

INFORMATION TO USERS

This was produced from a copy of a document sent to us for microfilming. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help you understand markings or notations which may appear on this reproduction.

- 1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure you of complete continuity.**
- 2. When an image on the film is obliterated with a round black mark it is an indication that the film inspector noticed either blurred copy because of movement during exposure, or duplicate copy. Unless we meant to delete copyrighted materials that should not have been filmed, you will find a good image of the page in the adjacent frame.**
- 3. When a map, drawing or chart, etc., is part of the material being photographed the photographer has followed a definite method in "sectioning" the material. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.**
- 4. For any illustrations that cannot be reproduced satisfactorily by xerography, photographic prints can be purchased at additional cost and tipped into your xerographic copy. Requests can be made to our Dissertations Customer Services Department.**
- 5. Some pages in any document may have indistinct print. In all cases we have filmed the best available copy.**

**University
Microfilms
International**

300 N. ZEEB ROAD, ANN ARBOR, MI 48106
18 BEDFORD ROW, LONDON WC1R 4EJ, ENGLAND

7921774

JONES, PATRICIA LONG

A SURVEY OF SOUTHEASTERN CONFERENCE WOMEN'S
BASKETBALL COACHES AND OHIO VALLEY CONFERENCE
WOMEN'S BASKETBALL COACHES ON THE OVERALL
EFFECTS OF PRE-SEASON WEIGHT TRAINING.

MIDDLE TENNESSEE STATE UNIVERSITY, D.A., 1979

University
Microfilms
International

300 N. ZEEB ROAD, ANN ARBOR, MI 48106

A SURVEY OF SOUTHEASTERN CONFERENCE WOMEN'S
BASKETBALL COACHES AND OHIO VALLEY
CONFERENCE WOMEN'S BASKETBALL
COACHES ON THE OVERALL
EFFECTS OF PRE-SEASON
WEIGHT TRAINING

Patricia Long Jones

A dissertation presented to the
Graduate Faculty of Middle Tennessee State University
in partial fulfillment of the requirements
for the degree Doctor of Arts

May, 1979

A SURVEY OF SOUTHEASTERN CONFERENCE WOMEN'S
BASKETBALL COACHES AND OHIO VALLEY
CONFERENCE WOMEN'S BASKETBALL
COACHES ON THE OVERALL
EFFECTS OF PRE-SEASON
WEIGHT TRAINING

APPROVED:

Graduate Committee:

Martha H. Whaley
Major Professor

Stanley H. Hall
Committee Member

Wallace R. Meyer
Committee Member

W.S. Solomon
Head of the Department of Health, Physical Education,
Recreation, and Safety

Robert C. Allen
Dean of the Graduate School

ABSTRACT

A SURVEY OF SOUTHEASTERN CONFERENCE WOMEN'S
BASKETBALL COACHES AND OHIO VALLEY
CONFERENCE WOMEN'S BASKETBALL
COACHES ON THE OVERALL
EFFECTS OF PRE-SEASON
WEIGHT TRAINING

by Patricia Long Jones

This study was concerned with a survey of the coaches of women's basketball teams in the Southeastern Conference and the Ohio Valley Conference to see if they had implemented a pre-season weight training program similar to those described in recent literature which have proven positive results. Additionally, the study attempted to ascertain what percentage of surveyed coaches used pre-season weight training, which of the various types of weight training programs were most frequently used by the coaches in their programs, what relationship, if any, existed between a particular type of weight training program and the coach's won-lost record, and which of the various types of weight training methods were found to be used most frequently in the related literature.

A questionnaire was mailed to ten coaches of women's basketball teams in the Southeastern Conference and seven coaches of women's basketball teams in the Ohio Valley Conference. Each respondent answered sixteen questions identifying selected information concerning their pre-season weight training program. The questionnaire was open-ended to allow each coach to elaborate on her/his answer. There was 100 percent response to the questionnaire.

The data were tabulated question by question to allow the reader an insight into individual items of the pre-season weight training programs of each conference.

The tabulated data from the survey revealed the following:

1. Eighty-eight percent of the coaches of women's basketball teams in the Southeastern Conference and the Ohio Valley Conference use a pre-season weight training program.

2. The related literature indicated that pre-season weight training was desirable for developing athletes and that pre-season weight training reduces injuries that could prove disastrous to a team or an athlete.

3. Isokinetics was by far the most widely used type of conditioning exercises. It was indicated that isokinetics is instrumental in strength development and reduction of injuries. Also indicated is that not many other types of weight training programs were used by the coaches.

4. The majority of the coaches (ten) indicated their pre-season weight training program was only one of the major contributing factors in their won-lost record. Other factors were greater level of efficiency in skill performance, fewer injuries, strength, and cardiorespiratory endurance. However, six of the coaches indicated that their pre-season weight training program was the major contributing factor in their won-lost record. One coach indicated that there was no pre-season weight training program for her women's basketball team.

5. The related literature indicated that isokinetics seem to hold the most promise for weight training programs of the future. Again, the reduction of injuries and the realization of almost immediate results, plus the ability to go through the full range of motion, make isokinetics the popular choice.

6. The Leaper and the Universal Weight Machine were most frequently used in the coaches' pre-season weight training program. The emphasis was on the development of the vertical jump, leg strength, and the development of the upper body area.

7. Pre-season weight training is not only beneficial to the player's performance but also has a favorable "psychological effect" which is very important because this factor tends to give a player mental alertness and confidence in herself and in her teammates.

8. All of the coaches who were involved with weight training would like to know more about pre-season weight training for their basketball players.

RECOMMENDATIONS

The following recommendations were based on the responses to the questionnaire and review of literature:

1. Further extensive research needs to be done concerning weight programs for women.
2. The need exists for more publications for all types of weight programs for women. The writer found it very difficult to obtain enough sources for this dissertation.
3. All coaches should assess the isokinetic exercise programs available. This is the newest of the exercise programs, and it is the opinion of the writer, as a former coach, that positive results will occur in the players as a result of using the isokinetic method.
4. A future investigation needs to be made, between very successful basketball teams and teams with little success, to see if weight training is a factor for the success.
5. The companies producing the weight training machines and devices should be more aggressive in advertisement and salesmanship.

Patricia Long Jones

6. Hopefully, this study will open the door for further investigation in the area of pre-season weight training for women basketball players.

ACKNOWLEDGEMENTS

The writer is grateful to several people who were very instrumental in various ways for their contributions to this study:

Dr. Martha H. Whaley, major professor, for her scholarly direction, encouragement, and assistance.

Dr. Stanley Hall, Dr. Wallace Maples, and Dr. Robert Aden, Dean of the Graduate School, for their direction and assistance during this study.

Dr. A. H. Solomon, Department Chairperson (HPERS), for his constant support and encouragement.

Dr. Robert Prytula, for his unselfish assistance, consultation, and motivation.

The respondents from both the Southeastern Conference and the Ohio Valley Conference, for their contributions to this study.

Her children, Leila Robinson Jones Nicol, Robert McNeilly Jones II, and Mary Ashby Jones, for their untiring efforts of encouragement, patience, and confidence during this study.

TABLE OF CONTENTS

	Page
LIST OF TABLES	v
LIST OF APPENDIXES	vii
 Chapter	
1. INTRODUCTION	1
STATEMENT OF THE PROBLEM	3
PURPOSE OF THE STUDY	4
DELIMITATIONS OF THE STUDY	5
BASIC ASSUMPTIONS	5
DEFINITIONS OF TERMS	6
2. REVIEW OF RELATED LITERATURE	8
ISOTONIC TYPE PROGRAM	22
ISOMETRIC TYPE PROGRAM	25
Functional Isometric Exercise Program	26
Basic Exercises	27
ISOKINETIC TYPE PROGRAM	29
3. METHODS AND PROCEDURE	32
SURVEY SAMPLE	33
INSTRUMENT OR QUESTIONNAIRE	34
COLLECTING THE DATA	35
ANALYSIS OF DATA	35

Chapter	Page
4. ANALYSIS OF DATA	37
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . .	62
SUMMARY	63
CONCLUSIONS	64
RECOMMENDATIONS	66
APPENDIXES	67
BIBLIOGRAPHY	74

LIST OF TABLES

Table	Page
1. Distribution of Returns of the Data from the Coaches of Women's Basketball Teams in the Southeastern Conference and the Ohio Valley Conference	38
2. Pre-season Weight Training Program for Women's Basketball	40
3. Number of Years Pre-season Weight Training Program Used by Coaches	41
4. Coaches' Won-lost Records for the Past Three Years	42
5. Visible or Measurable Improvement in Players' Performance Since Beginning Pre-season Weight Training Program	43
6. Preference of Exercise Method	45
7. Use of Weighted Devices for Performance Improvement	46
8a. Types of Machines Used in Pre-season Weight Training Program	48
8b. Purpose of Accomplishment of Each Machine Used in Pre-season Weight Training Program	49
9. Other Types of Pre-season Weight Training Methods	51
10. Coaches' Desire to Know More About Pre-season Weight Training	52
11. Observable Psychological Effects of Pre-season Weight Training on the Trainees	54

Table	Page
12. Notice of Injuries Resulting from Pre-season Weight Training	55
13. Reduction of Injuries Due to Pre- season Weight Training that Normally Occur During Regular Season Play	56
14. Player Attitude Concerning Pre-season Weight Training	58
15. End of Pre-season Weight Training Program	59
16. Pre-season Weight Training Program Major Contributing Factor to Coaches' Won-lost Record	60

LIST OF APPENDIXES

Appendix	Page
A. Letter to Coaches	68
B. Questionnaire	70

Chapter 1

INTRODUCTION

Since the passage of Title IX and the Educational Amendments Act of 1972, there has been a phenomenal growth in every phase of women's athletics.

The National Collegiate Athletic Association (NCAA) reports a sixfold increase in women's sports. National championships are now played in approximately seventeen women's intercollegiate sports, and manufacturers are reporting a sales growth of over 60 percent in women's sporting equipment. Only a few years back, names like Cathy Rush, Luisa Harris, Anne Meyers, Carol Blazejowski, and others were not household names. The women's sports program has expanded to the point that schools are competing for the services of talented high school women athletes. As golfer Carol Mann noted, "Things are changing, things are changing."

The increase in interest and competitive intensity has had some side effects. Dr. C. Harmon Brown, California State University at Hayward, notes:

Four years ago it was socially unacceptable for women to compete in sports, and they were forced to be sedentary. Now, active women are accepted, but the teachers,

coaches, and trainers are not equipped to show the women how to gradually improve their physical fitness and cut down on injuries.¹

However, the improvement of women's athletic programs, in the administrative aspect, in the excellence of coaches, and in the administration of the physical conditioning of the athlete, is moving at a fast pace.

The competition has become so very keen that the coaches of women's sports are searching for the most sophisticated and well organized pre-season conditioning program for their athletes.

During the past few years, the authorities working with women's sports have realized the benefits of weight training. Two of our finest olympic caliber athletes have noted on separate occasions the benefits of weight training. The East German women, fierce competitors in women's sports, engage in weight training activities to give them an added edge in competition. Whether it is a more powerful stroke in swimming, a stronger release in field events, or the domination of the bucket area in basketball, the stronger athlete is a better athlete.

The suppression of the woman athlete by society has led to the reluctance to pursue maximum participation or to reach her potential. It is commonly thought by young women

¹Louis Tomasi, "Weighting for Women," United States Women Coaches and Athletes, I (October, 1978), 16.

that weight training will produce unsightly, bulging muscles. There are many physiological differences between men and women that affect the increase in muscle development. The level of the hormone testosterone is one of the biggest factors. The level of blood testosterone in women is much less than in men. In a study at West Point by Peterson and Tomasi, it was shown that women who undertook an eight week weight training program increased their strength, power, and muscle endurance, but exhibited no evidence of unsightly bulging muscles.²

Goldenberg states that,

Training with weights will give you that extra power or strength when it's needed, and it will also enable you to train harder and longer without getting tired as quickly. If you start out with a light weight in your exercises and gradually increase your poundage over a period of months, the body will slowly develop in order to handle this increased resistance.³

STATEMENT OF THE PROBLEM

This study was designed to investigate (1) the pre-season weight training programs of the Ohio Valley Conference and the Southeastern Conference women's basketball teams and (2) the coaches' opinions of the value of

²Tomasi, p. 16.

³Joseph Goldenberg, "Training with Weights," Scholastic Coach, XXXI (January, 1961), 36.

the pre-season weight training program in regard to the won-lost record.

PURPOSE OF THE STUDY

The purpose of this study was to survey Ohio Valley Conference and Southeastern Conference coaches of women's basketball teams to see if they have implemented women's weight training programs similar to those described in recent literature which have proven positive results.

From this survey and related literature the following question will be answered:

1. What percentage of surveyed coaches use pre-season weight training?
2. Which of the various types of weight training programs were most frequently used by the coaches in their programs?
3. Is there any relationship between a particular type of weight training program and won-lost records among universities?
4. Which of the various types of weight training methods were found to be used most frequently in the related literature?

DELIMITATIONS OF THE STUDY

1. The study was limited to the discipline of basketball.
2. The study was limited to coaches of women's basketball teams.
3. The study was limited to coaches of women's basketball teams in the Southeastern Conference (consisting of the following universities: The University of Alabama, Auburn University, The University of Florida, The University of Georgia, The University of Kentucky, Louisiana State University, The University of Mississippi, Mississippi State University, The University of Tennessee, and Vanderbilt University) and the Ohio Valley Conference (consisting of the following universities: Austin Peay State University, Eastern Kentucky University, Middle Tennessee State University, Morehead State University, Murray State University, Tennessee Technological University, and Western Kentucky University).

BASIC ASSUMPTIONS

1. Women basketball players need to strengthen the upper chest and arm areas.
2. Women basketball players need to strengthen the legs and cardiovascular system.
3. Women basketball players need to improve their vertical jumping ability.

4. A pre-season weight training program can be used to improve performance and decrease injuries.

5. The implementation of a weight program must be planned well in advance of the season.

6. The won-lost record of a team may depend on the pre-season weight training program.

DEFINITIONS OF TERMS

For the purpose of this study, the following terms and definitions were used.

NCAA--National Collegiate Athletic Association, the national organization for men's intercollegiate athletics.

AIAW--Association Intercollegiate Athletics for Women, the national organization for women's intercollegiate athletics.

OVC--Ohio Valley Conference, a conference consisting of intercollegiate athletic teams in Tennessee and Kentucky.

SEC--Southeastern Conference, a conference consisting of intercollegiate athletic teams in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, and Tennessee.

Isometric exercise--contractions in which the muscle contracts, but there is no movement, as when pushing or pulling against an immovable object.

Isotonic exercise--exercise in which the muscle contracts and there is movement, but the force it contracts against is constant, as when lifting a weight doing calisthenics or pulling against a frictional rope exercise.

Isokinetic exercise--another form of resistive exercise in which the speed of movement is held relatively constant (there is no throwing or ballistic movement) and the force the muscle works against fluctuates so that it always equals the maximum force the muscle is capable of creating at any given point in its range of movement.

Chapter 2

REVIEW OF RELATED LITERATURE

In the opinion of this writer, of the seventeen national championships offered in women's intercollegiate athletics by the Association Intercollegiate Athletics for Women (AIAW), basketball has ranked first as far as national interest has been concerned. There are now national polls for ranking women's intercollegiate basketball teams and for the first time in 1979 the National Broadcasting System (NBC) will telecast, live, the finals of the AIAW national tournament. The benefits of media exposure are many to an institution, and what explosive effect this year's telecast of the women's basketball game will have can only be speculative. Probably all women's basketball teams in this country will be looking for the ingredients to propel them into the national tournament limelight.

Most coaches of women's basketball teams evaluate their programs from the beginning of the school year to the end of their regulation game season. Many will consider that basketball is a complicated sport which requires many hours of team practice to develop the on-court coordination needed for a winning team.

The best way to develop a good team quickly is to have each member totally conditioned individually before team practice begins. Then the team's conditioning and coordination will have a head start on the season.¹

It is unfortunate that many physical educators, basketball coaches, parents, and young women athletes still believe that weight training has unfavorable results for the female athlete. The most common misconception is that, in addition to an increase in strength, weight training produces unsightly, bulging muscles and a decrease in muscular coordination.

It is true that a woman's muscular strength will increase following a weight training program. In fact, it is generally believed that her increases may be greater than a man's because of the initial relative strength levels.² But, in addition to an increase in strength, weight training can also increase an athlete's aerobic fitness and jumping ability. At the same time there is little change in body weight. Indeed, such a program produces significant losses of fat tissue which is replaced by lean muscle tissue.

In a study conducted at West Point a group of women athletes exhibited increases of 12.0 percent to 13.5 percent

¹Hydra Gym Athletics, Inc., Scholastic Coach, XXXXVIII (September, 1978), 109.

²Louis Tomasi, "Weight Training for the Basketball Team," United States Women Coaches and Athletes, I (December, 1978), 36-37.

in the strength of their quadricep muscles (jumping muscles), yet their body weight increased by only two pounds.³ This increase is explained by the loss of fat tissue and gain in lean body mass. Their levels of submaximal fitness increased making a workload easier after training than prior to training.

Jumping ability is of utmost importance to basketball coaches and players. The ability to leap high to gather rebounds will benefit the team effort. A pre-season weight training program, however, is often ignored as a basic but effective means to increase the distance an athlete can leap. It was noted in the West Point study that the women increased an average of two inches in the standing long jump.⁴ This increase in power will allow one's players to outrebound the opponent and significantly contribute to the team effort.

Muscular coordination will not be affected by weight training. The athlete must continue to shoot, dribble, and develop her basketball skills while engaging in weight training. Strength development is not intended to increase the player's ability alone, but it is intended to supplement

³Tomasi, pp. 36-37.

⁴Tomasi, pp. 36-37.

the coach's teaching drills and assist the player's desire to reach her maximum potential.⁵

A strong argument can be made in the face of the tremendous, relatively recent advances in the number of athletic opportunities for women that a sound, legitimate foundation in women's athletics can be established with regard to pre-season weight training programs and techniques.

Generally speaking, such a foundation will result from two actions on the part of coaches of women's teams. First, all coaches of women's teams need to reexamine their weight training and conditioning programs to ensure that their fitness efforts are sound, safe, and scientifically proven. Second, whenever necessary, coaches should take action to base their weight training and conditioning efforts on scientific principles--not personal intuitions or idiosyncrasies. Total fitness will pay results where it counts--on the athletic fields and courts.⁶

Scientifically, training implies making changes within the body. Training is not advocated as a panacea for all basketball problems but simply as one of the many

⁵Tomasi, pp. 36-37.

⁵James A. Petersen, "Total Fitness--The Key to Winning Athletes," United States Women Coaches and Athletes, I (November, 1978), 43-44.

important phases of preparing athletes for basketball competition.

A deliberate plan is needed to provide proper training for each individual. In order to bring about desired change, repeated exercises that progressively increase in intensity and difficulty over a space of time must be experienced.

Specificity: Training is specific. A player receives what he trains for and should not expect much more. Specificity also applies to weight training. If strength is desired, the training must be directed toward strength development by progressively increasing the resistance to a given movement. If this is not done, increased strength will not occur as the body adapts to the level of strength needed to overcome the resistance.

Overload intensity: There is no question that the addition of overload on the specific musculature used in a movement will improve power performance, i.e., jumping and sprinting. The overload required is work per unit of time, not duration. This may be accomplished by using heavy resistance for few repetitions. The most resistance a person can move for nine to ten repetitions per bout seems to be the most efficient for strength gains.⁷ Doing more

⁷Dale L. Hanson, "Scientific Basis of Pre-Season and Early Season Training for Basketball," Athletic Journal, XLVI (September, 1965), 80-81.

repetitions with lighter weight may prove of little value. If the athlete is to continue to improve, the increase in load must be progressive.

Retgression: It should be pointed out that many athletes will regress before they progress when they start on a training program. The athlete and coach should be advised so they do not panic when retrogression occurs and decide to discontinue the program. If they remain devoted to the program, provided they are training properly, they will pass through the stage quickly and then make rapid gains.

The following are considered important: strength, power, endurance, flexibility, agility, coordination, and relaxation. These will be examined one at a time.

Strength: A weight training program is recommended which emphasizes the proper development of the shoulder and arms, lower back, abdomen, thighs and hips, and calves. The exercises to employ and their proper execution are well outlined in various weight training textbooks.

Shoulder and arms: A lack of shoulder strength probably represents the most noticeable physical weakness in present-day basketball players.⁸

Hands and wrists: A daily strengthening of hands and wrists should be employed. Exercises and weights should

⁸Hanson, pp. 80-81.

be used to increase not only strength but dexterity and flexibility in the fingers, hands, and wrists.

Abdomen: Abdominal strength is important to the execution of offensive and defensive rebounding.

Legs: The overload principle should be used to increase the speed of the leg return but will result in impaired speed unless the musculature that propels the body is also overloaded.

Endurance: The running recommended for basketball competition consists of a series of short bursts of short lengths to produce speed.

Flexibility: Standard stretching, bending, and twisting exercises are recommended and should be overloaded whenever possible.

Agility: Agility may be developed in many conventional ways with a change of direction used frequently.

Coordination: Coordination is best acquired by practicing the event while fresh.

Relaxation: The athlete must learn to recognize her/his increase in muscular tension and then release it. Her/his movements will be faster and more efficient; consequently, the athlete will be less liable to injury which accompanies fatigue.

Rest periods: Adequate time for rest should be planned into the training schedule--at appropriate

intervals. Perhaps this will help solve staleness problems.⁹

When undertaking a weight training program, there are five factors to consider: the number of repetitions, the number of sets, exercise through the range of motion, the time intervals, plus the order of the exercises to be performed.

The number of repetitions to be performed is between eight and twelve repetitions. Because the same muscles are used to lower as to raise the weight, the sequence of exercises is two seconds to lift the weight, one second for a pause and four seconds to lower the weight. When the muscle is exercised in the above sequence, momentary muscle failure between eight and twelve repetitions is desired to gain maximum muscle strength.¹⁰

The number of sets used is dependent on the type of weight training apparatus employed. For the new resistance machines, one set is recommended. When conventional free weights are used, two sets are required. The second set is usually performed with an adjusted resistance.

One of the misconceptions of weight training is that it causes "muscle boundness." In a properly designed program, the muscle is exercised through the full range of

⁹Hanson, pp. 80-81.

¹⁰Tomasi, pp. 16-17.

motion. This allows the muscle to stretch and precludes shortening or "muscle boundness."

A weight training group of women, measured as a result of a pre-season weighting program, increased their leg strength by over 12 percent and their upper body strength, power, and endurance by 24 percent, 25 percent, and 30 percent, respectively.¹¹

The body responds best to weight training with forty-eight to seventy-two hours of rest. The rest allows the muscle to replenish its expended stores and recover from the previous workout. If a subsequent weight training bout is scheduled during the rest time, accumulative fatigue develops and weight training becomes counterproductive.

The exercises performed should include development of the whole body. The legs, torso, arms, neck, and abdominal muscles are of primary concern. In order to gain maximum benefits, the systematic approach to exercise is from the strongest muscles to the weaker ones. This precludes initial fatigue to the weaker muscles, whereby development of the stronger muscles is not hindered. The routine of the specific muscle group is: buttocks, quadriceps, hamstrings, calves, chest, mid-back muscles, deltoids (shoulder), biceps, triceps, forearms, neck

¹¹Tomasi, pp. 16-17.

muscles, and, finally, the abdominal muscles. Hopefully, the results of a weight training program will decrease the number of debilitating injuries.

There are four items to remember when undertaking a weight training program:

1. Women (and men) should start an exercise program at an intensity appropriate to their level of fitness.

2. Because of their susceptibility to lower leg problems, women who are in an exercise program should be particularly careful to protect themselves from leg and foot injuries and should take such precautions as good running shoes and reasonable, progressive exposure to stress.

3. Coaches, trainers, and others who monitor women's exercise programs should be aware of the symptoms of those injuries that most commonly affect women.

4. A woman who exercises should know the difference between "pushing herself" past her perceived level of pain tolerance and exposing herself to undue risk of injury.

Women are far better performers than the literature suggests. It is imperative that physicians, coaches, and trainers alike insure that weight training for women is as beneficial and injury free an experience as possible.

Listed are the exercises for the specific muscle group using conventional and variable resistance machines:

Muscle Group	Conventional Weights	Variable Weight
Buttocks	Squat	Leg Press
Quadriceps	Squat or Leg	Leg Extension
Hamstrings	Leg Curl	Leg Curl
Calves	Heel Raisers	Heel Raisers
Chest Muscle	Bend Press	Chest Press
Mid-back	Bent Over Row	Pull Down
Shoulder	Seated Press	Seated Press
Biceps	Bicep Curl	Bicep Curl
Triceps	French Curl	Tricep Extension
Forearms	Forearm Flexors	Forearm Flexors
Neck	Neck Extension Curl	Neck Extension Curl
Abdominal	Sit-ups	Sit-ups ¹²

Coaches and athletes now have an interesting variety of techniques with which to develop muscular strength and/or endurance. Adaptable to the specific needs of individuals or programs, the three basic types of programs are identified as isotonic, isometric, and isokinetic.

1. Isotonic training involves the use of progressive exercises. Weights are generally used, and the athlete moves them through a full range of motion from extension to flexion.

¹²Tomasi, pp. 16-17.

The program has several variable factors, repetitions, resistance, and sets. Weight training in general and isotonic training specifically can deal with muscular conditioning for both strength and endurance. Though the pattern of exercise remains basically the same, the number of repetitions and the percent of maximal resistance are substantially different.

Muscular strength development simply involves the strengthening of a specific muscle group. An athlete who lifts for strength would employ a program of few repetitions, using heavy weights and few sets, e.g., 90 percent of maximum weight times three repetitions for three sets, or three times three times 90 percent maximum.

Simply stated, this means that the athlete should lift a weight which is 90 percent of her/his maximum. She/he should lift it three times in succession and repeat the lift twice more for a total of nine. The nine should never be done consecutively; the athlete should rest between sets of three.

Muscular endurance should not be confused with muscular strength. Muscular endurance may be dynamic or static. Static endurance is the ability to hold a fixed position for an extended time. Dynamic endurance is the ability to sustain work over an extended period. The athlete who wants to increase her/his dynamic muscular

endurance would follow a different type of program than that outlined for strength development.

The program would consist of lifting weight from 5 percent to 10 percent of the athlete's maximum. The weight would be lifted between 50 and 100 times, then separate times for a total of 150 to 300 repetitions.

This type of light-weight, high repetition program is suitable for activities which require a high tolerance to fatigue, such as distance running or swimming.

2. Isometric training. In 1953, two German researchers, Hettinger and Muller, published a paper in which they claimed that large increases in strength could be effected through a program of "static tension"--or isometric training.¹³

An isometric contraction involves the exertion of force against an immovable object. In Hettinger and Muller's program, a contraction was held for six seconds at two-thirds of maximum strength. Findings indicated maximum strength increase of 5 percent per week.¹⁴ Neither an increase in the force (beyond two-thirds) nor the time (beyond six seconds) of the contraction produced any effect.

¹³Thomas J. Sheenan, "Contemporary Strength-Training Modalities," Scholastic Coach, XXXXVII (August, 1977), 50-55.

¹⁴Sheenan, pp. 50-55.

Subsequent research confirmed that isometric training could produce strength gains, but substantially less than originally claimed. It now appears that one maximal contraction held for ten seconds is sufficient for accomplishing gains in strength through isometric training.

3. Isokinetic training is the newest development in muscular conditioning, involving the use of "accommodating resistance."

The exercises closely resemble those used in isotonic strength and endurance training in that resistance is moved "through a full range of motion from extension to flexion."

There is one basic difference in isotonic weight training; the amount of resistance remains the same throughout the range of motion, which in isokinetic training the resistance changes as the force changes.

The latter type of training requires special devices which allow the athlete to perform all movements through a full range of motion, while the resistance always remains slightly less than the applied force. Due to the nature of this type of training, that of accommodating resistance, the muscle being exercised is stressed just submaximally throughout the range of motion.¹⁵

¹⁵Sheenan, pp. 50-55.

ISOTONIC TYPE PROGRAM

An example of a general progressive weight training course for all athletes will produce speed, strength, and endurance, with special emphasis on the legs. In other words, it is a good course for track, football, basketball, baseball, tennis, soccer, diving, and any other activity that places a similar demand upon the body.

The first explanation will be how to work out, then a complete description of each exercise, with a special abbreviated warm-up course at the end.

First, never work out two days in a row. Lifting weights requires more energy than one may think, though it does not become evident until, roughly, twenty-four to thirty-six hours later. For that reason, lifting weights should never be performed prior to the regular workouts for one's particular sport. Otherwise, one will incur a loss of coordination and extreme fatigue.

It is advisable to train for one's sport first, rest at least thirty minutes, then do weight-training workout. The next day should be a day of rest. Light workouts or skill practice for one's particular sport is advisable.

Now, for the proper method of working out. First, an explanation of what is meant by repetitions and sets for the true beginners:

A repetition is a complete cycle of exercises from the starting position through the range of motion and return to the starting position. Ten repetitions consist of repeating this complete cycle ten times without a stop.

A set consists of one group of repetitions.

When an exercise is referred to as three sets of ten repetitions, it means that the exercise is performed ten times, followed by a rest of two to three minutes, another ten repetitions, then a second rest period, and, finally, the third group of ten repetitions.

One should start each exercise with ten repetitions and then add one repetition every workout day. Upon reaching fifteen, add five pounds to the barbell and reduce the repetitions to ten. Work this new weight up to fifteen repetitions, then repeat the previous procedure. Every exercise should consist of three sets of ten to fifteen repetitions.

For a true beginner, a different approach is advised, one that is more gradual in the beginning. It is suggested that only one set of ten to fifteen repetitions for each exercise, then, instead of adding weight to the barbell, doing two sets of ten to fifteen and finally working into three sets of ten to fifteen repetitions. From this point on, one may add five pounds, after the third set of repetitions.

A muscle developed over a long period remains in good condition for a long period of time, even without exercise. On the other hand, a muscle developed through heavy weights with few repetitions lasts a short time.

There is another very important reason for starting with light weights and progressing slowly and steadily. The muscle tissue, the tendons, and the ligaments are growing tissues which can be damaged by excessive resistance and too much weight when improperly conditioned.

For the average teen-ager, thirty pounds is advised as a nucleus. Less may be used for a light, thin person or more for a heavy, well muscled person. It is wise to use a light weight in the beginning and go up, rather than use a heavy weight and have to go down.

A good indication of having employed the proper weight is a pleasantly tired feeling at the end of the session rather than complete exhaustion.

During an athlete's heavy training program, it is advisable to get plenty of sleep, from eight to ten hours, every night, weekends included. It is during these rest periods that the body rebuilds. If the body is not given sufficient time to rebuild, no progress will be made.

Good, wholesome food is also a must during this period. Frankfurters and a soft drink are not a nourishing

lunch or snack. The proper understanding of food is one of the greatest faults--"You are what you eat."¹⁶

ISOMETRIC TYPE PROGRAM

Isometrics can develop strength and should be an integral part of any physical activity program, but they must be used properly if strength is to be developed where it is needed. To be conducted properly, there must be some form of evaluation, either through success in an activity or by appropriate testing.

Isometric exercises and equipment involving generalized movements that allow substitution of extraneous bodily structures should be avoided. Such exercises merely aid the strong muscles to get stronger, the weak muscles to get weaker, and the ranges of motion to become restricted.

Without some form of evaluation, there is little or no adequate way to evaluate true work versus malingering. For the best results, isometric exercise should be followed by appropriate adjunctive isotonic and stretching exercises.

¹⁶Joseph Goldenberg, "A General Progressive Weight-Training Course for All Athletes," Scholastic Coach, XXXI (October, 1961), 40-41, 59.

Isometrics are not a panacea for exercise ills, nor can they perform miracles. No easy exercise can replace hard work.¹⁷

Functional Isometric Exercise Program

Recently, a relatively old method of developing strength has become extremely popular. Incorporated into Paul Dietzel's training program when he was at Louisiana State University, the concept is generally referred to as isometric contraction.

It is also known as static or tonic contraction because the muscle contracts partially or completely without changing its length. As the muscle contracts and the tension develops, energy is liberated as heat, since no mechanical work is performed.

An isometric contraction can be performed under three varying lengths or degrees of the muscle groups and joints: (1) at minimum length, (2) at intermediate length, and (3) at full length. It has been proven that a functional static contraction program does develop muscular strength in a relatively short time.

The initial cost of the equipment, along with the upkeep of it, is very inexpensive. All that is needed for

¹⁷Jay A. Bender, Harold M. Kaplan, and Alex J. Johnson, "Isometrics, A Critique of Fadism Versus Facts," Journal of Health, Physical Education and Recreation, XXXIV (May, 1963), 21-22.

one isometric exercise station is two 3 X 5 or 3 X 6 inch timbers and a steel bar. Staggered holes, one and one-half inches in circumference, should be drilled three inches apart in both timbers, which should be anchored to the floor and to the ceiling, separated by a space equal to the distance between the collars of an olympic barbell.

For a more sturdy apparatus, a four inch channel iron could be used as standards in lieu of the timbers. If channel iron is selected, the approximate cost of the materials and the bar would double.

Before an athlete begins performing these static contraction exercises, she/he should warm up properly with light calisthenics.

Basic Exercises

Leg curl (develops hamstrings): Lie in prone position on bench, knees at edge of bench, head resting on folded arms, knees flexed to 160 degrees, and bars on rear surface of legs midway between knees and ankle joints.

Knee extension (develops quadriceps): Sit in backward-leaning position on bench, knees at edge of bench, knees extended to rear with hands grasping sides of bench, knees extended to 115 degrees, and bar on front surface of legs midway between knee and ankle joints.

Ankle-dorsi flexion (develops ankles): Lie perfectly flat in supine position on floor, arms resting on

chest, ankles flexed to 115 degrees, legs flat on floor, and bar on front surface of feet below toes.

Trunk flexion (develops abdominal muscles): Lie perfectly flat in supine position on floor, legs and hips flat on floor, arms placed below chest, and bar on chest below armpits.

Trunk extension (develops back muscles): Lie perfectly flat in prone position on floor, legs and hips flat on floor, hands placed behind back, and bar on back below armpits.

Shoulder shrug (develops shoulder muscles and upper portion of trapezius muscle): Stand fully erect and close to bar. Place bar at height so that arms are fully extended downward. Grip bar with hands close together and shrug shoulders upward.

Leg press (develops quadriceps): Lie perfectly flat in supine position on floor or bench, hips directly beneath bar, position so that legs, when feet are placed on bar, will form an approximated 130 degree angle at knees and keep back flat against bench or floor and elevate head slightly.

Arm curl (develops biceps): Stand fully erect and fairly close to bar, position bar at height so that arms, when hands grasp bar with an underhand grip, will form a 115 degree angle at elbows, and keep back straight and head erect as pressure is exerted against bar.

Military press (develops triceps): Stand fully erect and fairly close to bar, place bar just above head, grasp bar with an overhand grip, keep elbows rotated inward, have angle at elbows approximately 40 degrees, and keep back straight and head erect as pressure is exerted against bar.

Toe raise (develops triceps): Place bar in a position so that it rests against shoulders and back of neck when standing on toes, flex knees to an approximated angle of 120 degrees, spread legs shoulder-width apart, keep feet straight ahead, grasp bar with overhand grip, but do not use arms to exert pressure, keep back straight and head erect when attempting to straighten legs.

A functional isometric exercise training program used in conjunction with a good weight training program can contribute greatly to the strength development of varsity athletes.¹⁸

ISOKINETIC TYPE PROGRAM

In isokinetic exercise, more energy must be absorbed by muscular exertion because acceleration is controlled mechanically by the device. Therefore, energy is not wasted in speed control and may be concentrated on developing force. With the use of the isokinetic device, the muscle is able to

¹⁸Hugh Thompson, "Functional Isometric Exercise Program," Scholastic Coach, XXXII (November, 1962), 30-31.

maintain a state of maximum contraction through full range of motion and thereby a maximum demand is required on the work capacity of the muscle.

Progressive resistance efforts may be reached in isokinetics by adjusting the rate of speed to establish specific exercise conditions of muscular exertion. Adjusting the speed on the device to a position at which a muscle can still contract, and achieve maximum work, enables a maximal muscular output. Hence, progressively higher paths of speed settings in an exercise program will place greater demands on the contractile speed of the muscle. This technique will provide optimal gains in muscle strength. With the maintenance of maximum power output through longer periods of exercise, increased endurance may be achieved.

The concept of isokinetic exercise requires nearly a total involvement of muscle fibers because of the accommodating force applied to the muscle throughout a given range of motion.

The values of the isokinetic concept may be summarized in that accommodating resistance is the best method of safely overloading a dynamically contracting muscle to its capacity. The psychological factor of confidence enables the exerciser to concentrate on the muscular movement without consideration for safety, fatigue, and/or pain. The adjustments for fatigue are automatic with

the devices, or in eight, ten, or twelve station compact units.¹⁹ Frequency of usage and repetitions do not vary too much among the isokinetic machines--usually four times weekly with twenty to thirty repetitions, three to five sets.

Virtually every major women's basketball team in the country is using isokinetic machines. In the national ratings, all the first ten women's teams and seventeen out of the first twenty women's teams are using isokinetic machines.²⁰

Which type of weight training is best for developing strength and muscular endurance? Of the three types, according to Sheenan, isokinetic exercise is the most effective for total muscular development, both strength and endurance.²¹

While isotonic weight lifting has had the most traditional foothold, isokinetic training may hold the most promise for the future.

¹⁹Donald A. Chu and Gerald Smith, "Isokinetic Exercise: Controlled Speed and Accommodating Resistance," The Journal of the National Athletic Trainers Association, VI (Spring, 1971), 41-42.

²⁰Mini-Gym Isokinetic Exercise Equipment: A Complete Inventory of World-Famous Isokinetic Exercise Equipment and Accessories (Independence, Mo.: Mini Gym, Inc., 1975).

²¹Sheenan, pp. 50-55.

Chapter 3

METHODS AND PROCEDURE

The purpose of this study was to survey Ohio Valley Conference and Southeastern Conference coaches of women's basketball teams regarding the existence of a pre-season weight training program. The study also attempted to identify which type of pre-season weight training method or methods were used; how many coaches were using pre-season weight training, and if the coaches felt there was any relationship between their pre-season weight training program and their won-lost record. The writer was also curious to see if the universities with the best won-lost records also used the same or similar pre-season weight training methods.

A questionnaire related to pre-season weight training was used to evaluate the responses of the coaches of the women's basketball teams. The questionnaire was mailed during the month of January, 1979, to the coaches of the women's basketball teams in the Ohio Valley Conference and the Southeastern Conference.

The review of related literature revealed already known information about isometric and isotonic type

exercises with many detailed exercise programs. The review of related literature also revealed a collection of facts about the newest type of weight training exercises, isokinetics. Most of the current literature on weight training focused on isokinetics as a better and safer type of weight training exercise.

SURVEY SAMPLE

The subjects for this study were composed of seventeen coaches of the women's basketball teams in the Southeastern Conference and the Ohio Valley Conference. The Southeastern Conference coaches of the women's basketball teams consisted of ten coaches (Ed Nixon--The University of Alabama; Jan Pylant--Auburn University; Cathy Davis--The University of Florida; Carolyn Lehr--The University of Georgia; Debbie Yow--The University of Kentucky; Barbara Swaner--Louisiana State University; Van Chancellor--The University of Mississippi; Peggy Collins--Mississippi State University; Pat Head--The University of Tennessee; and Joe Pepper--Vanderbilt University). The Ohio Valley Conference coaches of the women's basketball teams consisted of seven coaches (Jeanine Cox--Austin Peay State University; Shirley Duncan--Eastern Kentucky University; Larry Inman--Middle Tennessee State University; Mickey Wells--Morehead State University; Jean Smith--Murray State University; Marynell

Meadors--Tennessee Technological University; and Eileen Canty--Western Kentucky University).

A letter (Appendix A) requesting completion of the questionnaire was sent to each coach of the women's basketball teams in the Ohio Valley Conference and the Southeastern Conference. The two conferences were selected for the quality of the teams and the success of the coaches.

INSTRUMENT OR QUESTIONNAIRE

The questionnaire (Appendix B) consisted of sixteen questions, of which twelve were open-ended. The respondents were asked to check a yes or no where indicated on the questionnaire and to complete each open-ended question. The writer was seeking the coach's personal reasons and personal preference for the particular weight training exercises used. The questionnaire was limited to pre-season weight training in intercollegiate women's basketball.

The instrument or questionnaire in this study was developed after a thorough study of related literature and recommendations from Dr. Stanley Hall, Dr. Wallace Maples, and Dr. Martha H. Whaley, dissertation committee. In addition, the researcher consulted coaches of women's basketball teams in the surrounding area.

COLLECTING THE DATA

The questionnaire (Appendix B) was mailed by the researcher to all the coaches of the women's basketball teams in the Southeastern Conference and the Ohio Valley Conference. A cover letter stating the purpose of the study and instructions for answering the questionnaire was sent with each copy of the questionnaire. The respondents were asked to complete the questionnaire within two weeks, if at all possible. Included with the questionnaire was a self-addressed, stamped envelope for the coaches' use in returning the questionnaires. There were seventeen coaches who participated in the study, five males and twelve females. One hundred percent of the questionnaires was returned.

ANALYSIS OF DATA

The information obtained from the responses to the questionnaires was organized and analyzed to determine the use of pre-season weight training, the type of exercises, number of years involving usage of pre-season weight training, types of machines used in the pre-season weight training and the purpose of accomplishment of each machine, observable psychological effects on the trainees, the tendency of pre-season weight training to reduce injuries, the length of the pre-season weight training programs, and

if the pre-season weight training program is the major contributing factor to the coach's won-lost record and why.

Implications are that isokinetics may be one type of weight training exercises that produce the best form of strength, jumping ability, and quickness building because of dramatic results achieved by the female athlete.

Another consideration is what, if any, emphasis is placed on the pre-season weight training program as the major contributing factor to the coach's won-lost record.

Another implication is what machines are used in the coach's pre-season weight training program and accomplishment of each machine on the female athlete's overall physical condition.

Chapter 4

ANALYSIS OF DATA

The basis for data analysis was a questionnaire mailed to the coaches of women's basketball teams in the Southeastern Conference and the Ohio Valley Conference as listed in The 1978-1979 National Directory of College Athletics--Women's Edition.¹ The data were gathered in January and February, 1979.

Seventeen completed questionnaires were returned by the respondents, representing ten coaches of women's basketball teams in the Southeastern Conference and seven coaches of women's basketball teams in the Ohio Valley Conference for a total return of 100 percent (see Table 1).

The data obtained from the instrument were presented in a tabular form question by question so that the reader can look at individual items of pre-season weight training.

The data is a descriptive survey of the coaches of women's teams in the Southeastern Conference and the Ohio

¹Ray Franks, ed., The 1978-1979 National Directory of College Athletics--Women's Edition (Amarillo, Texas: Ray Franks Publishing Ranch, 1978), pp. 38-153.

Table 1

Distribution of Returns of the Data from the Coaches of
 Women's Basketball Teams in the Southeastern
 Conference and the Ohio Valley Conference

Populations	Number of Questionnaires Sent	Number of Returns	Percent of Returns
Southeastern Conference	10	10	100
Ohio Valley Conference	$\frac{7}{17}$	$\frac{7}{17}$	$\frac{100}{100}$

Valley Conference on the overall effects of pre-season weight training.

Question Number 1 (see Table 2) pertains to whether or not the coaches use pre-season weight training and the reasons for this.

The data obtained overwhelmingly indicated a predominance of pre-season weight training programs in women's basketball. The major perceived reason for this program seems to be that the coaches feel it increases strength and reduces injuries.

Question Number 2 (see Table 3) was an inquiry as to how many years the coaches have been using a pre-season weight training program.

The data indicated that the majority of the coaches have been using a pre-season weight training program two to three years. This was conceivable as this correlated with the explosion of women's athletics on the university level.

Question Number 3 (see Table 4) indicated the won-lost record of the coaches in the last three years. This was tabulated on a 500 percent or better record or a less than 500 percent record. Again, the data indicated an overwhelming majority with a 500 percent or better record.

Question Number 4 (see Table 5) was constructed to ascertain if the coaches noticed any visible or measurable improvement in the players' performance since beginning a

Table 2
Pre-season Weight Training Program for Women's Basketball

Question Number 1	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Weight Training Programs	8*	2	7	0
Reason for Program				
Strength-Endurance	8**		6	
Injury Prevention	4		2	

*One coach in the Southeastern Conference indicated no pre-season weight training program for women's basketball, but did answer questions in the questionnaire which may appear in the tabulated data.

**Numbers add up to more than 10 in the Southeastern Conference and more than 7 in the Ohio Valley Conference since some coaches chose more than one answer.

Table 3
 Number of Years Pre-season Weight Training
 Program Used by Coaches

Question Number 2	Southeastern Conference	Ohio Valley Conference
1 yr.		1
2 yrs.	1	1
3 yrs.	4	3
4 yrs.		1
5 yrs.	1	0
More than 5 yrs.	2	1

Table 4
Coaches' Won-lost Records for the Past Three Years

Question Number 3	Southeastern Conference	Ohio Valley Conference
.500 or better	9	5
Less than .500	1	2

Table 5

Visible or Measurable Improvement in Players' Performance Since
Beginning Pre-season Weight Training Program

Question Number 4	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Visible or Measurable Improvement	9	0	7	0
Phase of Weight Training Involved				
Strength	8*		4*	
Jumping Ability	6		3	
Shooting Range	2		2	
Finger-wrist-arm Strength	1		2	
Overall Conditioning	0		2	
Quickness	1		1	

*Numbers add up to more than 10 in the Southeastern Conference and more than 7 in the Ohio Valley Conference since some coaches chose more than one answer.

pre-season weight training program and the phase of the pre-season weight training program in which the improvement occurred.

The data indicated 100% of the coaches who used a pre-season weight training program felt there was visible or measurable improvement. The data indicated the coaches felt that the major improvement occurred in strength. Other improvements indicated by the coaches, listed in order of most answers tabulated, were jumping ability, shooting range, finger, wrist arm strength, overall conditioning, and quickness. Many of the coaches indicated more than one of the improvements listed occurred in their pre-season weight training program.

Question Number 5 (see Table 6) pertained to the coaches' preference for a particular type of exercise program for their pre-season weight training. Choices were isotonic, isometric, or isokinetic.

The data established that the majority of the coaches preferred the isokinetic type of exercise program for their pre-season weight training.

Question Number 6 (see Table 7) was an inquiry as to the use of weighted devices for improvement of performance by the women basketball players.

The data revealed that the majority of the coaches did not use weighted devices. Of the very few coaches who

Table 6
Preference of Exercise Method

Question Number 5	Southeastern Conference	Ohio Valley Conference
Exercise Method		
Isotonic	3	0
Isometric	0	0
Isokinetic	6	7

Table 7
Use of Weighted Devices for Performance Improvement

Question Number 6	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Use of Weighted Devices	1	8	2	5
Other Weighted Devices				
Medicine Balls		1		0
Free Weights		0		1
Weighted Vests		0		1

indicated they did use weighted devices, medicine balls, free weights, and weighted vests were listed.

Question Number 7 (see Table 8a) pertained to the types of machines used by the coaches in their pre-season weight training program and the purpose of accomplishment of each machine.

The data tabulation indicated the Leaper and the Universal Weight Machines were used most often. Other machines in order of preference were the Nautilus Weight Machine, Mini-Gym, Free Weights, AD/AB Machine, and the Real Runner Machine.

The data tabulation indicated that the coaches' use of each machine for the purpose of accomplishment is as follows (see Table 8b):

1. Leaper--used for upper leg strength and vertical jump.
2. Universal Weight Machine--used for arm and shoulder strength, hamstring, and quadricep strength.
3. Nautilus Weight Machine--used for the upper body area--major muscle groups (pectorals, deltoid, latissimus, trapezius, biceps, and triceps).
4. Mini-Gym--used for arm and shoulder strength.
5. Free weights--used for finger, wrist, and ankle strength.
6. AD/AB Machine--used for inner muscle of legs and a decrease of percent of body fat in hips and buttocks.

Table 8a

Types of Machines Used in Pre-season Weight Training Program

Question Number 7	Southeastern Conference	Ohio Valley Conference
Types of Machines		
Leaper	5*	5*
Universal Weight Machine	5	3
Nautilus Weight Machine	3	1
Mini Gym	3	2
Free Weights	1	0
AD/AB Machine	1	1
Real Runner	0	1

*Numbers add up to more than 10 in the Southeastern Conference and more than 7 in the Ohio Valley Conference since some coaches chose more than one answer.

Table 8b

Purpose of Accomplishment of Each Machine Used in Pre-season
Weight Training Program

Question Number 7	Southeastern Conference	Ohio Valley Conference
Accomplishment of Machines		
Leaper (upper leg strength, vertical jump)	5*	5*
Universal Weight Machine (arm and shoulder strength, hamstring, quadricep strength)	5	3
Nautilus (upper body area--major muscle groups: pectorals, deltoid, latissimus, trapezius, biceps, triceps)	3	1
Mini Gym (arm and shoulder strength)	3	1
Free Weights (fingers, wrists, ankles)	1	0
AD/AB Machine (inner muscles of legs, decrease of % of body fat in hips and buttocks)	1	1
Real Runner (overall leg strength)	0	1

*Numbers add up to more than 10 in the Southeastern Conference and more than 7 in the Ohio Valley Conference since some coaches chose more than one answer.

7. Real Runner--used for overall leg strength.

Question Number 8 (see Table 9) was used to determine if the coaches preferred types of pre-season weight training methods other than the ones described in the questionnaire and, if so, what type methods were used.

The data indicated that an almost unanimous majority of the coaches did not use any other type of pre-season weight training method. Only one coach indicated the use of endurance running as a type of pre-season weight training method other than the ones described in the questionnaire.

Question Number 9 was not tabulated. It inquired if the coach would be interested in starting a pre-season weight program if one did not already exist. Since all but one of the coaches did have a pre-season weight training program, this question was not answered. The coach who did not have a pre-season weight training program indicated a "no" answer to this question.

Question Number 10 (see Table 10) pertained to the coach's desire to know more about pre-season weight training.

The data indicated, again, an almost unanimous majority of the coaches did have a desire to know more about pre-season weight training. The coach who indicated a negative answer to this question also indicated a pre-season

Table 9

Other Types of Pre-season Weight Training Methods

Question Number 8	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Other Pre-season Weight Training Methods	1	9	0	7
Other Methods				
Endurance Running		1		

Table 10

Coaches' Desire to Know More About Pre-season Weight Training

Question Number 10	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
More Pre-season Weight Training Information	9	1	7	0

weight training program was not used for that particular team.

Question Number 11 (see Table 11) was concerned with any observable psychological effect the coach feels the pre-season weight training program may have on the trainees and, if yes, what type.

The data revealed that the majority of the coaches did feel there were observable psychological effects in their women basketball players as a result of the pre-season weight training program. The psychological effects indicated by the coaches on the questionnaire were confidence and mental alertness.

Question Number 12 (see Table 12) pertained to any injuries that resulted from the coach's pre-season weight training and, if yes, what type of injury.

The data indicated an overwhelming positive response from the coaches that no injuries resulted from the pre-season weight training program. One coach indicated that muscle soreness in the knees had occurred in a player during the pre-season weight training program.

Question Number 13 (see Table 13) was included in the questionnaire to ascertain if the coaches felt that a pre-season weight training program had a tendency to reduce injuries that normally occurred during regular season play.

The data indicated that 100 percent of the coaches did feel that their pre-season weight training program was

Table 11
 Observable Psychological Effects of Pre-season Weight
 Training on the Trainees

Question Number 11	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Observable Psychological Effects	9	0	5	1
Psychological Effects				
Mental Alertness		3	3	
Confidence		6	2	

Table 12

Notice of Injuries Resulting from Pre-season Weight Training

Question Number 12	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Notice of Injuries	1	8	0	7
Types of Injuries				
Muscle Soreness in Knees		1		0

Table 13

Reduction of Injuries Due to Pre-season Weight Training that
Normally Occur During Regular Season Play

Question Number 13	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Reduction of Injuries	9	0	7	0

responsible for the reduction of injuries that normally occur during regular season play.

Question Number 14 (see Table 14) pertains to the player's attitude concerning pre-season weight training.

The data were tabulated to indicate either good or bad attitude. The results were that the majority considered it a good attitude. It is interesting to note that the three coaches who indicated their players did not have a good attitude toward their pre-season weight training program did not use the isokinetic exercise method.

Question Number 15 (see Table 15) requested an indication of when the coach ended the pre-season weight training program and why.

The data were tabulated to indicate if the pre-season weight training program terminated before the first game and if a maintenance program were continued throughout the season. The data indicated that the majority of the coaches finished their pre-season weight training program before the first game of the season. The majority also had a maintenance program for the duration of the basketball season.

Question Number 16 (see Table 16) was constructed to obtain the coach's opinion as to the value of the pre-season weight training program in the won-lost record of the team. Was it the major contributing factor?

Table 14

Player Attitude Concerning Pre-season Weight Training

Question Number 14	Southeastern Conference		Ohio Valley Conference	
	Good	Bad	Good	Bad
Player Attitude	7	2	5	1

Table 15

End of Pre-season Weight Training Program

Question Number 15	Southeastern Conference	Ohio Valley Conference
Program Ends		
Before First Game	9	6
Maintenance Program	7	5

Table 16

Pre-season Weight Training Program Major Contributing
Factor to Coaches' Won-lost Record

Question Number 16	Southeastern Conference		Ohio Valley Conference	
	Yes	No	Yes	No
Pre-season Weight Training Program Major Factors in Won-lost Record	4	5	2	5
Other Factors Considered as Contributory				
Greater Level of Efficiency in Skill Performance		2		1
Fewer Injuries		2		0
Strength		4		1
Cardiorespiratory		1		1

The data obtained indicated that all the coaches considered it a major factor; however, only six coaches considered it the major factor, and ten coaches did not consider it the major factor. Again, one coach did not answer because of not having a pre-season weight training program. The ten coaches indicated other factors as important contributions to their won-lost records:

1. Greater level of efficiency in skill performance.
2. Fewer injuries.
3. Strength.
4. Cardiorespiratory.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

With the passage of Title IX and the Educational Amendments Act of 1972, the explosion of women's athletics has occurred on every college campus in the United States.

Within the past three years, the women's intercollegiate sports have expanded at a phenomenal rate. There has occurred a keen competitive intensity in all the women's intercollegiate sports, especially in women's basketball.

The coaches of women's basketball teams, realizing that competition is fast reaching a pinnacle, are searching for the most sophisticated and well organized pre-season conditioning program for their athletes.

Authorities working with women's sports are making data available that support the theory and benefits of a pre-season weight training program.

Literature has revealed that increasing numbers of coaches of women's basketball teams are using pre-season weight training programs. Further, many companies are producing weight training devices of a very sophisticated nature and within the budget of most athletic programs. The

literature produced by these companies stresses the physical benefits which may be obtained from the use of their equipment.

SUMMARY

This study sought to investigate the use of pre-season weight training programs by the coaches of women's basketball teams in the Southeastern Conference and the Ohio Valley Conference.

A questionnaire was mailed to ten coaches of women's basketball teams in the Southeastern Conference and seven coaches of women's basketball teams in the Ohio Valley Conference. The questionnaire consisted of sixteen questions seeking the coaches' personal reasons and personal preferences for the particular pre-season weight training program used. Twelve of the questions were open-ended and completed by the coaches justifying their initial answers on the questionnaire.

The data were tabulated question by question to allow the reader an insight into individual items of the pre-season weight training programs of each conference.

There was an overwhelming predominance of positive responses to the questions by the coaches in this survey. All but one of the seventeen coaches indicated that they felt the pre-season weight training was one of the most important phases of their programs. They also felt that the

pre-season weight training program was a major contributing factor to the success of their programs. The writer was able to determine that there was much similarity in many of the programs.

CONCLUSIONS

The tabulated data from the survey revealed the following:

1. Ninety-four percent of the coaches of women's basketball teams in the Southeastern Conference and the Ohio Valley Conference use a pre-season weight training program.

2. The related literature indicated that pre-season weight training was desirable for developing athletes and that pre-season weight training reduces injuries that could prove disastrous to a team or an athlete.

3. Isokinetic exercises were by far the most widely used type of conditioning exercises. It was indicated that isokinetics are instrumental in strength development and reduction of injuries. It was also established that not many other types of weight training programs were used by the coaches.

4. The majority of the coaches (ten) indicated that their pre-season weight training program was only one of the major contributing factors in their won-lost record. Other factors were greater level of efficiency in skill performance, fewer injuries, strength, and cardiorespiratory

endurance. However, six of the coaches indicated that their pre-season weight training program was the major contributing factor in their won-lost record. One coach indicated that there was no pre-season weight training program for her women's basketball team.

5. The related literature indicated that isokinetics seem to hold the most promise for weight training programs of the future. Again, the reduction of injuries and the realization of almost immediate results, plus the ability to go through the full range of motion, make isokinetics the popular choice.

6. The Leaper and the Universal Weight Machine were most frequently used in the coaches' pre-season weight training program. The emphasis was the development of the vertical jump, leg strength, and the development of the upper body area.

7. Pre-season weight training is not only beneficial to the player's performance but also has a favorable "psychological effect" which is very important because this factor tends to give a player mental alertness and confidence in herself and in her teammates.

8. All of the coaches who were involved with weight training would like to know more about pre-season weight training for their basketball players.

RECOMMENDATIONS

The following recommendations were based on the responses to the questionnaire and review of literature:

1. Further extensive research needs to be done concerning weight programs for women.
2. The need exists for more publications for all types of weight programs for women. The writer found it very difficult to obtain enough sources for this dissertation.
3. All coaches should assess the isokinetic exercise programs available. This is the newest of the exercise programs, and it is the opinion of the writer, as a former basketball coach, that positive results will occur in the players as a result of using the isokinetic method.
4. A future investigation needs to be made, between very successful basketball teams and teams with little success, to see if weight training is a factor for the success.
5. The companies producing the weight training machines and devices should be more aggressive in advertisement and salesmanship.
6. Hopefully, this study will open the door for further investigation in the area of pre-season weight training for women basketball players.

APPENDIXES

APPENDIX A
LETTER TO COACHES



MIDDLE TENNESSEE STATE UNIVERSITY

69

Department of Athletics

MURFREESBORO, TENNESSEE 37132

January 22, 1979

Dear

I am presently completing work toward a Doctor of Arts degree in physical education at Middle Tennessee State University. My study is a comparative survey of Southeastern Conference Women's Basketball Coaches and Ohio Valley Conference Women's Basketball Coaches on the overall effects of pre-season weight training.

With the explosion of women's intercollegiate athletics, many basketball coaches are looking at all aspects of the success factor and possible contributing elements.

The purpose of this letter is to request your assistance by completing a questionnaire to identify the key components of an existing pre-season weight training program. The results of the study will be available to all participants.

Please complete and return the enclosed questionnaire in the stamped, self-addressed envelope within two weeks if at all possible. Your contribution will add strength to and identify the key components of this survey.

Thank you for your professional interest, time, and efforts in behalf of this study.

Sincerely yours,

Patricia L. Jones
Women's Athletic Director

APPENDIX B
QUESTIONNAIRE

QUESTIONNAIRE

- | | Yes | No |
|--|-------|-------|
| 1. Do you now use pre-season weight training (Check one)?
Briefly state reasons: _____

_____ | _____ | _____ |
| 2. How many years have you used pre-season weight training? _____ | | |
| 3. What has been your won-lost record for the past three years? _____ | | |
| 4. Have you noticed any visible or measurable improvement in the players' performance since you began your weight training program (Check one)?
If so, what improvement and what phase of weight training did it involve?

_____ | _____ | _____ |
| 5. Do you prefer "isotonic," "isometric," or "Isokinetic" type exercises (Check one)?
Isotonic___ Isometric___ Isokinetic___
Why? _____
_____ | | |
| 6. Do you use "weighted devices" such as weighted vests, ankle weights, wrist weights for improvement of performance (Check one)?
If others are used, please list:

_____ | _____ | _____ |

- | | Yes | No |
|--|-----|----|
| 7. List the types of machines that are used in your pre-season weight training program and the purpose of accomplishment of each machine:

_____ | | |
| 8. Do you have any other type of pre-season weight training method, other than the ones described in this questionnaire (Check one)?
If so, what type method do you use?

_____ | — | — |
| 9. Would you be interested in starting a pre-season weight training program if you do not now have one in your program (Check one)?
If yes, what type? _____ | — | — |
| 10. Would you, as a coach, like to know more about pre-season weight training (Check one)? | — | — |
| 11. Does pre-season training have any observable psychological effect on the trainees (Check one)?
If yes, what type? _____ | — | — |
| 12. Have you noticed any injuries that have resulted from pre-season weight training (Check one)?
If yes, what type? _____ | — | — |

- | | Yes | No |
|--|-------|-------|
| 13. Have you found that pre-season weight training has a tendency to reduce injuries that normally occur during regular season play (Check one)? | _____ | _____ |
| 14. What are the attitudes of the players concerning pre-season weight training? | | |
| _____ | | |
| _____ | | |
| 15. When do you end your pre-season weight training program and why? | | |
| _____ | | |
| _____ | | |
| 16. Do you consider the pre-season weight training program the major contributing factor to your won-lost record (Check one)? | | |
| Why? | _____ | _____ |
| _____ | | |
| _____ | | |
| _____ | | |

BIBLIOGRAPHY

BIBLIOGRAPHY

- Bender, Jay A., Kaplan, Harold M., and Johnson, Alex J. "Isometrics, A Critique of Faddism Versus Facts," Journal of Health, Physical Education and Recreation, XXXIV (May, 1963), 21-22, 66.
- Chu, Donald A., and Smith, Gerald. "Isokinetic Exercise: Controlled Speed and Accommodating Resistance," The Journal of the National Athletic Trainers Association, VI (Spring, 1971), 41-42.
- Franks, Ray, ed. The 1978-1979 National Directory of College Athletics--Women's Edition. Amarillo, Texas: Ray Franks Publishing Ranch, 1978.
- Goldenberg, Joseph. "A General Progressive Weight-Training Course for All Athletes," Scholastic Coach, XXXI (October, 1961), 40-41, 59.
- _____. "Training with Weights," Scholastic Coach, XXXI (January, 1961), 36-39.
- Hanson, Dale L. "Scientific Basis of Pre-Season and Early Season Training for Basketball," Athletic Journal, XLVI (September, 1965), 80-81, 95-98.
- Hudra Gym Athletics, Inc., Scholastic Coach, XXXXVIII (September, 1978), 109.
- Mini-Gym Isokinetic Exercise Equipment: A Complete Inventory of World-Famous Isokinetic Exercise Equipment and Accessories. Independence, Mo.: Mini Gym, Inc., 1975.
- Petersen, James A. "Total Fitness--The Key to Winning Athletes," United States Women Coaches and Athletes, I (November, 1978), 43-44.
- Sheenan, Thomas J. "Contemporary Strength-Training Modalities," Scholastic Coach, XXXXVII (August, 1977), 50-55.

Thompson, Hugh. "Functional Isometric Exercise Program,"
Scholastic Coach, XXXII (November, 1962), 30-34.

Tomasi, Louis. "Weighting for Women," United States Women
Coaches and Athletes, I (October, 1978), 16-19.

_____. "Weight Training for the Basketball Team," United
States Women Coaches and Athletes, I (December, 1978),
36-38.