



Rusie Dutton traditional Thai exercise promotes health related physical fitness and quality of life in menopausal women

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A B S T R A C T

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Quality of life

Objective: To examine the effects of “Rusie Dutton” on health and quality of life in menopausal women.
Method: Menopausal women (aged 45–59) were recruited and randomly allocated to 2 groups. Rusie Dutton group ($n = 24$) practiced Rusie Dutton conducted by Wat Pho Thai Traditional Massage School for 13 weeks. The control group ($n = 26$) was assigned to a waiting list and received no intervention. BW, BMI, restingHR, BP, flexibility, VO_2max , and MENQOL including vasomotor, physical, psychosocial and sexual domains were measured at the beginning and the end. A paired-sample *t*-test and independent sample *t*-test were used for statistical analysis.

Results: Significant improvement was found in all variables within group ($p < .05$) in Rusie Dutton group, and a significant difference between groups was found ($p < .05$) in all variables except BW and BMI. Therefore, it is concluded that the traditional Thai exercise Rusie Dutton can promote health related physical fitness and QOL in menopausal women.

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1. Introduction

Menopause is a naturally occurring phase of women's lives as they transit from the reproductive to non-reproductive stage resulting from the loss of ovarian follicular activity and consequent decline in estrogen [1–3]. During menopause the majority of women experience menopause symptoms including hot flushes, night sweats [4–10], sleep disturbance, insomnia [4,8,9,11–14], mood swings, nervousness, anxiety, depression [7–9], fatigue and musculoskeletal pain [5,15,16]. In addition, many menopausal women suffer from vaginal dryness and urinary incontinence [9,15,17] that affect the social, psychological and sexual aspects of their lives and impact their quality of life (QOL) [9,17,18]. Moreover, the decreased level of estrogen experienced during menopause result in increased risk of disease such as cardiovascular disease (CVD) [19–22], hypertension [23–25], osteoporosis [26–28] and obesity [20,23–25,29,30]. Many recent reports have shown that the prevalence of obesity is high in menopausal women [31,32], and

obese menopausal women have a greater frequency or severity of hot flashes [33–35] and greater risk of CVD [29,36] than menopausal women of normal weight. In Thailand, there are 6.6 million women between the ages of 45 and 59, that is in menopause (10.6% of the Thai population) [37]. They are at risk of physical and mental health problems and encounter many health consequences due to inappropriate life styles and high stress levels that lead to a decline in QOL. Therefore, life style modification is needed.

A number of studies suggest that mind-body exercises such as Yoga, Tai Chi and Qigong have been associated with a reduction of menopause symptoms [38–40], stress [41,42], anxiety [43–49], depression [43,45,46,49], insomnia [45,47,49–51], back pain [46,47,49,52–57] and improvement in cardiorespiratory performance [47,49] due to their incorporation of slowly movements, controlled breathing and meditation. Rusie Dutton, a traditional exercise from Thailand is another mind-body exercise that incorporates slow and gentle movements to twist or extend the limbs and body part, controlled deep breathing and mindfulness meditation during the movements. As well, Rusie Dutton includes weight bearing and perineum strengthening activities, therefore it may be an effective exercise for menopausal women, promoting both physical and mental health.

Although, Rusie Dutton is well-known to Thai people and has existed for more than 200 years, there is some evidence that it can increase flexibility [58], improve cardiorespiratory function [59],

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decrease stress [59,60] and muscle pain [60], no study of its effectiveness to promote health in menopausal women has been conducted. As a result, this study was undertaken to examine the effects of Rusie Dutton in the promotion of health through physical fitness and quality of life in a group of menopausal women in Thailand.

2. Methods

2.1. Study design

The study used a quasi-experimental randomized control group design with pre and post tests over 13 weeks and took place in a Thai community between June and October 2013.

2.2. Participants

Sixty menopausal women (aged 45–59 years) in a Thai community were recruited and randomly allocated to an experimental group or a control group on a wait list. They were screened via the Physical Activity Readiness Questionnaire (PAR-Q) [61] and the Self Assessment for Menopause Symptom [62] that was developed from the Menopause Rating scale Questionnaire (MRS) that was validity tested and found reliable. The screening assessment reported 54 women met the inclusion criteria that included having mild to moderate menopause symptoms, a BMI of = 18.5–29.9 kg/m², no uncontrolled chronic diseases (diabetes, hypertension, heart disease), no spine or knee joint problems and not undergoing any form of hormone treatment. Prior to participating in the study, 27

participants from each group read and signed an informed consent form that had been approved by the Chulalongkorn University Research Ethics Committee, then both groups completed a baseline assessment to record body composition measured by body weight (BW) and body mass index (BMI), resting HR (rest.HR), blood pressure (BP), flexibility measured using a shoulder girdle flexibility test [63], sit and reach test [63], cardiorespiratory fitness measured with a 6 min walk test (6MWT) [64,65] and Quality of life assessment measured with the Menopause-Specific Quality of Life(MENQOL) questionnaire (Thai version) [66,67]. Exclusion from the study was based on the following criteria: attending the Rusie Dutton class less than the minimum 13 times (80% of 16) and being unwilling to attend the group sessions.

The experimental group was requested to regularly attend a 13 week Rusie Dutton practice of 16 yoga-like postures conducted by the Chetawan Temple (Wat Pho) Thai Traditional Massage School and approved by three sport science experts (IOC = .92), while the control group received no intervention but were offered the chance to take the Rusie Dutton practice for 13 weeks after the post test assessment was completed. Both groups received a Menopausal Health promotion handbook that consisted of a definition of menopause and dietary and exercise guidelines for menopausal women.

2.3. Procedures

Thirteen weekly Rusie Dutton practice sessions were supervised by the researcher, a certified Rusie Dutton trainer from the Wat Pho Thai Traditional Massage School in Bangkok. The practice procedure was the following:



Fig. 1. Generalized weakness or not alert

Week 1: One session of about 2 h duration consisted of Rusie Dutton exercise explanation and training in deep breathing techniques (inhalation for four count, retention of breath for three and exhalation for six); muscle stretching of the neck, shoulders, back and legs. The participants were encouraged to practice these techniques at home every day anytime they could.

Weeks 2–13: Ninety minute Rusie Dutton practice sessions performed 3 times in the second week, twice in class and once at home in the third week, once a week in class and at least 2 days/wk. at home by following positions on a poster or a DVD recommending Rusie Dutton for 20–30 min each day over ten weeks. In addition, a daily record of Rusie Dutton practice was kept by participants.

Each Rusie Dutton class took place from 7.30 to 9.00 a.m. in a community center, with the first 40 min spent on a question-and-answer period about home practice and health problems followed by deep breathing exercises. The next 50 min were spent doing muscle stretching (5 min), practice of the postures of Rusie Dutton (40 min) and deep breathing and stretching (5 min). The practice session started with easy postures followed by more difficult ones until all 16 postures were covered. Participants were encouraged to extend, stretch or twist the limbs and body part as much as they could but not to the point of pain. During the movements, participants were instructed to focus on mindfulness meditation and deep breathing by inhalation while moving, retention of breath while posing and exhalation while returning to the initial position which is different from Yoga, Tai chi or Qigong. Finally, data on all variables were collected at the end of the experiment.

For example: Rusie Dutton practice 3 postures from 16 postures (each repeated 3 times) *Figs. 1–3*. (Wat Pho Thai Traditional Massage School).

Generalized weakness or not alert (Fig. 1)

Position: standing with legs spread

Activity: step 1 interlace fingers and turn palms out and extend arms in front at shoulder height (inhale for 4 count)-hold(for 3 count)-relax(exhale for 6 count)
: step 2 push both arms to the left(inhale for 4 count)-hold(for 3 count)-turn to the middle(exhale for 6 count) and change to the right side then repeat from step 1-2.

Functional muscles: increase extension of supraspinatus, hamstring, gastrocnemius and soleus muscle and improve strengthening of quadricep femoris muscle.

Shoulder & leg trouble (Fig. 2)

Position: place left foot in front of the right foot, left hand on the left thigh, right hand on the right waist.

Activity: slowly bend left leg forward, keeping right knee straight and open the heel, press left arm straight above left knee and press right hand on the waist (inhale for 4 count)- hold(for 3 count)-turn to the initial position(exhale for 6 count), repeat on same side then do the same on the opposite side.

Functional muscles: increase extension of hamstring, gastrocnemius and soleus, hip flexor group muscle and improve strength of quadriceps femoris muscle.



Fig. 2. Shoulder & leg trouble.

Chest & low back pain (Fig. 3)

Position: place left foot in front of the left foot, flex right elbow and rest at shoulder height, right hand on the right waist.

Activity: slowly bend left leg forward, keeping right knee straight and heel on the floor extend left shoulder backward while turning face in opposite direction and twist body to the right and press right hand on the waist (inhale for 4 count)- hold(for 3 count)-return to the initial position(exhale for 6 count), repeat on this side then do the same on the opposite side.

Functional muscles: increase extension of sternocleidomastoid, upper trapezius and pectoralis major.

2.4. Measurement

2.4.1. BW & BMI

Participants were weighed without shoes on a single digital scale which was calibrated according to normal specifications. The BMI was calculated by the standard formula: $BMI = BW (\text{kg})/\text{height} (\text{m}^2)$.

2.4.2. Resting HR and BP

Resting HR and BP were measured with a single digital sphygmomanometer properly calibrated with appropriate cuff size, with

the arm supported at heart level after the participant sat quietly for at least 10 min in a chair.

2.4.3. Flexibility of the upper arm

Flexibility of the upper arm and shoulder were measured with a shoulder girdle flexibility test.

2.4.4. Flexibility of the lower back

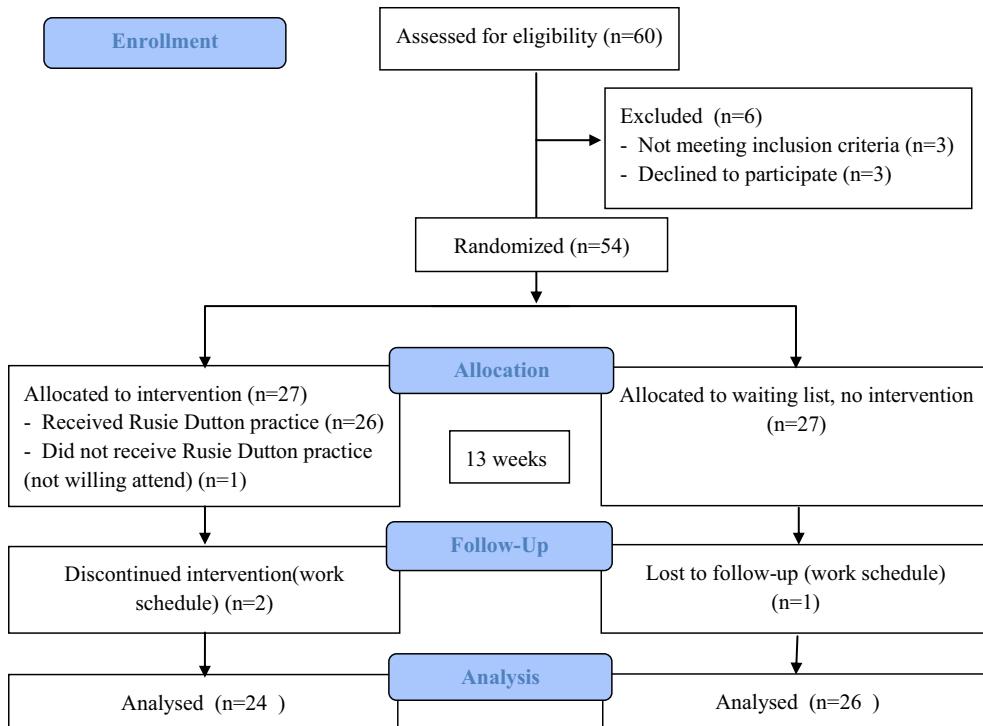
Flexibility of the lower back and hamstring muscles were measured by having participants do a sit and reach test twice from which the best result was selected.

2.4.5. The $VO_{2\max}$

The $VO_{2\max}$ was measured with a 6-min walk test (6MWT) by having participants walk on a flat floor while recording the distance in meters (m). $VO_{2\max}$ was calculated and recorded using the following formula: $VO_{2\max} (\text{mL}\cdot\text{kg}(-1)\cdot\text{min}(-1)) = 70.161 + (.023 \times 6\text{MWT} [\text{m}]) - (.276 \times \text{weight} [\text{kg}]) - (6.79 \times \text{sex, where } m = 0, f = 1) - (.193 \times \text{resting HR} [\text{beats per minute}]) - (.191 \times \text{age [y]})(64, 65)$. Before walking, the steps involved in testing and the technique to stretch the muscles of the leg before and after the test were explained to participants.



Fig. 3. Chest & low back pain.

**Fig. 4.** Menopausal women RCT profile.

2.4.6. Quality of Life

Quality of Life was measured with the MENQOL (Thai version), which is a validated tool consisting of 29-items of self-reported information that covered 4 different domains: vasomotor, physical, psychosocial and sexual. It indicated whether the participants had experienced any symptoms or had a fall over the past month. The participant was awarded a score of 1 for each item not experienced on the list. If they experienced the item, they then indicated to what degree the occurrence of the item affected them on a scale from 2 to 8, from “not bothered at all” to “extremely bothered”. Each domain score was the average of the item scores in that domain (higher scores indicated greater level of disturbance from the item or less favorable quality of life) [66,67].

3. Data analysis

Statistical analyses were carried out with the SPSS Version 16.0 program. Characteristics of both experimental and control group are given as mean \pm SD, frequency and percentages. The homogeneity of the values of the variables measured between the experimental and control group at baseline were tested using a two tailed

independent sample *t*-test. At post test the difference of means were compared using a one tailed paired *t*-test within groups and a one tailed independent sample *t*-test for between groups comparison. For all analyses, a *p*-value of $<.05$ was considered statistically significant.

4. Results

Fig. 4 shows the trial profile. Twenty four of 27 participants (88.9%) in the experimental group and 26 of 27(96.3%) in the control group met eligibility criteria and completed all assessments. The mean age of participants in the experimental group was 52.9 ± 4.3 years and that of the control group was 50.7 ± 3.6 years.

Table 2

Health assessment values of participants at baseline.

Outcome variable	Exp. group (<i>n</i> = 24)	Cont. group (<i>n</i> = 26)	<i>t</i>	<i>p</i>
BW (kg)	60.8 ± 9.6	57.9 ± 9.1	1.11	.273
BMI (kg/m^2)	24.8 ± 3.5	23.8 ± 3.0	1.15	.257
Rest.HR (bpm)	74.9 ± 8.1	75.7 ± 7.7	-.33	.745
SBP (mmHg)	123.2 ± 10.5	117.7 ± 15.3	1.45	.153
DBP (mmHg)	77.4 ± 7.3	72.2 ± 11.1	1.95	.057
Rt.shoulder flex. (cm)	-4.5 ± 8.5	-2.7 ± 7.9	-.78	.438
Lt.shoulder flex. (cm)	-11.1 ± 10.7	-7.7 ± 9.7	-1.18	.245
S&R (cm)	7.9 ± 8.1	3.8 ± 11.1	1.49	.142
$\text{VO}_{2\text{max}} \text{ mL kg}^{-1} \text{ min}^{-1}$	33.4 ± 2.8	33.8 ± 3.0	-.48	.636

Data are mean \pm SD.

Table 3

Menopause quality of life (MENQOL) of participants at baseline.

Outcome variable	Exp. group (<i>n</i> = 24)	Cont. group (<i>n</i> = 26)	<i>t</i>	<i>p</i>
MENQOL (vaso)	3.3 ± 1.9	3.0 ± 1.9	.47	.640
MENQOL (psycho)	2.4 ± 1.3	2.9 ± 1.3	-1.35	.182
MENQOL (physical)	2.8 ± 1.1	3.4 ± 1.3	-1.85	.071
MENQOL (sexual)	2.7 ± 2.2	2.8 ± 1.7	-.08	.933

Data are mean \pm SD.

Table 4

Health assessment values of participant at post test.

Variable/group	Baseline	12 weeks	<i>t</i> ^w		Difference (post-pre)	<i>t</i> ^b	<i>p</i> (One-tail)
BW (kg)							
Exp. gr	60.8 + 9.6	59.5 + 9.5	−4.45	.000	−1.3 + 1.5	.58	.282
Cont. gr.	57.9 + 9.1	57.9 + 8.9	.30	.385	.1 + 1.5		
BMI (kg/m ²)							
Exp. gr	24.8 + 3.5	24.3 + 3.4	−4.51	.000	−.55 + .6	.52	.304
Cont. gr.	23.8 + 3.0	23.8 + 2.9	.33	.371	.04 + .57		
Rest.HR (bpm)							
Exp. gr	75.0 + 8.1	70.1 + 7.0	−11.20	.000	−4.9 + 2.1	−2.59	.007
Cont. gr.	75.7 + 7.7	75.6 + 8.0	−.06	.475	−.1 + 6.1		
SBP (mmHg)							
Exp. gr	123.2 + 10.5	112.8 + 8.3	−4.97	.000	−10.4 + 10.2	−2.27	.015
Cont. gr.	117.7 + 15.3	120.9 + 15.8	.88	.193	3.2 + 18.4		
DBP (mmHg)							
Exp. gr	77.4 + 7.3	70.6 + 8.1	−9.61	.000	−6.8 + 3.5	−1.90	.032
Cont. gr.	72.2 + 11.1	75.2 + 9.0	1.44	.082	3.0 + 10.8		
Rt.shoulder flex. (cm)							
Exp. gr	−4.5 + 8.5	2.2 + 7.3	7.79	.000	6.8 + 4.2	2.74	.005
Cont. gr.	−2.7 + 7.9	−4.2 + 9.1	−1.63	.058	−1.5 + 4.6		
Lt.shoulder flex. (cm)							
Exp. gr	−11.1 + 10.7	−3.3 + 9.8	6.93	.000	7.8 + 5.5	2.14	.019
Cont. gr.	−7.7 + 9.7	−9.0 + 9.0	−1.04	.155	−1.3 + 6.3		
S&R (cm)							
Exp. gr	7.9 + 8.1	14.5 + 7.5	9.98	.000	6.6 + 3.3	5.12	.000
Cont. gr.	3.8 + 11.1	.4 + 11.7	−1.95	.031	−3.4 + 8.9		
VO ₂ max mL kg ^{−1} min ^{−1}							
Exp. gr	33.4 + 2.8	36.2 + 2.8	15.10	.000	2.8 + .9	3.93	.000
Cont. gr.	33.8 + 2.9	32.9 + 3.3	−3.28	.001	−.9 + 1.4		

Experimental group (*n* = 24), control group (*n* = 26).

Data are mean + SD.

t^w : Paired *t*-test within a group; *t*^b : independent *t*-test between groups.

Almost of the participants in each group had mild menopause symptoms (Table 1). The analysis shows no significant differences in any variables were detected between the two groups at the beginning of the study (Tables 2 and 3).

After 13 weeks, a significant decrease in BW, BMI, resting HR, SBP, DBP, and increase in right and left shoulder flexibility, sit&reach test and VO₂max were observed only in the experiment group, but no significant differences were noted in the control group. There was a significant difference between groups in terms of a decrease in resting HR, SBP and DBP, and an increase in right and left shoulder flexibility, sit&reach test and VO₂max in the experimental group compared to the control group but no significant differences in BW and BMI (Table 4).

Table 5 shows that at post test, a significant improvement in all MENQOL domains (vasomotor, physical, psychosocial and sexual) was observed in the experiment group but no significant difference

was observed in the control group. There was also a significant difference in all MENQOL domains between the two groups indicated by decreased values in the experiment group compared to the control group.

5. Discussion & conclusion

This is the first study to examine the effects of the traditional Thai exercise Rusie Dutton on the health and quality of life of menopausal women. The findings of this study indicate a significant improvement in health related physical fitness in the experimental group of participants as shown in a decreased body weight, body mass index, resting heart rate and blood pressure, increased muscle and joint flexibility, improved cardiorespiratory fitness, and improvement in QOL with fewer menopause symptoms consisting of vasomotor, physical, psychosocial and sexual symptoms after the

Table 5

Menopause quality of life (MENQOL) of participants at post test.

Variable/group	Baseline	12 weeks	<i>t</i> ^w	<i>p</i> (One-tail)	Difference (post-pre)	<i>t</i> ^b	<i>p</i> (One-tail)
MENQOL (vaso)							
Exp. gr	3.3 + 1.9	2.2 + 1.3	−2.87	.005	−1.0 + 1.8	−1.79	.040
Cont. gr.	3.0 + 1.9	3.0 + 1.6	−.14	.445	−.04 + 1.4		
MENQOL (psycho)							
Exp. gr	2.4 + 1.3	1.8 + .8	−2.49	.010	−.6 + 1.2	−3.45	.000
Cont. gr.	2.9 + 1.3	2.8 + 1.1	−.69	.248	−.1 + 1.0		
MENQOL (physio)							
Exp. gr	2.8 + 1.1	2.1 + .8	−3.26	.002	−.7 + 1.1	−4.51	.000
Cont. gr.	3.4 + 1.3	3.5 + 1.3	.46	.324	.1 + .7		
MENQOL (sex)							
Exp. gr	2.7 + 2.2	1.6 + 1.0	−2.96	.004	−1.1 + 1.8	−2.88	.003
Cont. gr.	2.8 + 1.7	2.7 + 1.6	−.23	.409	−.1 + 1.4		

Experiment group (*n* = 24), control group (*n* = 26).

Data are mean + SD.

t^w : Paired *t*-test within a group; *t*^b : independent *t*-test between groups.

period of Rusie Dutton training. These finding are consistent with a previous study which found that Rusie Dutton training increased flexibility [58], improved cardiovascular function [59] and reduced stress in subjects who practiced it [59]. In addition, Rusie Dutton has similar benefits to other mind-body exercises as it incorporates slowly paced-gentle movements, controlled breathing and meditation as found in practitioners of Yoga which increased flexibility [46,52], improved cardiorespiratory function [49], decreased vasomotor symptom [38–40,68] and physical symptom such as muscle pain [46,49,52–55,57], improved psychological problems such as anxiety and depression [43–46] and insomnia [45,50,51]. Similarly, Tai Chi and Qigong exercises had the effect of reducing psychological problems such as sleep and anxiety [47], stress [41], and improved cardiovascular function by reducing BP [47,69,70] and heart rate [41,47] in practitioners. In addition, Rusie Dutton practice exercises are not limited in area and place as they are done in standing position. They are also not limited to a particular population because all practitioners can find postures appropriated for themselves, it can be done in sitting position and takes less than 10 min to practice so can be done at work to release muscle stress and fight fatigue.

In light of the aforementioned results, the researcher would like to recommend that Rusie Dutton should be promoted as an alternative exercise for menopausal women. Moreover, the practice should be further studied with other groups of patients to discover if it might provide the same health benefits as Yoga, Tai Chi, or Qigong exercises. Such research may thereby increase the popularity and recognition of Rusie Dutton which is taught at the Chetawan Temple(Wat Pho) Thai Traditional Massage School in Bangkok (visit to http://www.watpho.com/contorted_hermit_exercise.php) and Thai Ministry of Public Health in another style of Rusie Dutton exercise (visit to www.youtube.com/watch?v=fa4-WG8ouT0).

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Conflict of interest

None.

Appendix A. Rusie Dutton (Wat Pho) 16 postures (each repeated 3)

1. Headache : increase extension of sternocleidomastoid, upper trapezius, latissimus dorsi, external and internal abdominal oblique muscle.
2. Generalized weakness or not alert : increase extension of posterior deltoid, latissimus dorsi, external and internal abdominal oblique, biceps brachii and flexor group of forearm muscle.
3. Shoulder & neck discomfort : increase extension of supraspinatus, hamstring, gastrocnemius and soleus muscle and improve strengthening of quadricep femoris muscle.
4. Shoulder & leg trouble : increase extension of hamstring, gastrocnemius and soleus, hip flexor group muscle and improve strengthening of quadricep femoris muscle.
5. Knee & leg trouble : increase extension of sternocleidomastoid, hamstring, gastrocnemius, soleus, hip flexor group and quadricep femoris muscle.
6. Chest & low back pain : increase extension of sternocleidomastoid, upper trapezius and pectoralis major.

7. Chronic muscular discomfort : increase extension of hamstring, gastrocnemius and soleus, hip flexor group, quadricep femoris and pectoralis major.
8. Wata for spasm knee, leg and chest : increase extension of hip flexor group and quadricep femoris, tibialis anterior, improve strengthening of quadricep femoris.
9. Chest pain : increase extension of hip flexor group, quadricep femoris and anterius, improve standing balance and improve strengthening of quadriceps femoris.
10. Knee discomfort : improve standing balance, coordination of muscle and strengthening of gluteus medius and quadriceps femoris.
11. Heel discomfort : increase extension of quadriceps femoris, tibialis anterior, biceps brachii, flexor group of forearm, improve standing balance and improve strengthening of gluteus medius and quadricep femoris.
12. Low back & leg discomfort : increase extension of hamstring, gastrocnemius and soleus standing balance, strengthening of quadricep femoris.
13. Foot numbness : increase extension of hamstring, gastrocnemius and soleus improve standing balance and improve strengthening of quadricep femoris.
14. For longevity : increase extension of adductor group, improve strengthening of quadricep femoris and gluteus maximus and perineum exercise.
15. chest trouble : increase extension of biceps brachii, flexor group of forearm, latissimus dorsi and improve chest movement.
16. Wrist trouble : increase extension of flexor group of forearm and improve strengthening pectoralis major.

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