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ABSTRACT

The first chapter of this manual for tennis instructors provides an overview of the game of tennis, a brief history of the background of skill testing in tennis, and general instructions for using the manual. The second chapter presents tests for ground stroke, serve and volley, as well as suggestions on selecting the most appropriate tests. Diagrams and scoring rules are included. In the third chapter the use of norms is explained and tables list percentile and T-score norm tables for males and females in grades nine to college. The fourth chapter provides detailed descriptions of tennis drills for the basic skills in ground stroke, service, and volley. References are included and appendices contain the American Alliance for Health, Physical Education, Recreation and Dance tennis skills tests and rating scales. (JD)

Tennis Skills Test Manual

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Alliance objectives include:

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2. Communication—to facilitate public and professional understanding and appreciation of the importance and value of health, leisure, and movement-related activities as they contribute toward human well-being.

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Bylaws, Article III

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Contents

CHAPTER 1

Test Development

Evaluation in physical education is done for a variety of reasons but, whatever the purpose, the credibility of the outcome is directly related to the quality of the measuring tool used in the process. Recognizing this precept, the Measurement and Evaluation Council appointed a task force to develop sports skill tests which could be used to assess student performance. This group was responsible for the delineation of a sequence of tasks to be completed by a sports skills subcommittee in the development of a battery of tests for a given sport. Specific guidelines for the completion of the tasks were also outlined.

The first task for each sport skills subcommittee was to identify the skills deemed most important for success in a particular sport. Since the battery was intended for use at all age levels, it was directed that all tests included within it must represent skills used by all players, regardless of age. Because the task force believed that the skill test should not require more than two class periods for administration, a maximum of four tests per battery was established.

Determination of content validity for the essential skills was a requisite to individual test selection or development. Based on the judgment of experts in the sport, obtained either directly or through a search of the literature, the subcommittee was required to provide evidence that the selected skills are, in fact, those which are most essential to successful performance in the respective sport. The next task was to select an existing test or, in the absence of an adequate measure, to develop a new one. Guidance, to determine the adequacy of a potential test or to develop a new test, was provided by a list of the cardinal features of good sport skills tests.

The test should:

- have at least minimally acceptable reliability and validity;
- be simple both to administer and to take,
- have directions which are easy to understand;
- require neither expensive nor extensive equipment;
- be reasonable in terms of time with regard to both preparation and administration;
- encourage correct form and be gamelike, but involve only one performer;
- be of suitable difficulty, i.e., it should be neither so difficult that it causes discouragement nor so simple that it is not challenging;
- be interesting and meaningful to the performer;
- exclude extraneous variables as much as possible;
- provide for accurate scoring by utilizing the most precise and meaningful measure.
- follow specific guidelines if a target is the basis for scoring. The target should have a common goal with the capacity to encompass 90 percent of the attempts; near misses may need to be awarded points. The determination of target placement should be based on two principle factors. First, the developmental level of the student needs to be considered, e.g., the height of a given target may be appropriate for a 17-year-old but not a 10-year-old. Second, the strategical aspects of the performance should enter into the allocation of points, e.g., the placement of a badminton serve to an opponent's backhand should score higher than an equally accurate placement to the opponent's forehand.
- require a sufficient number of trials to obtain a reasonable measure of performance; those tests which have accuracy

as a principle component will require more trials than will tests measuring other characteristics.

- yield scores that provide for diagnostic interpretation whenever possible.

Compliance with the first requirement for minimally acceptable reliability and validity necessitated the development of additional guidelines. The task force specified that the reliability to be determined was to be a measure of stability. If the test involved multiple trials, either the sum or the mean of the trials was to constitute the test score. With regard to validity, the task force indicated that evidence of two or three types of validity should be presented. Content validity was mandated previously; therefore, either concurrent or construct validity would also need to be established. It was strongly recommended that both be determined, if possible. For all statistical evidence, i.e., reliability and validity, the minimum sample size was set at 50 per sex per group, e.g., elementary, junior high, or subgroup, e.g., high, medium, low, within each academic level. The minimal coefficient for the entire battery would be .70.

Upon completion of the set preparatory tasks, it was possible to select the skill items which would comprise the test battery. The next step, to generate norms, necessitated the development of the test protocol and score sheets. Volunteers to administer the tests were then solicited in such a way that the total sample (N = 600 per sex per academic level) was selected from various parts of the country. The norms of the national testing were to be described in both percentile ranks and T-scores.

Given all this information, the final task was to prepare a test manual. It is believed that this systematic procedure has made it possible to produce an instrument capable of providing invaluable information to teachers and coaches. Those who use it are invited to send any comments and/or suggestions to the task force chairperson.

Overview of Tennis

Tennis, in its simplest form, merely involves hitting a ball over a net. This is done, of course, within a specified area and using an implement called a racket. The addition of an opponent, boundary lines, and a prescribed set of rules make tennis one of the most popular sports in the world today.

Mason (1974, p.1) described tennis as follows:

> The game consists of stroking a ball with a racket, back and forth across a net, until one player misses the ball or hits it into the net or out of bounds.

She additionally indicated that the fundamental techniques involved in playing tennis include eye-hand-racket coordination, motor (movement) skills, and stroking skills. Gensemer (1975) suggested that one needs to be able to throw a ball, swat a fly, run and walk in order to play tennis. He stated that tennis involves basically the skills of running and throwing. Tennis champion John Newcombe (1975, p.21) indicated that there are three basic concepts in learning tennis.

> The first is to see the ball coming toward you and judge where it will bounce. I call this ball sense. The second is to move yourself to the ball and still give yourself room to swing. I call this movement. The third is to develop control and feel of the strings of your racket so you can hit the ball. This is called racquet control.

He further suggested that everything in tennis is merely a refinement of these basics.

According to Bunn (1965), tennis consists of three factors—service, stroking, and footwork. Footwork enables the tennis player to get in position to hit the ball, whereas serving and stroking are primarily involved in changing the motion of a moving ball by

imparting force to it. Pelton (1980) stated that 90 percent of all tennis shots involve the serve, forehand, and backhand. The volley has also been categorized as an additional beginning tennis skill by other authors (Chavez, 1982, Kenfield, 1982). Murphy and Murphy (1978) suggested that unless a player was beyond the intermediate level, in excess of 75 percent of the shots made during play were the forehand and backhand ground strokes. Moore and Chafin (1979) maintained that the three basic strokes are the forehand, backhand, and serve. According to Johnson and Xanthos (1976, p.19), "it is not necessary to be able to volley to play tennis." They expressed that the forehand drive, backhand drive, and serve were the essential skills of every tennis player. The forehand drive, backhand drive, and serve were considered by former tennis great Don Budge (1937) to be the fundamental tennis skills and, consequently, should receive the greatest emphasis in a learning situation. Emphasizing this point, Budge stated, "Ground strokes are basic for all players' games. Three-fourths of all balls hit during a match have been first allowed to bounce."

The basic components of all strokes, as described by Mason (1974), are force production (developing power), absorption (reducing power), and direction (placement) in relation to the player, the ball, and the racket. In order to effectively utilize these elements in playing tennis, the participant must understand (1) the effect of body action on stroking, (2) the effect the angle of the racket face has on the ball, and (3) the effect of various types of ball spin. She suggested that beginning tennis players acquire skill in four basic strokes—forehand, backhand, serve, and volley. The 26 experts whose opinions were solicited by Edwards (1965) generally agreed that the forehand, backhand, serve, and volley were the desirable skills for a beginner to acquire. Hillas and LeFevre (1955) indicated a total of five essential strokes for the beginning tennis player—forehand and backhand ground strokes, serve, volley, and lob. Armbruster, Irwin, and Musker (1963) identified as fundamental skills the following (in order). stance, footwork, serve, forehand, backhand, and volley, with other strokes presented being merely a variation of these listed. Murphy (1976), Kenfield (1982), and Chavez (1982) also identified the forehand, backhand, serve, and volley as the basic shots of tennis. Johnson, Oliver, and Shields (1979) maintained that the forehand, backhand, serve, and volley were the basic strokes while grip and stance were basic fundamentals.

In a factor analytic study of 14 tennis skill tests, Hensley (1982) identified three components of tennis playing ability for the beginning level player: (1) hitting an approaching ball after it has bounced, (2) hitting an approaching ball before it has bounced, and (3) hitting a ball from a self-toss. Based upon these findings he concluded that a battery of tennis skill tests which contains items to measure stroking, serving, and volleying would provide a valid measurement of the unique components of tennis playing ability. He further suggested that since males, on the average, performed better than the females on the selected tests, separate performance standards would be appropriate.

On the basis of the foregoing research evidence, the committee decided to base the tennis skills test on the fundamental skills which constitute the foundation of every tennis game. forehand drive, backhand drive, and serve. The volley was included as an optional test item.

Background of Skill Testing in Tennis

The measurement of anyone's ability to execute the elements included in sport skills

can be a difficult task. One needs to consider the specific movement patterns, power, accuracy, and game-like situations. Many attempts have been made since 1900 to develop objective skill tests to measure tennis ability. The most popular of these tests are briefly discussed in the following section.

The first tennis test to achieve prominence among physical educators and tennis teachers was the Dyer Backboard Test (Dyer, 1935, 1938). As devised in 1935, the test consisted merely of rallying a tennis ball above a specified line on a wall for a 30-second period. This rally was initiated 20 feet from the wall and only those shots hitting the wall above a 3-foot high line, representing the net, were counted. Once the rally was started, the student could move as close to the wall as desired. Test-retest reliability of the original test was reported between .84 and .90 while the validity coefficient, as measured against a judgement criterion, was reported as .85 to .90. In 1938, Dyer revised the test by adding a restraining line 5 feet from the wall. The validity coefficient of the revision when measured against the original test was .94 to .99. The test-retest reliability estimate was reported to range from .86 to .92.

In 1950, Broer and Miller constructed forehand and backhand drive tests for female college students of beginning and intermediate ability levels. The Broer-Miller tests allowed 14 placement or accuracy shots in designated scoring areas using the forehand and backhand strokes. The test consisted of standing behind the baseline, bouncing the ball to one's self, and attempting to hit the ball to the opposite baseline. Fox (1953) tested the validity of both the Dyer and the Broer-Miller tests using 84 beginning college students. The author analyzed three phases of the tennis game. forehand, backhand, and serve. A panel of four judges subjectively rated each student as they participated in a game of doubles. The intercorrelations of the ratings of the four judges were all between .76 and .84. Fox found the validity coefficient between the Dyer Test and the subjective ratings to be .53. Fox also reported a validity coefficient of .61 between the subjective ratings and the Broer-Miller test for college women.

Cobane (1962), elaborating on the work of Driver (1941), developed a test for service in which accuracy was measured merely by whether or not the serve landed in the service court. In addition, force was measured by a reasonable approximation of the distance that the ball bounced and was scored according to where the ball landed on its second bounce. She reported test-retest reliability as .87. Validity was not reported.

Hewitt revised the Dyer Backboard Test in 1965. Noting that the Dyer Test did not discriminate sufficiently at the beginner's level, Hewitt surmised that the main reason the test discriminated better for advanced players was because the test was a better measure of the subject's ability to volley. To eliminate this factor, Hewitt added a 20-foot restraining line. The target area for the Hewitt Revision of the Dyer Test was 20 feet high and 20 feet wide. He also required the subjects to start the test with a serve and then continue to rally the ball against the wall for 30 seconds using any stroke desired. The final score for the test was the average of three trials. The reliability of the Hewitt revision was .82 for beginners and .93 for advanced players.

In 1965, Timmer developed a forehand and backhand drive test in which the balls were projected to the student taking the test by a ball machine. The placement of the student's return shots into zoned scoring areas was to alternate from one side of the opposite court to the other. Scoring was based on where the ball landed in the designated target area. The validity coefficients ranged from .75 to .86.

Hewitt (1966) constructed a Tennis Achievement Test to evaluate three basic

strokes in tennis—forehand, backhand, and serve. The test involved returning balls hit by the instructor to zoned areas on the court over the net, but below a rope 7 feet above the net. After hitting 5 practice balls, the student would hit 10 forehands and 10 backhands to the opposite baseline. The service portion of the test measured the speed and accuracy of the served ball. The placement serve test was scored on the basis of the target area in which the ball landed in the service zone. The speed of serve was measured by where the served ball landed on its second bounce.

The Kemp-Vincent Rally Test (1968) was developed for the purpose of classifying students and rating playing skill. The test was created to measure the rallying ability of a player in game conditions. The test was easy to administer and required no specific equipment or line markings. Two players of equal ability stood on opposite sides of the net with two balls each and commenced to rally the ball across the net for a 3-minute period. Scoring was based on the total number of hits during the test period, less the number of errors committed. The test-retest reliability was .86 for beginners and .90 for intermediate players. Validity, using rankings of a round robin tournament as the criterion, was found to .84 and .93 for beginning and intermediate players, respectively. A second validation in which test scores of 362 students were correlated with performance on the Scott-French Revision of the Dyer Test yielded a validity coefficient of .80.

In 1968, Hewitt devised two classification tests for tennis which did not require the use of a backboard. The Bounce Test required the student to continually bounce the ball on the court with the racket for 30 seconds. The Shoulder Test, meanwhile, measured the ability of the student to bounce the ball upward with the racket to a point above shoulder level while alternating forehand and backhand on each successive hit. Hewitt reported test-retest reliability coefficients of .88 for the Bounce Test and .83 for the Shoulder Test. When the results of a round robin tournament were compared to test scores, the validity coefficients ranged from .56 to .88 for the Bounce Test and from .23 to .88 for the Shoulder Test. Hewitt recommended the tests be used as a classification device.

Shepard (1972) revised the Broer-Miller Tennis Test to evaluate a student's performance in hitting forehand and backhand drives from an approaching ball, as opposed to a self-toss in the original test. The instructor or another student was required to toss the ball underhand into a target circle as the performer moved into position to drive the tossed ball deep into the opposite backcourt. The test consisted of 14 forehand and backhand trials. The reliability of the total test determined from the correlation of the odd- and even-numbered trials was .91. Validity was established on the basis that the test discriminated among three skill level groups beyond the .001 level of significance.

Green (1976) reported a Backboard Ability Test measuring ground strokes, volleys, serves, half volleys, lobs, overhead smashes, and footwork. The test involved completing each of the above shots and skills within a specified time period by aiming at a target area on a wall. Participants would stand behind a restraining line during 11 sections of the test. No normative, reliability, or validity data were reported, although scales indicating various levels of ability were indicated.

Trying to maximize the relationship between skill tests and playing situations, Avery, Richardson, and Jackson (1979) constructed a serve test which incorporated two balls per trial, attempts from both left and right service courts, and comparable credit for the flat, slice, and spin serves. The Avery-Richardson Tennis Serve Test (ARTST) measured placement of served ball and amount of speed. The subject served 20 trials in a

specific order. A trial consisted of two attempts to serve the ball to a designated half of the service court. Placement was measured by the location of the serve on the first bounce. Speed and spin were measured by the location of the second bounce. Validity was established by using a one-way analysis of variance between groups, beginning and intermediate for both males and females. The analysis revealed a significant difference between beginning and intermediate for both males and females.

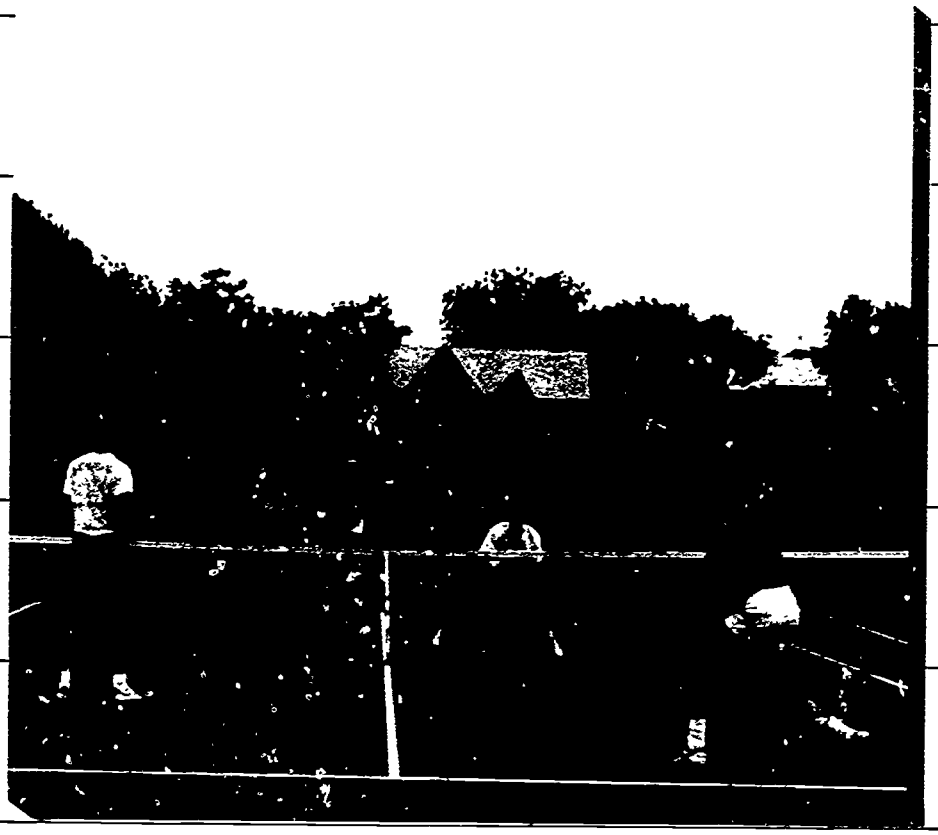
In order to simulate a skill test which would employ techniques related to actual game conditions, Purcell (1981) developed a forehand-backhand drive skill test. Purcell contended that speed, direction, and depth were important elements in the forehand and backhand drives. A ball-pitching machine was used to propel a pressureless tennis ball. Subjects attempted to return the pitched ball over the net and into target areas. To take into account the firmness of the shot, a time factor was employed. Using a stop watch, the experimenter started the watch when the racket contacted the ball and stopped it when the ball struck the target or the net or it became apparent that the ball would not hit the target area. At the conclusion of the 10 trials the accumulated time was recorded to the nearest second. A correction factor was calculated as a time factor. Forehand, backhand, and total scores were calculated. The forehand and backhand scores were the mean of the two rounds, while the total score was the sum of the forehand and backhand means. A validity coefficient of .83 was reported between test scores and judges' ratings when the time factor was considered. The validity coefficient was .76 when the target values were used exclusively. The test-retest reliability was found to be .84.

Conclusion

The selection of a battery of tennis skill tests which meets the teacher's needs is usually based on practicality. Although reliability and validity are important criteria, administrative time, necessary equipment, equipment costs, space limitations, set-up time, and administrator expertise are factors which usually contribute to the final decision. Skill tests which require a ball-pitching machine, a motion picture camera, numerous individuals having the ability to use a stopwatch, or a large array of markings should be critically evaluated before being included in a test battery.

General Instructions for Using the Manual

1. Study each test thoroughly. Take careful note of violations and resultant penalties.
2. Examine the diagrams in detail and be certain to conform to all test specifications.
3. Take special note of all required equipment and ensure availability.
4. If a specific order of administration of tests within the battery is recommended, be sure to follow it.
5. Determine which norm (percentile rank or T-score) is most appropriate for your evaluation purpose and transform the raw scores to the selected derived scores.



CHAPTER 2

The Tests

Selecting the Tests

A committee of experts in the areas of tennis and measurement and evaluation representing college, high school, and junior high school grade levels was identified to develop the *Tennis Skills Test Manual*. The first task for the committee was to identify the essential skills of the sport of tennis. Essential skills were defined as those skills representing the basics of play without which an individual could not effectively participate in the sport of tennis. The identification of the essential skills involved a task analysis whereby a comprehensive review of the conceptual and skill-testing literature was completed as well as consultation with recognized tennis teachers and coaches. A summary of these findings has been presented in Chapter 1 of this Manual. Based upon the task analysis completed, the committee identified two essential skills that are requisite to playing tennis: ground strokes (forehand and backhand drive) and the serve. A third skill, the volley, was generally thought to be more appropriate for intermediate or advanced players, but was included in the test battery as an optional item.

A pilot study was conducted in a variety of school settings around the country to determine the appropriateness of several published tennis skills tests and to investigate a variety of testing protocols and scoring systems. Data were collected for both males and females from the 7th grade through the college level. The primary purpose of the pilot study was to determine the administrative feasibility of the test items. A secondary purpose was to provide preliminary estimates of reliability and validity. In order to develop a test battery that possessed desirable test characteristics and at the same time was administratively feasible and gamelike, many compromises had to be made. Clearly, the most reliable and valid tests consisted of those items that required many trials and considerable setup in terms of equipment and markings, but such features would preclude the use of this test in a typical school setting. Conversely, those tests which required only a few trials or limited administrative setup were often found to be lacking in scientific authenticity. Based upon the information obtained from the pilot study, the specific test items and administrative procedures were developed. For instance, it was found that the best measure of stroking ability was a composite score involving both the forehand and backhand rather than separate scores for each. Furthermore, both the ground stroke and service tests sought to incorporate a measure of both placement and power in the obtained score, while the volley test considered only placement. The pilot testing also revealed that tennis was not taught at the junior high school level as much as previously believed. Consequently, the decision was made to proceed with test development only for the 9th grade level through college.

Utilizing the standardized administrative procedures developed through the pilot test phase, reliability and validity for each test item for each sex and academic level were established by the administration of the test battery in the school setting at the conclusion of a tennis unit. A minimum of 50 students per sex per grade level were administered the test items on two separate occasions no more than 10 days apart. Stability reliability estimates for the test items are shown in Table 1.

Content validity for the test items was assumed based upon the task analysis completed earlier. Concurrent validity coefficients were determined by correlating subjective ratings by experts for the specific skills with performance on each test item. In order to enhance the validity of the subjective ratings as the criterion by which the test items would be judged, considerable attention was given to the development of specific, stan-

Table 1. Intraclass stability reliability information

Test Item	Male		Female	
	High School	College	High School	College
Ground Stroke	.88	.86	.80	.81
Serve	.95	.86	.88	.79
Volley	.72	.70	.79	.69

dardized rating scales. The rating scales used by the experts throughout the validation phase are shown in the Appendix. The validity coefficients ranged from .65 to .91 as presented in Table 2. Only the volley test for college females fell below the desired criterion level of .70.

The three test items were adjudged as having acceptable reliability and validity by the tennis committee and the task force overseeing the project. The directions for administering and scoring the tests are simple and straight-forward which enable students to practice the tests and to assist in test administration. After properly marking the tennis courts and by using students to assist with parts of test administration and scoring, the complete three-item test battery can be administered to an average-sized class in two class periods. It is not necessary, however, to administer all three test items in order to utilize the test battery, although a combination of the ground stroke and serve tests would probably best measure the skills required for a beginning tennis player. The inclusion of the optional volley test may be appropriate for those situations in which the volley is routinely taught. The appropriateness of a test item is dependent upon the instructional objectives established for one's class. Chapter 3 provides percentile rank and T-score norms for those teachers wishing to compare the performance of one student with that of another of the same sex and academic level.

Table 2. Concurrent validity estimates

Test Item	Male		Female	
	High School	College	High School	College
Ground Stroke	.86	.83	.76	.82
Serve	.91	.78	.86	.80
Volley	.76	.75	.76	.65

GROUND STROKE TEST
Forehand and Backhand Drive

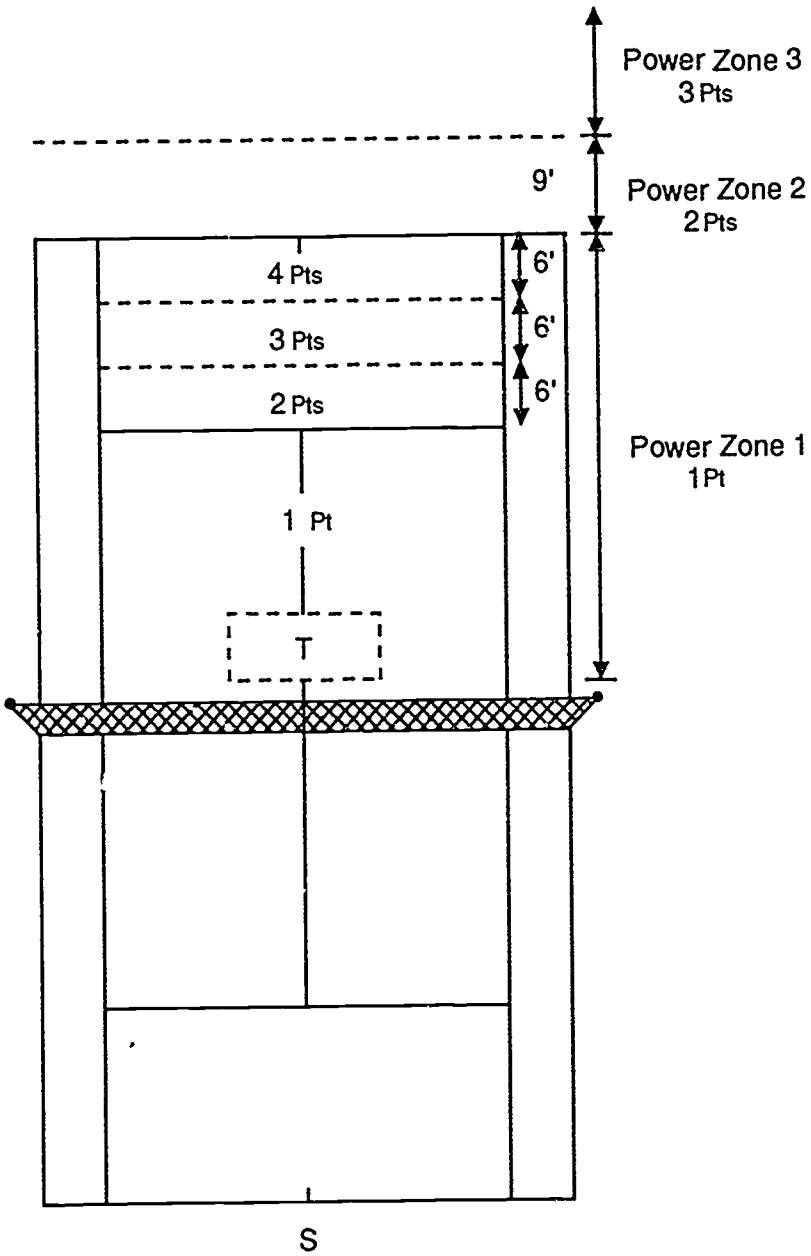


Figure 1. Ground Stroke Test—Court Markings

PURPOSE: To measure the ability to hit ground strokes with both accuracy and power.

EQUIPMENT: Tennis court, racket, a box of tennis balls (10–12 balls per test court is recommended), and tape or chalk for marking target area on court

TARGET AREA: Two lines, parallel to the baseline and extending across the singles court, are marked at a distance of 6 feet and 12 feet from the baseline. In addition, a third line, parallel to and 9 feet from the baseline is marked outside the court. (See Figure 1.)

DIRECTIONS: Prior to taking the test, all students are permitted a warm-up period of approximately 5 minutes. The student takes a position at approximately the location of the center mark of the baseline, yet remaining behind the baseline as shown in Figure 1. The tester is stationed with a box of balls on the other side of the net, within approximately 3 feet of the net and along the center line. Using an overhand throwing motion, the tester tosses 12 consecutive balls to the forehand followed by 12 balls to the backhand. The first 2 tosses to each side serve as practice, with the remaining 10 trials scored. The tester should attempt to toss the ball so that it will land beyond the service line on the desired side and within approximately 6 feet of the student. The student may elect not to swing at a total of 2 scored tosses for each test item and request that additional tosses be made. (This decision must be made prior to attempting to return the ball. Consequently, no swing should be made.) The student should attempt to hit the ball over the net into the designated scoring area within the singles court.

SCORING: Each of the 10 designated trials for both the forehand and backhand drives is scored for both placement and power. The placement score is determined according to the target area in which the ball lands (see Figure 1). Shots landing deeper in the court receive the greater point values. For each of the legal return shots which lands in the designated scoring area, an appropriate score is awarded for power (i.e., 1, 2, or 3) according to bounce distance as determined by the power zone in which the second bounce lands. Balls that are wide, long, or hit into the net receive a score of 0 for both placement and power. A student's score is the sum of the placement and power score for each of the scored trials. The forehand and backhand trials are combined for the total score.

In order to facilitate test administration, students may be trained to serve as ball tossers, scorers, and retrievers.

SERVE TEST

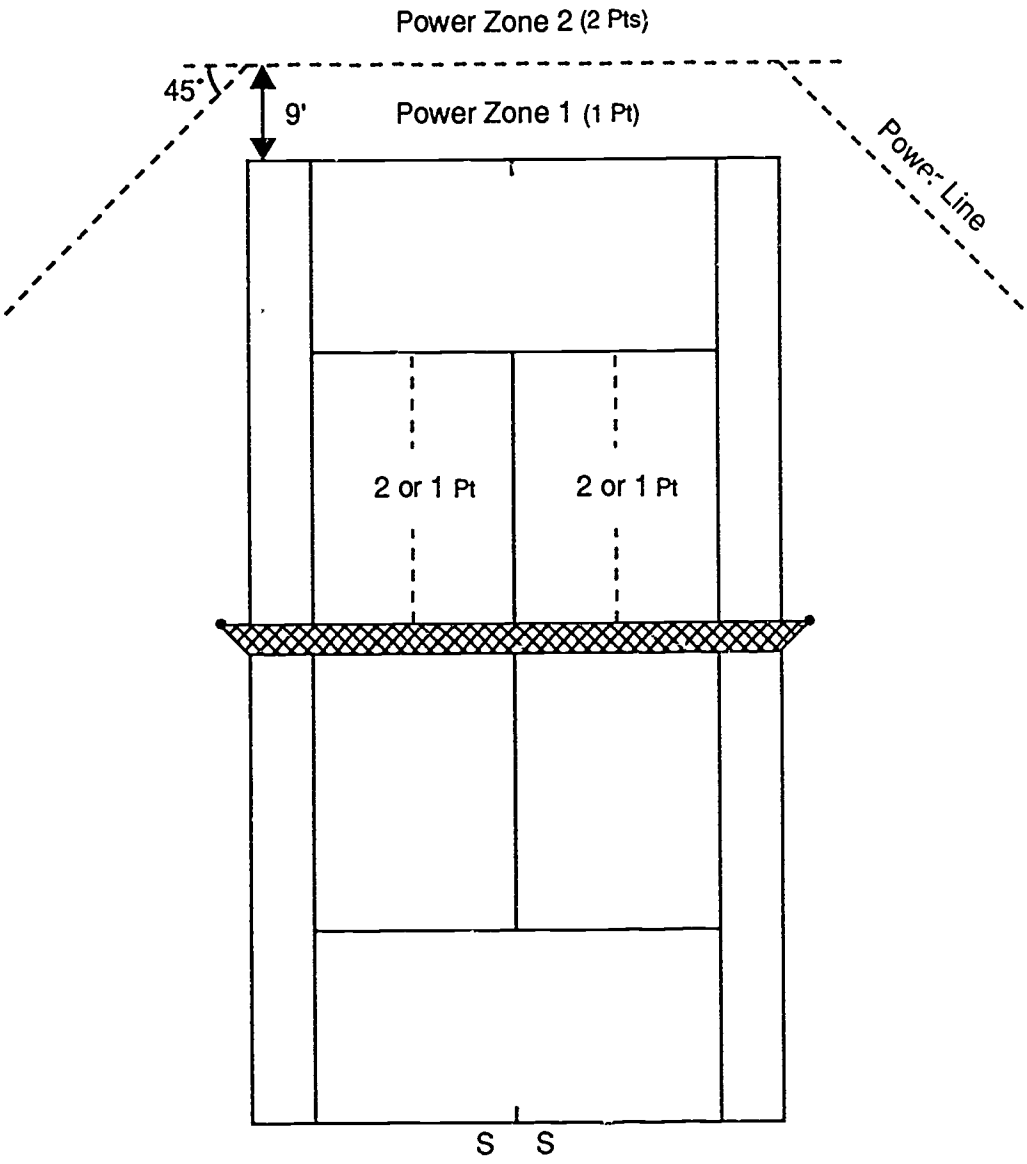


Figure 2. Serve Test—Court Markings

PURPOSE: To measure skill in serving the ball with both accuracy and power.

EQUIPMENT: Tennis court, racket, a box of tennis balls (approximately 20 balls per test court is recommended), and tape or chalk for marking target area on court.

TARGET AREA: A line is marked down the center of each service court, bisecting the service court into right and left halves. A power line extending from sideline to sideline is marked 9 feet from and parallel to the baseline outside the court. This line is extended approximately 10 feet towards the net on each end at a 45 degree angle. (See Figure 2.)

DIRECTIONS: Prior to taking the test, all students are permitted a warm-up of approximately 5 minutes. Two students may be tested simultaneously on each testing court. A box of balls is placed several feet behind the center mark on the end of the court where the server is located. One student takes a position behind the baseline in preparation to serving to the deuce court while the second student prepares to serve to the ad court. Each student is permitted two practice serves prior to attempting 4 scored trials into the designated scoring area. Each trial may consist of a second service attempt if the first is a fault. The first 4 trials are directed to the outside half of the service court, the next 4 scored trials towards the inside half of the respective service court. After each student has completed all 8 scored trials to the designated service court, the students trade service positions and they repeat the process without additional practice serves. All let serves are reserved. In order to facilitate test administration, it is recommended that two students be tested simultaneously and that they alternate attempts. Two other students may be used to collect balls on the opposite end of the court and then carry them to the ball box after the testing is completed. These students then become the next servers. The tester should be positioned near the baseline on the opposite end of the court from the servers. Students may also be trained to be scorers.

SCORING: Each of the 16 designated service attempts is scored for both placement and power. The placement score is determined according to the target area within the service court in which the ball lands (see Figure 2). Serves landing in the designated half of the court are awarded 2 points, serves landing elsewhere in the service court are awarded 1 point, and those landing outside of the service court receive a score of 0. For each of the service attempts which lands within the service court, an appropriate score is awarded for power according to the location of the second bounce. (See scored Figure 2 for appropriate scoring zones and point values, i.e., 1, 2, 3.) Served balls that fail to go over the net or that land outside the appropriate service court are scored 0 for power. A student's score on the service test is the sum of the placement and power scores for each of the 16 trials.

Note: The serve test was adapted from the Avery-Richardson Tennis Serve Test (1979).

VOLLEY TEST (OPTIONAL)

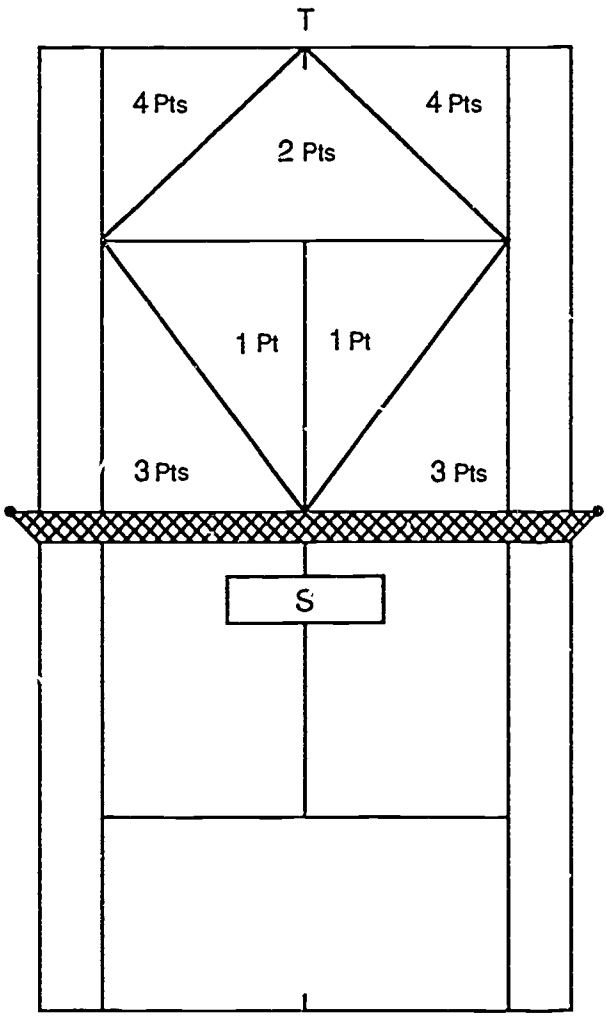


Figure 3. Volley Test—Court Markings

PURPOSE: To measure the ability to volley the ball accurately from a position near the net.

EQUIPMENT: Tennis court, racket, a box of tennis balls (10–12 balls per test court is recommended), and tape or chalk for marking target area on court.

TARGET AREA: Four straight lines are marked on the court as illustrated in Figure 3.

DIRECTIONS: Prior to taking the test, all students are permitted a warm-up period of approximately 5 minutes. The student takes a position 3 to 6 feet from the net in the center of the court as shown by the box in Figure 3. (It is recommended that the box NOT be marked on the court.) The tester is stationed with a box of balls on the other side of the net near the center of the baseline. Using a forehand stroke, the tester *hits* 10 balls to the forehand side and 10 balls to the backhand side of the student. The student should attempt to volley the ball over the net into the designated scoring areas within the singles court. The first 4 balls hit to each side constitute practice trials, with the remaining 6 trials scored. The tester should attempt to hit the balls at a consistent, moderate speed at approximately 1 to 3 feet above the level of the net. (Depending upon the height of the student, this would represent a range from waist high to head high.) The student may elect *not* to attempt to volley a total of two scored trials for each test item and request that additional attempts be given. (This decision must be made prior to attempting to return the ball. Consequently, no swing should be made.) If in the judgment of the tester an improperly set-up ball was responsible for a low score on a student's attempt, this trial may be repeated.

SCORING: Each of the 6 designated trials for both the forehand and backhand are scored for placement. The placement score is determined according to the target area in which the ball lands (see Figure 3). Higher scores are awarded for shots hit deep into the corners and to sharply angled shots near the net. Balls that are wide, long, or hit into the net receive a score of 0. A student's score on the volley test is the sum of the scores for all 12 trials.

In order to facilitate test administration, students may be trained to serve as scorers and retrievers, and highly skilled students may be trained to hit balls to the student being tested.

CHAPTER 3

Normative Information

Data for the norms were collected through a "convenience" sampling procedure. Data collectors were solicited through advertisements in the AAHPERD publication *Update* and announcements at the AAHPERD national convention. Those persons responding to this request were provided with test directions and scoresheets and were given instructions to carefully follow the administrative procedures described for each test. This sampling procedure was employed because the financial resources were not available to identify and test a national, random sample. Normative data for the test battery obtained in this manner were collected on over 7,000 students representing 42 states and grades 9 through college.

The normative data in this manual provide information relative to the range of performance scores that can be expected for students of both sexes and different academic levels. In addition, the tables enable the user to compare the performance of one student with that of another of the same sex and academic level and also to compare the performance of a given student over a period of time.

To convert raw scores to derived scores, select the appropriate table (percentile rank or T-score) for the specific test and for the gender of the student. Locate the column which classifies the student according to academic level and then, within that column, find the student's score. Match the score with the corresponding percentile rank or T score reported at the left of the table.

The selection of percentile ranks or T-scores must be determined by the purpose of the evaluation, and there may be times when both scores would prove useful. Percentile rank norms have the advantage of being more easily understood by both students and parents. If, for example, a student scores at the 80th percentile, one would say either that the student had a score which was equal to or better than 80 percent of the students in his or her norm group ... that the student had a score which exceeded that of 79 percent of the students in his or her norm group.

If the user wishes to utilize the derived scores for further statistical manipulation, even as simplistic as combining scores for a composite battery score, the T-score must be selected. This standard score makes it legitimate to combine results of two or more tests when raw scores are based upon different scales of measurement, e.g., time, distance, number completed. The mean of the T-score distribution is 50 and its standard deviation is 10, therefore, a T-score of 60 would represent a score that is one standard deviation above the mean. Commonly, the T-score distribution ranges from 20 to 80 because, although it is possible, it is rare to have scores which are more than three standard deviations above or below the mean. Interpretation of T-scores will be facilitated by reference to Figure 4.

Percentile norms are provided in Tables 3 through 8 for evaluating a student's tennis skill development. The percentile rank represents the percentage of students from the national sample who scored at or below a given test score. The 50th percentile represents an average level of performance for the population with which the student is being compared. Students who score below the 25th percentile should be provided with a program of exercise and drills as described in Chapter 4.

T scores, provided in Tables 9 through 14, enable one to combine results of tests when scores are reported in different scales of measurement. By summing the T-scores of a student for the various test items, a composite battery score is derived. The composite score provides an indication of overall tennis performance. Since the mean of the T-score distribution is 50 and its standard deviation is 10, the average sum of the three T-scores would be 150. Students scoring composite scores above 150 would be performing above

the national mean. The sum of the T-scores allows the student to compare his or her overall tennis performance to the national sample, while the individual test-item T-scores provide the same information for each skill. The following is an example of a 12th-grade boy's scores:

Test Item	Score	T-score
Ground Stroke	36	40
Serve	27	50
Volley	38	69
		159 = sum of T-scores

This student's performance on the ground stroke test was below average, average for the serve, and above average for the volley. The composite score indicates performance on the test battery was slightly above average.

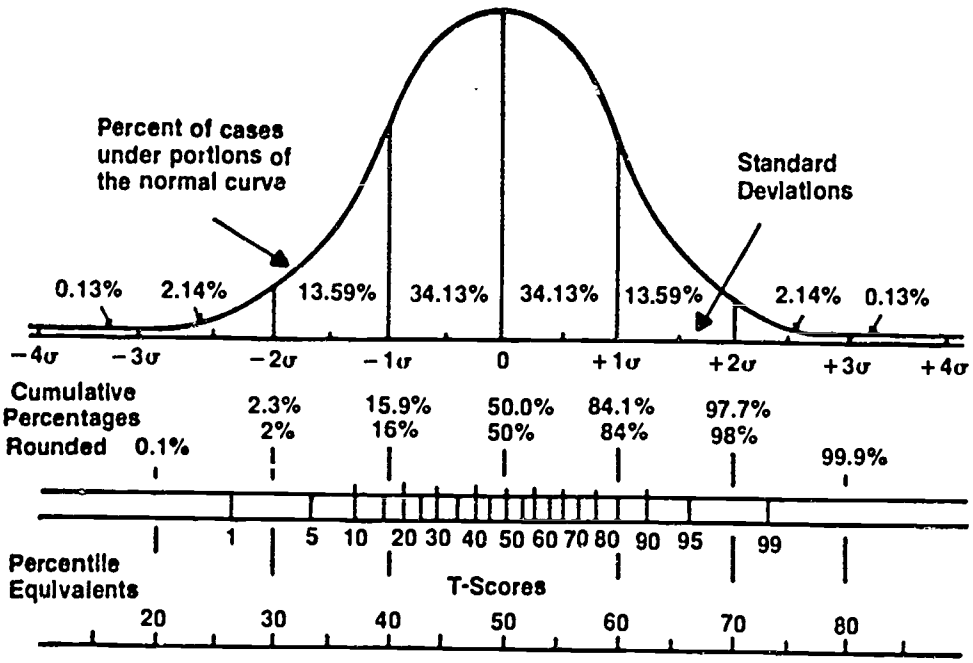


Figure 4. Normal Curve

Table 3. Percentile norms—Groundstroke: Females

	Grade Level				
PR	9	10	11	12	College
99	94	92	108	104	105
95	66	67	78	79	80
90	59	61	70	73	74
85	54	56	65	69	69
80	50	52	60	65	66
75	46	49	56	62	63
70	43	47	53	59	60
65	40	44	50	57	57
60	37	42	47	54	55
55	35	39	44	52	53
50	32	37	41	50	50
45	29	35	39	47	48
40	27	32	36	45	46
35	24	30	33	43	43
30	21	27	30	40	41
25	18	25	27	38	38
20	15	21	23	34	35
15	11	18	18	31	31
10	6	13	13	26	27
5	2	7	5	20	20

Table 4. Percentile norms—Groundstroke: Males

	Grade Level				
PR	9	10	11	12	College
99	97	108	107	109	124
95	73	83	82	84	96
90	67	76	75	78	89
85	63	72	70	73	84
80	59	68	67	70	80
75	57	65	63	66	77
70	54	62	60	64	74
65	52	60	58	61	71
60	49	57	55	59	68
55	47	55	53	57	66
50	45	53	51	54	63
45	43	50	48	52	60
40	40	48	46	50	58
35	38	46	43	47	55
30	36	43	41	45	52
25	33	41	38	42	49
20	30	37	35	39	46
15	27	34	31	35	42
10	23	29	26	31	37
5	16	23	20	24	30

Table 5. Percentile norms—Serve: Females

	Grade Level				
PR	9	10	11	12	College
99	34	50	49	52	50
95	24	36	35	40	37
90	21	32	32	37	34
85	19	30	29	34	32
80	18	28	27	33	30
75	16	26	26	31	28
70	15	24	24	30	27
65	14	23	23	28	26
60	13	22	22	27	24
55	12	20	20	26	23
50	11	19	19	25	22
45	10	18	18	24	21
40	9	16	17	22	20
35	8	15	15	21	18
30	7	14	14	20	17
25	6	12	13	19	16
20	5	10	11	17	14
15	3	8	9	15	13
10	1	6	7	13	10
5	0	2	3	10	7

Table 6. Percentile norms—Serve: Males

	Grade Level				
PR	9	10	11	12	College
99	44	50	54	52	64
95	31	36	41	41	48
90	27	32	37	38	44
85	25	30	35	36	41
80	23	28	33	34	39
75	21	26	31	33	37
70	20	24	30	31	35
65	18	23	28	30	34
60	17	22	27	29	32
55	16	20	26	28	31
50	15	19	25	27	29
45	13	18	23	26	28
40	12	16	22	25	26
35	11	15	21	24	25
30	10	14	19	22	23
25	8	12	18	21	21
20	6	10	16	20	19
15	4	8	14	18	17
10	2	6	12	16	14
5	1	2	9	13	10

Table 7. Percentile norms—Volley: Females

	Grade Level				
PR	9	10	11	12	College
99	29	26	37	36	38
95	20	19	27	27	29
90	18	17	25	24	27
85	16	16	23	23	25
80	15	15	22	21	24
75	14	14	20	20	23
70	13	13	19	19	22
65	12	12	18	18	21
60	11	12	17	17	20
55	11	11	17	16	19
50	10	10	16	16	19
45	9	10	15	15	18
40	8	9	14	14	17
35	7	8	13	13	16
30	7	8	12	12	15
25	6	7	11	11	14
20	5	6	10	10	13
15	3	5	8	8	12
10	2	4	7	7	11
5	1	2	4	4	8

Table 8. Percentile norms—Volley: Males

	Grade Level				
PR	9	10	11	12	College
99	32	39	39	47	45
95	24	29	31	36	35
90	22	26	28	33	33
85	20	24	27	31	31
80	19	23	25	30	29
75	18	22	24	28	28
70	17	21	23	27	27
65	16	20	22	26	26
60	16	18	22	25	25
55	15	18	21	24	24
50	14	17	20	23	23
45	13	16	19	22	22
40	12	15	18	21	22
35	12	14	17	20	21
30	11	13	17	19	20
25	10	12	16	17	19
20	9	10	15	16	17
15	8	9	13	14	16
10	6	7	12	12	14
5	4	4	9	9	12

Table 9. T-Score norms—Ground Stroke: Females

T-Score	Grade 9	Grade 10	Grade 11	Grade 12	College
80	94	92	108	104	105
79	92	90	106	102	103
78	90	89	104	101	101
77	88	87	102	99	100
76	86	85	99	97	98
75	84	83	97	95	96
74	82	81	95	93	94
73	80	79	93	91	92
72	78	77	91	90	91
71	76	76	88	88	89
70	74	74	86	86	87
69	72	72	84	84	85
68	70	70	82	82	83
67	67	68	79	81	81
66	65	66	77	79	80
65	63	65	75	77	78
64	61	63	73	75	76
63	59	61	70	73	74
62	57	59	68	71	72
61	55	57	66	70	70
60	53	55	64	68	69
59	51	54	62	66	67
58	49	52	59	64	65
57	47	50	57	62	63
56	45	48	55	61	61
55	43	46	53	59	59
54	40	44	50	57	58
53	38	42	48	55	56
52	36	41	46	53	54
51	34	39	44	51	52
50	32	37	41	50	50
49	30	35	39	48	49
48	28	33	37	46	47
47	26	31	35	44	45
46	24	30	33	42	43
45	22	28	30	41	41
44	20	26	28	39	39
43	18	24	26	37	38
42	16	22	24	35	36
41	13	20	21	33	34
40	11	18	19	32	32
39	9	17	17	30	30
38	7	15	15	28	28
37	5	13	12	26	27
36	3	11	10	24	25
35	1	9	8	22	23
34	0	7	6	21	21
33	0	6	4	19	19
32	0	4	1	17	18
31	0	2	0	15	16
30	0	0	0	13	14
29	0	0	0	12	12
28	0	0	0	10	10
27	0	0	0	8	8
26	0	0	0	6	7
25	0	0	0	4	5
24	0	0	0	2	3
23	0	0	0	1	1
22	0	0	0	0	0
21	0	0	0	0	0
20	0	0	0	0	0

Table 10. T-Score norms—Ground Stroke: Males

T-Score	Grade 9	Grade 10	Grade 11	Grade 12	College
80	97	108	107	109	124
79	95	106	105	107	122
78	94	104	104	105	120
77	92	103	102	103	118
76	90	101	100	102	116
75	88	99	98	100	114
74	87	97	96	98	112
73	85	95	94	96	110
72	83	93	92	94	108
71	81	92	90	93	106
70	80	90	88	91	104
69	78	88	87	89	102
68	76	86	85	87	100
67	74	84	83	85	97
66	73	82	81	83	95
65	71	80	79	82	93
64	69	79	77	80	91
63	67	77	75	78	89
62	66	75	73	76	87
61	64	73	71	74	85
60	62	71	70	72	83
59	61	69	68	71	81
58	59	68	66	69	79
57	57	66	64	67	77
56	55	64	62	65	75
55	54	62	60	63	73
54	52	60	58	62	71
53	50	58	56	60	69
52	48	57	54	58	67
51	47	55	53	56	65
50	45	53	51	54	63
49	43	51	49	52	61
48	41	49	47	51	59
47	40	47	45	49	57
46	38	45	43	47	55
45	36	44	41	45	53
44	34	42	39	43	51
43	33	40	37	42	49
42	31	38	36	40	47
41	29	36	34	38	45
40	27	34	32	36	43
39	26	33	30	34	41
38	24	31	28	32	39
37	22	29	26	31	37
36	20	27	24	29	35
35	19	25	22	27	33
34	17	23	20	25	31
33	15	22	19	23	29
32	13	20	17	21	26
31	12	18	15	20	24
30	10	16	13	18	22
29	8	14	11	16	20
28	7	12	9	14	18
27	5	10	7	12	16
26	3	9	5	11	14
25	1	7	3	9	12
24	0	5	2	7	10
23	0	3	0	5	8
22	0	1	0	3	6
21	0	0	0	1	4
20	0	0	0	0	2

Table 11. T-Score norms—Serve: Females

T-Score	Grade 9	Grade 10	Grade 11	Grade 12	College
80	34	50	49	52	50
79	33	49	48	52	49
78	33	48	47	51	48
77	32	47	46	50	47
76	31	45	45	49	46
75	30	44	44	48	45
74	30	43	43	47	44
73	29	42	42	46	43
72	28	41	41	45	42
71	27	40	40	44	41
70	26	39	39	43	40
69	26	38	38	42	40
68	25	37	37	41	39
67	24	36	36	40	38
66	23	35	35	40	37
65	23	34	34	39	36
64	22	33	33	38	35
63	21	32	32	37	34
62	20	31	31	36	33
61	20	30	30	35	32
60	19	29	29	34	31
59	18	28	28	33	30
58	17	27	27	32	29
57	16	26	26	31	29
56	16	25	25	30	28
55	15	24	24	29	27
54	14	23	23	28	26
53	13	22	22	28	25
52	13	21	21	27	24
51	12	20	20	26	23
50	11	19	19	25	22
49	10	18	18	24	21
48	9	17	17	23	20
47	9	16	16	22	19
46	8	15	15	21	18
45	7	14	14	20	17
44	6	13	13	19	17
43	6	12	12	18	16
42	5	11	11	17	15
41	4	10	10	16	14
40	3	9	9	15	13
39	3	8	8	15	12
38	2	7	7	14	11
37	1	6	6	13	10
36	0	5	6	12	9
35	0	4	5	11	8
34	0	3	4	10	7
33	0	2	3	9	6
32	0	1	2	8	6
31	0	0	1	7	5
30	0	0	0	6	4
29	0	0	0	5	3
28	0	0	0	4	2
27	0	0	0	3	1
26	0	0	0	3	0
25	0	0	0	2	0
24	0	0	0	1	0
23	0	0	0	0	0
22	0	0	0	0	0
21	0	0	0	0	0
20	0	0	0	0	0

Table 12. T-Score norms—Serve: Males

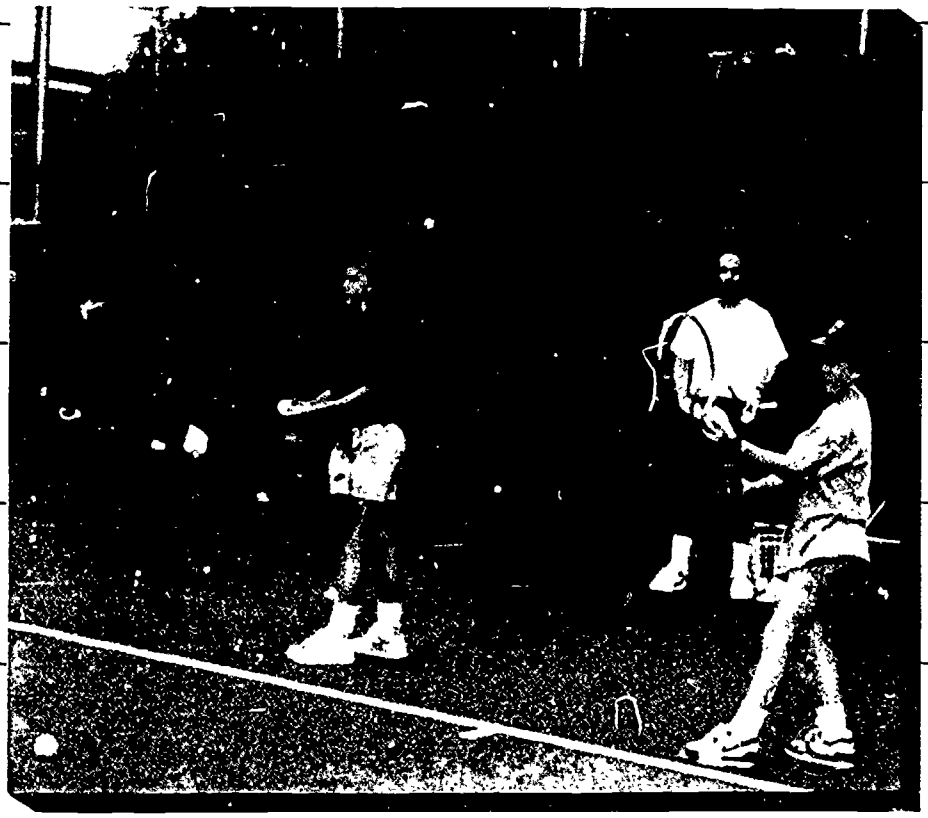
T-Score	Grade 9	Grade 10	Grade 11	Grade 12	College
80	44	50	54	52	64
79	43	49	53	51	62
78	42	48	52	51	61
77	41	47	51	50	60
76	40	45	50	49	59
75	39	44	49	48	58
74	38	43	48	47	57
73	37	42	47	46	55
72	36	41	46	46	54
71	35	40	45	45	53
70	34	39	44	44	52
69	33	38	43	43	51
68	32	37	42	42	50
67	31	36	41	41	49
66	30	35	40	40	47
65	29	34	39	40	46
64	28	33	38	39	45
63	27	32	37	38	44
62	26	31	36	37	43
61	25	30	35	36	42
60	24	29	34	35	41
59	23	28	33	34	39
58	22	27	32	34	38
57	22	26	31	33	37
56	21	25	30	32	36
55	20	24	29	31	35
54	19	23	28	30	34
53	18	22	28	29	33
52	17	21	27	29	31
51	16	20	26	28	30
50	15	19	25	27	29
49	14	18	24	26	28
48	13	17	23	25	27
47	12	16	22	24	26
46	11	15	21	23	25
45	10	14	20	23	23
44	9	13	19	22	22
43	8	12	18	21	21
42	7	11	17	20	20
41	6	10	16	19	19
40	5	9	15	18	18
39	4	8	14	17	16
38	3	7	13	17	15
37	2	6	12	16	14
36	1	5	11	15	13
35	0	4	10	14	12
34	0	3	9	13	11
33	0	2	8	12	10
32	0	1	7	12	8
31	0	0	6	11	7
30	0	0	5	10	6
29	0	0	4	9	5
28	0	0	3	8	4
27	0	0	2	7	3
26	0	0	1	6	2
25	0	0	0	6	0
24	0	0	0	5	0
23	0	0	0	4	0
22	0	0	0	3	0
21	0	0	0	2	0
20	0	0	0	1	0

Table 13. T-Score norms—Volley: Females

T-Score	Grade 9	Grade 10	Grade 11	Grade 12	College
80	29	26	37	36	38
79	28	25	36	36	37
78	27	25	35	35	36
77	27	24	34	34	36
76	26	24	34	34	35
75	26	23	33	33	34
74	25	23	32	32	34
73	24	22	32	32	33
72	24	22	31	31	33
71	23	21	30	30	32
70	22	21	30	29	31
69	22	20	29	29	31
68	21	20	28	28	30
67	21	19	28	27	29
66	20	19	27	27	29
65	19	18	26	26	28
64	19	18	25	25	28
63	18	17	25	25	27
62	17	17	24	24	26
61	17	16	23	23	26
60	16	16	23	23	25
59	16	15	22	22	24
58	15	14	21	21	24
57	14	14	21	20	23
56	14	13	20	20	22
55	13	13	19	19	22
54	12	12	18	18	21
53	12	12	18	18	21
52	11	11	17	17	20
51	11	11	16	16	19
50	10	10	16	16	19
49	9	10	15	15	18
48	9	9	14	14	17
47	8	9	14	13	17
46	7	8	13	13	16
45	7	8	12	12	15
44	6	7	12	11	15
43	5	7	11	11	14
42	5	6	10	10	14
41	4	6	9	9	13
40	4	5	9	9	12
39	3	4	8	8	12
38	2	4	7	7	11
37	2	3	7	6	10
36	1	3	6	6	10
35	0	2	5	5	9
34	0	2	5	4	9
33	0	1	4	4	8
32	0	1	3	3	7
31	0	0	2	2	7
30	0	0	2	2	6
29	0	0	1	1	5
28	0	0	0	0	5
27	0	0	0	0	4
26	0	0	0	0	3
25	0	0	0	0	3
24	0	0	0	0	2
23	0	0	0	0	2
22	0	0	0	0	1
21	0	0	0	0	0
20	0	0	0	0	0

Table 14. T-Score norms—Volley: Males

T-Score	Grade 9	Grade 10	Grade 11	Grade 12	College
80	32	39	39	47	45
79	32	38	39	47	44
78	31	37	38	46	43
77	31	37	37	45	43
76	30	36	37	44	42
75	29	35	36	43	41
74	29	35	35	42	41
73	28	34	35	42	40
72	28	33	34	41	39
71	27	32	33	40	38
70	26	32	33	39	38
69	26	31	32	38	37
68	25	30	32	38	36
67	24	29	31	37	36
66	24	29	30	36	35
65	23	28	30	35	34
64	23	27	29	34	33
63	22	26	28	33	33
62	21	26	28	33	32
61	21	25	27	32	31
60	20	24	26	31	31
59	20	23	26	30	30
58	19	23	25	29	29
57	18	22	24	29	28
56	18	21	24	28	28
55	17	20	23	27	27
54	16	20	23	26	26
53	16	19	22	25	25
52	15	18	21	24	25
51	15	17	21	24	24
50	14	17	20	23	23
49	13	16	19	22	23
48	13	15	19	21	22
47	12	14	18	20	21
46	12	14	17	19	20
45	11	13	17	19	20
44	10	12	16	18	19
43	10	11	15	17	18
42	9	11	15	16	18
41	9	10	14	15	17
40	8	9	13	15	16
39	7	8	13	14	15
38	7	8	12	13	15
37	6	7	12	12	14
36	5	6	11	11	13
35	5	5	10	10	13
34	4	5	10	10	12
33	4	4	9	9	11
32	3	3	8	8	10
31	2	2	8	7	10
30	2	2	7	6	9
29	1	1	6	6	8
28	1	0	6	5	8
27	0	0	5	4	7
26	0	0	4	3	6
25	0	0	4	2	5
24	0	0	3	1	5
23	0	0	3	1	4
22	0	0	2	0	3
21	0	0	1	0	2
20	0	0	1	0	2



CHAPTER 4

Tennis Drills for the Basic Skills

Mastering the component skills of tennis is largely a matter of proper instruction and practice. Although each teacher of tennis may adopt an instructional approach that is compatible with his or her philosophy, expertise, and available resources, a common element of most instructional strategies is the use of tennis drills to enhance learning. The tennis literature abounds with examples of tennis drills for the basic skills as well as those required for the advanced player. The following drills have been selected as representative of those that have been designed to elicit improvement in the tennis skills of hitting forehand and backhand groundstrokes, serving, and volleying. They are offered in progressive order from simple to complex and from individual to group participation.

GROUND STROKE DRILLS

A. Progression from Novice to Advanced Beginner

Objective: Racket-to-ball contact and tracking.

Description:

Step 1—Self Toss

Student hitter (H) stands behind *service line*. Using a self toss (bounce-hit), the student hits the ball into the parallel service court. (If the student is having difficulty with the self toss to the backhand, a partner may be used. The partner (P) may stand next to the hitter or behind the hitter. In either case the hitter should be in racket preparation position.)

Competency Goal: 6 out of 10.

Step 2—Partner Toss

Student hitter stands behind *service line*. A partner (T), from across the net, tosses ball to hitter. The ball is hit into the parallel service court.

Competency Goal: 6 out of 10.

Step 3—Rally

Student partners stand behind parallel service line. Beginning with a self toss (bounce-hit), students rally using the parallel service court as boundaries. Students must attempt to contact the ball after the first bounce.

When using these progressions the instructor may want to have the student hit all forehands, all backhands, either forehands or backhands or alternating forehand - backhand.

Competency Goal: six consecutive hits by each student.

Step 4—Game

Students stand behind parallel service lines. Beginning with a self toss (bounce-hit) serve, students play a four (4)-point game. The parallel service court area is used as service and play boundaries. The first player to score four (4) points wins the game. Serving, receiving, and game play rules are consistent with regular playing rules except for the boundaries.

Competency Goal: win two out of four games.

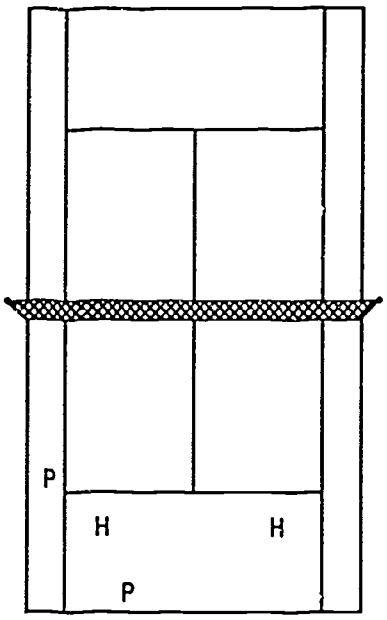
Step 5—Doubles Game

Using the service line extended and doubles side line as boundaries, the four players play a four (4)-point game. Students stand behind the service line. The game begins with a self toss (bounce-hit) serve. The first team to score four points wins the game. Serving and receiving order is consistent with regular doubles play. Game play rules are consistent with regular playing rules except for the boundaries and the "bounce-hit" serve.

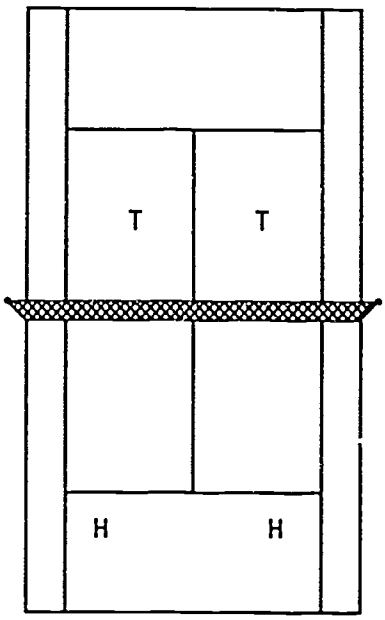
Competency level: win two out of four games

Step 6—Repeat Steps 1–5 from the baseline

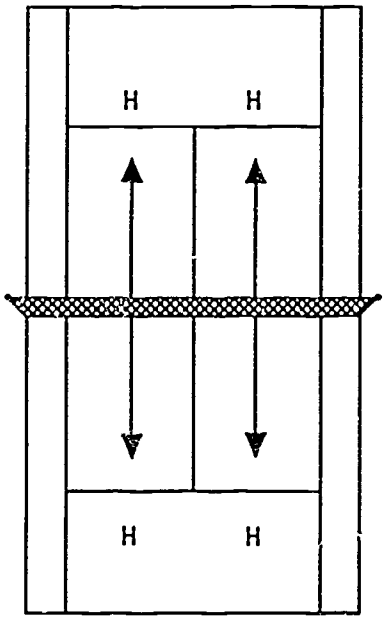
Steps 1–5 are repeated except students begin all drills from behind the baseline.



STEP 1



STEP 2



STEP 3

Figure 5. Progressive Ground Stroke Drill

The target area and play area becomes the back court.

B. Level Progression from Beginner to Intermediate Level

Objective: Controlled rally.

Description: Two students assume a position behind the baseline and rally for a two-minute period. They attempt to commit as few errors as possible. Each student has two balls to start a rally. If the four balls have been played, students must retrieve at least one of the balls in order to start another rally. One student begins the rally with a self toss (bounce-hit). Any time an error is committed the rally ends. Immediately a new rally is started by either student from behind the baseline. Errors include: ball being hit out of bounds, ball not going over net, or not hitting the ball on the first bounce. The rally ends after the two (2)-minute time period or if the students were unable to retrieve any of the original four balls. The scoring system includes both the combined "good" strokes by both students, and the "errors" committed by each of the students. First, the combined total of "good" strokes executed by both students is calculated, not counting the initial self toss. Then, the number of errors committed by each student is subtracted from this total. Therefore, scores are calculated for both students.

Students should determine their counting responsibilities prior to the two-minute rally or if four students are assigned per court, the two sitting out should assume the counting responsibilities. Time periods can be increased in accordance with the skill level of the students. It is not recommended to rally beyond a four (4)-minute period.

Competency level: Students reflect an increase in score.

C. Level—Progression from Intermediate to Advanced Level

Objective: Cross-court, down-the-line forehand and backhand strokes, and strategy.

Description:

Step 1—Down-the-line—alley rally

Using the appropriate ground stroke (forehand or backhand) the students rally with a partner in the parallel alley. For example, a right-handed student in position A uses a backhand, right-handed student B a forehand, right-handed student C uses a backhand, and right-handed student D uses a forehand. The parallel alley area is used as the boundary.

Rotation involves A and D, and B and C exchanging places.

Step 2—Cross-court alley drill

Using the appropriate ground stroke the students rally with a partner in the cross-court alley. If all students were right handed, students A and C rally using a backhand cross-court stroke and students B and D rally using forehand cross-court strokes. The cross-court alley is used as the boundary.

The rotation involves students A and D, and students B and C.

Competency level: Steps 1 and 2–5 consecutive hits by each student.

Step 3—Steps 1 and 2, 4-point game

Beginning with a self toss (bounce-hit) and the alleys as boundaries, students play a four (4)-point game. The first student to reach four (4) points wins. The step 1—four-point game involves only students in parallel alleys. The step 2—four-point game may involve only those students in diagonal alleys *or* all four students. In both cases only cross-court strokes are allowed. Serving, receiving, and game play rules are consistent with

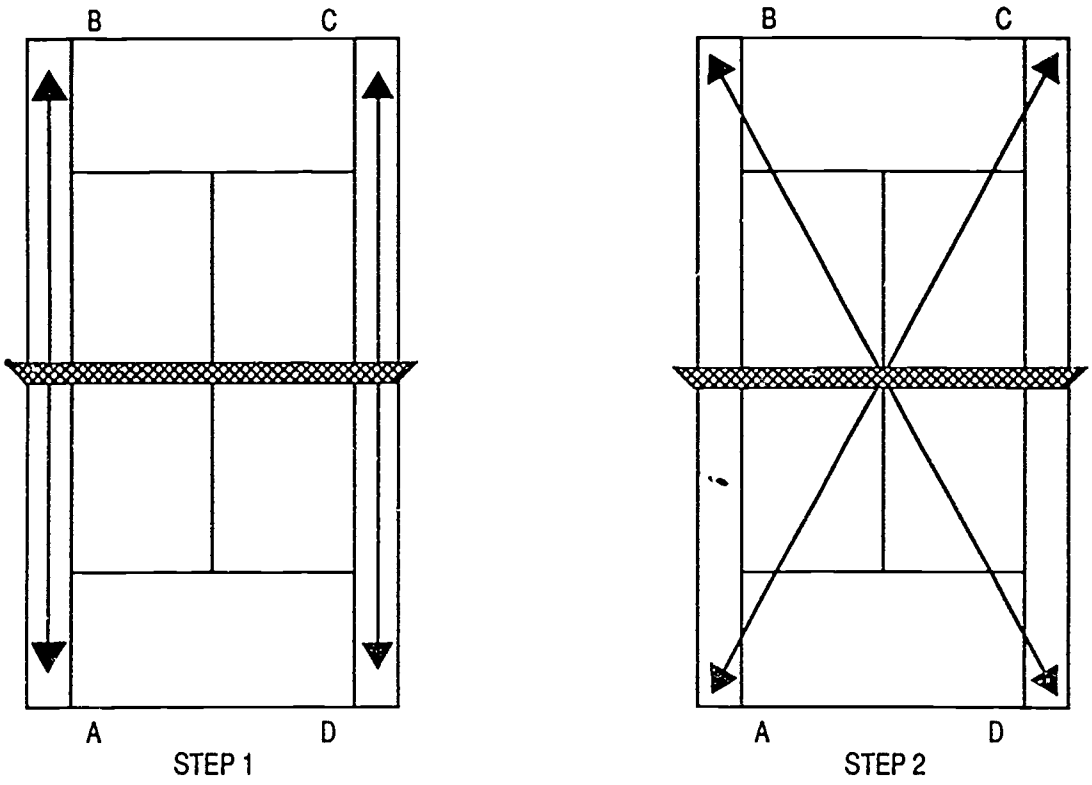


Figure 6. Down-the-line/Cross-Court Rally Drill

regular playing rules except for the alley boundary area.

Step 4—Down-the-line—return-to-center-mark

Students rally down-the-line shots, but after each down-the-line shot the student must return to the center mark position. Thus, student A is always moving left to return the shot and student B moves to the right. Repeat with students moving in opposite directions, student A moving to the right, and student B moving to the left.

Step 5—Cross-court—return-to-center-mark

This drill is similar to step 4 except cross-court shots are executed. In this drill, both players would move to the right, execute a cross-court shot and then return to the center mark. This sequence continues until an error is made. The drill is then repeated with the student moving to the left executing a cross-court shot and returning to center mark.

Competency level: Steps 4 and 5; 5 consecutive hits by each student.

Step 6—Cross-court/down-the-line sequence

Students rally using only designated shots. One student hits only cross-court shots, while the other student only hits down-the-line shots. For example, student A would hit only cross-court shots, while student B hits only down-the-line shots. Students then reverse assigned

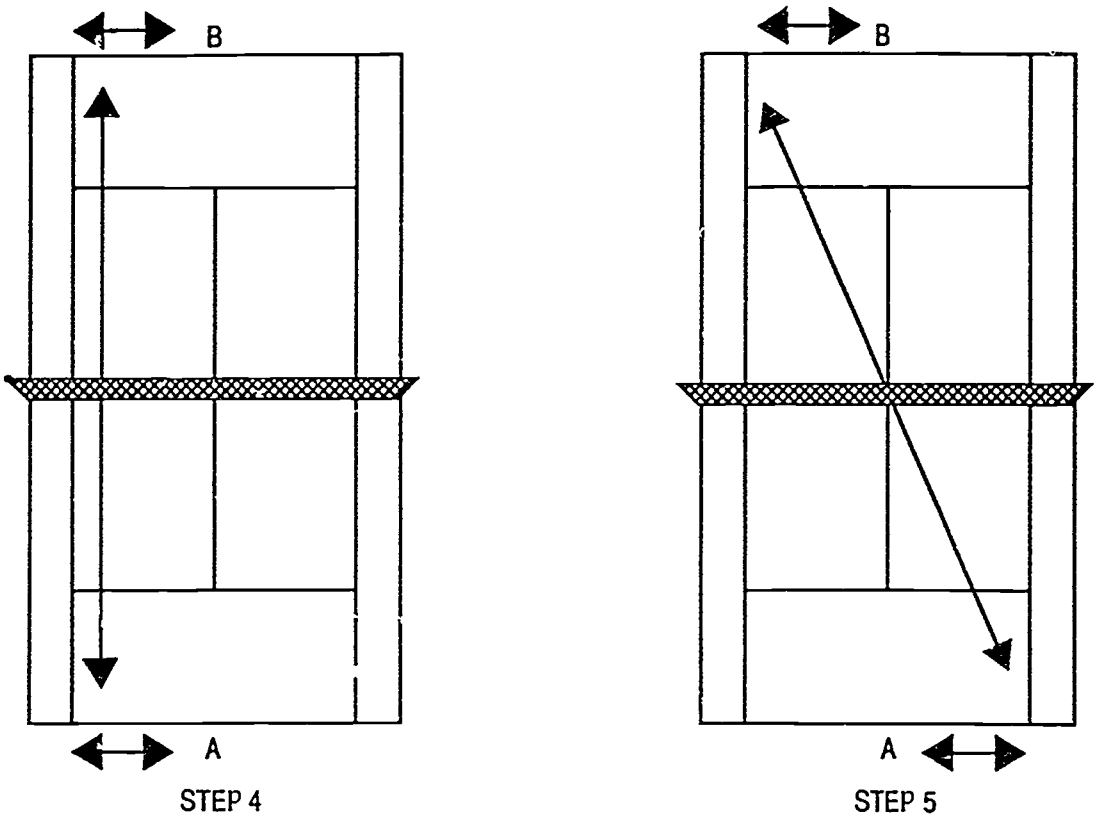


Figure 7. Return-to-Center Drill

strokes, A hitting down the line, B hitting cross-court strokes.

Competency level: Each student must hit a sequence of two consecutive forehands and two consecutive backhands.

Step 7—Cross-court/down-the-line game

Starting with a self-toss (bounce-hit), students begin with the cross-court/down-the-line sequence. After each student has executed two of their designated strokes, they rally using any stroke, yet attempting to keep the ball in play and forcing an opponent error. The playing area is the backcourt. Playing rules are consistent with regular play except for the boundaries.

[The ground stroke drills are provided courtesy of Carolyn Lehr and Jane Kuykendall of the University of Georgia.]

SERVICE DRILLS

A Service Toss Drill

Objective: To improve the consistency of the service toss, since an accurate and consistent toss is a key component of the serve.

Description: This drill may be practiced anywhere, but the ideal position is standing just behind the baseline while facing the net. This adds realism to the drill, since you are practicing from the

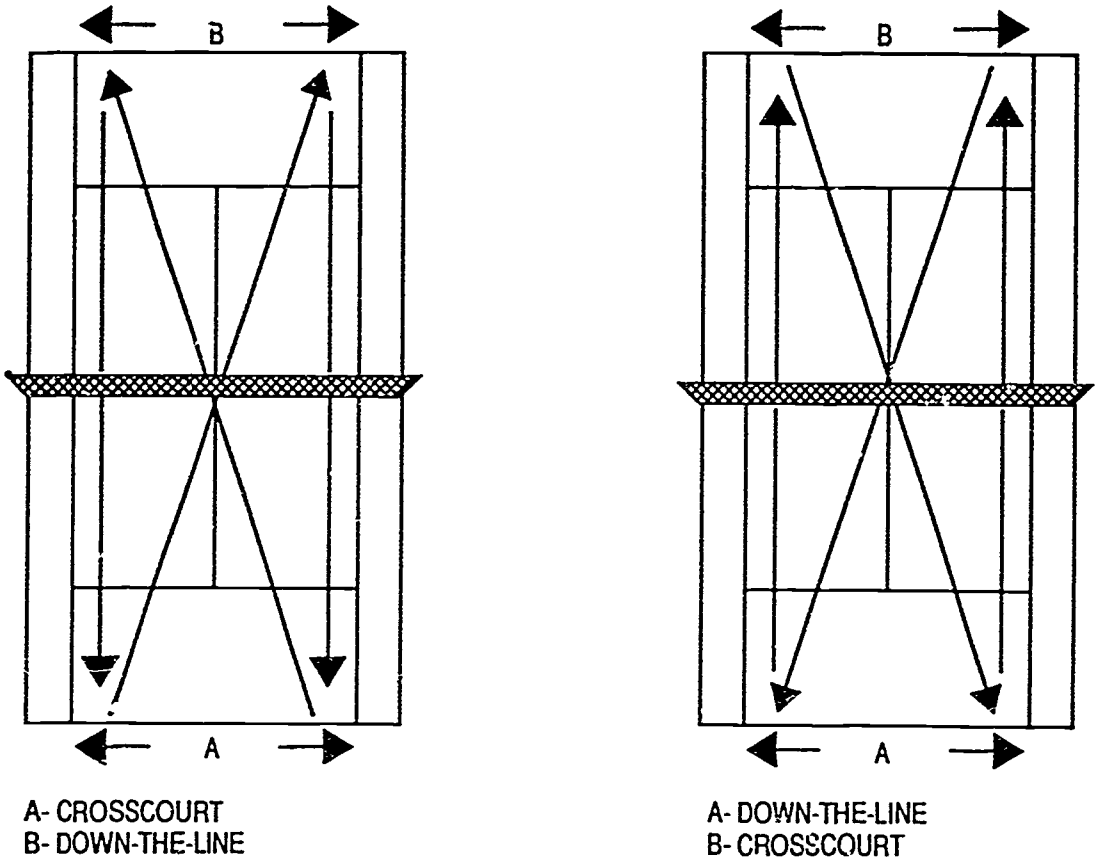


Figure 8. Cross-Court/Down-the-line Rally Drill

normal service area. Place your racket head at a spot that represents the location where a tossed serve should land. The preferred spot is slightly in front of the baseline and in line with the right shoulder. A right-handed player should take a ball in the left hand and toss it in the air as if to initiate a serve. Pay particular attention to the height of the ball and the accuracy of the toss in relationship to the body. If the toss is done correctly, the ball should land on the racket head and bounce back up to you. Take your time and continue to toss the ball until you have developed the required consistency.

General Comments. An accurate and consistent service toss requires a great deal of practice to develop, so do not become discouraged if you do not succeed immediately. Once you feel comfortable with your toss, you might want to add the normal body rotation that is also an integral part of the serve, taking into account that you are practicing this rotation without a racket in your hand.

B. Service Form Drill

Objective: To coordinate the total body rotation with the ball toss while actually serving the ball, without being con-

cerned about the placement or speed of the serve.

Description: Stand 5 to 7 feet away from a fence or net and practice the serve. Draw an imaginary baseline and work on the ball toss, body rotation, arm extension, and hitting the ball as you would during a regular game. Avoid any concern about how high the ball hits on the net or fence in the early stages. With practice, players eventually become more comfortable with the total service motion, and only then should work on service placement be initiated.

General Comments. The tennis serve is a difficult stroke to master, so be patient and allow yourself plenty of practice time. The serve is a very important part of tennis, and for that reason, many players at all skill levels spend a great deal of time practicing the serve.

C. Half-Court Serve Drill

Objective: Once the basic body mechanics of the serve have been practiced, service placement is the next important hurdle. This drill allows a player to concentrate on ball placement from a position closer to the net than normal.

Description: Stand just behind the service line and immediately to the right of the center service line. Once in position, proceed to serve a ball diagonally into the right service court. Placement is important, so try to consistently serve within the boundaries of the right service court. Forget about the speed of the serve until you have achieved consistent placement. As you improve, add a faster body rotation and arm swing to the service motion. This promotes an increase in service velocity. When you have thoroughly practiced the right service court serve, then move to the left of the center service line and serve diagonally into the left service court. Be sure to practice an equal amount of time from both the right and left sides.

General Comments. By initially standing at the service line, each player should experience a higher rate of success, which allows him/her to concentrate more on placement and speed while gaining confidence in performing the serve. As service ability improves, the distance from the net to the server should be increased until the baseline is reached.

D. Consecutive Serves

Objective: To practice concentration when serving.

Description: Player A serves to B, two serves to each court, alternating courts. When A misses, B serves. Keep track of the number of consecutive good serves by each player. Try to improve by increasing the number. Keep personal and group records to add an element of competition.

E. Jacks

Objective. To develop concentration and consistency in serving.

Description: Spin the racket to determine which player serves first. Player A serves one serve from the forehand court. If the serve is good, A moves to the backhand court to attempt two consecutive serves. If both are good, A attempts three consecutive serves from the forehand court. A continues serving until missing, alternating service courts and attempting an additional serve each time. If A misses, B serves. B follows the same pattern. If B misses, A serves. Player A will continue from the last successful set. (If the last set completed was three consecutive

serves, then four consecutive serves should be attempted.) The object is to be the first player to serve ten consecutive successful serves.

F. Target Serve

Objective: To develop accuracy in serving.

Description: Mark a line 3 feet inside and parallel to the service line. Divide that area in half with another line. Make a pyramid with four balls in the center of each area to use as targets. Player A will serve two balls to the deuce court, the first to land in the forehand target area (1), the second to land in the backhand target area (2). A will then serve two balls to the ad court, the first to land in the forehand target area (3), the second to land in the backhand target area (4). A will continue this pattern until 12 balls have been served, then B will serve 12 balls. Five points are awarded if the pyramid of balls is hit, three points if the serve lands in the proper target area, and one point if the serve lands anywhere in the correct service court but not in the proper target area. The player having the most points wins.

Variation: The target areas and five-point targets can vary in size, depending on the skill level of the players.

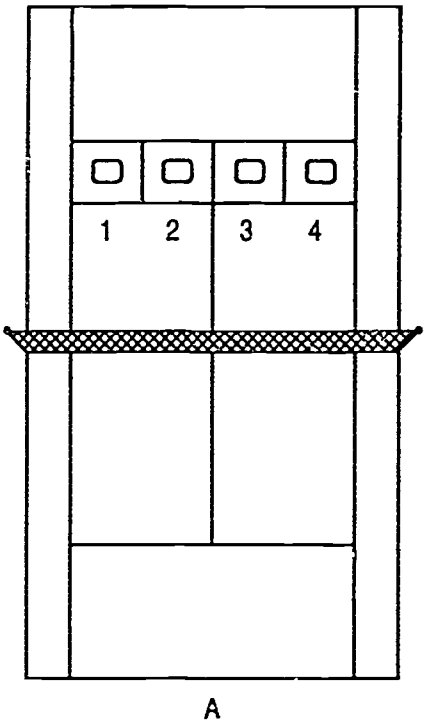


Figure 9. Target Service Drill

G. Serve and Return Drill

Objective: To improve a player's serving ability.

Description: Stand just behind the baseline and immediately to the right of the center service line, just as you would if it were the first serve of an actual game. Serve the ball diagonally into the right service court, concentrating on both the placement and speed of the serve. After practicing from the right side, move to the left of the center service line and continue to work on your serving consistency. This is a good time to work on serves toward an imaginary opponent's forehand and backhand sides, as well as for practicing spin serves. Remember that serving to an empty service court is different from serving to an opponent.

Once you feel comfortable serving to an empty court, have your partner take a proper service return position and stroke the ball back over the net after each serve. The drill then becomes valuable for both players, as it becomes a serve and return drill. After thoroughly practicing your serve, switch roles and become the returner. Avoid the temptation to keep score. Just concentrate on the serve and service return.

General Comments. This is an excellent drill for a server, regardless of his/her skill level. The drill promotes service consistency, improves forehand and backhand placement, and allows for the practice of spin serves. The partner is also given the opportunity to work on positioning for the service return along with return placement.

Advanced drills for the serve simply involve a player's serving from the baseline while working on such things as precise placement, spin, and the speed of the serve. Most skilled tennis players would agree that proficiency in serving is attained only through much hard work and concentration.

[The service drills are taken from Petro, S. (1986). *The tennis drill book.* Champaign, IL: Leisure Press.]

VOLLEY DRILLS

A. Wall Volley Drill

Objective: To develop the hitting technique for the volley shot.

Description: Stand approximately 5 feet from a wall and proceed to continuously hit a ball against the wall, concentrating initially on the forehand volley. With any volley shot, it is important that you follow the flight of the ball until it makes contact with your racket. In other words, keep your eyes on the ball and try to have the ball consistently make contact with the racket at the "sweet spot." Once you feel comfortable with the forehand, switch to the backhand and again hit volley shots continuously against the wall. As you improve, move back from the wall until you are consistently hitting both the forehand and backhand volley shots from a distance of 10 feet.

General Comments. A common mistake with any volley shot is to overswing or try to "power" the ball over the net. Work on a smooth, fluid swing while concentrating on accuracy. Do not be concerned about ball velocity until later. As your skill improves, alternate forehand and backhand volleys and gradually increase the speed of the shot.

B. Stationary Volley Drill

Objective: To improve the consistency and accuracy of the volley shot.

Description: Stand between 5 and 7 feet from the net, facing it and straddling the center service line. Have your partner stand at the service line on the opposite side of the net and throw a tennis ball to your forehand side. Attempt to hit a volley shot over the net while concentrating on hand-eye coordination and ball-racket contact. Avoid any concern about ball placement or speed. After thoroughly practicing the forehand volley, go to the backhand, staying 5 to 7 feet from the net and in the center of the court.

After some improvement, increase the distance from the net to 10 to 12 feet and continue to practice both forehand and backhand shots. You should eventually work your way back to the service line, a distance of 21 feet from the net.

General Comments. Once you have developed hitting consistency with the volley shot, placement is the next important objective. Placing the volley return at an angle, either to the right or left, is usually preferred. Gradually increase the tempo of your swing, and speed of the return will increase accordingly.

As you gain some confidence in your volley stroke, it is a good idea to have your partner hit a ground stroke to you

instead of simply throwing the ball. This adds a little more speed to the oncoming ball and requires some movement on your part in order to obtain proper positioning. An excellent variation of the stationary volley drill involves two players hitting a ball continuously over the net without allowing the ball to hit the playing surface. In the partner volley drill, each player stands facing the net, approximately 5 feet away, and proceeds to volley the ball back and forth, concentrating on consistency. As progress is made, the players move farther from the net until they have reached the service line.

C. Moving Volley Drill

Objective: To improve a player's ability to set up and hit a volley shot in a simulated game situation.

Description: As in the previously discussed stationary volley drill, start at a position 5 to 7 feet away from the net and in the middle of the court. Have your partner hit ground strokes from the baseline to both your forehand and backhand side, varying the speed and height of the ball. Instead of hitting the ball directly to you, he/she should hit it at least 8 to 10 feet to each side. This way you will be forced to move to the shot, as opposed to standing in the center of the court.

As you progress, increase the distance from the net until you have at least reached the service line, a distance of 21 feet. Concentrate on shot consistency and placement. Speed is developed naturally as confidence in hitting the volley shot is increased.

General Comments. Proper positioning is an important prerequisite for the successful return of any tennis shot, especially the volley. React to the ball as soon as it leaves the opponent's racket, if not before. Based on the body position of your opponent, you can often determine the angle of the return or the shot selection ahead of time. Body language in tennis varies from player to player, but a correct interpretation of an opponent's movement definitely gives a player an advantage in shot anticipation and reaction time. Drill work provides a player the opportunity to study a partner's body language, which can be later applied against a real opponent. Take full advantage of this opportunity during drills such as the moving volley drill.

D. Scramble Drill

Objective: Footwork and racket preparation.

Description:

1. Student (A) assumes position at net in center of court.
2. Feeder (B) assumes position at baseline, behind center mark.
3. A is randomly fed balls to volley, forehand, backhand, low, high, wide, and tight.

Note: The pace of the balls fed may be adjusted to the skill level of the student. Additionally, B's position may be moved toward net as well, dependent upon each student's ability.

E. One-On-One Volley

Objective: Footwork, racket preparation, and consistency/accuracy of volley.

Description:

1. Students (A and B) assume net position in center of court.
2. One student feeds ball and both volley back and forth keeping ball in play.

Note. Variations of this drill can involve students in deuce or ad court, cross court from each other, or with two pairs of

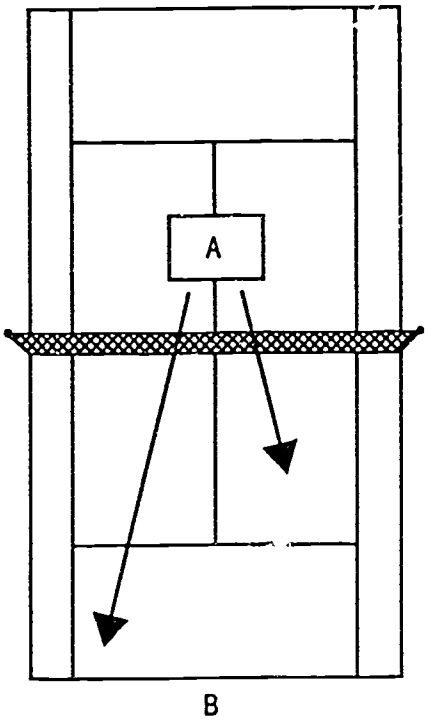


Figure 10. Scramble Volley Drill

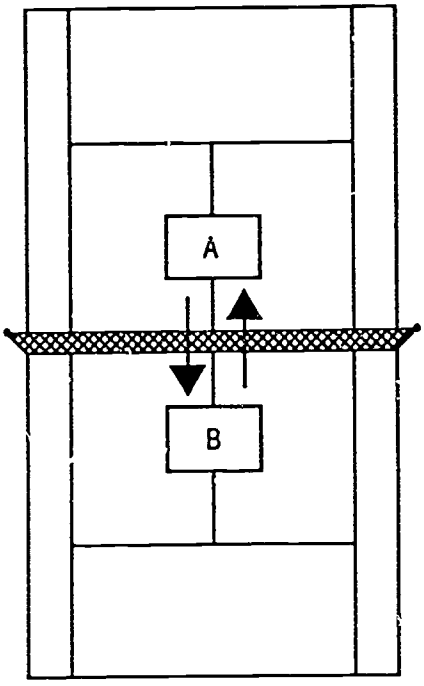


Figure 11. One-on-one Volley Drill

volleyers alternating hitting down line and cross court.

F. Volley Placement Drill

Objective: Contacting ball in front of body and depth in placement of volleys.

Description:

1. Student (A) assumes position at net in center court.
2. Feeder (B) assumes position at baseline, behind center mark.
3. Using forehand volley, A attempts placements in backcourt alternating shots to corners.

Note: Two retrievers may be utilized to assist in keeping drill moving. This drill may be performed emphasizing either forehand or backhand volley, A

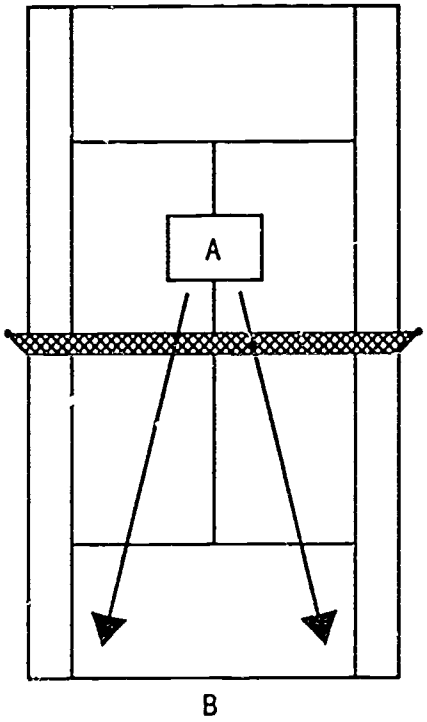


Figure 12. Volley Placement Drill

placed in either deuce or ad court, and/or executing cross-court and down-the-line volleys.

[Volley drills A, B, and C are taken from Petro (1986). Volley drills D, E, and F are provided courtesy of Graham Hatcher of the University of North Carolina, Wilmington.]

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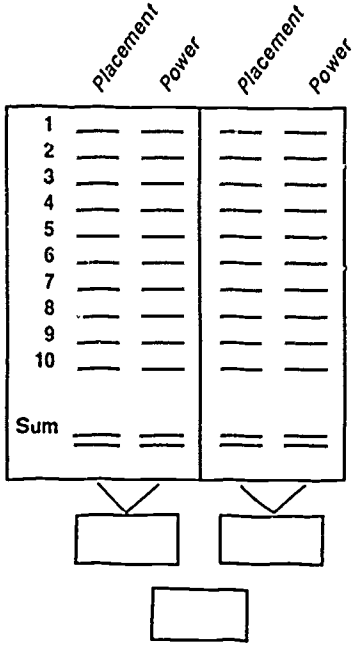
APPENDICES

APPENDIX A

AAHPERD Tennis Skill Test

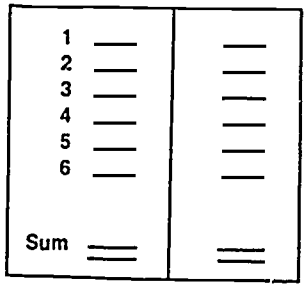
Name _____ Sex: M F
Grade Level: _____ Age: _____
Location of school: _____

Ground Stroke



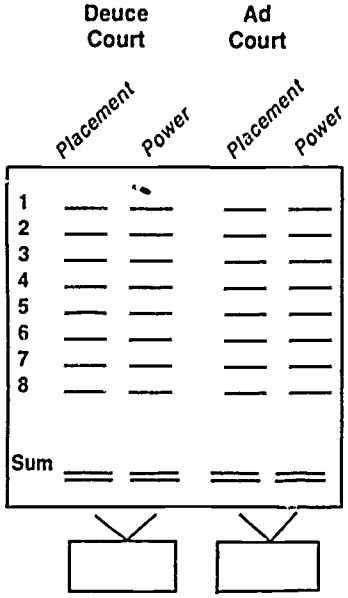
Composite Score
Date: _____

Volley



Composite Score
Date: _____

Serve



Composite Score
Date: _____

APPENDIX B

TENNIS RATING SCALE: FOREHAND/BACKHAND

5—Excellent Proper grip, good balance, footwork, and near perfect form. Demonstrates consistent stroke mechanics. Anticipates opponent's shots. Placement appropriate for opponent's weaknesses or position.

4—Good Proper grip, good balance, adequate footwork, and acceptable but not perfect, form. Demonstrates above average consistency of stroke mechanics. Anticipates opponent's shots. Consistent placement within court area.

3—Average Proper grip, acceptable balance, but footwork is poor. Form is somewhat erratic and inefficient, resulting in inconsistency in shot placement. Style of play may be defensive. Little anticipation of opponent's shots.

2—Fair Uses improper grip at times, poor footwork, and basically incorrect form. Inconsistent in stroke mechanics. Defensive style of play, merely trying to get ball over net. Little anticipation of opponent's shots. Unable to sustain a rally.

1—Poor Incorrect grip, off-balance, with poor footwork. Form is very poor and erratic. Inaccurate shot placement. No anticipation of opponent's shots. Experiences difficulty in getting ball over net.

TENNIS RATING SCALE: SERVE

5—Excellent Continental or Backhand grip, good balance, good use of shoulder (loop), consistent ball toss with adequate height, ability to place serve powerfully in designated areas.

4—Good Grip may vary some, balance is adequate, good use of shoulder, slight ball toss problems, ability to place serve (most of the time) in designated area with power.

3—Average Forehand grip, balance is adequate, shoulder may be slightly inefficient, ball toss too short or too high consistently. Control of serve is lacking and has limited power.

2—Fair Forehand or Western grip, balance problems, ineffective use of shoulder, ball toss control problems, little control and power.

1—Poor Forehand or Western grip, poor balance, improper use of shoulder and body, no control of serve and very little power.

TENNIS RATING SCALE: VOLLEY

5—Excellent Textbook form, footwork facilitates stroking patterns, shoulders turned when time permits. Consistent racket preparation, contacts ball in front of body, little backswing or follow through. Anticipates well, capable of hitting offensively and aggressively off both sides.

4—Good Good grip, above average footwork, generally good position. Acceptable form, often has good racket preparation, often contacts balls in front of body. Seldom hits with backswing or follow through. Good anticipation, above average consistency in shot placement.

3—Average Acceptable grip, occasional backswing and follow through, erratic form. Often defensive volley but an occasional good volley from one side. Inconsistent stroke production, little anticipation, contacts ball late from open stance with little footwork.

2--Fair Inconsistent grip, frequent backswing, frequent late contact with ball. Incorrect form, poor framework, inconsistent stroke mechanics and production. Generally defensive, little anticipation, poor racket preparation.

1—Poor Unacceptable grip, poor footwork, inefficient form. No racket preparation or anticipation, late contact with ball, if any. Hits with same side of racket for forehand and backhand volleys. Always defensive, poor racket/eye coordination.