

The Influence of a 1.5 Kg Resistance Band Training Method on the Crescent Kick Speed of Female Adolescent Pencak Silat Athletes at SMAN 1 Maospati

Ahmad Dayan Noer Pradana^{1*}, Ardyansyah Arief Budi Utomo², Pratama Dharmika Nugraha³

Sports Science Study Program, Faculty of Health and Sciences, Universitas PGRI Madiun, Madiun, Indonesia

¹ahmaddayan54@gmail.com; ²ardyansyah@unipma.ac.id; ³pratama@unipma.ac.id

* Corresponding author: Ahmad Dayan Noer Pradana

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ABSTRACT

This study compared changes in crescent-kick test performance after resistance-band training and routine training among female adolescent pencak silat athletes at SMAN 1 Maospati. A quasi-experimental pretest–posttest design included 30 athletes aged 15–18 years, with 15 in each group. The reported intervention comprised eight weeks of training, three sessions weekly, using a band described as providing 1.5 kg resistance. The outcome was kicks completed in a 10-second punching-bag test. Reanalysis of the supplied right-leg records yielded experimental-group means of 21.600 and 23.267 kicks at pretest and posttest, compared with 20.000 and 20.533 in the control group. Mean gains were 1.667 and 0.533 kicks. The between-group gain difference was 1.133 kicks (approximate 95% confidence interval 0.273–1.994), Welch $t(27.883) = 2.698$, $p = 0.012$, Cohen's $d_s = 0.985$. Gain distributions departed from normality; a tie-corrected Mann–Whitney sensitivity test also indicated a difference ($U = 177.0$, $p = 0.006$). The right-leg findings favor the experimental group but remain limited by undocumented allocation, incomplete training-dose reporting, and unverified elastic-load calibration. Left-leg claims could not be evaluated because paired records were unavailable. The outcome represents repeated-kick performance, not directly measured movement velocity, power, or neuromuscular adaptation.

I. Introduction

Repeated crescent-kick performance is a practical training outcome in pencak silat. Research has examined combined physical and technical practice [1] and a structured kicking-drill program for female athletes [2]. These studies provide relevant precedents, but their training tasks and designs do not isolate the benefit of the resistance-band program used here. Counting kicks within a fixed interval also differs from measuring the velocity or force of an individual kick.

Elastic resistance may be convenient for school training, but its load depends on elongation and measurement conditions. Mechanical research on resistance bands demonstrates the need to relate force to stretch rather than treating a band label as a constant load [3]. A description of 1.5 kg resistance is therefore insufficient without the band model, resting length, reference elongation, attachment configuration, and calibration procedure.

The study addresses a context-specific question: whether female school athletes receiving the reported band program show greater improvement in a 10-second crescent-kick test than athletes receiving routine training. It does not establish the first use of elastic resistance in pencak silat. Its intended contribution is a concurrent comparison in this cohort, with an explicitly identified nominal load; the physical meaning of that load still requires verification.

The objective was to estimate the between-group difference in pretest–posttest improvement. The two-sided hypothesis tested whether mean change differed between groups. Right-leg performance is the verifiable outcome in the supplied records. The original study also described left-leg assessment, but absent paired left-leg data prevent a reproducible bilateral analysis. The unchanged title's speed terminology is interpreted operationally as kicks completed in 10 seconds.

II. Related Work

Hidayat and Haryanto [1] examined combined physical and technical training in a small mixed-sex pencak silat cohort using a one-group design. Palgunadi et al. [2] studied a defined kicking-drill prescription among female athletes. Both illustrate the relevance of task practice, but neither justifies transferring its percentage improvement to the present band intervention. Comparisons must consider participants, training exposure, control conditions, and scoring procedures.

Mechanical evaluation of Theraband CLX [3] supplies a separate methodological lesson: elastic resistance must be described against elongation. Its band-specific findings do not calibrate the unidentified band used in this school study. TIDieR and CERT reporting frameworks [4], [5] support documentation of exercise delivery, dose, progression, supervision, and adherence. These requirements frame the unresolved protocol details rather than supply missing facts.

III. Method

A. Design and participants

The source described a quasi-experimental pretest–posttest control-group study conducted at SMAN 1 Maospati, Magetan, East Java, during April–June 2026. The planned intervention lasted eight weeks with three sessions per week, giving 24 planned sessions. Exact dates and actual completed sessions were not supplied. The experimental group received resistance-band training, while the control group continued routine training.

All 30 female adolescent athletes in the reported school cohort were included through total sampling and divided into groups of 15. Ages were reported as 15–18 years. Active participation and physical and mental health were stated eligibility conditions, but screening procedures, exclusions, recruitment flow, and withdrawals were not detailed. The allocation method was not documented; randomization or matching cannot be assumed. Baseline differences and unmeasured group characteristics may confound the comparison. No reproducible prospective sample-size justification was supplied [6].

Ethics approval or exemption, school authorization, parental/guardian consent for minors, participant assent or consent appropriate to age, and confidentiality arrangements were not documented in the supplied manuscript. These details require confirmation from the actual research records. Anonymous group-specific identifiers are used below to avoid relying on duplicate initials in the source tables.

B. Intervention and control condition

The experimental program comprised standing hip abduction, crescent kicks, and standing hip flexion using elastic resistance. The reported schedule was three sessions weekly for eight weeks. The source did not define the exercise order, sets, repetitions, work duration, recovery, progression, movement cadence, supervision, adherence, or stopping criteria. Table 1 identifies the intervention information available for replication without inventing a prescription.

Table 1. Reported intervention components

Component	Source description
Exercises	Hip abduction, crescent kick, hip flexion with a band

Component	Source description
Schedule	8 weeks; 3 sessions/week; 24 planned sessions
Nominal resistance	1.5 kg; reference stretch not specified
Dose / progression	Sets, repetitions, recovery and progression not specified
Control	Routine training; content and exposure not specified

The source's 1.5 kg description is retained as a nominal resistance designation. If intended as 1.5 kilogram-force, it corresponds to approximately 14.7 N at a stated reference condition; this conversion does not establish the actual force applied during exercise. Elastic force changes with stretch [3]. Calibration at specified elongations, resting length, band model, anchor location, and replacement or wear checks are needed to substantiate a measured load.

Routine training content, frequency, duration, coaching, and additional band-free task practice in the control group were not described. It is unclear whether band work replaced routine sessions or added training time. Other physical activity and concurrent training were not monitored. Consequently, the contrast may combine exercise modality with differences in practice volume or attention [4], [5].

C. Outcome measurement

The reported test counted crescent kicks completed against a punching bag in 10 seconds. The source cited Hidayat and Haryanto [1] as a related instrument reference, but did not document the exact protocol used here. Starting stance, bag height and distance, valid-kick criteria, right/left testing order, familiarization, warm-up, trials, rest intervals, timing device, scoring rule, and assessor identity were absent. Assessor blinding and consistency were not reported. Local validity, test–retest reliability, and inter-rater agreement were unavailable.

The outcome is reported as kicks per 10 seconds, with higher counts indicating better repeated-kick test performance. Counts do not directly measure angular velocity, linear foot velocity, impact force, explosive power, or competitive success. No performance categories or normative thresholds are assigned without a verified reference for this population.

D. Analysis and data reconciliation

During revision, analyses were recalculated from the 15 right-leg pairs in each supplied table. These records yield experimental means of 21.600 and 23.267, differing from the original narrative's 20.80 and 21.90. The source also reported left-leg means of 21.23 and 22.40 without paired data or a supporting output table. Those left-leg values are not treated as verified findings in this revision; the author must reconcile them against original records.

Gain was defined as posttest minus pretest count. Individual percentage gain was calculated as $100 \times \text{gain/pretest}$; the source's percentages used posttest denominators. Group percentage change was calculated from the pretest and posttest group means, rather than averaging individual

percentages. Means, sample SDs, and ranges were recalculated. The original manuscript named SPSS but did not provide a complete inferential output.

Shapiro–Wilk tests [7] assessed gain distributions. Levene’s test on gains used median centering. Welch’s independent t-test [8] estimated the between-group mean gain difference at two-tailed $\alpha = 0.05$, with an approximate 95% confidence interval. Cohen’s d_s used the pooled SD of gains [9]. Paired t-tests describe within-group changes but are secondary to the direct group comparison.

Because both gain distributions departed from normality, a tie-corrected, continuity-corrected asymptotic Mann–Whitney U test was added as a sensitivity analysis [10]. It compares gain distributions/ranks, not the same mean estimand as Welch’s test. Both analyses assume independent groups, which remains unverified if allocation involved matching. ANCOVA can adjust follow-up scores for baseline [11], but no adjusted claim is made because allocation and matching need clarification. Small-sample t-based intervals remain approximate, and statistical adjustment cannot remove undocumented allocation bias.

IV. Results and Discussion

A. Individual and descriptive findings

Tables 2 and 3 retain all supplied right-leg counts with group-specific identifiers. Experimental gains ranged from -1 to $+3$ kicks; 13 athletes improved, one was unchanged, and one declined. Control gains ranged from -1 to $+4$ kicks; five improved, nine were unchanged, and one declined. Thus, an assertion that every experimental athlete improved would be incorrect.

Table 2. Experimental right-leg counts

ID	Pre	Post	Gain	Gain %
E01	23	26	+3	13.04
E02	23	22	-1	-4.35
E03	24	24	+0	0.00
E04	17	19	+2	11.76
E05	21	23	+2	9.52
E06	15	17	+2	13.33
E07	23	24	+1	4.35
E08	20	23	+3	15.00
E09	24	25	+1	4.17
E10	23	25	+2	8.70
E11	26	27	+1	3.85
E12	20	23	+3	15.00

ID	Pre	Post	Gain	Gain %
E13	24	26	+2	8.33
E14	18	20	+2	11.11
E15	23	25	+2	8.70

Table 3. Control right-leg counts

ID	Pre	Post	Gain	Gain %
C01	20	20	+0	0.00
C02	19	19	+0	0.00
C03	23	23	+0	0.00
C04	16	20	+4	25.00
C05	21	21	+0	0.00
C06	25	24	-1	-4.00
C07	18	20	+2	11.11
C08	21	21	+0	0.00
C09	24	24	+0	0.00
C10	16	17	+1	6.25
C11	19	19	+0	0.00
C12	21	21	+0	0.00
C13	18	19	+1	5.56
C14	19	20	+1	5.26
C15	20	20	+0	0.00

Mean experimental performance increased from 21.600 (SD 3.043) to 23.267 kicks (SD 2.789), giving a gain of 1.667 (SD 1.113). Control means increased from 20.000 (SD 2.619) to 20.533 kicks

(SD 1.922), giving a gain of 0.533 (SD 1.187). Baseline mean counts differed by 1.600 kicks. Similar group size does not establish comparable baseline ability or training history.

The experimental and control changes in group means correspond to 7.72% and 2.67% of their respective pretest means. These replace the source's inconsistent right-leg 5.02% statement. Percentages are descriptive; the primary inferential contrast is the absolute gain difference. Figure 1 displays all gain values, including unchanged and declining records.

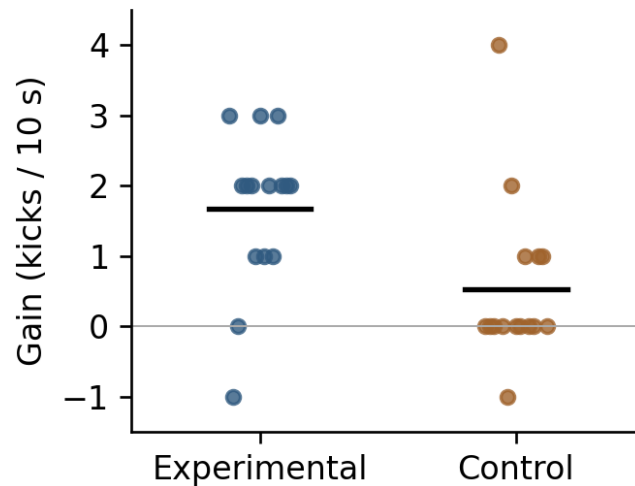


Fig. 1. Individual right-leg gains; horizontal bars indicate group means.

B. Inferential comparison

Gain-score Shapiro–Wilk results were $W = 0.866$, $p = 0.029$ for the experimental group and $W = 0.735$, $p < 0.001$ for controls. Both tests detected a departure from normality. Median-centered Levene testing yielded $F(1,28) = 0.033$, $p = 0.857$; this does not establish identical variances. Discrete scores, ties, and the control group's +4 gain motivate the rank-based sensitivity analysis.

Table 4. Right-leg inferential estimates

Contrast	Estimate / 95% CI	Test / p
Experimental paired gain	1.667 1.050–2.283	$t(14)=5.801$ $p<0.001$
Control paired gain	0.533 −0.124–1.191	$t(14)=1.740$ $p=0.104$
Between-group mean gain	1.133 0.273–1.994	Welch $t=2.698$ $df=27.883$ $p=0.012$

Contrast	Estimate / 95% CI	Test / p
Gain-rank sensitivity	U=177.0	p=0.006

Gain estimates and their intervals are in kicks per 10 seconds. Welch's test detected a greater mean gain in the experimental group, with Cohen's $d_s = 0.985$. The interval spans approximately 0.27 to 1.99 additional kicks relative to control. The Mann–Whitney result also favors higher experimental gain ranks. Agreement in direction supports the observed contrast, but neither analysis verifies random allocation or proves that elastic resistance alone caused it.

The paired experimental change was statistically significant, while the control paired change was not. That pattern alone would not demonstrate a group difference; the direct between-group analysis supplies that comparison. Paired d_z values were 1.498 and 0.449, respectively, and must not be substituted for the between-group d_s [9]. Their t-based interpretations share the gain-distribution limitations noted above.

C. Interpretation and limitations

The observed contrast is compatible with an association between the reported program and repeated-kick performance. Prior kicking-practice studies [1], [2] support considering both physical and technical preparation, but do not establish the mechanism in this dataset. Increased task practice, coaching attention, or training exposure are plausible alternatives when control dose is undocumented. Specific neuromuscular adaptation and increased explosive power were not measured and are not presented as findings.

The nominal 1.5 kg label does not establish a standardized mechanical stimulus. Elastic force depends on the band and its stretch [3]; without calibration, comparisons with other resistance protocols are uncertain. Test repetitions also cannot distinguish faster individual kicks from changes in recovery between kicks, technique, or valid-kick scoring. Measurement error cannot be quantified without repeated trials and reliability records.

The small single-school female cohort limits generalization. Undocumented allocation and a 1.600-kick baseline difference weaken causal interpretation. Unknown training exposure, assessor procedures, concurrent activity, and incomplete ethics reporting further limit assessment. A statistically detected contrast is not automatically a meaningful competitive benefit; no prespecified performance threshold was available.

Missing left-leg records prevent verification of bilateral effects or right–left symmetry. The contradiction between narrative means and individual right-leg counts must be resolved before submission. Current analyses are conditional on the supplied tables being the correct study data. If those records change, every result, figure, and conclusion must be recalculated rather than retaining the present estimates.

Future work should document allocation, define comparable training exposure, calibrate elastic force at stated elongations, standardize scoring, report adherence and safety, and provide both-leg paired records. A prospectively justified sample and prespecified analysis would improve precision [6]. Baseline-adjusted analysis may be useful after the original design and records are confirmed [11].

V. CONCLUSION

The supplied right-leg records show a larger mean gain after the reported resistance-band program than after routine training: 1.667 versus 0.533 kicks per 10 seconds. The between-group difference was 1.133 kicks (approximate 95% CI 0.273–1.994; Welch $p = 0.012$; Cohen's $d_s = 0.985$), with a concordant rank-based sensitivity result ($p = 0.006$). These findings concern repeated-kick performance in this cohort. Undocumented allocation, baseline imbalance, incomplete dose reporting, and unverified load calibration prevent a definitive causal or mechanistic conclusion. Left-leg effectiveness remains unverified without paired data.

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