

CHANGES IN ISOMETRIC AND ISOKINETIC STRENGTH, POSTURAL BALANCE AND ENDURANCE AFTER THAI-BO TRAINING PROGRAM

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The objective of the present study was to examine the influence of a long term Thai-Bo training program on muscular strength of the knee muscles, postural balance, and cardiovascular parameters. Thirty-five volunteers participated in two groups. Pre- and post-test with measuring of isometric and isokinetic strength of knee extension/flexion as well as postural balance on a force plate were performed before and after a weekly six-months training period. Furthermore cardiovascular parameters were measured during a stepwise increasing cycle ergometry. The results showed a significant increase of isometric strength and isokinetic strength at 60°/s in addition to an improvement in postural balance. Also a significant improvement of cardiovascular parameters in retest could be demonstrated.

KEY WORDS: Thai Bo; TaeBo ®; Thairobic; BodyCombat; postural balance; isokinetics; strength; endurance.

INTRODUCTION: Thai-Bo, a martial arts-based class, combining moves and stances developed from a range of self-defence disciplines (karate, kickboxing, t'ai chi and tae kwondo), combined with elements from classical aerobics is actually one of the most popular fitness programs and commonly popular with various appellations. No evidence about the efficacies of a long term Thai-Bo workout is given in the literature.

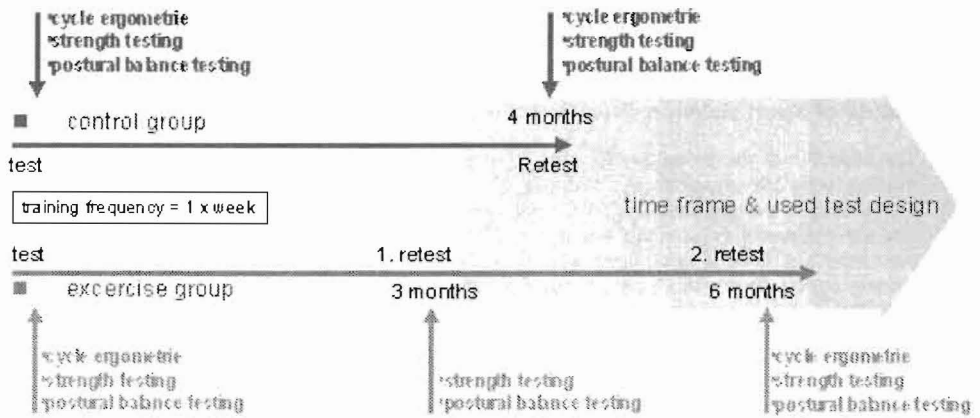
METHODS: Thirty-five volunteers (informed consent) participated in two groups: Thai-Bo exercise group (n=21; mean age 22.9±1.7 years), control group (n=13; mean age 25.1±3.7 years) [table 1].

Isometric strength with 5 maximum repetitions over 10 seconds in extension/flexion as well as isokinetic strength with 5 maximum repetitions at 60°/s (Cybex NORM) of knee were tested in both directions (ext/flex) after a standardised "warm up". Postural balance on a force plate (ProvecPlus) was measured with 5 trials (3 of 5 blindfolded) over 20 seconds each side. Pre- and post-test with measuring of heart rate (HR), blood lactate (LA), blood pressure (RR), and rate of perceived exertion (RPE) were performed during a stepwise increasing cycle ergometry starting with 50 Watts increasing 50 Watts every 3 minutes. All tests were performed before and after a weekly six-months training period whereas the control was tested twice in a 4 month period. [table 2].

Table 1 Anthropometrical data of the volunteers.

	gender	n =	age [years]	weight [kg]
exercise group	female	16	22,8 ± 1,9	60,5 ± 8,9
	male	5	23,5 ± 1,1	76,0 ± 3,8
	Total	21	22,9 ± 1,7	64,2 ± 10,4
control group	female	11	24,4 ± 1,4	63,0 ± 76,1
	male	2	28,5 ± 10,6	63,5 ± 10,6
	total	13	25,1 ± 3,7	63,1 ± 6,3

Table 2 Time frame and test design.



RESULTS: A significant increase in relative isometric strength ($E = 2.58 \pm 0.30$ vs. 3.33 ± 0.55 Nm/kg; $F = 1.39 \pm 0.26$ vs. 1.60 ± 0.38 Nm/kg bodyweight) and relative isokinetic strength at $60^\circ/s$ ($E = 2.17 \pm 0.29$ vs. 2.41 ± 0.37 Nm/kg; $F = 1.45 \pm 0.21$ vs. 1.65 ± 0.34 Nm/kg bodyweight) [figure 1], could be demonstrated in addition to an improvement in postural balance, whereas the total body sway of the training group decreased not significantly ($1.93m$ test vs. $1.76m$ retest) [figure 2].

The Thai Bo exercise group showed positive alterations in most measured parameters whereas the control group keeps unchanged, however, regarding the postural control this group diminished from test to retest.

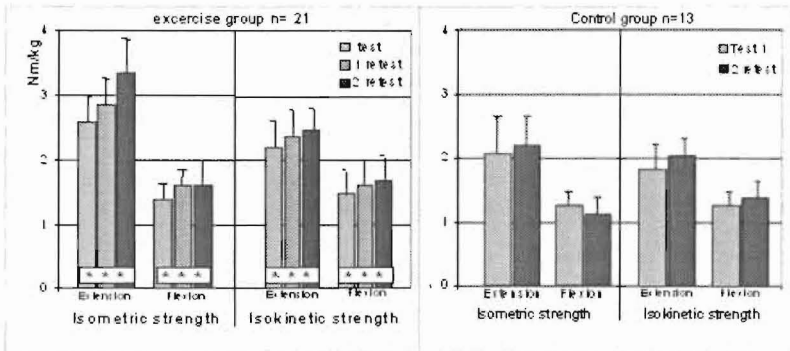


Figure 1: Mean relative isometric and isokinetic strength in test and retest for the exercise group.

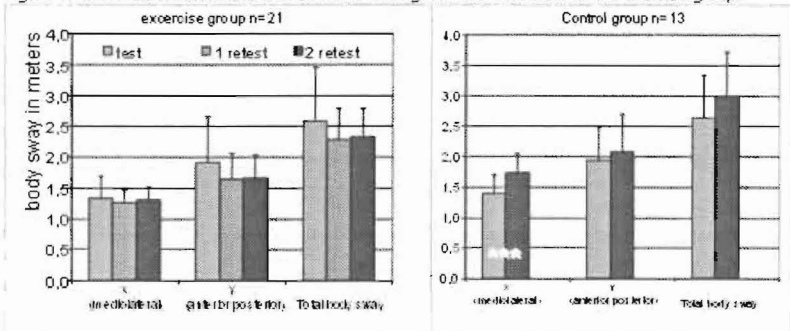


Figure 1: Mean relative isometric and isokinetic strength in test and retest for the exercise group.

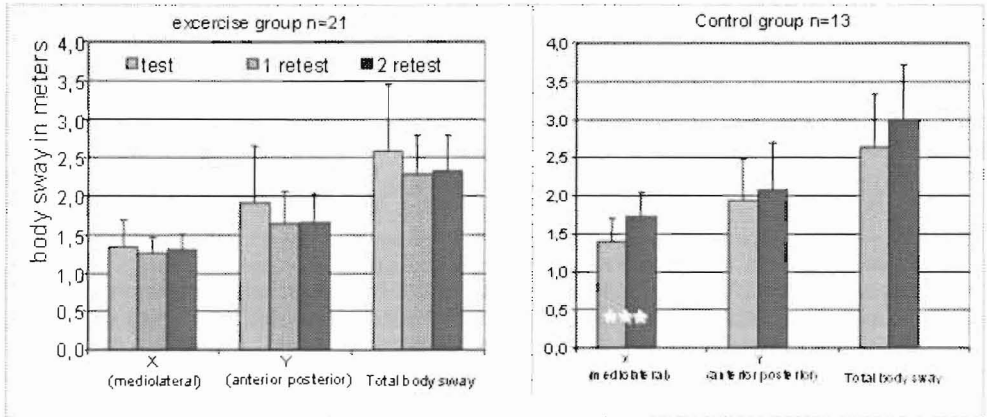


Figure 2: Postural balance measured by body sway in test and retest for the exercise group and the control group.

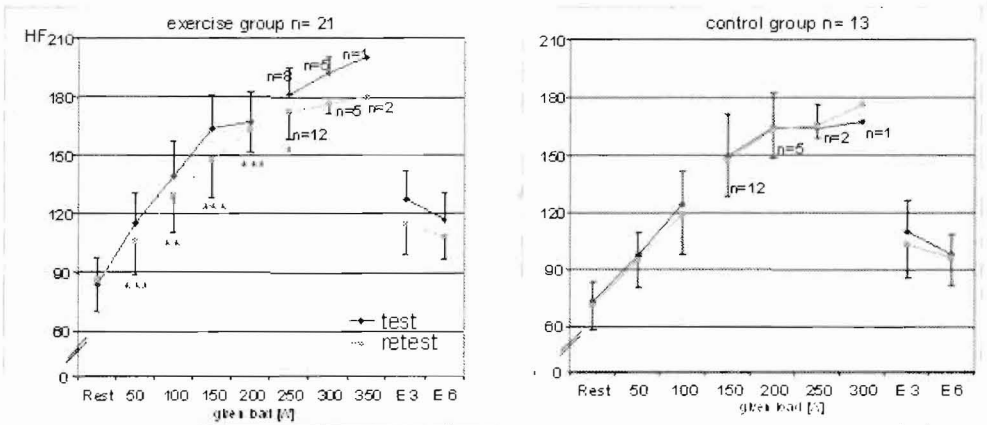


Figure 3: Heart rate at a given load in test and retest for the exercise group and the control group.

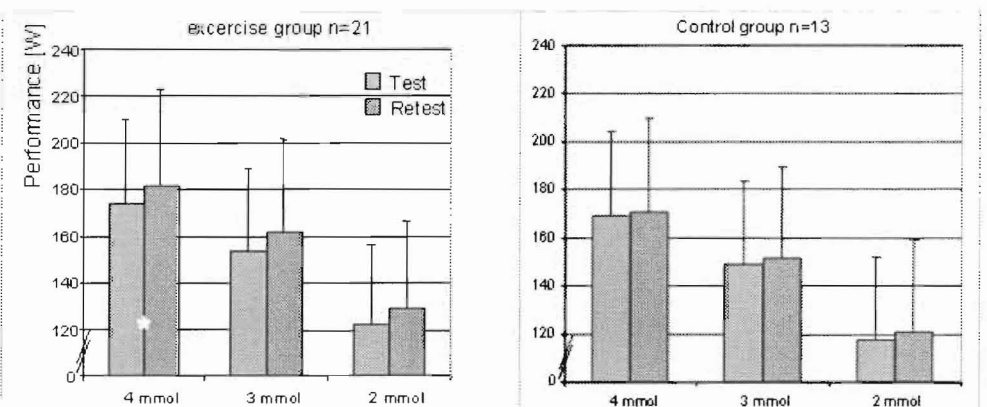


Figure 4: Performance at different lactate thresholds in test and retest for the exercise group and control group.

Also the results showed a significant improvement of most cardiovascular parameters in retest (decreasing HR at a given ergometric load ($p < 0.01$) [figure 3]; increasing HR at LA thresholds ($p = 0.01$); increasing performance at LA thresholds ($p < 0.05$) [figure 4]; decreasing systolic RR, reduced RPE).

DISCUSSION AND CONCLUSION: Static and dynamic strength, postural balance as well as cardiovascular fitness can be positively influenced by a long term Thai-Bo training program. Therefore possible preventive effects can be assumed regarding the cardiovascular system. Enhanced strength and balance capabilities pointed to an improvement in sensory motor control to cope with the activities of daily living.

Even there is a lack of information regarding influence of ThaiBo (or the like) exercises on sport specific capabilities, the comparison to step-aerobics or aerobics is slightly misleading, because the mean load has to be classified higher.

On account of differences in individual strain during training sessions some effective control mechanisms are recommended to adjust the individual load. For novices or untrained people heartrate monitoring is recommended even special instructions regarding intensity of movement on behalf of the instructor is essential impeding individual overload. Further investigation is necessary.

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