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ORIGINAL ARTICLE

COMPARATIVE EFFECT OF DYNAMIC STRETCHING VERSUS SLOW-REVERSIBLE PNF TECHNIQUE ON HIP FLEXIBILITY AMONG YOUNG ADULTS

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ABSTRACT

Background of the study: Flexibility is a very important duty and performance of human in order to achieve successfully his/her skills and abilities in a wide range of conditions. Hip flexibility currently accounts for 13% of the global population and are predicted to account for 21 % by 2050. The objective of the study is to compare the effect of Dynamic stretching versus Slow-Reversible PNF technique on Hip flexibility among the young adults. **Methodology:** The study was an experimental design, comparative and pre-post type. The study setting is at A.C.S medical college and hospital (University students) with sample size of 30 subjects based on the inclusion and exclusion criteria. The study duration was about 12 weeks. The inclusion criteria are both male and females, age group between 18 - 25 years of. The exclusion criteria are History of musculoskeletal injury, Recent fracture, Pathology of pelvis, hip and knee, Any surgery of low back, hip and knee in normal adults. Materials Used for the study were Universal Goniometer, Thomas test, Pen and paper. Outcome Measures of the study are Hip flexibility, Posture, Increase ROM. Measurement Tools for the study were Goniometer, Plumb line method. **Result:** On comparing pre-test and post-test within Group A & Group B on ROM score. shows highly significant with mean difference 4.933 over 1.867 respectively. **Conclusion:** The present study concluded that the slow reversible PNF technique considerable to be more effective than Dynamic stretching group on hip flexibility among young adults.

Keywords: Dynamic stretching; Flexibility; PNF; Posture.

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INTRODUCTION

Flexibility plays an important role in preventing injury and improving physical performance. The high level of flexibility adaptability not only introduced a factor in preventing injury but also causes a rapid movement to be performed easily and without any pressures¹. Thus, increasing flexibility is not only to meet the demands and needs of sports skills but it must be somewhat beyond the scope and the extent of the required maximum exercise (ability to create and develop flexibility storage) should be strengthened. The lack of flexibility may lead to failure and susceptibility to various disorders. Muscular flexibility, major components of physical fitness, have long been the center of attention for athletes, champions, physical trainers, physiotherapists and rehabilitation professionals²⁻⁴.

Goniometric measurements taken on subjects with impaired hip ROM found to be very reliable when using either a goniometer or the universal goniometer. The study sought to analyse the hip flexibility in limited SLR and concluded that the inability to touch the ground and a limited SLR. It is caused by increasing muscle stiffness but determined by the stretch tolerance. The results of this study show the primary goal of flexibility is to increase the capacity of muscle fibres capable of the elastic or stretching properties^{5,6}.

The lack of sufficient activity to stimulate and maintain the readiness of the anti-gravity muscles and the use of muscle tensions during the exercise of flexibility is necessary for some parts of the body. These parts include thigh, front hip, back, neck, and chest. Stretching ligaments and muscles improves the ROM in major joints of the body and the optimal muscle performance is the initial tension. The application of stretching for improving flexibility is based on

the notion that such exercise may reduce the occurrence, intensity and duration of muscular, ligamentous and articular injuries^{7,8}.

Comparing dynamic and PNF stretching of the hip muscle to determine if either any effect on muscle performance had flexibility gains made with no difference noted in the type of stretch used. No significant difference in muscle elongation with PNF stretching compared to passive stretching. Better stretching technique for the improvement of the ROM is dynamic stretching in which the limb moved slightly behind the terminal position slowly and then maintained in that position for at least⁹⁻¹².

30 seconds. Moving the limbs slowly decreases the response of the type sensory neuron input allowing minimal interference to the joint movement. A study suggests that duration of 30 seconds is an effective time for stretching in enhancing the flexibility of hip muscle. A study compared dynamic stretch and PNF techniques while maintaining the posture in plumb line method. Muscle flexibility is enhanced through various stretching exercises including dynamic PNF and vibration training¹³⁻¹⁵.

One example of PNF training is contraction-relaxation, which some sources report to be dynamic stretching. Another study, however, reported to be that 6 weeks of dynamic stretching yielded better results compared to PNF. Some researchers have noted that vibration stretching methods are more efficacious for improving muscle flexibility. Compared the PNF and dynamic on hip flexibility. The results showed that PNF made the maximum development of motion range in this regard¹⁶⁻²⁰.

METHODOLOGY

The study was an experimental design, comparative and pre-post type. The study setting is at A.C.S medical college and hospital (University students) with sample size of 30 subjects based on the inclusion and exclusion criteria. The study duration was about 12 weeks. The inclusion criteria are both male and females, age group between 18 - 25 years of. The exclusion criteria are History of musculoskeletal injury, Recent fracture, Pathology of pelvis, hip and knee, Any surgery of low back, hip and knee in normal adults. Materials Used for the study were Universal Goniometer, Thomas test, Pen and paper. Outcome Measures of the study are Hip flexibility, Posture, Increase ROM. Measurement Tools for the study were Goniometer, Plumb line method.

Inclusion Criteria: Age group between 18 - 25 years, both males and females, Bilateral hamstring tightness, Thomas test positive

Exclusion criteria: History of musculoskeletal injury, Recent fracture, Pathology of pelvis, hip and knee Any surgery of low back, hip and knee.

Materials used: Universal Goniometer, Thomas test, Pen and paper

Procedure: The study will be performed by 30 subjects and classified into two groups as Group A and Group B. 15 subjects in each group. The treatment duration for a period of 12 weeks, 3 sessions per week, duration ins 45 mints per day with 2 to 4 minutes rest between each workout including warm up and cool down.

Group A The patients in this group received dynamic stretching each 5 repetition for 10 seconds.

1.Forward lunges, 2. Plank with twist, 3. Standing squad stretch, 4. Seat side straddle, 5. Seat straddles lotus.

Group B: The patients in this group received slow reversible technique.

Intervention: The study recruited 30 subjects with hip flexibility and the participants were positive in Thomas test. Hence the subjects with hip flexibility in the age group of 18 – 25 years were selected on the inclusion criteria and exclusion criteria; they were fully explained about the study and measure the range of motion form in acceptance with participation of the study is signed by the participate and the research the subjects will be randomly recruited in to two groups (group A & group B). Group A will be given dynamic stretching and Group B will be given slow reversible technique for a period of 12 weeks, 3 days per week duration is 45 minutes with 2 to 4 minutes rest between each workout. And they will be evaluated before and after 12 weeks of the therapy through measuring their ROM and hip flexibility and Posture.

Dynamic Stretching: Forward lunges, Plank with twist, Standing squad stretch, Seat side straddle Seat straddles lotus.

Slow Reversible PNF Technique: Hold relax technique.

Forward Lunges: Ask the patient to stand tall with feet hip-width apart engage your core. Take a big step forward with right leg. Start to shift your weight forward so heel hits the floor first. Lower body until right thigh is parallel to the floor and right shin is vertical. Its ok if knee shifts forward a little as long as it doesn't go past right toe. If mobility allows, lightly tap left knee to the floor while keeping weight in right heel.

Press into right heel to drive back up to starting position. Repeat on the other side.



Figure 1 Forward Lunges

Plank With Twist: Ask the patient to start out in a plank position with patient elbows on the mat, on your toes with your stomach off the mat. Keep your back straight. Keeping your belly button pressed in twist your left hip till it slightly touches the mat and then back to the plank position. Then twist so your right hip slightly touches the mat and return to the plank position. This completes one rep.



Figure 2 Plank with Twist

Standing Squad Stretch: Ask the patient to stand on your left leg, one knee touching the other. You can hold a chair or the wall to keep you steady if needed. Grab your right foot, using your right hand, and pull it towards your butt. Hold the position for 20-30 seconds, then repeat, switching from your left leg to your right.



Figure 3 Standing squad stretch seat side straddle

Seat Side Straddle: Ask the patient to sit with legs spread, placing both hands on the same shin or ankle. Bring the chin towards the knee, keeping the leg straight. Hold for 5 seconds. Repeat 3 to 6 times. Repeat exercise on the opposite leg.



Figure 4 Seat Side Straddle

Seat Straddle Lotus

Ask the patient to sit down, placing the soles of the feet together and drop the knee toward floor. Place the forearms on the inside of the knees and push the knees toward the ground. Lean forward from the hips. Hold for 5 seconds. Repeat 3 to 6 times.



Figure 5 Seat Straddle Lotus

Slow-Reversible PNF Technique: Ask the patient to put a muscle in a stretched position and hold that stretch for about 10 seconds. Contraction without actually moving that muscle. contract it like a gentle push against the stretch. Relax now just relax the stretch. and then go for stretching

again while exhaling. Try to make it deeper than the first one.



Figure 6 Slow Reversible Technique

Data Analysis: The collected data were tabulated and analysed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS). Paired t-test was adopted to find the statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find statistical difference between the groups.

GROUP A- Dynamic Stretching

| Eye Sight | Mean | Number of Pairs | Mean Diff. | SD, SEM | DF | t | P value | Sig. Diff. (P<0.05) |
|-----------|-------|-----------------|------------|---------|----|-------|---------|---------------------|
| Pre-Test | 81.07 | 15 | 1.867 | 0.7432 | 14 | 9.727 | P<0001 | **** |
| Post Test | 82.93 | | | 0.1919 | | | | |

Table 1: paired t test on rom within group a on effectiveness by dynamic stretching on hip flexibility among young adults

The above table 1 shows significant difference in rom within Group A with P value >0.0001.

Group B –Slow-Reversible PNF Technique

| Eye Sight | Mean | Number of Pairs | Mean Diff. | SD, SEM | DF | t | P value | Sig. Diff. (P<0.05) |
|-----------|-------|-----------------|------------|------------------|----|-------|---------|---------------------|
| Pre Test | 86.27 | 15 | 4.933 | 0.5936 0.1533 | 14 | 32.19 | P<0001 | **** |
| Post Test | 91.20 | | | | | | | |

Table 2: Paired t test on eye sight on rom within group b on effectiveness by slow reversible PNF technique on hip flexibility among young adults.

The above table 2 shows significant difference on ROM within Group B with P value >0001.

Comparative Study between Group A and B By ANOVA

| Outcome Measures | Exercise Group A and B | Test | Mean | Mean Diff. | R Square | F | P value | Sig. diff. (P <0.05) |
|------------------|-------------------------|-----------|-------|------------|----------|-------|---------|----------------------|
| ROM | Dynamic Stretching | Pre test | 81.07 | 1.867 | 0.0215 | 0.409 | P<0.409 | NS |
| | | Post Test | 82.93 | | | | | |
| | Slow Reversal Technique | Pre test | 86.27 | 4.933 | | | | |
| | | Post Test | 91.20 | | | | | |

Table 3: ANOVA to Compare ROM between Group A and B

The above table 3 shows significant difference on ROM between Group A and B with P value <0.409.

RESULT

The purpose of the study is found out the effects of Dynamic Stretching and Slow Reversal Technique in improving hip joint ROM. Total 15 participants of both genders with age group between 19 to 21 years were included in the

study. In Group A, ROM improved significantly with mean difference of 1.867, by Dynamic Stretching with P value>0.0001. In Group B, ROM improved significantly with mean difference of 4.933, by Slow Reversal Technique with P value>0.0001. Comparative study between Group A and Group B showed no

significant difference in ROM with P value 0.409. The study concluded that Slow Reversal Technique is more effective than Dynamic Stretching with mean difference 4.933 over 1.867 respectively.

DISCUSSION

The aim of the study is to find out the comparative effect of Dynamic stretching versus slow reversible PNF technique on hip flexibility among young adults.

30 subjects from A.C.S medical college, based on the inclusion criteria underwent dynamic stretching for group A & slow reversible PNF technique for group B period of 12 weeks.

After 12 weeks, statistical analysis revealed that the slow reversible group was considerable to be more effective than dynamic stretching on hip flexibility among young adults.

Most of the previous study made perform different PNF stretching techniques can be used by athletes and sports physiotherapists to improve hamstring flexibility and their performance and also prevent injuries³.

The PNF and static in order to achieve level of muscle relaxation necessary for the complicated motions of their field¹¹.

The static and proprioceptive neuromuscular facilitation stretching both have produced greater improvement but compared with PNF contract relax stretching showed significant changes in hamstring flexibility compared with control group²⁰.

The active aerobic warm-up significantly increased hamstring flexibility. After warm-up static stretching further increased flexibility while dynamic stretching decreased flexibility⁶.

The comparison of post – test mean values of ROM over the subjects shows differences in the effectiveness to regular rom and increased in post-test has lower mean value is more effective than the pre-test.

The result of this study shows that there is highly significant difference between post–test when compare to pre – test.

The mean post – test slow reversible technique scores comparatively more than pre – test scores of slow reversible techniques.

The result of this study also shows that there is a significantly increased flexibility and improvement of the posture.

Hence, the post – test, slow reversible technique showed statistically better significant result than the pre – test slow reversible technique on hip flexibility improving functional ability in posture.

The present study concluded that there was significant improvement in 12 weeks of slow reversible PNF technique is increase ROM and posture quality of life improvement in young adults. Hence dynamic stretching group was considerable to be more effective than slow reversible PNF technique group.

Ethical Clearance: Ethical clearance has obtained from Faculty of Physiotherapy, Dr. MGR. Educational and Research Institute, Chennai, Tamil Nadu, Reference number: No: A-25/PHYSIO/IRB/2019-2020 Dated: 07/01/2020.

Conflict of interest: There was no conflict of interest to conduct and publish this study.

Fund for the study: It was a self-financed study.

CONCLUSION

The present study concluded that there was significant improvement in 12 weeks of slow reversible PNF technique is increase ROM and posture quality of life improvement in young adults. Hence dynamic stretching group was considerable to be more effective than slow reversible PNF technique group.

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