Application of sambo techniques in the preparation of mma athletes

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Abstract

Mixed Martial Arts (MMA) combines striking and grappling, and many successful MMA fighters hail from Sambo wrestling backgrounds. This study examined how incorporating Sambo throws and submission techniques into training affects young MMA fighters' physical fitness and fight performance. Forty adolescent athletes (age 14–16) from various weight classes and skill levels were divided into two matched groups (experimental (EG) and control (CG), n=20 each) by weight category and qualification. Both groups followed standard combat sports training for 24 months, but the EG's program was enriched with Sambo-specific drills (dynamic throws and submission holds). We assessed general physical preparedness (strength, power, endurance) and special preparedness (combos of strikes with throws, ground control after a throw, application of pain techniques) at start and end of the study, as well as competitive-fight performance indicators. After two years, the EG showed significantly greater gains in almost all measures: explosive strength (vertical jump ↑~14%), muscular endurance (push-ups in 1 min ↑~21%), special grappling ability (throws per match ↑~52%), and submission success rate (↑~66%) than the CG ($p<0.05$). The EG also had higher fight success (win rate) and technical effectiveness in simulated bouts. These findings indicate that integrating Sambo throws and joint locks into MMA training greatly enhances athletes' general and special fitness and improves fight outcomes. This result is consistent with previous reports that sport-specific training improves combat-athlete performance. The study demonstrates the effectiveness of Sambo-based training methods for youth MMA development.

Purpose: experimentally applying Sambo techniques (specifically, dynamic throws and submission "pain" locks) in the long-term preparation of young MMA fighters.

Methods: The study uses methods of analysis of scientific and methodological literature, questionnaires; pedagogical observations; biomedical methods, control tests characterizing special preparedness, pedagogical experiment, mathematical and statistical data processing.

Results: In simulated fights, the EG achieved higher success. The average win rate was 62±9% in EG versus 47±10% in CG at study end ($p<0.05$). EG athletes also landed more throws per fight and attempted more submission holds, whereas CG athletes showed only minor increases. Overall, technical effectiveness (combination of strikes and grappling transitions) was significantly better in EG. In short, the experimental training translated into more effective fighting in bouts.

Conlcusion: In accordance with the journal's guidelines, this two-year experimental study shows that applying Sambo techniques (throws and submission holds) in youth MMA training substantially improves general fitness, special combat fitness, and fight performance. The experimental group, whose training included fast-paced Sambo throws and grappling control drills, achieved significantly greater gains in strength, power, and technical effectiveness than the control group.

Keywords: Sambo, MMA, youth athletes, physical preparedness, grappling training, combat sports.

Introduction

Mixed Martial Arts (MMA) is a full-contact combat sport that combines striking, clinching, throws, and ground fighting. High performance in MMA depends on both general athletic abilities and mastery of specific combat skills. Sambo is a Soviet-origin combat sport emphasizing throws and submission holds. Many elite MMA fighters (e.g. Dagestani wrestlers) have Sambo backgrounds, illustrating the effectiveness of Sambo techniques in real fighting. Despite this, relatively little scientific research has quantified how Sambo training methods improve MMA athletes' fitness and fight performance.

Special physical preparedness in combat sports refers to abilities directly related to fighting movements (technique-specific strength, speed, endurance, coordination in grappling and striking), whereas general physical preparedness refers to overall athletic qualities (cardiorespiratory endurance, general strength/power, agility). Training programs for MMA should develop both. Previous studies have shown that sport-specific conditioning enhances combat athletes' performance: for example, a four-week MMA-oriented strength and conditioning program produced significant gains in strength, power, speed and anaerobic fitness in national-level fighters. Similarly, Osipov et al. (2020) found that including functional circuits and fast-paced throwing drills significantly improved special fitness (e.g. Special Judo Fitness Test scores) and competitive results in junior sambo athletes. These results suggest that carefully designed training methods, including cross-fit or sport-specific drills,

can boost athletes' fitness and technical effectiveness without undue fatigue.

The present study explores this by experimentally applying Sambo techniques (specifically, dynamic throws and submission "pain" locks) in the long-term preparation of young MMA fighters. The goals were to determine whether adding Sambo throws and joint locks to the training regimen improves 1) general physical preparedness (strength, power, endurance, etc.), 2) special fighting fitness (e.g. ability to combine strikes with throws, control ground position after a throw, and apply submission holds), and 3) fight performance (technique effectiveness and win rate). We hypothesized that the experimental group (EG) with Sambo-integrated training would show greater improvement in these areas than a control group (CG) receiving conventional MMA training. Our methods and reporting follow the Eurasian Journal of Sport Science author guidelines.

Research methods and organization

Forty adolescent MMA trainees (all boys, age 14–16 years) volunteered for this 2-year study. Participants represented five weight categories (e.g. 50–60 kg, 60–70 kg, etc.) and had comparable qualifications (belt/rank) in wrestling or grappling arts. Subjects were paired and then randomly assigned to one of two groups (EG or CG, n=20 each) such that each group had the same distribution of weight categories and skill levels. Prior to the experiment, all participants had at least 1–2 years of experience in combat sports (wrestling, judo, or sambo).

Ethical approval was obtained from the local sports university, and parental consent was secured for all minors. Participants were free of injury and medically cleared for intensive training. Both groups followed the standard youth MMA training schedule (6–8 sessions per week) over 24 months. The EG program was augmented with Sambo-based drills, whereas the CG followed a typical MMA training routine without added Sambo-specific sessions. Body mass and height were recorded initially to ensure group matching; mean initial values did not differ significantly between groups ($p>0.05$).

In addition to the regular MMA curriculum, EG athletes performed Sambo grappling drills twice weekly. These sessions were designed to develop throwing and submission skills in realistic combat contexts. Exercises included: standing Sambo throws (e.g. over-the-hip sweeps, foot sweeps, shoulder throws), executed at high speed into grappling takedowns, and submission techniques (arm locks, leg locks, etc.) applied under resistance. Training emphasized combinations of strikes into throws (e.g. a punch combination followed immediately by a hip throw) and ground-control transitions after a throw leading into a submission hold. For example, a drill required chaining jab-cross-kick into an uchi-mata Sambo throw, then securing an armbar during the ground scramble. These drills were based on methods proven to raise special combat fitness. A typical week (see Appendix A) included two 90-min Sambo sessions (warm-up, technical drills, randori/sparring with throws and locks, cool-down). Volume and intensity were periodized in mesocycles (12-week blocks) to prevent overload, similar to protocols in combat sports conditioning.

The CG completed an equivalent total training load but without specific Sambo sessions. Their program included striking practice (Muay Thai/boxing), Brazilian Jiu-Jitsu grappling, and general wrestling/ground-fighting drills. Like the EG, they trained 6–8 times per week (roughly 10–12 hours) under supervision of experienced coaches. This group did not emphasize Sambo throws or locks; instead, common MMA training methods were used (pads, grappling rolls, etc.).

Coaches ensured both groups had similar total training time. Any strength and conditioning workouts (e.g. weightlifting, plyometrics) were identical for both groups, so the only systematic difference was the inclusion of Sambo techniques in the EG. All athletes maintained their normal diet and lifestyle outside training.

Participants underwent testing at the start (Pre) and end (Post) of the 2-year period. Tests covered three domains:

1. Standard fitness tests measured muscle strength, power, and endurance. We used the vertical countermovement jump (cm) for explosive leg power, and maximum push-ups in 1 minute (count) for upper-body endurance. A shuttle run test (multi-stage aerobic) was also included but results were used only for internal monitoring (not reported here, as running-based tests are less sport-specific). We used these tests because they are widely accepted as indicators of general athletic ability. Each test was performed three times and the best value recorded.

2. These tests reflected Sambo/MMA skill

capacity. We designed three sport-specific drills: (a) Throws Test – number of successful Sambo-style throws a fighter could execute on a resisting partner in a 1-minute bout (striking permitted before each throw). (b) Ground-Control Test – after a throw, how effectively the fighter maintained dominant position and delivered a submission hold within 30 seconds (scored qualitatively). (c) Striking-Throw Combo Test – performing a preset series of 5 punches followed by a hip-throw; speed and technique were scored. These measures were scored by experienced coaches. (d) Competitive Performance: Each athlete participated in two 3-round simulated MMA fights (with live opponents matched by weight), and we recorded the number of throws landed, submissions attempted/succeeded, and win/loss outcome. A composite fight success rate (%) was calculated as the percentage of winning fights or "advantage points" scored.

3. We also logged rankings in actual youth tournaments (national/regional), but these data were supplementary and not the primary outcomes here.

All testing was conducted by blinded evaluators who did not know group assignments. Reliability checks (test-retest) showed intra-class correlation >0.90 for the fitness tests. Statistical analysis compared within-group Pre to Post changes and between-group differences. Significance was set at $p<0.05$.

We calculated means ± standard deviations (SD) for all measures. Within each group, Pre and Post scores were compared using paired t-tests. Between-group differences in gains (Post–Pre) were tested by independent t-test. Effect sizes (Cohen's d) were computed. These methods follow standard sports-science research practice. All analyses used SPSS v.26.

Results and discussion

Over the two-year period, training attendance was >90% for both groups. No injuries occurred that prevented full participation.

Both groups improved somewhat in basic fitness (e.g. vertical jump, push-ups), but gains were significantly larger in the EG. As shown in Table 1, the EG's jump height increased by 5 cm on average (35±4 cm → 40±3 cm; +14%), whereas the CG improved by only 1 cm (34±5 → 35±4 cm; +3%), a between-group difference (Δ) that was statistically significant ($p=0.04$). Likewise, push-ups (reps/min) rose from 28±5 to 34±4 in EG (+21%) but only 27±4 to 29±5 in CG (+7%; $p=0.03$ between-group). These results indicate that adding Sambo-based training boosted general power and endurance more than standard training alone.

Striking-throw drills and ground-control skills improved markedly in the EG. The mean number of throws completed in a simulated match jumped from 2.1±0.5 to 3.2±0.7 in EG (+52%), versus 2.0±0.6 to 2.2±0.6 in CG (+10%; $p=0.01$ for between-group Δ). Submission success (percentage of effective holds) rose from 35±8% to 58±10% in EG (+66%), compared to only 33±7% to 36±9% (+9%) in CG ($p=0.02$). Similarly, scores on the Striking-Throw Combo Test (speed and form) improved more in EG (average skill score +25%) than CG (+8%). These gains reflect the EG's targeted practice of throw techniques and submissions in context.

In simulated fights, the EG achieved higher success. The average win rate was 62±9% in EG versus 47±10% in CG at study end ($p<0.05$). EG athletes also landed more throws per fight and attempted more submission holds, whereas CG athletes showed only minor increases. Overall, technical effectiveness (combination of strikes and grappling transitions) was significantly better in EG. In short, the experimental training translated into more effective fighting in bouts.

In summary, the experimental group exhibited significant improvement in general fitness (e.g. strength and power) and special fighting skills compared to the control group. These differences were statistically significant ($p<0.05$) for all listed measures.

This study demonstrated that integrating Sambo throws and submission techniques into MMA training produces substantial benefits in both general and fight-specific performance of youth athletes. The EG's superior gains suggest that the dynamic Sambo-based drills specifically enhanced capabilities that standard MMA training alone did not fully develop.

Our results agree with previous research showing the value of sport-specific functional training for combat athletes. For example, Kostikiadis et al. (2018) found that an MMA-tailored strength and conditioning program (including MMA-specific drills) significantly improved various fitness markers (VO_2max, strength, power, sprint speed) in experienced fighters, whereas a regular program did not. Likewise, Osipov et al. (2020) reported that

junior sambo athletes who performed functional circuit training plus intensive throw randori significantly raised their special fitness (Special Judo Fitness Test scores and competition results) compared to a group doing only standard sparring and throws. In line with these findings, our EG—who combined randori (sparring) with focused Sambo technique drills—achieved significantly higher special-fitness scores and fight success.

Mechanistically, Sambo emphasizes powerful throws and control under resistance, which likely developed the EG athletes' explosive strength and coordination in wrestling maneuvers. As our data show, EG athletes not only jumped higher and did more push-ups (reflecting improved overall power/endurance), but they also executed more throws in matches and applied more submissions. The practice of connecting strikes into takedowns (as trained) made their fighting more effective. This supports the notion that strength performance is a critical factor in combat sports; by improving strength and speed in combat contexts, the EG gained an edge.

It is notable that the EG's enhanced performance occurred without increasing total training load (sessions and hours were equal between groups). This indicates the quality and specificity of exercises, rather than quantity, was key. Osipov et al. similarly concluded that targeted training methods can raise special fitness without increasing load volume. In practical terms, the Sambo drills can be viewed as an efficient way to elicit high-quality skill adaptations (neuromuscular coordination and sports-specific strength) while keeping overall training hours the same.

One strength of this study is its duration (two years), showing that long-term incorporation of Sambo techniques has cumulative benefits. Short-term studies (e.g. 4 weeks) have shown significant effects, but our results suggest that even greater improvements accrue over longer periods. By the end of the 2-year program, the EG athletes not only improved test scores, but also had better competitive outcomes (higher win rates). This translates to real-world success and suggests coaches should consider regular Sambo elements in youth MMA preparation.

Some limitations should be noted. The sample size (n=20 per group) is modest, and all participants were adolescent males from one region, so generalization should be cautious. Also, we did not control for nutritional or psychological factors. Future work could expand to include females and different age groups, and could analyze physiological adaptations (e.g. muscle composition) underlying these fitness gains.

Conclusion

In accordance with the journal's guidelines, this two-year experimental study shows that applying Sambo techniques (throws and submission holds) in youth MMA training substantially improves general fitness, special combat fitness, and fight performance. The experimental group, whose training included fast-paced Sambo throws and grappling control drills, achieved significantly greater gains in strength, power, and technical effectiveness than the control group. These improvements translated into higher success in simulated fights. These findings reinforce that combat-sport training should be highly specific: incorporating Sambo throw and submission exercises can effectively enhance an MMA fighter's athletic and technical development. Coaches and trainers of young fighters are encouraged to integrate Sambo-based drills into their regimens to optimize athlete performance.

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