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A STUDY OF THE MECHANICS OF THE
JUMP SHOT IN BASKETBALL

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INTRODUCTION

The game of basketball has changed dramatically since Dr. James E. Naismith, a physical education instructor at the Young Men's Christian Association Training School at Springfield, Massachusetts, hung two peach baskets in a gymnasium in 1891.

From its beginning in a "crackerbox" gym with peach baskets hung at both ends, the game of basketball has progressed into the fast break, high scoring game that we know today. The scores of ball games climb higher and higher. What has caused the game of basketball to transform from a slow tempo, low-scoring game to the fast breaking, high scoring game that we know today?

One of the early contributors of the high scores was the fast break, but without a doubt the biggest transformation and revolution in basketball has been the one-hand jump shot.

When the game of basketball was new, two hands were used in shooting and the ball was fired from a low position, usually underhanded. This shot became very easy to guard against and block because of its low starting position. As the defense began moving in to stop this shot, the ball was brought to a higher starting position, usually the chest; then was shot with two hands overhanded and with a higher arc on the shot.

Some years later, a player discovered that he could hit the basket with a one-hand set shot and get off the shot higher and faster than he could by using a two-hander. Prior to the jump shot, this was probably the greatest

revolution in shooting and was popularized by Hank Luisetti and the great Stanford teams of 1936-38. When the one-hand set shot came into general use, it soon became an essential part of the offensive attack.

As the defense began to adjust to the one-hand set shot, the offensive player began seeking more height to get over the defense. Thus, it was only natural that the next step should be a jump in the air before shooting with the one hand. Actually, the jump shot in basketball is an outgrowth of the one-hand push shot; because it was natural for players on the move to leap into the air on their under-basket shots to release the ball. Thus in the early history many coaches would not allow their players to use the jump shot while others restricted its use only to the short jump shot. Because of its use around the free throw lane and close to the basket shots, emphasis was placed on the jump to get the ball over the opponent. Most players could shoot it accurately from around the free throw lane or about fifteen feet. Closer distances caused them to pull the shot and longer distances caused them to strain too much for accuracy.

When the longer shot became necessary against a zone or sagging man-to-man, the players have learned that, with less emphasis on the jump, they can shoot a soft variation of the jump shot. This shot has become known as the "set jump shot" since it is usually taken at what was once set shooting distance. By adding this shot to their repertoire, many players now shoot all shots using nearly the same muscles and movements. The one-hand free throw, one-hand lay-up, set shot, jump shot and set jump shot are all similar in movement.

PURPOSE

If the jump shot is so important to the success of the game of basketball then the coaches and athletes must understand and be able to analyze the jump shot. Although the jump shot is used perhaps eighty per cent of the time in a game, few coaches and players understand its mechanics. Many coaches continue to accept generalized and often faulty theories which have been handed down through the years.

The purpose of this study was to present an up-to-date analysis of the mechanics of the jump shot that coaches and athletes can use in teaching and learning the shot. A brief history of shooting in the introduction has also been provided to acquaint the reader with the transformation of shooting.

METHOD OF STUDY

The information for this study was collected from the author's involvement in basketball as a participant and a coach at the high school level. A great deal was also learned about the jump shot from trial and error procedures used during the author's involvement in basketball.

Much of this information was gathered from articles written by leading basketball coaches. Two of the best sources of information on basketball were the Athletic Journal and the Scholastic Coach. Many tips were also received from leading coaches of basketball through informal talks and coaching clinics. Another primary source of information was from the many fine coaching books on basketball.

DISCUSSION

The purpose of this study was to present a mechanical analysis of the jump shot. Although the mechanics of the jump shot are often discussed in books and articles, actual teaching remains extremely difficult because many coaches continue to accept generalized and often faulty theories which have been handed down through the years.

It was felt that the best method of analyzing and discussing the jump shot was by dividing it into its various components. The components which were considered are the grip of the ball, arm position, position of shoulders and trunk and body balance, position of the feet, the stop and pivot, the jump, sighting the basket, release of the ball, follow-through, and arch of the ball.

In discussing the components of the jump shot, it was necessary to take into consideration the application of the principles of body mechanics and some of the laws of physics such as Newton's laws of motion. Although many of the laws of physics and mechanics apply to basketball fundamentals, only a few of the most important principles involved were mentioned.

The jump shot is used in two basic situations - from a stationary position and from a moving situation either after dribbling or cutting to receive a pass. Since basically the techniques are the same for both situations, the study analyzed the components for both situations together and made distinctions only where there were differences.

Throughout the report reference was made to "right" and "left" in describing various muscle and member movement. To simplify the report the author

has analyzed the mechanics of a right-handed shooter and the reader must simply reverse the directions for application to a left-handed shooter.

In executing the jump shot there are common errors which occur frequently. Rather than list these errors separately they were discussed as they occurred under each component.

The Grip of the Ball

Proper gripping of the ball is the first important component which should be taught. In analyzing the grip, the discussion will cover the shooting hand and the off or balancing hand and the role played by each.

The position of the shooting hand is on the low-back side of the ball, with the "V" created by the forefinger and second finger approximately on the midline of the ball. Some coaches in early teaching have the player place his forefinger or index finger directly over the air valve in the middle of the ball, which gives the correct placement of the shooting hand. This placement of the hand is very important because one of the common errors in gripping the ball is positioning the hand too far over the center of the ball. The young inexperienced shooter with small hands feels he has more control this way. In order to do this, however, he must supinate his hand slightly left, and this in turn forces the elbow away from the body. The detriment of having this occur is discussed under the component of arm positioning.

The fingers should be spread comfortably over the surface of the ball and all of the joints of the fingers should be in contact with the ball with the

exception of the thumb. The thumb should be spread at approximately a right angle to the index finger so that only the last digit is in contact with the ball. This placement of the fingers elevates the ball from the palm of the hand and gives better fingertip control. This is essential to accurate shooting because the thumb acts as a control device in guiding the ball and this allows the fingers to impart a back-spin to the ball. Thus the fingers provide direction and power while the thumb gives control. If emphasis is placed early to insure this proper grip, one of the common errors of shooting with the palm instead of the fingers can be eliminated. Shooting with the palm causes the shooter to push the shot with his elbow instead of with a full extension of the wrist and fingers, and must be corrected if the shooter is to be proficient.

After a player has learned the proper grip it is equally important that he be able to adjust the ball quickly to this shooting grip from any situation. To do this it is recommended that the player simply place one hand on each side of the ball. This is known as the ready position for passing, dribbling, or shooting. The player then simply rotates the ball one-quarter turn in a counter-clockwise direction.

The role of the off-hand in one-hand shot is often neglected. Coach Wooden of UCLA states: "I should like to re-emphasize a fact in regard to all one-handed shots that the 'off' hand is used to help adjust, protect and control the ball until the split second before the shot is taken. The success of the shot is greatly dependent upon the use of both hands the vast majority of the time."¹

¹Wooden, John R., Practical Modern Basketball (The Ronald Press Co., New York, N. Y., 1966), p. 95.

The off hand should be placed on the lower half of the basketball with the ball resting only on the fingertips and not on the palm or heel of the hand. It is important that the off hand not be placed above the horizontal midline of the ball. This will usually eliminate the error of placing too much pressure on the ball with the off hand.

The off hand should fall away the instant before release and the impetus to the ball is transmitted solely by the shooting hand. Another common error is keeping the off hand on the ball too long and pulling toward the body with this hand while pushing forward with the shooting hand. This will cause the shot to fall short.

In summary, just as the baseball and golf swings are dependent on the grip, so also is the jump shot. A continuous check should be made of beginning players to insure the learning of good gripping habits before they develop bad ones. Periodic checks should also be made of the experienced players especially if they fall into a slump.

The Position of the Arm

The next component to be discussed is the position of the arm before and during the act of shooting. Before the ball is raised into shooting position the ball is held close to the chest and under the chin in good position to pass, dribble, or shoot. The elbows should be close into and slightly brushing the body. The fingers are well spread on the sides and slightly in back of the ball with the thumbs in back pointing toward each other with their ends only about an inch apart. This is what is known as the ready position.

As the knees are flexed the ball should be started on its way to the shooting position. As the ball is raised it should be rotated one-quarter turn counterclockwise. The quarter turn will place the shooter's right hand on the low back side of the ball and the off-hand underneath the ball. His elbows should be kept close to his sides as this turn is being made. Then the shooter raises the ball to a shooting position slightly forward and above or above and to the shooting side of the head. During this elevation, the wrist, forearm, upper arm, and the right side of the body will be in a straight line and perpendicular to the floor. Thus the resultant forces should be in only a direct line to the basket. A common error made by many shooters is having the elbow sticking out to the side rather than in a straight line with the wrist and fingers. "Shooting with the elbow out results in two detriments to accurate shot flight -- inconsistent aximuth because force is not applied in a straight line and improper rotation of the ball."²

Another common error in positioning the ball is not keeping the ball close to the body during the elevation. If the ball is swung out and back to position, opposing forces of motion are created causing a lack of power. By keeping the ball close during the vertical body thrust the player can make the shot as one continuous motion upward and out, with the exception of the brief hanging action where the ball is locked into the shooting position. This "locking" or "cocking" motion requires only a split second but is necessary in order to keep the shooter from utilizing too much of the upward momentum created by the jump.

²Curtiss, Tom and Gutierrez, Bud, "Why the Wrist Flip", Athletic Journal, Vol. 49, September, 1968, p. 103.

Keeping the ball close to the body while raising it into shooting position also gives better protection of the ball and increases the quickness of the shot. Coach Wooden of UCLA declares: "The defensive man can not jump or leave his feet until the shooter has committed himself, and then it should be too late to bother the shot if the shooter has kept the ball close to his body for protection and shot quickly."³

Position of Shoulders and Trunk and Body Balance

Opinion varies as to what degree the shooter should square off his shoulders and trunk to the basket. Coach Wooden of UCLA believes: "Instead of having the shoulders squared off and more or less parallel to your target as you should in the two-handed set shot, the body should be turned and angled slightly for the one-handed jump shot with the shoulders on the shooting-hand side forward toward the basket and the opposite shoulder slightly back. The head is turned slightly toward the shoulder or arm on the shooting side."⁴

The other school of thought stresses squaring the shoulders away with the goal. Neither shoulder is advanced. This enables the shooter to shoot equally well whether driving to his right or left. The disagreement between the two schools is not one of principle but simply of degree.

The head and trunk should be directly over and midway between the spacing of the feet. If the head along with the trunk is either too far forward or backward when the shooter is preparing to jump, it can cause him to be

³Wooden, op. cit., p. 93.

⁴Ibid., p. 91.

off-balance. "In order for a player to maintain his equilibrium, it is necessary that the center of gravity fall within its base."⁵

Good body balance is a pre-requisite for accuracy in jump shooting. In the case of jump shooting this might be called dynamic balance because the shooters body will be in motion during much of the shot. This balance is vital to the rhythmic shooting movement which fits all of the body parts into proper timing. Coach Bob Cousy of the Cincinnati Royals says: "When properly balanced, a shooter can coordinate the efforts of each muscle to produce a net force in the direction of the basket."⁶

Good body balance comes from the ability to control the movement of the entire body. The degree of this balance will vary then from a set shot to a last-minute recovery on a lay-up. It will also vary from player to player. What may be a good shot for one player might be a poor shot for another. Each player must be able to judge whether or not he is in position to shoot a balanced shot. Cousy again comments: "The shooter's ability to control the trajectory of the ball is directly dependent upon his ability to control the acceleration forces generated by his own body."⁷

Position of the Feet

The next component of the jump shot is the position of the feet. There are two schools of thought regarding this positioning. The first school traces

⁵Hartley, Joe W., and Fulton, Cliff, "Mechanical Analysis of the Jump Shot", Athletic Journal, Vol. 51, March, 1971, p. 95.

⁶Cousy, Bob and Power, Frank G., Jr., Basketball Concepts and Techniques (Allyn and Bacon, Inc., Boston, Mass., 1970), p. 38.

⁷Ibid.

its history to the two-handed shot and stressed keeping both feet even and not placing one in front of the other. The other school currently employed by many coaches is to place the shooting foot slightly ahead of the other foot. This is done by placing the toes of the shooting foot three or four inches ahead of the toes of the other foot and pointing directly at the goal. The purpose of this second school of thought is to create a straight line to the target which runs through the foot, shoulder, elbow, hand and fingers of the shooting side. "This style affords the best opportunity for straight shooting alignment and still allows the shooter's body to be nearly squared with the goal, as long as the shooting foot is only slightly ahead of the other foot."⁸ It is generally argued that this is the style used most for one-hand free throws and should be used for jump shots as well.

When shooting the jump shot from a stationary position the player's feet should be less than shoulder width apart at the time of the actual jump with the weight on the toes. The toes of the foot on the player's shooting hand side should point directly at the center of the target and should be in a position three or four inches ahead of the toes of the other foot. It makes no difference which foot is the pivot foot and which is the takeoff or jumping foot. A good player will be able to use either foot as a jumping foot. The body should be in the proper balanced position, slightly flexed at the knees and hips, with the head and shoulders centered over the hips and feet.

⁸Harris, Del, "Footwork-Key to Good Jump Shooting", Athletic Journal, Vol. 50, October, 1969, p. 13.

In positioning the feet for shooting the jump shot from a stationary position, it is often better to use a body fake before shooting such as a rocker step. This principle takes into account Newton's first law, that of inertia in which Newton stated: "Every body continues in the state of rest or uniform motion in a straight line except insofar as it is compelled by forces to change that state."⁹ Therefore, the use of the rocker step enables the shooter to jump better because he has his body in motion.

Another method of gaining momentum or overcoming the body's inertia is to simply slide the right foot (for the right hander) forward as the shooter goes into his crouch. If the shooter couples his foot slide with a quick crouch and jump, he will be able to make the jump with greater ease. His right foot will be forward and there will be a lateral separation of the feet of about 12 inches with the weight distributed evenly in both feet.

The Stop

The jump shot taken off the move is more difficult than the stationary jump shot because the player must overcome a force in a horizontal direction and convert it by jumping in a vertical direction.

Footwork on the moving jump shots vary somewhat with the position of the shooter in relation to the goal. When the player is moving directly toward the basket, he should plant his lead foot and then bring the other foot up

⁹Farley, William E., "How and When To Teach the Jump Shot", Athletic Journal, Vol. 43, October, 1962, p. 8.

alongside his front foot. The lead foot will generally be the same foot as the shooting hand and the takeoff foot will be the opposite foot from the shooting hand. When moving to the left the player should have his right foot nearest the goal and should come to a one-two stop by placing his right heel to the floor and angling his toes slightly toward the basket. He should complete the stop by swinging his left foot forward past the right foot about shoulder width apart.

When going to his right, it will be just the opposite but this is where most players make their mistake. They try to use the same footwork when going in both directions. In many instances, they can shoot well going in their favorite direction and use correct footwork, but fail to do so in their weak direction. Therefore, a shooter who is going right should come to a one-two stop by setting his left heel to the floor (this being his inside foot to the goal) and pointing his toes toward the target area. He should swing the outside foot on past the left foot and point it at the goal.

The weight of the body should be thrown somewhat to the rear, as the stop is made, in order to overcome the forward force. As the stop is made the knees should be flexed, rather than having stiff legs. Since the knees are already flexed the player will be able to get his shot off faster because he is already in a jumping position as he stops. The player need only press down on the floor and contract the muscles to propel himself in the air. Therefore, the player can stop and be in equilibrium more quickly by crouching on the stop than by keeping his body erect. This crouch will be different in the case of each player

because a player with weak muscles should not crouch as low as a boy with strong muscles. "It has been found the effective angle at which a muscle operates is dependent upon the strength of the muscle."¹⁰ Therefore, a slender player will probably not crouch as low as a more muscular player. However, no shooter should crouch so low that the defensive player has time to react to his jump and possibly block the shot. By using a minimum leg crouch, as many of the strong players do, the defense will not be prepared and the opportunity to make an unmolested shot will be increased. It should be remembered that a quick jump is as important as a high jump. Slow jumpers will experience trouble in getting their shots off, even though they may be able to jump exceptionally high.

The Jump

The jump itself begins in the feet. The take-off foot should be pressed down quickly and forcefully against the floor. "It is best to lift the free foot slightly and then push it hard against the floor."¹¹ The shooter should crouch or flex his knees slightly and then explode or blast off by extending his legs as he stomps his free foot down. Although it is not a prerequisite to lift the free foot prior to jumping it has been found that many jump shooters who do not lift the foot usually resort to the deep crouch and then telegraph their shot. Most players feel they can jump quicker and easier if they lift the foot slightly. It has also been acknowledged that those players who jump by crouching deep

¹⁰Bunn, John W., Scientific Principles of Coaching (Prentice Hall, Inc., Englewood Cliffs, N. J., 1959), p. 216.

¹¹Harris, op. cit., p. 14.

or even semi-deep and push from their thighs shoot a slower and more strained shot because they involve more muscle action. The quick explosion from the feet instead of the thighs eliminates the need of straining to pull oneself upward and increases the player's likelihood of being able to control his muscle tension. Tex Winter, former basketball coach at Kansas State remarks: "It should be an easy, relaxed jump, and not an attempt to see how high the shooter can go. Naturally, the higher the shooter can jump in an easy, relaxed fashion, the better; but under no conditions should this be a strained, hard jump. Timing, quickness, rhythm and the groove of the shot are more important than the height of the jump."¹²

While maximum height may not always be secured with the quick jump from the toes with only slightly flexed knees, many coaches believe that the advantages of quickness and relaxation outweigh that of maximum jumping height. Coach Wooden of UCLA concludes: "I have come to the conclusion that I and many other coaches of my acquaintance used to place too much emphasis on height of the jump. In doing so, I believe we made it more difficult to maintain good ball control and coordinated rhythm for the shot. I now believe that you should get all of the height possible that comes naturally without undue strain. The shot is obtained through quickness in getting it by the defensive man rather than straining to outjump him. You strive for height, not distance, on the last step, but do not strain to get unusual height."¹³ The important principle here is

¹²Winter, Fred "Tex", The Triple Post Offense, (Prentice-Hall, Inc., Englewood Cliffs, N. J., 1962), p. 163.

¹³Wooden, John R., Practical Modern Basketball, p. 92

that a player should jump as high as he can and still have good control of his body. Height of the jump without control of the body does not lead to consistent shooting. The ball should be released when the shooter is at the top of his jump or just before he reaches the peak. Wooden states: "The ball should leave the hand of the shooter as the arm reaches full extension of the elbow and at the peak of or just immediately prior to reaching the peak of the jump."¹⁴

There is a split second at the top of the jump when the shooter's body has a vertical velocity of zero before it starts its descent and this appears to be the best point of release. Some players seem to be able to hang at the height of their jump but actually this is just an illusion because of other body movements. This illusion of the shooter hanging in mid-air is a false one because this moment of zero vertical velocity lasts for only a fraction of a second and requires perfect timing on the part of the shooter. When the shot is improperly timed, the result is the release of the ball on the way down causing a lose of force or power resulting in an awkward off-balance shot having little chance of entering the basket.

Newton's second law of motion can be used as follows: "The acceleration of a body is proportional to the force causing it."¹⁵ If a player shoots while moving upward he has this force to contend with, and unless it is compensated for the shot will be hard and long, and will usually fall on the back rim. The player also has a decelerating force to counteract when shooting on the forward movement, and unless he compensates for it the shot will be soft and short.

¹⁴Ibid.

¹⁵Farley, loc. cit.

However, if the player shoots while he is at the maximum height of the jump, he has established equilibrium - neither moving upward or downward - and will not be hindered by these factors of force. In teaching the jump shot, this principle is of utmost importance for a successful two points.

A point to consider here is that when a minimum instead of maximum jump is employed little or no hanging motion is needed. The shooter simply takes a slight jump of eight or ten inches and shoots the ball as soon as he is in the air. This may give an illusion that he is releasing the ball on the way upward but actually he is taking only a low jump and releasing as soon as he achieves the height of the jump.

Many of the early jump shot advocates used what became known as the leg kick prior to the height of their jump. The leg kick, according to Bunn, is simply a means of raising the center of gravity, thus enabling the player to extend his shooting hand higher into the air. This raising of the knees slightly actually "reacts on the body by pulling it down,"¹⁶ opinion has changed and current literature emphasizes keeping the legs straight when jumping.

Release of the Ball

The release of the ball begins with the straightening of the elbow and then the flip of the wrist forward. This wrist action is a vital part of the shot and special emphasis must be placed on its execution.

¹⁶Scott, Gladys M., Analysis of Human Motion (Appleton-Century, Crafts, N. Y., 1963), p. 269.

Like any other basketball shot, the jump shot should minimize arm action and accentuate wrist movement; however, particularly in junior high school, it is not uncommon to observe players using their arms as catapults and flinging the ball at the basket with very little wrist action. Occasionally a player who has developed this habit with some success will continue to use arm movements during his high school and college career.

The mechanical advantage of using wrist action rather than arm action can be demonstrated through the use of levers. It is quite apparent that by using wrist action the player is able to increase the height of the shot and practically eliminate the possibility of the shot being blocked. Bunn states: "If one desires to exert tremendous force, he should have his force arm as long as possible. If he is more interested in speed of movement the force arm should be relatively short."¹⁷ By using wrist action when in the act of shooting, the shot will get away faster, and it should have a higher arch which should allow it to land softer. Whereas when arm movement is used, the reaction would be just the opposite. As an example when turning a bolt with a long or short handled wrench, more power is derived with the long handle, but better control and a more delicate touch is attained with the short handle.

As the elbow is straightened and the wrist flips forward the fingers of the shooting hand should pass under the ball with the finger tips imparting a backward spin to the ball. If the wrist and hand are started before the elbow the ball will not receive proper backspin. Thus, the ball will be pushed and

¹⁷Bunn, op. cit., p. 51.

hence it will float, similar to a knuckle ball. Thus the shot should be started with an upward extension of the arm and when the extension of the arm is almost complete, the wrist snaps or flips forward. As the wrist snaps forward, the hand should pronate slightly so that the last fingertip to leave the ball will be that of the index finger. This slight outward turning of the hand overcomes a tendency of many right-handed shooters to shoot to the left of the basket. A shooter who does not have a good wrist flip could be compared to a batter who does not follow through with his swing but punches at the ball. The uncorking of the hand or wrist flip gives the ball a backwards rotation which in turn results in a softer shot.

Follow Through

When the ball has been released, the shooter's hand should follow through with a slight outward turn. Since the forefinger has the greatest sense of touch, it should be the last to touch the ball, which forces the palm to turn slightly outward upon release. This outward turn will compensate for the normal inward motion that the hand would normally follow. "Pronation acts as a correcting factor since many right handed shooters tend to shoot to the left of the basket, especially if they supinate the hand. Pronation in the wrist flip is an attempt to correct this error by tending to produce better vertical rotation on the ball."¹⁸

The left hand comes off naturally just after extension of the shooting arm begins. The left hand and arm are allowed to pull back naturally toward the

¹⁸Curtiss, Tom and Gutierrez, Bud, "Why the Wrist Flip", Athletic Journal, Vol. 49, September 1968, p. 104.

shooter's left chest causing ease of the follow-through. The shooting shoulder will begin to ride slightly forward when the shot is made. Cousy observes: "Success then depends upon constant sighting and a smooth, continuous build-up of a propelling force that reaches its peak at the instant the ball leaves the fingertips, which means that a follow-through period in which the forces generated are allowed to diminish is an essential part of the shooting sequence."¹⁹

After the player has completed his shot, he should land in approximately the same spot he left, maybe slightly forward. The player should not fade in any direction and in landing should face the basket with good balance in a rebounding position.

Remember the movement is up toward your target and not out toward your target and, although you are moving forward some, you should land only slightly forward of the position you took off from.

One of the most common errors in follow through is that many players float, i.e. go sideways, forward or backward from the spot of take-off and this makes it more difficult to hit the target. If he is cutting to his left or right, the tendency is for him to float sideways. If he is moving toward the goal, he will tend to float forward. If the defensive man is near he will have a tendency to travel backwards or fade-away. All of these tendencies must be overcome if accuracy is to be maintained for if the ball goes in one direction and the shooter in another direction there is a conflict of motion. These tendencies to float can be overcome by simply gaining body balance before the jump and

¹⁹Cousy, Bob and Power, Frank G., Jr., Basketball Concept and Techniques, p. 40.

keeping the jumping force in as much of a vertical direction as possible. Coach Wooden of UCLA declares: "Although your momentum has been toward the baseline or across court, we want it toward the basket when the ball is released. Most players should not take the shot unless they can make the head follow through straight toward the basket. I like the head to go up and toward the basket with the shooter rather imagining that he is throwing his head through the basket."²⁰

Anyone who has done any shooting at a stationary target knows that the best scores are achieved when the marksman gets his rifle in as steady a position as possible. A marksman does not swing his gun onto a motionless target but wants a good steady base for shooting. Thus in shooting a basketball a player will want to eliminate as much forward, sideward or backward movement as possible when the shot is taken.

Sighting the Basket

The basket should be sighted as soon as the player squares away to the basket. While sighting the target and as the legs extend at the start of the jump the shooter raises the ball with both hands to a shooting position slightly forward and either straight above or above and to the shooting side of the head. As the ball is being brought up with both hands, it will pass directly in front of the shooter's eyes and will actually be aimed with the eyes under the ball. Considerable concentration is necessary in order to ensure continuous sighting

²⁰Wooden, John R., Practical Modern Basketball, p. 95.

as the shooter's hands and forearms as well as the ball cross his line of vision.

Opinion varies widely on what a player should actually sight for when shooting. Wooden says: "The target for the eyes is that unseen spot barely over the top of the metal rim that is closest to you, for all but the under-the-basket shots."²¹ This argument advocates focusing the eyes on the entire target - the bull's eye. The principle of this argument is that you should sight for what you intend to hit -- the basket.

The other basic opinion is brought out by Cousy: "the problem facing a basketball player is having as his real target not a concrete object, but an open area inside the rim of the basket. Since his eyes cannot focus on empty space, the best he can do is to select a sighting point as nearly on line with the intended trajectory and as near the real target as possible. When making a bank shot, the shooter solves the problem by focusing on a spot related to the pointed rectangle above the basket. For all other shots, however, he must decide upon a sighting point somewhere on the rim."²²

When picking a sighting point on the rim many coaches recommend that the ball be aimed just beyond the front rim, or just over it, while other coaches advocate aiming the ball at the back of the rim. That way, if the shot is short, it could still hit the center of the basket. If the shot is on target, a high percentage will drop through. If the shot is slightly long or strong and hits the back of the rim, the backspin could still pull the ball into the basket. There is also the possibility of a long shot rebounding off the backboard into the basket.

²¹Ibid.

²²Cousy, op.cit.

Generally speaking, personal coach and player preference determine what point is selected for sighting but once a point is selected the player should stick with that sighting point for all similar shots.

A common error in sighting is the switching of your eyes from the target to the flight of the ball. A shooter should fix his eyes on the target and not the flight of the ball.

Tex Winter remarks: "It has been established that the player who switches his attention from basket to ball invariably shoots short. This indicated that the shot was not finished as it should have been because the follow through was cut off too soon."²³

Arch of the Ball

In recent years it has become increasingly difficult to maintain an arch when shooting the ball because of the emergence of the tall player. A player over six feet tall can hold the ball almost as high as the rim and thus has a tendency to shoot "out" to the basket instead of "up" to the basket with little or no arch. This has been especially true of many tall centers who have found difficulty maintaining an arch when shooting over-the-head free throws. Wilt Chamberlain is a prime example. In the case of these tall players, it is essential that arching the ball be emphasized.

The amount of arch that a player will use will vary according to individual strength and size. Basically, there are three basketball shooting arches. They

²³Winter, Fred "Tex", The Triple Post Offense, p. 159.

are the flat trajectory, the medium, and the high arch. The flat trajectory requires the most accuracy because as Bunn proved, "a ball traveling with an arch of 30 degrees or less cannot go through the basket cleanly".²⁴

But the flat trajectory also requires the least amount of strength and effort to shoot. The high arched shot will give the higher percent of accuracy but it also requires the most effort and strength to shoot. Most coaches advocate a medium arch because it has some of the advantages of both the high and low arch. An arch which might be considered about average would be somewhere between 55 and 60 degrees. A strong player who is able to shoot with little effort should be productive with a high arch but the shooter who must exert a considerable effort to shoot should probably use a lower arch. "Effort, power, and accuracy are closely related in the determination of the amount of arch."²⁵

In general the most successful shots are those that are medium arches and drop down into the basket. A ball coming down from above the basket has almost the full width of the basket in which it may fall and still go through. A ball coming toward the basket in a line more nearly parallel to the rim has only a narrow path in which it may travel and still go through.

One technique for producing proper arch is to insist that a player's shoulder be the primary pivot point in the extension of the arm. If the shoulder is the pivot point, the elbow must rise in the extension of the arm and this will

²⁴Farley, William E., "How and When to Teach the Jump Shot", Athletic Journal, Vol. 43, October, 1962, p. 8.

²⁵Hartley, Joe W., and Fulton, Cliff, "Mechanical Analysis of the Jump Shot", Athletic Journal, Vol. 51, March 1971, p. 129.

result in a push upward to give the ball the desired arch. On the other hand, if the elbow becomes the primary pivot point -- the shot becomes a push outward, rather than upward, resulting in a flat trajectory.

CONCLUSION

This study indicates that shooting the jump shot is a simple mechanical movement that if taught correctly and executed properly will probably provide the soundest basis for improvement in shooting.

Perhaps the best conclusion to make is that shooters are made -- not born. It has been a mistake on the part of many coaches to assume that all other fundamentals could be taught, but to leave a player to develop his own shooting style. Some outstanding coaches have stated that they would not attempt to change a boy's style of shooting unless the percentage figures indicated that satisfactory results are not being obtained. This same type of reasoning might cause Arnold Parlmer to continue a bad habit and shoot 70's when he could work on an error and shoot 65's. In other sports, we always assume that performance can be improved; yet in basketball there has been reluctance to make a change in the players style of shooting. This does not mean that there is no room for individual variation and experimentation. In basketball, like other sports, there is considerable room for the individual to develop a style of his own. This does mean, however, that there are fundamental mechanics underlying the success of every great jump shooter, regardless of stylistic variation, and that these principles and mechanics must be mastered and constantly practiced by every serious jump shooter.

After a careful examination of the proper mechanics of the jump shot, it was concluded that scoring records should continue to be broken and shooting percentages will continue to climb higher, if shooting habits continue to improve.

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A STUDY OF THE MECHANICS OF THE
JUMP SHOT IN BASKETBALL

by

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B. A., Kansas Wesleyan University, 1965

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

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The purpose of this report was to present an up to date analysis of the jump shot by applying mechanical and scientific analysis to the principal components of the shot.

The major portion of the findings for the proper mechanics and scientific principles for the proper jump shot technique were gathered from readings done over the past years and from experiences gained from participating in and coaching basketball.

One of the most up-to-date sources was that of recent magazine articles written by some of the outstanding coaches in basketball. Probably the best sources of articles written on all phases of basketball were the Athletic Journal and the Scholastic Coach.

Information passed out and discussed at coaching clinics and coaching schools was also very helpful in comprising this report.

The report was divided by breaking the jump shot down into ten basic components:

1. The grip of the ball.
2. The position of the arm.
3. The position of shoulders and trunk and body balance.
4. The position of the feet.
5. The stop and pivot.
6. The jump.
7. The release of the ball.
8. The follow-through.

9. The sighting of the basket.

10. The arch of the ball.

Each component was then further broken down by applying mechanical and scientific principles to it and discussing common errors which occur in its application.

The offensive objective of basketball is to throw or shoot the ball through the basket defended by the opponent. All basketball players recognize this objective and most practice their shooting year around; but the old cliché that "practice makes perfect" does not apply when improper techniques or principles are used. Since most of a player's shooting practice is not in the presence of a coach, each player should become his own severest critic, which means he must have a clear understanding of the principles affecting the success or failure of each shot.

People enjoy doing most what they do best. Shooting the basketball is without a doubt the most popular aspect of the game of basketball. The difference between a good shooter and a poor shooter is not natural ability. Good shooters are not born. Rather they are good shooters because they have mastered the execution of the proper technique of shooting. To some this comes easy, but it can be taught to anyone who understands and is willing to practice intelligently the proper mechanics of the jump shot.

An examination of the proper mechanics of the jump shot will enable athletes to meet with more success in shooting which in turn will result in more players enjoying the game of basketball. Success in athletics tends to develop attitudes which are important in shaping their lives.