

Effects of Traditional Thai Hermit's Exercise or Ruesi Dudton on Flexibility and Range of Motion in Female University Students

นิพนธ์ฉบับ

Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อประเมินผลของการฝึกฤๅษีตัดตนที่มีต่อความอ่อนตัวของกล้ามเนื้อและมุมการเคลื่อนไหวของข้อต่อของนักศึกษาหญิง **วิธีการศึกษา:** การศึกษาเชิงทดลองในนักศึกษาชั้นปีที่ 2 สาขาวิทยาศาสตร์สุขภาพของมหาวิทยาลัยราชภัฏอุดรธานีในปีการศึกษา 2559 จำนวน 13 คน โดยให้ฝึกตามโปรแกรมการออกกำลังกายท่าฤๅษีตัดตน 18 ท่า ครั้งละ 60 นาที สัปดาห์ละ 3 ครั้ง ติดต่อกัน 8 สัปดาห์ ทำการประเมินก่อนและหลังการฝึกในด้านความอ่อนตัวของกล้ามเนื้อโดยใช้ sit-and-reach test และมุมการเคลื่อนไหว ทั้ง flexion และ extension ในไหล่และสะโพกทั้งสองข้างโดยใช้ Goniometer วิเคราะห์ข้อมูลโดยหาค่าเฉลี่ยและส่วนเบี่ยงเบนมาตรฐาน และทดสอบความแตกต่างของค่าเฉลี่ยของการวัดแต่ละค่าก่อนและหลังการฝึกโดยใช้ paired *t*-test ซึ่งกำหนดระดับนัยสำคัญทางสถิติที่ 0.05 **ผลการศึกษา:** เมื่อสิ้นสุดการฝึก 8 สัปดาห์ ความอ่อนตัวเพิ่มขึ้นอย่างมีนัยสำคัญ (+8.70 ซม.; *P*-value = 0.001) และมุมการเคลื่อนไหวทั้ง flexion และ extension มีค่าที่สูงขึ้นอย่างมีนัยสำคัญทางสถิติในไหล่ทั้งสองข้าง (flexion: ไหล่ซ้าย +11.91 องศา, ไหล่ขวา +23.07 องศา; extension: ไหล่ซ้าย +17.30 องศา, ไหล่ขวา +26.15 องศา, *P*-value < 0.001 สำหรับทุกค่า) และสะโพกทั้งสองข้าง (flexion: สะโพกซ้าย +6.92 องศา, สะโพกขวา +13.07 องศา; extension: สะโพกซ้าย +13.46 องศา, สะโพกขวา +25.00 องศา; *P*-value < 0.001 สำหรับทุกค่า) **สรุป:** การออกกำลังกายท่าฤๅษีตัดตนช่วยเพิ่มความอ่อนตัวของกล้ามเนื้อและทำให้มุมการเคลื่อนไหวของข้อต่อดีขึ้น จึงควรส่งเสริมให้นักศึกษาได้ฝึกการออกกำลังกายดังกล่าว

คำสำคัญ: การออกกำลังกายท่าฤๅษีตัดตน, ความอ่อนตัวของกล้ามเนื้อ, มุมการเคลื่อนไหวของข้อต่อ, นักศึกษาหญิง

Abstract

Objective: To assess the effects of traditional Thai hermit's exercise (or Ruesi Dudton) on flexibility and range of motion (ROM) in female university students. **Method:** In this quasi-experimental study, a purposive sample of 13 second-year female students enrolled in the Health Science Program of Udon Thani Rajabhat University in the academic year of 2016 was recruited. They were trained in the 18-posture Ruesi Dudton program with a 60-minute session, three days a week, for eight weeks. The flexibility and ROM were measured before and after the program. The flexibility was measured using a sit-and-reach test, whereas the ROM for the flexion and extension of shoulders and hips on both sides was measured by the Goniometer. Data were analyzed and presented as means and standard deviations. A paired *t*-test was also used to compare the means of individual measures before and after the program with a significance level set at 0.05. **Results:** At the end of the 8-week program, there was a significant improvement in the flexibility of the body trunk (+8.70 cm; *P*-value = 0.001). The ROM for both flexion and extension was significantly improved in both shoulders (flexion: left shoulder +11.91° and right shoulder +23.07°; extension: left shoulder +17.30° and right shoulder +26.15°; *P*-value < 0.001 for all values) and both hips (flexion: left hip +6.92°, right hip +13.07°; extension: left hip +13.46°, right hip +25.00°, *P*-value < 0.001 for all values). **Conclusion:** Traditional Thai hermit's exercise could improve the muscle flexibility and ROM in female university students. Such exercise should therefore be encouraged in this student group.

Keywords: traditional Thai hermit's exercise, Ruesi Dudton, muscle flexibility, range of motion, female university student

Introduction

At present, physical stress and related health problems have been increasing. For example, low back pain, tight muscles, muscle strain and muscle fatigue. Among various health promotion and treatments that have been used, traditional Thai hermit exercise or Ruesi Dudton is believed to be in Thai culture for 200 years. It has also been known in other names including Yogi self-stretching and self-adjusting exercise. Ruesi means hermit or Yogi, and Dudton means body stretching. Ruesi Dudton has been developed based on a folk wisdom to promote health and alleviate illnesses.

Ruesi Dudton is useful for body restructuring both in standing and sitting positions. Officially this Ruesi Dudton exercise practice has been navigated by the inscripts recorded at Wat Pho. Ruesi Dudton exercise is a slow movement of the body along with breathing in and out slowly. It has been known to help promote physical and mental fitness.¹ Thai Traditional Medicine Institute has compiled a recitation of the postures which is applied to the continuity of all 15 movements including eight sitting postures (i.e., Dudton with face massage, Dudton with hands

in prayer pose, Dudton with arm stretching, Dudton with torso stretching, Dudton with arm twisting, Dudton with leg massage, Dudton with Hanuman pose, and Dudton with dove pose), four standing postures (i.e., Dudton with archer pose, Dudton with knee standing, Dudton with massage on leg standing, and Dudton with Khon pose), one reclining posture (Dudton with supine lying), and two supine postures (i.e., Dudton with prone lying and Dudton with lying on one side).²

In this retreat of the traditional Thai hermit's exercise or Ruesi Dudton, the person is guided to focus on movement, breath and concentration. In Ruesi Dudton, there is a way to set the breath exercise similar to yoga. Ruesi Dudton exercise has been practised for potential health benefits including alleviating various illnesses, especially lower back pain and muscle pain.¹ The stretching routines performed during Ruesi Dudton practice have also been shown to improve conditions such as reducing frustration, irritability, drowsiness, depression, and stress, increase breathing efficiency, and improve flexibility. The training of Ruesi Dudton exercise can enhance health and overall fitness, regulate all the body functions in a balanced manner. Its efficacy was supported by the study conducted by Laochar (2010)³ examining the effects of the hermit self-stretching exercise on flexibility in working women. It was found that the hermit self-stretching exercise could increase flexibility of the body trunk.

Flexibility is an important element of physical fitness described as the range of motion or movement, around a particular joint or set of joints.⁴ Flexibility is one of the goals of Ruesi Dudton. The muscles and their fascia should be the major focus of flexibility training. However, bone, joint, ligament, tendon and skin also contribute to overall flexibility.⁵ Muscles must have a full and healthy range of motion for joints and skeletal structure to function properly. The purpose of flexibility training is to correct muscle imbalances, increase the joint's range of motion, decrease muscle soreness, relieve joint stress and decrease unnecessary friction in joint structures which can lead to premature damage or wear.

For reasons mentioned above, the researchers applied the traditional Thai hermit's exercise or Ruesi Dudton to increase the flexibility and range of motion among university students whose flexibility and range of movement were supposed to be lower than acceptable values. The purpose

of this study was to determine the effects of eight-week training of Ruesi Dudton on flexibility and range of motion in female university students.

Methods

In this quasi-experimental study, we expected to study the effect of Ruesi Dudton stretching exercise on female undergraduate students with low flexibility. Our study population was female undergraduate university students in the Health Science program, Faculty of Science, Udon Thani Rajabhat University in the academic year of 2016. Purposive sampling was used to recruit the participants using a criteria set of 1) age between 19 and 21 years old, 2) having a low flexibility (i.e. less than 9 centimeters based on sit-and-reach test⁵⁻⁷), and 3) being able to understand the Ruesi Dudton instructions. For the exclusion criteria, individuals with recent fracture, neuromuscular problems, infections of the musculoskeletal system, or severe spinal injuries were not recruited in the study. Of 37 students, only 13 were found to have a low flexibility^{6,7} Of those with low flexibility as our study population, only 12 participants were needed as indicated by Krejcie and Morgan's sample size estimation from a small population size with an unknown proportion of population characteristic, a sampling error of 5% and a confidence level of 95%.⁸ As a result, all 13 students were recruited to participate in our study.

Procedures and measurements

The traditional Thai hermit's exercise or Ruesi Dudton was undertaken to enhance strength and flexibility for the female university students. All participants took a 60-minute Ruesi Dudton exercise session, three days a week (Monday, Wednesday, and Friday) for eight weeks. In addition to the standard 15 Ruesi Dudton exercises as described previously, we added three more exercises including Dudton for relief of pain in chest (reclining posture), Dudton for distorted foot (sitting posture), and Dudton for relief of cramp in hand and foot (standing posture). As a consequence, each session composed of 18 postures of the Ruesi Dudton stretching exercise. Flexibility of the trunk was measured by the sit-and-reach test. Range of motion of left and right shoulder joints (both flexion and extension) and left and right hip joints (both flexion and extension) was measured by goniometer test. Measurements were performed at baseline

(pre-test) and the end of the eight-week Ruesi Dudton exercise sessions (post-test). Each measurement was taken twice and the higher value was chosen. For flexibility, in women aged 20 – 29 years old, a value of 20 centimeters (cm.) or higher is considered an excellent flexibility; while 17 – 19 cm., 10 – 16 cm., 7 – 9 cm. and 6 cm. or lower are considered good, fair, low, and very low level of flexibility, respectively.⁶ For range of motion, higher degree (°) indicates higher level of motion. Acceptable cut-off values for hip flexion and extension are 120 and 120 degree, respectively. For shoulder, 165° and 160° are acceptable cut-off values for flexion and extension, respectively.⁹

Data analysis

Descriptive statistics on the study outcomes specifically muscle flexibility and range of motion at baseline (pre-test) and end of study (post-test) were summarized using mean with standard deviation. To compare each of the outcome at pre- and post-test, paired t-test or Wilcoxon signed rank test was used as appropriate. Difference between pre- and post-test in each measure was presented as t score. Statistical significance was set at *P*-value < 0.05.

Results

Thirteen participants had a mean age of 20.07 ± 0.75 years old with a range of 19.0 – 21 years. With a mean flexibility of the trunk of 8.65 cm. at pre-test, their flexibility was considered poor (Table 1). At post-test, or 8-week Ruesi Dudton exercise program, their flexibility increased to 17.36 cm. which was considered a good flexibility level. Such improvement (+8.36 cm.) was found statistically significant (*P*-value = 0.001).

Range of motion was improved in all measures. At baseline, their average shoulder flexion values of 111.36° (left shoulder) and 100.00° (right shoulder) were lower than the acceptable cut-off point of 165°. After the exercise program, their flexion values of both left and right shoulders increased to 123.18° but were still lower than the acceptable cut-off value. Such improvements, +11.92° and +23.07° for left and right shoulders, respectively, were statistically significant (*P*-value < 0.001 for both shoulders).

For shoulder extension, at baseline their average shoulder extension values of 65.90° (left shoulder) and 52.27° (right shoulder) were lower than the acceptable cut-

off point of 160°. After the exercise program, their extension values of the left and right shoulders increased to 83.18° and 78.63°, respectively, but were still lower than the acceptable cut-off value. Such improvements, +17.30° and +26.15° for left and right shoulders, respectively, were statistically significant (*P*-value < 0.001 for both shoulders).

In terms of range of motion in the hip, at baseline, their average hip flexion values of 67.27° (left hip) and 66.36° (right hip) were lower than the acceptable cut-off point of 120°. After the exercise program, their flexion values of the left and right hips increased to 78.63° and 79.54°, respectively, but were still lower than the acceptable cut-off value. Such improvements, +6.92° and +13.07° for left and right hips, respectively, were statistically significant (*P*-value < 0.001 for both hips).

For hip extension, at baseline, their average hip extension values of 49.09° (left hip) and 41.36° (right hip) were lower than the acceptable cut-off point of 120°. After the exercise program, their extension values of the left and right hips increased to 62.72° and 66.81°, respectively, but were still lower than the acceptable cut-off value. Such improvements, +13.46° and +25.00° for left and right hips, respectively, were statistically significant (*P*-value < 0.001 for both hips).

Table 1 Comparisons of pre- and post-test flexibility (cm.) and the range of motion (degree) in women aged (N = 13).

Variable	Pre-test		Post-test		Mean difference		t	P-value*
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Flexibility (cm.)								
Trunk flexibility	8.65	5.70	17.36	4.41	+8.70	3.16	8.46	0.001
Range of motion (degree)								
Left shoulder flexion	111.36	6.36	123.18	5.13	+11.92	10.31	5.75	< 0.001
Right shoulder flexion	100.00	5.47	123.18	5.13	+23.07	16.65	6.10	< 0.001
Left shoulder extension	65.90	5.83	83.18	10.06	+17.30	8.57	6.14	< 0.001
Right shoulder extension	52.27	12.31	78.63	9.77	+26.15	16.65	6.01	< 0.001
Left hip flexion	67.27	7.53	78.63	4.52	+6.92	3.25	6.82	< 0.001
Right hip flexion	66.36	5.95	79.54	6.87	+13.07	5.96	6.79	< 0.001
Left hip extension	49.09	7.35	62.72	6.03	+13.46	4.27	10.00	< 0.001
Right hip extension	41.36	6.36	66.81	6.03	+25.00	7.64	10.69	< 0.001

* paired t-test with significance level of *P*-value < 0.05.

Discussions and Conclusion

In this present study, we aimed to test the effects of the traditional Thai hermit's exercise or Ruesi Dudton on the flexibility and range of motion among female university

students aged 19 to 21 years old. The findings revealed that Ruesi Dudton exercise had an impact on specific parameters indicating a statistically significant increased flexibility (P -value = 0.001) in the hamstring and lower back. We also found a statistically significant increase in a range of motion in hip and shoulder both in flexion and extension postures (P -value < 0.001 for all). Our findings were consistent with the study by Laochar³ testing the effects of a hermit self-stretching exercises on the flexibility of working people. The subjects participated in the 50-minute exercise session, three days a week for eight weeks. The researcher found that at the end of the exercise program, the flexibility increased significantly (P -value < 0.05). This was consistent with basic physiological effect that the hermit self-stretching exercise could increase the flexibility of the body trunk. Another study was performed by Surachit (2008)¹⁰ to test the effects of Ruesi Dudton exercise on flexibility and body balance of the elderly. A sample of 40 elderly individuals participated in the 50-minute Ruesi Dudton exercise session, three days a week for 12 weeks. At the end of the program, body balance and flexibility increased significantly (P -value < 0.05). It has been suggested that the training increases flexibility, most directly in the stretching and resistance movement.¹¹ Blood flow to the muscle and connective tissue could be increased by holding the poses for more than 30 seconds with the controlled breathing. These techniques have been recognised as some of the most important elements of training. Based on these techniques, the active muscles responsible for stabilizing the body is focused.¹²

Our study had some limitations. The sample size was relatively small. To gain a more reliable result, a larger sample is recommended. Since recruitment has been an obvious obstacle in most studies in this field, a longer recruitment period with more innovative ways to recruit participants should be employed in the future research. In addition, participants with a broader range of flexibility should be tested for the benefits of the Ruesi Dudton stretching exercise. In addition, only undergraduate female university students were tested, future research should employ a broader range of individuals, for example, working adults and the elderly. Our study tested the overall effect of all postures together, it was difficult to determine which postures were more efficacious. Therefore, the benefits of Ruesi Dudton stretching exercise on flexibility and range of motion benefits of each individual kinds of postures, i.e., sitting postures,

four standing postures, reclining postures and two supine postures, should be tested.

In conclusion, traditional Thai hermit's exercise, or Ruesi Dudton stretching exercise, offered a significant improvement regarding the flexibility and range of motion of the body among young female university students. Benefits of individual kinds of postures should be further studied.

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Editorial note

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