

COMPARISON OF VMO STRENGTH EXERCISE TRAINING WITH CONVENTIONAL STRENGTH TRAINING IN INCREASING QUADRICEPS STRENGTH

Shilpa Jain

Assistant Professor, SBMN College of Physiotherapy, BMU, Rohtak

Dr Charu Sharma

Assistant Professor, SBMN College of Physiotherapy, BMU, Rohtak

INTRODUCTION

In today's world no one have time to do exercise even for 5 minutes and as result of this busy schedule and lack of exercises the degenerative changes are more likely to occur as compare to the person in which degenerative changes are occur due to any injury or due to aging. So, top ,as to maintain the strength and power in the muscle and joints which helps in walking we have to exercise that muscle in the normal adult age (20 - 35 years) . So, through this project I want to teach the adults about the awareness of Isometric exercise and VMO training and what are its uses or how these exercises are to be helpful in maintaining the strength and power of Quadriceps muscle.

About the Isometric Quadriceps Exercise:

It is a static form of exercises that occurs when a muscle contracts without an appreciable change in a muscle or without visible joint motion. If adaptive changes in muscle, such as increase in strength and endurance, are to occur, isometric contractions should be held against resistance for at least 6 sec.

About the VMO (Vastus Medialis Oblique): VMO is the lower fiber of vastus medialis muscle which originates on the femur and merge into a common tendon, the quadriceps tendon . This is one of the extensions of the knee joint. It is also known as locking muscle and also prevents the lateral deviation of the patellar .

About VMO Training : In this type of training there are both static and dynamic form of exercises are performed against resistance applied and this training its especially for one muscle that is Vastus medial is oblique to increase strength and endurance of the extension on Quadriceps muscle.

AIMS AND OBJECTIVES

1. To increase Quadriceps strength , endurance and balance.
2. Prevention from any pathological condition.
3. To maintain the ROM of the Knee Joint.
4. To aware the society about the weight management.
5. To find effectiveness of VMO Training in normal adults.
6. To find effectiveness of isometric quadriceps exercise 1n normal adults.

7. To find out which type of exercise or training is more beneficial for Quadriceps in normal adults.

8. To prevent the loss of function, neuromuscular incoordination and to promote health awareness in Public.

LIMITATION OF STUDY

The study was limited to small area that is in Rohtak and Hisar

SIGNIFICANCE

The study on making people aware about the strengthening exercises to increase strength in normal adults and making them aware that exercises can prevent from many degenerative conditions and many deformities. The people are made aware that exercise can relieve them from pain and increase their joint ROM. Also help them to find out which types of exercises are more effective and comfortable for normal person.

PRECAUTION

1. Rhythmic breathing should always be performed during exercises to minimize the presser response.
2. Increase weakness
3. Unusual or persistent fatigue
4. Decrease ROM
5. continuing Pain.

REVIEW OF LITERATURE

1. By Sridhar V. Vasudevan, D.D., 2003 Arthritis and the Benefits of Exercise
2. Quality B, Tucker M. Compbell R. Dieppe, P, 2003 Physiotherapy, including quadriceps exercises and patellar taping, for knee osteoarthritis: randomized controlled trial.

3. Vasn den Ende CH, Breedreld EC, LeCersie S. Dinkmans BA, DeMy AW, Hazes JM, 2000

4. Jenny MC Connell and Jill Cook

According to their study the results of intensive exercises program consorted of knee and shoulder dynamic and isometric muscle strengthening exercises against resistance 5 times a week were assessed at 0, 3, 12 and 24 wks. The study conducted that a short term intensive in impairing muscle strength .

5. Iversen MD, Eciton HM, Daltory LH, 2004

According to this study 70% of the 132 patients discussed exercise of these 18 received an exercise prescription. These discussion strongly impact on the likelihood a patients receives an exercise prescription.

6. CHM Van den Ende, TPM Vliet Vlieland, M. Monneke, JMW Hazes, 1998.

This is a summary of a systematic literature review of 6 randomized studies and 251 patients conducted by the Cochrane muscle skeletal group, which is a part of the Cochrane collaboration. The results suggest that dynamic.

SELECTION OF SAMPLE

1. Sample strategies: convenience Method of sampling.
2. Sample Size: 30 candidates in 2 Groups.
3. Duration of Project: Two months.

Method:

Group A:

Candidates under observation with VMO training 15 candidates.

Group B:

Candidates under observation with Isometric Quadriceps exercise = 15 candidates.

Time Duration: twice a day (Morning as well as evening)

SELECTION CRITERIA

I have selected only a few criteria that i have concluded in inclusive and Exclusive criteria

Inclusive Criteria:

Age: 20 to 35
Sex: Both Male and female
Normal adults

Exclusive Criteria:

Age: < 20 and > 35
Any Cardiac Condition
Any Pulmonary condition
Any Renal problem
Any Neurological condition
Any Psychiatric diseases Congenital Abnormalities
Anticipates undergoing knee surgery with yr of study entry
Any implant or wire fixation
Osteoporotic Condition
Obesity
Any type of sports injuries Osteoarthritis
Any Fracture
Bone inflammatory disorder
Surgical Condition in Knee joint
BMR level above 30

MATERIAL AND METHODOLOGY

Materials: Goniometry .

Goniometry for joint range of motion. Goniometry is measurement of angles created at the joints by one of body. The instrument used for measurement is known as goniometer.

Use:

To measure the extension of the Knee joint (ROM) . Motion occurs in the saggital plane around a medial lateral axis.

Testing Position:

Subject should be placed in the prone position, with the hip in 0 degree of abduction, adduction, flexion, extension and rotation . The foot is over the edge of the supporting surface.

Stabilization:

Stabilize the femur to prevent rotation , abduction and adduction of the hip.

Goniometer Alignment:

1. Centre the fulcrum of the Gonio meter over the lateral epicondyle of the femur.

2. Align the proximal arm with the lateral midline of the femur, using the greater trochanter for reference."

3. Align the distal arm with the lateral midline of the fibular using the lateral malleolus and fibular head for reference.

Normal End Feel:

The end feel is firm because of tension in the posterior joint "capsule, the oblique and accurate popliteal ligament, the collateral

ligament and the anterior & posterior cruciate ligament .

Material: cuff in flatter .

Position of patient: Half lying on a couch.

PRINCIPLES PRIOR TO INITIATING THE EXERCISE

1. Explain the exercises plan and procedures to the patient.
2. Place the patient in a comfortable position. Ensure that the region of the body in which the exercises to be done is free of the restrictive clothing.
3. Demonstrate the desired motion to the patient by passively moving the patient's Extremity through the motion.
4. Explain to the patient that he or she must perform exercises with the maximum. but Pain free efforts.

METHOD USED

VMO TRAINING

- 1.To train and strengthen the VMO in non-weight bearing position .
 - 2.To train and strengthen functional control of VMO weight bearing position .
- (b) Resisted mini squats: Closed chain short-arc training . Position of the patient. Standing.
2. Elastic resistance to knee extension is provided for short-arc motion .
- (c) Closed- chain quad sets in partial weight bearing.

NON- WEIGHT BEARING.

(a) Quadriceps setting (Quad sets)

1. Position of the patient supine with the knee extended.
2. Have the patient contracts the quadriceps isometric- ally, causing the patella to glide. Proximally; then hold for a count of 10.
3. Have the patient dosiflex the ankle and then hold an isometric contraction of the Quadriceps against resistance .

(b) Straight leg raising (SLR)

1. Position of the patient: Supine with the knee extended .
2. SLR i.e. coupled with lateral rotation on isometric adduction of the hip.

IN WEIGHT BEARING

(a) Unilateral terminal knee extension.

1. Position of the patient - standing Initiate unilateral terminal knee extension against elastic resistance.

Position of the patient: long sitting with the knee in near extension and heel on floor. Push the thigh into the chair and heel into the floor.

ISOMETRIC REGIMEN

BRIME (Brief repetitive isometric exercise)

This regimen was a refinement of the initial research on isometric. According to this I have

applied up-to max contractions, each held for 6 seconds, were performed daily. A 20 Secs after each contraction.

Position of the Patient: Supine and a rolled towel is placed below the knee slightly knee flexion, press the towel by extended the knee.

This repetitive approach was found to be more effective and maintained the subjects level of motivation better than using a single maximum contraction.

OBSERVATION AND –ANALYSIS

This chapter deals with analysis, interpretation and discussion of the data collected on the cuff inflator and of 30 subjects was put into several suitable statistical analysis in order to verify the investigation of the study.

The characteristics of the data presided through tables. Pre and post score of and cuff inflator was analysed by using mean and standard deviation presented in tables.

The paired 't' test was used to find out any significant difference between pre and post test of and cuff inflator.

The statistical procedures and their formulas are:

1. Mean $X = \sum x / n$
2. Standard deviation S.D. $\sqrt{\sum (X - \bar{X})^2 / n - 1}$
3. Paired 't' test $t = d / \sqrt{3/Yn}$

Table 1

15 Subjects having VMO training exercises for months strength measurement

Sr. no.	Age	M/F	Pre (mm/Hg)	Post(mm/Hg)
1	22	M	.14	.18
2	21	F	.1	.15
3	24	M	.3	.35
4	20	F	.3	.38
5	24	M	.14	.22
6	23	F	.1	.15
7	30	F	.2	.26
8	25	M	.15	.18
9	26	F	.3	.35
10	23	M	.1	.16
11	24	F	.2	.28
12	25	M	.1	.15
13	28	F	.24	.3
14	26	M	.2	.25
15	32	F	.21	.24

15 Subjects having Quadriceps Isometric for a month strength measurement

Sr. no.	Age	M/F	Pre(mm/Hg)	Post(mm/Hg)
1	22	M	.24	.3
2	21	F	.3	.38
3	24	M	.21	.3
4	20	F	.2	.3
5	24	M	.15	.21
6	23	F	.3	.4
7	30	F	.1	.18
8	25	M	.1	.2
9	26	F	.11	.2
10	23	M	.21	.3
11	24	F	.1	.2
12	25	M	.1	.2
13	28	F	.1	.15
14	26	M	.2	.28
15	32	F	.25	.31

CONCLUSION

The results of both the training methods concluded that Isometric Quadriceps exercises are more effective than VMO training in normal adults.

Table-1

	Pre Rx	Post Rx
Mean	0.18533	0.23867
SD	0.074725	0.07972
Paired 't' test	0.0189(less than 0.5)	
P value	Less than 0.5	

Table-2

	Pre Rx	Post Rx
Mean	0.178	0.260667
SD ₂	0.07447	0.074973
Paired 't' test	0.04315(less than 0.5)	
P value	Less than 0.5	

References

1. A Thomson et al, 1996" Tidy's Physiotherapy, 12th edition Varghese Publication.
2. CASH 2002- textbook Orthopedics & Rheumatology For physiotherapists.
3. Apley's Orthopedics, 2002."Textbook of Orthopedic Condition.
4. Physical Rehabilitation, Assessment &"Treatment: 4th Edition
5. Research Methodology "C.R Kothari"
6. Physical Therapy research, Principles &" Applications. Elizabeth Domholdt, PT, EdD.
7. Injuries Diagnosis & Management for Physiotherapists. Christopher M Norris.

RESULT AND DISCUSSION

Group I - Persons receiving VMO training.

Group II - Persons receiving 'isometric Quadriceps exercises standard deviation (post test) of Group I is .07972 and Standard deviation of Group II is .074973. This indicates that increase in Quadriceps strength is to a great extent in Group II people received isometric quadriceps than group I who received VMO training. Paired t test of both Group I and Group II is significant but t-test value is more significant for isometric Quadriceps that is .04315 for VMO training the t-test value is 0.0189 which is less significant. It indicates that isometric Quadriceps exercise is better and effective to increase the quadriceps strength .