



The relationship of selected skills tests to evaluations of basketball playing ability
by Anne Kruse Olson

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE
in Physical Education
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Abstract:

The purpose of this study was to determine: (1) if any relationships existed between the skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall, pass, front shot, field goal speed test, or the Lambert speed and accuracy test, (2) if any of these skills tests were related to basketball playing ability as perceived by the coaches and (3) if there was any relationship between basketball playing ability as perceived by the coaches and basketball playing ability as perceived by the players.

Twenty-five members of the 1979-80 Montana State University Women's Varsity and Junior Varsity teams and eighteen members of the 1979-80 Bozeman High School Girls' Varsity and Junior Varsity Basketball teams were the subjects.

Significant correlations ($p < .05$) were found for the Montana State University Women's Basketball team between the following skills tests in order of greatest to least significance: the Lambert speed and accuracy test and the two-directional wall pass; the speed pass and the two-directional wall pass; the speed pass and the jump and reach; the Lambert speed and accuracy test and the front shot; dribble and the front shot; the Lambert speed and accuracy test and the speed pass; the speed pass and broad jump; dribble and the jump and reach; dribble and the two-directional wall pass; front shot and the broad jump; two-directional wall pass and field goal speed test; and the two-directional wall pass and the front shot.

Significant correlations ($p < .05$) were found for the Bozeman High School Girls' Basketball team between the following skills tests in order of greatest to least significance: dribble and the speed pass; jump and reach and the broad jump; and the dribble and the Lambert speed and accuracy test.

Correlations ($p < .05$) between the skills tests and the coaches' ranking for the Montana State University team in order of greatest to least significance showed the skills tests of speed pass, two-directional wall pass, the Lambert speed and accuracy test, jump and reach, and broad jump to be significantly correlated. The Bozeman High School team showed significant correlations ($p < .05$) between the coaches' ranking and skills tests of dribble and the speed pass.

The factor that appeared to correlate ($p < .05$) the most to the coaches' ranking of the Montana State University team was the speed pass. For the Bozeman High School team the factor was the dribble.

There was a significant correlation ($p < .05$) for both teams between the coaches' ranking and the players' ranking of their perceived basketball playing ability.

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June 3, 1980
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EVALUATIONS OF BASKETBALL PLAYING ABILITY

by

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A thesis submitted in partial fulfillment
of the requirements for the degree

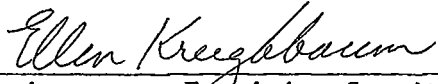
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ABSTRACT

The purpose of this study was to determine: (1) if any relationships existed between the skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall, pass, front shot, field goal speed test, or the Lambert speed and accuracy test, (2) if any of these skills tests were related to basketball playing ability as perceived by the coaches and (3) if there was any relationship between basketball playing ability as perceived by the coaches and basketball playing ability as perceived by the players.

Twenty-five members of the 1979-80 Montana State University Women's Varsity and Junior Varsity teams and eighteen members of the 1979-80 Bozeman High School Girls' Varsity and Junior Varsity Basketball teams were the subjects.

Significant correlations ($p < .05$) were found for the Montana State University Women's Basketball team between the following skills tests in order of greatest to least significance: the Lambert speed and accuracy test and the two-directional wall pass; the speed pass and the two-directional wall pass; the speed pass and the jump and reach; the Lambert speed and accuracy test and the front shot; dribble and the front shot; the Lambert speed and accuracy test and the speed pass; the speed pass and broad jump; dribble and the jump and reach; dribble and the two-directional wall pass; front shot and the broad jump; two-directional wall pass and field goal speed test; and the two-directional wall pass and the front shot.

Significant correlations ($p < .05$) were found for the Bozeman High School Girls' Basketball team between the following skills tests in order of greatest to least significance: dribble and the speed pass; jump and reach and the broad jump; and the dribble and the Lambert speed and accuracy test.

Correlations ($p < .05$) between the skills tests and the coaches' ranking for the Montana State University team in order of greatest to least significance showed the skills tests of speed pass, two-directional wall pass, the Lambert speed and accuracy test, jump and reach, and broad jump to be significantly correlated. The Bozeman High School team showed significant correlations ($p < .05$) between the coaches' ranking and skills tests of dribble and the speed pass.

The factor that appeared to correlate ($p < .05$) the most to the coaches' ranking of the Montana State University team was the speed pass. For the Bozeman High School team the factor was the dribble.

There was a significant correlation ($p < .05$) for both teams between the coaches' ranking and the players' ranking of their perceived basketball playing ability.

Chapter 1

INTRODUCTION

Statement of the Problem

The purpose of this study was to ascertain the relationships of the following selected skills tests to basketball playing ability as perceived by coaches and players. Specifically, an attempt was made to determine:

1. if any significant relationships existed among the performance of the skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall pass, front shot, field goal speed test, or the Lambert speed and accuracy test,
2. if the skills tests of jump and reach, standing broad jump, dribble, speed pass, two directional-wall pass, front shot, field goal speed test, or the Lambert speed and accuracy test were related to basketball playing ability as perceived by coaches,
3. if there were any significant relationships between basketball playing ability as perceived by coaches and basketball playing ability as perceived by players.

Justification

Of primary concern to basketball coaches today is the identification of the factors which are indicative of potential basketball

playing ability. Repeated tests have been devised and tested with inconsistent results (Hopkins 1977). Basketball rules have changed and the tests must be adapted to the new styles of play (Lambert 1969).

This study is especially timely because of the current reevaluation of the AAPHER sports skills series, in particular the basketball tests (Baumgartner 1979). If the factors of jump and reach, standing broad jump, dribble, speed pass, two-directional wall pass, front shot, field goal speed test, and Lambert's speed and accuracy test can be used to enhance the prediction of level of performance of basketball, then the task of recruiting and selecting team members will be facilitated.

Definitions

Basketball playing ability. The basketball playing ability in this study was the ability to play basketball as perceived by coaches and players (Appendix I).

Dribble. Dribble was defined as the speed with which a player can move the ball around obstacles (Appendix C).

Field goal speed test. The field goal speed test was the number of shots made in thirty seconds starting close under the basket (Appendix G). (Also called Scott and French test and Johnson test.)

Front shot. The front shot was the measure of the player's

skill in making shots at the basket from a designated spot to the left of the basket (Appendix F).

Jump and reach. The jump and reach was the measure of the height of a player's jump over and above her reach (Appendix A).

Lambert speed and accuracy test. The Lambert speed and accuracy test was the twice time plus accuracy score it takes for a player to shoot ten shots from an alternating eighteen foot starting mark (Appendix H).

Speed pass. The measurement of the speed with which a player can continue to pass and catch a ball ten times against a wall nine feet away (Appendix D).

Standing broad jump. The standing broad jump was the player's ability to stand, take off from both feet, and jump as far as possible (Appendix B).

Two-directional wall pass. The two-directional wall pass was the ability to pass the ball quickly and with accuracy in two alternating directions (Appendix E).

Hypothesis

It was hypothesized that there would be no significant relationships among the skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall pass, front shot, field goal speed test, Lambert speed and accuracy test, or between any one

of these factors and basketball playing ability as perceived by the coaches. It was also hypothesized that there would be no significant relationship ($P < .05$) between the basketball playing ability as perceived by coaches and the basketball playing ability as perceived by the players.

Delimitations

This study was delimited to two groups, the 25 varsity and junior varsity members of the 1970-80 Montana State University Women's basketball team and the 18 varsity and junior varsity members of the 1979-80 Bozeman High School girls' team. It was further delimited to the ages of the team members that ranged from 18 to 22 years, and from 15 to 18 years, respectively.

The study was delimited to ten experimental factors selected by the researcher: (1) jump and reach, (2) standing broad jump, (3) dribble, (4) speed pass, (5) two-directional wall pass, (6) front shot, (7) field goal speed test, (8) Lambert speed and accuracy test, and basketball playing ability as perceived by (9) coaches and (10) players.

Limitations

The study was limited to the validity and reliability of the tests (AAHPER 1966, Lambert 1969, Gaunt 1979). Any personal preconceived biases of the coaches and the players in ranking basketball playing ability also limited the study. No attempt was made to

determine the degree of motivation or the level of fatigue affecting the subjects' execution of the tests. No consideration was given to the effect of anthropometric measures or somatotypes of the subjects on their performance in the selected tests. The potential varsity skill level of the sample also limited the study.

Sample

Twenty-five members of the 1979-80 Montana State University women's varsity and junior varsity basketball team and 18 members of the 1979-80 Bozeman High School girls' varsity and junior varsity basketball team were administered the skills tests. Ages ranged from 18 to 22 years and from 15 to 18 years, respectively.

Chapter 2

REVIEW OF LITERATURE

Many attempts have been made to objectively measure basketball playing ability. There have been two schools of thought regarding basketball playing ability testing. One area concentrates on using many individual basketball skills tests in order to determine the player's basketball playing abilities. The second avenue of examination involves setting up a single test that combines several basketball skills into a game-like situation. Scott (1938) stated that it is impossible to test all the skills involved in a game. She saw the importance of both schools of thought. She recognized a need for either a battery of skills tests that measures several of the principal skills or a single test that involves more than one skill. Both methods of analysis focus on producing an objective score in order to compare players and predict basketball playing potential. Both types of tests have omitted the intangible, unmeasurable elements such as strategic ability, cooperative team play (Scott 1938), and "athletic potential" (Nelson 1967). The review of literature will be divided into the following categories:

1. Single skills tests.
2. Game-like skills tests.

Single Skills Tests

Moser (1935) stated that the measurement of skill requires scientifically conducted tests that are valid, reliable, objective and practical in their administration. Many tests that have been devised are impossible for one or two coaches to administer, and the time and space requirements are prohibitive.

Using Thurston's method for determining multiple factors, Wendler (1938) conducted a study on critical analysis of test elements used in physical education. He found four common factors in test performance: (1) strength, (2) velocity or speed of movement, (3) motor educability, and (4) sensorimotor coordination. The basketball skill tests of dribbling, target throw, shooting baskets, and the Johnson test were highly correlated with the factor of motor educability.

Dyer, Schurig, and Apgar (1939) believed that ball handling involved the greatest variety of abilities. These authors enumerated 24 possible combinations in passing the basketball and the same number in catching. They further subdivided ball handling into accuracy and speed in passing while motionless and while in motion, to a stationary player, and to a moving player. All of the authors agreed that there was no single test that had been standardized and validated for use throughout the total basketball playing age range. They believed that motor abilities such as controlling the ball and

the body accurately, speedily, and effectively in relation to other players could be measured objectively through the use of skills testing. They favored the jump and reach test and the bounce and shoot test using separate scales for college, high school and junior high age groups for obtaining an objective score of basketball ability.

A factor analysis of basketball motor ability test items was done in 1952 by Leilich. Fourteen selected basketball test items measuring various aspects of motor performance were analyzed. The data were obtained from a study of 110 college women. The investigator defined basketball motor ability as: "...those measures used to evaluate the efficiency in the manipulation of the body in performing basketball skills." (Leilich: 1952, p. 56). The study found basketball motor ability, related to 40 yard sprint test, and ball handling involving accuracy in goal shooting to be basic in testing basketball skills tests. Leilich proposed as being valid and reliable a three item battery consisting of the Glassow, Colvin and Schwarz bounce and shoot test, the field goal speed test, and the push pass for accuracy. The Glassow, Colvin and Schwarz bounce and shoot test yielded a Chi square of .63 but failed to correlate significantly with the 40 yard sprint test. The investigator hypothesized that the subjects had sacrificed in order to complete the test with accuracy when performing the test. Leilich summarized that the Glassow, Colvin

and Schwarz test significantly measured the aspects of basketball motor ability and the specific ball handling skills common to basketball ability.

Broer (1962) stressed that when a single test or battery "claims to measure" a complicated skill such as playing ability, the validity needs to be proven and evidence shown that the test or tests given do evaluate the student's ability. She also stated that there is no question of the validity of a test that tests a single skill element by the performance of the particular skill in question.

In 1963, Fox and Usilaner claimed that ball handling is the most fundamental requisite in basketball. They stated that regardless of the shooting skill and speed, a player who could not handle the ball would not adjust to offensive styles of play easily.

The American Association for Health, Physical Education, and Recreation (AAHPER 1966) published a nine item test battery in order to facilitate the judging of boys' and girls' basketball playing abilities. The skills tests were the field goal speed test, foul shot, side shot, front shot, speed pass, overarm pass, push pass, dribble and the jump and reach.

Childress (1972) did a factor analysis on the scores of 24 skill tests performed by 106 high school boy basketball players. The six skills tests that he believed were important were (1) Cozen's dodging run, (2) right-hand grip strength, (3) Lehsten's wall bounce,

(4) pull-ups, (5) hand time and movement time, and (6) backward movement time. Cozen's dodging run was the time it took for a player to weave in and out of cones on a 40 yard course. Lehsten's wall bounce was measured by the time it took for a player to pass ten passes to a wall nine feet away so that the ball came back in a bounce pass.

Success at the skills tests of jump shot, jump and reach, and the dribble were found to correlate with player ability in a study done by Fratzke in 1976. Age and height factors also determined player success in that study.

Hopkins believed that the previous factor analysis results of basketball playing ability skills tests were conflicting. He tested 21 items on 70 junior high and high school boys at a University of Minnesota summer basketball camp, 1975. Hopkins believed that a battery of tests could be constructed to measure the domain of basketball playing skill. He concluded that a battery composed of the following test items would provide a quick and objective measure of basketball skill: (1) jump and reach (AAHPER 1966), (2) dribble (AAHPER 1966), (3) speed pass (AAHPER 1966), and (4) front shot (AAHPER 1966).

Gaunt tested 167 female high school basketball players enrolled in the Eastern Kentucky University Sports Camp during the summer of 1977. The subjects ranged in age from 13 to 18 years of age. She

concluded that to measure basketball playing ability the following skills tests should be used: (1) dribble (AAHPER 1966), (2) standing broad jump (AAHPER 1966), (3) field goal speed test (AAHPER 1966), and (4) two-directional wall pass (AAHPER 1966).

Hopkins conducted another factor analysis study in 1978 using the AAHPER 1966 basketball skills tests for women. The nine items of the test were administered to 60 girls ranging in age from 13 to 18 years old. He suggested that the administration and evaluation of the two skills tests of the field goal speed test (AAHPER 1966) and the dribble (AAHPER 1966) would provide a quick, objective, efficient, and preliminary assessment of a large group of highly skilled women basketball players.

In summary, there is no consensus of professional opinion on which skills tests would provide an evaluation of basketball playing ability for either sex or for any specific age level.

Game-like Skills Tests

The second avenue of examination involved setting up a test to objectively measure basketball playing ability in a game-like situation. This single test would involve testing more than one skill in order to get an objective score.

Edgren (1932) was among the first to devise a basketball test for college men based on statistical evidence. He concluded speed

passing, accuracy passing, pivoting and shooting, speed dribbling, accuracy shooting and ball handling into one game-like test. A significant relationship was obtained between the test and the subjective ratings of the performance of the players.

Young and Moser (1934) reviewed 36 tests and reported a short battery of tests to measure the basketball playing ability of college women. They found five tests that significantly correlated with the ratings by judges of players' performance in game situations: (1) the Edgren ball handling test, (2) the wall speed pass, (3) the free jump and reach, (4) the bounce and shoot, and (5) the moving target test. They believed that since the intercorrelations between the tests were low, different qualities of basketball were being measured. Young and Moser recommended substituting a game-like test that included the five test items. However, they did not design such a test themselves.

Cozens, Cubberly and Neilson (1937) presented a basketball game-like test that included the jump and reach, one minute goal shooting, push pass for speed and accuracy, pivot and pass, and the pivot and bounce for distance. No statistical measure was made to validate this test. Their recommendation was based on their empirical observations.

Schwartz (1937) constructed a test to measure improvement by using a pass and catch, throw for goal, pivot, bounce

and shoot, jump and reach, and a written knowledge test.

Glassow, Colvin, and Schwarz (1938) shortened the Young and Moser test to a three item battery including the bounce and shoot, speed pass, and the zone toss to be used as an objective measure of the basketball playing ability of college women. Recognizing the need to combine the accuracy score and the speed score in bounce and shoot, they devised a scoring plan that combined the accuracy score and the speed score to arrive at a single score for bounce and shoot. The accuracy score was arrived at by assigning a given number of points to an individual based on how many fractional standard deviations an individual was above or below the mean. For example, excellent accuracy was given a larger positive integer than was poor accuracy. The speed score was similarly scored, the only difference being that a fast time was given a larger positive integer than a slow time depending on how many fractional standard deviations the individual was from the mean. Violations such as double dribbling, traveling, and failing to start from behind a 24 foot restraining line were handled by adding additional time to the speed score. The final score for bounce and shoot was then derived by multiplying the two positive integers from the accuracy and speed tests. The correlation coefficient between this battery of tests and the coaches rating was .66.

Geltz (1939) faced the same problem as Glassow, Colvin, and

Schwarz (1938). It was difficult to combine into a single score a test in which a superior performance yields a high score (accuracy) and a second test in which a superior performance yielded a low score (speed). He designed schemes for combining speed and accuracy scores of dribbling and for dribbling with shooting. He made recommendations but did no statistical analysis.

Schwarz (1945) devised a battery of tests for high school girls that included the following items: bounce within a six foot area, jump and reach, pass and catch against a wall, accuracy throw for a goal, and pivot, bounce and throw for a goal. Statistical evidence for the validity was established by comparing the test scores to scores that were assigned to individuals by judges. It was suggested that the tests included could be slightly modified for use on the college level.

Know (1947) designed a test for high school or college varsity players composed of speed dribble, wall bound, dribble shoot, and the "penny cup" test. Reliability coefficients for the individual items ranged from .158 to .90. The total battery had a reliability of .88. The criterion for validation of the tests was the judges' scoring of the varsity players in actual games. At least four out of five varsity players finished among the top five on each test score.

Miller (1953) established norms based on percentile rankings

and T scores for the bounce and shoot test, the field goal speed test, and the push pass for accuracy. These three were chosen by Miller on the basis of Leilich's factor analysis study. Achievement scales were determined by classifying the raw scores of the bounce and shoot test into an accuracy classification and a time in seconds classification. Miller did not describe a method for combining accuracy and time into a single score. Subjects were college women majoring in physical education.

Stroup (1953) stated that the difficulty in devising a test that demonstrated high validity increased as the purpose for which the test is chosen broadened. He wanted an administratively economical test and used game results such as the number of turnovers, free throw percentage, field goal percentage, assists, and rebounds as the criterion for validating his basketball skill tests for college men. Stroup included goal shooting, wall passing, and dribbling in his test battery. Scoring was based on the number of passes completed, goals made, and obstacles passed while dribbling. Time for each test was one minute. He concluded that an average of the skill scores on the three individual items comprised a battery that was a valid measure of the player's basketball playing ability as related to the player's composite score based on the game results.

In 1962, Scott and French recommended two tests: the field

goal speed test, and a passing test that was a modification of the Edgren ball handling test. The validity coefficient for the field goal speed test was .60 when compared with a judges' rating of shooting ability. A reliability of .70 was obtained on the basis of repeated trials. The validity coefficient for the passing test was .51 when judges' ratings of ball handling ability were used as the criterion. If only one test was possible, they recommended use of the field goal speed test. Scott and French were critical of the bounce and shoot test. Although the test had "game-like" qualities, they claimed "the lack of pressure for speedy action characteristic of the game partly nullifies the possible value." (Scott and French: 1959, p. 164.) Since nothing prevents the player from pausing before attempting the shot the purpose of having the player do a pivot or bounce before shooting could be defeated.

Clarke (1967) described the Johnson basketball test as two battery tests for high school boys. One battery measured basketball ability by the field goal speed test, basketball throw for accuracy, and the dribble test. The second battery measured "potential" basketball playing ability by footwork, jump and reach, dodging run, and the Iowa Revision of the Brace test. The reliability coefficients for the ability tests was .89 and .93 for the potential basketball playing ability when compared to the judges' evaluation of the players.

In 1969, Lambert tested a revised version of the Glassow, Colvin,

and Schwarz test against the original test. (See the revised version in Appendix B.) The investigator came to four conclusions:

1. Shooting accuracy alone, as measured by the bounce and shoot test, was ineffective in rating college students' basketball playing ability.
2. A combination of twice time plus accuracy or time alone were the most valid and reliable methods for scoring the bounce and shoot test for either the original or the revised form of the test.
3. The revised version of the bounce and shoot test was a statistically reliable and valid, as well as administratively practical, measure of basketball playing ability.
4. The revised version of the bounce and shoot test with time and accuracy scores converted to T-scores and combined on the basis of twice time plus accuracy can be used for determining basketball playing ability of college women, (Lambert:69).

Summary

The review of literature shows that many attempts have been made at devising an acceptable basketball playing ability test. Most tests were devised when the rules of the game differed considerably from those rules now used. No single test has been found to be entirely

satisfactory.

Physical factors of height and weight have been shown to influence basketball playing ability. Certain elements of speed, dribble, accuracy, and jumping ability are recurrent considerations used to enhance the prediction and selection of basketball players. However, the accurate prediction of successful basketball playing ability remains a problem to be solved.

Chapter 3

PROCEDURES

Research Design

The eight skills tests used in this study had been recommended by Hopkins (1975 and 1979), Gaunt (1977), and Lambert (1969) as indicators of basketball ability (Appendices A-H). The coaches' ranking of their respective teams were used in order to correlate these skills tests to an evaluation of basketball playing ability. (Appendix I)

Data Collection

Data were collected in eight stations set up on September 25, 1979, for the 25 members of the Montana State University women's basketball team and on October 13, 1979, for the 18 members of the Bozeman High School girls' basketball team. The same administrators, test directions, and scoring sheets were used. The coaches ranked the players on their respective teams based on the previous week of scrimmage games. The players ranked their fellow players and themselves after they had completed the eight stations. One was considered the best, 2 second best and so on until all were ranked. The names of the players were placed on a sheet in random order so as to facilitate recalling names. (Appendix I)

Subjects were clothes in T-shirts, gym shorts, and basketball shoes normally worn for practice.

Statistical Analysis

Correlation coefficients were calculated and used to make the following comparisons:

1. comparisons among the skills tests,
2. comparisons between each skill test and the coaches' ranking,
3. and the comparison between the coaches' ranking and the players' ranking.

The coaches' ranking for the Montana State University team was agreed upon by the head coach and the two assistant coaches in conference. Similarly, the Bozeman High School team was ranked by the head coach and her assistant in conference. This ranking took place after the coaches viewed their respective teams after a week of scrimmage games in which all the players participated and just before the eight skill tests were administered. The players' rankings were calculated by summing the individual's rankings for each player and then ranking these sums. These players' rankings were done after the eight skill tests were completed by the basketball players. (Appendix I)

The stepwise regression test was applied to the skill tests and the coaches' ranking in order to identify which skill test items most significantly predicted the coaches' ranking.

Chapter 4

RESULTS

The purpose of this study was to determine if any relationships existed (1) among the selected basketball skills tests, (2) between each skills tests and the coaches' ranking of the players, and (3) between a player's basketball playing ability as perceived by the coaches and by the players. Correlation coefficients were used to make comparisons between each of these relationships. The results of these comparisons are presented in tables in this chapter.

The skills tests are numbered as follows:

- I. Dribble
- II. Front Shot
- III. Field Goal Speed Test
- IV. Jump and Reach
- V. Broad Jump
- VI. Two-Directional Wall Pass
- VII. Speed Pass
- VIII. Lambert Speed and Accuracy Test.

Relationships Between the Basketball Skills Tests

Multiple correlation was done to determine if any relationships existed among the skills tests as shown in Table 1 and Table 2.

Table 1

Multiple Correlation Among the Basketball Skills Tests
 Montana State University Women's Basketball Team (N = 25)

Skill Tests	II	III	IV	V	VI	VII	VIII
I Dribble	-.516*	.037	-.436*	-.206	-.426*	.386	.362
II Front Shot			.311	.416*	.396*	-.369	-.523*
III Field Goals Speed Test			.244	.118	.410*	-.373	-.276
IV Jump and Reach				.269	.287	-.573*	-.339
V Broad Jump					.132	-.471*	-.220
VI Two-Directional Wall Pass						-.688*	-.763*
VII Speed Pass							.511*
VIII Lambert Speed and Accuracy Test							

*Significant correlation ($P < .05$), critical value .390

Table 2

Multiple Correlations Among the Basketball Skill Tests
Bozeman High School Girls Basketball Team (N = 18)

Skills Tests	II	III	IV	V	VI	VII	VIII
I Dribble	-.337	-.406	-.349	-.106	-.210	.689*	.518*
II Front Shot		.375	.088	.076	.028	-.254	-.340
III Field Goal Speed Test			-.349	-.327	-.018	-.433	-.337
IV Jump and Reach				.666*	.177	-.260	-.263
V Broad Jump					.191	-.058	-.269
VI Two-Directional Wall Pass						-.289	.224
VII Speed Pass							.368
VIII Lambert Speed and Accuracy Test							

*Significant correlation ($P < .05$), critical value .480

The Montana State University women's basketball team's scores showed significant correlations ($P < .05$) between the following skills tests listed in order from highest to lowest correlation coefficient:

- (1) the Lambert speed and accuracy test and the two-directional wall pass, (VIII and VI),
- (2) the speed pass and the two-directional wall pass, (VII and VI),
- (3) the speed pass and the jump and reach, (VII and IV),
- (4) the Lambert speed and accuracy test and the front shot, (VIII and VII),
- (5) the dribble and the front shot, (I and II),
- (6) the Lambert speed and accuracy test and the speed pass, (VIII and VII),
- (7) the speed pass and the broad jump, (VII and V),
- (8) the dribble and the jump and reach, (I and IV),
- (9) the dribble and the two-directional wall pass, (I and VI),
- (10) the front shot and the broad jump, (II and V),
- (11) the two-directional wall pass and the field goal speed test, (VI and III), and
- (12) the two-directional wall pass and the front shot, (VI and II).

The Bozeman High School girls' basketball team's scores showed significant correlations ($P < .05$) between the following skills tests

listed in order from greatest to least significance:

- (1) the dribble and the speed pass (I and VII),
- (2) the jump and reach and the broad jump (IV and V), and
- (3) the dribble and the Lambert speed and accuracy test (I and VIII).

Relationships Between the Basketball Skills Tests and the Coaches'

Ranking

Multiple correlation was used to determine if any significant relationships existed between any of the skills tests and the coaches' ranking for the Montana State University women's basketball team and the coaches' ranking for the Bozeman High School girls' basketball team as shown in Table 3.

The Montana State University women's basketball team members showed significant correlations ($P < .05$) between their performances on the following skills tests and their coaches' ranking. These tests are listed in order from greatest to least significance:

- (1) speed pass (VI),
- (2) two-directional wall pass (VI),
- (3) Lambert speed and accuracy test (VIII),
- (4) jump and reach (IV), and
- (5) the broad jump (V).

The Bozeman High School girls' basketball team's members showed

Table 3

Multiple Correlations Between the Skills Tests and the Coaches Ranking

	Skills Tests							
	I	II	III	IV	V	VI	VII	VIII
	Dribble	Front Shot	Field Goal Speed Test	Jump and Reach	Broad Jump	Two-Directional Wall Pass	Speed Pass	Lambert Speed and Accuracy Test
N = 25								
Coaches' Ranking								
Montana State University	.379	-.257	-.207	-.445**	-.405*	-.574*	.609*	.479*
N = 18								
Coaches Ranking								
Bozeman High School	.586**	-.170	-.378	-.397	-.067	-.110	.576**	.289

* Montana State University significant correlation ($P < .05$) critical value - .390.

**Bozeman High School significant correlation ($P < .05$) critical value - .480.

significant correlations ($P < .05$) between their performance on the following skills tests and their coaches' ranking. These tests are listed in the following order from highest to lowest correlation coefficient:

- (1) the dribble (I), and
- (2) the speed pass (VII).

The stepwise regression analysis was applied to the skills tests and the coaches' ranking to identify which skill test items most significantly predicted the coaches' rankings. These results for the Montana State University women's basketball team and for the Bozeman High School girls' basketball team are found in Table 4 and Table 5, respectively.

The stepwise analysis showed that the speed pass was the only significant skill test that could be used to predict the coaches' ranking for the Montana State University women's basketball team. The dribble skill test was the only significant test that could be used to predict the coaches' ranking for the Bozeman High School girls' team.

Relationship Between the Coaches' Ranking and the Players' Ranking of Perceived Basketball Ability

There were significant correlations between the coaches' ranking and the players' ranking of perceived basketball playing ability of .978 and .947 for the Montana State University women's basketball team and the Bozeman High School girls' basketball team, respectively.

Table 4

Stepwise Analysis of the Coaches' Ranking and the Skills Tests
 Montana State University Women's Basketball Team (N = 25)

<u>Step Number</u>	<u>Variable Entered</u>	<u>F Value to Enter or Remove</u>
1	VII Speed Pass	13.531*
2	VI Two-Directional Wall Pass	1.721
3	V Broad Jump	1.679
4	IV Jump and Reach	1.154
5	II Front Shot	.740
6	I Dribble	.240
7	III Field Goal Speed Test	.054
8	VIII Lambert Speed and Accuracy Test	.017

*Significant value (P < .05)

Table 5

Stepwise Analysis of the Coaches' Ranking and the Skills Tests
Bozeman High School Girls' Basketball Team (N = 18)

<u>Step Number</u>		<u>Variable Entered</u>	<u>F Value to Enter or Remove</u>
1	I	Dribble	8.385*
2	VII	Speed Pass	1.413
3	IV	Jump and Reach	.988
4	V	Broad Jump	3.721
5	III	Field Goal Speed Test	2.336
6	II	Front Shot	.244
7	VIII	Lambert Speed and Accuracy Test	.014
8	VI	Two-Dimensional Wall Pass	.004

*Significant value (P < .05)

Chapter 5

DISCUSSION OF RESULTS

Relationships Between the Skills Tests

Young and Moser, 1934, believed that if intercorrelations between the skills tests were low, different qualities of basketball were being measured. If one looks at the Montana State University women's team one could assume that the same qualities of basketball were being measured by the skills tests that were significantly correlated and therefore, the tests were redundant and not all of them were necessary to administer. The Montana State University women's basketball team showed significant correlations ($P < .05$) between the skills tests of:

- dribble and the front shot,
- dribble and the jump and reach,
- dribble and the two-directional wall pass,
- front shot and the broad jump,
- front shot and the two-directional wall pass,
- front shot and the speed pass,
- field goal speed test and the two-directional wall pass,
- jump and reach and the speed pass,
- broad jump and the speed pass,
- two-directional wall pass and the speed pass,
- two-directional wall pass and the Lambert speed and accuracy test,

and the speed pass and the Lambert speed and accuracy test.

If one considers the Bozeman High School girls' basketball team's skills tests relationships, one could assume the contrary, that is, that since the intercorrelations between most of the skills tests were low, different qualities of basketball were measured. All of the tests would be necessary to give a score of basketball playing ability. The Bozeman High School girls' basketball team showed significant relationships ($P < .05$) between:

dribble and the speed pass,
dribble and the Lambert speed and accuracy test,
and the jump and reach and the broad jump.

It was interesting to note in the results that there were no common skills tests which were significant for both teams. They may have been related to several factors. The two groups were different in ages and skill level. Another difference was the motivation associated with taking the basketball skills tests. The Montana State University women's team was administered the skills tests on the first day of regular practice, and the players knew that the coaches would list the varsity and junior varsity teams the following day. The Bozeman High School Team could only be scheduled during the week after regular season and before their tournament. The girls already knew who was going to be on the tournament team. They were not competing for a

position as the University team members were. This motivation difference could have had more influence than either age or skill level.

Relationships Between the Skills Tests and the Coaches' Ranking

Using multiple correlation regression, the eight skills tests were compared to the coaches' ranking of basketball playing ability. The Montana State University women's basketball team showed significant correlations ($P < .05$) between coaches' ranking and skills tests of;

jump and reach,

broad jump,

two-directional wall pass,

speed pass,

and the Lambert speed and accuracy test.

The Bozeman High School girls' team showed significant correlations ($P < .05$) for:

dribble,

and the speed pass.

The jump and reach skill test had been correlated to the subjective rating by coaches in the study by Dyer, Schurig and Apagar in 1939, by Fratzhe in 1976 and Hopkins in 1976.

Gaunt, in the study completed in 1979 with high school girls, supported the results of the broad jump and the two-directional wall pass as being important in assessing basketball playing ability.

The speed pass, which was found to be significant for both the Montana State University team and the Bozeman High School girls' team, is similar to the push pass that was proposed by Leilich in 1952 as part of a three item test battery that would aid the coach in evaluating basketball playing ability. Glassow, Colvin and Schwarz, 1938, and Hopkins, 1976, also concluded that the speed pass was significant and should be included in such a test battery.

The Lambert speed and accuracy test as proposed by Lambert in 1969 was found to correlate significantly between the scores from that skills test by the performances of the Montana State University team and the coaches' ranking.

The dribble skill test that was significantly related to the coaches' ranking for the Bozeman High School team was also suggested by Wendler in 1938 and Gaunt in 1959 to be used to evaluate basketball playing ability.

The stepwise analysis showed that the speed pass was the most significant factor when compared with the coaches' ranking for the Montana State University women's basketball team. Hopkins proposed that the speed pass was an essential skills test for junior high and high school boys in 1976. There may be a relationship between the basketball ability of junior high and high school boys and college women. This relationship should be investigated further.

The stepwise analysis showed that the dribble skills test was

the most significant skills test item for the Bozeman High School girls' basketball team. This study supported the findings of Gaunt, 1979, that the dribble was essential for high school girls' basketball playing ability evaluation. Gaunt also included the standing broad jump, field goal speed test and the two-directional wall pass, in order of importance, in her four skills tests battery that would measure basketball playing ability in high school girls. Hopkins, in his later study of 1978, concluded that for high school girls the field goal speed test was the most important skills test followed closely by the dribble skills test. He believed that these two skills tests could be 75 to 80 percent effective in evaluating basketball playing ability.

Relationship Between the Coaches' and Players' Ranking of Basketball Playing Ability.

The correlation of the coaches' ranking to the players' ranking of basketball playing ability was extremely high for both groups. The Montana State University team showed a significant correlation ($P < .05$) of .978 and the Bozeman High School team showed a significant correlation ($P < .05$) of .947. As indicated by Cowell and Ismail (1961) significant relationships were found to exist between playing ability as perceived by the coaches and playing ability as perceived by the players. The players' ranking of themselves could be used as an additional tool in aiding a coach in evaluating basketball playing ability.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to ascertain the relationships of selected skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall pass, front shot, field goal speed test, and Lambert's speed and accuracy test to basketball playing ability as perceived by coaches and players. Specially, an attempt was made to determine:

1. if any relationships existed among the skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall pass, front shot, field goal speed test or Lambert's speed and accuracy test;
2. if the skills tests of jump and reach, standing broad jump, dribble, speed pass, two-directional wall pass, front shot, field goal speed test, or Lambert's speed and accuracy test were related to basketball playing ability as perceived by coaches;
3. if there was any relationship between basketball playing ability as perceived by coaches and basketball playing ability as perceived by players.

It was hypothesized that there would be no significant relationships among any of the skills tests, between the skills tests scores

and the coaches' ranking, and between the basketball playing ability of the players as perceived by the coaches and that perceived by the players.

Eight basketball skills tests were administered to 25 members of the 1979-80 Montana State University women's varsity and junior varsity basketball teams and 18 members of the 1979-80 Bozeman High School girls' varsity and junior varsity basketball teams. Correlation coefficients were calculated to determine the degree of relationship among the variables studied. A stepwise regression analysis was applied in order to determine which test items were most significant when correlated with the coaches' ranking. The skills tests were administered during basketball practice (Appendices A - H0).

Significant correlations ($P < .05$) were found for the Montana State University women's basketball team between the skills tests listed in order of greatest to least significance:

- the Lambert speed and accuracy test and the two-directional wall pass,
- the speed pass and the two-directional wall pass,
- the speed pass and the jump and reach,
- the Lambert speed and accuracy test and the front shot, dribble and the front shot,
- the Lambert speed and accuracy test and the speed pass,
- the speed pass and the broad jump,

dribble and the jump and reach,
dribble and the two-directional wall pass,
front shot and the broad jump,
the two-directional wall pass and the field goal speed test,
and the two-directional wall pass and the front shot.

Significant correlations ($P < .05$) were found for the Bozeman High School girls' basketball team between the skills tests of:

jump and reach and the broad jump,
dribble and the speed pass,
and the dribble and the Lambert speed and accuracy test.

Significant relationships ($P < .05$) between the coaches' ranking and the basketball skills tests for the Montana State University women's team showed the skills tests of jump and reach, broad jump, two-directional wall pass, speed pass, and the Lambert speed and accuracy test to be correlated with the coaches' ranking. The Bozeman High School girls' team showed significant correlations ($P < .05$) between the coaches' ranking and skills tests of dribble and the speed pass.

The stepwise regression analysis showed the speed pass to be the most significant factor ($P < .05$) when correlated with the coaches' ranking for the Montana State University women's team. The dribble skills test was found to be the most significant factor ($P < .05$) when correlated with the coaches' ranking for the Bozeman High School girls'

team.

There was a significant correlation for both teams between the coaches' ranking and the players' ranking of perceived basketball playing ability.

Conclusions

The following conclusions were based on this study:

1. These skills tests were shown to be inter-related (p. 24) to the skills tests of speed pass (VII), front shot (II), dribble (I) and two-directional wall pass (VI) for the women's basketball team at the university level.

2. These skills tests were shown to be inter-related (p.25) to the skills tests for the high school girls' basketball team.

3. The speed pass skills test was the most significant factor when correlated with the coaches' ranking for the women's basketball team at the university level.

4. The dribble skills test was the most significant factor when correlated with the coaches' ranking of the high school girls' basketball team.

5. The players' evaluation of themselves may be an additional tool for the coach for evaluating basketball playing ability.

Recommendations

The following recommendations were warranted:

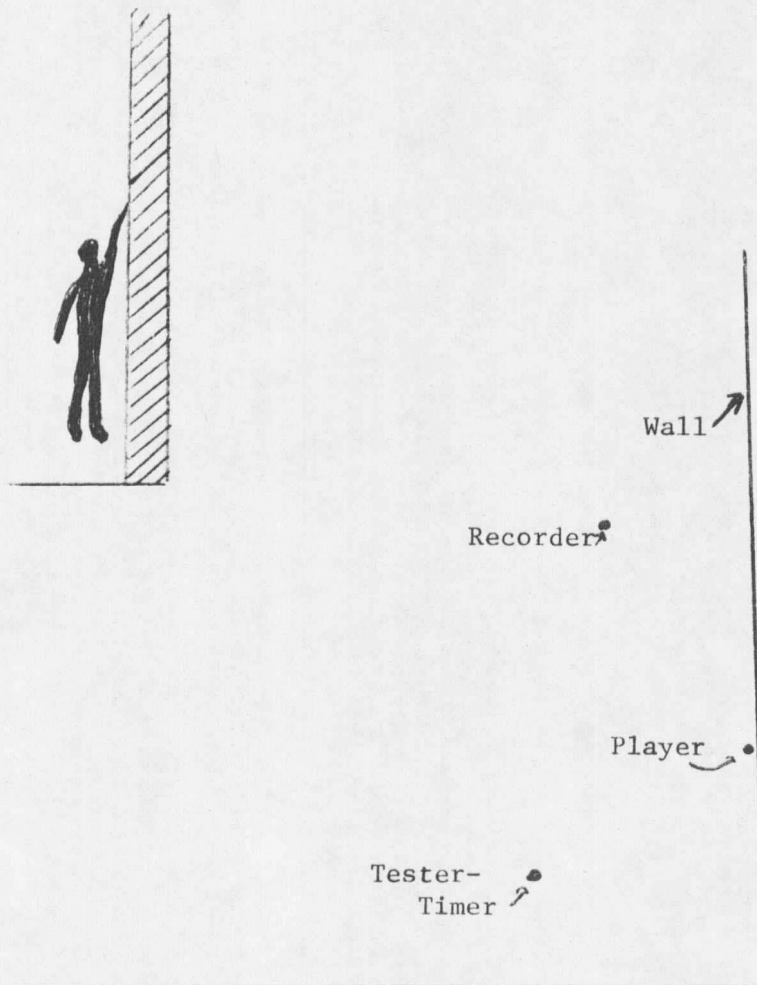
1. Skills testing should be done before official practice begins so that motivation to do well is high.
2. A method of scoring the players other than ranking them would lend itself to more statistical analysis. This scoring should be normally distributed.
3. A larger number of subjects should be used.
4. Different age groups should be used to determine whether certain skills tests are specific to an age group in evaluating basketball playing ability.
5. The effect of personal distance on subjective evaluation should be considered by including a sociometric analysis in the comparisons.

APPENDICES

APPENDIX A

JUMP AND REACH (AAHPER, 1966)

- PURPOSE:** To measure the height of a player's jump over and above his reach.
- EQUIPMENT:** A level floor and a smooth wall surface upon which chalk marks can be made, pieces of chalk three-fourth inches long, yard stick. (Some schools may have a prepared target for the jump and reach test, which can be used.)
- PROCEDURES:** The player, holding a small piece of chalk in his fingers, stands with his side to the wall with knees straight and feet flat on the floor. He reaches up as far as possible and makes a mark on the wall at the top of his reach. The player then crouches, swings his arms, jumps as high as possible, and makes a second mark on the wall. The distance between the first and second marks on the wall is measured with a yard stick to the nearest inch. A practice jump is allowed.
- INSTRUCTIONS:** "You must stand flat-footed with knees straight in making the first mark.
- The jump must be made from both feet without a hop.
- Two trials are taken."
- SCORING:** The score is the distance between the mark at the top of the reach and the mark at the top of the jump. Yard stick must be perpendicular to the floor when measuring the distance between marks. Record the distance to the nearest inch. The distance of the jump on two separate trials is recorded. The score is the best of the two trials.



JUMP AND REACH

APPENDIX B

STANDING BROAD JUMP (AAHPER, 1966)

- PURPOSE:** To measure power.
- FACILITIES AND EQUIPMENT:** Tape measurer and space on the floor.
- PROCEDURES:** The student stands behind a take-off line with her feet shoulder width apart. Preliminary to jumping, the student dips her knees and swings her arms backward. She then jumps forward by simultaneously extending her knees and swinging her arms forward. Six trials are permitted. Measurement is from the closest heel mark to the take-off line. If the player falls backward, repeat the trial. One practice trial is allowed.
- INSTRUCTIONS:** "You must take off from both feet simultaneously, jump as far forward as possible, and land on both feet. Try not to fall backward after the landing. You can jump farther by crouching before the jump and swinging your arms. Six trials are recorded. One practice trial is allowed."
- SCORING:** The score is the distance between the take-off line and the nearest point where any part of the student's body touches the floor to the last inch. Record all six trials.

APPENDIX C

DRIBBLE (AAHPER, 1966)

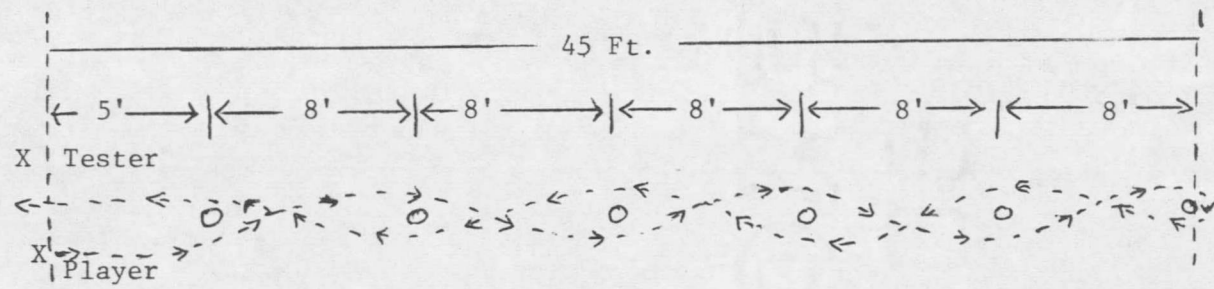
PURPOSE: To measure the speed with which a player can dribble a basketball around obstacles.

**FACILITIES AND
EQUIPMENT:**

The player stands behind the starting line with a ball in hand and on the signal "go" starts with a dribble on the right of the first cone and continues to dribble in and out alternately around the remaining five cones and returns to cross the starting line. The cones are arranged single file in a straight line so that the front of the first cone is 5 feet from the starting line and the following cones are 8 feet apart, measured from the front of each cone. The overall distance from the starting line to the far edge of the sixth cone is 45 feet. A practice trial is allowed. If a cone is knocked over or the subject loses gross control of the ball, the trial is repeated.

INSTRUCTIONS: "On the signal, 'Ready, go', dribble to the right of the first cone and continue to dribble in and out alternately around the remaining five cones in a figure-of-eight pattern until you have crossed the starting line. Your score is the time it takes you to complete the course so go as fast as you can while still keeping the ball under control."

SCORING: The score is the time in seconds and tenths that it takes to dribble around between the cones and back. Time is started on the signal "go" and stopped the instant the player crosses the starting line at the end of the course with the ball. Two trials are given and recorded. The sum time of the two trials is the player's score.

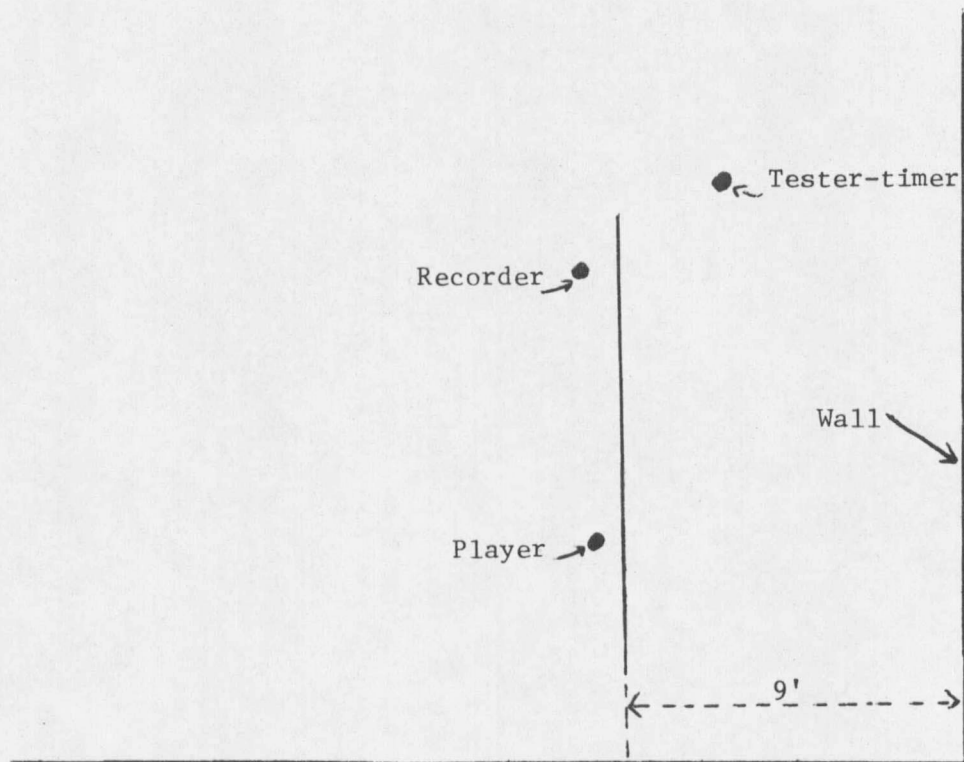


DRIBBLE

APPENDIX D

SPEED PASS (AAHPER, 1966)

- PURPOSE:** To measure speed with which a player can continue to pass and catch a ball.
- EQUIPMENT:** A level floor or ground and a wall with smooth surface, stop watch, standard inflated basketballs.
- PROCEDURE:** The player stands behind a line on the floor parallel to and 9 feet from a solid smooth wall. On the signal "go" the player passes the ball against the wall, about head high, catches the rebound, and continues passing against the wall as rapidly as possible until ten passes have hit the wall. Any method of passing may be used, but the push pass is faster. A practice trial is allowed.
- INSTRUCTIONS:** "All passes must be made from behind the line. The ball cannot be batted, but must be caught and passed. The ball can hit the wall at any height. If the ball is dropped, the player must recover it and continue from behind the line until he has hit the wall ten times. Two complete trials are allowed."
- SCORING:** The test is timed from the instant the first pass hits the wall until the tenth pass hits the wall (the player starts on the signal "go", but the watch is not started until the ball hits the wall). Record the time in seconds and tenths. Two complete trials should be recorded. The score is the best time required to complete ten passes against the wall.

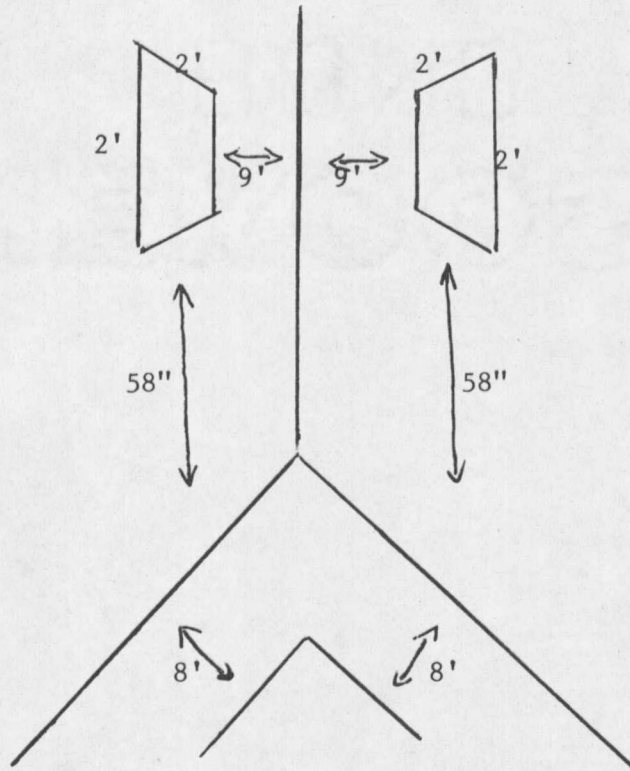


SPEED PASS

APPENDIX E

TWO-DIRECTIONAL WALL PASS (AAHPER, 1966)

- PURPOSE:** To measure the ability to pass the ball quickly and with accuracy in two directions.
- FACILITIES AND EQUIPMENT:** Regulation basketballs, two wall spaces (smooth) at right angles to each other, and a stop watch. See diagram.
- PROCEDURES:** The player stands behind the intersecting 8-foot lines and passes the ball alternately to each of the target areas beginning to the right. The player has 15 seconds to make as many successful passes to the target area as possible without going across the restraining line. Two trials are given. One practice pass is allowed to each wall.
- INSTRUCTIONS:** "On the signal, 'Ready, go,' pass the ball to the target area on the right wall, catch the rebound, and then pass the ball to the target on the left wall. Make as many successful passes to the targets as possible in 15 seconds without stepping on or over the restraining line. Your score is the total of your two trials, a point being awarded for each successful pass to the target without going over the line. You must catch the ball each time, do not slap or volley the ball. One practice pass is allowed to each wall before the first trial."
- SCORING:** One point is scored each time the ball hits in the target area unless the player steps on or over the restraining line, in which case no points are awarded for that pass. The ball must hit the target before the signal to stop or it does not count. Record each of the two trials. The score is the total of the two trials.

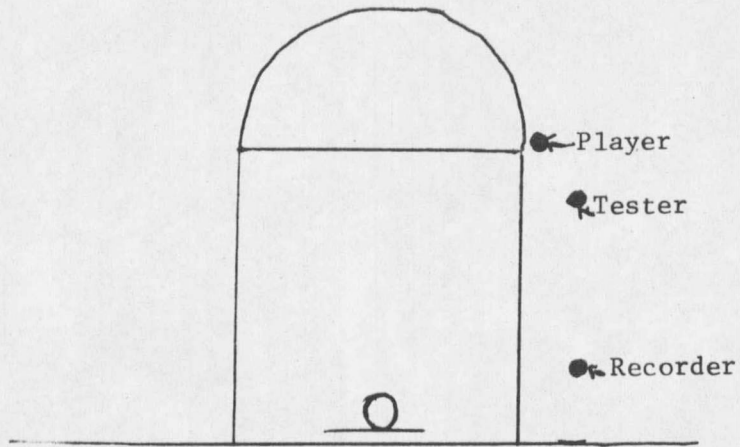


TWO-DIRECTIONAL WALL PASS

APPENDIX F

FRONT SHOT (AAHPER, 1966)

- PURPOSE:** To measure the player's skill in making shots at the basket from a designated spot at the left front of the basket.
- EQUIPMENT:** Standard inflated basketballs, standard goals.
- PROCEDURE:** The player shoots from a spot just outside of the free throw circle where the free throw line intersects the circle. This point is on the left facing the basket. A mark should be drawn on the floor, as in the diagram. Any method of shooting with one or both hands may be used. The player should try to make the shot without hitting the backboard. Fifteen trials are taken in series of five at a time. The player must leave the spot at the end of each five shots and move around or let another player take his first series of shots before continuing. A practice shot is allowed.
- RULES:** Players must shoot from the shooting spot only. Fifteen shots are taken in all.
- SCORING:** Two points are counted for each basket made, regardless of how the ball goes in. One point is counted for shots which hit the rim but do not go in the basket, provided the ball hits the rim before hitting the backboard. Balls which hit the backboard first and do not go in the basket do not count any points. Record the points as made on each shot, and then total the points for the final score. The maximum score that may be made on the 15 shots is 30 points.



FRONT SHOT

APPENDIX G

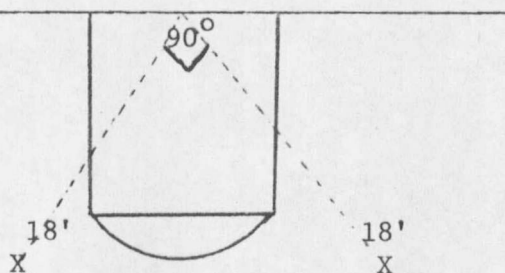
FIELD GOAL SPEED TEST (AAHPER, 1966)

- PURPOSE:** To measure ability to make successive field goals under the stress of time.
- FACILITIES AND EQUIPMENT:** Regulation basketballs and goals and a stop watch.
- PROCEDURES:** The student shoots as many baskets as possible in any style from any distance starting close under the basket. One practice shot is allowed before each trial. Two 30-second trials are given.
- INSTRUCTIONS:** "On the signal, 'Ready, go,' make as many baskets as you can in 30 seconds from any spot. One practice shot is allowed."
- SCORING:** Two 30-second trials are given. One point is scored for every basket made. Record each of the trials. The score is the sum of the two trials.

APPENDIX H

LAMBERT'S SPEED AND ACCURACY TEST (LAMBERT, 1969)

- MATERIALS:** The court should be marked with two X's eighteen feet from the basket as shown in the diagram.
- One basketball is placed on each X.
- PROCEDURE:** Players are tested in pairs. One player alternately takes a ball from the X mark and legally approaches the basket and takes a shot. That same player that took the ball then rebounds the ball and passes it back to the partner who is standing by the X mark from where the ball was taken. The player then goes to the other X mark and makes a second shot. Ten shots are attempted, rebounded, and passed back to the partner before positions are exchanged. Three trials are given with players exchanging positions after each turn.
- SCORING:** Two points are scored for accuracy if the basket is made; one if the ball hits the rim. Time from the word "go" until the shooter holds the ball after the tenth shot. Record scores of twice time plus accuracy for each of the three trials. Use the sum of the two best scores as an indicator of basketball ability.



APPENDIX I

In your own judgment, please rate the player with a number 1, the second best with a number 2, and so on until you use all the numbers 1-24. The names have been placed on the sheet in no specific order.

NAME

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

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