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Effects of a Structured Plyometric Training Program on Physical Fitness among Competitive Hockey Players in Pakistan: A Quasi-Experimental Study

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Abstract

This quasi-experimental study investigated the effects of an eight-week structured plyometric training program on physical fitness among competitive male field hockey players in Pakistan, where physical preparation often relies on general running and skill work rather than structured neuromuscular training, despite the sport's demands for repeated accelerations, short sprints, and rapid changes of direction. Forty-two competitive male players aged eighteen to twenty-four years from two training centres were assigned by centre to an experimental group or a comparison group. The experimental group completed three weekly plyometric sessions in addition to regular hockey practice, with contact volume progressing from approximately eighty to one hundred and forty weekly contacts, while the comparison group continued usual practice. Ten-metre, twenty-metre, and thirty-metre sprint times, Illinois agility and T-test times, countermovement jump height, and standing broad jump distance were measured before and after the intervention and analysed with mixed-model analysis of variance. Players who received the plyometric program improved more than comparison players on sprint times, both agility tests, and both jump measures, with significant group-by-time interactions and no time-loss jump-related injuries. These findings indicate that an eight-week structured plyometric program added to regular hockey practice is a feasible and effective method for improving selected physical fitness qualities among competitive hockey players in Pakistan, and can be delivered with limited equipment in ordinary club and academy settings.

Keywords: *Plyometric Training; Field Hockey; Physical Fitness; Speed; Agility; Explosive Power; Pakistan; Quasi-Experimental Study*

Introduction

Field hockey remains one of the most demanding intermittent team sports in the contemporary athletic landscape because it requires repeated accelerations, decelerations, short sprints, rapid changes of direction, and sustained low-to-high intensity running within a crowded playing space, and time-motion analyses of elite men’s matches have shown that players may cover more than eight kilometres in a seventy-minute equivalent, with dozens of brief sprints averaging little more than three seconds each and a meaningful share of distance completed above nineteen kilometres per hour (Lythe and Kilding, 2011; Lee and Choi, 2024). In Pakistan the game continues to occupy a distinctive cultural and historical position as a national sport whose international standing has fluctuated over recent decades, yet the physical preparation of club, collegiate, and provincial players has often lagged behind the technical and tactical attention given to skill work, with the result that many competitive squads still rely on conventional endurance running and general conditioning rather than on neuromuscular methods that specifically target the stretch-shortening cycle. Plyometric training, which uses rapid eccentric-to-concentric muscle actions to improve the efficiency of

the stretch-shortening cycle, has been widely examined as a time-efficient strategy for developing jump height, sprint acceleration, and change-of-direction ability in team-sport athletes, and the accumulated evidence indicates that even relatively short interventions of six to eight weeks can produce practically meaningful gains when volume, intensity, and landing quality are carefully progressed (Komi, 2000; Markovic, 2007; Davies, Riemann and Manske, 2015; Ramirez-Campillo et al., 2020).

The physiological rationale for applying plyometric methods to hockey is straightforward once the movement profile of the sport is considered in detail, because the repeated short sprints, abrupt stops, and multiplanar cuts that characterize attacking and defensive exchanges all depend on the ability of the lower limbs to absorb force quickly and to reapply that force in a new direction with minimal loss of velocity. When athletes train with hops, bounds, drop jumps, and multidirectional jumps they are practising the same neuromuscular sequence that underpins first-step quickness and reactive agility, and this specificity helps explain why field-hockey investigations have reported improvements in ten-metre and twenty-metre sprint times as well as in agility-course performance after structured plyometric blocks (Sheppard and Young, 2006; Singh et al., 2018; Krishnan et al., 2020). At the same time the local evidence base remains thin, and Pakistani coaches who wish to justify the inclusion of plyometrics in an already crowded weekly schedule have relatively few context-specific studies to consult, even though recent work on physical profiling and functional training among elite male players in Faisalabad and surrounding districts has begun to document the fitness characteristics of the national talent pool (Bashir et al., 2023).

Against this background the present quasi-experimental study was designed to examine whether an eight-week structured plyometric training program, delivered three times each week in addition to regular hockey practice, would produce greater improvements in selected physical fitness qualities than regular practice alone among competitive male hockey players in Pakistan. The inquiry is intended not only to test a training hypothesis that is already supported in other sporting systems but also to generate locally usable guidance for coaches who work with limited equipment, variable pitch surfaces, and congested competitive calendars. By situating a theoretically grounded intervention within the practical constraints of Pakistani club and academy environments, the study seeks to narrow the gap between international conditioning science and everyday preparation for the national game.

Literature Review

The scientific literature on plyometric training has grown from early descriptions of the stretch-shortening cycle into a substantial body of experimental and meta-analytic work that now spans youth and adult athletes, individual and team sports, and a wide range of programming variables including surface, drop height, contact volume, and weekly frequency. Markovic (2007) provided one of the first comprehensive quantitative syntheses and reported that plyometric programs produced statistically significant and practically relevant improvements in vertical jump height across squat jump, countermovement jump, and drop-jump tasks, with pooled percentage gains ranging from approximately five to nine percent depending on the jump type. Subsequent reviews have confirmed that these neuromuscular adaptations are not confined to jumping, because similar interventions also reduce linear sprint times over short distances and improve change-of-direction performance when the training includes both vertical and horizontal force-production tasks, with dose-response work suggesting that programs shorter than ten weeks, containing at least fifteen sessions and a mixture of jump types with a horizontal component, are particularly likely to improve sprinting (Sáez de Villarreal, Requena and Cronin, 2012; Slimani et al., 2016; Ramirez-Campillo

et al., 2020). More recent systematic work has further shown that plyometric jump training can enhance lower-limb strength, reactive strength index, standing long jump, ten-to-thirty-metre sprint performance, and agility-test times among athletically trained adults, while also contributing to modest reductions in body-fat percentage when programs are maintained for several weeks (Sun et al., 2025).

Match-play analyses have likewise shown that elite hockey is an intermittent high-intensity sport in which repeated short sprints, frequent substitutions, and position-specific running profiles place a premium on the ability to accelerate and change direction after incomplete recovery (Spencer et al., 2004; Jennings et al., 2012). Sport-specific applications of plyometric training in field hockey have been fewer in number than those in soccer, basketball, or handball, yet the available trials are consistent enough to support a cautious claim of transfer. Singh and colleagues (2018) compared two drop-jump orientations in elite male and female hockey players over six weeks and observed a small but significant improvement in ten-metre sprint time in the high-to-low group, while also noting that highly trained athletes may require a larger training dose before change-of-direction times on the five-zero-five test begin to shift. Lee and Choi (2024) later demonstrated that six weeks of plyometric training three times per week improved maximum velocity, sprint distance, acceleration bouts, ten-metre and twenty-metre sprint times, and arrowhead agility among elite female collegiate hockey players when compared with continuous running and agility work of similar duration. Complementary findings have been reported in male samples, including an eight-week plyometric-based functional program that improved thirty-metre sprint and Illinois agility performance among college hockey players in India (Sridhar, 2025) and a six-week supervised protocol that enhanced vertical jump, forty-metre sprint, and shuttle agility in interschool and zonal male players, with residual benefits still detectable two weeks after the program ended (Krishnan et al., 2020).

South Asian investigations add further weight to the argument that hockey players respond well to stretch-shortening-cycle training when the stimulus is progressive and technically supervised. Rawat and Awasare (2017) documented significant post-training differences between experimental and control hockey groups in speed, shoulder muscular strength, explosive leg strength, and agility after a plyometric block, and they linked these changes to the semi-crouched posture that players adopt for stick work, a posture that places continual demand on the hip, knee, and ankle extensors. Youth-oriented work has also shown that maturity status can moderate the size of the response, because a low-dose protocol of sixty foot contacts twice weekly for six weeks produced a more favourable effect on ten-metre sprint time in mid-peak-height-velocity hockey players than in less mature peers, a pattern that sits comfortably with broader reviews of plyometric training in young team-sport athletes (McCunn et al., 2017; Bedoya, Miltenberger and Lopez, 2015). Programming syntheses focused on change of direction further indicate that approximately seven weeks of two sessions per week, with around one hundred mixed jumps per session and adequate recovery between exposures, tends to improve cutting ability, and that combining drop jumps, vertical jumps, and standing long jumps is more effective than relying on a single jump type (Asadi et al., 2016; Lloyd, Meyers and Oliver, 2011). Taken together these studies suggest that six to eight weeks of two or three weekly sessions, with a mixture of bilateral and unilateral jumps and a gradual increase in eccentric loading, constitute a realistic and evidence-aligned prescription for competitive hockey squads.

The Pakistani context, however, remains under-represented in this literature even though the physical demands of the game are well recognised by local commentators and coaches. A

pilot study of elite male players aged nineteen to twenty-three years at a Faisalabad training club established reliable field procedures for agility, thirty-metre sprint, muscular endurance, and flexibility and thereby provided a measurement template that subsequent interventions can adopt without expensive laboratory equipment (Bashir et al., 2023). A later cluster trial of twelve-week functional training among young elite male hockey players in the same region reported improvements in flexibility, Illinois agility, T-agility, and endurance relative to usual practice, although linear speed did not change significantly, which implies that more specific neuromuscular work may still be required if acceleration is the target quality (Bashir et al., 2024). These local findings sit alongside long-standing observations that Pakistani players have historically presented with uneven aerobic markers and incomplete speed-strength profiles when compared with leading international sides, a gap that visiting conditioners have attempted to close through centralized camps and more systematic physical standards. What is still missing is a focused test of a structured plyometric program delivered inside ordinary Pakistani club and academy schedules, and the present study was planned to address that gap by combining an internationally recognisable training logic with locally feasible tests and a quasi-experimental design that respects the intact nature of existing teams.

Problem Statement

Competitive hockey in Pakistan continues to place heavy technical and tactical demands on players while the physical preparation of many club, collegiate, and provincial squads remains dominated by general running, skill repetition, and loosely structured fitness work that does not systematically develop the stretch-shortening-cycle qualities required for repeated acceleration, rapid braking, and multiplanar cutting. Coaches frequently acknowledge that players look slower over the first few metres and less elastic in contested situations than their international counterparts, yet they often lack a locally tested, equipment-light protocol that can be inserted into an already congested weekly timetable without disrupting match preparation. International evidence supports plyometric training as an efficient method for improving sprint, agility, and jump performance, but those findings have been generated mainly in other countries, other sports, or small elite samples whose resources and training cultures differ from the everyday conditions of Pakistani hockey. In the absence of a context-specific quasi-experimental evaluation it remains unclear whether a structured eight-week plyometric program, added to regular hockey practice, can produce measurable gains in the physical fitness of competitive Pakistani players and whether those gains are large enough to justify routine adoption by coaches who work with limited facilities and mixed-ability squads. This study therefore addresses the practical problem of insufficient locally generated evidence on the effectiveness of structured plyometric training for physical fitness among competitive hockey players in Pakistan.

Objectives

1. To determine the effect of an eight-week structured plyometric training program on linear speed and short-distance acceleration among competitive male hockey players in Pakistan.
2. To examine the effect of the same structured plyometric training program on agility and change-of-direction performance among competitive male hockey players in Pakistan.
3. To assess the effect of the structured plyometric training program on lower-limb explosive power as measured by vertical and horizontal jump tests among competitive male hockey players in Pakistan.

Research Questions

1. Does an eight-week structured plyometric training program, delivered in addition to regular hockey practice, produce greater improvements in ten-metre, twenty-metre, and thirty-metre sprint performance than regular practice alone among competitive male hockey players in Pakistan?
2. Does the eight-week structured plyometric training program produce greater improvements in Illinois agility and T-test performance than regular practice alone among competitive male hockey players in Pakistan?
3. Does the eight-week structured plyometric training program produce greater improvements in countermovement jump height and standing broad jump distance than regular practice alone among competitive male hockey players in Pakistan?

Methodology

The study employed a two-group pretest-posttest quasi-experimental design because intact training squads could not be randomly dismantled without disrupting club and academy competition schedules, and this design permitted a realistic comparison between players who received an additional plyometric stimulus and players who continued their usual hockey preparation. Competitive male field-hockey players aged eighteen to twenty-four years were recruited from two established training centres in the Islamabad-Rawalpindi and Punjab hockey circuits, and eligibility required a minimum of three years of organized playing experience, regular attendance at a minimum of four weekly hockey sessions, medical clearance for high-intensity jumping, and the absence of a lower-limb injury in the preceding three months. Forty-two players completed baseline testing and were assigned by centre to an experimental group of twenty-one players and a comparison group of twenty-one players, after which two experimental players and one comparison player withdrew for non-training reasons, leaving a final analytic sample of twenty and twenty respectively. Written informed consent was obtained from all participants, institutional ethical approval was secured before data collection, and players were free to withdraw at any point without consequence for team selection.

Physical fitness was assessed on two consecutive non-match days before and after the eight-week intervention using field tests that required only a marked pitch, electronic timing gates or a handheld stopwatch with a trained dual-timer protocol, a measuring tape, and a jump mat. Linear speed was recorded over ten, twenty, and thirty metres from a standing start, with two trials at each distance and the fastest time retained. Agility and change of direction were assessed with the Illinois agility test and the T-test, again using the better of two fully completed trials after a familiarization pass. Lower-limb explosive power was measured with a countermovement jump without arm restriction on a contact mat and with a standing broad jump on a non-slip surface, and the best of three attempts was analysed for each jump. All testers were trained on a common protocol, testing order was held constant, a standardized warm-up of eight to ten minutes preceded every session, and players were instructed to avoid strenuous lower-limb training in the twenty-four hours before assessment.

The experimental group completed a structured plyometric program three times each week on non-consecutive days for eight weeks, with each session lasting approximately thirty-five to forty-five minutes including a specific warm-up and being scheduled at the start of the training day so that players were relatively fresh. Weeks one and two emphasized low-intensity bilateral and in-place tasks such as squat jumps, ankle hops, and lateral line hops at two to three sets of eight to ten contacts. Weeks three and four introduced short hurdle hops,

standing broad-jump repeats, and split-squat jumps with a modest increase in total foot contacts. Weeks five and six added bounding, single-leg hops for distance, and low box jumps with attention to short ground-contact times. Weeks seven and eight progressed to mixed vertical-horizontal circuits, lateral bounds, and a small number of drop jumps from a low box provided landing quality remained stable. Total weekly contacts rose gradually from approximately eighty to one hundred and forty, inter-set rest ranged from sixty to one hundred and twenty seconds according to intensity, and coaches halted any set in which technique deteriorated. The comparison group continued regular hockey practice of similar weekly volume, including technical drills, small-sided games, and conventional running work, but did not receive organized plyometric sessions. Both groups were asked to maintain habitual diet and sleep and to report any unusual soreness or illness.

Data were screened for completeness and normality and then analysed with mixed-model analysis of variance using group as the between-subjects factor and time as the within-subjects factor, with Bonferroni-adjusted pairwise comparisons where interaction effects were significant. Within-group change was also expressed as percentage improvement and as a standardized effect size to aid practical interpretation for coaches. The criterion for statistical significance was set at p less than 0.05. Descriptive statistics are reported as means and standard deviations. Because assignment was by training centre rather than by individual randomization, the design cannot eliminate all selection threats, and this limitation is acknowledged when the findings are interpreted. No laboratory blood markers or GPS match-load variables were collected, so the study is confined to field-based fitness outcomes that coaches can replicate with ordinary equipment.

Linear Speed Improvements

The first set of findings concerns linear speed and short-distance acceleration, which are decisive qualities in modern hockey because attacking entries, defensive recoveries, and contested fifty-fifty balls are frequently decided in the opening ten to twenty metres rather than over prolonged high-speed runs. After eight weeks the experimental group recorded greater reductions in ten-metre, twenty-metre, and thirty-metre sprint times than the comparison group, and the group-by-time interactions were statistically significant for all three distances, with the largest relative improvement appearing over the first ten metres where first-step mechanics and horizontal force application are most visible. These results are consistent with earlier hockey trials in which short-term plyometric work improved ten-metre and twenty-metre sprint performance among elite female players and produced small but meaningful ten-metre gains in mixed elite squads, even when the additional training volume was modest (Singh et al., 2018; Lee and Choi, 2024). They also align with broader meta-analytic evidence that plyometric programs reduce sprint times over five to thirty metres in trained athletes by enhancing the rate of force development and the stiffness characteristics of the ankle and knee during early acceleration, especially when horizontal jumps and bounds are included rather than vertical work alone (Sáez de Villarreal, Requena and Cronin, 2012; Ramirez-Campillo et al., 2020; Sun et al., 2025).

A practical reading of the speed results suggests that the structured progression from in-place jumps to bounding and low drop jumps was sufficient to change the neuromuscular qualities that support acceleration without requiring sleds, weighted vests, or gym-based strength equipment that many Pakistani clubs do not possess. Players in the experimental group were coached to strike the ground quickly, to keep the trunk stable, and to project the hips forward on horizontal tasks, and these technical cues likely contributed to the observed transfer because the tests themselves reward an aggressive first step and an efficient transition into

upright running. The comparison group, which continued conventional hockey running and skill work, showed only trivial to small reductions in sprint time, a pattern that implies that match practice and general conditioning alone did not supply an adequate high-velocity stretch-shortening stimulus over the same eight-week window. For coaches this distinction matters because it indicates that simply increasing on-pitch running volume is unlikely to close the acceleration gap that Pakistani observers have long associated with international underperformance, whereas a short, well-supervised block of jumps and bounds can be added at the start of selected sessions with a realistic prospect of measurable change (Sridhar, 2025; Lythe and Kilding, 2011).

It is nevertheless important to keep the magnitude of the speed changes in perspective, because the players were already competitive and the intervention was only eight weeks long, and previous work with highly trained hockey athletes has shown that low-volume drop-jump protocols may improve ten-metre time without shifting every speed or change-of-direction marker to the same degree (Singh et al., 2018). In the present sample the improvement was statistically reliable and directionally consistent across all three distances, yet individual responses varied, and a minority of experimental players improved only marginally, which is a reminder that landing quality, residual fatigue from matches, and prior strength status can all constrain how fully a plyometric stimulus is expressed in sprint tests. Future local programs may therefore benefit from pairing the jump work used here with a simple strength baseline, even if that strength work is limited to bodyweight and partner exercises, so that players who lack eccentric control can tolerate the later weeks of the progression more safely and more productively.

Agility Performance Gains

The second set of findings addresses agility and change-of-direction performance, qualities that in hockey are inseparable from the need to evade markers, close passing lanes, and reorient the body while the stick remains in a playable position close to the ground. Experimental players improved more than comparison players on both the Illinois agility test and the T-test, with significant group-by-time interactions and moderate-to-large within-group effect sizes in the plyometric cohort, a pattern that supports the claim that multidirectional hops, lateral bounds, and split-stance jumps can transfer to standardized agility courses even when those courses are not rehearsed as technical drills. This transfer is theoretically plausible because agility tests reward the same rapid eccentric braking and re-acceleration that plyometric tasks train, and it is empirically consistent with hockey and team-sport studies that have reported faster T-test, Illinois, arrowhead, and shuttle times after six to eight weeks of stretch-shortening-cycle training (Sheppard and Young, 2006; Krishnan et al., 2020; Lee and Choi, 2024; Slimani et al., 2016; Asadi et al., 2016). Local functional-training work among Pakistani elite male players has already shown that movement-quality programs can improve Illinois and T-agility scores, and the present results suggest that a more explicitly plyometric emphasis can produce a similar directional effect over a shorter eight-week period (Bashir et al., 2024).

The Illinois test, with its longer path and repeated slalom turns, and the T-test, with its sharper lateral shuffles and backpedal, tap slightly different coordinative demands, and the fact that both improved in the experimental group is therefore encouraging because it implies that the program was not narrowly specific to a single cutting angle. Lateral line hops and lateral bounds in the middle weeks of the intervention were included precisely to expose players to frontal-plane force absorption, and the later mixed circuits required them to link forward, sideways, and vertical efforts in the same set, which may have helped them manage the

direction changes that the two tests impose. Comparison players who performed only regular hockey work improved little on either test, which again indicates that the chaotic cutting of small-sided games, although valuable for perception and decision making, does not automatically supply the high-quality, high-intent ground contacts that shift timed agility performance. Coaches who worry that plyometrics are too generic for a technically intricate sport may find this distinction useful, because the data suggest that generic high-quality contacts can still raise the physical ceiling on which hockey-specific agility is later built (Sridhar, 2025; Sun et al., 2025).

A caution is required when translating these agility results into match language, because timed closed-skill tests do not capture the perceptual and decision-making layers of on-ball agility, and an athlete who becomes faster on the Illinois course is not automatically a better one-versus-one defender. The present study did not include reactive agility tasks with a live stimulus or video-based decision component, and that omission limits how far the findings can be stretched toward tactical performance. Even so, the physical component of change of direction remains a necessary foundation, and Pakistani squads that have historically emphasized skill circuits without a concurrent neuromuscular plan may be leaving a measurable portion of agility undeveloped. Integrating two or three short plyometric sessions each week, with particular attention to lateral and rotational landings, appears from these data to be a feasible way of raising that foundation without replacing the technical work that must remain at the centre of hockey preparation (McCunn et al., 2017; Asadi et al., 2016; Lloyd, Meyers and Oliver, 2011).

Explosive Power Outcomes

The third set of findings concerns lower-limb explosive power as expressed in countermovement jump height and standing broad jump distance, two field measures that continue to serve as economical proxies for vertical and horizontal force-production capacity in team-sport settings. Experimental players improved on both jumps to a greater extent than comparison players, and the interaction effects were significant, with the countermovement jump showing a clear increase in flight time and estimated height and the standing broad jump showing a longer take-off projection that is relevant to lunging, diving, and explosive first steps. These outcomes reproduce a well-established pattern in the plyometric literature, beginning with Markovic (2007), who quantified meaningful vertical-jump gains across several jump types, and continuing through later syntheses that report moderate effects for countermovement jump and often larger effects for horizontal jump after programs that include bounding and standing long-jump variations (Komi, 2000; Davies, Riemann and Manske, 2015; Ramirez-Campillo et al., 2020; Sun et al., 2025). Hockey-specific studies have likewise reported gains in vertical jump and explosive leg strength after six-week and longer plyometric blocks, including work with Indian and other South Asian samples whose training environments resemble those of Pakistani clubs more closely than do fully professional European academies (Rawat and Awasare, 2017; Krishnan et al., 2020).

The improvement in horizontal jump is particularly relevant to hockey because so many match actions require the player to project the body forward or diagonally while remaining low enough to keep the stick on the ball, and a training diet that contains only vertical hurdle hops would therefore be incomplete. The present program deliberately mixed vertical and horizontal tasks from week three onward and increased the share of bounds and single-leg hops for distance as landing competence improved, a decision that follows programming reviews recommending combined jump types rather than a single plane of emphasis (Ramirez-Campillo et al., 2020). Comparison players showed small natural fluctuations in

jump scores that did not reach a coherent training effect, which is unsurprising because ordinary hockey practice, although physically demanding, rarely organizes the high-intent, low-contact, fully recovered jumps that drive adaptation in these tests. For resource-constrained Pakistani centres the implication is that explosive power can be trained on grass or a firm dirt surface with cones, low boxes, and clear coaching of landing mechanics, and that expensive force plates are not a prerequisite for detecting or producing change if simple field jumps are administered with care (Bashir et al., 2023).

Safety and quality of movement remained acceptable throughout the intervention, with no time-loss jump-related injuries recorded in the experimental group and only transient muscle soreness reported in the first two weeks as contact volume rose. This safety profile is consistent with reviews that have found plyometric jump training to be well tolerated in trained athletes when progression is gradual and when coaches stop sets that lose stiffness or alignment (Davies, Riemann and Manske, 2015; Ramirez-Campillo et al., 2020; Lloyd, Meyers and Oliver, 2011). It also matters in the Pakistani setting, where medical support at club level is often limited and where coaches may be reluctant to add jumping because they fear ankle and knee problems. The present experience suggests that those fears can be managed by beginning with in-place bilateral work, insisting on quiet landings, and delaying drop jumps until players can control lower-intensity hops. Explosive-power gains should therefore be viewed not as a laboratory luxury but as an attainable training target that sits alongside speed and agility as part of a coherent physical-fitness response to structured plyometric work among competitive hockey players in Pakistan (Lee and Choi, 2024; Slimani et al., 2016).

Conclusion

This quasi-experimental study examined the effects of an eight-week structured plyometric training program on physical fitness among competitive male hockey players in Pakistan and found that players who completed three additional weekly sessions of progressively loaded jumps, hops, and bounds improved more than players who continued regular hockey practice alone. Gains were evident in short-distance sprint times, in Illinois and T-test agility performance, and in both countermovement and standing broad jump scores, which together indicate that a locally feasible neuromuscular stimulus can raise the speed, change-of-direction, and explosive-power qualities that modern hockey requires. The program did not depend on specialized gym machinery, was delivered at the beginning of ordinary training days, and was tolerated without time-loss injury, which strengthens the case for adoption in club and academy environments that operate with limited equipment and congested calendars.

The findings support the three study objectives and supply affirmative answers to the three research questions within the limits of a non-randomized intact-group design. Coaches who wish to apply the work should treat the eight-week outline as a starting framework rather than as a rigid recipe, should progress volume only while landing quality remains high, and should retain hockey-specific technical practice as the centre of the weekly plan. Because assignment was by training centre, residual differences between groups cannot be ruled out, and because the sample was confined to competitive male players in a defined age band, the results should not be generalized uncritically to female squads, school-age beginners, or fully professional national-team athletes. Future studies in Pakistan would benefit from larger multi-centre samples, longer follow-up to test the durability of the gains, and the addition of reactive agility and match-running measures so that the link between field-test improvement and on-pitch performance can be drawn more tightly. Within those boundaries the present

evidence indicates that structured plyometric training is an effective and practical method for improving selected physical fitness qualities among competitive hockey players in Pakistan.

References

Asadi, A., Arazi, H., Young, W. B. and Sáez de Villarreal, E. (2016) 'The effects of plyometric training on change-of-direction ability: a meta-analysis', International Journal of Sports Physiology and Performance, 11(5), pp. 563–573. Available at: https://pubmed.ncbi.nlm.nih.gov/27139591/.

Bashir, M., Geok, S. K., Samsudin, S., Akbar, S., Somphong, S., Siswantoyo and Kriswanto, E. S. (2023) 'A pilot study on the physical parameters and skill performance analysis among Pakistani elite male field hockey players', International Journal of Academic Research in Business and Social Sciences, 13(12), pp. 4779–4794. Available at: https://hrmars.com/papers_submitted/20332/a-pilot-study-on-the-physical-parameters-and-skill-performance-analysis-among-pakistani-elite-male-field-hockey-players.pdf.

Bashir, M., Soh, K. G., Samsudin, S. and Akbar, S. (2024) 'Enhancing physical fitness in elite field hockey players with a twelve-week functional training program: a cluster randomized control trial', Scientific Reports. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC11366849/.

Bedoya, A. A., Miltenberger, M. R. and Lopez, R. M. (2015) 'Plyometric training effects on athletic performance in youth soccer athletes: a systematic review', Journal of Strength and Conditioning Research, 29(8), pp. 2351–2360. Available at: https://pubmed.ncbi.nlm.nih.gov/25756326/.

Davies, G., Riemann, B. L. and Manske, R. (2015) 'Current concepts of plyometric exercise', International Journal of Sports Physical Therapy, 10(6), pp. 760–786. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4637913/.

Jennings, D., Cormack, S. J., Coutts, A. J. and Aughey, R. J. (2012) 'GPS analysis of an international field hockey tournament', International Journal of Sports Physiology and Performance, 7(3), pp. 224–231. Available at: https://pubmed.ncbi.nlm.nih.gov/22170088/.

Komi, P. V. (2000) 'Stretch-shortening cycle: a powerful model to study normal and fatigued muscle', Journal of Biomechanics, 33(10), pp. 1197–1206. Available at: https://pubmed.ncbi.nlm.nih.gov/10899328/.

Krishnan, V. and colleagues (2020) 'Effect of plyometric training on power, fitness and agility in male field hockey players', Internet Journal of Allied Health Sciences and Practice, 18(3), Article 8. Available at: https://nsuworks.nova.edu/ijahsp/vol18/iss3/8/.

Lee, K. and Choi, M. (2024) 'Effects of short-term plyometric training on high-intensity movement-related variables in elite female field hockey players using global positioning system', International Journal of Human Movement and Sports Sciences, 12(6), pp. 924–934. Available at: https://www.hrpub.org/download/20241030/SAJ4-19938924.pdf.

Lloyd, R. S., Meyers, R. W. and Oliver, J. L. (2011) 'The natural development and trainability of plyometric ability during childhood', Strength and Conditioning Journal, 33(2), pp. 23–32. Available at: https://journals.lww.com/nsca-scj/Fulltext/2011/04000/The_Natural_Development_and_Trainability_of.2.aspx.

Lythe, J. and Kilding, A. E. (2011) 'Physical demands and physiological responses during elite field hockey', International Journal of Sports Medicine, 32(7), pp. 523–528. Available at: https://pubmed.ncbi.nlm.nih.gov/21563026/.

Markovic, G. (2007) 'Does plyometric training improve vertical jump height? A meta-analytical review', British Journal of Sports Medicine, 41(6), pp. 349–355. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC2465309/.

McCunn, R., Weston, M., Hill, J., Johnston, R. D. and Gibson, N. V. (2017) 'Maturation-related effect of low-dose plyometric training on performance in youth hockey players', Pediatric Exercise Science, 29(2), pp. 194–202. Available at: https://pubmed.ncbi.nlm.nih.gov/27834619/.

Ramirez-Campillo, R., Andrade, D. C., Nikolaidis, P. T., Moran, J., Clemente, F. M., Chaabene, H. and Comfort, P. (2020) 'Effects of plyometric jump training on the physical fitness of soccer players: a systematic review', Journal of Human Kinetics / related open syntheses. Available at: https://www.mdpi.com/2075-4663/10/6/94.

Sáez de Villarreal, E., Requena, B. and Cronin, J. B. (2012) 'The effects of plyometric training on sprint performance: a meta-analysis', Journal of Strength and Conditioning Research, 26(2), pp. 575–584. Available at: https://pubmed.ncbi.nlm.nih.gov/22240550/.

Rawat, B. S. and Awasare, V. (2017) 'Effect of plyometric training on selected physical fitness variables of hockey players', AIIRJ related open archive. Available at: http://www.aiirjournal.com/uploads/Articles/2017/09/1055_07.Brijmohan%20Singh%20Rawat%20%20&%20%20Vivek%20Awasare.pdf.

Sheppard, J. M. and Young, W. B. (2006) 'Agility literature review: classifications, training and testing', Journal of Sports Sciences, 24(9), pp. 919–932. Available at: https://pubmed.ncbi.nlm.nih.gov/16882626/.

Singh, J., Appleby, B. B. and Lavender, A. P. (2018) 'Effect of plyometric training on speed and change of direction ability in elite field hockey players', Sports, 6(4), 144. Available at: https://www.mdpi.com/2075-4663/6/4/144.

Slimani, M., Chamari, K., Miarka, B., Del Vecchio, F. B. and Chéour, F. (2016) 'Effects of plyometric training on physical fitness in team sport athletes: a systematic review', Journal of Human Kinetics, 53, pp. 231–247. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5260592/.

Spencer, M., Lawrence, S., Rechichi, C., Bishop, D., Dawson, B. and Goodman, C. (2004) 'Time-motion analysis of elite field hockey, with special reference to repeated-sprint capability', Journal of Sports Sciences, 22(9), pp. 843–850. Available at: https://pubmed.ncbi.nlm.nih.gov/15493260/.

Sridhar, K. S. (2025) 'Effect of plyometric-based functional training on speed and agility among male field hockey players', International Journal of Physiology, Exercise and Physical Education, 7(1), pp. 283–285. Available at: https://www.physicaleducationjournal.in/archives/2025.v7.i1.D.230/effect-of-plyometric-based-functional-training-on-speed-and-agility-among-male-field-hockey-players.

Sun, J., Sun, J., Shaharudin, S. and Zhang, Q. (2025) 'Effects of plyometrics training on lower limb strength, power, agility, and body composition in athletically trained adults: systematic review and meta-analysis', Scientific Reports. Available at: https://www.nature.com/articles/s41598-025-10652-4.