

## Building young athletes: The role of physical fitness in sports

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Physical fitness is the cornerstone of athletic success. Individualized tailored exercise programs, proper nutrition, and in case of injury a sufficient recovery plans optimize an athlete's fitness and performance.(1) The success of an athlete depends on multiple reasons, including the natural talent of the athlete, technical skills, strategic thinking, mental wellness, and a strong body. Physical fitness allows the athlete to further hone their talents and withstand rigorous training. Research suggests a lower level of fitness among Pakistani athletes compared to their international counterparts.(2) A multi-modal approach to enhance physical fitness starting at a younger age can prepare athletes for more advanced training protocols.

Physical exercises and fitness programs bring around an overall structural and physiological change in an athlete which enables them to perform efficiently. These changes enhance cardiovascular fitness, cardiovascular endurance, muscular strength, and endurance allowing the athletes to maintain high performance levels over extended periods, granting them a competitive edge.(3) There are several researches that have shown the relation between a good muscle endurance and an athlete's capacity to perform many complex movements such as sprinting, rapid postural adjustments, and jumping. These skilled movements are crucial in increasing an athlete's performance in different sports like hockey, cricket, tennis, or squash.(4) Well-developed muscular endurance also allows athletes to maintain proper technique and power throughout gameplay, minimizing fatigue-induced errors.(5)

Flexibility is another component of fitness that is incorporated and important in multiple sports, such as martial arts, football, or soccer to enhance the efficiency and precision of an athlete's movements and injury prevention, allowing for smoother transitions

and better control during different sports competitions.(6,7) Prolonged and intense physical activity can lead to profound changes in the morphological characteristics of athletes, including changes to body composition i.e. the ratio of fat mass to lean muscle mass. An ideal body composition optimizes an athlete's power-to-weight ratio, enhancing performance in competitions. Maintaining a healthy body composition through proper nutrition aligned with exercise is crucial for maximizing an athlete's potential. By strategically fueling their bodies with the right nutrients and engaging in targeted training programs, athletes can optimize their physiological makeup for peak performance.(8,9)

Physical fitness offers a multifaceted approach in sports to building well-rounded athletes. Participation not only enhances physical fitness through improved muscularity, endurance, and agility, but also fosters mental wellbeing. Regular exercise acts as a stress reliever, boosting endorphins and promoting a positive outlook. Teamwork and collaboration during training and competition cultivates discipline, leadership skills, and strong social bonds. However, physical fitness is more than just a separate component. Optimizing athletic performance requires understanding their interplay. Soccer players, for example, need a blend of cardiovascular endurance for the game's pace, muscular strength for physical battles, dexterity for precise movements, and body composition that sustains speed and agility throughout the match.

Coaches and parents play a pivotal role in fostering a positive foundation for young athletes' physical fitness development. While this work in a triad of athletes, coaches and parents, few psychosocial aspects also need to be considered. These include the overall approach towards physical fitness, cultural aspects, expectations of the family and the people as well as the constant pressure of maintaining societal standards. Furthermore, nutritional deficiency is another issue in Pakistani youth. Around 56% of population suffer from vitamin D deficiency and 20% from vitamin D insufficiency, with the highest percentage in children and adolescents.(10) These nutritional deficiencies are common in whole population and not restricted to underprivileged only. Lack of balanced diet is another

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**DOI:** <https://doi.org/10.33897/fujrs.v4i2.434>

**How to Cite:** Hassan MF, Asim M. Building Young athletes: The role of physical fitness in sports. Foundation University Journal of Rehabilitation Sciences. 2024 July;4(2):71-72.

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nutritional aspect which limits sports personal's ability to build muscle mass, energy production and efficient recovery. By performing community screening and integrating such nutritional evaluation and management programs in schools, the nutritional deficiency aspect can be tackled to some extent. A step-by-step improvement in the amenities provided to the young population will help us in building the physical fitness of young athletes of Pakistan to international level. By implementing a targeted plan that prioritizes holistic approach and well-rounded physical fitness over short-term achievements, young Pakistani athletes can reach their full potential.

Considering Pakistan is a Low middle income country, underprivileged youth are unable to participate in organized sports and lack access to proper training and equipment. By developing a national goal to promoting access to well equip infrastructure and qualified trainers, in schools or at the community level, particularly in underprivileged areas of Pakistan, the physical fitness aspect of future sportsmen can be promoted from grass root level.

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