A STUDY OF FOOTBALL NECK INJURIES IN THE BIG EIGHT CONFERENCE

by 2235

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INTRODUCTION

People truly concerned with safety in football are becoming more aware of the ever increasing number of neck injuries. According to the American Coaches Association fatality survey, all direct fatalities in 1968 resulted from either head or neck injuries.[1] Individuals who are involved in football coaching should be aware of this fact. Sometimes coaches in searching for better techniques become so intensely involved with the mechanical things, they forget that they are dealing with human beings and not machines.

The game of football is a rough contact sport. A certain amount of injuries can be expected, but the fine qualities that the game possesses offset this negative factor. Knowing that football makes many contributions to our society, then it's the responsibility of all people involved (coaches, trainers, team doctors, officials,) to find ways of decreasing and preventing injuries.

PURPOSE OF STUDY

The purpose of the study was to examine the tackling technique that some coaches were teaching. There was evidence that some coaches were teaching a dangerous technique. The technique being examined is teaching to tackle the opponent by putting the face into the opponent's chest upon contact. This report should be of significant value to the coaching profession.

REVIEW OF LITERATURE

There was very little literature in the library pertinent to the problem. The information was obtained from equipment manufacturers,National Federation of High Schools, and the American Medical Association. They supplied the bulk of the material and suggested other sources.

According to Richard H. Alley's survey of 19,413 football players in Southern California, "Neck injuries numbered 118 accounting for 0.6 (per cent) of the players or 2.4 (per cent) of injured players."[2]

Alley stated, "Eighty-one percent of the players with neck injuries had less than seven days of team conditioning exercises before scrimmage. In 10.2 (per cent) practice was begun immediately without any group conditioning. In 57.6 (per cent) of the players, less than three minutes daily was spent in neck-strengthening exercises, and, only 34 (per cent) spent more than four minutes in this activity every day."[3]

The survey pointed out that the boy with the long thin neck received the least number of injuries,17 per cent. The well muscled suffered 31 per cent of the neck injuriesand the average built were the majority of the injured.[4] ..."Most of the players were average or husky 62.7 (per cent), most had good or outstanding ability, 71.2 (per cent) and many were notably athletic or aggressive in their football play 61 (per cent)."[5]

Contact with the knee or thigh resulted in 13.6 per cent of the neck injuries, 30 per cent of the injuries involved hitting the opponent's trunk. Of all players who suffered neck injuries,

44 per cent were taught to aim with the head. Spearing also led to 35 per cent of the head injuries.[6] Alley continued, "injuries were received while tackling 45.8 (per cent) or while carrying the ball 18.6 (per cent). Though a higher proportion were injured in some other activity--especially line blocking 16.9 (per cent). Most neck injuries occurred during practice sessions 54.2 (per cent)."[7]

Most neck injuries occurred with the head down (33). There were six from extension, nine lateral motion, and 25 other cases where exact motion was not known.[8]

The improper fitting of helmets in categories of fair and poor resulted in 28 injuries, compared to 24 in the excellent and good categories. Fifty-four per cent had plastic face guards-76 per cent of the double bar type.[9]

Alley also stated, "Sixty-six per cent of the players with neck injuries returned to football within seven days; 5 (per cent) did not return during the season."[10]

According to George A. Snook, a study of neck injuries at the University of Massachusetts was conducted over a three year period. "If the neck was unprotected by high shoulder pads or by a neck collar, a stretch injury or sprain occurred to the ligament and nerves on the side where the contact was made. This is the so-called pinched nerve syndrome. The player experiences sudden sharp pain in the neck usually radiating down into the arm and frequently accompanied by weakness in the arm."[11]

Snook continued, "In 22 athletes with this type of injury, 13 showed motor weakness in pronation or supination; and, in most

of these, the signs persisted for over a year. Associated with this finding was a consistent limitation of lateral flexion of the neck toward the affected side (i.e., the side of the stretching), which might be attributed to reparative fibrosis of the vertebral ligaments on the side of the injury. There was no evidence of limitation of flexion. In three players observed for over three years, supination weakness and limitation of motion were still present. In addition, subsequent roentgenograms showed spurring consistent with early osteoarthritis."[12]

A study by Richard C. Schneider of three neck injuries sheds some light on an area so far overlooked. "An 18 year football player was injured in a football scrimmage at 5 p.m. on October 9, 1959. While attempting to make a tackle the opposing player's knee struck his faceguard forcing his cervical spine into hyper-extension causing a C4 C5 fracture dislocation with immediate complete titraplegia and a sensory level at C5 dermatome.... His faceguard protruded three and one half inches from the base of the helmet. It was my thinking that this type of injury would not have occurred without the protruding faceguard which is made of a plastic-like material which does not give and acted as a lever in causing the injury."[13]

Another suggestion he had was a chin snap that would release like binding on skis. This would prevent the helmet from pinching against the back of the neck. Also, the adding of foam rubber at the back of the helmet would help lessen the chance of injury from hyperextension.[14]

The American Medical Association said, "The name of the game is heads up football; in the anatomic as well as the strategic sense. With the head up--chin away from chest--and the neck bulled (drawn back on the shoulders) the athlete has good visual field, the least chance of a direct blow to the head, and the most effective muscular control of his neck. He is in a good position to stop the opponent by shoulder, chest and arm strength."[15]

Dr. Richard C. Schneider an Ann Arbor, Michigan, neurosurgeon and member of the A.M.A. sports medicine committee said, many neurosurgeons are appalled by coaches' permitting or even deliberately teaching the devastating techniques of 'spearing,' 'stick-blocking,' and 'head-butting,'

He pointed out that death may be only 30 to 60 seconds away if the blood vessels draining the brain are damaged by a heavy blow or if hemorrhaging begins within the brain.[16]

The following comments were made by coaches and trainers either in personal letters received or from newspaper articles.

A letter from Ohio State's Trainer, Ernie Biggs, gives us some more facts. "We know that the problems we have with the neck were not present previous to head blocking. We know that the loss of muscular strength is great, we do have a cervical or brachial plexus injury. Our neuro-surgeon informed us there is a vital relationship between muscle strength and neck injury incidence. We know that padding of the helmet on the outside brings 35(per cent)more absorption of an impact at the forehead."[17]

John Ralston, Head Football Coach, Stanford University, in a letter, had the following comments: "I feel quite strongly

that every effort possible should be made to protect a boy's head and neck region. As you undoubtedly know, we had a boy break his neck here in spring practice, in 1963, and he ultimately died fourteen months later. This is a real shock to anyone in coaching and leaves a lasting impression. Football is such an enjoyable game that this type of hazardous injury should be eliminated if at all possible through our teaching and coaching methods. I sincerely believe that the most difficult shock that you can ever get would be in the head tackling method, and this should never be allowed in football. In close interior line blocking, the player uses his head often times, but it probably will be in the correct position, as well as the impact cannot be as great when the two people strike each other from a distance of perhaps a yard apart. It is when two bodies are moving at full speed for some distance and collide, as happens on a tackle, that you can get a severe head injury."[18]

George Allen, Head Football Coach Los Angeles Rams, in a letter states,"...coaches have emphasized striking with the forehead but we don't emphasize this on our level. We feel the people we have to tackle are too big and strong to be hitting with your head. I think there is merit in teaching this technique as a base fundamental as it does teach you to keep the head up and focus attention on your target. I wouldn't teach this in a 'live' drill situation. Once you get playing in a game, you very seldom get a chance to tackle the ball carrier using the so-called 'spear technique' but the emphasis placed on keeping the head up and driv-

ing through the target would have to help develop a more sure tackler."[19]

The following is a statement by Notre Dame's Head Football Coach, Ara Parseghian. "I can't begin to tell of the number of clinics where I have lectured on the spearing problem. We don't teach this at Notre Dame and, over the years, I have done everything within my power to influence others to coach against it."[20]

Murray Warmath, Football Coach at the University of Minnesota, said, "Spearing will never disappear from the game until we quit coaching it and until we absolutely disallow its use on the part of our men.

"It isn't the first man who makes the tackle, it's that second tackle. He puts his head down, closes his eyes, and piles into the man who's down with one intent, and that's to maim and cripple."[21]

Former great Coach Clark Shaughnessy supports the recommendations the physicians present concerning the dangers of so-called spearing. Shaughnessy said: "Head-on blocking, or 'spearing,' is a dangerous football tactic, especially to the face, head and neck of the blocker and should be eliminated. Head-on tackling in which the tackler lowers his head and extends his neck downward before contact is dangerous and should be eliminated. No head protection of any kind is adequate to prevent injuries from occurring when these two tactics are employed."[22]

METHOD OF STUDY

A survey questionnaire was designed with the help of Pro-

fessor Ray Wauthier, Kansas State University athletic trainer Lawrence Morgan, and by gleaning questionnaires used in other reports. Its function was to collect information pertinent to football neck injuries. The questionnaires were sent to all the trainers in the Big Eight Conference.

A second questionnaire was sent to all the head coaches in the Big Eight Conference. Its purpose was to find out how tackling techniques in their particular school were taught. It was also a check list type of questionnaire.

LIMITATION OF THE STUDY

All football teams have head and neck injuries, but the study was limited to the Big Eight Conference.

A reason for using the Big Eight Conference was that it gave a good cross section of collegiate football. One must keep in mind that anytime in dealing with injuries there is the element of luck or chance. There is a chance that a team may just be lucky in the number of injuries received.

RESULTS AND ANALYSIS OF THE QUESTIONNAIRE

The results and analysis of the questionnaires are given in the following tables.

Question 1. Do you teach to block and tackle by putting the forehead into the numbers? Possible response, yes or no.

TABLE I

DO YOU USE THE HEAD
FOR HITTING

Reply	Number	School	Per Cent
Yes	7	CU, ISU, KU, KSU, CU, OSU, MU	87.50
No	1	NU	12.50

Seven schools, or 88 per cent used the head in blocking or tackling. One school, or 13 per cent did not use the head for hitting.

Question 2. Do you do neck isometrics or neck bridges before practice? Possible response, yes or no.

TABLE II

WHO EXERCISES THE NECK

Reply	Number	School	Per Cent
Yes	4	CU, KSU, MU, NU	50.00
No	3	ISU, OU, OSU	37.50
No Comment	1	KU	12.50

Four schools, or 50 per cent did some type of neck isometrics or neck bridges. Three schools, or 38 per cent did not do any neck exercises before practice. One school, or 13 per cent did not comment.

Question 3. How many new neck injuries did you have this season? Possible response, 1 to 4, 5 to 8, 9 to 12, 13 to 16, or more.

TABLE III

NUMBER OF NEW NECK INJURIES

Reply	Number	School	Per Cent
1 - 4	3	CU, NU, OSU	37.50
5 - 8	1	ISU	12.50
9 - 12	2	MU, KSU	25.00
13 - 16	1	KU	12.50
More	1	OU	12.50

Three schools, or 38 per cent had one to four players that suffered a neck injury. One school, or 13 per cent had five to eight players that suffered a neck injury. Two schools, or 25 per cent had nine to twelve players that suffered a neck injury. One school, or 13 per cent had thirteen to sixteen players that suffered a neck injury.

Question 4. How many players missed practice due to a neck injury? Possible response, none, 1 to 5 practices, 1 week of practice, 2 weeks of practice, 1 game, 2 games, or 3 games. There was a possibility of marking more than one answer which will show in the following table.

TABLE IV

(Continued on The Next Page)

TABLE IV

NUMBER OF MISSED PRACTICES

Reply	Number	School	Per Cent
None	2	NU, OSU	18.18
1 - 5 practices	4	CU, ISU, KU, MU	36.36
1 week of practice	2	ISU, KSU	18.18
2 weeks of practice	2	CU, ISU	18.18
1 game	0	None	-----
2 games	0	None	-----
3 games	1	ISU	9.09

Two schools, or 18 per cent had no one miss practice because of a neck injury. Four schools, or 36 per cent had players who missed one to five practices. Two schools, or 18 per cent had players who missed one week of practice. Two schools, or 18 per cent had players miss two weeks of practice. No school, or 0 per cent had any player miss one or two games. One school, or 9 per cent had a player who missed three games.

Question 5. Were there any players who were advised to quit because of injury to the neck? Possible response, none, 1 to 3, or 4 - 6.

TABLE V

(Continued on The Next Page)

TABLE V

PLAYERS FORCED TO QUIT

Reply	Number	School	Per Cent
None	3	NU, OSU, KSU	37.50
1 - 3	5	CU, ISU, KU, MU, OU	62.50
4 - 6	0	None	-----

Three schools, or 38 per cent had no one forced to quit because of a neck injury. Five schools, or 63 per cent had one to three players forced to quit due to a serious neck injury.

Question 6. What type of neck injury was most common--muscle, vertebrae, or nerve injury? Possible response, muscle, vertebrae, or nerve. It was possible here to have checked more than one.

TABLE VI

MOST COMMON TYPE OF NECK INJURY

Reply	Number	School	Per Cent
Muscle	3	CU, MU, OSU	37.50
Vertebrae	0	None	-----
Nerve	4	ISU, KU, NU, KSU	50.00
Nerve and Muscle	1	OU	12.50

Three schools, or 38 per cent listed muscle as a most common type of neck injury. No school, or 0 per cent listed vertebrae as a most common type of neck injury. Four schools, or 50 per

cent listed nerve injuries as a most common neck injury. One school, or 13 per cent listed both nerve and muscle as a most common type neck injury.

Question 7. What treatment worked best for neck injuries? Possible response, heat, cold, massage, traction, or intermittent traction? Here again some trainers checked more than one to get a combination.

TABLE VII

BEST TREATMENT

Reply	Number	School	Per Cent
Heat	0	------	------
Cold	0	------	------
Massage	0	------	------
Traction	0	------	------
Intermittent Traction	0	------	------
Heat and Cold	1	MU	12.50
Heat and Intermittent Traction	2	OU, KSU	25.00
Cold, Massage, and Intermittent Traction	1	KU	12.50
Heat, Massage, Traction	1	ISU	12.50
Cold, Intermittent Traction	2	NU, OSU	25.00
Heat, Traction, Intermittent Traction	1	CU	12.50

None of the schools checked just one type of treatment.

One school, or 13 per cent checked heat and cold as the best treatment. Two schools, or 25 per cent checked heat and intermittent traction as the best treatment. One school, or 13 per cent checked cold, massage, and intermittent traction as the best treatment. One school, or 13 per cent checked heat, massage, and traction as the best treatment. Two schools, or 25 per cent checked cold, or intermittent traction. One school, or 13 per cent checked heat, traction, and intermittent traction as the best treatment.

Question 8. What number of your players hurt their necks in practices and games? Possible response, games--1 to 4, 5 to 8, 9 to 12, more practices--1 to 4, 5 to 8, 9 to 12, more.

TABLE VIII (a)

PLAYERS INJURED IN PRACTICE

Reply	Number	School	Per Cent
1 - 4	2	CU, MU	25.00
5 - 8	3	ISU, NU, KSU	37.50
9 - 12	0	------	-----
More	2	KU, OU	25.00
No Comment	1	OSU	12.50

Two schools, or 25 per cent had one to four players injure their neck in practice. Three schools, or 38 per cent had five to eight players injure their neck in practice. No school, or 0 per cent had nine to twelve players injure their neck in practice. One school, or 13 per cent made no comment on this question. Two schools or 25 per cent had more than 12 injuries.

TABLE VIII (b)

PLAYERS INJURED IN GAMES

Reply	Number	School	Per Cent
1 - 4	5	KSU, CU, ISU, NU, OSU	62.50
5 - 8	1	MU	12.50
9 - 12	0	------	-----
More	0	------	-----
No Comment	2	OU, KU	25.00

Five schools, or 63 per cent had one to four players injure their neck in games. One school, or 13 per cent had five to eight players injure their neck in games. No school, or 0 per cent reported in the nine to twelve or more category. Two schools, or 25 per cent made no comment on this question.

Question 9. What activity caused the most neck injuries? Possible response, tackling, blocking, any drill that is unique to your program. Some trainers checked both to add a response.

TABLE IX

ACTIVITY THAT CAUSED THE MOST INJURIES

Reply	Number	School	Per Cent
Blocking	3	ISU, MU, OSU	37.50
Tackling	2	CU, NU	25.00
Drill	1	KSU	12.50
Tackling and Blocking	1	KU	12.50
No Comment	1	OU	12.50

Three schools, or 38 percent listed blocking as the activity that caused the most neck injuries. Two schools, or 25 per cent listed tackling as the activity that caused the most neck injuries. One school, or 13 per cent listed a drill unique to their program. One school, or 13 per cent listed both tackling and blocking. One school, or 13 per cent made no comment on this question.

Question 10. How many of your players wear a neck collar? Possible response, 1 to 5, 6 to 10, or more.

TABLE X

NUMBER OF PLAYERS WHO WEAR NECK COLLARS

Reply	Number	School	Per Cent
1 - 5	2	NU, OSU	25.00
6 - 10	4	CU, KSU, KU, MU	50.00
More	2	OU, KSU	25.00

Two schools, or 25 per cent wore one to five collars. Four schools, or 50 per cent wore six to ten collars. Two schools, or 25 per cent wore more than ten collars.

Question 11. What type of helmet do you use? Possible response, suspension, padded suspension, padded, air cell, bell crash helmet, or combination.

TABLE XI

(Continued on The Next Page)

TABLE XI

TYPE OF HELMET

Reply	Number	School	Per Cent
Suspension	1	KU	12.50
Padded Suspension	2	OU, OSU	25.00
Padded	0	------	-----
Air Cell	0	------	-----
Bell Crash Helmet	0	------	-----
Suspension and Air Cell	1	NU	12.50
Suspension, Padded Suspension and Padded	2	ISU, MU	25.00
Suspension, Padded, Air Cell	2	CU, KSU	25.00

One school, or 13 per cent wore just a suspension helmet. Two schools, or 25 per cent wore padded suspension helmets. No school, or 0 per cent wore just a padded or air cell helmet. One school, or 13 per cent wore suspension and air cell helmets. Two schools, or 25 per cent wore suspension, padded suspension, and padded helmet. One school, or 13 per cent wore suspension, padded and air cell helmets. One school, or 13 per cent wore suspension, padded suspension, padded, and air cell helmets.

Question 12. How many head injuries did you have in 1969? Possible response, 1 to 5, 6 to 10, or more. Some wrote in none,

TABLE XII

(Continued on The Next Page)

TABLE XII

NUMBER OF HEAD INJURIES

Reply	Number	School	Per Cent
1 - 5	4	KSU, CU, ISU, OSU	50.00
6 - 10	2	MU, OU	25.00
More	0	------	-----
None	2	KU, NU	25.00

Four schools, or 50 per cent had one to five players suffer a head injury. Two schools, or 25 per cent had six to ten players suffer a head injury. None of the schools, or 0 per cent had more than ten players suffer a head injury. Two schools, or 25 per cent had no head injuries.

COACHES REPLY

Question 1. Is your tackling technique, ____striking with the head in the numbers, or ____making contact with the shoulder pad? Possible response, was to check either blank.

TABLE XIII

DO YOU TACKLE WITH THE HEAD

Reply	Number	School	Per Cent
Yes	6	CU, ISU, KU, KSU, OU, OSU	75.00
No	2	MU, NU	25.00

Six coaches, or 75 per cent replied that they did teach to

tackle by putting the head into the numbers. Two coaches, or 25 per cent replied that they use the shoulder to tackle with.

Question 2. If striking with the head, do you emphasize making contact with the arms, chest, and shoulder? Possible response, yes or no.

TABLE XIV

IS CONTACT MADE WITH YOUR ARMS, CHEST, AND SHOULDER

Reply	Number	School	Per Cent
Yes	5	CU, KU, OU, OSU, ISU	62.50
No	1	KSU	12.50
No Comment	2	MU, NU	25.00

Five coaches, or 63 percent replied that they do emphasize making contact with the arms, chest, and shoulder. One coach, or 13 per cent replied that they didn't emphasize making contact with the arms, chest, and shoulder. Two coaches, or 25 per cent made no comment because they had stated in question 1 that they make contact with the shoulder and not the head.

Question 3. Do you emphasize bowing the neck and tucking the chin and keeping the head up? Possible response, yes or no.

TABLE XV

DO YOU BOW THE NECK, TUCK THE CHIN, AND KEEP THE HEAD UP

Reply	Number	School	Per Cent
Yes	5	OSU, CU, KU, NU, ISU	62.50
No	3	KSU, MU, OU	37.50

Five coaches, or 63 per cent answered yes, they did teach their players to bow the neck, tuck the chin, and keep the head up. Three coaches, or 38 per cent answered no, that they didn't teach their players to bow the neck, tuck their chin, and keep their head up.

Question 4. In a full-speed tackling drill do you let your ball carrier get farther than five yards from the tackler? Possible response, yes or no.

TABLE XVI

DISTANCE OF BALL CARRIER FROM THE TACKLER

Reply	Number	School	Per Cent
Yes	0	------	-----
No	8	OSU, ISU, CU, KU, KSU, MU, NU, OU	100.00

All the coaches, or 100 per cent answered no, that in all their tackling drills the ball carrierswere within five yards of the tackler.

Question 5. How many full-speed tackles do you perform in your daily tackling drill? Possible response, 1 - 2, 3 - 4, 5 - 6, more, none.

TABLE XVII

(Continued on The Next Page)

TABLE XVII

NUMBER OF FULL-SPEED TACKLES

Reply	Number	School	Per Cent
1 - 2	4	CU, KSU, MU, NU	50.00
3 - 4	1	KSU	12.50
5 - 6	0	------	-----
More	2	KU, OSU	25.00
None	1	OU	12.50

Four coaches, or 50 per cent said they only do one to two full-speed tackles in their daily tackling drills. One coach, or 13 per cent said they do three to four full-speed tackles in their daily tackling drills. None of the coaches, or 0 per cent use five to six full-speed tackles in their daily tackling drills. Two coaches, or 25 per cent did more than six full-speed tackles in their daily tackling drills. One coach, or 13 per cent did no full-speed tackles in their daily tackling drills.

Question 6. Do you ever hit bags with your head? Possible response, yes or no.

TABLE XVIII

STRIKING BAGS WITH THE HEAD

Reply	Number	School	Per Cent
Yes	6	ISU, CU, KSU, MU, OU, OSU	75.00
No	2	NU, KU	25.00

Six coaches, or 75 per cent answered yes they do hit bags with their head. Two coaches, or 25 per cent answered no they don't hit bags with their head.

SUMMARY AND CONCLUSIONS

There was some difference between those teams who did or did not hit with their head. Only Colorado, Nebraska, and Oklahoma State suffered one to four neck injuries. Both Colorado and Oklahoma State hit with the head. Nebraska did not hit with the head and was in the one to four group. The four remaining categories were made up of only teams who hit with their heads. Iowa State was in the five to eight possible injury group. Missouri and Kansas State were in the nine to twelve possible injury group. Kansas University was in the thirteen to sixteen possible injury group. Oklahoma University was in the more than sixteen possible injury group.

With the total of seven teams, or 88 per cent using the head, only 29 per cent managed to have the minimum number of neck injuries. The only team not hitting with the head was in the minimum number of neck injuries. It seems reasonable to state that when hitting with the head a player will have considerably more neck injuries. Missouri would have been in the lowest category for neck injuries had they not used the head to block with, because they did not use the head when performing a tackle. Missouri received most of their neck injuries while blocking.

Two teams, Colorado and Nebraska,ranked low in the number of neck injuries, and they did neck isometrics or neck bridges be-

fore practice. On the other hand, Kansas State and Missouri who did neck isometrics or neck bridges before practice, ranked fairly high in their number of neck injuries. Iowa State, Oklahoma, and Oklahoma State did not do neck isometrics or neck bridges before practice. Oklahoma University had the greatest number of neck injuries, while Oklahoma State was in the lowest group for neck injuries. Iowa State was in the five to eight range on possible number of neck injuries.

It appears that drills in neck exercises before practice was not significant in number of neck injuries with Big Eight teams. It was not known how long a period of time or how strenuous the exercises were performed. This information would probably shed more light on the subject. There was too wide a range in this study to prove neck exercises before practice were harmful.

Nebraska and Oklahoma State had no player miss practice due to a neck injury. Both schools also ranked in the lowest category for number of neck injuries. There was a sharp contrast between Nebraska and Oklahoma State. Nebraska was a shoulder tackling and blocking team, while Oklahoma State used the head. In further examination of Table IV, the only teams who had players missing practice or a game did hit with the head.

Even though both methods of tackling had good results, shoulder tackling had only positive results, whereas head tackling had one positive and six negative results. This suggests that if you do not want your players to miss practice or a game, that perhaps the shoulder method would be most desirable.

Five teams, or 63 per cent had at least one player advised

to quit due to a serious neck injury. All five of these teams hit with their head. Also, four out of five ranked high in the number of neck injuries. Three teams, or 38 per cent did not have any players forced to quit. These three teams were Nebraska, Oklahoma State, and Kansas State. Oklahoma State and Nebraska also ranked low in number of neck injuries. Kansas State ranked in the middle for neck injuries. Again, Nebraska was the only team who used the shoulder instead of the head.

There seems some proof that if one wanted to lessen the chance of having a player being forced to quit, then the shoulder tackle may be preferred. It was the only method used that did not have a player forced to quit. It also appears that the team with the lower number of neck injuries has a less chance of having a player forced to quit.

Nerve injuries were reported more common by 50 per cent of the teams. 38 per cent reported muscle as the most common injury. One team, or 13 per cent reported nerve and muscle as the most common neck injury.

These figures between muscle and nerve injury are too close to say that one is more dominant than the other, leaving one to believe that you may have both types of injuries.

There were many types of treatment used for neck injuries. Intermittent traction was used by six schools, or 75 per cent. Heat was used by 63 per cent of the schools. 50 per cent of the schools used cold, and 25 per cent used traction. Nebraska and Oklahoma State who had no players miss practice used cold and intermittent traction. Two of the four teams who had at least one

player miss practice used intermittent traction along with other treatments. The rest of the schools all used various types of treatment. Oklahoma used intermittent traction and did have at least one player miss two weeks of practice.

After reviewing the facts, it does seem apparent that intermittent traction, cold, and heat would be good treatment for neck injuries. Though this study did not go into the seriousness of each injury, this should be done before one can make a valid statement as to which type of treatment is best.

38 per cent of the teams had one to four players hurt in practice, whereas 63 per cent of the teams had one to four players hurt in games. 38 per cent of the teams had five to eight hurt in practice. 13 per cent of the teams had five to eight hurt in games. No teams had nine to twelve players hurt in either practices or games. 25 per cent of the teams had more than twelve neck injuries in practice. No team had more than twelve neck injuries in games.

It would appear that more injuries take place in practice than games. This suggests that the repetition of blocking and tackling that takes place in practice may be causing the neck injuries. Also, the two teams, Kansas University and Oklahoma University, who had more than twelve players injured in practice, might suggest that when a team is losing or having a disappointing season that the coach may increase the amount of contact thus causing more neck injuries.

38 per cent of the teams listed blocking as causing most neck injuries. 25 per cent of the teams listed tackling as causing

most neck injuries. 13 per cent of the teams listed a drill as causing most neck injuries. 13 per cent of the teams listed both blocking and tackling as causing the most neck injuries.

From this sampling, it would be difficult to say what activity causes the most neck injuries. It does seem that both blocking and tackling will cause neck injuries. Kansas State was the one that listed a drill that most neck injuries occurred. This drill will be discussed later.

Every team in the Big Eight had players wearing neck collars. Again, Nebraska and Oklahoma State had the fewest number of players wearing them. There is not anything significant about wearing a collar, except with more emphasis being put on the passing game a collar does cut down on a players ability to see and cover pass receivers.

It would seem that coaches would do everything possible to prevent a player from wearing a collar. It appears that if a coach wants fewer players to wear collars, he should use the shoulder instead of the head. The head tackling teams had only one team wearing less than five collars. All the rest were wearing five or more collars.

There were many types of helmets used by each team. Colorado, Nebraska, and Oklahoma State had the fewest number of neck injuries, all wore different types of helmets. Oklahoma and Oklahoma State both used the same type of helmet. Oklahoma had many neck injuries and Oklahoma State had very few. Oklahoma's problem might be of another nature that will be discussed later. Nebraska and Colorado

wore some of the new air cell type of helmet, but the exact number was not known.

No valid recommendation can be made, except that a closer study should be made to see what type of helmet was being worn by the injured players.

Kansas University and Nebraska had no head injuries. Kansas University hits with the head and Nebraska does not. All the other teams mentioned do hit with their head. 50 per cent of the teams had one to five head injuries. 25 per cent of the teams had six to ten injuries.

Here again, the figures are in favor for the team who does not hit with the head. Only one out of seven, or 14 per cent of the teams who hit with the head went through the entire season without a head injury, while one team who did not hit with their head had no head injuries. This suggests that if you are having a number of head injuries perhaps you should examine your tackling technique.

This discussion applies only to teams who hit with their head. As Nebraska and Missouri both shoulder tackle, remembering that Missouri would have had fewer neck injuries had they not blocked with their head. 63 per cent of the teams emphasized hitting with the arms, chest, and shoulder. All the teams in the 63 per cent category fell in different places on the scale in Table III. Some of the 63 per cent only having one to five injuries, and others more than 16 neck injuries. One team did not emphasize hitting with the chest, arms, and shoulder and had nine to twelve neck injuries.

The results do not seem to show that making contact with the arms, chest, and shoulder is real important. But it is not known the exact amount of emphasis that was placed on hitting with the arms, chest, and shoulder. Until the exact amount of emphasis is known, it is hard to make a valid statement for or against emphasizing hitting with the arms, chest, and shoulder.

63 per cent of the teams emphasized bowing the neck, tucking the chin, and keeping the head up. Only one of these teams, Kansas University, ranked high in neck injuries. 38 per cent of the teams did not emphasize bowing the neck, tucking the chin, and keeping the head up. All of those teams in the 38 per cent ranked high in the number of neck injuries they had.

It was safe to say that emphasizing bowing the neck, tucking the chin, and keeping the head up will help prevent neck injuries.

50 per cent of the teams only did one to two full-speed tackles in their daily tackling drills. Of this 50 per cent, two teams, Colorado and Nebraska,were in the one to four category in number of neck injuries. Kansas State and Missouri ranked in the nine to twelve category for the number of neck injuries, with most of their neck injuries came from something besides tackling. 13 per cent of the teams did three to four full-speed tackles and ranked in the five to eight category for the number of neck injuries in the season. Oklahoma State and Kansas did more than six full-speed tackles, Oklahoma State ranking low in the number of neck injuries in the one to four category. Kansas University ranked very high in the 13 to 16 category. Oklahoma University did not do any full-speed tackles and ranked the highest in the

number of neck injuries.

One can only suggest that it may be better to perform a few full-speed tackles. Each time you do a full-speed tackle you risk the chance of injury. In a game one does not get the perfect tackle very often. Giving a head tackler a perfect hit may be dangerous even if he does it correctly. Here are some variables that are not known about their full-speed tackling drills. Does the ball-carrier run straight up and down to give the tackler a good shot? Does he throw the tackler off balance by dodging maneuvers? Does the tackling drill require the tackler to change direction to make the tackle or make overly difficult movements before tackling?

75 per cent of the teams hit bags with their head. Colorado and Oklahoma State were two of the teams who made up the 75 per cent. They ranked very low in the number of neck injuries. The other four teams ranked from five to eight neck injuries all the way to more than 16. Most of Kansas State's neck injuries came from a particular drill where the players would hit a heavy bag with their head while it was swinging towards them. Nebraska and Kansas University does not hit bags with their head. Nebraska had few neck injuries, Kansas had many.

Some of the evidence suggests that striking a bag with the head might be dangerous. The type of bag being hit was not known in any case except two --Kansas State using a heavy swinging bag resulting in many injuries, and Colorado using a light flat bag that is soft and gives. They had very few neck injuries. The distance from the bag was not known in any of the cases except one. Kansas

State's players were only one yard away from the bag, so even a short distance can cause a neck injury. When hitting a bag, emphasis may be put on only hitting with the head.

A valid conclusion can be made that it was safer to hit with the shoulder. Nebraska is a good example of a shoulder blocking and tackling team. They had the fewest number of neck injuries, no players missing practice due to a neck injury, no player forced to quit because of a neck injury, and having no head injuries. There was no other team in the Big Eight who fell into all of those categories. There was some who were in a couple, but no team who used the head was in every category with Nebraska.

If using the head, it does seem very important that it is taught correctly. There was some evidence that emphasizing keeping the head up, tucking the chin, and bowing the neck may help prevent some neck injuries. Oklahoma State ranked second to Nebraska in regards to neck injuries. This seems a logical choice, as they enjoyed a very find season under their new coach, Floyd Gass. He won with mostly the same material that the previous coach had. This speaks well of his teaching ability which was very critical when hitting with the head.

One last thought, the teams who were winning, Nebraska and Colorado, had few neck injuries. Only Missouri, who had a fine season, had a high number of neck injuries. Teams who did better than expected, such as Oklahoma State, had few neck injuries. Teams who did poorly or not as well as expected suffered more neck injuries, Oklahoma University, Kansas University, and Iowa State.

Kansas State really does not fall into any one class. A possible reason for a rash of neck injuries on a losing team was that a coach gets pressured and does more live full-speed hitting than if he were winning.

FOOTNOTES

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[1]Carl Blyth, Ph.D., "The Thirty-Seventh Annual Survey of Football Fatalities," American Football Coaches Association, (January, 1969), p. 129.

[2]Richard H. Alley, "Head and Neck Injuries in High School Football," Journal of American Medical Association, (May 4, 1964), p. 419.

[3]Ibid.

[4]Ibid.

[5]Ibid.

[6]Ibid., pp. 419-420.

[7]Ibid., p. 422.

[8]Ibid., p. 420.

[9]Ibid., p. 420.

[10]Ibid.

[11]George A. Snook, "Head and Neck Injuries in Contact Sports," Medicine and Science in Sports, (September, 1969), p. 118.

[12]Ibid.

[13]Richard C. Schneider, M.D., Edward Reifel, M.C., Herbert O. Crisler, S.B., and Bennie G. Oosterbaan, A.B.,"Serious and Fatal Football Injuries Involving the Head and Spinal Cord," Journal of American Medical Association, (August 12, 1961), p. 364.

[14]Ibid., p. 366.

[15]American Medical Association, "AMA Calls for Abolition of Football 'Spearing'," The American Medical Association, (September 25, 1968), p. 2.

[16]Medical Tribune, "A.M.A. Attack on 'Spearing' Backed by Football Experts," September 14, 1967.

[17]Ernie Biggs, Athletic Trainer, Ohio State University, personal correspondence, November, 1969.

[18]John Ralston, Head Coach, Stanford University, personal correspondence, January, 1970.

[19]George Allen, Head Coach, Los Angeles Rams, personal correspondence, November, 1969.

[20]Medical Tribune, "A.M.A. Attack on 'Spearing' Backed by Football Experts," September 14, 1967.

[21]Ibid.

[22]Fred V. Hein, "Report of the National Conference on Head Protection of Athletes," 1963.

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APPENDIX

Dear Trainer:

I am a graduate student at Kansas State University. I am doing my master's report on Football Neck Injuries in the Big Eight Conference, with the help of Porky Morgan.

I was hoping you could fill out the enclosed questionnaire and return it to me at your earliest convenience. The information desired is only of this past season but includes freshmen and varsity players. When I complete my study, I will send you a copy of the findings.

I realize you get many questionnairs during the course of the year, but your help and cooperation would sincerely be appreciated by Porky and me. Thank you very much for your time.

Sincerely,

Al Vermeil
Graduate Assistant

d

Enclosure

1. Do you teach to block and tackle by putting the forehead into the numbers?

____yes ____no

2. Do you do neck isometrics or neck bridges before practice?

____yes ____no

3. How many new neck injuries did you have this season? (I consider an injury to be anything requiring treatment, missing a game or practice, or having a player wearing a collar).

____1 to 4 ____5 to 8 ____9 to 12 ____13 to 16 ____more

4. How many players missed due to a neck injury?

____1 to 5 practices ____1 week of practice

____2 weeks of practice ____1 game ____2 games ____3 games

5. Were there any players who were advised to quit because of injury to the neck?

____1 to 3 ____4 to 6

6. What type of neck injury was most common--muscle, vertebrae, or nerve injury?

____muscle ____vertebrae ____nerve

7. What treatment worked best for neck injuries?

____heat ____cold ____massage ____traction

____intermitten traction

8. What number of your players hurt their necks in practices and games?

(Games) ____1 to 4 ____5 to 8 ____9 to 12 ____more

(Practices) ____1 to 4 ____5 to 8 ____9 to 12 ____more

9. What activity caused the most neck injuries?

____tackling ____blocking ____any drill that is unique to your program, describe

10. How many of your players wear a neck collar?

____1 to 5 ____6 to 10 ____more

11. What type of helmet do you use?

____suspension ____a padded suspension ____padded

____air cell ____bell crash helmet

12. How many head injuries did you have in 1969?

____1 to 5 ____6 to 10 ____more

NOTE: I would appreciate any comments you have on tackling and blocking with the head.

Dear Coach:

I am now in the process of writing my master's report on Football Neck Injuries in the Big Eight Conference. I feel before I can make any valid conclusions, I must know how you teach your players to tackle.

The enclosed questionnaire is for you to check and return to me at your earliest convenience. Any information you may have will be appreciated. Thank you very much.

Sincerely,

Al Vermeil
Graduate Assistant

d

Enclosure

1. Is your tackling technique, ____striking with the head in the numbers, or ____making contact with the shoulder pad?

2. If striking with the head, do you emphasize making contact with the arms, chest, and shoulder?

____yes ____no

3. Do you emphasize bowing the neck and tucking the chin and keeping the head up?

____yes ____no

4. In a full-speed tackling drill do you let your ball carrier get farther than five yards from the tackler?

____yes ____no

5. How many full-speed tackles do you perform in your daily tackling drills?

____1 to 2 ____3 to 4 ____5 to 6 ____more

6. Do you ever hit bags with the head?

____yes ____no

A STUDY OF FOOTBALL NECK INJURIES IN THE BIG EIGHT CONFERENCE

by

ALBERT LOUIS VERMEIL

B. S., Utah State University, 1968

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

DEPARTMENT OF PHYSICAL EDUCATION

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

The objective of this study was to collect facts concerning the increase of neck injuries in football. It was felt that a way could be found to reduce the number of neck injuries.

The problem under investigation in this study was: Is the increase in neck injuries due to the coaches' teaching players to use the head as a battering ram?

To obtain this information in regards to neck injuries a questionnaire was sent to all the athletic trainers in the Big Eight Conference. Another questionnaire was sent to all the head coaches in the Big Eight Conference. The information collected was concerned with injuries received during the 1969 football season.

Literature of a pertinent nature was investigated and analyzed, none dating back farther than 1963.

The information in this study revealed that only one team in the Big Eight does not hit with the head, and that is Nebraska. This study gave evidence that Nebraska, a shoulder tackling and blocking team, had the least number of neck injuries, no players missing practice due to a neck injury, no player forced to quit because of a neck injury, and none having head injuries. There was no other team in the Big Eight who fell into all those categories.

It appears that drills in neck exercises before practice has no effect on the number of neck injuries a team may have.

The figures between muscle and nerve injury are too close to say that one is more dominant than the other, leaving one to believe that a player may have either type of injuries.

After reviewing the facts, it does seem apparent that intermittent traction, cold, and heat would be good treatment for neck injuries. There were too many types of treatment used to state that one was the very best treatment for neck injuries.

This study showed that more neck injuries were taking place in practice than in games. This suggests that the repetition of blocking and tackling that takes place in practice may be causing the neck injuries.

Blocking and tackling were both found as leading causes of neck injuries. This sampling may be too small to find a definite answer on what activity causes the most neck injuries.

Every team in the Big Eight had some players wearing neck collars. 75 per cent of the teams had five or more players wearing neck collars. All of these teams hit with the head. Only one team hitting with the head wore fewer than five neck collars.

No valid recommendation can be made, except that a closer study should be made to see what type of helmet was being worn by the injured players.

The results do not seem to show that making contact with the arms, chest, and shoulder is real important. But it is not known the exact amount of emphasis that was placed on hitting with the arms, chest, and shoulder.

All the teams, or 38 per cent who did not emphasize bowing the neck, tucking the chin, and keeping the head up, ranked high in the number of neck injuries. It does seem important that coaches emphasize bowing the neck, tucking the chin, and keeping the head up.

Nothing definite can be stated in regards to the number of full-speed tackles performed in daily tackling drills in relation to the number of neck injuries. It does seem that the more tackles performed the greater chance of injury.

Hitting bags with the head cannot be proven at this time to be a definite cause of neck injuries. The type of bag used and the drill that was done were not known, except in two cases. Colorado had few neck injuries and Kansas State many. Most of Kansas State's neck injuries were attributed to hitting a big-heavy swinging bag.

It was found that the teams who were winning or doing better than expected had fewer neck injuries than those who were losing. A possible reason for a rash of neck injuries on a losing team was that a coach gets pressured and does more live full-speed hitting than if he were winning.