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# EFFECTIVENESS OF TELEREHABILITATION ON HAMSTRING FLEXIBILITY IN HEALTHY ADULTS

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

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**Abstract**

**Background.** Telerehabilitation used as an exercise method has become increasingly common in recent years. Various methods have been used to increase hamstring flexibility, but more research is required on the optimal program.

**The study purpose** was to investigate the effect of hamstring stretching exercises given as telerehabilitation and home exercise program on hamstring flexibility.

**Materials and methods.** Sixty-eight healthy adults were randomly assigned to two groups, namely telerehabilitation and home exercise. Exercises were performed for 8 weeks (4 sessions/week) in both groups. Active and passive range of motion (ROM), sit and reach test (SRT), and International Physical Activity Questionnaire Short Form (IPAQ-SF) were conducted in the pre- and post-intervention and after a 6-month period.

**Results.** At the end of 8 weeks, a significant improvement was observed in the SRT scores in both the telerehabilitation group ($p = 0.001$) and the home exercise group ($p = 0.001$). In addition, significant improvements were observed in the passive ROM measurements of both the telerehabilitation group ($p = 0.005$) and the home exercise group ($p = 0.001$). At the end of 8 weeks, the telerehabilitation group was found to be significantly superior to the home exercise group in the SRT results ($p = 0.034$). As for the long-term results, significant improvement was maintained in both SRT ($p = 0.001$) and passive ROM ($p = 0.014$) in the telerehabilitation group.

**Conclusions.** Eight-week telerehabilitation and home exercise program was observed to have positive effects on passive and active ROM. The telerehabilitation method may prove to be more effective than the home exercise method in the long term.

**Keywords:** exercise, hamstring muscle, telerehabilitation, muscle stretching, flexibility.

## Introduction

Adequate extensibility of the hamstring muscle is known to be an important factor in the efficiency and quality of basic activities such as walking and running. Physical inactivity leads to a decrease in muscle-tendon flexibility, especially in the hamstring muscles (De Oliveira et al., 2018).

It has been shown that decreased hamstring flexibility can cause muscle imbalances, muscle injuries, musculoskeletal disorders such as patellar tendinopathy and patellofemoral pain (Medeiros et al., 2016).

Stretching exercises consist of three interventions, namely, static, dynamic, and ballistic stretching, and both static and dynamic stretching help to increase range of motion (ROM) and flexibility (Lempke et al., 2018). Static stretching usually involves moving a limb to the end of its ROM (Matsuo et al., 2019). Dynamic stretching is a movement-based method of stretching (Opplertid et al., 2020; Demoulin et al., 2016).

Stretching exercises have acute effects through viscoelastic change and chronic effects through the myogenic response of sarcomeres (Shamsi et al., 2020). Hamstring stretching exercises improve hip joint ROM, increase dynamic balance ability, and reduce the risk of injury by enabling the development of functional skills for sports (O'Sulliva et al., 2009; Martin et al.,2022).

Lockdown imposed to prevent the spread of the disease during the COVID-19 pandemic has increased the need for telerehabilitation methods (Hamadi et al., 2022). It has been observed that the use of telerehabilitation can promote standardization, improve patient compliance with exercise programs and reduce costs (Syamsul Taufik et. al., 2021; Middleton et al., 2020).

To our knowledge, there is no study examining the long-term results of hamstring flexibility exercises applied through telerehabilitation. Our aim is to use two different exercise approaches to increase hamstring flexibility and to examine the short- and long-term effectiveness of these approaches. Our hypothesis is that the telerehabilitation method is more effective than the home exercise method in increasing hamstring flexibility, and that the short-term effects of the exercise programs may be maintained in the long-term. For this purpose, both groups performed static and dynamic stretching exercises for 8 weeks, but the first group did so through telerehabilitation, and the second group through home exercise program. Whether they achieved superiority over one another was assessed at the end of the 8th week and 6th month.

## Materials and methods

### *Study participants*

University students with 18-25 years of age and hamstring shortness were included in our study. The criteria for inclusion in the study were: having active hip flexion ROM between 0-80 degrees and being able to speak and understand Turkish language. The criteria for exclusion from the study were: being a professional athlete, having orthopedic or neurological problems, and having undergone lower extremity musculoskeletal surgery. All participants read and signed the informed consent form before participating in the study.

Having met the criteria for inclusion, 68 participants were randomly divided into 2 groups of 34 individuals. Exercises were applied with telerehabilitation in the first group (n = 34), and home exercise program in the second group (n = 34) (Figure 1).

### *Study organization*

This study was conducted between August 2021 and February 2022 in accordance with the Declaration of Helsinki, which provides ethical principles for medical research involving humans. Ethical approval was obtained from Istanbul Medipol University Non-Invasive Clinical Research Ethics Committee (E-10840098-772.02-2899). Clinical trials registration number: NCT05083533.

The study lasted for 8 weeks. The participants were evaluated before the start of the study. Then, the participants were randomly divided into two groups by means of a computer program. Assesment was repeated at the end of 8 weeks. Finally, the participants were re-evaluated at the end of 6 months.

Following the initial evaluations, the individuals were divided into 2 groups using a computer-assisted randomization table. This study was planned as a single-blind randomized controlled trial. The researchers who carried out the assessment measurements were blinded to all participants.

The sample size was calculated using the raosoft sample size calculator. The universe of our study consists of students

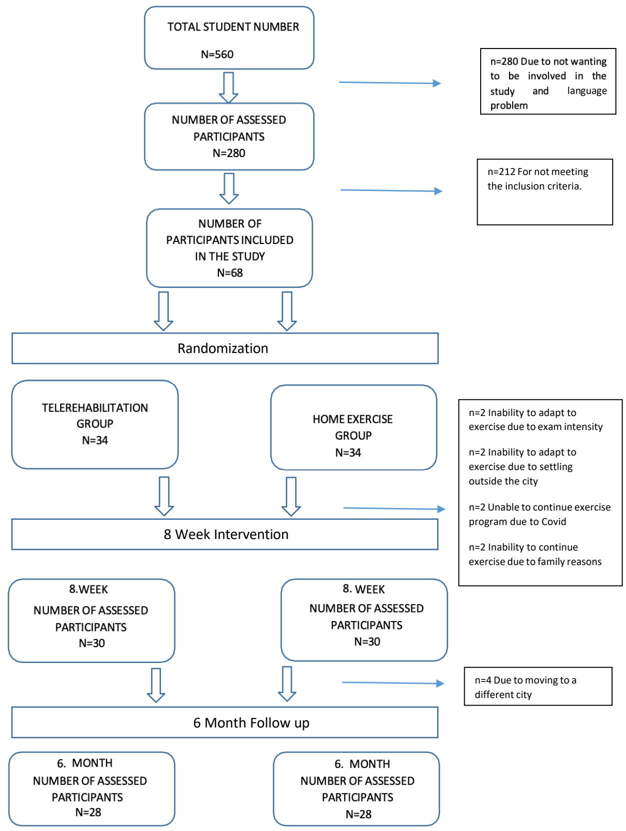


**Figure 1.** Flowchart of Participant Selection throughout the Study

of Bahçeşehir University Physiotherapy and Rehabilitation Department (n = 280). The sample size was calculated to be 55 with %10 error in the %90 confidence interval. After calculating the dropout rate as 20%, 68 individuals were included in the study.

Hamstring flexibility exercises were applied to the telerehabilitation group via an online communication program (Microsoft Teams program 1.5.00.8070). The participants completed the exercises in front of the camera and under the supervision of a physiotherapist. The exercise program continued 4 days a week for 8 weeks. In the first four weeks, 3 different dynamic and static hamstring stretching exercises were performed for 10 seconds and in 5 repetitions. These exercises were hamstring stretching exercises performed in the position of standing with the help of a chair, sitting and supine. In the last 4 weeks, 4 different dynamic and static stretching exercises were performed for 20 seconds and in 10 repetitions. These exercises were forward folding in straddle and with straight legs, and hamstring stretching exercises performed in the sitting and half-knee positions.

The participants in the second group were given a home exercise program that included the same protocol as the first group. The exercises were explained in a brochure containing written and visual information. The participants were interviewed by phone once a week. The home exercise program continued for 8 weeks.

Three different tests were implemented to assess hamstring shortness. The sit and reach test (SRT) was performed with a SRT box. The participants were asked to sit on a flat surface, place their hands on top of each other with their palms facing the ground, and move the indicator on the box

**Table 1.** Baseline characteristic data

| Characteristics | All (n = 60) (Mean±SD) | Group 1-Telerehabilitation group (n = 30) (Mean±SD) | Group 2-Home exercise group (n = 30) (Mean±SD) | p |
|---|---|---|---|---|
| Age (yrs) | 20.80 ± 1.59 | 20.60 ± 1.26 | 21.00 ± 1.85 | 0.33 |
| BMI (kg/m$^2$) | 23.18 ± 3.76 | 24.07 ± 3.16 | 22.29 ± 4.14 | 0.06 |
| Gender (female) | 33(55%) | 10 (33.3%) | 23 (76.7%) | 0.44 |
| Dominant side (right) | 55 (91.6%) | 27 (90.0%) | 28 (93.3%) | 1.0 |

The values are shown as mean ± SD. $p < 0.05$ was considered statistically significant. Age: years, BMI: body mass index (kg/m$^2$)

to the furthest point they could without bending their knees. Measurements were repeated three times. The three measurement results were averaged and the result was recorded in centimeters (Ayala et al., 2012).

In the active straight leg raise test, while the participant was in the supine position, they actively raised the dominant-side lower extremity with their knee extended. In the meantime, care was taken not to flex the hip and knee on the non-dominant side. The degree of hip flexion on the dominant side was measured by the physiotherapist with the help of a goniometer. Goniometric measurement was repeated 3 times. The averages were taken and recorded in the participants' files.

In the passive straight leg raise test, while the participant was in the supine position, the physiotherapist passively lifted the dominant-side lower extremity with the knee extended. In the meantime, care was taken not to flex the non-dominant hip and knee.

The degree of hip flexion on the dominant side was measured with the help of a goniometer. Goniometric measurement was repeated 3 times. The averages were taken and recorded in the participants' files. All hamstring shortness measurements were performed at the beginning, and repeated at the 8th week and 6$^{th}$ month.

The level of physical activity was evaluated using the International Physical Activity Questionnaire Short Form (IPAQ-SF). The short form consists of 7 questions in total. The questionnaire provides information about the time spent walking, performing moderate and vigorous activities, and sitting. The measurement of all activities performed is based on the fact that each activity is carried out for at least 10 minutes at a time. According to the total physical activity score, the physical activity levels of the participants are defined as "low, moderate and high" (Saglam et al., 2010).

### *Statistical analysis*

Descriptive statistics were presented as mean ± standard deviation (SD). Independent samples t-test, Paired t-test, Wilcoxon test and Mann Whitney U test were used for analysis. Pearson correlation coefficient was used to measure the correlation. All statistical analyzes were performed using SPSS for Windows, version 26.0 (SPSS Inc., Chicago, IL, USA). p value lower than 0.05 was considered statistically significant.

## Results

A total of 280 participants were initially evaluated, and 68 participants meeting the inclusion criteria were included in the study. The 8$^{th}$-week results of 60 participants and the long-term results of 56 participants were analyzed.

The dropout rate was the same in both groups (13%). The reasons for dropping out were the COVID-19 pandemic,

**Table 2.** Analysis of intra-group differences

| | Group 1-Telerehabilitation group (n = 30) | | | | | Group 2-Home exercise group (n = 30) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline (Mean ± SD) | 8$^{th}$ week (Mean ± SD) | p | 6$^{th}$ month (Mean ± SD) | p | Baseline (Mean ± SD) | 8$^{th}$ week (Mean ± SD) | p | 6$^{th}$ month (Mean ± SD) | p |
| Sit and reach test | 16.29 ± 3.89 | 23.45 ± 7.25 | 0.001 | 24.25 ± 7.97 | 0.001 | 16.75 ± 5.02 | 20.87 ± 6.01 | 0.001 | 20.68 ± 6.21 | 0.001 |
| Dominant side AROM | 52.21 ± 1.52 | 66.35 ± 2.26 | 0.001 | 70.44 ± 2.72 | 0.162 | 53.96 ± 1.72 | 64.56 ± 2.48 | 0.001 | 68.89 ± 1.84 | 0.454 |
| Dominant side PROM | 57.45 ± 1.56 | 71.551724 ± 2.18 | 0.005 | 74.36 ± 2.99 | 0.014 | 57.20 ± 2.18 | 68.63 ± 2.86 | 0.001 | 72.95 ± 2.17 | 0.762 |
| IPAQ-SF Total | 4678.60 ± 317.76 | 4230.85 ± 360.55 | 0.657 | 3512.394 ± 368.56 | 0.02 | 497.15 ± 475.56 | 4596.06 ± 558.58 | 0.66 | 3788.74 ± 569.61 | 0.238 |
| IPAQ-SF Low | 290.02 ± 81.61 | 1065.45 ± 186.88 | 0.001 | 1040.33 ± 144.76 | 0.001 | 480.88 ± 130.13 | 1383.40 ± 329.93 | 0.319 | 1395.89 ± 258.2 | 0.388 |
| IPAQ-SF Moderate | 286.20 ± 104.95 | 380.01 ± 108.62 | 0.275 | 331.684729 ± 71.35 | 0.234 | 432.00 ± 193.71 | 561.71 ± 158.01 | 0.320 | 836.22 ± 312.48 | 0.538 |
| IPAQ-SF High | 806.53 ± 158.43 | 1163.14 ± 194.88 | 0.015 | 994.01 ± 200.79 | 0.27 | 912.73 ± 181.84 | 114.86 ± 235.53 | 0.170 | 874.67 ± 245.95 | 0.116 |

The values are shown as mean ± SD, $p < 0.05$ was considered statistically significant. Dominant side AROM: Dominant side active range of motion, Dominant side PROM: Dominant side passive range of motion, IPAQ: International Physical Activity Questionnaire

**Table 3.** Analysis of Intergroup Differences

| | Group 1 - Difference between baseline-8th week (Mean ± SD) | Group 2 - Difference between baseline-8th week (Mean ± SD) | p | Group 1 - Difference between baseline-6th month (Mean ± SD) | Group 2 - Difference between baseline-6th month (Mean ± SD) | p |
|---|---|---|---|---|---|---|
| Sit and Reach Test | 6.60 ± 4.71 | 4.03 ± 4.42 | 0.033 | 7.26 ± 8.33 | 3.83 ± 5.86 | 0.070 |
| Dominant Side AROM | 17.53 ± 14.96 | 14.90 ± 12.81 | 0.467 | 14.60 ± 9.72 | 11.86 ± 10.43 | 0.298 |
| Dominant Side PROM | 11.43 ± 9.55 | 15.70 ± 12.66 | 0.146 | 8.10 ± 17.26<br>12.44 ± 8.10 | 12.44 ± 8.10<br>8.10 ± 17.26 | 0.370 |
| IPAQ SF Total | 25.20 ± 257.23 | 43.93 ± 276.49 | 0.763 | 39.16 ± 206.28 | -34.93 ± 149.08 | 0.295 |
| IPAQ SF Low | 153.36 ± 336.59 | 94.50 ± 280.94 | 0.368 | 134.83 ± 323.85 | 230.86 ± 334.38 | 0.426 |
| IPAQ SF Moderate | 366.75 ± 875.37 | -114.36 ± 1191.41 | 0,088 | 109.60 ± 290.71 | 100.20 ± 317.08 | 0.905 |
| IPAQ SF High | 258.23 ± 1120.44 | -38.13 ± 1460.63 | 0.169 | 786.86 ± 1228.50 | 442.66 ± 1050.0 | 0.116 |

The values are shown as mean ± SD, p < 0.05 was considered statistically significant. Dominant side AROM: Dominant side active range of motion, Dominant side PROM: Dominant side passive range of motion, IPAQ SF: International Physical Activity Questionnaire Short Form

moving to a different city, busy exam schedule and family-related ones. The long-term results of 76% of the participants in both groups could be analyzed.

There were 30 participants in the telerehabilitation group (mean age: 20.60 ± 1.26) and the home exercise group (mean age: 21.00 ± 1.85) each. There was no significant difference between the baseline values for mean age (p = 0.33), BMI (p = 0.06), female-to-male ratio (p = 0.44) and dominant side (p = 1.0). The characteristics of the participants are presented in Table 1.

The effects of the 8-week intervention on hamstring flexibility are given in Table 2. At the end of 8 weeks, significant improvement was observed in the SRT scores of both the telerehabilitation group (p = 0.001) and the home exercise group (p = 0.001). In addition, significant improvements were observed in active ROM (p = 0.001) and passive ROM (p = 0.005) in the telerehabilitation group, and those (p = 0.001) in the home exercise group.

The long-term results revealed that the improvements in both the SRT (p = 0.00) and passive ROM (p = 0.014) were maintained in the telerehabilitation group, while the improvement was maintained only in the SRT (p = 0.001) in the home exercise group. When the difference between the groups was analyzed, only the telerehabilitation group was found to be significantly superior in the 8th week results of the SRT (p = 0.034). No significant difference was observed between the groups in the other parameters.

No significant change was observed in the level of physical activity in the home exercise group. In the telerehabilitation group, a significant increase was observed in IPAQ-SF total score in the 6th month (p = 0.028), IPAQ-SF low score in both the 8th week (p = 0.001) and the 6th month (p = 0.001), and IPAQ-SF high score in the 8th week (p = 0.015). There was no significant difference in IPAQ-SF total score and its categories between the groups.

When all participants were evaluated, a high level of correlation was found between IPAQ-SF total score and active ROM of dominant hip (r = 0.942).

## Discussion

In this randomized controlled trial, significant improvements were found in passive ROM of hip flexion after hamstring stretching in both the telerehabilitation group (Δ = 11.43) and the home exercise group (Δ = 15.70). There was a significant difference between the groups in favor of the telerehabilitation group only in the SRT. In addition, at the end of the 6-month period, significant improvement was observed in passive ROM of hip flexion only in the telerehabilitation group.

Studies have reported that adults with a sedentary lifestyle have less hamstring flexibility (De Oliveira et al., 2018). Cho et al. (2017) observed a significant relationship between physical activity level and hamstring flexibility. This finding agree with previous report, our initial evaluation results showed that hamstring flexibility was low in individuals with low physical activity levels.

Different measurement methods are used to measure hamstring flexibility. The SRT is one of these methods. The literature suggests that the SRT should not be used as a cut-off value in the measurement of hamstring flexibility (Ayala et al., 2012). We used passive ROM of the dominant extremity as the cut-off value in the measurement of hamstring flexibility in the individuals included in our study. We included both tests to evaluate the efficacy of the treatment.

The duration of the hamstring stretching exercises varies. Ayala et al. (2010) examined the effect of 15-, 30- and 45-second active stretching exercises on the degree of hip flexion. An increase in hip flexion angle was observed after the treatment in our study. There was no statistically significant difference between the effectiveness of the exercises performed at different lengths. Takeuchi et al. (2020) investigated the effectiveness of 20-second static stretching exercise applied to the hamstring muscle in healthy individuals. The study showed that the hip joint ROM increased as a result of the 20-second stretching program, which is in line with our study.

In a review study examining the effects of stretching exercises, the immediate and chronic effects of stretching were found to be different from each other (Knudson, 2006). Similar to our study, the immediate effect of hamstring flexibility exercises was examined in the study, in which 46 physiotherapy students participated, and significant improvements were observed in the degree of passive hip flexion (Cini et al., 2017).

In some of the studies, four-week exercises were found to be sufficient for significant improvement, while in others they were not. Davis et al. (2005) did not observe any increase in hamstring flexibility after 4 weeks of hamstring flexibility exercises. They stated that an exercise program lasting longer than 4 weeks might be required to increase the passive ROM of the hip. In the study LaRoche & Connolly (2006) conducted, an improvement was observed in functional capacity and muscle performance at the end of the 4-week hamstring flexibility exercise program, while no improvement was observed in muscle stiffness. We are of the opinion that although a 4-week period is effective in establishing regular exercise habits, it is not enough for an effective rehabilitation program.

According to studies on the stretching of different muscle groups, remarkable improvements were found thanks to 3 to 6 weeks of training in the ROM of the joint, and it was reported that the muscle was lengthened by 5-31% or 6 to 12 degrees (Knudson, 2006). There are hamstring flexibility exercise programs performed with different durations with healthy adults in the literature. However, there is no consensus on the optimal duration (Sainz de Baranda & Ayala, 2010). Chan et al. (2001) applied two stretching exercise programs lasting 4 and 8 weeks in their study on healthy adults. The study reported that the 8-week program was more effective on hip joint ROM and hamstring flexibility than the 4-week program. Ayala et al. (2013) reported an increase in passive hip flexion angle in individuals with and without hamstring shortness after a 12-week exercise program. We observed a significant improvement in hamstring flexibility with an 8-week exercise program in our study. To the best of our knowledge, there is no study in the literature examining the long-term effects in this population. Our study found that the effects of hamstring flexibility exercises in healthy individuals were maintained in the long term.

The effect of exercise position on flexibility response is also discussed in the literature. Investigating the effects of hamstring stretching positions on flexibility, Borman et al. (2011) reported that there was no difference between exercises performed while sitting and standing. Stretching exercises performed in both positions were included in the flexibility program in our study. We believe that exercises performed in different positions affect patient participation in the exercise positively.

Different types of stretching exercises can be used to increase hamstring flexibility (De Oliveira et al., 2018). In their study comparing the effectiveness of active and passive hamstring stretching exercises, Meroni et al. (2010) reported that active stretching is more efficient in terms of time use and requires less compliance in terms of performing the exercises. We speculate that the high effectiveness of the exercise program in our study may be because the exercises were planned to be performed actively.

Fasen et al. (2009) compared four different types of stretching, including static and dynamic stretching exercises, in their study in healthy adults. Following the 8-week exercise training, they reported that there was no difference between the effectiveness of different stretching types on flexibility. In our study, we implemented a combination of active static and active dynamic hamstring stretching exercises to increase the effectiveness of the exercise program.

Telerehabilitation applications are generally applied in neurological and orthopedic patient groups, for whom it is difficult to access the hospital (de Menezes et al., 2021; Lawford et al., 2018). The pandemic process has adversely affected not only certain patient groups but also all populations in accessing health services. This has revealed that we need innovations in rehabilitation and exercise practices. Studies on young individuals, who can use new technology really well, are extremely insufficient (Hasani et al., 2021).

Exercise practices have been performed using different telerehabilitation methods in the literature. The use of mobile technology-based health interventions is encouraged, and the use of programs is supported to reach large populations economically (Mönninghoff et al., 2021; Stork et al., 2021). Videoconference-based exercise training can be considered a safe and effective way to maintain functional capacity (Kuldavletova et al., 2021). We observed a significant effect on flexibility by using the video conference method in our study.

The advantage of telerehabilitation and home exercise programs over one another is still debated. In their study, Özer et al. (2021) divided the patients diagnosed with nonspecific neck pain into two groups as telerehabilitation and home exercise. After the four-week exercise program, significant improvements were observed in both groups. However, the groups did not have superiority over each other. In our study, in which we also applied telerehabilitation and home exercise, the only difference between the short- and long-term results was the evaluation of hamstring flexibility performed at the end of the 8th week. Dias et al. (2021) concluded in their review study that telerehabilitation and exercise practices could lead to clinical results similar to other interventions in improving pain, physical function and quality of life in the short and long term. Similarly, the clinical results of the home exercise group and of the telerehabilitation group were similar in our study.

Various studies also indicate that hamstring flexibility is related to physical activity level, muscle injuries and performance (Martin et al., 2022; Barbosa et al., 2020). However, due to individual characteristics such as age and muscle-tendon structure, there is no consensus on the optimal exercise program to increase hamstring flexibility in healthy adults (Medeiros et al., 2016).

## Conclusions

The pre- and post-treatment measurements of the telerehabilitation and home exercise groups showed that the improvement in the results of hamstring flexibility was more significant in the former. The main reason for this difference could be the inability to perform a supervised exercise program in the home exercise group. Based on the data we obtained, we believe that hamstring stretching exercises performed through telerehabilitation can be used to increase flexibility, just like other methods. Our study has several limitations. The limitation of our study is that we conducted it with a healthy young population aged 18-25. The heterogeneity of physical activity levels is another limitation.

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Clinical trials registration number: NCT05083533.

## Conflict of interest

The authors declare no conflict of interest.

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# ВПЛИВ ТЕЛЕРЕАБІЛІТАЦІЇ НА ГНУЧКІСТЬ ПІДКОЛІННИХ М'ЯЗІВ СТЕГНА У ЗДОРОВИХ ДОРОСЛИХ

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 7 с., 3 табл., 1 рис., 37 джерел.

**Базова проблематика.** Телереабілітація, яку використовують як метод виконання вправ, набуває дедалі більшого поширення за останні роки. Для підвищення гнучкості підколінних м'язів стегна використовують різні методи, але пошук оптимальної програми потребує більших обсягів досліджень.

**Метою дослідження було** вивчення впливу на гнучкість підколінних м'язів стегна вправ на розтягування підколінних м'язів стегна, рекомендованих у рамках телереабілітації, і програми домашніх вправ.

**Матеріали та методи.** Шістдесят вісім здорових дорослих випадково розподілили на дві групи, а саме: група телереабілітації та група домашніх вправ. В обох групах вправи виконували протягом 8 тижнів (4 заняття/тиждень). У період безпосередньо до та після втручання, а також через 6 місяців після втручання проводили вимірювання активної та пасивної амплітуди руху (ROM), вимірювання гнучкості під час тесту на згинання тулуба вперед сидячи на підлозі з випрямленими вперед руками (Sit and Reach Test, SRT), а також вимірювання рівнів фізичної активності учасників на підставі заповнених ними коротких форм Міжнародної анкети з фізичної активності (IPAQ-SF).

**Результати.** Наприкінці 8 тижнів спостерігалося значне покращення показників гнучкості за результатами тесту на згинання тулуба вперед сидячи на підлозі з випрямленими вперед руками (SRT) як у групі телереабілітації (p = 0,001), так і в групі домашніх вправ (p = 0,001). Крім того, суттєве покращення спостерігалося в показниках вимірювань пасивної амплітуди руху (ROM) як у групі телереабілітації (p = 0,005), так і в групі домашніх вправ (p = 0,001). Наприкінці 8 тижнів було визначено, що група телереабілітації значно перевершує групу домашніх вправ за результатами тесту на згинання тулуба вперед сидячи на підлозі з випрямленими вперед руками (SRT) (p = 0,034). Що стосується довгострокових результатів, у групі телереабілітації зберігалося суттєве покращення в показниках тесту на згинання тулуба вперед сидячи на підлозі з випрямленими вперед руками (SRT) (p = 0,001) та вимірювання пасивної амплітуди руху (ROM) (p = 0,014).

**Висновки.** За результатами спостереження восьмитижневої програми телереабілітації та домашніх вправ було встановлено її позитивний вплив на показники пасивної та активної амплітуди руху (ROM). У довгостроковій перспективі метод телереабілітації, можливо, виявиться ефективнішим за метод домашніх вправ.

**Ключові слова:** вправа, підколінні м’язи стегна, телереабілітація, розтягування м’язів, гнучкість.

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