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# A Study of Interscholastic Wrestling Injuries in the State of Missouri During the 1965-66 Season

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A STUDY OF INTERSCHOLASTIC WRESTLING INJURIES

IN THE STATE OF MISSOURI DURING THE 1965-66 SEASON  
(TITLE)

BY

GLENNON J. ACKSEL

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF

MASTER OF SCIENCE IN EDUCATION

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY  
CHARLESTON, ILLINOIS

1966  
YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING  
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

8/3/66  
DATE

5 August 1966  
DATE

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A STUDY OF INTERSCHOLASTIC  
WRESTLING INJURIES IN THE STATE  
OF MISSOURI DURING THE 1965-66 SEASON

CHAPTER I

STATEMENT OF THE PROBLEM

INTRODUCTION

Wrestling is a valuable competitive sport. It gives a boy an opportunity for self-expression which is not possible in team games. Self-confidence, individual initiative, courage, desire, quick thinking and responsiveness, and physical ruggedness are products of wrestling. Once a boy begins a wrestling match only he will be able to decide the final outcome because the wrestling coach cannot make a substitution and he cannot call a time out in a vital situation.

Because of its many values, high school wrestling had a tremendous increase in participation and popularity in the United States during the past three decades. "In 1960 it was estimated that 60,229 boys participated in interscholastic wrestling, a figure surpassed only by the number of participants in the so-called major sports."<sup>1</sup> As participation

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<sup>1</sup>Philip J. Rasch and Walter Kroll, What Research Tells the Coach About Wrestling, A report prepared for the American Association for Health, Physical Education and Recreation (Washington: The American Association for Health, Physical Education, and Recreation, 1964), 52.



in wrestling increases, the possibility of more wrestling injuries also increases. It was the writer's opinion that many wrestling injuries are unnecessary and could be reduced; therefore, a study of interscholastic wrestling injuries was conducted.

#### PURPOSE OF THE STUDY

The purpose of this study was threefold: (1) to determine the extent of wrestling injuries which occurred in Missouri high schools during the 1965-66 season; (2) to determine the causes of these injuries; and (3) to make suggestions for the purpose of reducing the number of wrestling injuries in the future.

#### NEED FOR THE STUDY

Although wrestling does make valuable contributions to those who participate, the number of injuries occurring has increased because of the larger number of boys now participating. Improved mats and safety equipment have been introduced to help prevent injuries. Nevertheless, wrestling still has too many injuries that could, perhaps, be prevented. A statistical analysis of wrestling injuries is needed to help determine the nature and causes of these injuries. With this idea in mind, the writer conducted this study to determine the nature and causes of wrestling injuries that occurred in the 1965-66 wrestling season in Missouri high schools so that recommendations could be made for the reduction of future injuries.

#### METHODOLOGY

The data was collected through the use of a questionnaire devised

by the writer. The questionnaire was sent to all the high schools in Missouri which had wrestling teams, with the exception of one school.<sup>1</sup> The schools were selected from a list compiled by the Missouri State Activities Association published in 1965.

#### LIMITATIONS OF THE STUDY

The data for this study was collected during one wrestling season, from December 1, 1965 to March 26, 1966. Only high schools in Missouri which were known to have wrestling teams were asked to participate in the study. Forty-nine high schools which represented two thousand thirty-two wrestlers were included in the study. The writer realizes that some of the information provided by the coaches in the questionnaires might not be completely accurate due to the fact that some coaches do not keep accurate records of wrestling injuries and also because some coaches might not want to reveal their inadequacies. The study was conducted at the end of the wrestling season. If the study had been conducted throughout the season and the coaches could have kept a running account of the injuries as they occurred, the results might have been more accurate.

#### DEFINITION OF TERMS

There are two terms which need to be defined in order for the reader to more clearly understand this study. They are:

Injury: a disablement that caused the wrestler to miss one or more days of practice.

Severity index: The average number of days lost per injury (the number of days lost as a result of the injuries divided by the number of injuries).

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<sup>1</sup>The procedure employed in the study is explained in Chapter III.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

Many studies have been made concerning athletic injuries; however, not very many have been devoted to the problem of wrestling injuries. The first study that follows is concerned primarily with all high school injuries. It does make some valuable contributions to the problem of wrestling injuries; however, some of the findings are not pertinent today because of the changes in regulations, technique, facilities and equipment in the last three decades.

Lloyd, Deaver, and Eastwood reported "...that without question wrestling is a highly hazardous sport, ranking fifth in hazard in high school and third in hazard in college."<sup>1</sup> They found that wrestling injuries tend to be more serious than football injuries in high school.

Their study also revealed that in high school most injuries occur to the shoulder, arm and hand, head and neck, leg and foot, and thorax as indicated in Chart I.

#### CHART I

##### Gross Percentage of Parts of Body Injured

Shoulder.....	21%
Arm and Hand.....	26%

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<sup>1</sup>Frank Lloyd, George Deaver, and Floyd Eastwood, Safety in Athletics (Philadelphia: W.B. Saunders Company, 1937), 99.

## CHART I (continued)

Gross Percentage of Parts of Body Injured

Head and Neck.....	20%
Leg and Foot.....	18%
Thorax.....	8% <sup>1</sup>

However, the most serious injuries occurred to the thorax as is indicated in Chart II.

## CHART II

Severity Index Per Thousand Exposures

Thorax.....	14.0
Shoulder.....	10.9
Arm and Hand.....	8.1
Leg and Foot.....	8.0 <sup>2</sup>

Chart III shows that most of the injuries that occurred were strains, followed by sprains, bone injuries, and wounds.

## CHART III

Type of Injury

Strains.....	33%
Sprains.....	26%
Bone Injuries.....	22%
Wounds.....	20% <sup>3</sup>

Patacsil,<sup>4</sup> in his study of interscholastic and intercollegiate

<sup>1</sup>Ibid.

<sup>2</sup>Ibid., 100.

<sup>3</sup>Ibid.

<sup>4</sup>Joseph Patacsil, "An Analytical Study of the Incidence of Injuries Sustained in Intercollegiate and Interscholastic Wrestling" (unpublished Master's Thesis, West Lafayette, Indiana: Purdue University), 1955, 68-71.

wrestling injuries, found that 8.8% of the total high school wrestling enrollment received injuries and that the severity index was 5.6 days lost per injury. He further reported that 88.2 injuries occurred per 1000 squad members and that the number of injuries decreased with an increase in years of wrestling experience. He also indicated that most injuries occurred in the 138 to 165 pound classes; that most injuries occurred while the wrestler was working on his feet and that most injuries occurred in practice.

Patacsil found that most injuries occurred to the head and neck; that bone injuries were the most serious and that ligament and cartilage injuries to all parts of the body accounted for almost 50% of the total number of injuries.

He found that crowded wrestling areas, not wearing ear guards, unnecessary roughness and the recurrence of an old injury were the major causes of all high school injuries.

Gallagher<sup>1</sup> conducted a study of athletic injuries over a period of seven years at Phillips Academy in Andover, Massachusetts. He reported that the severity index per 1000 wrestlers was 72.45.

According to a national study of wrestling injuries conducted by Reeck<sup>2</sup> in 1938, approximately 5% of the total squad enrollment received injuries and the average accident rate per school was 1.9 injuries. He reported that the average severity rate was seven days

<sup>1</sup>J. Roswell Gallagher, "Athletic Injuries Among Adolescents: Their Incidence and Type in Various Sports," Research Quarterly, XIX (October, 1948), 198-204.

<sup>2</sup>Claude Reeck, "A National Study of Incidence of Accidents in High School Wrestling," Research Quarterly, I (March, 1939), 72-74.

per accident and the accident rate per 1000 squad members was 52.5.

He indicated through his study that the greatest number of injuries occurred while the wrestler was working on his feet and that coaches who had six years of experience had fewer injuries occur to their team. In Reeck's study most schools reported that they required a medical examination before the start of the season.<sup>1</sup>

He pointed out that most injuries were to the knees, elbows, the cartilage of the ear, ribs, and muscles of the lumbar region. The main causes of the injuries were mats that were too small, defective mat covers, not wearing ear guards, lack of training, and carelessness.<sup>2</sup>

Reeck<sup>3</sup> made the following suggestions to help eliminate future injuries: larger mats, better preparation of coaches, better conditioning, employment of a full time physician, use of ear guards, and discouragement of too rapid weight reduction.

Gallagher and Perry<sup>4</sup> reported that most injuries occurring in wrestling are mat burns, boils, impetigo, cauliflower ears, strains, and sprains. They indicated that most injuries occurred from poor conditioning, improper warm up and improper equipment.

Konrad,<sup>5</sup> in his study of wrestling injuries in high schools

<sup>1</sup>Ibid.

<sup>2</sup>Ibid.

<sup>3</sup>Ibid.

<sup>4</sup>E.C. Gallagher and Rex Perry, Wrestling (New York: A.S. Barnes and Company, 1951), 81-84.

<sup>5</sup>Ignatius Konrad, "A Study of Wrestling Injuries in High Schools Throughout Seven Midwestern States" (unpublished Master's Thesis, East Lansing, Michigan: Michigan State University), 1951, 17-24.

throughout seven midwestern states, found that infections and cauliflower ears accounted for the greatest number of injuries. He found that the average time allotted for daily practice was two hours and that the average number of years experience for a coach was 7.6. His study also revealed that boys with one or two years of experience received twice as many injuries as boys with three or four years of experience. The greatest number of injuries occurred in the 145 pound class, and carelessness was listed as the major cause of injuries.

## CHAPTER III

### PROCEDURE

The information obtained in this study was taken from an injury questionnaire devised by the investigator. First a letter was sent to all wrestling coaches in the state of Missouri asking if: (1) they considered a study of this nature to have some merit; and (2) if they would be willing to answer a short questionnaire. A post card was provided for their answer. Fifty-seven or 78.08% of the seventy-three coaches replied; fifty-six or 76.71% of the coaches stated that they considered the study to have some merit and that they would be willing to answer a short questionnaire; and one coach stated that he was unwilling to participate in the study.

Second, a pilot study was conducted in Illinois using thirteen selected high schools from a list provided by Coach Harold Pinther.<sup>1</sup> The questionnaire, along with a letter requesting criticisms and suggestions that might make the questionnaire more complete, was sent to the coaches. Eleven or 85.38% of the thirteen coaches returned the questionnaires completed with several criticisms and suggestions. After the suggestions were analyzed, some changes were made in the questionnaire.

Third, the revised questionnaire was sent to seventy-two coaches

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<sup>1</sup>Varsity wrestling coach at Eastern Illinois University.



in Missouri, namely; the fifty-six who replied positively to the first letter and also to the sixteen coaches who did not reply to the first letter in hopes that they would reconsider and also answer the questionnaire.

Fourth, three weeks after the questionnaire had been sent out, a post card was sent to the coaches who had not yet returned their questionnaires requesting them to do so--either completed or not--so that the writer could begin compiling the data.

Of the seventy-two questionnaires sent out, forty-nine or 68.05% were completed and returned. Of the forty-nine questionnaires returned, forty-one or 73.21% were from coaches who had originally stated that they would respond and eight questionnaires were from coaches who had not replied to the first letter. The total number of schools in Missouri which were involved in the study was forty-nine or 67.12% of the schools with wrestling programs.

Two areas of concern were covered by the questionnaire. They were general information about the school, coach and participants and information specifically concerned with wrestling injuries.

#### GENERAL INFORMATION

1. Number of schools with a team physician and/or a team trainer.
2. Number of schools with special wrestling rooms; number of these schools which have the walls padded to a minimum height of five feet; and temperature at which wrestling room is kept.
3. Where schools without a special wrestling room practiced.
4. Number of schools with vinyl and covered mats.
5. Number of schools with safety mats around regular mats.
6. Frequency with which mats are cleaned.

7. Number of schools that require wrestlers to wear ear guards.
8. Number of schools that require a physical examination before the beginning of the wrestling season.
9. Amount of time allotted for practice.
10. Amount of time allotted for warming up.
11. Number of meets per year.
12. Number of tournaments per year.
13. Number of wrestlers per squad.
14. Number of years of coaching experience.
15. Number of coaches who wrestled in high school and/or college.

INFORMATION CONCERNED SPECIFICALLY WITH INJURIES

1. Part of body injured.
2. Types of injuries.
3. Causes of the injuries.
4. Injuries by weight class.
5. Injuries by wrestling experience.
6. Injury occurrence by activity--practice or match.
7. Injury occurrence by period in match.
8. Position from which injury occurred.
9. Type of mat on which injury occurred.
10. Injuries related to previous injuries.
11. Injuries treated by a doctor.
12. Injuries by coach's experience.
13. Injuries by coach's wrestling experience.

## CHAPTER IV

### PRESENTATION OF DATA AND RESULTS

During the 1965-66 wrestling season, 49 schools in the state of Missouri reported 289 injuries. These schools had a total of 2032 students participating in wrestling. Approximately one injury occurred for every seven participants. The number of injuries that occurred per 100 participants was 13.73 and the severity index was 7.43.

#### GENERAL INFORMATION

Eleven or 22.44% of the coaches reported that their wrestling team had the services of a physician and only 4 or 8.16% of the coaches reported that their team physician attended all home meets.

TABLE I

TEAM PHYSICIAN

<u>No team physician</u>	<u>Team physician</u>	<u>At most home meets</u>	
		<u>Yes</u>	<u>No</u>
38	11	4	7

Table II refers to the number and type of team trainers employed by the schools.

TABLE II  
TEAM TRAINER

<u>No team trainer</u>	<u>Team trainer</u>	<u>Student trainer</u>	<u>Coach trainer</u>
28	21	10	11

Table III shows the type of wrestling area used by each team; Table IV shows the temperature of the special wrestling rooms; and Table V shows the wrestling rooms which were padded to a minimum height of five feet.

TABLE III  
TYPE OF WRESTLING AREA

<u>Wrestling Rm</u>	<u>Stage</u>	<u>Gym</u>	<u>Cafe</u>	<u>Lobby</u>	<u>Class Rm</u>	<u>Weight Rm</u>	<u>Dressing Rm</u>	<u>Hall</u>
26	9	5	3	2	1	1	1	1

TABLE IV  
TEMPERATURE OF WRESTLING ROOMS\*

<u>Temperature</u>	<u>Number of schools</u>
65	1
70	5
72	2
75	8

\*These tables pertain only to schools with a special wrestling room.

## TEMPERATURE OF WRESTLING ROOMS\* (continued)

<u>Temperature</u>	<u>Number of schools</u>
80	5
85	4
88	1
<hr/>	
Average temperature: 76.4	

TABLE V

SPECIAL WRESTLING ROOM PADDED TO A MINIMUM HEIGHT OF 5 FEET\*

<u>Yes</u>	<u>No</u>
2	24

Table VI refers to the type of mat used; Table VII shows the number of schools which use safety mats; and Table VIII shows the frequency of mat cleaning and disinfecting.

TABLE VI

TYPE OF MAT USED

<u>Vinyl</u>	<u>Covered</u>
17	32

\*These tables pertain only to schools with a special wrestling room.

TABLE VII  
USE OF SAFETY MATS

<u>Yes</u>	<u>No</u>
37	12

TABLE VIII  
FREQUENCY OF MAT CLEANING AND DISINFECTING

<u>Everyday</u>	<u>Three times per week</u>	<u>Twice a week</u>	<u>Once a week</u>
8	4	15	16

Table IX shows the number of schools requiring the use of ear guards and Table X shows the number of schools that require a physical examination before the beginning of the season.

TABLE IX  
REQUIRED USE OF EAR GUARDS

<u>Yes</u>	<u>No</u>
2	47

TABLE X

REQUIRED PHYSICAL EXAMINATION BEFORE THE BEGINNING OF THE SEASON

<u>Yes</u>	<u>No</u>
44	5

The minimum time allotted for practice was 60 minutes, the maximum time allotted was 180 minutes, and the average time allotted for practice was 114.6 minutes.

TABLE XI

TIME ALLOTMENT FOR PRACTICE

<u>Number of minutes</u>	<u>Number of schools</u>
60	2
75	2
80	1
90	9
95	1
105	3
120	21
135	2
150	6
180	2

Average time allotted for practice: 114.6 minutes

The most time any coach allotted for warming up was 60 minutes, the least time allotted was 10 minutes, and the average time allotted was 17.4 minutes.

TABLE XII

TIME ALLOTTED FOR WARMING UP

<u>Number of minutes</u>	<u>Number of schools</u>
10	6
12	1
15	17
20	8
25	2
30	11
40	1
45	2
60	1

Average time allotted for warming up: 17.4 minutes

The fewest number of meets in which a team participated was eight, the most meets in which a team participated was 20, and the average number of meets participated in was 13.34.

TABLE XIII

NUMBER OF MEETS

<u>Number of meets</u>	<u>Number of schools</u>
8	4
9	2
10	2
11	3
12	7
13	4
14	6
15	9
16	5
17	4
19	1
20	1

Average number of meets: 13.34 per season



The most tournaments in which a team participated was 7, the fewest was 2, and the average was 3.3.

TABLE XIV  
NUMBER OF TOURNAMENTS

<u>Number of tournaments</u>	<u>Number of schools</u>
2	19
3	10
4	12
5	4
6	2
7	2

Average number of tournaments: 3.3 per season

There were 2032 wrestlers on the 49 teams involved in the study. The smallest team consisted of 18 wrestlers, the largest team had 70 wrestlers, and the average number of wrestlers per team was 41.46.

TABLE XV  
WRESTLERS PER SQUAD

<u>Number of Wrestlers</u>	<u>Number of schools</u>
18	2
20	1
22	1
23	1
26	1
28	2
30	2
32	2
33	1
34	1
35	1
36	3
40	9
42	3
45	6

## WRESTLERS PER SQUAD (continued)

<u>Number of wrestlers</u>	<u>Number of schools</u>
46	1
50	2
55	1
60	7
66	1
70	1

Average number of wrestlers per squad: 41.66

One coach had 22 years of experience which was the greatest number of years, and 8 coaches had only 1 year of experience. The average number of years coaching experience was 5.1 years.

TABLE XVI

COACHING EXPERIENCE

<u>Number of years</u>	<u>Number of coaches</u>
1	8
2	5
3	7
4	5
5	7
6	5
7	1
8	3
9	2
10	2
12	2
13	1
22	1

Average number of years coaching experience: 5.1

Only 10 of the coaches reported that they had wrestled in both college and high school. Seven coaches wrestled in college only, 9 in

high school only, and 23 of the coaches had no wrestling experience.

TABLE XVII

COACH'S WRESTLING EXPERIENCE

Wrestled in:

<u>High school and college</u>	<u>College only</u>	<u>High school only</u>	<u>None</u>
10	7	9	23

## INFORMATION CONCERNING INJURIES

The greatest number of injuries was sustained by wrestlers in the 133 lb. weight class. There were 33 injuries which is 11.4% of the total injuries. The fewest number of injuries occurred in the 95 lb. weight class; there were 8 injuries or 2.72% of the total injuries. The greatest number of days lost due to injuries occurred in the 133 lb. and in the 180 lb. classes. Both weight classes lost a total of 225 days due to injuries. The most severe injuries occurred in the heavyweight class. The severity index was 8.58.

TABLE XVIII

INJURIES BY WEIGHT CLASS

<u>Weight Class</u>	<u>Number of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
95	8	2.72	44	2.42	5.50	.39
103	15	5.21	93	4.25	6.20	.73
112	25	8.85	178	8.25	7.12	1.23
120	28	9.67	204	9.45	7.29	1.34
127	26	8.98	207	9.59	7.96	1.23
133	33	11.40	225	10.43	6.83	1.62

## INJURIES BY WEIGHT CLASS (continued)

<u>Weight Class</u>	<u>Number of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
138	26	8.98	223	10.34	8.57	1.23
145	23	7.93	178	8.25	7.74	1.13
154	23	7.93	184	8.53	8.00	1.13
165	30	10.36	183	8.51	6.10	1.47
180	28	9.67	225	10.43	8.04	1.34
Hyv	24	8.30	206	9.55	8.58	1.16
<b>Totals</b>	<b>289</b>	<b>100 %</b>	<b>2150</b>	<b>100 %</b>		

The greatest number of injuries occurred to wrestlers having one year of experience. They received 118 injuries or 40.84% of the total number of injuries. The fewest number of injuries occurred to wrestlers having 5 or 6 years of experience. They received only two injuries. The greatest number of days lost due to injuries, 1009 days, were to wrestlers with one year of experience. The severity index was also the highest for wrestlers with one year of experience. It was 8.47.

TABLE XIX

INJURIES BY WRESTLING EXPERIENCE

<u>Years of Experience</u>	<u>Number of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
1	118	40.84	1009	46.97	8.47	5.80
2	73	25.25	500	23.26	6.85	3.59
3	65	22.49	476	22.26	7.32	3.19
4	29	10.04	143	6.65	4.93	1.42
5	2	.69	10	.47	5.00	.09
6	2	.69	12	.56	6.00	.09
<b>Totals</b>	<b>289</b>	<b>100 %</b>	<b>2150</b>	<b>100 %</b>		

Most of the injuries that occurred were not related to previous injuries. Only 49 or 16.96% of the injuries were associated with previous injuries. Eight hundred sixty-eight days were lost due to new injuries. This was the greatest number of days lost. The severity index was higher for new injuries (7.78) as compared to related-to injuries with a severity index of 5.71.

TABLE XX

INJURIES RELATED TO PREVIOUS INJURIES

	<u>Number of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>Related Injuries</u>	49	16.96	282	13.11	5.71	2.41
<u>Not Related</u>	240	83.04	1868	86.89	7.78	11.76
<u>Totals</u>	289	100 %	2150	100 %		

Two hundred twenty-nine injuries or 79.24% of the injuries resulted in treatment by a doctor. These injuries accounted for 2006 of the total days lost. The severity index for the injuries treated by a doctor was 8.75. Only 60 injuries or 20.76% of the total injuries were not treated by a doctor. One hundred forty-four days were lost as a result of these injuries and their severity index was 2.73.

TABLE XXI

INJURIES TREATED BY A DOCTOR

	<u>Number of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>Injuries Treated</u>	229	79.24	2006	93.30	8.75	11.26
<u>Not treated</u>	60	20.76	144	6.70	2.73	2.93
<u>Totals</u>	<u>289</u>	<u>100 %</u>	<u>2150</u>	<u>100 %</u>		

The greatest number of injuries occurred in practice, 179 injuries; the most days lost, 1434, were from injuries sustained in practice; and the severity index was the greatest for injuries suffered in practice, 8.01.

TABLE XXII

INJURY OCCURRENCE BY ACTIVITY

<u>Activity</u>	<u>Number of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>Match</u>	110	38.06	716	33.30	6.50	5.41
<u>Practice</u>	179	61.94	1434	66.70	8.01	8.80
<u>Totals</u>	<u>289</u>	<u>100 %</u>	<u>2150</u>	<u>100 %</u>		

Of the 110 injuries that occurred in a match, 31 occurred in the first period, 41 in the second period, 37 in the third period, and 1 occurred in an overtime period. The greatest number of injuries occurred in the second period and the greatest number of days lost were due to injuries which occurred in the second period; however, those which occurred in the first period tended to be more serious, having a severity index of 7.45.

TABLE XXIII

INJURY OCCURRENCE BY PERIOD

<u>Period</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>First</u>	31	28.19	232	32.40	7.45	1.55
<u>Second</u>	41	37.28	287	40.08	7.00	2.01
<u>Third</u>	37	33.63	191	26.69	5.16	1.80
<u>Over-Time</u>	1	.90	6	.83	6.00	.05
<u>Totals</u>	100	100 %	716	100 %		

One hundred thirty-seven injuries or 47.4% of the total injuries occurred while the wrestler was on the bottom position. Although, fewer injuries occurred while the wrestler was on his feet than in the bottom position, the injuries that did occur while the wrestler was on his feet tended to be more serious. They resulted in the most days lost, 972. The severity index was 9.25 for injuries sustained while the wrestler was on his feet as compared to 4.82 when on the top position and 6.94 when on the bottom position.

TABLE XXIV

POSITION FROM WHICH INJURY OCCURRED

<u>Position</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>On Feet</u>	105	36.33	972	45.22	9.25	5.16
<u>On Top</u>	47	16.27	227	10.56	4.82	2.31
<u>On Bottom</u>	137	47.40	951	44.22	6.94	6.74
<u>Totals</u>	289	100 %	2150	100 %		

Most of the injuries, 187 or 64.71% of the injuries occurred on covered mats; and the most days lost, 1364 or 63.44% of the total days lost were the result of injuries which occurred on covered mats. However, the injuries which occurred on the vinyl mats tended to be more serious having a severity index of 7.7.

TABLE XIV  
TYPE OF MAT ON WHICH INJURY OCCURRED

<u>Mat</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>Vinyl</u>	102	35.29	786	36.56	7.70	5.01
<u>Covered</u>	187	64.71	1364	63.44	7.29	9.20
<u>Totals</u>	289	100 %	2150	100 %		

The greatest number of injuries occurred to the ear. There were 50 injuries to the ear reported. This is 17.4% of the total injuries. The shoulder, ankle, and knee, respectively, received the second, third, and fourth greatest number of injuries. Injuries to the shoulder resulted in the most days lost. There were 349 days lost or 16.24% of the total days lost. Although only 9 injuries to the sternum were reported, they tended to be the most serious with a severity index of 15.33.



TABLE XXVI

PART OF THE BODY INJURED

<u>Part Of The Body</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
Head	11	3.80	73	3.40	6.63	.54
Ear	50	17.40	161	7.49	3.22	2.46
Nose	2	.69	6	.27	3.00	2.09
Face	3	1.03	6	.27	2.00	.14
Teeth	6	2.07	31	1.44	5.16	.29
Neck	10	3.46	62	2.84	6.20	.49
Back	24	8.36	231	10.74	9.62	1.18
Shoulder	31	10.82	349	16.24	11.25	1.52
Upper Arm	4	1.38	9	.44	2.25	.19
Lower Arm	0	.00	0	.00	.00	.00
Elbow	21	7.26	210	9.74	10.00	1.03
Wrist	14	4.48	158	7.34	11.28	.68
Hand	7	2.42	11	.54	1.57	.34
Finger	18	6.22	98	4.54	5.44	.88
Ribs	15	5.19	131	6.09	8.73	.73
Sternum	9	3.11	138	6.44	15.33	.44
Abdomen	1	.34	1	.04	1.00	.04
Hip	2	.69	8	.39	4.00	.09
Thigh	0	.00	0	.00	.00	.00
Knee	27	9.44	188	8.74	6.96	1.32
Lower Leg	0	.00	0	.00	.00	.00
Ankle	28	9.78	250	11.64	8.93	1.37
Foot	0	.00	0	.00	.00	.00
Toes	1	.34	4	.19	4.00	.04
Groin	4	1.38	10	.49	2.50	.19
Lung	1	.34	15	.69	15.00	.04
Totals	289	100 %	2150	100 %		

The injury that occurred most frequently was a sprain. Eighty-seven sprains or 30.11% of the total number of injuries were sprains. No other type of injury occurred nearly as often. There were 47 cauliflowerers, 43 strains, 35 fractures and 29 dislocations reported. Sprains were also responsible for the greatest number of days lost. They accounted for 578 days lost. Dislocations were the most severe injuries reported; the severity index was 15.72. Fractures usually are more serious or just as serious as dislocations; however, most of the

fractures reported were to the fingers. This type of fracture caused the wrestlers to miss only 4 or 5 days of practice. Thus, the severity index was lower. Two other types of injuries were reported that were more severe than fractures and dislocations. These were infections with a 35.0 severity index and collapsed lung with a 15.0 severity index. Because of their infrequent occurrence, only one injury of each type, the investigator did not classify them as being most severe.

TABLE XXVII

TYPE OF INJURY

<u>Type</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
Fracture	35	12.12	356	16.56	10.17	1.72
Sprain	87	30.11	578	26.89	6.64	4.28
Strain	43	14.88	288	13.40	6.72	2.12
Bruise	20	6.92	118	5.49	5.90	.98
Abrasion	4	1.38	16	.74	4.00	.19
Cut	5	.69	8	.39	4.00	.09
Laceration	5	1.73	35	1.63	7.00	.24
Cauliflower	47	16.27	149	6.94	3.17	2.31
Dislocation	29	10.04	456	21.20	15.72	1.42
Infection	1	.34	35	1.62	35.00	.04
Chipped Teeth	6	2.07	29	1.34	4.83	.29
Collapsed Lung	1	.34	15	.69	15.00	.04
Not Specified	9	3.11	67	3.11	7.44	.44
<b>Totals</b>	<b>289</b>	<b>100 %</b>	<b>2150</b>	<b>100 %</b>		

Poor conditioning and poor facilities were listed most often by the coaches as the cause of injuries. Both contributed to 48 or 16.55% of the total number of injuries. The most days lost were due to overcrowded wrestling areas. Injuries due to inexperience tended to be the

most serious with a severity index of 17.75.

When the injuries were classified by the investigator (see Table XXVIII), poor leadership resulted in the most injuries. These numbered 124 or 42.98% of the total number of injuries. The most days lost resulted from poor facilities and equipment. The injuries in the category of nature of the activity were the most serious. They had a severity index of 10.53.

TABLE XXVIII  
CAUSES OF INJURIES

<u>Causes</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>Poor Leadership</u>						
Poor Conditioning	49	16.89	339	15.81	7.10	2.31
Miss Match*	1	.34	1	.04	1.00	.04
Not Warmed Up	12	4.18	132	6.06	11.00	.59
Not Strong Enough	8	2.77	53	2.46	6.62	.39
Horse Play	7	2.44	118	5.54	16.85	.34
Not Wearing Ear Guards	43	14.92	123	5.80	2.86	2.12
Not Wearing Knee Pads	5	1.78	18	.83	3.60	.24
<b>Total</b>	<b>123</b>	<b>43.32</b>	<b>784</b>	<b>35.07</b>	<b>36.54</b>	<b>6.10</b>
<u>Illegal Hold</u>						
	15	5.26	47	2.13	3.13	.73
<u>Incompetent Officiating</u>						
	5	1.78	27	1.23	5.40	.24

\*A 133 lb. class wrestler was injured while wrestling against a boy in the heavyweight class.

## CAUSES OF INJURIES (continued)

<u>Causes</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
<u>Old Injury</u>	6	2.12	84	3.90	14.33	.29
<u>Nature Of Activity</u>						
Legal Hold	16	5.58	116	5.33	7.35	.78
Nature Of The Game	14	4.53	142	6.60	10.14	.68
Inexperience	8	2.77	142	6.60	17.75	.39
Total	38	12.88	400	18.53	10.53	1.86
<u>Facilities and Equipment</u>						
Poor Facilities	47	11	342	15.94	7.22	2.31
Faulty Mat	7	2.47	79	3.64	11.28	.34
Overcrowded Wrestling Area	46	15.96	387	18.09	8.41	2.26
Total	100	34.64	808	37.67	8.00	4.90
Total	289	100.00	2150	100.00		

Coaches with three years experience had the most injuries occur to their teams, forty-six injuries or 15.98% of the total injuries. The most days lost, 374 days, occurred to teams whose coach had only one year of experience. The severity index was highest for the one coach with seven years experience. The severity index was 12.00. It was followed by coaches with six years of experience, two years, one year, and eight years in that order. Their severity indexes were 9.38, 8.77, 8.50, and 7.21 respectively.

TABLE XXIX  
INJURIES BY COACHING EXPERIENCE

<u>Years Of Experience</u>	<u>Number Of Coaches</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
1	8	44	15.34	374	17.49	8.50	2.16
2	5	36	12.59	316	14.79	8.77	1.77
3	7	46	15.98	314	14.71	6.82	2.21
4	5	30	10.56	208	9.68	6.93	1.47
5	7	45	15.94	293	13.26	6.51	2.21
6	5	26	8.99	244	11.43	9.38	1.32
7	1	3	1.04	36	1.67	12.00	.14
8	3	14	4.48	101	4.69	7.21	.68
9	2	11	3.14	63	2.93	5.72	.54
10	2	27	9.52	171	7.96	6.33	1.32
12	2	5	1.73	18	.83	3.60	.24
13	1	0	.00	0	.00	.00	.00
22	1	2	.69	12	.56	6.00	.09
<b>Total</b>	<b>49</b>	<b>289</b>	<b>100 %</b>	<b>2150</b>	<b>100 %</b>		

The greatest number of injuries, 138 or 47.63% of the total injuries, occurred to wrestling teams whose coaches had no wrestling experience. Those teams also lost more days, 1146; and had the highest severity index, 8.30.

TABLE XXX  
INJURIES BY COACH'S WRESTLING EXPERIENCE

<u>Experience</u>	<u>Number Of Coaches</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
High School and College	10	75	25.95	561	26.09	7.84	3.69
High School Only	9	43	14.92	283	13.16	6.58	2.12

## INJURIES BY COACH'S WRESTLING EXPERIENCE (continued)

<u>Experi- ence</u>	<u>Number Of Coaches</u>	<u>Number Of Injuries</u>	<u>Percentage Of Total Injuries</u>	<u>Days Lost</u>	<u>Percentage Of Total Days Lost</u>	<u>Severity Index</u>	<u>Injuries Per 100 Wrestlers</u>
College Only	7	33	11.40	160	7.44	4.84	1.62
None	23	138	47.63	1146	53.31	8.30	6.78
<b>Total</b>	<b>49</b>	<b>289</b>	<b>100 %</b>	<b>2150</b>	<b>100 %</b>		

## RESULTS

1. Eleven or 22.44% of the coaches reported that their team had the services of a team physician.
2. Twenty-one or 42.85% of the coaches indicated that a team trainer was available for use by their wrestling team.
3. A variety of wrestling areas was reported, however, 26 or 53.06% of the coaches indicated having a special wrestling room for practice.
4. Only two of these coaches indicated that the wrestling room was padded to a minimum height of 5 feet.
5. The average temperature of the wrestling rooms was 76.4.
6. Only 17 teams used vinyl mats.
7. Thirty-seven teams used safety mats.
8. Eight coaches reported having their mats cleaned and disinfected everyday.
9. Two coaches required the use of ear guards.
10. Forty-four coaches required a physical examination before the beginning of the season.
11. The average time allotted for practice was 111.6 minutes.
12. The average time allotted for warming up was 17.4 minutes.
13. The average number of meets was 13.34 per season.
14. The average number of tournaments was 3.3 per season.
15. There was an average of 41.46 wrestlers per squad.

16. The average number of years coaching experience was 5.1.
17. Only ten coaches reported having wrestled in high school and college.
18. The 133 lb. class received the most injuries.
19. Wrestlers with one year of experience received the most injuries.
20. Most injuries were not related to old injuries.
21. Seventy-nine percent of the injuries were treated by a doctor.
22. The greatest number of injuries occurred in practice.
23. When injuries occurred in a match, most occurred in the second period.
24. Most injuries occurred on a covered mat.
25. Most injuries occurred while the wrestler was on the bottom position.
26. The ear was the part of the body receiving the most injuries.
27. The injury that occurred the most frequently was the strain.
28. Poor conditioning and poor facilities were listed most often by the coaches as the cause of injury.
29. When the causes were classified by the writer, poor leadership resulted in the most injuries.
30. Coaches with three years of experience had the most injuries occur to their team.
31. The greatest number of injuries occurred to wrestling teams whose coaches had no wrestling experience.

## CHAPTER V

### DISCUSSION OF RESULTS

The data presented shows that the group of weight classes, 133 lbs., 145 lbs., and 154 lbs. received the most injuries. This might be explained by the fact that most boys on high school wrestling teams are in one of these three weight classes. The data also shows that the 95 lb. and 103 lb. weight classes received the fewest injuries. This might be explained by the fact that there normally are fewer boys in these weight classes in high school.

Most of the injuries occurred in practice as opposed to a regular match. This can possibly be explained by the fact that the average time allotted for practice was 111.6 minutes. Therefore, each boy wrestled about 6 minutes (the length of a high school match) per week in a match and about 446.4 minutes per week in practice. The greater amount of time spent wrestling in practice could be the reason most injuries occurred in practice.

The most severe injuries occurred in the first period of a match. When one considers this fact, he must also consider that the coaches involved in the study frequently listed "not being warmed up enough" as a cause of injury. Not being warmed up properly might possibly explain why the most severe injuries occurred in the first two minutes of the match.



When injuries were considered by position, the data revealed that the most severe injuries occurred while the wrestler was on his feet in the takedown position. The idea of the takedown is to bring one's opponent to the mat and control him. The fall to the mat during the takedown might possibly explain why the most severe injuries occurred while the wrestler was on his feet.

The type of body part receiving the most injuries was the joint. Wrestling is a sport which requires the use of leverage in many situations. This might account for the joints receiving the most injuries.

Only one infection was reported by the coaches. This is in direct contrast to studies made by Konrad<sup>1</sup> and Gallagher and Perry<sup>2</sup> in 1951. They indicated through these studies that infections accounted for a large number of injuries. The reason for the decline in the number of infections reported might possibly be that more sanitary conditions now prevail. All of the coaches in the study indicated that their mats were cleaned and disinfected at least twice a week.

When the causes of the injuries were classified by the writer, poor leadership was the cause of the most injuries. The causes of injuries listed by the coaches that the writer classified as poor leadership were: miss match, not warmed up enough, not strong enough, horse play, and not wearing ear guards or knee pads. It is the writer's opinion that these causes were the direct responsibility of the coaches; therefore, these causes were classified under one major heading of poor leadership.

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<sup>1</sup>Konrad, loc. cit.

<sup>2</sup>Gallagher and Perry, loc. cit.

## CHAPTER VI

### SUMMARY, CONCLUSIONS, RECOMMENDATIONS

#### SUMMARY

A study of interscholastic wrestling injuries in the state of Missouri during the 1965-66 season was made in order to determine: (1) the extent of wrestling injuries; (2) the causes of these injuries; and (3) to make suggestions for the purpose of reducing the number of injuries in the future.

The questionnaire technique was utilized to gather the data for the study. Two thousand thirty-two wrestlers representing forty-nine high schools were involved in the study.

Two areas of concern were covered by the questionnaire. They were general information about the school, coach, and participant and information specifically concerned with wrestling injuries.

Two hundred eighty-nine injuries and 2150 days lost were reported. Approximately one injury occurred for every seven participants. The severity index was 7.43 and the number of injuries that occurred per 100 participants was 13.73.

#### CONCLUSIONS

The following conclusions may be projected:

1. The equipment, facilities, and the conditions under which the wrestlers participated were poor in most schools involved in the study.

2. All the weight classes were about equally susceptible to injury.
3. Wrestlers with one year of experience were most likely to receive injuries and with each year of experience fewer injuries occurred. However, the injuries that did occur at any level of experience had about the same severity index.
4. Most of the injuries that occurred were not related to previous injuries.
5. The most severe injuries were treated by a doctor.
6. The majority of injuries occurred in practice and these injuries tended to be more severe than injuries incurred during a match.
7. Injuries were fairly equally distributed among all three periods.
8. More injuries occurred while the wrestler was on the bottom position, however, the most severe injuries occurred from the takedown position.
9. Only 35.20% of the total number of injuries occurred on vinyl mats, however, it can not be assumed that when vinyl mats are used fewer injuries occur because only 34.60% of the coaches reported using vinyl mats. It can be concluded that the type of mat used had no affect on the number of injuries that might occur.
10. The ear was the specific part of the body most susceptible to injury; however, a further analysis of the data reveals that the joints of the body were the general part of the body most susceptible to injury.
11. The injury that occurred most was the strain.
12. Poor leadership, as classified by the writer was the cause of the most injuries. Within this classification, poor conditioning was the individual cause of most injuries.
13. The number of years of coaching experience and the coach's wrestling experience (if any) had no affect on the number of injuries that occurred.

#### RECOMMENDATIONS

The writer recommends that:

1. An evaluation of the existing facilities and equipment be made for the purpose of improvement.
2. An inservice training program such as a wrestling workshop for

coaches be established for the purpose of improving the quality of leadership.

3. More studies of this nature be conducted in order to gain a better insight into the causes of wrestling injuries.

**APPENDIX**

February 9, 1966

Dear Wrestling Coach:

I am a graduate assistant at Eastern Illinois University. I am quite interested in wrestling, especially in Missouri, since I wrestled in high school and college in Missouri. As a Master's thesis, I am considering making a study of wrestling injuries - their occurrence and causes.

Do you think a study of this nature has merit? If so, would you be willing to answer a short questionnaire? It will be a great help to me if you will check "yes" or "no" on the enclosed post card and drop it in the mail.

Your reply will be greatly appreciated, and thank you for your time and interest.

Very truly yours,

Glenn J. Acksel

Enclosure  
GJA:ag

I think that a study of this nature has some merit.

YES \_\_\_\_\_ NO \_\_\_\_\_

I would be willing to answer a short questionnaire.

YES \_\_\_\_\_ NO \_\_\_\_\_

Coach \_\_\_\_\_

High School \_\_\_\_\_

March 19, 1966

Dear Coach:

Thank you for the prompt reply concerning the worth of my study on wrestling injuries and for your willingness to answer a short questionnaire.

I am enclosing a wrestling injury questionnaire, an explanation page, and a stamped addressed envelope. At your earliest convenience would you please fill out the questionnaire and return it to me.

Without your help this study will not be a success. Your time and effort will be greatly appreciated. At the completion of the study, I will send you a summary of the results.

Thank you very much.

Very truly yours,

Glenn J. Acksel

Enclosure









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VITA

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The writer was born in St. Louis, Missouri, on March 19, 1943. He attended St. Anthony Elementary School in St. Louis and Riverview Gardens High School in St. Louis County. While in high school he earned varsity awards in football, wrestling, and track. The writer received the Degree of Bachelor of Science in Education, with a major in physical education and a minor in sociology, from Northwest Missouri State College, Maryville in May, 1965. He earned varsity awards in football and wrestling. In 1965, he received a graduate assistantship from Eastern Illinois University, Charleston, where he assisted with varsity wrestling and intramurals, and taught a basic physical education class. There he received the Degree of Master of Science in Education in August, 1966.