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Combined Effect Of Retro-Walking And Forward Walking On Hamstring Flexibility In Obese Individuals

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Abstract

Background

Aims: *Obese people frequently have hamstring tightness, which lowers their quality of life. Tight hamstrings frequently result in postural instability, decreased flexibility, and an increased risk of injury. It has been demonstrated that the combination of conventional exercises, forward walking, and retro walking increases lower limb flexibility. This study aims to evaluate the combined effect of retro-walking and forward walking on hamstring flexibility in obese individuals.*

Material and method: *The present experimental study on those with obesity was conducted in Karad. The 80 participants in the study were taken into account. Participants in the study are from the 30 to 50-year-old obese population. The data was collected via. Consent was acquired with information gained from all participants. The ethical approval of study was obtained by the institutional ethical committee (protocol no. 374/2024-20250).*

Results: *The experimental investigation involved 80 obese participants, between the ages of 30 and 50, both men and women. A comparison of two groups was made. Both sit-and-reach test and the 90-90 hamstring test indicate that group B had shown extreme significant improvement in terms of hamstring flexibility ($p < 0.05$) in the post-intervention study.*

Conclusion:*The study found that both conventional exercises, forward and retro walking, this common workout, are useful for increasing hamstring flexibility in obese people. This attention to the posterior chain muscles promotes muscle balance and reduces the risk of injury. According to our research, hamstring flexibility can be increased by involving conventional exercises into a regular routine that also includes forward and retro walking.*

Keywords: *Conventional exercises, forward walking, hamstring flexibility, obesity(BMI), retro-walking, sit-and-reach test, 90-90 hamstring test.*

INTRODUCTION

Retro walking that is backward walking is very important in considering the strength of hamstring muscle. With this forward walking is also consider as the main component of flexibility of hamstrings muscle . Hamstrings muscle is the muscle which is located in the posterior compartment of thigh which comprises of 3 important muscles which are semimembranosus ,semitendinosus , and biceps femoris . From the above muscles biceps femoris have two heads that is long head and short head . This muscle acts on hip as well as knee joint therefore it is called as two joint muscles . Hip extension and knee flexion are the anatomical movements carried out by this muscle which are important in day-to-day life . [(1)]

An increasing public health concern is obesity. The lower extremity joints experience biomechanical stress due to excess weight and causes and joint pathologies[(11)] .

Hamstring tightness is very common problem in obese individuals which affects their quality of life . Research indicated that the rate obesity in karad taluka was 26.15%.

Several elements that affect ideal hamstring flexibility, such as age, gender, race, tissue temperature, strength training, stiffness, uneasy posture, and lesser warm-up time during physical activity. [(11)] Flexibility is very crucial factor in normal biomechanical function .

Inability to extend the knee completely when the hip is flexed which is accompanied by discomfort or pain along the posterior thigh and knee is defined as hamstrings tightness [(2)].It causes post exercise soreness.

Previous studies shows that decreased hamstring flexibility is a possible risk factor for development of patellar tendinopathy and patellofemoral pain [(2)]. According to the studies the Patients with obesity are frequently counselled by their physician to increase their physical activity levels in order to losing weight and reducing cardiovascular and metabolic risk profiles.[(6)] Heavy physical activities are advised by their

health care providers to manage weight. As in obese people whole body weight is on lower body there are chances of hamstrings tightness in them .

There are various physiotherapy treatment methods for hamstring tightness, including manual therapy and electrical agents. The methods specifically include of myofascial release techniques, position release techniques, muscular energy techniques, and different kinds of stretching techniques.[(1)] The results of the present study were recommended by a recent thorough review that demonstrated that using conventional physiotherapy treatment in conjunction with backward walking is effective.[(5)] split up into two groups, each with Group A receiving conventional treatment and Group B receiving conventional treatment along with retro-walking. The main outcomes were pain assessments using the Visual Analogue Scale (VAS) and WOMAC. And knee range of motion, hip abductor, and extensor strength were secondary outcomes. These were assessed before, one week, and three weeks of the intervention. The results showed that Using retro walking in addition to conventional treatment had no discernible impact on pain when compared to the conventional treatment-treated control group, since both groups' pain-reduction efficacy was equal.[(5)]

This study comprises of the combine effects of retro walking and forward walking on hamstring flexibility in obese individuals . Retro walking is beneficial in improving hamstring flexibility in normal individuals . Retro walking is considered a type of closed chain exercise which paid attention recently in rehab of sports cases which includes heavy physical activities . The purpose of this investigation is to find the combine effect of retro walking and forward walking in obese individuals.[(6)]

Inclusion criteria

- Age: 30-50years.
- BMI= obese class 1 : 30.0-34.9(moderate)
  obese class 2: 35.0-39.9(severe)
  obese class 3: ≥40 (very severe).
- People with condition such as hamstring tightness.
- Mobility: the capacity to move freely without assistance. Restricted mobility.
- Sedentary lifestyle.
- Gender: both male and female.
- Individuals who are willing to participate and provide informed consent.

Exclusion criteria

- Individuals under the age of 30 years and above 50 years.
- Recent current injuries to the hamstring muscles, knees, hips.
- Any history of fractures.
- Lower back ache brought on by recent trauma.
- Posture-affecting congenital defects or pregnancy.
- Recent surgery that may affect physical activity.
- Not willing to give consent or follow directions.

MATERIAL AND METHODS

METHODS

The present experimental study on Obese people were examined in Karad. The 80 participants in the study were taken into account. Participants in the study are from the 30 to 50-year-old obese population. Clinical assessment involves the use of sit-and-reach test, 90-90 hamstring test, MMT, goniometry.

1) Sit-and-reach test: this is used to measure flexibility of the hamstring muscles. Three trials were conducted, and the best score was recorded.
2) 90-90 hamstring test: this test was performed to asses hamstring flexibility.
3) MMT: MMT of hamstring muscle was performed using grading scale (0-5).
4) Goniometry: goniometry was utilized to calculate the knee joint angle. A universal goniometer was utilized to calculate the angle at the knee joint. A small angle indicates greater hamstring flexibility.

The ethical approval of study was obtained by the ethical committee. Informed consent was obtained from each participant after a thorough description of the data collecting sheet and the planned study was given.

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STATICIAL ANALYSIS

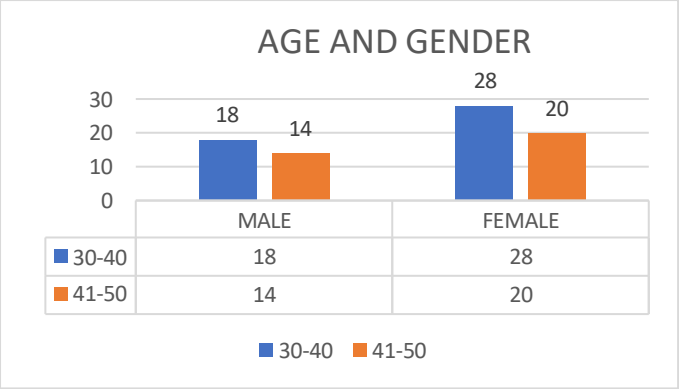
The study that was experimental was undertaken among 80 participants who was obesed. The research was conducted by taking assessment of the obese individuals, checking the flexibility of hamstring muscles. Data collection was been taken which included demographic data, BMI, sit-and-reach test, 90-90 hamstring test, MMT, goniometry, which was taken pre and post intervention. The study duration was of 6 months. The approach of random sampling was applied because of limited time. The data was analysed by a statistician using an instat application. Microsoft Excel was utilized for collecting and coding the included data, had been used for data analysis. The standard deviation and mean were utilized for ongoing variables. Chi-test and t-test were used, where each and every statement was seen as important at a p value lower than 0.05.

RESULT

The experimental investigation involved 80 obese participants, between the ages of 30 and 50, both men and women. Prevalance of 26.15%. A comparison of two groups was made. Both the sit-and-reach test and the 90-90 hamstring test indicate that group B has improved more in terms of hamstring flexibility ($p < 0.05$) in the post-intervention study. Excel from Microsoft was utilized for collecting and coding the included data, had been used for data analysis. The standard deviation and mean were utilized for ongoing variables. Chi-test and t-test were used, where every statement was regarded as important at a p value lower than 0.05.

Graph 1

Demographic Data:



INTERPRETATION:

Graph 1 shows that

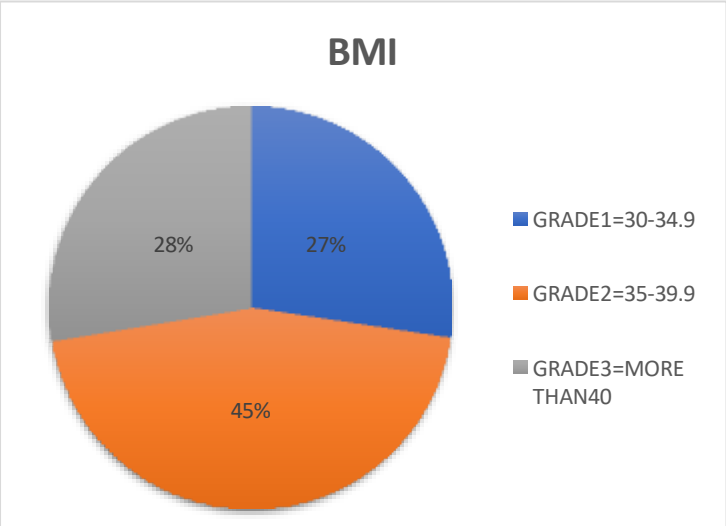
In the 30–40 age group, there are more females (28) than males (18).

In the 41–50 age group, again females (20) outnumber males (14).

Across both age groups, females are more represented than males.

Graph 2

BMI:



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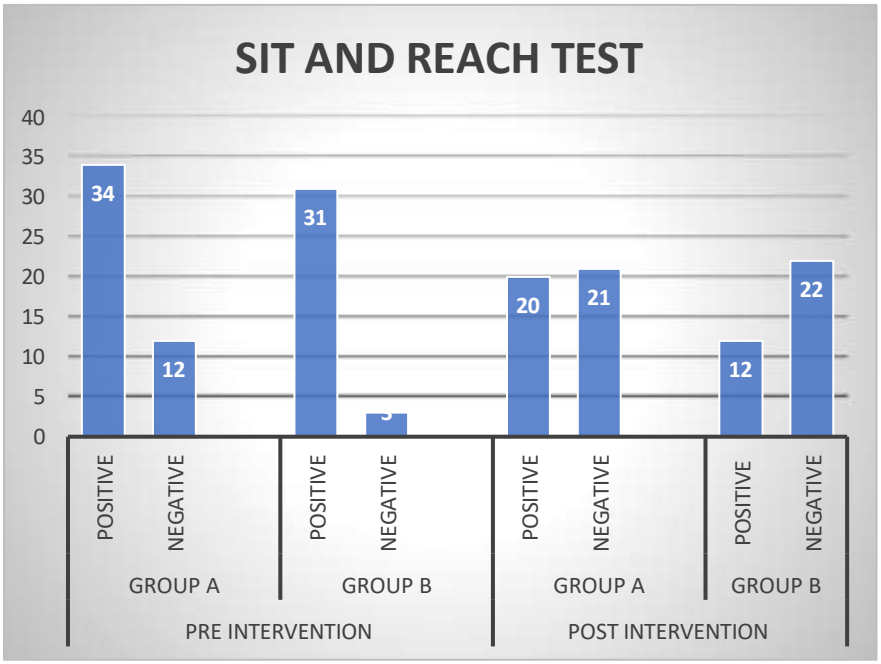
INTERPRETATION:
Graph 2 shows that the majority (45%) of people fall into Grade 2 obesity (BMI 35–39.9).
Grade 3 obesity (BMI 40+) is seen in 28%, which is also quite significant.
Grade 1 obesity (BMI 30–34.9) includes 27% of the participants

Graph 3

SIT AND REACH TEST:



INTERPRETATION:
Before intervention:

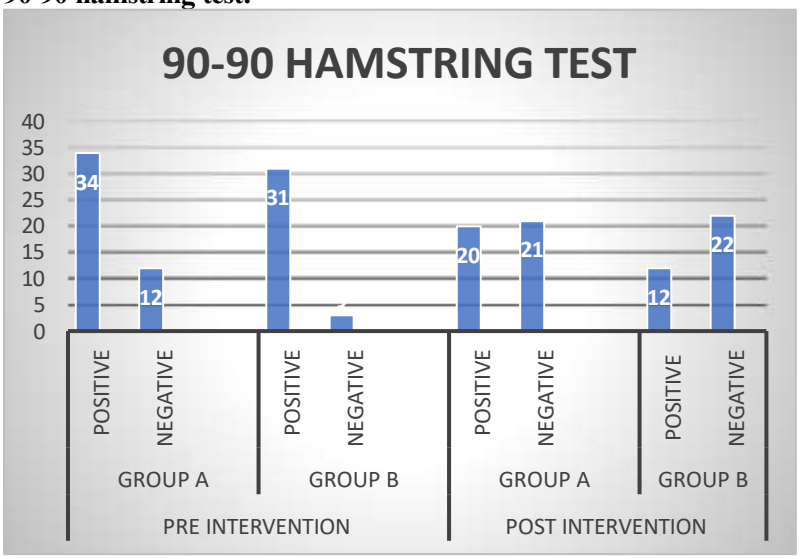
- Group A had more people with positive flexibility scores (34) than negative (12).
- Group B also had mostly positive scores (31) and very few negatives (3).

After intervention:

- In Group A, the number of positives dropped (20), while negatives slightly increased (21).
- In Group B, positives reduced (12), and negatives went up noticeably (22).

Graph 4

90-90 hamstring test:



INTERPRETATION:
Before intervention:
Both groups had strong flexibility, with most participants in the positive range (Group A: 34 positives vs. 12 negatives, Group B: 31 positives vs. 3 negatives).
After intervention:

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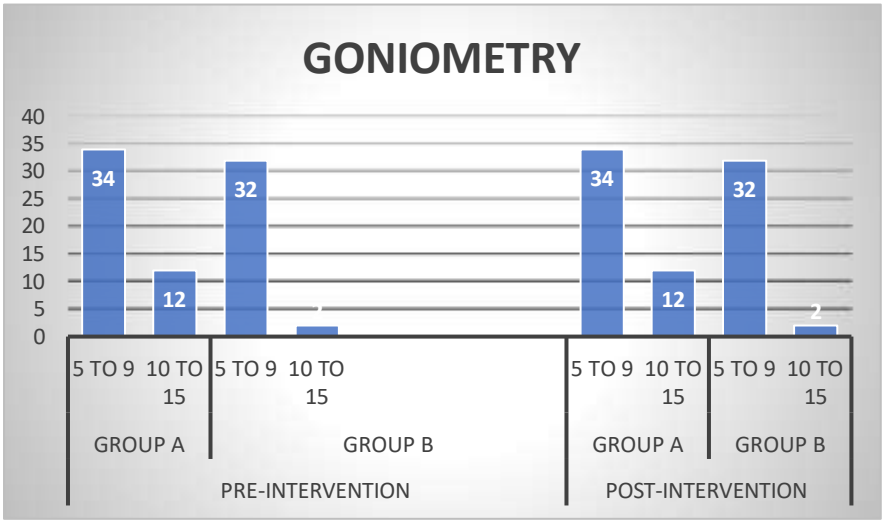
Flexibility declined. In Group A, positives dropped to 20 while negatives rose to 21. In Group B, positives decreased to 12, and negatives increased sharply to 22.

Graph 5

Goniometry:



INTERPRETATION:

Before intervention:

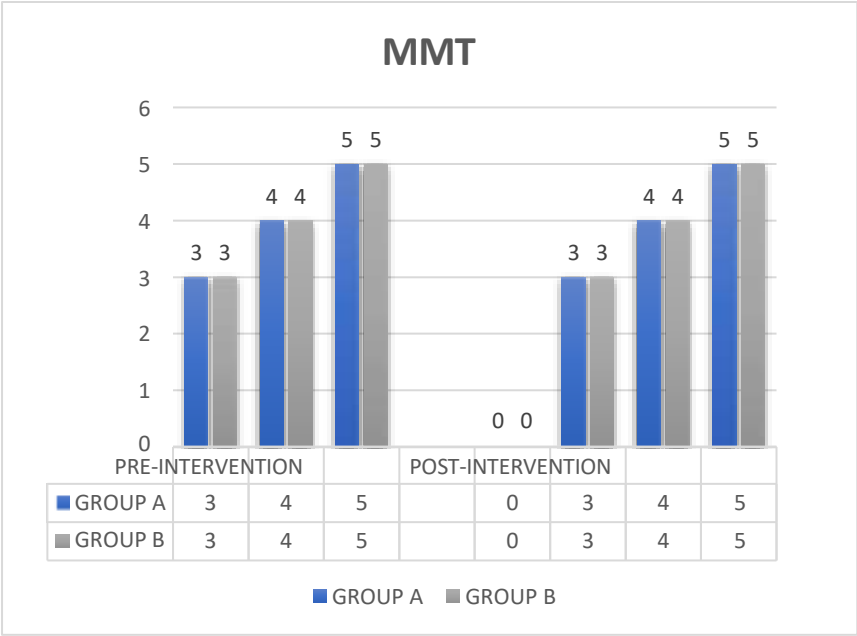
Most participants in both groups were in the 5–9° range (Group A: 34, Group B: 32), with only a few in the 10–15° range (Group A: 12, Group B: 2).

After intervention:

The numbers stayed exactly the same, with no improvement or decline in either group.

Graph 6

MMT:



INTERPRETATION:

Pre-intervention:

Group A and Group B had the same distribution, with participants scoring across grades 3, 4, and 5.

Post-intervention:

The distribution did not change—participants continued to score similarly (3, 4, or 5), and there was no shift in muscle strength levels.

DISCUSSION

Our objective was straightforward: to determine whether combining the normal activity of walking forward with the unusual activity of walking backward may actually improve hamstring flexibility in obese individuals. Our participants followed this walking regimen for a few weeks. By the end, the results were self-evident: their reach had improved, their hamstrings become more flexible, and this was shown in better scores on the sit-and-reach test and 90-90 hamstring test.

Group B experienced a remarkable shift from 49.5 to 85, while Group A started with an average Sit-and-Reach score of 50 and concluded at 42.4 (in our test design, a lower score indicated higher flexibility). We took note of Apurwa Kashtikar's previous research, in which active stretching raised scores from 9.175 to 10.6. Different numbers, different experiments, but the same result: greater flexibility.

Other research confirmed what we found. It has previously been demonstrated by Whitley et al. that "retro locomotion," or walking backward, increases lower back and hamstring flexibility. Aher and Kumar (2024) discovered that retro walking by itself was quite effective when compared to PNF stretching in college students. We also saw similar benefits when we combined retro walking with forward walking.

We think this is because forward walking and retro walking work muscles differently. While forward walking promotes cardiovascular health and functional movement, retro walking more effectively contracts the hamstrings and glutes. Similar to our measurements, Gurudut et al. (2019) discovered that incorporating retro walking into knee osteoarthritis treatment increased hamstring length. Although they did not measure hamstring strength directly, Alghadir et al. (2019) demonstrated that retro walking also increases lower-limb strength. To determine whether the gains were in strength as well as flexibility, we added manual muscle testing.

Various researchers have experimented with inventive combinations. Desai et al. found that retro walking and suboccipital muscle inhibition were significantly more effective when combined than when used separately. It implies that results can be enhanced by focusing on both distant and close muscle interactions. The benefits in our instance were evident even when we only walked forward and backward.

One thing that stood out to us was how rarely we walk backward in daily life. And yet, retro walking makes the hamstrings and glutes work harder, stretches them, and even challenges coordination and balance. Jyothi et al. (2024) found it boosted lower-limb stability and muscle activation. Forward walking, on the other hand, may not directly stretch the hamstrings, but it builds endurance, supports circulation, and keeps the body moving well.

This study explored how a combination of forward walking and backward (retro) walking could improve hamstring flexibility in individuals with obesity. After following the walking routine for a set period, participants showed noticeable improvement in their flexibility, as measured by the Sit and Reach Test and 90-90 Hamstring Test.

CONCLUSION:

Our study found that including both forward walking and retro (backward) walking simple and accessible exercises can effectively improve hamstring flexibility in obese individuals. These movements target the posterior chain muscles, which helps maintain better muscle balance and lowers the risk of injuries, especially those related to tight or weak hamstrings.

By regularly performing these conventional walking exercises, individuals can gradually improve their flexibility without needing advanced or complex routines. The results suggest that just adding forward and backward walking to a daily or weekly routine can make a noticeable positive difference in hamstring health for obese adults.

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DECLARATION OF INTEREST

We confirm that we have no conflicts of interest that could have influenced this study. Our work in the combined effect of retro walking and forward walking on hamstring flexibility in obese individuals was

carried out solely for research and academic purposes, without any financial or personal relationships affecting the results or conclusions.

REFRENCE

1) Kashtikar A, Vardhan GDV. A comparative study of retro walking and active stretching on hamstring flexibility in students from age group 18 to 24 years. Int J Sci Res. 2020 Mar;9(3):1–3. doi:10.36106/ijsr.
2) Chawdi, M., et al. (2022). Effect of muscle energy technique vs retro-walking on hamstring flexibility and dynamic balance in young college-going students – A comparative study. *International Journal of Health Sciences and Research, 12*(6), 165–172. http://www.ijhsr.org
3) Nallasamy, A., Arumugam, L., Mohd Zaidi, S. N., Pui Yee, L., & Purushothaman, V. K. (2024). *The Impact of Treadmill Retro Walking on Hamstring Flexibility and Speed in Distance Runners*. INTI Journal. https://iuojs.intimal.edu.my/index.php/intijournal/article/view/530
4) Korkmaz, C., & Toy, A. B. (2023). *The Effect of Retro Walking Training on Dynamic Balance in Sedentary Individuals with Hearing Impairment. International Journal of Education and Literacy Studies, 11*(1), 164–169. https://eric.ed.gov/?id=EJ1368703
5)Omar, E. A., Youssif, E. F., Abdullah, D. S., & Kamel, E. (2024). *Effect of Retro Walking on Pain in Patients with Knee Osteoarthritis (Randomized Control Trial)*. MJCU, 92(3), 139–143. https://mjcu.journals.ekb.eg/article_353096.html
6) Forhan, M., & Gill, S. V. (2013). *Obesity, functional mobility and quality of life.* Best Practice & Research: Clinical Endocrinology & Metabolism, 27(2), 129–137. https://doi.org/10.1016/j.beem.2013.01.003
7) Duysens, J. E. J., Tax, A. A. M., Murrer, L., & Dietz, V. (1996). *Backward and forward walking use different patterns of phase-dependent modulation of cutaneous reflexes in humans*. *Journal of Neurophysiology, 76*(1), 301–310. https://doi.org/10.1152/jn.1996.76.1.301
8) Nadeau, S., Amblard, B., Mesure, S., & Bourbonnais, D. (2003). *Head and trunk stabilization strategies during forward and backward walking in healthy adults*. *Gait & Posture, 18*(3), 134–142. https://doi.org/10.1016/S0966-6362(02)00070-X
9)Anandh, S., & Sajan Varughese, S. (2023). *Effectiveness of Forward Walking and Retro Walking on Balance and Walking Speed in Geriatric Population*. Journal of Coastal Life Medicine, 11(1), 1134–1139. https://www.jclmm.com/index.php/journal/article/view/483
10) Cha, H.-G., Kim, T.-H., & Kim, M.-K. (2016). *Therapeutic efficacy of walking backward and forward on a slope in normal adults*. *Journal of Physical Therapy Science, 28*(6), 1901–1903. https://doi.org/10.1589/jpts.28.1901
11) Ko, S.-U., Stenholm, S., & Ferrucci, L. (2010). *Characteristic gait patterns in older adults with obesity—Results from the Baltimore Longitudinal Study of Aging*. Journal of Biomechanics, 43(6), 1104–1110. https://doi.org/10.1016/j.jbiomech.2009.12.004