

EFFECTIVENESS OF PLYOMETRIC AND TRADITIONAL TRAINING METHODS IN IMPROVING EXPLOSIVE POWER AMONG ELITE KURASH ATHLETES

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Abstract: This study investigates the comparative effectiveness of plyometric and traditional resistance training methods in improving explosive power among elite Kurash athletes. Twenty-four male athletes were randomly assigned to plyometric (n=12) and traditional training (n=12) groups. The intervention lasted 8 weeks, with pre- and post-tests including vertical jump height and standing long jump distance. Results showed significant improvements in both groups; however, the plyometric group demonstrated greater increases in explosive power indicators. These findings suggest that plyometric training may be more effective for enhancing Kurash performance and should be considered an essential component of conditioning programs.

Keywords: Kurash, plyometric training, traditional resistance training, explosive power, athletic performance.

Introduction. Kurash is a traditional Uzbek martial art involving dynamic throwing techniques that require high levels of explosive power, neuromuscular coordination, and rapid force production. Explosive power is a decisive factor for success in Kurash as athletes must throw opponents effectively while maintaining balance and control.

Traditional resistance training is widely used to enhance muscular strength and hypertrophy. Exercises like squats, lunges, and deadlifts improve maximal force production; however, the direct transfer of these strength gains to explosive sports movements is often limited due to a lack of velocity specificity.

Plyometric training, utilizing the stretch-shortening cycle (SSC) with rapid eccentric-concentric muscle actions, has gained recognition for improving neuromuscular efficiency, power output, and reactive strength. Exercises such as depth jumps, squat jumps, and bounding drills target the neuromuscular system's ability to produce force rapidly, which is critical for throws in Kurash.

While numerous studies in judo, wrestling, and taekwondo confirm the effectiveness of plyometric training in enhancing explosive performance, limited research has focused specifically on Kurash athletes. Therefore, the aim of this study was to compare the effectiveness of plyometric and traditional resistance training in improving explosive power, as measured by vertical jump height and standing long jump distance, among elite Kurash athletes.

Methods

2.1 Participants

Twenty-four male elite Kurash athletes (mean age 21.2 ± 2.1 years; height 173.4 ± 5.6 cm; weight 73.8 ± 7.2 kg; training experience 5-8 years) volunteered for this study. Inclusion criteria included:

- ✓ Minimum 5 years of competitive Kurash experience

- ✓ Free from musculoskeletal injuries in the previous 6 months
- ✓ Regular participation in technical-tactical Kurash training.

All participants provided informed consent, and the study followed the ethical standards of the Declaration of Helsinki. Participants were randomly assigned to:

- ✓ **Plyometric Training Group (PTG, n=12)**
- ✓ **Traditional Resistance Training Group (TRTG, n=12).**

2.2 Training Protocol

Both groups continued their standard Kurash technical-tactical sessions alongside the intervention.

Plyometric Training Group (PTG)

Exercises:

- ✓ Depth jumps (40-50 cm box)
- ✓ Squat jumps (body weight)
- ✓ Lateral hops
- ✓ Bounding drills (30 m).

Session structure:

- ✓ Warm-up: 10 minutes dynamic stretching
- ✓ Main set: 4 exercises × 4 sets × 10 reps, 2-3 min rest
- ✓ Cool-down: 10 minutes static stretching.

Progression included increasing drop heights and exercise complexity after week

Traditional Resistance Training Group (TRTG)

Exercises:

- ✓ Back squats (70–85% 1RM)
- ✓ Lunges with barbell
- ✓ Leg press
- ✓ Standing calf raises.

Session structure:

- ✓ Warm-up: 10 minutes dynamic stretching
- ✓ Main set: 4 exercises × 4 sets × 8-12 reps, 2 min rest
- ✓ Cool-down: 10 minutes static stretching.

Load increased progressively by 2.5-5 kg per week as tolerated.

2.3 Measurements

Assessments were conducted 48 hours pre- and post-intervention:

- ✓ **Vertical Jump Height (cm):** Measured using a jump mat system; best of three attempts recorded.

- ✓ **Standing Long Jump Distance (cm):** Best of three jumps recorded.

Testing was performed in the morning to control for diurnal variations, with athletes avoiding strenuous activity 48 hours prior.

2.4 Statistical Analysis

Data were analyzed using SPSS v.26. Normality was checked via Shapiro-Wilk tests. Paired t-tests assessed within-group differences, and independent t-tests assessed between-group differences. Effect sizes were calculated using Cohen's d, interpreted as small (0.2), medium (0.5), and large (0.8). Significance was set at $p < 0.05$.

Results. 3.1 Vertical Jump Height

Both groups showed significant improvements:

- **PTG:** 42.6 ± 3.2 cm (pre) → 48.9 ± 3.8 cm (post), $p < 0.001$, **Cohen's d = 1.79 (large effect).**
- **TRTG:** 43.1 ± 2.9 cm (pre) → 46.0 ± 3.5 cm (post), $p < 0.01$, **Cohen's d = 0.87 (large effect).**

Between-group comparison indicated significantly greater improvement in PTG ($p < 0.05$).

3.2 Standing Long Jump Distance

Both groups improved significantly:

- **PTG:** 220.5 ± 12.3 cm (pre) → 236.8 ± 13.1 cm (post), $p < 0.001$, **Cohen's d = 1.28 (large effect).**
- **TRTG:** 221.8 ± 11.5 cm (pre) → 229.4 ± 12.0 cm (post), $p < 0.01$, **Cohen's d = 0.66 (medium effect).**

PTG showed greater gains compared to TRTG ($p < 0.05$).

Discussion. This study demonstrates that both plyometric and traditional resistance training significantly improved explosive power among elite Kurash athletes. However, plyometric training produced superior enhancements in both vertical jump height and standing long jump performance.

The enhanced effectiveness of plyometric training is attributed to its capacity to improve neuromuscular coordination, muscle-tendon unit stiffness, and rate of force development, all of which are critical for executing explosive throwing techniques in Kurash. While traditional resistance training effectively increases maximal strength, it lacks the velocity-specific adaptations required for sport-specific explosive movements.

Practical Applications

Coaches should prioritize plyometric training during pre-competition phases to maximize performance in Kurash. Traditional resistance training remains essential for foundational strength and injury prevention but should be periodized alongside plyometric training to optimize adaptations.

Limitations

- Small sample size limits generalizability.
- Absence of biomechanical and electromyographic analyses to explain neuromuscular adaptations.
- Lack of follow-up testing to determine retention of performance gains.

Future Research. Further studies should investigate the combined effects of plyometric and resistance training, integrate biomechanical analyses of Kurash techniques post-training, and explore psychological variables such as confidence and competitive readiness.

Conclusion. Both plyometric and traditional resistance training methods effectively improved explosive power among elite Kurash athletes. However, plyometric training produced greater gains, emphasizing its importance in conditioning programs designed to enhance Kurash performance.

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