International Journal of Current Research and Review
DOI: http://dx.doi.org/10.31782/IJCRR.2022.141201

Research Article

IJCRR
Section: Healthcare
ISI Impact Factor (2021-22): 2.176
IC Value (2020): 91.47
SJIF (2020) = 7.893

Efficacy of Quadriceps sets with Biofeedback and Modified Quadriceps sets with Biofeedback along with Ultrasound in Reduction of Pain and Active Extension Lag in Bilateral Knee Osteoarthritis"- A Comparative Study

Gaurav Bhatnagar[1], Shital Ghule[2], Pallavi Dangat[3], Rafi Mohammed[4], Vishvnath Pawadshetty[5]

[1]Professor, Department of Musculoskeletal Physiotherapy, Maharashtra Institute of Physiotherapy, Latur, India; [2]Assistant Professor, Department of Community Physiotherapy, Maharashtra Institute of Physiotherapy, Latur, India; [3]Professor, Department of Neuro Physiotherapy, Maharashtra Institute of Physiotherapy, Latur, India; [4]Pofessor and Principal, Maharashtra Institute of Physiotherapy, Latur, India, [5]Professor, Department of Cardio Respiratory Physiotherapy, Maharashtra Institute of Physiotherapy, Latur, India.

ABSTRACT

Introduction: The functional dysfunction in osteoarthritis knee is caused by pain and quadriceps muscle weakness. Physiotherapy treatment includes isometric and isotonic exercises for improving joint range of motion and muscle strength of quadriceps muscle. Biofeedback can be combined with these exercises to enhance the awareness about the extent of work done by the muscle.

Aim: The aim of the study was to compare the efficacy of quadriceps sets with biofeedback and modified quadriceps sets with biofeedback along with ultrasound in reduction of pain and active extension lag in knee osteoarthritis.

Methodology: A Total number of 30 participants were divided into group A and B, 15 each group according to inclusion and exclusion criteria using simple random sampling. Group A received quadriceps sets exercises with biofeedback and group B received modified quadriceps sets with biofeedback. Both groups also received pulsed ultrasound prior to exercise. The outcome measures were pain and extensor lag, which were assessed at baseline and after 2 weeks of treatment protocol.

Results: Both the groups showed improvement but between group analysis showed significant reduction of pain (mean 1.53 right side and mean 1.73 left side, p<.0001) and active extension lag (mean 5.33 right side and mean 6.06 left side, p<.0001) bilaterally in group B who had received modified quadriceps sets with biofeedback when compared with group A.

Conclusion: Modified quadriceps sets with biofeedback were more effective than quadriceps sets with biofeedback along with ultrasound in reduction of pain and active extension lag in knee osteoarthritis patients.

Key Words: Active extension lag, Biofeedback, Modified Quadriceps sets, Osteoarthritis Knee, Ultrasound, Stiffness

INTRODUCTION

Knee osteoarthritis is an inflammatory joint disease that affects the cartilage between bones thereby causing joint pain and stiffness, resulting in muscle weakness, periarticular muscle atrophy, tenderness and swelling. Majorly affects large weight bearing joints such as hips and knee.[1] Knee OA is divided into primary OA which is result of age and secondary OA which is result of disease or injury leading to joint degeneration.[1] There are alterations of the tensile, compressive, shear properties and hydraulic permeability of the cartilage, thus increased stiffness of the subchondral bone.[2] Osteoarthritis is the second most common rheumatologic problem affecting joints with a prevalence of 22% to 39% in India.[3] The prevalence of osteoarthritis increases with age. Nearly, 45% of women over the age of 65 years have symptoms while radiological evidence is found in 70% of those over 65 years.[4]

Knee osteoarthrosis (KOA) is generally associated with a dysfunction of the quadriceps muscle which mainly contributes to changes in motor performance.[5,6] The quadriceps

Corresponding Author:
Dr. Gaurav Bhatnagar, Professor, MSK PT Department, Maharashtra Institute of Physiotherapy, Latur.
Mob: 7415505920; Email: bhatnagargaurav8@gmail.com

ISSN: 2231-2196 (Print) **ISSN:** 0975-5241 (Online)

Received: 25.04.2022 **Revised:** 14.05.2022 **Accepted:** 02.06.2022 **Published:** 17.06.2022

muscle is also responsible for knee joint stabilization and it's persistent weakness decreases the protective force generated at the knee joint. Sensorimotor dysfunction of the quadriceps muscle is related with knee osteoarthritis progression.[5] Muscular inhibition and muscular atrophy may cause reduce force generating capability of quadriceps muscle in knee osteoarthritis.[7]

Quadriceps lag or active extension lag is a condition when patient cannot actively extend knee fully using muscle contraction, but can be passively extended by the therapist.[8] This would mean that the quadriceps muscle is weak or inhibited, or may be that there are some adhesions present causing pain and inhibition.[9] Exercise is recognized as an essential component of the long-term management of OA.[10]Isometric contractions produce low articular pressure and are well tolerated by OA patients with swollen, painful joints. These exercises can improve muscle strength and endurance. They prepare the joints for more dynamic movements and are, therefore, typical starting point for most strengthening programs.[11] VMO originates from the medial intramuscular septum, adductor longus and majority of fibers arising from the tendon of the adductor magnus.[12] Based on anatomical findings, VMO activation can be more selectively obtained by simultaneous activation of the knee extensor muscles and the hip adductor muscles.[13] Also the lowermost fibers of VMO attach to the anteromedial aspect of tibia through the medial extensor aponeurosis and may resist external rotation of tibia thus VMO can be recruited through active medial rotation of tibia.[14] VMO and VL (Vastus Lateralis) have been shown to be active throughout the full range of knee extension, with VMO: VL EMG proportion value ranging from 1 to 1.2 in healthy participants.[15] Hodge and Rechardson in their study added hip adduction to an isometric knee extension, in both weight bearing and non weight bearing conditions. They found a greater increase in VMO activity compared with VL activity.[16] Judi Laprade Et Al compared five commonly used isometric exercises i.e. knee extension, hip adduction, hip adduction with knee extension, medial tibial rotation and knee extension and they concluded that VMO:VL proportion was highest when medial rotation and knee extension were resisted at the same time.[17] Some research suggests that hip adduction might be useful in promoting a greater VMO/VL ratio[18] while other research apparently does not agree.[19] Also, some studies[18,20] failed to standardize the hip adduction force.

With consideration of the above mentioned, the purpose of this study was to compare the efficacy of modified quadriceps sets with biofeedback and quadriceps sets with biofeedback in reducing pain and active extension lag in osteoarthritic knee.

METHODOLOGY

A comparative experimental design was chosen for this study. Ethical clearance was taken from the Institutional Ethical Committee of Maharashtra Institute of Physiotherapy, Latur before conducting the study (Approval No: IEC/2021/SR-3/2021). Total 30 participants were recruited from the college OPD. Both males and females aged 50 and above, X ray showing osteophytes and joint space narrowing (grade II and III), who were having bilateral knee pain since 6 months, difficulty in cross leg sitting and stair climbing and with active extension lag were included in the study. Participants who had recent knee surgery, neurological, psychological and cardiac, vascular and sensory disorders were excluded from the study. The aim, objectives and method of the study were explained to the participants in detail before obtaining written informed consent. The outcome measures assessed were pain by NPRS which is valid and reliable and extensively used for knee OA (ICC = 0.95) [21] and active extension lag by universal goniometer which is valid and reliable and extensively used for measuring ROM in knee OA (ICC=0.99)[22] at baseline and after 2 weeks. For active extension lag measurement, the participants were positioned in high sitting, leaning 45 degrees backwards to minimize any resistance from hamstring during procedure. Participants were then asked to extend knee actively and active extension lag is measured with goniometer.

The participants were randomly divided into groups A and group B of 15 participants each by an independent collaborator by using coin method. Group A received quadriceps sets with biofeedback and Group B received modified quadriceps sets with biofeedback. The treatment protocol was followed for 2 weeks. After first 3 days of treatment, one day rest was given and again treatment was given for another two days and one day rest avoid the exertion to the patient. The same treatment protocol was followed for the 2nd week.

Group A received quadriceps sets with biofeedback in which the participants were asked to sit on the couch with the knee flexed to few degrees. Place an inflated sphygmomanometer cuff below the distal end of femur. Then the participants were asked to push his/her knees back and tighten the front thigh muscle. They were instructed to maximally activate their thigh muscles in order to straighten their knee without letting the foot to clear the floor and hold the isometric contraction for 10 seconds.[23] Participant maintained the rise in the mercury level of sphygmomanometer during isometric contraction served as biofeedback.

Group B received modified quadriceps sets with biofeedback in which the participants were asked to sit on the plinth with the knees flexed to few degrees. Two inflated Sphygmomanometer cuff were used. One was placed in between the thighs. Second was placed below the distal end of the femur. Firstly the therapist instructs the participants to press on the cuff from both thighs and then were asked to activate their thigh muscles in order to straighten their knee by pressing on the inflated cuff below distal femur without letting the foot to clear the floor and hold this isometric contraction for-10seconds.[23] Participant maintained the rise in the mercury level during isometric contraction in both the sphygmomanometer served as biofeedback.

Both the groups received 3 sets of 15 repetitions.

Participants of both the groups also received pulsed ultrasound prior to exercise with a frequency of 1MHz, power-2W/cm2 with a pulsed mode duty cycle-1:4.[24]

STATISTICAL ANALYSIS

The data is analyzed using unpaired t-test and paired t-test. Descriptive statistical data was presented in the form of mean +/- standard deviation and difference percentage were calculated and presented. Unpaired t test was performed to assess the statistical significant difference between the groups for the pain and active extension lag. Paired T test was performed to assess the statistical difference within the group for the pain and ROM and active extension lag. p-value < 0.05 were considered significant. Confidence interval was 95%.

RESULTS

Group A

The mean value and SD of Pretest and posttest of NPRS right side were 6.40 ± 0.99 and 3.33 ± 0.82 respectively. The mean value and SD of Pretest and posttest of NPRS left side were 6.27 ± 1.03 and 3.93 ± 0.70 respectively. The mean value and SD of Pretest and posttest of active extension lag right side were 16.80 ± 1.74 and 7.73 ± 1.28. The mean value and SD of Pretest and posttest of active extension lag left side were 17.07 ± 1.16 and 8.07 ± 1.10 and p-value was <0.0001 for all the outcome measures, these values suggest there was a significant reduction in pain and active extension lag in group A at 2 weeks as shown in table 1 and figure 1.

Group B

The mean value and SD of Pretest and posttest of NPRS right side were 6.53 ± 0.92 and 1.53 ± 0.74 respectively. The mean value and SD of Pretest and posttest of NPRS left side were 6.33 ± 0.90 and 1.73 ± 0.70 respectively. The mean value and SD of Pretest and posttest of active extension lag right side were 17.07 ± 1.87 and 5.33 ± 0.90. The mean value and SD of Pretest and posttest of active extension lag left side were 16.67 ± 1.1.63 and 6.07 ± 1.22 and p-value was <0.0001 for all the outcome measures, these values suggest there was a significant reduction in pain and active extension lag in group B at 2 weeks as shown in table 2 and figure 2.

Comparison of group A and group B at 2 weeks.

The mean value and SD of posttest comparison of NPRS right side between group A and B were 3.33 ± 1.81 and 1.53 ± 0.74 respectively. The mean value and SD of posttest comparison of NPRS left side between group A and B were 3.93 ± 0.70 and 1.73 ± 0.70 respectively. The mean value and SD of posttest comparison of active extension lag right side between group A and B were 7.73 ± 1.27 and 5.33 ± 0.89 respectively. The mean value and SD of posttest comparison of active extension lag left side between group A and B were 8.06 ± 1.09 and 6.06± 1.22 respectively and p-value was <0.0001 for all the outcome measures, these values suggest there was a greater reduction in pain and active extension lag in group B at 2 weeks when compared to group A as shown in table 3 and figure 3.

DISCUSSION

The results of the present study showed that modified quadriceps sets with biofeedback were more effective clinically in reducing active extension lag and pain when compared to the group who received only quadriceps set with biofeedback. Brownstein et al, 1985 suggested that when knee extensors and hip adductors were simultaneously activated, might provide the VMO with more force of Quadriceps. VMO muscle originates in part from fascia overlying adductor magnus muscle.[25] Exercising larger muscle first may generate tension within it and thereby VMO muscle has mechanical advantage in reducing lateral shearing .Relative activity of VMO and VL during knee extension has been conducted, which reported proportionally greater VMO activity during maximal hip adduction with knee extension exercises in both weight bearing and non weight bearing condition.[26] VMO oblique portion of vastus medialis muscle function primarily as an active medial stabilizer of the patella[27] and primarily function in final 20 degree of extension. Training this muscle increases the strength in VMO and increases support and stabilization of patella. Quadriceps isometrics and Quadriceps isometrics with biofeedback also showed decrease in extensor lag.[28] A study reported that subjects having stronger Quadriceps strength showed a reduction in knee pain and better functional activity as compared with those with least strength.[29] Strong muscle stabilize the joint in proper alignment, attenuate shocks that are transmitted to the joint and decrease effect of impact by spreading the forces over greater area. A study reported that sustained isometric contractions can improve muscle strength and static endurance.[30] So it may be concluded that improvement in quadriceps muscle strength reduced active extension lag and pain. In the present study group B who received modified isometric exercises with biofeedback showed better improvement in pain and active extension lag may be due to neurological reorganization which has increased motor unit recruitment and muscle strength.[31]

In the present study pulsed ultrasound with intensity of 2w/cm^2 with duty cycle 1:4 was applied to the patient and showed reduction in NPRS. Ultra sound reduces pain in knee OA when applied over tender point around the knee joint prior to exercise by increasing blood flow to the muscle in spasm and causes muscle relaxation.[32] In a systematic review it was concluded that the exercise is beneficial for pain and functional problems in patients with osteoarthritis of the knee.[33] A study by Sinha et al concluded that modified Quadriceps sets with biofeedback showed clinically more improvement in reducing pain and extensor lag in patients with knee osteoarthritis.[34] Our study supports the study by Shukla et al which reported that modified quadriceps sets with biofeedback were better than the quadriceps sets and quadriceps sets with biofeedback in improvement of extensor lag in osteoarthric knee patients.[35]

STUDY LIMITATIONS

Our study has few limitations:

1. Due to lack of follow-up, long term effects of the protocol was not established.
2. Quadriceps strength was not measured.

CONCLUSION

This study showed that there was significant reduction in pain and active extension lag in both the groups but when we compared the two groups it was found that the group B showed more improvement clinically than group A. So this study concludes that modified quadriceps sets with biofeedback along with ultrasound were better in reducing pain and active extension lag than quadriceps sets with biofeedback along with ultrasound in osteoarthritic knee patients.

ACKNOWLEDGEMENT

I am grateful to Almighty God and my Parents to give me strength and a guiding light. Also I am thankful to my other colleague whose constant interest in my project kept me go on. Lastly, I am highly grateful to all the subjects for their co-operation during the study. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

Conflict of Interest: None.

Source of Funding: Nil.

Authors' Contribution:

1. Gaurav Bhatnagar: Designed the analysis and wrote the paper.
2. Shital Ghule: Collected data.
3. Pallavi Dangat: Performed the statistical Analysis.
4. Rafi Mohammed: Helped in writing discussion.
5. Vishvnath Pawadshetty: Helped in framing results

REFERENCES

1. Heidari B. Knee osteoarthritis prevalence, risk factors, pathogenesis and features: Part I. CJIM. 2011;2(2):205-212.
2. Jacobson LT. Definitions of osteoarthritis in the knee and hand. Ann Rheum Dis. 1996;55(9):656-658.
3. Pal CP, Singh P, Chaturvedi S, Pruthi KK, Vij A. Epidemiology of knee osteoarthritis in India and related factors. IJO. 2016;50(5):518-522.
4. Akinpelu AO, Alonge TO, Adekanla BA, Odole AC. Prevalence and pattern of symptomatic knee osteoarthritis in Nigeria: A community-based study. IJASHP. 2009;7(3):1-7.
5. Hurley MV. The role of muscle weakness in the pathogenesis of osteoarthritis. Rheum Dis Clin North Am. 1999;25(2):283-86.
6. Bennell KL, Wrigley TV, Hunt MA, Lim BW, Hinman RS. Update on the role of muscle in the genesis and management of knee osteoarthritis. Rheum Dis Clin North Am. 2013;39(1):145-176.
7. Diracoglu D, Baskent A, Yagci I, Ozcakar L, Aydin R. Isokinetic strength measurements in early knee osteoarthritis. Acta Reumatol Port. 2009;34(1):72-77.
8. Ikeda S, Tsumura H, Torisu T. Age-related quadriceps-dominant muscle atrophy and incident radiographic knee osteoarthritis. J Orthop Sci. 2005;10(2):121-126.
9. Antich TJ, Brewster CE. Modification of quadriceps femoris muscle exercises during knee rehabilitation. Phys Ther. 1986;66(8):1246-1251.
10. Chandra A, Sharad K, Shahnawaz A, Sikdar S. A study on the efficacy of patellar taping for knee osteoarthritis as compared to conventional physical therapy. IJCRR. 2012;04(22):91-98.
11. Van Baar ME, Dekker J, Oostendorp RA, Bijl D, Voorn TB, Bijlsma JW. Effectiveness of exercise in patients with osteoarthritis of hip or knee: nine months' follow up. Ann Rheum Dis. 2001;60(12):1123-1130.
12. Bose K, Kanagasuntheram R, Osman MB. Vastus medialis oblique: an anatomic and physiologic study. Orthopedics. 1980;3(9):880-883.
13. Miao P, Xu Y, Pan C, Liu H, Wang C. Vastus medialis oblique and vastus lateralis activity during a double-leg semisquat with or without hip adduction in patients with patellofemoral pain syndrome. BMC Musculoskelet Disord. 2015;16:289.
14. O'Reilly SC, Jones A, Muir KR, Doherty M. Quadriceps weakness in knee osteoarthritis: the effect on pain and disability. Ann Rheum Dis. 1998;57(10):588-594.
15. Salzman A, Torburn L, Perry J. Contribution of rectus femoris and vasti to knee extension. An electromyographic study. Clin Orthop Relat Res. 1993;(290):236-243.
16. Hodges PW, Richardson CA. The influence of isometric hip adduction on quadriceps femoris activity. Scand J Rehabil Med. 1993;25(2):57-62.
17. Laprade J, Culham E, Brouwer B. Comparison of five isometric exercises in the recruitment of the vastus medialis oblique in

persons with and without patellofemoral pain syndrome. JOSPT 1998;27(3):197-204.

18. Irish SE, Millward AJ, Wride J, Haas BM, Shum GL. The effect of closed-kinetic chain exercises and open-kinetic chain exercise on the muscle activity of vastus medialis oblique and vastus lateralis. JSCR. 2010;24(5):1256-1262.
19. Hertel J, Earl JE, Tsang KK, Miller SJ. Combining isometric knee extension exercises with hip adduction or abduction does not increase quadriceps EMG activity. Br J Sports Med. 2004;38(2):210-213.
20. Boling M, Padua D, Blackburn JT, Petschauer M, Hirth C. Hip adduction does not affect VMO EMG amplitude or VMO : VL ratios during a dynamic squat exercise. J Sport Rehabil. 2006;15(3):195–205.
21. Alghadir AH, Anwer S, Iqbal A, Iqbal ZA. Test-retest reliability, validity, and minimum detectable change of visual analog, numerical rating, and verbal rating scales for measurement of osteoarthritic knee pain. J Pain Res. 2018;11:851-856.
22. Hancock GE, Hepworth T, Wembridge K. Accuracy and reliability of knee goniometry methods. J Exp Orthop. 2018;5(1):46.
23. 23. Thakur R, Mande M, Mitra M. Effectiveness of Quadriceps Strengthening Exercises in Reducing Extensor Lag, Pain and Improving Functional Activity in Patients of Knee Osteoarthritis. IJPOT. 2017;11(2):18-23.
24. Tascioglu F, Kuzgun S, Armagan O, Ogutler G. Short-term effectiveness of ultrasound therapy in knee osteoarthritis. J Int Med Res. 2010;38(4):1233-1242.
25. Brownstein B, Lamb RE, Mangine RE. Quadriceps torque and integrated electromyography. JOSPT. 1985;6(6):309-314.
26. Hanten WP, Schulthies SS. Exercise effect on electromyographic activity of the vastus medialis oblique and vastus lateralis muscles. Phys Ther. 1990;70(9):561-565.
27. Peeler J, Cooper J, Porter MM, Thliveris JA, Anderson JE. Structural parameters of the vastus medialis muscle. Clin Anat. 2005;18(4):281-289.
28. Amin S, Baker K, Niu J,. Quadriceps strength and the risk of cartilage loss and symptom progression in knee osteoarthritis. Arthritis Rheum. 2009;60(1):189-198.
29. Anwer S, Alghadir A. Effect of isometric quadriceps exercise on muscle strength, pain, and function in patients with knee osteoarthritis: a randomized controlled study. JPTS 2014;26(5):745-748.
30. Myers NL, Toonstra JL, Smith JS, Padgett CA, Uhl TL. Sustained isometric shoulder contraction on muscular strength and endurance: A randomized clinical trial. IJSPT. 2015;10(7):1015-1025.
31. Del Vecchio A, Casolo A, Negro F,. The increase in muscle force after 4 weeks of strength training is mediated by adaptations in motor unit recruitment and rate coding. J Physiol. 2019;597(7):1873-1887.
32. Jia L, Wang Y, Chen J, Chen W. Efficacy of focused low-intensity pulsed ultrasound therapy for the management of knee osteoarthritis: a randomized, double blind, placebo-controlled trial. Sci Rep. 2016;6:35453.
33. Sinha RN, Varma AK, Singh MK, Kumar S. A Comparative Study to Evaluate the Effectiveness of Quadriceps Strengthening Exercises in Patients of Osteoarthritic Knee. IJHCR. 2021;4(9):206-208.
34. Veetil S, Kandaswami K, Selvakumar V. Evolving Trends in Physical Therapy Management in the Prevention of Knee Osteoarthritis from Mild to Moderate Grade: A Systematic Review. IJCRR. 2021;13(6):179-183.
35. Shukla M, Sarkar M, Bansal N, Sharma R. Effectiveness of different quadriceps strengthening protocols in improvement of extensor lag in osteoarthritic knee joint. IJDDR. 2010;2(3):581-586.

Table 1: Pre-post comparison of outcome measures within group A (Quadriceps sets with biofeedback).

	Mean	SD	t- Test	P Value	Inference
Pre NPRS (Right)	6.40	0.99	12.35	< 0.0001	Extremely significant.
Post NPRS (Right)	3.33	0.82			
Pre NPRS (Left)	6.27	1.03	14.64	< 0.0001	Extremely significant.
Post NPRS (Left)	3.93	0.70			
Pre Active extension lag (Right)	16.80	1.74	20.53	< 0.0001	Extremely significant.
Post Active extension lag (Right)	7.73	1.28			
Pre Active extension lag (Left)	17.07	1.16	26.62	<0.0001	Extremely significant.
Post Active extension lag (Left)	8.07	1.10			

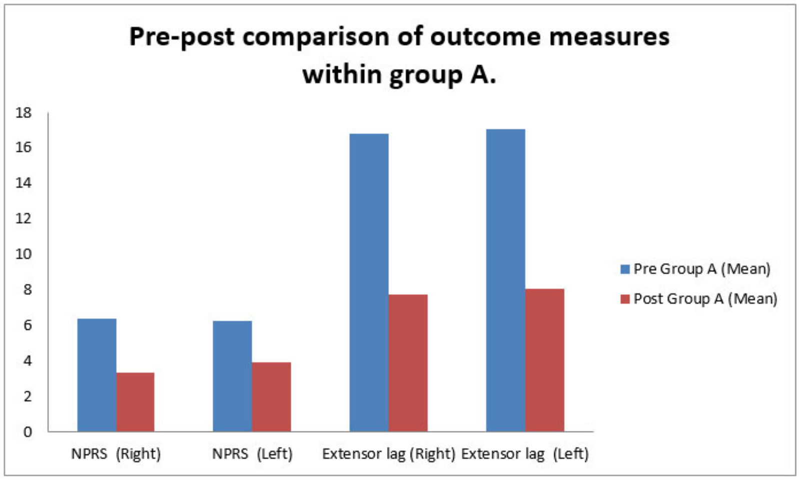

Figure 1: Pre-post comparison of outcome measures within group A (Quadriceps sets with biofeedback).

Table 2: Pre-post comparison of outcome measures within group B (Modified Quadriceps set with biofeedback).

	Mean	SD	t- Test	P Value	Inference
Pre NPRS (Right)	6.53	0.92	20.91	< 0.0001	Extremely significant.
Post NPRS (Right)	1.53	0.74			
Pre NPRS (Left)	6.33	0.90	19.57	< 0.0001	Extremely significant.
Post NPRS (Left)	1.73	0.70			
Pre Active extension lag (Right side)	17.07	1.87	20.78	< 0.0001	Extremely significant.
Post Active extension lag (Right side)	5.33	0.90			
Pre Active extension lag (Left side)	16.67	1.63	17.21	< 0.0001	Extremely significant.
Post Active extension lag (Left Side)	6.07	1.22			

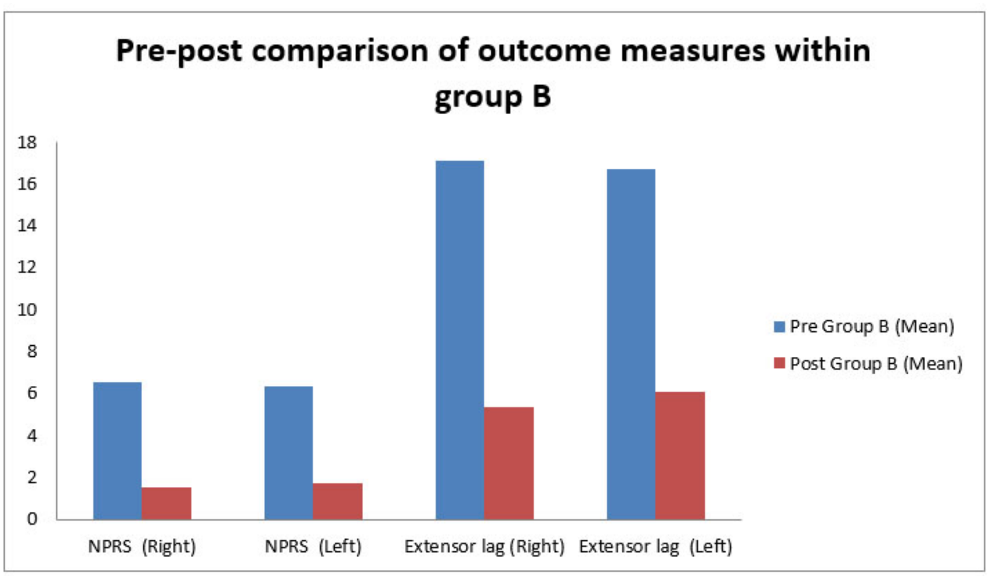

Figure 2: Pre-post comparison of outcome measures within group B (Modified Quadriceps sets with biofeedback).

Table 3: Post-post comparison of outcome measures between group A and B at the end of 2 weeks.

	Mean	SD	t- Test	P Value	Inference
Post NPRS A (Right)	3.33	0.81			
Post NPRS B (Right)	1.53	0.74	6.35	0.0001	Extremely statistically significant
Post NPRS A (Left)	3.93	0.70			Extremely statistically significant
Post NPRS B (Left)	1.73	0.70	8.60	0.0001	
Post Active extension lag A (Right)	7.73	1.27			Extremely statistically significant
Post Active extension lag B (Right)	5.33	0.89	5.99	0.0001	
Post Active extension lag A (Left)	8.06	1.09			
Post Active extension lag B (Left)	6.06	1.22	4.73	0.0001	Extremely statistically significant

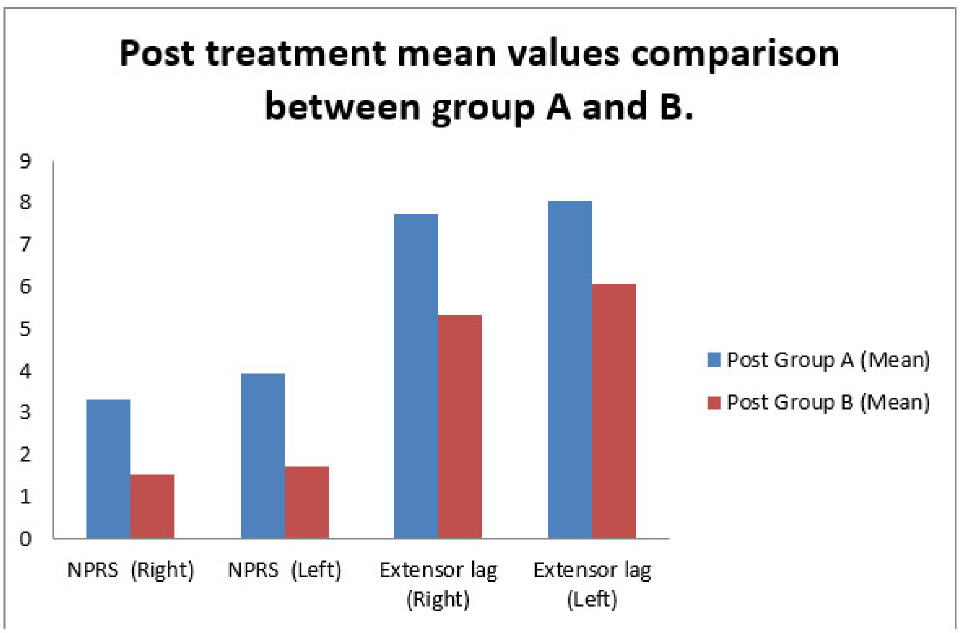

Figure 3: Post-post comparison of outcome measures between group A and B.