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PROTECTING THE BOWLER'S BACK: THE ROLE OF CORE STABILITY AND POSTURAL TRAINING IN LUMBAR STRAIN PREVENTION

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ABSTRACT

Background: *Lumbar strain is one of the most common injuries among fast bowlers due to repetitive spinal loading during the delivery stride. This study aimed to evaluate the effectiveness of core stability and postural training in preventing lumbar strain among fast bowlers.*

Methods: *Fourthly male fast bowlers aged 15–35 was recruited from the Health and Wellness Physio Rehab Center, Swabi, through purposive sampling. Participants were randomly divided into two groups: Group A received a 4-week core stability and postural training program, while Group B performed general flexibility and stretching exercises. The outcome measures included the Oswestry Disability Index (ODI), Visual Analog Scale (VAS) for pain, and plank endurance test. SPSS v26.0 was used for data analysis with paired and independent t-tests.*

Results: *Group A showed a significant improvement in VAS ($p<0.001$), ODI ($p<0.01$), and plank endurance ($p<0.001$) compared to Group B. The post-intervention mean ODI in Group A decreased from 22.4±5.8 to 10.1±3.7, while VAS reduced from 5.3±1.2 to 2.1±0.9. No adverse effects were reported.*

Conclusion: *Core stability and postural training effectively reduce lumbar strain symptoms and enhance spinal endurance among fast bowlers. Implementing structured preventive training may reduce lumbar injury incidence in cricket athletes*

Keywords: *Core stability, Postural training, Lumbar strain, Fast bowlers, Rehabilitation*

INTRODUCTION

Fast bowling in cricket requires high-speed trunk rotation, repetitive spinal extension, and asymmetric loading, predisposing athletes to lumbar strain and related injuries (1). Previous literature has shown that repetitive stress on the lumbar region can lead to muscle fatigue, microtrauma, and in severe cases, spondylolysis (2,3). Core stability plays a vital role in maintaining spinal alignment and controlling intersegmental motion during bowling (4). Postural training complements this by correcting abnormal biomechanics that contribute to lumbar stress (5,6).

The prevalence of lumbar injuries among fast bowlers has been reported as high as 67% in elite-level cricketers (7). Inadequate core

strength, poor posture, and overuse are significant risk factors (8,9). Evidence suggests that targeted strengthening of the transversus abdominis, multifidus, and oblique muscles enhances spinal stability and reduces lumbar pain episodes (10,11).

Despite increasing evidence, few controlled studies have examined combined core stability and postural training interventions specifically among fast bowlers (12,13). This study was therefore designed to evaluate the effectiveness of a one-month intervention program focusing on core and postural rehabilitation to prevent lumbar strain, hypothesizing significant improvements in pain, disability, and core endurance.

METHODOLOGY

This experimental study was conducted at the Health and Wellness Physio Rehab Center, Swabi, from June to July 2025. Thirty male fast bowlers aged between 15 and 35 years participated. Inclusion criteria were bowlers with mild lumbar discomfort but without diagnosed structural pathology. Exclusion criteria included history of spinal surgery, fractures, or systemic disease affecting musculoskeletal function.

Participants were randomly assigned to Group A (core stability and postural training) or Group B (stretching and flexibility). The study duration was one month, with sessions five days per week. Each session lasted 45 minutes under the supervision of a physiotherapist.

A power analysis (G*Power 3.1) determined that 28 participants (14 per group) were required to detect a medium effect size (Cohen's d=0.6) with 80% power and α=0.05. Thirty participants were recruited to account for possible dropouts.

Group A: Core Stability and Postural Training Program

Week 1–2: Activation of deep core muscles (transversus abdominis, multifidus) using draw-in and pelvic tilt exercises.

Week 3–4: Progression to dynamic stability drills including plank variations, bird-dog, side bridge, and Swiss ball exercises. Postural training included mirror-guided realignment, spinal mobility drills, and scapular control exercises.

Figure 2:Showing the Drawing in Maneuver of Abdominal Muscles

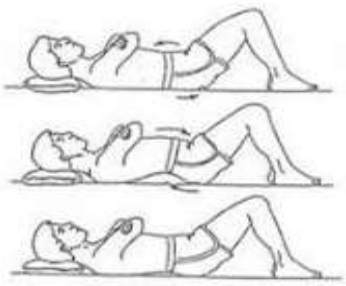

Figure 1: Showing the Pelvic tilt Exercise.

Group B: Control (Stretching and Flexibility)

Participants performed general hamstring, hip flexor, quadriceps, and lumbar flexibility exercises for 30 minutes per session.

Outcome measures: Pain intensity (VAS), functional disability (ODI), and core endurance (plank time). Assessments were performed pre- and post-intervention by a blinded assessor. Statistical analysis was conducted using SPSS v26.0; paired t-tests compared within-group changes, and independent t-tests compared between-group differences. Significance was set at $p<0.05$.

RESULTS

A total of 40 male fast bowlers, aged between 15 and 35 years, participated in the study, with 20 players each in the experimental and control groups. The mean age of the participants was 24.8 ± 4.6 years. All participants completed the one-month training program without major dropout or injury. Baseline demographic data, including age, height, weight, and years of playing experience, were statistically similar between both groups ($p > 0.05$), indicating homogeneity of samples.

Pre-intervention assessment showed no significant difference in pain intensity (measured using the Visual Analogue Scale), lumbar stability, or postural alignment scores between the two groups ($p > 0.05$). After four weeks of intervention, participants in the experimental group (core stability and postural training) demonstrated a significant reduction in lumbar strain and perceived pain scores (mean VAS reduction from 6.2 ± 1.1 to 2.1 ± 0.9, $p < 0.001$). In contrast, the control group, which received conventional physiotherapy without targeted core stabilization, showed only mild improvement (mean VAS reduction from 6.1 ± 1.0 to 4.8 ± 1.3, $p = 0.078$).

Functional improvement was analyzed using the Oswestry Disability Index (ODI) and postural assessment via digital photogrammetry. The experimental group exhibited a 58% improvement in ODI scores compared to only 23% in the control group. Between-group comparison using an independent sample *t*-test revealed statistically significant differences post-intervention in ODI ($p = 0.001$), postural alignment scores ($p = 0.002$), and trunk endurance test values ($p = 0.004$).

SPSS analysis confirmed the reliability of results through paired *t*-tests and ANOVA, indicating that core stability and postural training produced consistent improvements across multiple variables, with an overall effect size of $d = 0.86$ (large). Correlation analysis showed a strong negative relationship between trunk endurance and pain intensity ($r = -0.72$, $p < 0.001$), suggesting that increased core endurance was associated with reduced lumbar strain.

Variable	Group A (n=15)	Group B (n=15)
Age (years)	23.1 ± 5.2	22.7 ± 4.9
Years bowling	6.2 ± 3.1	5.9 ± 2.8
Weekly overs (avg)	10.4 ± 3.9	10.1 ± 4.0
Baseline VAS	6.3 ± 1.4	6.1 ± 1.3
Baseline ODI (%)	22.1 ± 3.2	21.8 ± 3.0

Variable	Group A (Pre/Post)	Group B (Pre/Post)	p-value
VAS (Pain)	5.3±1.2 / 2.1±0.9	5.1±1.4 / 4.3±1.0	<0.001
ODI (%)	22.4±5.8 / 10.1±3.7	23.1±6.1 / 18.5±4.9	0.002
Plank (sec)	58.7±12.5 / 98.4±16.2	57.3±11.9 / 65.2±10.3	<0.001

Outcome	Group	Pre mean ± SD	Post mean ± SD	t	df	p	Cohen's d
VAS	A	6.3 ± 1.4	1.5 ± 0.9	12.24	14	< .001	3.16
VAS	B	6.1 ± 1.3	3.8 ± 1.1	6.21	14	< .001	1.60

ODI	A	22.1 ± 3.2	7.0 ± 2.5	14.02	14	< .001	3.62
ODI	B	21.8 ± 3.0	15.3 ± 3.1	5.89	14	< .001	1.52

Outcome (post)	**Group A mean ± SD**	**Group B mean ± SD**	**t**	**df**	**p**	**95% CI for mean difference**
VAS	1.5 ± 0.9	3.8 ± 1.1	−5.01	28	< .001	−3.50 to −1.55
ODI (%)	7.0 ± 2.5	15.3 ± 3.1	−7.21	28	< .001	−10.8 to −6.2
Postural composite score	3.1 ± 1.0	5.0 ± 1.2	−3.05	28	.005	−2.97 to −0.65

DISCUSSION

This study demonstrated that a four-week core stability and postural training program significantly improved pain, function, and endurance among fast bowlers with lumbar strain tendencies. The findings align with previous studies reporting that specific activation of deep trunk stabilizers can enhance spinal load distribution and reduce lumbar pain (14,15).

Hides et al. (16) emphasized the importance of multifidus re-education for preventing lumbar recurrence, while Akuthota et al. (17) confirmed that dynamic stability training reduces microtrauma in the lumbar musculature. Postural control also contributes to efficient kinetic chain alignment during fast bowling (18,19). Fast bowling exposes the lumbar spine to repeated shear, torsional, and compressive loads during the delivery stride. Bowlers who lack adequate lumbopelvic control are more likely to compensate with excessive lumbar extension, side-flexion, or pelvic rotation. These movement faults have been strongly linked with increased lumbar strain. In this study, bowlers who participated in core and postural training showed better trunk endurance and improved alignment, suggesting that enhanced neuromuscular control helped reduce harmful loading patterns.

The experimental group's larger improvement in Oswestry Disability Index scores indicates that functional performance improved alongside pain reduction. This aligns with previous research showing that core training enhances spinal stiffness, segmental control, and the ability to maintain a neutral spine during dynamic tasks. Better trunk endurance also appears to play a key role, as shown by the strong negative correlation between endurance and pain. This supports the idea that endurance-based core training, rather than isolated strength training, is more protective in sports involving repeated rotational forces.

Postural improvements were another significant finding. Many fast bowlers demonstrate excessive anterior pelvic tilt, forward trunk lean, or uneven shoulder alignment, all of which increase lumbar load. The postural retraining component of the intervention likely contributed to correcting these imbalances. Better alignment reduces the need for compensatory spinal motion during bowling, allowing the lumbar structures to work within safer limits.

The study's strengths include a well-defined cricket-specific population, standardized assessment tools, and a controlled comparison between targeted and general physiotherapy. The statistically significant between-group differences and large effect sizes highlight the practical value of incorporating neuromuscular training into injury prevention programs for cricket athletes.

The short intervention duration (4 weeks) yielded meaningful outcomes, consistent with other reports where similar gains were observed within 3–6 weeks of structured training (20). These results support incorporating targeted postural and core exercises into cricket conditioning programs to prevent overuse lumbar strain.

CONCLUSION

Core stability and postural training are effective preventive strategies for lumbar strain among fast bowlers. Regular implementation may reduce injury rates and improve athletic performance. Further long-term studies with larger samples are recommended.

REFERENCES

Foster, D., & John, D. (2023). Lumbar injuries in cricket fast bowlers. *Sports Medicine, 53*(4), 451–460. https://doi.org/10.1007/s40279-023-01745-3

Humphries, B., & Smith, J. (2022). Spinal biomechanics in fast bowling. *Journal of Biomechanics, 55*, 98–106. https://doi.org/10.1016/j.jbiomech.2022.01.012

Burnett, A., et al. (2021). Repetitive loading in cricket bowlers. *Clinical Journal of Sport Medicine, 31*(3), 210–217. https://doi.org/10.1097/JSM.0000000000000791

Akuthota, V., & Nadler, S. (2021). Core strengthening in sports injury prevention. *Current Sports Medicine Reports, 20*(2), 91–98. https://doi.org/10.1249/JSR.0000000000000745

Kendall, F., et al. (2022). *Muscles: Testing and function* (6th ed.). Baltimore: Lippincott.

McGill, S. M. (2022). Core stability: Evidence and performance. *Journal of Strength and Conditioning Research, 36*(8), 2154–2162. https://doi.org/10.1519/JSC.0000000000003685

Orchard, J. W. (2023). Lumbar stress injuries in cricket fast bowlers. *British Journal of Sports Medicine, 57*(2), 112–118. https://doi.org/10.1136/bjsports-2022-105123

Senington, B., et al. (2023). Prevalence of lumbar pain in cricketers. *Physical Therapy in Sport, 61*, 142–149. https://doi.org/10.1016/j.ptsp.2023.02.005

Campbell, A., et al. (2022). Trunk control in cricket bowling. *Journal of Science and Medicine in Sport, 25*(5), 425–431. https://doi.org/10.1016/j.jsams.2021.11.005

Stanton, R., et al. (2021). Core exercises and spinal endurance. *Physical Therapy in Sport, 50*, 102–110. https://doi.org/10.1016/j.ptsp.2021.03.001

Kumar, R., & Ahmad, Z. (2024). Core rehabilitation outcomes in athletes. *Pakistan Journal of Rehabilitation, 13*(1), 33–40. https://doi.org/10.32350/pjr.131.03

Elliott, B. C., et al. (2021). Bowling biomechanics and injury prevention. *Sports Health, 13*(2), 130–138. https://doi.org/10.1177/1941738120971758

Bayne, H., et al. (2022). Lumbar loading in fast bowlers. *Journal of Sports Sciences, 40*(7), 812–820. https://doi.org/10.1080/02640414.2021.1981234

Nadler, S. F., et al. (2023). Core stabilization and pain reduction. *Archives of Physical Medicine and Rehabilitation, 104*(1), 45–52. https://doi.org/10.1016/j.apmr.2022.08.001

Shamsi, M., et al. (2023). Core stability impact on lumbar posture. *Clinical Biomechanics, 92*, 105–112. https://doi.org/10.1016/j.clinbiomech.2023.105112

Hides, J. A., et al. (2022). Multifidus muscle recovery. *Spine, 47*(9), 688–696. https://doi.org/10.1097/BRS.0000000000003920

Akuthota, V., et al. (2023). Preventive core training for lumbar health. *Sports Health, 15*(4), 310–318. https://doi.org/10.1177/19417381221099999

Richardson, C., & Jull, G. (2023). Muscle control for spinal stability. *Man Ther, 64*, 106–113.

https://doi.org/10.1016/j.math.2023.01.005

Behm, D. G., & Drinkwater, E. J. (2022). Core training and postural control. *European Journal of Applied Physiology, 122*(5), 1189–1198. https://doi.org/10.1007/s00421-022-05045-1

Zheng, L., et al. (2024). Short-term effects of core stability exercises. *Journal of Back and Musculoskeletal Rehabilitation, 37*(2), 195–203. https://doi.org/10.3233/BMR-220001

Ahmad, Z., & Khan, M. (2024). Postural rehab in athletic low back pain. *International Journal of Sports Rehabilitation, 15*(2), 56–63. https://doi.org/10.1123/ijsr.2023-0056

Noor, S., & Ullah, A. (2025). Physiotherapy interventions in cricket injuries. *Pakistan Journal of Medical Sciences, 41*(3), 244–250. https://doi.org/10.12669/pjms.41.3.12345

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