0.97	1.94	8.04	

T significance at 0.05 level = 2.145

Figure (2)
Variables measurements before and after PNF Program for Experimental and Control group Subject

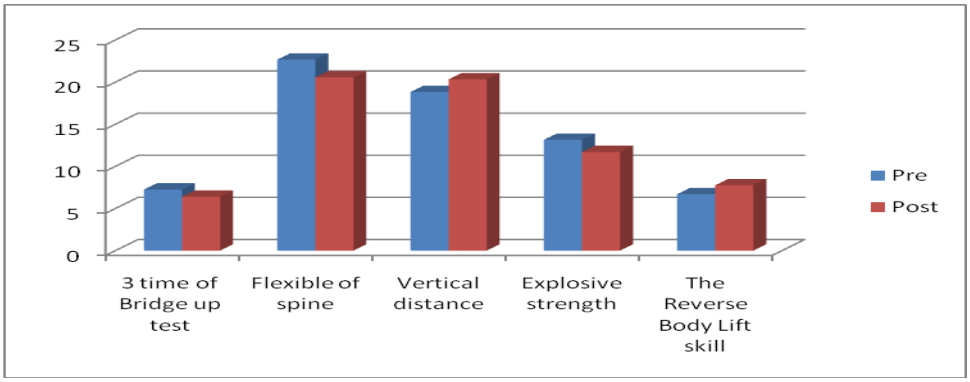

Table (3) and figure (2) show significant differences in physical and Skills variables after PNF Program between Experimental and Control group Subjects : The 3 time of Bridge up test (Sec) significantly decreased after PNF Program for (7.25 ± 0.38, 6.4±0.37 $p < 0.05$), and The difference (0.85) ($p < 0.05$).The Flexible of spine (cm) significantly decreased after PNF Program (22.67±0.91, 20.57±1.01 ($p < 0.05$), and The difference (2.1) ($p < 0.05$).The Vertical distance (cm) significantly Increased after PNF Program (18.83±0.69, 20.33±1.02 ($p<0.05$), and The difference (1.5) ($p < 0.05$). The Explosive strength (Sec) significantly decreased after PNF Program (13.15±0.88, 11.7 ± 0.71 ($p < 0.05$), and The difference (1.38) ($p < 0.05$). The Reverse Body Lift skill (cm) significantly Increased after PNF Program (6.7±1.40, 7.76 ± 0.97 ($p < 0.05$), and The difference (1. 94) ($p < 0.05$).

Discussion

Results in this study revealed presence of differences pre and post PNF Program in physical and Skills variables for Experimental group subjects. (Figure 1 and 2). Bridge up test time decreased to about 3 times with improvement percentage (10.73%). There was also significant differences between Experimental and Control group in Bridge up test time with difference about (0.85) after PNF training program, Bridge up skill speed has been improved, which mean that muscles can work faster, which in turn allow wrestler to perform this skill more speedy as possible without fatigue (Edward David, 1991: pp301- 312), (Chao- chung, 2003:p5),(Mohamed El-Ruby,2005 128), (McNeal 2006: p141-146)

Results also revealed significant decrease spine flexibility with improvement percentage (7.09), and difference between Experimental and Control group in spine flexibility with difference of (2.1). there was also increase in vertical distance variable between pre and post tests for Experimental group with improvement percentage improvement (8.46), There was also significant difference between Experimental and control group of (1.5). Stretching exercises have been considered an essential component of physical training programs for decades, studies have demonstrated that flexibility measures are related to performance for wrestler. More flexibility is acquired after PNF Program. Much flexibility needed each day, from bending over to tie our shoes to wrestling off tight, sweaty sports bras. It's these small tasks that often challenge our flexibility the most, (Abuella 1995: p264), (Bonner Bp, Devers, 2004:p6), (Davis DS,2005:2),(Kofotolis2005:p1), (Herman, 2008: pp 128-129), (Saleh Abdelgaber 2008:p80).

This study's results also revealed presence of significant decrease in Explosive strength test with improvement percentage (14.03); with significant differences between Experimental and Control group in the same test after PNF program with difference (1.38). Successful wrestling requires a combination of power, strength and speed which certainly is an advantage. Wrestle under a weight division, which most competitive wrestling is conducted, need to worry less about size and bulk as long as maximize his weight for specific division. (Edward,1991:pp301- 312),(Amjad, 2002:65)(Saleh, 2004: p90),(wlied, 2004:p70), (Roemmish, 2006:p3).

Study results also reveal existence of significant decrease of Reverse Body Lift skill with improvement percentage (22.29), with differences between Experimental and Control group after PNF program amounted to (1.94). PNF training or Stretching training can enhance athletic characteristics. Because all athletes have individual needs, the best program for an athlete will be modified for his wrestling style, age, goals, and facilities available. However, here's a Stretching program, starting out, which can be used to set up for wrestling competition. This applies to all forms of wrestling including College, Freestyle, Greco-Roman, and professional wrestling of various types, although professional wrestling often has its own bizarre requirements. (wlied, 2004:pp75-100),(Ala Mohammad, 2005:p9), (Ehab, 2008:p93), (Saleh, 2008:p86).

Conclusions

From the data, information, research results, research sample and through results discussion and interpretation, the researcher concluded that: Applying training program that contains PNF exercises lead to an improvement of all physical variables. PNF exercises that imitate motor skills' performance lead to significant improvement in skills performance (The Reverse Body Lift skill).

Recommendations

Application of the proposed training program, concerning with individual differences between players when training using PNF exercises (Hold – Relax with agonist contraction) on different skills, considering that training program should simulates the various skills performance.

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