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# Role of biomechanics in sport

**Dr. Suman**

Asst. Professor, Chaudhary Devilal University, Sirsa, Haryana, India

**Abstract**
During this study we will research about the term 'Biomechanics', we will explore its history, meaning and importance in sports. The significance of biomechanics as a feasible sub discipline of physical education is currently perceived for the change in the techniques of sport. Experts, Teachers, Coaches can take benefit by the study of biomechanics, they can enhance their techniques and comprehension by considering standards of biomechanics. It will give a superior comprehension of inside and outer strengths and the human body. They will have the capacity to comprehend things profoundly and can instruct and enhance accordingly and this will include more preformation in their preparation. It additionally gives scientific knowledge that can be used amid the practice or rivalry. In current time rivalries are exceptionally intense, so it is essential that the coaches must know that how to upgrade the abilities and give better performance of athletes with the assistance of new methods and types of equipment.

**Keywords:** Biomechanics, kinematics, kinetics, kinesiology, biological, mechanics, performance, training

## 1. Introduction

**1.1 History and Definition:** Definition of the word biomechanics is blend of two words Bio and Mechanic. The term biomechanics is gotten from the Greek. The word bio alludes to living things, and the word mechanic alludes to the field of physics and the powers that follow up on body's in movement.

In Biomechanics we learn about the structure and arrangement of biological organisms. On the off chance that we allude to humans under biomechanics, we study how the muscles and skeletal system functions under various conditions/circumstances.

At some point the word biomechanics is utilized for kinesiology in light of the fact that both are necessarily related. Before pushing forward, we will sharp our comprehension about the word kinesiology. So what is Kinesiology?

Kinesiology is connected with the anatomical and physiological components that do movements-particularly bones, muscles, tissues and nerves. It is expected to comprehend human movements and how the movement happens. Kinesiology is the logical investigation of human movement, the term kinesiology is gotten from the Greek Kinesi, means motion. Kinesiology is not just about the investigation of human movement; it incorporates non-human movement moreover.

### 1.2 Area of Biomechanics

Biomechanics is utilized as a part of various fields of biology, physiology, engineering, physical therapy, pharmaceutical, material science, oral and orthopedic specialists, cardiologists, aviation. Instructors, trainers, coaches and exercise physiologists additionally use biomechanics in practical fields. Biomechanics has turned out to be extremely prominent and broadly acknowledged in the field of physical education. A man may study a few properties of human body and mechanical aspects and he can apply that information in different fields moreover. For instance, a coach learns about the human body and the principal of mechanical physics with the goal that he can accomplish successful execution by applying this information on the learners.

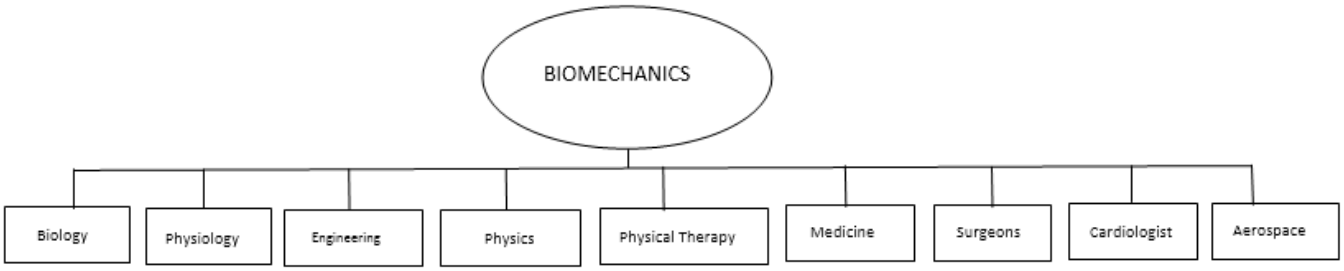


**Fig 1**

For example, in 1984 Winter Olympics Biomechanists worked with the United States Ski Team for the preparation of competition. They came to know that the same muscles are used in actual sking and dry land training. Through examination they found that better skiers had long walk lengths with these familiarities the

mentors could configuration practices to build up the more extended walk length, along these lines enhancing the execution of the colleagues. The utilization of biomechanists to work with national bore athletes and their mentors turn out to be progressively basic, with the biomechanists getting to be and vital part of the drilling staff. Biomechanists today work with different games groups at the national preparing focus in Colorado Springs.

**1.3 Area of Study-** There are two major areas of study.

1) Biological
2) Mechanics

1) Biological: The principal zone of biomechanics is biological in light of the fact that every last development and movement of human body is biological, it incorporates skeleton and muscular system. Without application of force we can't do any action even we can't raise our hand. Movement is the consequence of force, without force no movement is possible. At whatever point we do any action that time our body apply force to our bones, contraction of muscles, and bones act as a lever. For producing movements, bones, nerves and muscles work together. Without knowing biological perspectives, it is impractical to understand motor skill development.
2) Mechanics: The second territory of biomechanics is mechanics. It is essential in light of the fact that here the laws and standards of physics to human motion or movement. There are two subfield of mechanics, first is statics and second one is dynamic. In static mechanics we study steady/constant movement either at rest or move with a constant speed. In dynamic mechanics we study kinematics and kinetics.

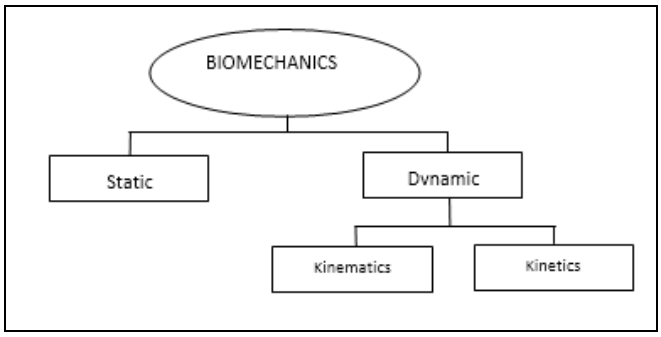


**Fig 2**

**1.4 Kinematics-** it is the study of the motion of bodies with respect to time displacement velocity and speed moment either in a straight line or in a rotary direction.

**1.5 Kinetics-** it is the study of the forces associated with motion, including forces causing motion and forces resulting from motion.

**1.6 How it can help in improving performance in sports**

There are such a variety of components which influence the game execution like physical wellness, motor movement, technical information, technique or tactics, physiological element, regular and scientific training and so on. Aside from these elements some different components are additionally there which enhance the execution, one of those component is biomechanics. On the off chance that the competitor executes the tenets and standards of biomechanics then he will have the capacity to perform better. In many games steadiness is required like sports events, gymnastics, wrestling, weight lifting and so forth. Biomechanics rule lets us know that focal point of gravity ought to be on the focal point of the base of your body, it will give more steadiness to the competitor. It is broadly acknowledged that for enhancing performance in games is to enhance the athlete's strategies, and strategies can be enhanced through biomechanics knowledge. So biomechanics acts as an inspiration to enhance or accomplish performance. Biomechanics can enhance the strategy in two ways. In first way instructors or coaches can enhance the strategy by their knowledge into biomechanics. Second the biomechanics analysts find new and viable techniques. In this way they can enhance the aptitude in two ways- qualitative and quantitative biomechanical analysis methods.

Let's take a gander at a simple example of the first case. As a coach, assume you watch that your long jumper is experiencing issues in finishing a landing. You may propose three things to long jumper to help him effectively: (1) approach run (2) the last two strides (3) take off, (4) action in the air and landing. Speed in the run up or approach and a high jump off the board are the keys of success.

The typical conviction is that new strategies are frequently developed by the biomechanics however actually such development is extremely uncommon. Disclosure of refinement in systems is more basic, with these refinements the old techniques are enhanced and with this enhancement the result is additionally improved that is the reason these refinements are a standout amongst the most vital thing.

**1.7 Reason for studying Biomechanics in field of physical education**

Bimechanics helps in improvement of the plan of sport equipment. Designs of various types of equipment are assessed by the bimechanicts and after assessment they make/propose changes in equipment that can be useful in enhanced performance. It is the aftereffect of biomechanics that in pole vault event fiber shafts are utilized rather than bamboo shafts in light of the fact that the fiber is more adaptable than bamboo. Designs of shoes are likewise changed to enhance friction which helps in upgrade speed and keep up body balance. Design of dresses are likewise changed for instance the costume of swimmers and outfit of athletes to diminishing water and air resistance.

Biomechanics helps in comprehension the body structure. Coaches with biomechanics knowledge can distinguish which body structure is proper for which sport, this will enhance sports and sports training result. Through Biomechanics knowledge competitors know how to use energy. Competitors can accomplish better outcomes by expending energy in an oversaw way. For instance, a

competitor save energy by wiping out undesirable movements while running.

Injuries are extremely normal in games and it influences the performance of the players. A few injuries are serious to the point that it requires a long time for recuperation. With the assistance of sports biomechanics various types of safety equipment are built which are imperative and valuable in sports to save competitors from injuries, for instance shin protector is utilized for football and hockey players. Pad, gloves, elbow guard, thigh guard, helmet and so on are utilized for cricket. The knowledge of biomechanics is vital for players, coaches, physical education teachers, trainers to forestall injuries. Sports biomechanics principles are based on fact, lets us know that what sort of principles to be actualizes to decrease odds of injuries. For instance, while taking high catch in cricket fielder moves his hands back toward the chest while catching the ball, in this way he is expanding the distance and diminishing the force of ball.

Through Biomechanics science we concentrate some extraordinary variables which impact sports performance. The Factors are streamlined, hydrodynamic, heading of air, rotation of object, releasing angle, force act on object, equilibrium, lever and so forth. By utilizing these variables competitors or games individual can improve their games performance.

## 2. Conclusion

Significance of biomechanics is expanding day by day Giving performance in games is becoming difficult nowadays. To offer great performance and to reprieve old record in sports, new techniques are exceptionally important and these techniques can be discovered with the assistance of biomechanics. Athletes are continually attempting to discover approaches to get speedier, higher and stronger with insignificant injuries. Enhancing your biomechanics might be one imperative method for upgrading your athletic skills. There is a major part of biomechanics in the accomplishment of athletes. Biomechanics has assumed a critical part for development of sports equipment, which are useful in sports performance.

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