ORIGINAL RESEARCH PAPER

Volume - 14 | Issue - 10 | October - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A COMPARISON OF THERABAND VERSUS BODY WEIGHT EXERCISES ON UPPER BODY POWER AND SHOTPUT PERFORMANCE AMONG FEMALE RECREATIONAL SHOT PUT ATHLETES

Physiotherapy & Rehabilitation

Indla Sai Bhargavi MPT Sports, SVIMS College of Physiotherapy, Tirupati, A.P

Dr. A. Viswanath Reddy Associate Professor & Vice- Principal, SVIMS College of Physiotherapy, Tirupati, A.P

Dr. K. Madhavi Professor & Principal, SVIMS College of Physiotherapy, Tirupati, A.P

ABSTRACT

Background: Shot put performance relies on maximal upper body power. Resistance training, including theraband and bodyweight exercises, can enhance strength, power, and reduce injury risk. **Methodology:** 30 female recreational shot put athletes were assigned to theraband or bodyweight training groups for 8 weeks. Upper body power and shot put performance were assessed using the seated medicine ball throw (SMBT) and throwing distance test (TDT). **Results:** Both groups improved significantly, with the theraband group showing greater gains. **Conclusion:** Theraband exercises were more effective than bodyweight exercises in enhancing upper body power and shot put performance among female recreational shot put athletes.

KEYWORDS

Theraband exercises, bodyweight exercises, upper body power, shot put performance.

INTRODUCTION

Shot put is a track and field event in which athletes "put" a heavy spherical ball using a pushing motion rather than an overhead throw [1,2]. It has been part of Olympics since 1896 for men using a 7.26 kg and 1948 for women using a 4 kg shot [3]. The performance depends on generating maximal force in minimal time, requiring power, strength and speed [4,5,8]. Where power is essential that enhances the reaction time, coordination, and balance [9,10].

This training focuses on increasing force production and execution speed through methods such as plyometric exercises [11], ballistic movements like medicine ball throws [12], dynamic effort movements [13], and resistance movements with weights and bands [14]. Therabands are affordable, portable, and color-coded for varying resistance that improves muscle power and prevent injuries [15–20]. Bodyweight exercises that similarly enhance strength and stability without external equipment [21,22], while power-focused training develops fast-twitch fibers for explosive strength [23,24].

Shot put carries a high risk of upper extremity strains, particularly in the wrist, hand, and shoulder, due to its explosive, rotational demands [6,7]. Upper body power is commonly assessed via the seated medicine ball throw (SMBT) and throwing distance test (TDT), both are validated and low-risk measures [25–27]. Theraband and bodyweight exercises have been studied for strength, speed, and endurance but research on the specific effects on power and shot put performance-particularly among overhead sport are limited, therefore this study is aimed to evaluate the effect on upper body power and shot put performance among recreational female athletes.

MATERIALS AND METHODOLOGY

A comparative experimental study was conducted at SVIMS College of Physiotherapy, Tirupati, after ethical clearance (IEC No: 1822, 25 April 2025). Thirty female recreational shot put athletes (age 17–26 years, BMI 18.5–24.9 kg/m², ≥6 month's experience, training ≥3 times/week) were recruited, excluding those with recent shoulder injuries or surgery. Materials included a 4 kg medicine ball, measuring tape, chalk, and therabands. Written informed consent was obtained, and pre- and post-training assessments were conducted using the seated medicine ball throw (SMBT) and throwing distance test (TDT). Participants completed an 8-week theraband or bodyweight training program, 3 sessions per week, with post-training measurements recorded to evaluate improvements.

Study Protocol

Both groups trained 3 days per week for 8 weeks, with 45–55 minute sessions including warm-up, main exercises, and cool-down. The standardized warm-up (4–5 min walking/jogging and callisthenics) progressed from upper extremities to trunk and lower extremities.

Theraband Exercises

The 8-week theraband program progressed in intensity and duration. Weeks 1–2 (30 min, red bands) included 3 × 15 reps of standing shoulder press, chest fly, triceps French press, biceps curl, and rhomboid squeeze. Weeks 3–4 (green bands) focused on lateral raises, front raises, trunk twists, concentration curls, and scapular retractions. Week 5 (35 min) included straight arm pull down, chest press, triceps kickback, rear deltoid exercises, and deadlifts. Weeks 6–7 (40 min, blue bands) incorporated seated resistance band row, bent-over row, overhead press, scapular retraction, and triceps extension. Week 8 (40 min, green bands) emphasized final conditioning exercises.

BODY WEIGHT EXERCISES

The 8-week bodyweight program gradually increased intensity. Week 1 (40 min) included 2 × 5 reps of kneeling push-ups, bent-leg triceps dips, renegade rows, marching front plank, and punches. Week 2 increased to 3 × 5 reps (45 min). Weeks 3–4 added incline push-ups, straight-leg triceps dips, plank variations, and overhead punches (3 × 5 reps). Week 5 included plank forward reach, mountain climbers, bear crawls, and plank exercises. Weeks 6–7 progressed to 4 × 5 reps with pike press, side plank, lateral plank walk, and inchworm exercises. Week 8 (45 min) focused on final conditioning.

STATISTICAL ANALYSIS AND RESULTS

All 30 participants completed the 8-week protocol. Paired t-tests assessed pre–post changes within groups, and independent t-tests compared differences between groups. A significance level of $p < 0.001$ was applied.

Table 1: Between The Group's Analysis Of SMBT Among Subjects Of Theraband Exercises Group And Body Weight Exercises Group.

Groups		Outcome	Mean	t-value	p-value
TERABAND EXERCISES	SMBT	Pre	81.60	12.41	<0.0001
		Post	98.20		
		Mean	16.60		
BODY WEIGHT EXERCISES	SMBT	Pre	79.53	16.73	<0.0001
		post	86.20		
		Mean	6.667		

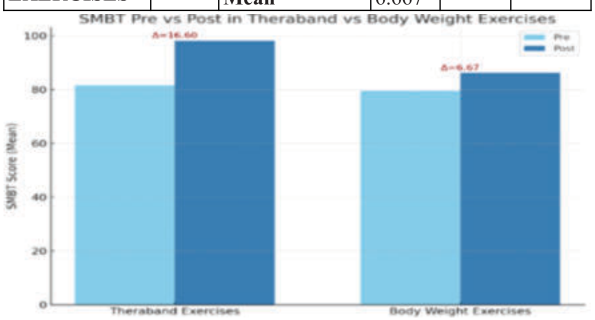

Figure 1: Graph Showing The Mean Values Of Pre & Post Test Data

Of Theraband Vs Body Weight Exercises Using SMBT.

Table 2: Between The Group's Analysis Of TDT Among Subjects Of Theraband Exercises Group And Body Weight Exercises Group.

Groups	Outcome		Mean	t-value	p-value
TERABAND EXERCISES	TDT	Pre	132.7	11.16	<0.0001
		Post	156.7		
		Mean difference	24.00		
BODY WEIGHT EXERCISES	TDT	Pre	127.0	20.07	<0.0001
		post	132.1		
		Mean difference	5.133		

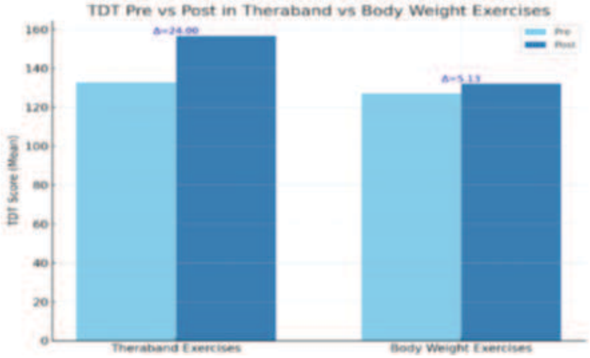

Figure 2: graph showing the mean values of pre & post test data of theraband vs body weight exercises using TDT.

INTERPRETATION:

Pre-intervention, no significant differences were observed between groups in SMBT and TDT (p = 0.05; p = 0.052). Post-intervention, both groups improved significantly (p = 0.0001), with greater gains in the Theraband group (SMBT = 16.60, TDT = 24.00) compared to the bodyweight group (SMBT = 6.67, TDT = 5.13).

DISCUSSION

This study compared the effects of Theraband and bodyweight exercises on upper body power and shot put performance in female recreational shot put athletes, assessed through SMBT and TDT. Most participants had a normal BMI (80%).

The theraband group showed significant gains in SMBT (81.60 → 98.20) and TDT (132.7 → 156.7). These results agree with prior findings that elastic resistance improves power, endurance, and throwing performance (Sforzo et al., 1996 [31]; Muehlbauer et al., 2013 [34]; Aloui et al., 2019 [44]; Mascarin et al., 2017 [30]). Elastic bands promote hypertrophy via greater fiber recruitment and protein synthesis [55], while enhancing neuromuscular efficiency, stability, and proprioception [56, 57]. They also improve muscular endurance and delay fatigue in key muscle groups when exercises mimic sport-specific motions [58, 59].

The bodyweight group also improved in SMBT (79.53 → 86.20) and TDT (127.0 → 132.1). Prior studies support these outcomes, showing enhanced power and throwing performance following bodyweight-based programs (Buckley et al., 2014 [41]; Turgut et al., 2019 [43]). High-intensity bodyweight exercises stimulate hypertrophy and strength [38], improve neuromuscular coordination [61], and strengthen the core—essential for efficient force transfer during shot put [62, 63].

Overall, Theraband training induced larger performance gains than bodyweight exercises, likely due to the added external resistance, sport-specific loading, and improved neuromuscular adaptations.

CONCLUSION

Theraband exercises proved more effective than bodyweight exercises in enhancing power and shot put performance, supporting the alternate hypothesis and rejecting the null.

LIMITATIONS

1. Small sample size.
2. Findings limited to female shot put athletes.
3. Restricted to a narrow geographical area.
4. Focused on a limited age range.
5. No long-term follow-up.

RECOMMENDATIONS

1. Future studies should include larger, more diverse samples.
2. Similar training interventions should be tested across athletes in other sports.

REFERENCES:

1. Robert Wood, "shot put (athletics) the sport. Sports matik website, i published april 202, accessed on 21 dec 2023.
2. **Meron A, Saint-Phard D.** Track and field. Throwing sports: injuries and prevention. *Current sports med rep. 2017; 16 (6):391–6.*
3. Wood R. Shot put at the olympic games. Topend sports website; 2016 april [cited 2025 jul 20].
4. Judge LW, Bellar D. Variables associated with the personal best performance in the glide and spin shot put for u.s. collegiate throwers. *Int j performs anal sport.* 2012; 12 (1):37–51.
5. Babbitt D. Methods to develop speed and power for the shot put [internet]. Published 2021 feb [cited 2025].
6. Mintz JJ, Jones CMC, Seplaki CL, Rizzone KH, Thevenet-Morrison K, et al. Track and field injuries resulting in emergency department visits from 2004 to 2015: an analysis of the national electronic injury surveillance system. *Phys sportsmed.* 2021; 1:74–80.
7. Meron A, Saint-Phard D. Track and field throwing sports: injuries and prevention. *Current sports med rep.* 2017; 6:391–6.
8. McCaughey R, et al. Athletics–coaching–shot put. *Special olympic sports* [internet]. 2014 aug 26 [cited 2015 aug 26].
9. British broadcasting corporation. Global sign rsa ov ssl ca 2018 [internet]. 2024 jun 26 [cited 2025 jul 19].
10. Trinh E. Power training: benefits and exercises [Internet]. [Cited 2023].
11. Chu D, Myers GD. *Plyometrics: dynamic strength and explosive power.* Champaign, il: human kinetics; 2013.
12. Effect of ballistic training and resistance training on development of power. *Int j phys education sports health.* 2024 jun 27.
13. Beardsley C. Why does the "dynamic effort" method (sometimes) work for powerlifting? [Internet]. 2017 Oct 20 [cited 2025].
14. Very well fit. Resistance training: why it is important for you? [Internet]. 2024 may 21 [cited 2025].
15. Theraband. About us [internet]. 2003 [cited 2025].
16. Read T. Explosive theraband exercises for speed, power, and strength [internet]. Medically reviewed by mechanism j. 2022 apr 18 [cited 2025].
17. The history of resistance bands [internet]. 2001 [cited 2025].
18. Behm DG, Sale DG. Velocity specificity of resistance training. *Sports med.* 1993; 15:374–88.
19. Israetel MA, McBride JM, Nuzzo JL, Skinner JW, Dayne AM. Kinetic and kinematic differences between squats performed with and without elastic bands. *J strength cond res.* 2010; 24:191–4.
20. Sundstrup E, Jakobsen MD, Andersen CH, et al. Evaluation of elastic bands for lower extremity resistance training in adults with and without musculoskeletal pain. *Scand j med sci sports.* 2014; 24:353–9.
21. Thomas N. Body weight training: benefits and exercises [Internet].
22. Lawler M. Body-weight exercises for arms, legs, core and more [Internet]. Medically reviewed by Franco R. 2023 Jul 10 [cited 2025].
23. Boyle M. *New functional training for sports.* 2nd ed. Champaign, Il: human kinetics; 2016.
24. Bosse C. Power training vs strength training – what is the difference between strength training and power training? [Internet]. [Cited 2020 Jun 2].
25. Wood R. Seated medicine ball throw [internet]. Topend sports website; 2005 mar [cited 2025 jan 14].
26. Harris C, Wattles AP, DeBeliso M, Sevene-Adams PG, Berning JM, Adams KJ. The seated medicine ballthrow as a test of upper body power in older adults. *J strength cond res.* 2011; 25(8):2344–8.
27. The effect of resistance training on throwing distance in recreational athletes. *J sports sci med.* 2019.
28. Thomas M, Mueller T, Busse MW. Quantification of tension in Thera-band and cando tubing at different strains and starting lengths. *J sports med phys fitness.* 2005; 45(2):188–98.
29. Sadeghi M, Mahdavi Nejad R. The effect of 8-week selected thera-band training on balance and motor performance in young wrestlers. *J sport biomech.* 2019; 5(1):28–37.
30. Mascarin NC, de Lira CAB, Vancini RL, de Castro Pochini A, da Silva AC, dos santos andrade m. Strength training using elastic bands: improvement of muscle power and throwing performance in young female handball players. *J sport rehabilitation.* 2017; 26(3):245–52.
31. Tyagi M, Pal S, Yadav J, Kalra S. Effectiveness of eight-week variable resistance training on ball release speed, jump height, speed of upper limb performance, and accuracy in young collegiate basketball players. *Med j dr dy patil vidyapeeth.* 2024; 17(4):722–9.
32. Bayrakdaroğlu S, Sever MO, Şenel E, Kılınçarslan G, Baydar A. Performance responses of child footballers to thera-band exercise. 2021.
33. Narang S, Patil D, Kumar K, Phansopkar P. Effects of ballistic six exercises and thera-band exercises on physical performance in badminton players: a randomized controlled trial. *Indian j forensic med toxicol.* 2021; 15(2):935–41.
34. Andersen CH, Andersen LL, Mortensen OS, Zebis MK. Muscle activation and strength in functional shoulder exercises: a comparative study of dumbbells and elastic resistance. *Phys therapy.* 2010; 90(4):538–49.
35. Benescu A, Caloian FM, Mihai G. The effect of thera-band exercises on balance and proprioception in the elderly. *J phys education sport.* 2016; 16(3):900–5.
36. Colado JC, Triplett NT. Effects of a short-term resistance program using elastic bands versus weight machines for sedentary middle-aged women. *J strength cond res.* 2008; 22(5):1441–8.
37. Gentil P, et al. Effects of resistance training with machines and elastic tubes on functional capacity and muscle strength in community-living older women: a randomized clinical trial. *J aging phys act.* 2021; 29(6):959–66.
38. Calatayud J, Borreani S, Colado JC, Martin F, Tella V, Andersen LL. Bench press and push-up at comparable levels of muscle activity result in similar strength gains. *J strength cond res.* 2015; 29(1):246–53.
39. Kikuchi N, Nakazato K. Low-load bench press and push-up induce similar muscle hypertrophy and strength gain. *J exerc sci fit.* 2017; 15(1):37–42.
40. Stone MH, Sanborn K, O'Bryant HS, Hartman M, Stone ME, Proulx C, Ward B, Hruby J. Maximum strength–power–performance relationships in collegiate throwers. *J strength cond res.* 2003; 17(4):739–45.
41. Andersen LL, Andersen CH, Mortensen OS, Poulsen OM, Bjørnlund IBT, Zebis MK. Muscle activation and perceived loading during rehabilitation exercises: comparison of

dumbbells and elastic resistance. *Phys ther.* 2010; 90(4):538–49.
42. Stockbrugger BA, Haennel RG. Validity and reliability of a medicine ball explosive power test. J strength cond res. 2001; 15(4):431–8.
43. Stone MH, O'Bryant HS, McCoy LB, Coglianese R, Lehmkuhl M, Schilling B. Power and maximum strength relationships during performance of dynamic and static weighted jumps. *J strength cond res.* 2003; 17(1):140–7.
44. Cormie P, McGuigan MR, Newton RU. Adaptations in athletic performance after ballistic power versus strength training. *Med sci sports exerc.* 2008; 42:1582–98.
45. Moir GL, et al. Effects of ballistic and non-ballistic bench press on mechanical variables. *J strength cond res.* 2019; 32(12):3333–9.
46. Castro Piñero J, Artero EG, España Romero V, Ortega FB, Sjöström M, Suni J, Ruiz JR. Criterion-related validity of field-based fitness tests in youth: a systematic review. *Br j sports med.* 2009; 44(13):934–43.
47. Harris C, Wattles AP, DeBeliso M, Sevene-Adams PG, Berning JM, Adams KJ. Seated medicine ball throw as a measure of upper-body power in older adults. *J strength cond res.* 2011; 25(8):2344–8.
48. Stockbrugger BA, Haennel RG. Validity and reliability of a medicine ball explosive power test. *J strength cond res.* 2001; 15(4):431–8.
49. van den Tillaar R, Marques MC. Reliability of seated and standing throwing velocity using differently weighted medicine balls. *J strength cond res.* 2013; 27(5):1234–8.
50. Anderson CE, Sforzo GA, Sigg JA. The effects of combining elastic and free weight resistance on strength and power in athletes. J strength cond res. 2008; 22(2):567–74.
51. Aloui G, Hermassi S, Hammami M, Gaamouri N, Bouhafs EG, Comfort P, et al. Effects of an 8-week in-season upper limb elastic band training programme on the peak power, strength, and throwing velocity of junior handball players. *Sportverletz sportschaden.* 2019; 33(3):133–41.
52. Andersen V, Fimland MS, Cumming KT, Vraalsen Ø, Saeterbakken AH. Explosive resistance training using elastic bands in young female team handball players. *Sports med int open.* 2018; 2(6):e171–8.
53. Winwood PW, Buckley JJ. Short-term effects of resistance training modalities on performance measures in male adolescents. *J strength cond res.* 2019; 33(3):641–50.
54. Turgut E, Cinar Medeni Ö, Colakoglu FF, Baltaci G. Ballistic six upper extremity plyometric training for pediatric volleyball players. *J strength cond res.* 2019; 33(5):1305–10.
55. Colado JC, Triplett NT, Tella V, Saucedo P, Abellán J. Effects of aquatic resistance training on health and fitness in postmenopausal women. *Eur j appl physiol.* 2010; 109(6):1185–92.
56. Aboodarda SJ, Spence AJ, Button DC. The effects of elastic resistance training on muscle strength and power: a systematic review. Sports med. 2016; 46(12):1763–83.
57. Andersen LL, Andersen JL, Zebis MK, Aagaard P. Early-phase adaptations of skeletal muscle to resistance training in elderly men and women. Eur j appl physiol. 2010; 110(5):1113–22.
58. Page P. Current concepts in muscle stretching for exercise and rehabilitation. Int j sports phys ther. 2010; 5(3):267–81.
59. Wiemann K, Hahn S. Influences of elastic resistance on muscle strength and emg activity in upper extremities. *J sports med phys fitness.* 1997; 37(2):114–20.
60. Martinez-Gomez R, Ortega FB, Ruiz JR, Vicente-Rodríguez G, Veiga OL. Effects of bodyweight-based exercise training on health outcomes in middle-aged women. *J sci med sport.* 2019; 22(2):237–43.
61. Behm dg, sale dg. Intended rather than actual movement velocity determines velocity-specific training response. *J appl physiol.* 1993; 74(1):359–68.
62. Markovic G, Mikulic P. Neuro musculoskeletal and performance adaptations to lower-extremity plyometric training. *Sports med.* 2010; 40(10):859–95.
63. Hibbs AE, Thompson KG, French DN, Wrigley A, Spears IR. Optimizing performance by improving core stability and core strength. *Sports med.* 2008; 38(12):995–1008.