

## EFFECTIVENESS OF VIDEO INSTRUCTIONAL MATERIAL HOME-BASED ECCENTRIC PROGRAM IN IMPROVING FLEXIBILITY AMONG STUDENTS TAKING UP ONLINE CLASSES

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### ABSTRACT

Muscle tightness is a prevalent issue particularly now that students are unable to attend school due to the pandemic, requiring them to adapt to a new online learning environment that involves extended periods of sitting. Specifically, the low back and hamstrings are common areas that develop tightness, resulting in loss of flexibility, causing discomfort and hindrance to a person's daily activities. In the study, the intervention of eccentric exercise will be used as it helps in lengthening the muscle under tension and produces sarcomeres resulting in improved flexibility. Moreover, the video instructional material will serve as a medium by which participants will be able to easily access the exercise program. Thus, the purpose of the study is to investigate the effectiveness of video instructional material home-based eccentric program in improving flexibility among students taking up online classes. A single-group pretest-posttest design was used, with twenty-nine (29) participants with limited low back and hamstring flexibility being assigned to an experimental group that would receive a home-based eccentric program presented via video instructional material. The Information Technology students were selected as participants since they are more susceptible to long periods of computer work which can greatly contribute to muscle tightness. The V Sit and Reach Test was used to assess the low back and hamstring flexibility of the respondents before and after the implementation of the video instructional home-based eccentric program, which lasted 4 weeks with a total of 12 sessions. The computed t- value was greater than the computed critical t- value ( $- 8.46 > \pm 2.05$ ), signifying that there was a significant difference between the V Sit and Reach pretest and post-test measurements. The findings of the study showed that Video Instructional Material is an effective medium in delivering the Home- Based Eccentric program among the selected participants which improved their flexibility.

**Keywords:** Video Instructional Material, Home Based Eccentric Program, Information Technology Students, Muscle Tightness, Flexibility.

### INTRODUCTION

Muscle tightness is a prevalent issue that is very common among people who have a sedentary lifestyle or prolonged periods of inactivity (Furlong, 2017); especially now that the use of virtual platforms is increasing, which leads to individuals being less involved in physical activity (OrthoExpress, 2020). Muscle tightness may occur in two ways: (1) passively, as a

result of postural adaptation or scarring; (2) actively, due to spasm or contraction (Page, 2012), which decreases the range of motion and can produce a muscle imbalance. Specifically, the low back and hamstrings are two prominent areas that develop muscle tightness (Ghulam et al., 2017; and Healthline, 2019). Extensive research has shown that eccentric exercise improves flexibility by lengthening muscles under tension, which causes adaptation and increases range of motion (Finn and Muntis, 2018; Kin, 2020; Morais et al., 2019; and Valle, 2020), as to why this has been utilized as the intervention of the study. Moreover, this will be presented through video instructional material because existing research showed that this is a convenient tool for meeting the needs and achieving learning outcomes of individuals in learning (Mhamdi, 2017)

Most of the previous studies investigating this topic have utilized video instructional materials but only as an aid for teaching (Boateg et al., 2016). Only one presented the exercises using video materials (Shariat et al., 2017). Moreover, strengthening muscles and reducing hamstring strains among athletes are the focus of these researches (Pais et al., 2015; Petersen, et al., 2011; Nichols, 2013). Although there is research that utilized eccentric exercises for flexibility, it is only limited to healthy overweight and obese participants (Muhamad & Yusoff, 2018). Needless to say, there have been no studies proving the effectiveness of eccentric exercises in students with muscle tightness who are not involved in strenuous physical activities, specifically those who are attending online classes. Hence, this study had sought to obtain data on this present topic to help address these research gaps.

This is the first study to investigate the effectiveness of using video instructional materials to present a home-based eccentric program in improving flexibility due to low back and hamstring tightness in a group of undergraduates of Information Technology from the University of Perpetual Help System Laguna – JONELTA. The researcher opted to recruit these students since there is a high prevalence of muscle tightness in this cohort (Nahar, 2018; Segall, 2016; Sirajudeen & Siddik, 2017; and Swetha et al., 2016). In addition, eccentric exercise was considered given its physiological benefits to flexibility (Finn and Muntis, 2018; Kin, 2020; Morais et al., 2019; and Valle, 2020). Moreover, the use of video instructional materials was selected to deliver the exercise program because of its accessibility and benefits in learning outcomes (Boateng et al., 2016; Costley & Lange, 2017; Jang & Kim, 2014; and Traphagan, Kusera, & Kishi, 2010) Furthermore, this study aims to collect data that has not been covered or remained inconclusive/lacking by previous studies indicating that more research on the effectiveness of video instructional material, among students, is needed. Hence, the primary purpose of this study was to demonstrate that the Video Instructional Material is an effective medium for presenting the Home-Based Eccentric program, and that people will use it when they need to do a specific exercise program and improve their functional capability—flexibility.

## **METHODOLOGY**

### **Study Design and Population**

In this quasi-experimental type of research, the researchers investigated the effectiveness of utilizing the video instructional material in presenting a home-based eccentric exercise in improving the flexibility of the selected undergraduates of Information Technology of the University of Perpetual Help System Laguna - JONELTA. The researchers used the Single-Group Pretest-Posttest Research Design as this incorporates both pre-test and post-test studies by conducting a single-group evaluation before and after treatment. The inclusion criteria were as follows: (1) University of Perpetual Help System Laguna - JONELTA male and female undergraduates of Information Technology who were taking up online classes; (2) ages

between 18-25; (3) V-Sit and Reach scores below the normative values (average) of 27.0 cm in males; and 29.0 in females as it signifies muscle tightness in the low back and hamstrings; (4) individuals who did not undertake any systematic and specific strength and flexibility training programmes in the region of investigation five months before the study; and (5) those who were willing to comply with the assigned treatment for 12 sessions. The exclusion criteria were as follows: (1) working student; (2) with asthma; (3) prior history of surgery of the back and hamstrings with any pain for more than 3 months; (4) anti-inflammatory medication in the past 2 weeks; (5) hypertension; (6) history of trauma; (7) impaired balance conditions; and (8) with mental health conditions.

### **Characteristics**

The population was screened twice. A Google Form questionnaire was first given to the participants to screen them according to the aforementioned criteria. This contains basic information such as their school emails, age, if currently IT enrollee, lifestyle status, and/or health status. Only those who passed the first screening were allowed to the next part, which is the V Sit and Reach Test.

### **Video Instructional Material**

The participants followed the video instructional material, which was reviewed by a Physical Therapist to ensure that the exercises were overseen by a licensed professional with expertise delivering video instructional materials and dealing with participants with muscle tightness. Furthermore, the exercises were shown in the third person perspective, and appropriate audio instructions were included in the video to guide participants through the safe and proper execution of each task. The video material was recorded using a DSLR camera and stored on a USB flash drive (4 gigabytes) to provide high quality 1080p resolution.

### **Eccentric Exercise**

The exercise session was held for a 4-week period of three days per week (Monday, Wednesday, and Friday), with participants required to log in their attendance on Google Forms prior to participating in order for the researchers to monitor their attendance and ensure their compliance. The assigned program lasted about 24 minutes which included warm-up exercises (6 minutes and 30 seconds) and eccentric exercises (15 minutes). Specifically, the home-based eccentric program was divided into two parts: (1) without equipment which include half split stretch, hamstring walkouts, hamstring catch flicks, and eccentric trunk extension with body weight (5 reps x 2 sets with 15 - 30 secs break in between); and (2) with equipment which include resistance-band hamstring eccentric closed-chain single leg, eccentric squats with resistance band, and seated resistance band hamstring curls (5 reps x 2 sets with 30 secs - 1 min break in between). According to Suchomel, et al., (2019) it is best to implement eccentric training with a minimum number of repetitions ranging from 5-10 reps, with a rest in between repetitions ranging from 45-90 seconds each. After two weeks, it was recommended to increase intensity from 5 reps x 2 sets to 5 reps x 3 sets to achieve optimal results.

### **Outcome Measure**

The outcome measure used was the V-Sit and Reach Test. The research of Cuberek, Lipenska, & Machova (2013) shows that the average intra-individual difference of V-Sit and Reach test is 1.14 cm (increasing test performance) is found to be statistically significant ( $t = -5,375$ ;  $df$

= 42). It also had a high intra-individual reliability ( $r = .98$ ); and the absolute reliability (SEM) is equal to 0.139 cm. Meanwhile, the study by Ayala F., indicated high reliability for the V-Sit and Reach test (VSRT) (4.48% typical error; 0.84% change in the mean, 0.95 ICC), toe touch test (TT) (5.89% typical error; 2.31% change in the mean, 0.89 ICC). Hence, these studies prove that the use of VSRT is an effective method for self-assessment of both hamstring and low back flexibility in adolescents.

### Statistical Technique

The statistical technique used was the paired sample t-test as it compares the means of two related groups to determine the statistically significant difference between these means (Statisticsolutions.com, 2020). Specifically, this test was used in the study to determine the differences in the V-Sit and Reach pre-test and post-test scores of the intervention group before and after the implementation of the video instructional material home-based eccentric program in the selected outcome of improved low back and hamstring flexibility.

## RESULTS

Discussion on the Pre-test and Post test Scores of the Participants Before and After the Implementation of the Video Instructional Material Home-Based Eccentric Program is presented on succeeding table:

**Table 1. Pre-Test Scores of the Participants Before the Implementation of the Video Instructional Material Home-Based Eccentric Program**

Category of VSRT (in cm)	No. of Respondents
Excellent (M = > 46.5; F = > 46.5)	0
Good (M = 46.5 - 38.0; F = 45.5 - 38.0)	0
Average (M = 37.5 - 27.0; F = 37.5 - 29.0)	0
Below Average (M = 26.5 - 17.0; F = 28.5 - 20.0)	24
Poor (M = <17.0; F = < 20.0)	5

Table 1 shows the pre-test scores of the participants with the mean score of 20.1 cm. The highest pretest score was 25 cm and the lowest was 4 cm. The standard deviation of 4.14 (SD =  $\pm 4.14$ ) which indicated that the pre-test measurements of the respondents were dispersed. It was shown that twenty-four participants were categorized under 'below average' and five participants were under the 'poor' category. The gathered pretest scores signify that each participant's initial measures of flexibility vary.

**Table 2. Post-Test Scores of the Participants After the Implementation of the Video Instructional Material Home-Based Eccentric Program**

Category of VSRT (in cm)	No. of Respondents
Excellent (M = > 46.5; F = > 46.5)	1
Good (M = 46.5 - 38.0; F = 45.5 - 38.0)	3
Average (M = 37.5 - 27.0; F = 37.5 - 29.0)	18
Below Average (M = 26.5 - 17.0; F = 28.5 - 20.0)	7
Poor (M = <17.0; F = < 20.0)	0

Table 2 shows the post-test scores of the participants with a mean score of 31 cm. The highest posttest score was 49 cm and the lowest was 20 cm. The total post-test scores had a standard deviation of 6.62 ( $SD = \pm 6.62$ ), which stated that the post-test measurements were dispersed. Overall, it can be observed that 29 out of 29 participants (100%) improved in their posttest scores as compared to pretest scores.

**Table 3. Significant Difference Between the V Sit And Reach Test Scores Before and After the Implementation of the Video Instructional Material Home-Based Eccentric Program**

		Mean	t-Value	
Pretest	Posttest	Difference	Computed	Critical
20.10	31.00	10.9	- 8.46	$\pm 2.05$

As shown in Table 3, the mean of the pre-test and post-test scores were 20.1 cm and 31 cm respectively, with a difference of 10.9 cm. The computed t - value was -8.461 and the critical t-value was  $\pm 2.048$ . The analysis yielded a significant difference ( $-8.461 > \pm 2.048$ ). Moreover, the post-test scores of the respondents were found to be higher than the pretest scores. Furthermore, since the computed t-value was greater than the computed critical t-value ( $8.46 > \pm 2.05$ ), this signifies that there was a significant difference between the pretest and post-test scores of the 29 participants.

## DISCUSSION

The effectiveness of the home-based eccentric program through the medium of video instructional material was expressed through the pre-test and post-test scores of the participants based on the categorical values of the V-Sit and Reach test. The normative (average) values were used as a criterion for selecting the participants in the study. Only those who scored lower than these values, (i.e., below average, and poor) were considered and had undergone the pretest. After the intervention, the post-test scores show that no participant fell under the 'poor'

category in comparison to the pretest. The pretest scores of three (3) out of five (5) participants under the 'poor' category improved and were then classified as 'below average' while the other two were categorized as 'average'.

Those who were classified as 'below average' in the pretest were classified into different categories. Among the 24 participants in the said category, four (4) remained in the category, 16 were classified as 'average', three (3) fell under the 'good category', while the remaining participant was classified as 'excellent'.

The reason for this was that some of the pre-test scores, although in the same category, were substantially lower than everyone else's. With a longer training period, these participants would achieve more improved flexibility, strength, and power (Muhamad & Yusof, 2016)

The mean of the pre-test scores and post-test scores further proves that a progressive training of eccentric exercises every Monday, Wednesday, and Friday generates positive changes in hamstring flexibility (Ponce & Muñoz, 2018).

## CONCLUSION

Based on the findings of the study, the following conclusions were drawn: The improvements in the muscle flexibility were most apparent after the participants completed the exercise program where their posttest scores significantly improved as compared to their pretest scores. The intervention of eccentric exercises for the low back and hamstring muscles for a period of four weeks, performed during class breaks in-between online classes, generated positive changes in the flexibility of these targeted muscles among the undergraduates ranging from 18-25 years of age, reducing muscle tightening. The findings of the study showed that Video Instructional Material is an effective medium in delivering the Home-Based Eccentric program in improving the flexibility among the selected undergraduates of Information Technology with muscle tightness. Therefore, there is sufficient evidence to reject the null hypothesis that there is no significant difference between the pretest and post test scores of the V Sit and Reach test of the participants after the implementation of the video instructional material home-based eccentric program.

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