

The Essentials of Long Snapping - A Fundamental Approach

A Project Proposal by

Gabriel Harrington

Biomechanics Masters Student – Michigan State University, Assistant Strength and Conditioning Coach – United States Military Academy (Army)

Abstract

Currently there is a lack of scientific research related to the performance of the long snap technique in the American sport of football. The purpose of this project is to examine the effect of non-dominant hand placement, stance, point of release, and sighting of the target have on the accuracy of the snap. Potential participants will be skilled long snap athletes currently competing for the United States Military Academy (Army) football team (n=3). Upon obtaining UCHRIS approval from Michigan State University, each participant will provide informed consent and will be cleared for activity by the head athletic trainer at the United States Military Academy. The resulting data will serve as a basis for creating an instructional digital video (DVD) that will include fundamentals and drills to teach and improve the long snap skill.

Introduction

Overview of the Problem

Throughout the course of the 2002 football season, the teams in the National Football League punted the ball 3,199 times, and attempted 951 field goals. Of these, twenty-two punts, and thirty-three field goals were blocked (nfl.com, 2003). In the Big Ten football conference, 191 field goals were attempted. Of these, 143 passed through the uprights (espn.com, 2003). No statistic was kept as to the number of punts and kicks blocked or missed due to a snap that either passed over the punter's head, rolled across the ground to his feet, or was drastically off target to the left or right. However, inaccurate snaps regularly happen at all levels of play.

Need for the Study

The punter cannot punt the ball without a snap from center, and the kicker cannot kick a point after touchdown (PAT) or field goal without a snap from center. The topic of the long snap deserves some emphasis in sport performance research. Few scientific research studies have been conducted over the course of football history pertaining to the mechanics of the long snap from center. Those that have, focused on limited aspects of the punt snap. While other writings were not research based at all. The aspects of punt variations are: differences in accuracy and speed when the center uses the visual versus non-visual method of snapping (Rubicam, 1965; Slebos, 1968) the contribution of the various segments of the body to the speed of the snap (Henrici, 1967) and the anatomical role of the muscles and joints during four defined phases in the punt snap (Ohton, 1988). In addition, Zauner (1985), in his instructional publication took a more in depth look at

differences in technique for both the punt and field goal snap, yet gave no reference as to how he came to his conclusions.

In high school and college, only a certain number of athletes are allowed to travel and participate in a competition on any given game day as determined by the conference in which the team participates. At the professional level (NFL) teams will only consist of between fifty-three and fifty-five players (Pat Shurmer, 2002). Because of this, most coaches prefer to travel with as many multi-purpose players as possible, thereby providing more room on the roster for depth at selected positions such as offensive lineman or quarterback (Williams, 2002). Therefore, the long snap athlete who is able to proficiently perform the punt and PAT/field goal snap can be a valuable asset to the team by providing one more spot on the roster for another player to travel.

Because of the importance of this position, this researcher believes that it would be extremely valuable to the coach and player to have scientifically based information on appropriate techniques for the skill of long snapping.

Statement of the Problem

The purpose of this project is to provide a research based instructional DVD to coaches and players to aid in the development of long snapping techniques.

Overview of Research Methods

For the purpose of this project, three skilled long snap athletes will be analyzed under several conditions: 1) placement of the guide hand (see Figures 9-11) on the football (high, low or in between), 2) placement of the feet (see Figures 20-22) in the stance (parallel with one another or not), 3) point of release (how early/late the athlete releases the ball -see Figure 6), and 4) method of sighting (visual versus non-visual-see

figures 15, 16, and 19). The snaps to a standardized target by the three skilled long snappers will be recorded on digital video. Subsequently, their long snaps will be analyzed. Participants will perform a total of thirty seven snaps, with nine snaps each dedicated to the guide hand placement, foot position, and point of release, and five snaps each to the visual and non-visual methods. To prevent biasing the results of the guide hand position, the trials will be randomized between a high, medium, and low position. Similarly, the trials for foot position will be randomized between feet parallel, left foot back, and right foot back. To test for point of release, the trials will be randomized between late, normal, and early. For visual and non-visual methods the participants will vary between looking directly at the target and looking forward. Results will be shown by relating the experimental condition to the pattern (if any) of where the long snaps hit the target. In addition, the images captured on digital video will be used to make observations relating what effect the experimental conditions have on the mechanics of the four defined events that occur in the long snap: 1) ready position (prior to movement-see Figure 3), 2) first movement (see Figure 4), 3) arm contact with the legs (see Figure 5), and 4) release of the football (see Figure 6). The results will be utilized to aid in coaching points for the long snap skill. As well, the experimental procedures will be recorded on video for purposes of documentation and to be included in the DVD.

The DVD will cover the fundamentals of the long snap: the grip (see Figures 7 and 8), the stance (see Figures 20-22), and how to aim the ball, as well as drills to improve every facet of the skill for beginners through advance level players. The DVD will be narrated by the main researcher, and the participants will demonstrate the fundamentals as well as the drills.

Definition of Terms

Anchor – Technique the center performs immediately after an extra point/field goal snap. He will lower his center of gravity and keep his feet steady, generally keeping a wide base to become as immobile as possible and thereby block on coming rush men.

Figure 1 Anchor



Base– The width of the feet, either in a ready position or during movement. A wider base generally implies more stability, while a narrower base implies more mobility. A long snapper is generally coached to have a base slightly wider than shoulder width.

Figure 2 Base



Events of the Long Snap – The long snap is broken down into four events: 1) the ready position (prior to movement), 2) first movement, 3) elbow contact with legs, and 4) release of the football.

Figure 3 Ready Position



Figure 4 First Movement



Figure 5 Elbow Contact with Legs



Figure 6 Release of the Football



Grip – How the long snapper holds the football. Variations are the height of the guide hand, as well as the spread of the fingers. Some of these variations are based on differences in hand size. Generally, the athlete is instructed to touch the index finger of the guide hand to the thumb of the snap hand.

Figure 7 Grip – Rear View



Figure 8 Grip – Front View



Guide Hand – The long snapper’s non-dominant hand. This hand is placed on the opposite side of the ball of the snap hand. The exact position of this hand is debatable, leaving room for individual preference. The guide hand shown here is the left hand used by a right handed snapper (opposite hand for a left handed snapper) in three different placements: high, medium, and low.

Figure 9 Guide Hand High



Figure 10 Guide Hand Medium



Figure 11 Guide Hand Low



Gunner – Two athletes on the punting team that align to the outermost left and right of the spread punt formation (near the numbers on the football field). Their responsibility is to run to the ball, and tackle the punt return man not allowing him to run forward.

Kick Slide – Technique the center performs immediately after a punt snap. The lead leg is dependent on which direction the center is responsible to go to (shown here with the right leg). The center will lift and step with the lead leg backwards in a diagonal direction either to the left or the right, while the trail leg will slide to follow in the same direction. The purpose is to provide the center with a mobile base from which to block the on coming defensive player.

Figure 12 Kick Slide Start



Figure 13 Kick Slide Step



Figure 14 Kick Slide Finish



Non-Visual Method – A method of long snapping in which the center does not look at his target while snapping the football. He may look at the defense, or at the football.

Figure 15 Non-Visual Method 1

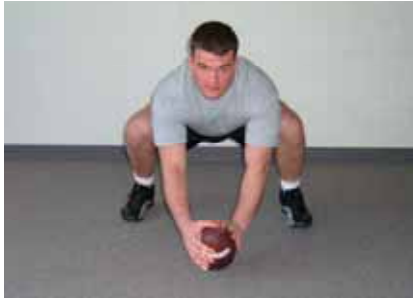


Figure 16 Non-Visual Method 2



Snap Hand – The center’s dominant hand. He grips the ball as if to complete a forward pass. A right handed snapper is shown here (opposite hand for a left handed snapper).

Figure 17 Snap Hand 1



Figure 18 Snap Hand 2



Spread Punt – A formation that the punting team assumes. The primary goal is to protect the punter, while the secondary goal is to control the football field by spreading the members of the punt team into coverage lanes that resemble a net.

Stance – The position the athlete assumes prior to movement. The visual, and non-visual methods of long snapping are an example of the long snap athlete’s stance. Pictured here are variations on the base of the stance: feet parallel, right foot slightly back, and left foot slightly back.

Figure 19 - Parallel



Figure 20 – Right Foot Back



Figure 21 – Left Foot Back



Visual Method – A method of long snapping in which the center looks between his legs and directly at his target while snapping the ball.

Figure 22 Visual Method



Wing – Athlete on the spread punt team whose alignment is on the line of scrimmage and outside of the tackle. His responsibility is to block, then run down the field and cover the punt with emphasis on keeping the punt return man from reaching the sideline.

Review of Literature

Role of Punting and Kicking

The game of football is complex in nature, but there are certain basic fundamentals which, when considered individually, help to make the game more simple. To begin, there are three units on any football team: offense, defense, and special teams, with 11 players on the field for each team (Wilkinson, 1987). Within the special teams units (i.e., punt, punt return, kickoff, kickoff return, point after touchdown (PAT)/field goal, and PAT/field goal block (kicking game) there is an offensive and defensive aspect. The offensive kicking game is comprised of receiving the kickoff, punt and covering the punt, and PAT/field goal and covering the field goal attempt (Wilkinson, 1987). Broken into further specifics, the offensive kicking game can be divided into the blocking schemes of the front/back lines (7-10 players); tackling techniques/lanes of coverage of the cover team (11 players); return strategies/techniques of the return man (1-2 players); and snap/hold/kick techniques of the snapper, holder and kicker (Gibson, 1999). Combinations of these various special teams aspects can and does prove to be a complex endeavor; yet when focused on individually they are more simple, understandable, and easier to coach.

The primary goals of the punt team are 1) to punt the ball without it getting blocked, 2) punt the ball such that it is difficult to return, and 3) cover the punt and tackle the punt return man for minimal yardage gained. The ultimate goal is thus superior field position (Ellerson, 2002; Gibson, 1999; Crossman, 2002; Wilkinson, 1987). There are various formations from which a team may choose to operate their punt scheme (Ellerson, 2002; Gibson, 1999).

One typical formation, the spread punt was developed in the National Football League (NFL). The intent of this formation is to protect the punter, as well as comply with the NFL rule which states only the two outside players, the left and right gunner are allowed to cover the kick as soon as the ball is snapped (Ellerson, 2002; Wilkinson, 1987). In turn, the remaining front seven players perform what is called a “kick slide” (see Figures 12-14) for approximately three steps backwards in order to absorb the rush from the oncoming punt block team. After blocking for approximately two seconds, the players release down field in pre-set cover lanes (Crossman 2002; Wilkinson, 1987). The types of athletes desired in this punt scheme are larger bodied linebackers/tight ends at the left and right guard, tackle, and personal protector; smaller faster-bodied defensive backs at the wing and gunner positions.

It should be noted that there is a difference in rules of football between the NFL and the National Collegiate Athletics Association (NCAA) regarding punts. In collegiate football any and all players are allowed to cover the punt as soon as the ball is snapped (Ellerson, 2002; Wilkinson, 1987). However, since most college and professional teams use the spread punt formation, the techniques employed by the center in making a long snap will be analyzed within this arrangement.

The responsibilities of the long snapper within the punt formation are sequentially 1) to perform a “good snap”, 2) “kick slide” and block in the assigned direction, and 3) cover the punt. The snap times from center to punter where the target is the hip of the punters kicking leg, have been rated as follows (Zauner 1985):

Excellent – between 0.6 to 0.7 seconds

Decent – 0.8 seconds

Poor – 0.9 to 1.0 seconds

If the center's snap time ranges from excellent to decent, and is on target, the punt snap is considered "good" and should not get blocked due to failure of his first responsibility (Zauner, 1985; Stoutland, 2002). The center's second responsibility is to set himself into an offensive blocking position by performing a "kick slide" backward for three steps see Figures 12-14). He then blocks the oncoming rush man until he hears the ball being punted behind him (Stoutland, 2002). Finally, for his third responsibility, he must break free of the rush man and cover the punt down field, where he goes directly to the ball and attempts to make a tackle (Crossman, 2002; Stoutland, 2002). If the center fails in his first two responsibilities, the punt has a high chance of being blocked. However, if he fails at his third responsibility, making the downfield tackle, his teammates still have a good chance of converging on the return man to make the tackle and maintain superior field position.

As for the PAT/field goal unit, the primary goals of the offensive team are 1) to execute a good snap, hold, and kick that gets away without being blocked, 2) block the oncoming rush so as to avoid the kick from being blocked; and most importantly 3) SCORE! All football teams run the same basic PAT/field goal formation. In this formation, the front nine players are generally the starting offensive line and tight ends. The holder is often the starting quarterback, a back up quarterback, a wide receiver or the punter. This allows the coach to not travel a player whose sole responsibility is to hold for PAT/field goal attempts, while at the same time having a player who is used to handling the ball receive the snap from the center. The kicker is the specialist (Crossman, 2002). The responsibilities of the front nine players (disregarding the center)

are to step outside (left if they are left of the center, right if they are right of the center), and punch inside (towards the center), thereby, creating a wide wall that protects the spaces in between each player (Crossman, 2002). The holder receives the snap, and places it for the kicker, who in turn attempts to kick the ball between the uprights and over the crossbar of the goal posts (Crossman, 2002).

The role of the center is to 1) perform a good snap and 2) block the area he occupies. A good PAT snap is defined as a crisp spiral snap that hits the holder near the inside shoulder approximately twelve to eighteen inches from the ground, depending on the height of the holder. (Zauner, 1985). The total time from snap to reception to placement of the ball by the holder are rated as follows (Zauner, 1985):

- 1.1 seconds – too fast, holder and kicker rush the operation
- 1.2 seconds – marginal, may miss the kick due to rushing the operation
- 1.3 seconds – perfect
- 1.4 seconds – marginal, will most likely get blocked
- 1.5 seconds – poor, a time like this will most definitely result in a blocked kick

After the snap, the center must block his gap. This technique differs from the punt in that the center does not perform a “kick slide”. Rather he keeps his feet stationary while lowering his center of gravity and “anchors” (see Figure 1) himself into the ground attempting to become as BIG as possible. Once the kick is away, his job is complete.

In all, the goals of the punt and PAT/field goal teams vary. The secondary responsibilities also vary for the long snap athlete, but his primary responsibility does not change. He must execute a perfect snap every time, to two different targets. One is nearly three feet above the ground, the other is only twelve to eighteen inches off the ground. Both targets have a small margin of error. If the center misses his mark by a few inches, the punt or kick may get blocked or never attempted.

Previous Research/Writings on the Long Snap

Rubicam (1965) conducted a study at Springfield College, Massachusetts to determine whether flight time and accuracy differed between a visual and non-visual method of long snapping. The subjects, seasoned centers, were tested over a five-day period in which one hundred snaps were recorded.

On each testing day, the participants were split into two groups. Following a warm-up, the participants in the first group would perform five snaps using the visual method first, followed by five snaps using the non-visual method. This process would then be followed by a second set of five snaps with the visual method, and finally five snaps with the non-visual method. The participants in the second group would perform five snaps using the non-visual method first, followed by five snaps using the visual method, again followed by a second set of five snaps with the non-visual method, and finally five snaps with the visual method.

Accuracy of the long snap was determined by where the ball passed through three concentric rectangles in front of a punter. Long snaps passing through the various rectangles were assigned point values for accuracy. A snap passing through the smallest rectangle received a value of nine points, while a snap passing through the medium and largest size rectangles received six and three points, respectively.

The flight time of each snap was measured with the Hale Reaction-Performance Timer. The ball was centered from a mat to a punter standing fourteen yards from the starting position of the ball. The timer was activated by the ball's movement from the mat and stopped when it struck a device held in a punter's hand.

Rubicam found no significant difference either at the .05 or .01 alpha level for flight time or accuracy between the visual and non-visual method of center snap.

Slebos, (1968) unsatisfied with the experimental methods used by Rubicam, conducted a similar study at the University of Iowa, to determine differences in flight time and accuracy between the visual and non-visual method of center snap to the punter. Slebos, also attempted to determine which method was more effective for the center to subsequently perform his blocking assignment.

Fourteen male participants were used for this experiment, none of which had any prior experience in centering the ball to a punter. On the first day of testing the participants were taught the techniques of stance, grip, and the visual and non-visual method of center snap.

The testing process for all subjects started with a warm-up. One-half was subsequently tested using the visual method first followed by the non-visual method. The other half was tested using the non-visual method first followed by the visual method. This process alternated each testing day for twenty-four testing days. Five center snaps were tested using each method each day.

To test for flight time, a starting box made of tempered hardwood with a micro switch placed beneath the lower surface was used in conjunction with a Standard Electric Timer (model SE-1). The weight of the ball held the circuit open such that when the ball was removed the circuit closed and the timer started. The timer stopped when a sensor on the target , twelve yards away was hit.

Accuracy was determined by the point struck on a six-foot by six-foot target. The target was covered with a canvas painted with six concentric circles, each with point

values designated as one, three, five, seven, nine, and eleven, from the perimeter of the target to the center of the target, respectively

For the purpose of testing the blocking ability of the center after the snap, Slebos dressed the participants in shoulder pads and head gear. A defensive man was lined up across from the participant for every center pass. The defensive man would vary his charge each time the ball was passed by the subject.

Slebos concluded that there was no difference in flight time between the two methods of center pass in subjects who were previously untrained. However, concerning accuracy, the difference between the visual and non-visual method proved to be significant at the .01 alpha level in favor of the visual method. Visual sighting of the target was shown to increase accuracy. In addition, the participants admitted their performance was affected negatively by the anticipation of contact from the defender using the visual method.

Henrici (1967) at the University of Wisconsin conducted a cinematographical analysis of the center snap to a punter. His purpose was to use kinematic principles to determine the body's segmental contribution to the linear velocity of the football.

Three male participants were used for this experiment, all of which were former punt snappers for the University of Wisconsin. Anatomical landmarks were located, and marked, at the ankle, knee, hip, low back, shoulder, elbow, and wrist. Then connected with black flesh pencil. The participants wore football shoes and shorts. The shorts had the right side cut out of them in order to see the landmark at the hip joint. Prior to filming, each participant was allowed at least six warm-up passes.

Two Kodak Cine-Special sixteen-millimeter cameras mounted on tripods were stationed 1) twenty feet to the right, and parallel to the subject, to observe the subject, and 2) thirty-two feet to the right of the subject and fifteen feet behind the ball, to observe the flight of the ball. The punter was thirteen yards behind the ball. The cameras' captured images at sixty-four frames per second. Two handprints were painted on the football with electrically conductive silver paint. The two handprints were connected with aluminum foil. Participants also wore a control release indicator on their thumbs and forefingers, which activated an argon flash bulb upon release of the football. This method was used to aid in defining the moment of release. A vertical reference was determined from a flagpole in the background of the field of view of the cameras. This was used to establish spatial orientations.

Upon observation of the film, Henrici chose one trial for each of the three subjects based on film clarity and snap accuracy. He defined three events for the punt snap action: 1) start - where the center had a hold of the ball and was in a static position, 2) prior to release-defined with the aid of the control release indicator as the moment just before the center would "lose control of the ball," and 3) release-defined with the aid of the control release indicator as the moment when the center "lost control of the ball". From these events, changes in joint angles were measured and angular velocity was determined. Linear velocity of the ball was determined, and the contributions of individual segments were judged by their angular velocities.

Eight segments were studied by Henrici: foot, shank, thigh, low back, upper back, upper arm, forearm, and hand. Henrici discovered that the arm contributed 28.3%,

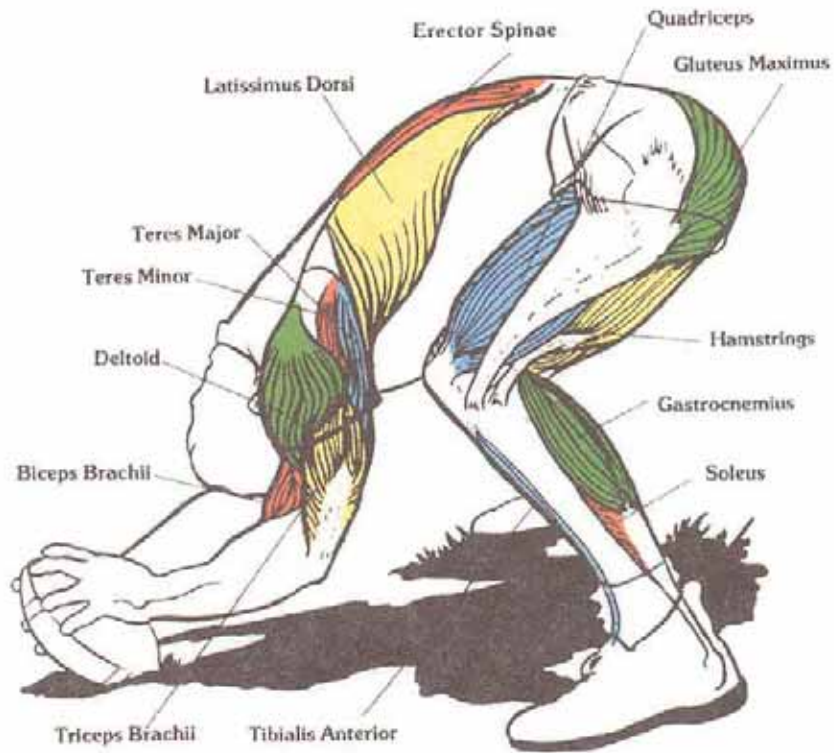
forearm contributed 32.08%, and hand contributed 32.79% to the linear velocity of the football; while the trunk and lower extremities only contributed 6.82%.

Ohton (1988) authored an article for the National Strength and Conditioning Journal's Sports Performance Series on the kinesiology of the punt snap. His purpose was to analyze the long snap, showing the anatomical role of the joints and muscles during four defined events of the snap to aid in creating an exercise protocol for the snapper, as well as to properly teach the technique of long snapping.

Ohton defines the events of the snap as the stance position, acceleration, release and deceleration, and contact position. He also provides a chart and drawings on the agonist and antagonist muscles used in the four events of the snap:

Stance Position (see Figure 23 and Table 1)

“The snapper's body is in a 'ready' position similar to the regular center's stance in a quarterback exchange. The ankles of the snapper are dorsiflexed. The flexion at the knees stretches the extensor muscles of the quadriceps. These slightly stretched muscles will facilitate contraction of the same muscle group. The lower spine 'rounds', displaying a stationary flexion of the spinal column. The rounding of the spinal column allows the snapper to focus on the punter. The firmly gripped football is extended with the hands toward the line of scrimmage. Both hands are neutral and the arms are approximately at 90 degrees flexion at the glenohumeral joints. The elbows are slightly flexed, which stretches the extensor muscles of the arms prior to rapid extension (Ohton 1988).”

Figure 23 Stance Position**Table 1 Stance Position**

JOINT	JOINT ACTION
Ankle	Dorsiflexed
Knee	Flexion
Hip	Flexion
Spinal Column	Flexion
Glenohumeral	Flexion
Elbow	Flexion w/ slight adduction
Wrist	Neutral

Acceleration (see Figure 24 and Table 2)

“In the second event of the long snap, the body moves from stationary to acceleration. The body weight on the ankles shifts from dorsi flexion toward plantar flexion. The spinal column experiences extreme flexion as the football proceeds on its angular path. Viewed from the front (nose guard position) of the snapper, the football travels in a clockwise rearward rotation with the hands. Extension and adduction of the glenohumeral joints causes the rearward motion of the arms. This motion leads both forearms and hands between the legs (Ohton 1988).”

Figure 24 Acceleration



Table 2 Acceleration

JOINT	JOINT ACTION
Ankle	Plantar Flexion
Knee	Extension
Hip	Extension
Spinal Column	Flexion
Glenohumeral	Extension (maintaining adduction)
Elbow	Extension
Wrist	Flexion (ulnar deviation)

Release and Deceleration (see Figures 25, 26 and Table 3)

“Phase three picks up where phase two leaves off. The spinal column is fully flexed, allowing the arms and the football to pass and release freely between the legs. In this release stage, a rapid extension of the forearm with medial rotation supplements the right hand pronation. The football is ‘pushed’ away by the fingers of both hands as it is released. Once the snap is made, the body loses angular velocity, and this is deceleration. This deceleration is a result of the ‘braking’ force provided by eccentric contraction and the elastic components of the antagonistic muscle groups (Ohton 1988).”

Figure 25 Release and Deceleration

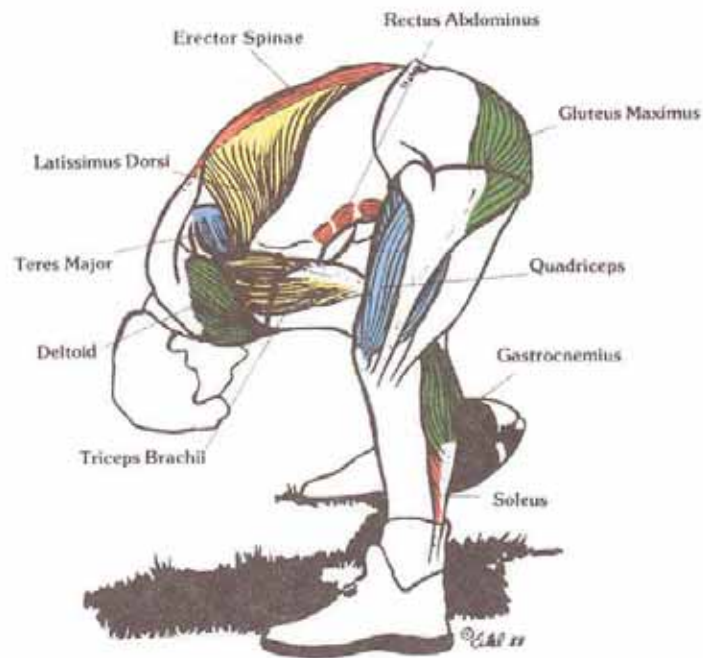


Figure 26 Release and Deceleration

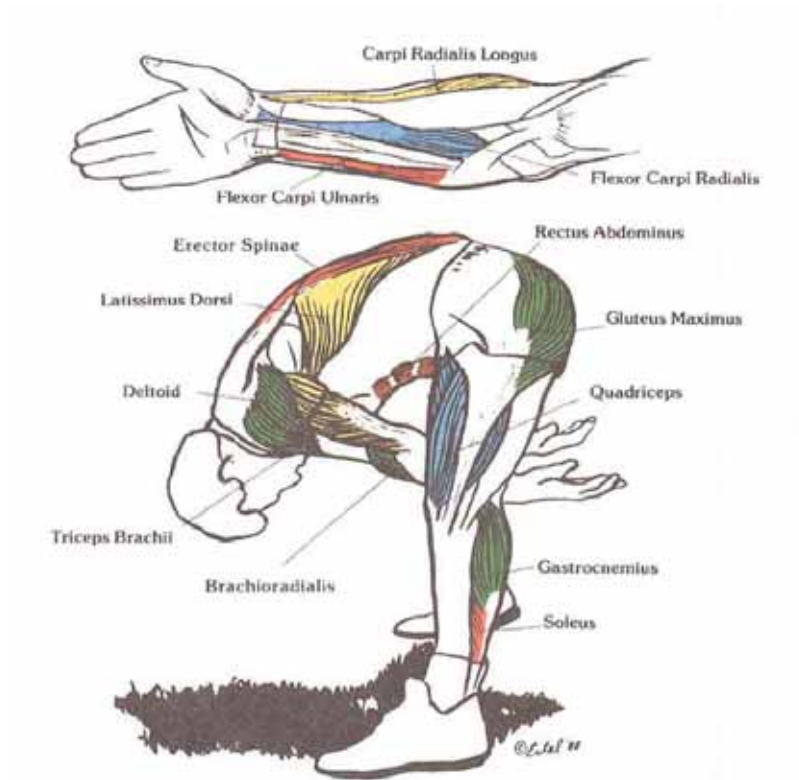


Table 3 Release and Deceleration

JOINT	JOINT ACTION
Ankle	Plantar Flexion
Knee	Extension
Hip	Flexion
Spinal Column	Flexion
Glenohumeral	Extension
Elbow	Extension
Wrist	Flexion

Contact Position (see Table 4)

“At the end of phase three, the long snapper gathers himself into a hitting position in anticipation of contact. The purpose of this position may be classified into three areas. In the first area. The gathering may provide stability to the restraint of a defensive player. Second, the gathering may allow an optimal application of muscular force, and finally, it may prepare the long snapper for any one of several movements. The joints in the body are held in intermediate positions between flexion and extension so that a quick movement in any direction is very possible. The long snapper now becomes a defensive player. This completes one full cycle of the long snap (Ohton 1988).”

Table 4 Contact Position

JOINT	JOINT ACTION
Ankle	Dorsi Flexion
Knee	Flexion
Hip	Extension
Spinal Column	Extension
Glenohumeral	Flexion
Elbow	Flexion
Wrist	Flexion

Ohton stressed a need specific strength training program emphasizing the weakest link in the kinetic chain for the long snapper. “The training should replicate as closely as possible the actual total body movement for which the speed and velocity variables are needed (Ohton 1988)”. Thus, for Ohton, strength training should be performed at an accelerating rate so that the muscles learn to shorten at a faster rate than the body segment that is moving (1988). He recommended a periodized program, which involves hypertrophy, strength/power, peaking and maintenance phases in conjunction with medicine ball movements that mimic the long snapping motion.

Ohton also mentions coaching points for the long snap. He stressed the importance of teaching the athlete to snap with both speed and accuracy from the beginning, lest the athlete have to re-learn to snap fast after learning how to snap accurately (1988). He warns coaches to watch the body positioning during the various

phases of the snap for clues to performance errors. He also stressed the importance of the fluidity of the entire movement. According to Ohton, the athlete not perform the snap in a sequence of “blocks”, but rather to overlap each phase into a refined technique (1988).

Zauner (1985) authored a manual entitled “The Coaches Edge to Winning: The Kicking Game!” In his manual he illustrated techniques for the coach and player on the various skills of the kicking game, from the place-kick, to the hold, to the punt, to the long snap. He defined and described two variations of the long snap technique: the pendulum swing and the pick-up-and-throw technique. For both, the first event, the starting position, is the same,

“ For punting and placekicking, a squared-off stance of feet even and parallel should be considered for the following reasons: 1) offers a simultaneous point of contact for both elbows as the center passes the football through his legs, 2) as the center snaps the football, both of his elbows will make contact simultaneously with the inside part of his thighs, 3) following this contact, the football will be released by the center’s hands (this simultaneous contact and release give the ball its perfect direction); and 4) this stance also stresses the importance of centering and following through with both hands... the center’s stance should be consistent and comfortable. The center should always be in a good athletic position, with his feet a little more than shoulder width apart. The center should be flatfooted, with his weight equally distributed. There should be no weight on the football... with the football placed in the proper starting position for himself, the center’s dominant arm is extended straight to the football with his dominant hand (snap hand) placed on the front portion of the ball, his wrist slightly cocked, and his fingers grasping the laces like a quarterback. His fingers should be spread moderately, so that one to three fingers are making contact with the laces. His non-dominant arm is also extended to the football with the non-dominant hand (guide hand) on top or slightly off to one side of the football. It is placed (center’s preference) in a comfortable position either on the front or rear portion of the football. Again, the fingers are spread moderately, pointing straight ahead with the thumb across the football.”

From here, Zauner separates the events that take place during the long snap for each technique. In the PAT/FG snap he recommended the pendulum swing. For the second event the pendulum motion and release, he stated that:

“the center snaps the football on the proper count. the nose of the football will slide on the ground (for a fraction of a second), as the pendulum swing of the center’s straight arms bring the football backwards. As the elbows make simultaneous contact with the thighs, the football will be in a position that is parallel and a couple of inches off the ground. The arms continue the swing backwards. The fingers and hands release the football in a parallel plane. The release and trajectory is low for extra points and field goals. The release point determines the football’s trajectory (1985).”

In the third and final event, the follow through, the arms continue to swing backwards after the release of the football. Good finger and wrist action during the snap and in the follow through are emphasized, though not defined.

For the punt snap, Zauner defined four events. The first event is the starting position as described earlier. In the second event, the pick-up-and-throw, “the center lifts the nose of the football up and off the ground, with his wrist and elbow movement. The movement of the ball should be up and back all in one motion. The elbows will lead the motion backwards, while the wrists follow. The ball is parallel to the ground (1985).”

In the third event, defined as the contact point, “the elbows make simultaneous contact with the inside of the thighs.” At this point, the *elbows and the knees are both locking out* as the ball is being released. Wrist and finger action is working (1985 emphasis mine).”

In the fourth and final event, the release,

“...the lower arms are still bringing the ball backwards as the ball is being released. As the elbows lock out, the wrists snap, and the football is released. For a good snap, the center releases the ball when the football is

parallel to the ground and a couple of inches off the ground. The snap hand is responsible for the lace action and the guide hand aids in control and direction of the snap (1985).”

Summary of Literature Review

The game of football is very complex overall. However, it is made more simple when the role and technique of each position is looked at separately. In the case of the long snapper, there are two different types of plays he has to perform: 1) the punt, and 2) the PAT/field goal attempt. For each type of play, he has different responsibilities and standards of excellence. When he performs the punt snap, he must not only snap the ball fifteen yards in 0.8 seconds or less, but block, and run downfield to make a tackle. On the PAT/field goal, he must snap at a target only seven yards away, with the time measured as a total from the first movement of the ball, to the kicker kicking the ball in 1.3 seconds. Then he must execute an entirely different technique when blocking and does not have to make a tackle.

In summary, table 5 displays the authors, their study, and discoveries:

Table 5 Authors

AUTHOR	STUDY	DISCOVERY
Rubicam	difference in speed and accuracy b/w visual and non/visual method	No significant difference
Slebos	<i>difference in speed and accuracy b/w visual and non/visual method</i>	<i>significant difference in accuracy visual method superior</i>
Henrici	Segmental contribution of body towards snap speed	Arm=28.3% Forearm=32.08% Hand=32.79% Rest of body=6.82%
Ohton	<i>Anatomical role of muscle/joints during snap</i>	<i>Need specific training Possible errors in technique</i>
Zauner	Differences in snap to punter and holder	3 events for PAT/Field goal 4 events for Punt

Methods

Participants

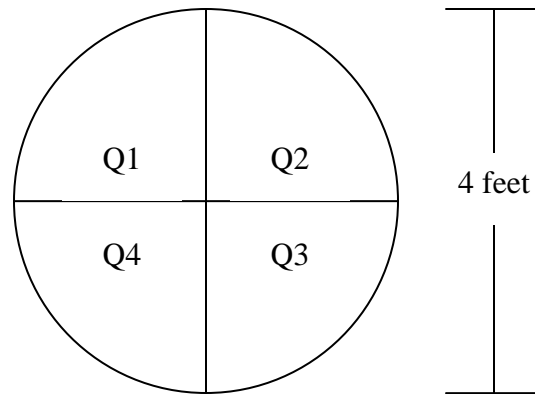
Participants (n=3) will be chosen from the United States Military Academy at West Point (Army) football team. Participants chosen will be proficient in the long snap. Proficiency being defined by the fact that the role of each participant on the Army football team is that of a long snapper. This will aid in the assurance that variation in the experimental condition is more likely to be the cause in variation in performance. Further, all students at the academy participate in the same basic curriculum regardless of gender or whether or not they play a sport. More specifically, all students at West Point have similar sleep patterns; eat the same food, follow the same military program, and all have demanding academic schedules. Given the consistency of lifestyle between participants, outside factors that would otherwise potentially disrupt reliability and/or consistency of the results are not as likely to occur. This researcher believes that this environment will provide a solid base for consistent, reliable, and controlled results.

Instrumentation

A Sony DCR-VX2000 digital video camera will be used to record all of the experimental procedures as well as the teaching of the fundamentals, and drills. The images will be played back by a Sony DSR-60 digital video cassette player and edited using DPS velocity software with the aid of four external hard drives. With the software, it is possible to do a voice over, and audio inserts along with traditional film editing. Finally the DVD will be burned using a Pioneer PRV-LX1 DVD writer which will also be used to create the DVD title page.

Accuracy of the long snappers will be measured using a method similar to that of Slebos (1968). One, large circular piece of plywood measuring four feet in diameter will be marked in a quadrant format, and will serve the purpose of identifying long snap placement. The target center will be in the center of the plywood. Quadrants will be numbered as follows: 1) upper left, 2) upper right, 3) lower right, and 4) lower left (see Figure 27).

Figure 27 Target



Wilson GST 1003 footballs will be used. They will have three marks on the seam opposite the laces in order to provide land marks for the participants to place their guide hand (see Figure 8). The first will be one inch from the nose of the ball, the second will be three inches from the nose of the ball and the third will be five inches from the nose of the ball.

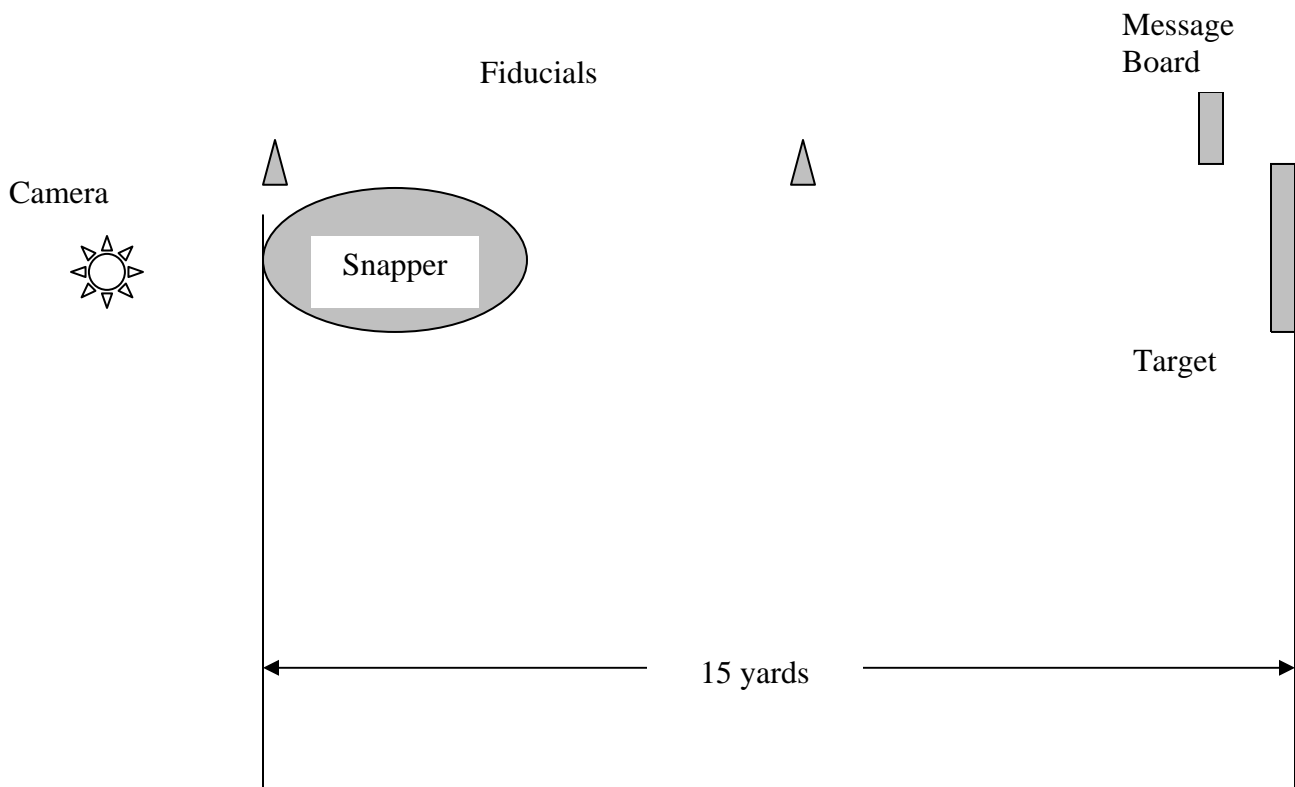
Procedures (testing)

The target will be placed such that the snap situation will be like snapping to a punter. As such the target will be fifteen yards behind the ball with the center 42 inches from the ground. The distance and height of the target from the participant will remain constant for all trials and all participants. This will aid in true determination of ball

placement under the varying conditions by providing a consistent target for all trials, as the scope of this experiment is to determine differences in snap placement under varying technical conditions. Any deviation of the long snap from the center of the target will be noticeable at fifteen yards as well as comparable to the other conditions. This as opposed to varying the target height and/or distance, which would create another factor to consider and would further complicate comparison.

For the setting, the background color will be off-white and will include vertical and horizontal references, fiducials, a message board, as well as the camera. The vertical and horizontal references will be black tape against the off-white wall for easy contrast. The fiducials will be a given distance apart to aid in later determination of real distance. The a message board will be used for each trial on the target with the Sony mini-digital camera, to display which participant is performing (designated by a number), which experimental condition (designated by an abbreviation), and which trial number the participant is on. For example, 1-GH-1 would represent participant (1), guide hand condition, trial (1) of nine (see table 8). Camera placement will vary depending on the experimental condition. Performances and recording will take place in a fifty yard long, by fifteen yard wide, by ten feet high carpeted room that is free of obstructions (see Figure 28).

Figure 28 Schematic



The experiments included will be: 1) placement of the guide hand (low, medium, high grip), 2) placement of the feet in the stance (parallel, left foot forward, right foot forward), 3) point of release (early, normal, late), 4) visual method (visual, non-visual). All trials will be randomized to avoid the participants becoming accustomed to one condition, and thus add strength to validity. Experimental conditions will not be

combined as the scope of this experiment is to determine what effect each condition has on the outcome of the snap. Trials will be scripted as seen in Table 8.

Table 8 Trials

GUIDE HAND		FOOT POSITION		RELEASE		VISUAL METHOD	
<u>Trial #</u>	<u>Condition</u>	<u>Trial #</u>	<u>Condition</u>	<u>Trial #</u>	<u>Condition</u>	<u>Trial #</u>	<u>Condition</u>
1	Hi	1	Parallel	1	Early	1	Visual
2	Medium	2	Left Forward	2	Normal	2	Non-Visual
3	Low	3	Right Forward	3	Late	3	Visual
4	Medium	4	Left Forward	4	Normal	4	Non-Visual
5	Low	5	Right Forward	5	Late	5	Visual
6	Hi	6	Parallel	6	Early	6	Non-Visual
7	Low	7	Right Forward	7	Late	7	Visual
8	Hi	8	Left Forward	8	Normal	8	Non-Visual
9	Medium	9	Parallel	9	Early	9	Visual
						10	Non-Visual

Participants will wear dark, tight clothing. Joint centers will be marked at the wrist, elbow, shoulder, hip, knee, and ankle with white tape for easy contrast and later analysis of the video. Next, participants will warm-up using whatever method they are comfortable with. Participants will be instructed to snap the ball as fast as possible at the center of the target. Participants will then snap the ball ten times using their normal technique to establish a baseline. Subsequently, all thirty seven long snaps under the afore mentioned conditions will be recorded beginning with the randomized guide hand trials, followed by foot position trials, then point of release, and finally the visual and non-visual methods. Prior to each trial, they will be instructed on which trial they are performing as well as monitored to ensure their body is in the correct position.

To determine the long snap placement on the target, the end of the ball will be dipped in chalk powder prior to each snap. The distance from the center of the target to

the powder marking will then be measured and recorded along with which quadrant the long snap hits. For snaps that hit on a line separating the quadrants the distance from center will be recorded and it will also be recorded as hitting the line. Snaps that hit the center of the target will be recorded as hitting the center, with zero as the distance from center.

Procedures (making the movie)

The Sony digital camera will be used to record the instructional segments of the DVD. The DVD will cover the fundamentals of the long snap, as well as drills to improve every facet of the skill ranging from beginner to advanced as well as how to progress from one level of skill to the next. The DVD will be narrated by the main researcher, and the participants will demonstrate the fundamentals as well as the drills. It will begin with an introduction of myself and the participants, followed by a monologue on the importance of the long snap in the sport of football. Next, a narrated step by step display of the fundamentals will be modeled by the participants. This will include how to approach the ball, how to get into the proper stance, how to grip the ball, how to properly view the target, how to block after the snap (punt and PAT), and how to cover the punt/make a tackle. These fundamentals will be supported by what was determined from the data collection phase of this project along with some brief footage. Perhaps the longest segment, will be the drills and progressions. The drills will be categorized by which component of the skill they emphasize the most: spiral, speed, accuracy, blocking, or covering, and the level of skill it takes to perform. Each drill will be defined and described by the narrator, while being modeled by the participants. Along with each drill, a progression will be explained that will summarize and lead into the next drill.

Finally, the digital cassette will be reviewed, and the desired footage will be noted by its beginning and ending minute. The film will then be taken to the editing software and compiled with audio. Though the target audience is the high school/collegiate coach and athlete the end project will be an instructional DVD for players and coaches at all levels of skill who wish to learn the basics, improve technique, or master the long snap.

Table 9 Video Timeline

Seg.	Desc.	Purpose	Time	Content
1	Introduction	To introduce researcher, participants,	2 min	Monologue
2	Monologue	To discuss importance of long snap	3 Min	Monologue
3	Model of Fund.	To discuss key elements/fundamentals and demonstrate proper technique (grip, stance, etc) To demonstrate and correct common errors	10 min	Narration Examples
4	Exp. Methods	To briefly show some of the variables that were tested technology	5 min	Exp Footage
5	Drills Drill Progression	To demonstrate various snapping drills To explain how to progress within the drill as well as progress to the next drill	15 min	Demonstrations Progressions

Analysis

For the purposes of this project, the analysis will include establishing a trend for each experimental condition, as well as the effect each condition has on the mechanics of the long snap. To establish a trend, each experimental condition will be quantitatively analyzed to see what percent of the long snaps hit each quadrant, and the average distance from the center of the target. For example, the experiment on the guide hand will involve

nine long snaps from each participant, three each with high, medium, and low conditions. For three participants this translates into nine long snaps per condition. Out of nine snaps in the low condition, what percent hit quadrants one, two, three, and four? What was the average distance away from the center of the target for these nine snaps?

Next, the forty seven trials captured on digital video will be observed and kinematically analyzed. For example, given the four defined events of the long snap (ready position, first movement, elbow contact with thighs, and release) what effect does the left foot being moved forward have on the elbow contact with the thighs? Does the right elbow make contact later than the left? How does that compare with the trend observed from the quantitative analysis?

Discussion

In summary, the long snap athlete is a very important link on the special teams and in the sport of football. The proposed study will contribute to the literature on this topic by examining several long snap variations. Three participants will perform a total of thirty seven snaps each, with nine snaps each dedicated to the guide hand placement, foot position, and point of release, and five snaps each to the visual and non-visual methods. For observation of the guide hand, the trials will be randomized between a high, medium, and low position. For foot placement, the trials will be randomized between feet parallel, left foot back, and right foot back. To test for point of release, the trials will be randomized between late, normal, and early. Visual and non-visual methods will vary between looking directly at the target, and looking forward. Results will be shown by relating the experimental condition to the pattern (if any) of where the long snaps hit the target. Images captured on digital video will be used to make observations

relating to the effect the experimental conditions have on the mechanics of the four defined events that occur in the long snap: 1) ready position (prior to movement), 2) first movement, 3) arm contact with the legs, and 4) release of the football.

Next, with the attained information, an in-depth instructional DVD will be produced and will include fundamental techniques, drills, and behind the scenes footage of the experimental procedures. A thorough instructional DVD backed by scientific evidence will vastly improve the awareness and skill of the long snap athlete and the effectiveness of the coach.

Works Cited

- Espn.com. (2003). Website.
- Crossman, Dan. (2002). Observation of Coaching. Aug. – Nov. Special teams coach, Michigan State University Football.
- Ellerson, Rich. (2002). The Pragmatics of Punting. AFCA Summer Manual Internet Source.
- Gibson, Mike. (1999). Dare to be Different. AFCA Summer Manual. Internet Source.
- Henrici, Ronald C. (1967). A Cinemagraphical Analysis of the Center Snap in the Punting Formation. M.S. Thesis: University of Wisconsin.
- Malina, R., Maud, P., & Foster, Carl. (1995). Physiological Assessment of Human Fitness. Champagne Illinois: Human Kinetics Books.
- Motionanalysis.com. (2004). Website.
- NFL.com. (2003). Website.
- Ohton, David. (1988). A Kinesiological Look at the Long Snap in Football. National Strength and Conditioning Association Journal, 10, 4-13.
- Rubicam, Clifton A. (1965). A Comparison of the Difference in Speed and Accuracy Between Two Methods of Spiral Center Pass to the Punter in Football. M.S. Thesis: Springfield College, Springfield, Mass.
- Shurmer, Pat. (2002). Candid Conversation. Quarterbacks coach, Philadelphia Eagles.
- Slebos, Warren G. (1968). Football: A Comparison of the Visual and the Non-Visual Methods of the Spiral Center-Pass. M.S. Thesis: University of Iowa.

Stoutland, Jeff. (2002). Observation of Coaching. Aug. – Nov. Offensive line coach, Michigan State University Football.

Wilkinson, Bud. (1987). Sports Illustrated: Football Winning Offense. Lanham, MD: Time.

Williams, Bobby. (2002). Observation of Coaching. Aug. – Nov. Head coach, Michigan State University Football.

Zauner, Gary. (1985). The Kicking Game! A Manual of Kicking Fundamentals and Drills for Coaches and Players. San Diego, CA.