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Multiple Regression Models of Successful Tennis Service Performance

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MULTIPLE REGRESSION MODELS OF SUCCESSFUL

TENNIS SERVICE PERFORMANCE

BY

SUSAN D. GIRARD

THESIS

Submitted in partial fulfillment of
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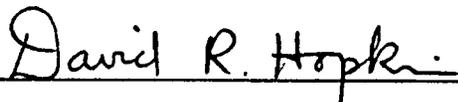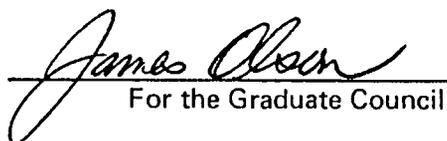
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TENNIS SERVICE PERFORMANCE

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THE UNIVERSITY OF TEXAS OF THE PERMIAN BASIN

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CHAPTER I

INTRODUCTION

Tennis has grown tremendously since the mid 1960's. Popular

demand has brought about an increase in tennis facilities, both public

and private. No longer is tennis a social game for the wealthy few,

but it is a highly competitive sport in which anyone with the ability

and desire can participate. The larger number of players has brought

about a demand for more and better trained tennis instructors.

Having played competitive tennis for more than ten years, and

currently a tennis coach and instructor, the researcher feels it is

important to standardize the basic stroke production as nearly as

possible. Though there is little basic research in this area, many

tennis coaches and professionals have written literature concerning

their methods and ideas of teaching. Most of these ideas conflict,

except the one involving practice. All tennis authorities agree that

repetition of the basic strokes is necessary. The mechanics of the

strokes should be repeated so often that they become, as nearly as

possible, standard.

The serve is the one time that a player is in total control of

the situation. Yet, this is a stroke that is often missed or poorly

hit. These mistakes have been attributed to several causes which

include a poor ball toss, the wrong grip, the wrong stance, no arm

extension, no weight transfer, no follow through, no wrist snap, ducking the head, dropping the elbow, and not pushing off with the legs. With the player having so many components to concentrate on to serve successfully, it is necessary to standardize as much of the serve as possible. It is the responsibility of the coach or instructor to help the player eliminate as many of these problem areas as possible.

PURPOSE OF THE STUDY

The purpose of this study was to determine the most important biomechanical components of a successful serve. A successful serve was determined by the accuracy of placement and the velocity of the ball.

PROBLEM OF THE STUDY

The problem of this study was to develop a multiple regression model of biomechanical elements of successful tennis service performance.

SIGNIFICANCE OF THE STUDY

As noted above in the introduction, the serve is a complicated series of movements in which the failure to execute adequately any part will result in a service fault. Since most instruction is group instruction rather than individual teaching, the coach must be able to explain and demonstrate methods of correction that apply to all of the students. In teaching a group of individuals, some degree of success must be seen to keep interest high. Much of the literature concerned with descriptive biomechanical models has focused on highly skilled performers. If in this study the most important components of the serve can be determined, then this information can be passed on to the students and stressed by the instructor.

Not all tennis professionals agree on which parts are the important parts. Emphasizing the serving motion as being the same as an overarm throwing motion is the contention of some instructors (Murphy and Murphy, 1975). Another contention is that the ball toss is the primary factor on the outcome of the serve (Fairs, 1978). To serve effectively, the player's feet must be positioned properly along the baseline (Eldred, 1977). These are but a few of the theories that various authorities offer.

With such lack of agreement among tennis authorities, there is a vital need for study of these components to determine their relative importance. Most literature available consists of statements by these authorities with no research support. "One of the great joys in tennis is serving the ace; one of the great disappointments is serving the double fault." (Plagenhoef, 1970, p. 47). It was the purpose of this study to eliminate these disappointments.

DELIMITATIONS

The study was delimited in the following way:

1. The test was administered to tournament players at the junior college level.

2. Eight players were filmed and analyzed, six on the basis of fifteen serves, one on the basis of forty-seven, and one on the basis of fifty-five.

3. The criterion for a successful serve was determined by:

   a. The speed of the serve as determined by the calculation of ball velocity during the film analysis.

   b. The placement of the serve as determined by a target score area on the court where the ball struck.

ASSUMPTIONS

The study was based on the assumptions that:

1. Biomechanical components of tennis service performance can be accurately measured from film records.

2. Each player was trying to serve his natural serve with no regard to the film analysis.

DEFINITION OF TERMS

For the purpose of this study, the following terms are defined:

1. Film Analysis--filming the subject and subsequently analyzing the component parts of the serve.

2. Follow through--finishing the stroke by bringing the racket arm and back leg forward.

3. Grip--the way in which the racket is held.

4. Serve--the initial movement by which the point is begun.

5. Stance--the placement of the feet along the baseline before serving.

6. Toss--throwing the ball up in the air with hand opposite of the racket hand.

7. Weight transfer--the shift of body weight from one foot to the other.