



IMPORTANCE AND BENEFITS OF BIOMECHANICS IN SPORTS AND PHYSICAL ACTIVITIES

Veereshkumar B. Vijapur

Research Scholar ,

Dept of Physical Education Karnatak University, Dharwad.

ABSTRACT

At the present days sports will become a popular and fashion. That's why more athletes are involving in sports competition. This makes it more difficult for coaches and physical educator to coach the athletes, therefore new techniques like, equipment, training plan, coaching, teaching, modeling, measurement and injury reduction have developed which helps to Physical educator and coaches. The "Biomechanics is the science that examines the internal and external forces acting on a human body and effects produced by these forces", the basic concepts of sports biomechanics as they relate to sport performance and injury. Its help to Analyze sport actions, Identify and faithfully execute the best training exercises, Reduce or prevent the likelihood of injuries occurring, Choose equipment that is appropriately sized for the athlete. Biomechanics is developing a new and more effective technique for better execution of a sport skills or motion for improvement of technique. A good technique in sports is helpful because it promote high sport performance, easy to coach and reduces the risk injury. The new technology is applying to sports equipment; it is changing the nature of sport. Sport performance can change use of new equipments. The biomechanics studies help a direct application to injury and recovery, it's provide a good knowledge for prevention of sports injury, treatment of sports injury, rehabilitation and diagnosis are essential for understand. Biomechanics will provide the reason of science behind the changes for physical education teachers, and Athletes and sport coaches.

KEYWORDS: Biomechanics, Physical Activities, Sports.

I. INTRODUCTION

In earlier Physical education teacher and coaches having little knowledge about importance of biomechanics in sports. At the present days sports will become a popular and fashion. That's why more athletes are involving in sports competition. This makes it more difficult for coaches and physical educator to coach the athletes, therefore new techniques like, equipment, training plan, coaching, teaching, modeling, measurement and injury reduction have developed which helps to Physical educator and coaches. The answers to the question may be rooted in psychological, physiological and sociological issues; the problems identified



are all biomechanical in nature. Nowadays, Biomechanics also contribute in improving the performance of sport skills.

"Biomechanics is the science that examines the internal and external forces acting on a human body and effects produced by these forces" (**James G. Hay**). Biomechanics applies the law of mechanics, the branch of physics that analyzes the actions of forces in the study of anatomical and functional aspects of living organisms. The study of human biomechanics may include questions such as whether the amount of force the muscles are producing is optimal for the intended purpose of

the movement. It is essential to good understanding of the sports to apply specific physical principles –motion, momentum, resistance and friction to physical education teachers, coaches and athletes seeking, by trial and error to improvement of sports performances **Basic biomechanics (2001)**

II. IMPORTANCE OF BIOMECHANICS TO PHYSICAL EDUCATION TEACHERS, ATHLETES AND SPORT COACHES

Biomechanics will help physical education teacher and coaches for the improvements in the high quality of sports performance. The Biomechanics major goal is to find out faults and detecting and correcting faults in an athlete's performance and the development of new equipments and also changes of new techniques. These new changes help in minimizing sports injury and rehabilitation, but one cannot change the fundamental principles in sports. Biomechanics will provide the reason of science behind the changes for physical education teachers, and Athletes and sport coaches.

III. BIOMECHANICS IS A STUDY ABOUT HUMAN MOVEMENTS CAN HELP TO COACHES

- Analyze sport actions
- Identify and faithfully execute the best training exercises
- Reduce or prevent the likelihood of injuries occurring
- Choose equipment that is appropriately sized for the athlete
 - Choose the athletic shoe that fit properly and provides then necessary support and flexibility as required for the specific sport
 - Choose the boot and blades that properly fit and support the skater or skier; replace prior to equipment degradation/failure
- Maximize economy and efficiency of body movements

IV. HOW CAN BIOMECHANICS FULFILL ITS GOALS / PERFORMANCE IMPROVEMENT

Biomechanics major goals are improve performance of physical exercise and sport, and Provide recommendations for injury prevention and rehabilitation like.

IV.1. TECHNIQUE IMPROVEMENT

Biomechanics is developing a new and more effective technique for better execution of a sport skills or motion for improvement of technique. A good technique in sports is helpful because it promote high sport performance, easy to coach and reduces the risk injury. A possible to specify motor skills or position can increase sports performance. It can be help for physical educator and coaches to correct movements of players or athletes. Athletes must to develop the skills are essential to perform the movements of their correctly. If athletes be taught and utilize incorrectly techniques they may at perform well bur they are placing themselves at increased risk of both acute and chronic injury that will reduce their ability to present. Athletes are should be responsible for learning correct techniques, practicing them and using them in competition. Coaches should coach correct technique a priority and should regularly observe their athlete's performances to make sure those techniques are practiced. Coaches' role is more important as a skills passed to the athletes in the early hours age can be carried through an entire career. Therefore Coaches should be update with new techniques and coaching methods. Its help to athlete's use of correct technique and optimize performance and reducing risk of injury.

IV.1.1. all type of sports activities they have more injury risk Like,

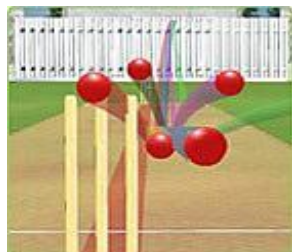
1. In netball game there players sudden changes of direction, the "stepping" or "stopping" position
2. In rugby game the tackles and scrums are basically dangerous.
3. In cricket bowlers delivery actions.
4. In football the twists and tackles.

IV.1.2. Coaches must identify risk of activities, make certain correct good techniques and best practice method have use in sports like.

1. Guidelines of particular sports techniques.

2. Video analysis its help to observing players performance and focusing players mistakes then correct technique.
3. Good techniques help to correct sequence and high level co-ordinate with muscles action.
4. In sports injuries are more happens with body twisting, jumping and landing or rotate in relation to the legs. The best techniques spreads adsorb and distribute forces in to the muscles and bones, help of bending and flexing at the hips, knees and ankles as this way to reduce the risk of injury

IV.2. Technology and Equipment Improvement



The new technology is applying to sports equipment; it is changing the nature of sport. Sport performance can change use of new equipments.

Technology developed in videos camera, electronic timers and computer system showing the trajectory of a cricket ball has made an **Hawkeye** immeasurable difference to the sport of cricket. Hawkeye produces all manner of statistical analysis such as ball speed, ball pitch on the wicket and trajectory of the ball after bounce.

IV.2.1. Hawkeye

A Coaches should the advice and provide the correct use of equipment In sports. Example are correct grip on implement like hockey, cricket, badminton, and tennis, grip will help to holding a bat and rockets handles its not skip.

The cricket bat is earlier very different compared to nowadays. The cricket ball has almost same size compared to earlier ball but a cricket bat is gradually developed throw the base of fundamental components like the origin of cricket bats have been made from variety of white willow wood, when hitting the cricket ball with a high bat speed an one drawback of bats it extremely heavy weight of bat average enormous 5 pounds. The solution was found bat making with the sapwood of the willow tree its much lighter than earlier. Thereafter using the heartwood of tree, now cricket bat weight has a average being around 3 pounds and bat shape and width also changed. This is a light feel and it helps extreme comfort.

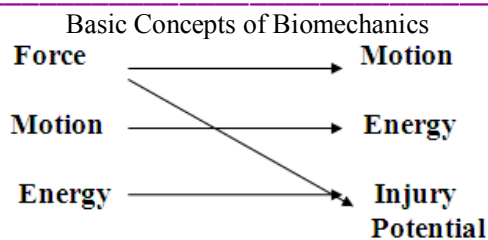
Field of rowing and cycling sports in developed lightweight but strong materials, and minimize drag though the water or air. British swimwear manufacture Speedo launched a new all-in-swimsuit known as the LZR Racer, its from polyurethane rather than conventional fabrics, the LZR racer was said to reduce a swimmers drag and also boost oxygen flow to the muscles. Development of Technology and equipments in sports to improve sports performance

IV.2.2. Benefits of technology in sport

- Its help to analysis of sport skills and enabling coaches to greatly improve the quality of feedback to athletes.
- Its help to developing accuracy in time measurement of sport performance.
- Its help to officials, umpires and referees to take a good decisions.
- Its help with better viewing of sport performance for spectators.
- Its help to improvement in the design of sport equipments.

IV.3. Injury Prevention and rehabilitation

The biomechanics studies help a direct application to injury and recovery, it's provide a good knowledge for prevention of sports injury, treatment of sports injury, rehabilitation and diagnosis are essential for understand



This table shows that **FORCE** leads to **MOTION** that leads to **ENERGY** that leads to **INJURY**. The basic concepts of sports biomechanics as they relate to sport performance and injury.

In swimming hands rotating on the axis, the correct stroke should be accompanied with equal body rotation to avoid injury. The body should be rotated at least 45° from its long axis equally in both directions. The head position must be natural on the spine as if the person were standing on a flat surface in good alignment. Many coaches and physicians had formerly taught the “eyes forward” head carriage, which increases impingement by impeding normal scapula thoracic motion.

The learning a proper Biomechanics to throw a fastball in cricket, starting with the wind-up stage culminating with the follow through stages, is crucial to staying injury free. In addition, developing effective secondary pitches can minimize the beating your body receives by diversifying your pitching repertoire, and keeping the fastball pitch counts down. For young pitchers of proper biomechanics of body movement can go a long way in minimizing the chances of getting injured. The less injury prone a pitcher is, the greater the chances of developing into a major leaguer.

During the case of running, including biomechanics can help to improve your running economy by creating the runner more efficient since they are using less energy. It also helps in minimizing imbalance and overuse injuries. The less time you spend on the sideline and more on competing and training the better chances of developing long-term.

V. CONCLUSION

This study finally shows that the “Biomechanics is the science that examines the internal and external forces acting on a human body and effects produced by these forces”, a **FORCE** leads to **MOTION**. In this paper we have already discussed about importance of biomechanics in sports and physical activities, its helps to improve the athletes performance, new skills developments, adopting new equipments, using new technology and The biomechanics studies help a direct application to injury and recovery, it's provide a good knowledge for prevention of sports injury, treatment of sports injury, rehabilitation and diagnosis are essential for understand, All of these factors contribute to improve the sports and physical activities.

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Research Scholar ,Dept of Physical Education Karnatak University, Dharwad.