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CHAPTER - I
INTRODUCTION

In this chapter general introduction of the study, statement of the problem, definition of terms, delimitation, limitation, hypothesis and significance of the study have been included.

1.1 GENERAL INTRODUCTION

Experts in the field of games and sports unanimously consider gymnastics as the mother of all sports and games. This is because an in-depth analysis indicates that the gymnastics activities are the most primitive and were developed in other forms of games and sports in different permutation and combination at different period of time. Thus gymnastics appears to the origin of games and sports. Primitive gymnastics involved the fundamental movements of human beings. These were running, jumping, throwing, vaulting, swimming etc. These natural and some unnatural activities used to be performed by human beings even during primitive age and therefore were older than the human civilization.

Etymological Meaning- The Greek word “Gymnos” means exercising in naked body and from this Greek word the activity was named “Gymnastics”. These activities were the events for competition during the Pan-Hellenic games including Ancient Olympic Games. Even today, gymnastics is the major area of attraction of Modern Olympic Games.

Olympic Games and Gymnastics- People first became interested in gymnastics thousands of years ago. In those far-off days, men used exercise to train themselves for war. But in ancient Greece, gymnastics
activities were much more important. In the first Olympic Games in 776 B.C., the Greeks stressed on the value of body exercises as a preparation for other events such as wrestling and jumping and they also encouraged physical fitness as being vital to personal development. Gymnastic movements aided in development of such general fitness.

The importance of physical culture declined with the fall of the Greek and Roman Empires. For many centuries, acrobats alone kept alive the gymnasts skill. Then, in the nineteenth century, there was new interest in gymnastics and other sports, during renaissance. This was due to the re-birth of idea of developing total personality of the individual instead of the spiritual faculty of man.

**Spread of Gymnastics**—In 1811, a Berlin schoolmaster, Ludwig Jahn (1778-1852), founded an outdoor gymnastics school. He also created apparatus for use in the school and much of today’s competitive equipment has been evolved from his design. Because of his immense contribution to the sport, Jahn is remembered as ‘TurnvaterJahn’- father of gymnastics.

At the same time in Sweden, Per Henrik Ling (1776-1839) introduced a different type of gymnastics. His system, based on mass exercising to command, aimed at developing perfect rhythm of movement. Ling’s methods were also adopted for military drilling. The two styles—muscular development using apparatus and rhythmic movement – competed for popularity in Europe. Soon gymnastics clubs were formed in many countries.

Gradually, these clubs set up National Associations to control training and competitions. Then, in 1881, a Belgian - Nicolas Cuperus, founded the Federation Internationale de Gymnastique (F.I.G.) linking the various national bodies.
For almost a century, F.I.G. controlled international gymnastics. In the 1920s, the Federation brought together the two systems, thus linking the precision of the German method with the fluency of the Swedish style. Today F.I.G., with its headquarters in Switzerland, groups seventy-four national organizations.

In 1878, just before F.I.G.s foundations, German archaeologists excavated the site of the ancient Olympic Games at Olympia in Greece. Their work drew the attention of many people and, in 1894, a French scholar and educationist, Baron Pierre de Coubertin, summoned representatives from twelve countries to a conference in Paris on revival of Olympic Games.

This meeting led to the revival of the Games after a gap of 1500 years. The first modern Olympics were held in 1896 in Athens. It took place in a newly-built marble stadium before a crowd of 50000: there were 311 competitors from a total of thirteen countries, and all were men. In the gymnastics section, the German team won nearly all the medals.

**Classification of Gymnastic events**-The sport in its modern form was first evolved during the 19th century, when the two styles of gymnastics conflicted - the Swedish system (mainly freestyles group exercises) and the German system (using apparatus). The ancient system of gymnastics was modernized by the German system. Now the Federation Internationale de Gymnastique (F.I.G.) classified the total official and competitive gymnastics into main five divisions for both men and women which are Artistic gymnastics, Rhythmic gymnastics, Acrobatic gymnastics, Aerobic gymnastics and Trampoline. Among these five divisions, more attractive and popular is Artistic Gymnastics. Men’s Artistic Gymnastics events now consist of six apparatus viz. Floor
Exercise, Pommel Horse, Rings, Table Vault, Parallel Bars and Horizontal Bar. Women’s Artistic Gymnastics events now consist of four apparatus viz. Beam, Uneven Parallel Bars, Floor Exercise and Table Vault.

**Take-off as a phase of total movement structure** - Take-off is a process in which an individual generates vertical momentum and lifts his body from the ground or rigid surface. Generally, the take-off is considered to be an important feature for most of the jumping events in Track and Field athletics but in case of running there is also take-off action in each stride. In gymnastics, body of the gymnasts is also lifted with the generated ground reaction force. Among different gymnastics events Floor Exercise and Table Vault involve take-off action. The purpose here also is to project the body into air. There are differences both in purpose and process in taking-off in Gymnastics and Track and Field athletics. In Track and Field the take-off is considered to the main phase for running and jumping and the movements there after are not that important in respect to performance, but in gymnastics, take-off is to project the body in space and to do some skillful movements which are the main factors for performance. For this difference the gymnastics take-off should have different performance structure than that of running and jumping. Secondly, the take-off action is completed by single foot action in running and jumping but it is not same in gymnastics. Here the take-off is done with both the feet. There may be many other differences in take-off action in running and jumping and take-off of gymnastics.

**Kinematic analysis of Take-off techniques in Gymnastics** - Kinematics analysis of take-off action as a part of sports biomechanical research has been proved to be of great value for several reasons. Firstly, it helps to identify the movement elements as components with which the total movement structure is formed. Secondly, the role of each sub-phases
of take-off in the total performance can be better understood and explained also from analysis of movement. Finally, identification of the faults in execution and there by possible correction can be prescribed from analysis of movement also.

For all these reasons there have been a number of attempts to analyze the execution of take-off technique of gymnasts. Present project is also a similar attempt. The purpose here was to analyze the action of take-off of national and international level male gymnasts from West Bengal on the basis of laws and principles of kinematics.

1.2 STATEMENT OF THE PROBLEM

The focus of the study was to analyze the technique of take-off for selected Floor Exercise and Table Vault of Gymnastics on the basis of laws and principles of kinematics. Accordingly, the problem was stated as “KINEMATIC ANALYSIS OF TAKE-OFF TECHNIQUES FOR DIFFERENT GYMNASTIC EVENTS”.

1.3 DEFINITION OF THE TERMS

In order to understand the nature and scope of present investigation the following terms should be specifically understood as follows:

i) Kinematics

Kinematics is a branch of mechanics. Kinematics deals with description of motion including consideration of space and time. The kinematic parameters include Distance and Displacements, Speed and Velocity and Acceleration. There may be linear as well as angular kinematics according to the nature of motion.
ii) Analysis

Analysis means a process of separation of underlying components of a total structure. In the present study, analysis was considered as the process of analysis of total movement structure involved in take-off action. The term has been specifically used to break down the complex movement structure of take-off on the basis of laws and principles of kinematics.

iii) Take-off

Take-off is a process in which an individual generates vertical momentum and lifts his body off the ground or rigid surface. Generally, the take-off is considered to be an important feature for most of the jumping events but in case of running, there is also take-off action in each stride.

iv) Gymnastic events

Federation Internationale de Gymnastique (F.I.G.) classified the total official and competitive gymnastics into main five divisions for both men and women which are (a) Artistic gymnastics, (b) Rhythmic gymnastics, (c) Acrobatic gymnastics, (d) Aerobic gymnastics and (e) Trampoline. Men’s Artistic Gymnastics (MAG) now consist of six events viz. Floor Exercise, Pommel Horse, Rings, Table Vaulting, Parallel Bars and Horizontal Bar. In the present investigation, researcher recognized only Floor Exercise and Table Vault as gymnastics events for analysis.

1.4 DELIMITATION

The present study was delimited to the following conditions:

i) The subjects of the study were very less (n=6).

ii) The subjects of the study were all men.

iii) The data were collected by using videographic technique.
iv) Only one video camera was used for recording movement of take-off action.

v) Only the kinematic parameters were considered for analysis.

vi) Backward Salto from Floor Exercise and Handspring Vault from Table Vault events were considered in this investigation.

1.5 LIMITATION

Present study was conducted under some liming condition. These were:

i) The non-availability of cinematography was major limitation.

ii) High speed videography camera was not available and it was a genuine limitation for the study.

iii) Recording of movements could not be done in actual competitive situation.

iv) Time and finance were also limiting factors.

v) The software used for analysis of movement was not of very high precision.

1.6 HYPOTHESIS

The study was based on the following hypothesis:

Ho: There would be no difference in take-off action between Backward Salto and Handspring Vault in respect to selected kinematic parameters.
1.7 SIGNIFICANCE OF THE STUDY

It was considered that the results of the study would of great significance for the field of games and sports in the following ways:

i) From the results the mechanics of take-off technique of selected gymnastics events would be clearly understood.

ii) The differences if any, between the take-off actions of Backward Salto and Handspring Vault would be clear.

iii) The differences between take-off action with two feet (in Gymnastics) and one foot (in Track and Field Athletics) would be thoroughly understood.

iv) It would be possible to understand the nature of take-off technique of gymnasts with respect to performance.

v) It would also be possible to develop the model of mechanical features of effective take-off actions for selected gymnastic events.

vi) The results would help in suggesting the methods of identification and correction of faults in execution.

vii) Results would provide important information for future research.