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A Survey of Percentage of Weight Loss in the Weight Classes and Chronological age Groups of Selected North Dakota High School Wrestlers

Edil R. Bodard

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A SURVEY OF PERCENTAGE OF WEIGHT LOSS IN THE WEIGHT CLASSES
AND CHRONOLOGICAL AGE GROUPS OF SELECTED NORTH DAKOTA
HIGH SCHOOL WRESTLERS

by

Earl R. Bedard

Bachelor of Science

Mayville State College, Mayville, N. D., 1965

A Thesis

Submitted to the Faculty

of the

Graduate School

of the

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Master of Science

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1967

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This thesis submitted by Emil R. Bedard in partial fulfillment of the requirements for the Degree of Master of Science in the University of North Dakota is hereby approved by the Committee under whom the work has been done.

W. C. Koenig
Chairman

Stewart Jones

Ellis M. Galt

Christopher G. Hamme
Dean of the Graduate School

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ABSTRACT

The purpose of this investigation was to determine the percentage of weight loss in comparison to the chronological age of all boys participating in high school wrestling in the state of North Dakota during the school year 1966-67. The writer also attempted to prove that the average weight loss of all wrestlers would not exceed 10 per cent of the normal body weight.

The survey method was employed in this study. Questionnaires were sent to the 63 high schools in North Dakota which have participants in wrestling. Thirty-four of the 63 questionnaires were returned for a total return of 53.9 per cent.

The results of the study were based upon a total of 447 high school wrestlers from the 34 North Dakota schools. The data was analyzed on the bases of: number of subjects in each weight class, mean chronological age and mean percentage of weight loss in these weight divisions. The mean percentage of weight loss for this entire group was 5.91 per cent of the subjects' body weight. The mean chronological age of the subjects was sixteen years and one and one-half months. The number of wrestlers that exceeded the maximum recommended 10 per cent body weight loss was 51. This constituted 11.4 per cent of the entire group of subjects.

On the bases of the findings of this study, it was concluded

that the percentage of weight loss is not directly influenced by the chronological age of the wrestler. It was also concluded that the percentage of weight loss varied from one school to another. The final conclusion was that: a coach rarely has justification in his recommending that the weight of maturing boys be reduced beyond the 10 per cent limits, unless it can be proven that the normal growth and development of these young men are not hindered.

CHAPTER I

INTRODUCTION

Since the early history of wrestling, much thought and concern has been given to the subject of weight control and weight reduction. As the popularity of the sport of wrestling has increased so has one of the major problems, that being weight reduction. The principle danger arises when, at the insistence of an adult or of his own volition, a boy attempts to starve himself temporarily to reduce his body weight. Drastic weight reduction measures have been found to result in jaundice, malfunction of the liver, and acute pancreatitis. Young boys, who may be potential diabetics, can develop clinical diabetes from starvation or crash diets. For this reason the sport of high school wrestling is often highly criticized.¹

Statement of the Problem

The purpose of this study was to determine the percentage of weight loss in comparison to the chronological age of all wrestlers participating in high school wrestling in the state of North Dakota. The writer also attempted to prove that the average weight loss of all wrestlers would not exceed 10 per cent of the normal body weight. This is the percentage of weight loss that the modern day experts,

¹W. D. Paul, MD, "Crash Diet and Wrestling," Journal of the Iowa Medical Society, (August 1966), 3.

on high school wrestling, feel that a boy can lose without doing physical harm to his body.

Need for the Study

The amount of criticism directed at the sport of wrestling seems to center on the particular area of weight reduction. The writer hoped this study would aid high school coaches gain insight into this problem.

The writer felt that little information was available concerning the percentage of weight loss in selected wrestlers on the basis of chronological age. By employing the results of this study the author attempted to determine in which weight class and age group the greatest and smallest percentage of weight reductions took place.

Definition of Terms

- Weight reduction - the loss of body weight through the decrease of the caloric intake, dehydration, and strenuous physical workouts.
- Weight classes - are used to classify wrestlers according to their body weight. In North Dakota high school wrestling there are twelve of these classes. The divisions are 95, 103, 112, 120, 127, 133, 138, 145, 154, 165, 180 pounds and the unlimited or heavyweight weight class.
- Heavyweight class - is the classification by body weight of all high school wrestlers weighing over 180 pounds to an unlimited weight.

Chronological age

- This represents the age of an individual in calendar years and months.

Certification date

- The date set by the North Dakota High School Activities Association. At this time all high school wrestlers must have their weight and the respective weight class, in which they will wrestle, on record in Valley City, North Dakota. The deadline for this certification was December 16, 1966.

North Dakota High School Activities Association - The governing body in North Dakota which regulates inter-scholastic competition in all activities. For the remainder of the paper the letters NDHSAA will stand for North Dakota High School Activities Association.

Dehydration

- is the process of removing water from the body, usually achieved in wrestling by strenuous physical workouts or dieting.

Delimitations of the Study

The data were limited to the members of teams participating in the sport of wrestling on the high school level in North Dakota. This study was based upon the material collected on the subjects from the beginning of the school year to the date of weight certification, which was December 16, 1966. These data were concerned with the wrestlers in the first eleven weight classes, with the exclusion of the heavyweight class. The writer felt that there would be

insufficient information to collect on the heavyweights because they are not limited to weight gained or lost.

Survey of Related Literature

The amount of literature directly related to the sport of wrestling in connection with the topic selected by the writer is somewhat limited. However, some research has been carried on in the field of weight reduction and dieting. An attempt was made to gather as much material as possible related to the topic of the study.

The study by Vincent Gonino² was conducted to determine various methods and the frequency used by high school coaches for weight reduction for wrestlers. Wrestlers used several methods for reducing their body weight. This study was of a questionnaire type. Two hundred questionnaires were sent to high school wrestling coaches in the United States to discover their weight reduction methods for squad members. The following table indicates the methods used and their frequency in relationship to the 150 returned questionnaires.

<u>Methods of Weight Reduction</u>	<u>Frequency</u>
Physical workouts	142
Dieting	123
Dehydration	52
Heat devices	21
Other	8

Some of the other important conclusions which resulted from this study were:

²Vincent Gonino, The Coaching Clinic (Englewood Cliffs, New Jersey: Prentice Hall Inc., 1966), pp. 29-32.

1. A wrestler may safely lose from 5 to 10 per cent of his body weight without suffering any ill effects.
2. The coach should only practice weight reduction in terms of each individual's physical make-up.
3. Five factors should be taken into consideration in determining a wrestlers diet:
 - a. Age
 - b. Body build
 - c. Height
 - d. Physical activity
 - e. Type of food

Gonino compared the results of his study with a similar one conducted 25 years ago. He found the methods of losing weight have not changed, only the frequency of their use has changed.

A high school wrestling study made by Elmer Pfaffenberger,³ at San Jose State College, indicated some of his early findings at the high school level were:

	<u>Number</u>	<u>Per cent</u>
1. States sponsoring wrestling in over five schools.	37	74
2. States that do not sponsor wrestling.	10	20
3. States that will sponsor wrestling next season (1965)	2	4
4. States that sponsor wrestling in less than 5 schools.	<u>1</u>	<u>2</u>
Totals	50	100%

³NCAA Wrestling Coaches and Officials Association of Wrestling Committee Newsletter. Volume IV (Omaha Nebraska, March 7, 1964)

With the information received the following summary concerning various types of state weight certification, was made possible:

1. States with administrator certified minimum weight.	11	27.5
2. States with coach controlled minimum weight.	11	27.5
3. States with parent and or M. D. required minimum weight.	8	20
4. States with no minimum weight control rules.	8	20
5. States with sectional rules on minimum weight.	<u>2</u>	<u>5</u>
Totals	50	100%

In correspondence with Mr. Don Rollie⁴, President, North Dakota High School Wrestling Coaches Association, the following information concerning the North Dakota type of minimum weight certification was obtained. In 1961, the high school wrestling coaches association adopted a planned weight program that has worked so well that similar organizations in other states have adopted the same program. This plan was adopted only after a great deal of research was done. Its two basic tenets were:

1. Every wrestler should have a physician's opinion of his maximum weight reducing capability.
2. A wrestler must be certified in a particular weight class by December 15, and may not compete in a lower weight class after that date.

The purpose of the cutoff date was to allow a reducing wrestler to stabilize his weight, and to prevent him from (voluntarily or involuntarily) attempting to reduce to an injurious point.

⁴Letter from Mr. Don Rollie, President, North Dakota High School Wrestling Coaches Association, Valley City, North Dakota, October 14, 1966.

Most of the coaches of the association recommended a maximum weight loss of 10 per cent of the body weight. This depended on musculature and bone structure. A copy of Mr. Kollie's letter is contained in Appendix A.

The study by Brown and Ober,⁵ was based upon experience in the field of coaching wrestling. The feeling was that when wrestlers were properly conditioned, the coach would have to decide in what weight class each would compete. A very simple formula was to put each wrestler in the weight class he qualified for upon reaching good physical condition. If both the coach and the wrestler felt the boy's best interest would be served in a lower weight class, a physician was consulted to determine whether further weight reduction would jeopardize the boy's health.

Brown and Ober felt that, from a weight chart which was posted on a week to week basis, a coach could judge just how hard his wrestlers were working, how heavily they were eating, and how the training program he was using affected the wrestler's weight. When the coach glanced over a group of wrestlers, Brown and Ober felt that he would never see two boys who were alike in attitude, personality and mannerisms. This led to the conclusion that each individual boy should be handled in a particular manner.

Weight control and the classification of wrestlers seems to have had genuine problems for a long time. Many high school boys have subjected themselves to continuous and long pre-season and

⁵Robert Brown and Kenneth D. Ober, Complete Book of High School Wrestling (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1962), pp. 23-25.

season dieting. The diet program became especially pronounced for the wrestler who lost a considerable amount of weight before the first weigh-in and then he was required to follow a stringent diet for the remainder of the season.

Freese⁶ conducted an experiment because of the growing concern over the weight problem. This experiment was conducted in the Beaver-ton, Oregon, School District. The purpose of the study was to establish criteria which would allow every boy to compete at his normal weight while following a normal diet. The program involved 223 high school wrestlers.

To begin the program a meeting was held for the parents, wrestlers, team doctors and the coaching staff. The purpose of the meeting was to enable a physician to explain the entire program. Following the program outline, a team of three doctors weighed each boy. Then, using the boy's age, height, and weight, each doctor made a suggestion concerning permissible weight loss. The physicians also pointed out that the recommendation was for each wrestler to experience no weight loss. But, if a boy desired to lose weight, he would be evaluated and a maximum weight loss would be noted for him.

Often times high school wrestlers may undergo weight reduction during the onset of a growth period. This growth period must be taken into careful consideration by coaches in respect to the amount of weight a boy is required to lose. One of the facts supporting this program was that 55 per cent of the boys gained weight during and after the season. Only 12 wrestlers asked at one

⁶Gene Freese, "A New Approach to Weight Control for Wrestling," Athletic Journal, XIII (February, 1965), pp. 10-11.

time or another to be re-evaluated. The coaches also believed that individual performance in several cases were improved by this realistic approach to weight maintenance.

The following comments come from a study by the National Federation of State High School Athletic Associations and the Committee on the Medical Aspects of Sports of the American Medical Association.⁷ The reason for the study stemmed from the misconceptions of body weight in relationship to strength. This misconception, simply stated, was that an athlete who is not overweight can undergo a great weight loss by dieting and dehydration without a noticeable loss in strength.

The study proved that starvation results in dehydration even though water is allowed. Under these conditions created in boys, endurance is decreased, speed deteriorates and hand-eye coordination is impaired. The subjects also complained of fatigue, muscle soreness, and weakness.

Some of the proposals made by the committee concerned with placing wrestlers into appropriate weight classes are listed below:

1. All wrestlers are to be weighed on an unannounced day.
2. Percentage allowance is to be made for additional weight increase during the season.
3. Wrestlers are to be assigned to a weight class which they will keep throughout the entire season.
4. There are to be no further weigh-ins during the season.

⁷John P. Dratz, Manly Johnson, and Terry Citann, Winning Wrestling (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1966), pp. 11-14, 193-194.

5. Wrestlers will not be allowed to make any weight reductions in excess of 5 per cent of the normal body weight.

The necessity of making weight has been a serious handicap to wrestling since the sport made its debut on the high school level.

Dr. H. H. Beard,⁸ of the University of Illinois, conducted a study using twenty possible candidates for the wrestling team. These candidates were examined by a physician. They were weighed four or five times previous to the opening of wrestling season. The Health Department of the school then decided in which weight class each boy would wrestle. Two more examinations during the season made it possible for the Health Department to move a wrestler to a different weight class. This was done if he had too much trouble making the weight class in which he was classified. Due to a boy's growth, he may gain from five to ten pounds during the wrestling season. With this fact in mind, a great amount of damage can be done by trying to make such a boy wrestle at the same weight class for every year.

Dr. Beard formed the following opinions from his study:

1. Permit boys to wrestle without decreasing their strength or lowering their resistance to disease.
2. Allow proper nutrition of the wrestlers at all times during the season.
3. Do much to prevent staleness and over-training.
4. Minimize the risk to health associated with excessive weight reduction.

⁸H. H. Kenny, "The Problem of Weight Making for Wrestling Wrestlers," The Journal of Health and Physical Education, I, (March, 1930), pp. 24-25, 29.

5. Give an opportunity to take into consideration the gain in weight due to the growth of the wrestler.

It was the feeling of Dr. Beard that wrestling coaches could do a great deal of good for their program by the elimination of the unfair advantage of excessive weight reduction. This in turn would help wrestling, as a sport, come much nearer to the attainment of the aims and objectives in the athletic program.

A doctoral study was conducted by Harold Nichols,⁹ Ph. D., now the head wrestling coach at the University of Iowa. From the study it was proven that a wrestler may safely reduce his weight rapidly up to 10 per cent of his body weight without adversely affecting his physiological responses. The conclusion was reached that weight loss, within the limits of the study, did not materially affect: the strength of the wrestlers, slow his reaction time, affect his ability to maintain balance while in motion, adversely affect his endurance, or hinder his ability to develop power.

Another study on weight reduction took place over a period of many years. It was based on the experience of the following three coaches: Clifford P. Keen, Wrestling Coach, University of Michigan; Charles M. Speidel, Wrestling Coach, Pennsylvania State University; and Raymond H. Swarts, Head Coach of Wrestling, United States Naval Academy.¹⁰

⁹Harold Nichols, "Weight Reduction in College Wrestlers" (unpublished Ph. D. dissertation, Dept. of Physical Education, University of Iowa), p. 37.

¹⁰Clifford P. Keen, Charles M. Speidel, and Raymond H. Swarts, Championship Wrestling (Annapolis, Maryland: United States Naval Institute, 1961), pp. 19-21.

From the study a few helpful suggestions were made. A weight chart which shows weight before and after workouts should be kept for each member of the team. The information derived from this chart may be of value in the determination of an individual's weight reduction possibilities. It may also show how hard he has been working, whether he is growing, and what his weight classification should be.

These coaches noted that it was possible for a boy in good physical condition to lose five pounds, and even as much as ten pounds, by dehydration and diet without any serious effect. It was desirable to have the advice and active assistance of competent medical authorities before permitting any great reduction in weight.

The purpose of a study, conducted by James,¹¹ was to determine the effects of weight reduction on high school wrestlers in good physical condition. The bases for testing were the following:

1. Pulse rate.
2. Blood pressure.
3. The performance on the Carlson Fatigue-Curve Test.

Twenty freshmen and varsity wrestlers of Newcastle High School, Newcastle, Wyoming, participated as subjects for the study. The wrestlers ranged in age from 14 to 18 years old.

The wrestlers were divided into two groups. The experimental group consisted of ten wrestlers. Throughout the season they were required to lose weight in order to be able to wrestle in their respective weight classifications. The control group consisted of ten

¹¹Byron Q. James, "The Effect of Weight Reduction on the Physical Condition of High School Wrestlers" (State University of Iowa: unpublished Master's Thesis, 1960), pp. 1-15.

wrestlers who did not have to lose weight in order to make weight.

The Carlsen Fatigue-Curve Test was administered to the subjects twice each week. The test was given during the initial day of practice and immediately after the final practice each week. After each match, which lasted a full six minutes, the subjects were required to report to a registered nurse who obtained the subjects pulse rate and arterial flow.

None of the differences, that were tested, met the requirements for statistical significance. Within the limits of this study there was nothing to indicate that the loss of weight procedures, practiced by the members of the experimental group, affected their physical condition.

Making weight has become one of the most significant problems in the conditioning of high school wrestlers. In a study prepared by Resch and Kroll,¹² a great deal of consideration was given to the problem of weight reduction. When a group of high school wrestlers who lost 4.4 per cent to 6.9 per cent of their body weight were compared to a group that did not have to reduce to make their weight classification, no significant differences were found. The bases for the comparisons were pulse rates, systolic blood pressure, diastolic blood pressure, and scores on the Carlsen Fatigue-Curve Test.

A study was also completed on a group of wrestlers who lost an overall average of 10.29 pounds, or 6.78 per cent, of their body

¹²Phillip J. Resch and Walter Kroll, What Research Tells the Coach About Wrestling (Los Angeles: American Association for Health, Physical Education and Recreation, 1964), pp. 41-47.

weight. The maximum amount lost was 11.11 per cent. This study revealed that weight loss within these limits did not materially affect a wrestler with respect to: the wrestler's strength, his speed in reaction time, body balance when in motion and endurance.

Eppright, Swenson and Iverson¹³ conducted a study of the nutrient intake relationship to body size. The study of the Iowa school children was conducted cooperatively with the Human Nutrition Research Branch of the Agricultural Research Service. A sample of 61 schools was drawn. Within the schools random samples totaling 1200 children were chosen. The ages from 11-15 concerned the wrestler most.

The investigators first plotted weight for height. From this information a measure of body size called "developmental level" was obtained. When the "developmental level" was considered in relation to the chronological age, placement could be made on a scale according to the above three factors. Careful records of the body intake of the individuals were kept.

Some of the important findings of the study were:

1. At the age of 12, body variations were the greatest.
2. Changes, such as food habits, environmental conditions, genetic influences and habits of living, should be considered in terms of food intake.
3. Undernourished children generally had lower daily intake of most nutrients than had the overnourished children.
4. Average sized boys were the only group in which the increase in intake of all nutrients was highly related to the increase in body size throughout the school age.

¹³Erceel S. Eppright, Pearl Swenson, and Carroll A. Iverson, Nutrient Control (Ames Iowa: The Iowa State College Press, 1955), pp. 119-131.

From the review of literature there was evidence that a great deal of work is yet to be done on the problem of weight reduction and weight control. The reduction of weight by restriction of caloric intake and dehydration are areas of severe criticism. The conferees on wrestling agreed that weight reduction was one of the most serious difficulties confronting those interested in the promotion of the sport of wrestling.

To summarize, weight control has confronted the sport of wrestling since its existence. If the sport of wrestling is to continue to grow it is up to the school, parents, coaches, and the community to see that starvation diets are eliminated. If the people most concerned with the sport do not see that weight control is properly taken care of, the wrestling program in their school will suffer or may even die. No sport can exist without interest or backing. Weight reduction can be a healthful part of the wrestling program as long as it is carefully supervised by the coach and parents. If, however dieting is carried to extremes, it can endanger the health of the wrestler. No match or sport is worth this.¹⁴

¹⁴Letter from Dr. F. W. Reichardt, Medical Advisor To The Wisconsin Interscholastic Athletic Association, November 14, 1961.

CHAPTER II

METHODOLOGY

The writer selected North Dakota as the state for this study. One of the reasons was that the sport of wrestling has become very popular throughout the state, both on the high school and the college level. The writer began his coaching career in this state. This was another reason for a very keen interest in the success of high school wrestling in North Dakota.

With the help of Dr. L. Jorgensen and Mr. W. C. Koenig, a questionnaire was constructed which would help the writer obtain the data needed for this study. The questionnaire was constructed and worded so that it could be completed in a very short time. A cover letter and a stamped, self-addressed envelope were also included. This material was sent to all potential respondents on September 1, 1966. A copy of the questionnaire and the follow-up letter are contained in Appendix A.

A complete list of the North Dakota high schools which had participated in wrestling was found in the 1965, November, issue of the North Dakota State High School Activities Association Bulletin.¹⁵ Questionnaires were sent to the wrestling coaches of the 63 schools

¹⁵North Dakota High School Activities Bulletin (November, 1965), p. 6.

listed in the bulletin. Thirty four of the coaches responded to the questionnaire. This gave the author a random sampling of 447 North Dakota high school wrestlers with which to work.

Permission to gather information from the weight certification records was granted by Mr. F. U. Smith, Executive Secretary of the NDNSAA. When permission to study the records had been received, the author went to Valley City, North Dakota. This is the location of the office of NDNSAA.

The data received from the wrestling coaches consisted of the selected wrestler's body weight and chronological age at the beginning of school. The writer compared this information with the weight certification records at Valley City, North Dakota. With the comparison of body weight at the opening of school to the weight on December 16, the certification date, the writer was able to find the amount of weight loss. The percentage of weight loss was determined by dividing the pounds of weight loss by normal body weight.

The data were then analysed and placed in tables and the results were presented in Chapter III.

CHAPTER III

RESULTS

Method of Analysis

Thirty-four North Dakota schools of the 63 to which questionnaires were sent completed and returned the questionnaire. The data from these questionnaires were analyzed statistically to determine whether or not the subjects concerned lost more than 10 per cent of their body weight through drastic weight reduction methods. The percentage of weight loss was determined by dividing the pounds of weight lost by the normal body weight. The normal body weight was defined as the weight of each subject during the first week of the 1966-67 school year. For example, if one of the subjects weighed 110 pounds the first week of school and weighed 103 pounds on the certification date, the percentage of weight loss would be computed as follows: $110 \text{ pounds} - 103 \text{ pounds} = 7 \text{ pounds of weight loss, } 7 \div 110 = 6.36 \text{ per centage of body weight loss.}$

Statistical Procedure

In this study the writer arranged the subjects into the first eleven high school wrestling weight classes, excluding the heavyweight class. These classes are defined as: 95, 103, 112, 120, 127, 133, 136, 145, 154, 165, 180. Each of these eleven groups was evaluated in terms of mean percentage of weight loss, mean chronological age,

and the extremes of weight loss and chronological age, and the number of subjects in each group which exceeded the recommended maximum weight loss of 10 per cent of the body weight. The formula used for determining the mean (expressed as \bar{M}) was obtained from Clarke¹⁶ in his book, Application of Measurement to Health and Physical Education.

$$\bar{M} = \frac{\sum(x)}{N}$$

Complete data for each weight class are presented in Appendix B, page 44.

Analysis of Results

95 Pound Weight Class

The number of subjects in the 95 pound weight class was thirty-one ($N=31$). The mean percentage of weight loss was 3.44 per cent of the subjects' body weight, with the extremes ranging from 1.04 per cent to 13.64 per cent. The mean chronological age was fourteen years four months, with the extremes ranging from 12 years 9 months to 16 years 1 month. In the 95 pound weight class 5 of the 31 subjects exceeded the 10 per cent maximum amount of body weight loss.

103 Pound Weight Class

The number of subjects in the 103 pound weight class was forty-three ($N=43$). The mean percentage of weight loss was 6.23 per cent. The extremes ranged from .96 per cent to 15.57 per cent. The mean chronological age of each of the subjects was fifteen years six months.

¹⁶H. Harrison Clarke, Application of Measurement to Health and Physical Education (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1965), p. 428.

The extremes ranged from 13 years 4 months to 18 years. In the 103 pound weight class 5 of the 43 subjects exceeded the 10 per cent maximum amount of weight loss.

112 Pound Weight Class

The number of subjects in the 112 pound weight class was forty-eight (N=48). The mean percentage of weight loss was 6.40 per cent of the subjects' body weight. The extremes ranged from .92 per cent to 12.60 per cent. The mean chronological age of the subjects was equal to sixteen years five months. The extremes ranged from 13 years 4 months to 17 years 9 months. Eight of the 48 subjects exceeded the 10 per cent maximum amount of the recommended weight loss.

120 Pound Weight Class

The number of subjects in the 120 pound weight class was fifty-one (N=51). The mean percentage of weight loss was 5.79 per cent of the subjects' body weight. The extremes ranged from .83 per cent to 14.89 per cent. The mean chronological age of the subjects was sixteen years five months. The extremes ranged from 14 years 10 months to 17 years 9 months. In the 120 pound weight class 6 of the 51 subjects exceeded the 10 per cent of body weight loss.

127 Pound Weight Class

The number of subjects in the 127 pound weight class was fifty-three (N=53). The mean percentage of weight loss was 5.97 per cent of the subjects' body weight. The extremes ranged from .78 per cent to 13.01 per cent. The mean chronological age of the subjects was fifteen years seven months. The extremes ranged from 13 years 11 months to 18

years 6 months. Four of the 53 subjects exceeded the 10 per cent reduction of normal body weight.

133 Pound Weight Class

The number of subjects in the 133 pound weight class was forty-three (N=43). The mean percentage of weight loss for this weight class was 5.19 per cent of the subjects' body weight. The extremes ranged from .75 per cent to 11.49 per cent. The mean chronological age of the subjects was sixteen years eight months. The extremes ranged from 14 years 4 months to 17 years 11 months. Five of the 43 subjects exceeded the 10 per cent weight reduction.

138 Pound Weight Class

The number of subjects in the 138 pound weight class was the largest of all weight classes numbering fifty-five (N=55). The mean percentage of weight loss was 3.95 per cent of the subjects' body weight. The extremes of weight loss ranged from .72 per cent to 19.30 per cent. The mean chronological age of the subjects was sixteen years seven months. The extremes ranged from 14 years 8 months to 18 years 1 month. Six of the 55 subjects in the 138 pound weight class exceeded the 10 per cent maximum weight loss.

145 Pound Weight Class

The number of subjects in the 145 pound weight class was thirty-five (N=35). The mean percentage of weight loss for the 145 pound weight class was 5.91 per cent of the subjects' body weight. The extremes ranged from .69 per cent to 14.79 per cent. The mean chronological age of the subjects was sixteen years five months. The

extremes ranged from 14 years 1 month to 18 years 2 months. Three of the 35 subjects exceeded the recommended 10 per cent weight loss.

154 Pound Weight Class

The number of subjects in the 145 pound weight class was thirty-one (N-31). The mean percentage of weight loss was 6.98 per cent of the subjects body weight. The extremes ranged from .65 per cent to 13.14 per cent. The mean chronological age of the subjects was sixteen years six months. The extremes ranged from 15 years 1 month to 18 years 2 months. Four subjects in the 154 pound weight class exceeded the 10 per cent weight loss.

165 Pound Weight Class

The number of subjects in the 165 pound weight class was thirty-three (N-33). The mean percentage of weight loss for this division was 5.69 per cent of the subjects' body weight. The extremes ranged from 1.21 per cent to 23.26 per cent which was the highest percentage of weight loss in the study. The mean chronological age of the subjects was sixteen years seven months. The extremes ranged from 14 years 3 months to 18 years. Six subjects from this weight class exceeded the 10 per cent suggested maximum amount of weight loss.

180 Pound Weight Class

The number of subjects in the 180 pound weight class was twenty-four (N-24). The mean percentage of weight loss was 5.79 per cent of their body weight. The extremes ranged from 1.14 per cent to 18.18 per cent. The mean chronological age was sixteen years seven months. The extremes ranged from 15 years 3 months to 18 years 11 months. In the

180 pound weight class three of the 24 subjects exceeded the 10 per cent loss of body weight.

SUMMARY

The study conducted was based upon a total of 447 high school wrestlers from 34 North Dakota schools. The mean percentage of weight loss for this entire group was 5.91 per cent of the subjects' body weight. The average or mean chronological age of the subjects was sixteen years and one and one-half months. The 133 pound weight class had the highest chronological mean, sixteen years eight months. The greatest percentage of weight loss occurred in the 112 pound weight class. In this class the average weight loss was 6.40 per cent of the normal body weight. The 138 pound weight class contained the greatest number of subjects: fifty five of the 447.

The number of wrestlers that exceeded the recommended 10 per cent body weight loss was fifty-one. This constituted 11.4 per cent of the entire group of subjects. The extremes of this group ranged from 10.25 per cent to 23.26 per cent of body weight loss. When these figures were converted into pounds, the wrestler who lost 10.25 per cent of his body weight actually lost twenty and one-half pounds. The wrestler who lost 23.26 per cent of his body weight began the wrestling season weighing 215 pounds, while his certification weight was recorded three and one-half months later as 165 pounds. His loss of body weight in pounds was 50 pounds, which was almost one-fourth of his normal body weight!

TABLE 1

SUBJECTS WEIGHT CLASSES, MEAN PERCENTAGE OF WEIGHT LOSS, MEAN CHRONOLOGICAL AGE AND NUMBER OF SUBJECTS IN EACH WEIGHT CLASS

Weight Class	Number of Subjects	Mean Percentage of Weight Loss	Mean Chronological Age Years-Months
95	N=31	M=5.44	14-4
103	N=43	M=6.28	15-6
112	N=48	M=6.40	16-5
120	N=51	M=5.79	16-5
127	N=53	M=5.97	15-7
133	N=43	M=5.19	14-4
138	N=55	M=5.95	16-7
145	N=35	M=6.38	16-5
154	N=31	M=6.38	16-6
165	N=33	M=5.69	16-7
180	N=24	M=5.79	16-7
Totals	447	Mean=5.91	Mean=16 yr. 1½ mo.

CHAPTER IV

DISCUSSION

The results of this study illustrated the mean percentage weight loss of wrestlers on the high school level in North Dakota. The overall mean percentage of weight loss in this study did not exceed the 10 per cent level, which is considered by many of the leading athletic physicians to be the maximum amount of weight loss that a high school wrestler should sustain. James,¹⁷ Gonino,¹⁸ and Nichols,¹⁹ in separate studies felt that weight loss within the 10 per cent limit did not affect materially a wrestler's strength, slow his reaction time, affect his balance in motion, reduce his endurance, or hinder his development of powers.

The writer felt it was interesting to note that the percentage of weight loss seemed to vary among the subjects from the schools that returned the questionnaires. Certainly this supports the fact that the coach's attitude concerning weight loss may or will influence the amount of weight reduction that his wrestlers felt inclined to attempt.

The questionnaire included a place for the coach to state his

¹⁷James, loc. cit.

¹⁸Gonino, loc. cit.

¹⁹Nichols, loc. cit.

attitude concerning weight loss. Some of the comments are condensed and stated below.

Larry McDaniel, Head Wrestling Coach, Kenmare High School, Kenmare, North Dakota, stated:

Our philosophy of weight control is to cut down on our carbohydrates and fats, along with extra hard conditioning work. We won't have any one cutting more than seven pounds. Our squad is primarily made up of seniors.

Dean Bachmeier, Head Wrestling Coach, Minot Ryan High School, Minot, North Dakota, stated:

From my coaching experience, I find that most boys do very well by losing about eight or ten pounds.

I think we must consider an individual's body build and level of physical maturity. Perhaps some of the high school boys (that are rather chubby) will lose more weight than others without any apparent harm.

Dave Strand, Head Wrestling Coach, Northwood High School, Northwood, North Dakota, stated:

I think that the wrestlers should be informed on the important points in weight control, so that they don't suffer any ill effects because they used the wrong approach in losing weight. Weight loss should not be so great that the wrestler develops a dislike for the sport because of this phase. Weight loss should not be stressed especially in beginning wrestlers, it is best to wait until they have mastered the fundamentals of wrestling.

Rich Studerud, Head Wrestling Coach, Rugby High School, Rugby, North Dakota, stated:

I believe that weight reduction should be under the supervision of a physician. He would state the lowest weight class into which the wrestler could participate. The stated weight should be recorded in the school and state office and signed by the parties concerned.

I also feel that the rule limiting weight loss by artificial means is not being respected in that everyone has a hot bath at home.

Even though the mean percentage of weight loss was 5.91 per cent of the subjects normal body weight, the writer feels that in some individual cases the amount may have exceeded the amount of weight that a wrestler could safely lose. Certain factors must be given strong consideration in attempting to justify proper weight reduction. Some of these considerations are: the wrestler's body build, his normal body weight, his age and the possibility of growth which would occur during the wrestling season. It is this writer's opinion that a program of mandatory weight loss at the high school age level must be undertaken with extreme caution.

The writer was very concerned with the group of subjects that exceeded the 10 per cent amount of body weight loss. This group amounted to 11.11 per cent of the total number of subjects in the study. This accounted for the startling fact that one out of every ten wrestlers in this study exceeded the 10 per cent amount of weight loss. This meant that 51 of the 447 participating subjects lost more than 10 per cent of their body weight. It would be interesting to investigate further into these extreme weight losses and find out if the decision to lose this weight was made by the coach, the wrestler or a combination of the two. It was felt that these wrestlers are examples for the criticism of high school wrestling in North Dakota as well as in many other states.

The writer had an interesting interview with Richard Schindler,²⁰ Assistant to the Executive Secretary of the NDHSAA. He stated,

²⁰Interview with Richard Schindler, Assistant to the Executive Secretary, NDHSAA, Feb. 18, 1967.

"at the pace our weight reduction program is going and the amount of criticism that has been voiced by parents and physicians, it is evident that a new type of weight reduction program may have to be adopted for the state of North Dakota in the near future." This would have to be done if the sport of wrestling is to thrive in North Dakota, but of more importance is that the issue of weight loss involves the health and welfare of growing boys.

Several uncontrollable factors were found that influenced the results of this study. The questionnaire was sent the first week of school. At this time many of the coaches had little knowledge of the boys who would participate on their wrestling squad during the 1966-67 school year. This fact, the writer felt, was especially true in the larger schools. It was difficult to predict the boys who would be wrestling in the 95 and 103 pound weight classes. These were usually younger boys who might be in their first year of competitive wrestling or they might be boys who had moved up from the junior-high squad. This was one of the reasons why the writer was able to obtain only 447 out of a potential 1,000 subjects for the study. The questionnaire was sent out at this time because the writer had to obtain the body weight of each subject the first week in school. Another reason for the small number of returns may have been that many of the wrestling coaches in North Dakota also serve as either head or assistant football coaches. With a great deal of time devoted towards football the coaches may have felt that they did not have time to gather the information. It was perhaps difficult for them to realize the importance of weight reduction or percentage of weight loss during football season.

Questionnaires were sent to the wrestling coaches of 63 high schools in the state. Thirty-four of the coaches responded to the questionnaire for a return of 53.9 per cent.

The increase in the number of schools which participate in the sport of wrestling in the past few years has been paralleled by the general interest in the sport. It is the hope of this writer that the results of this study may be of direct aid to coaches and the state association with regard to their attitudes and actions concerning a "safe" percentage of weight loss.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the percentage of weight loss in comparison to the chronological age of all boys participating in high school wrestling in the state of North Dakota during the school year of 1966-67. The writer also attempted to determine that the average weight loss of the wrestlers, in the study, would not exceed 10 per cent of the normal body weight. This is the percentage of weight loss that the modern day experts, on high school wrestling, feel that a boy can lose without doing physical harm to his body.

Questionnaires were sent to the wrestling coaches of the 63 high schools listed in the NDHSAA bulletin. Thirty-four of the coaches responded to the questionnaire. The data that were collected gave the author a random sampling of 447 North Dakota high school wrestlers with which to work. The data consisted of the following: each of the subjects normal body weight the first week of the 1966-67 school year, his chronological age in years and months, his certification weight on December 17, 1966, and the name of each subject.

Upon completion of the collection of the data the writer placed each of the subjects into one of the following weight classes:

95, 103, 112, 120, 127, 133, 136, 145, 154, 165, 180, according to their certification weight.

The weight classes were analysed on the following factors: number of subjects in each weight class, mean chronological age and mean percentage of weight loss.

It was found that the mean percentage of weight loss of the entire group of subjects was 5.91 per cent of the subjects body weight. The average chronological age of the subjects was 16 years one and one-half months. Fifty-one of the 447 subjects exceeded the recommended maximum 10 per cent weight loss.

It was also discovered that the percentage of weight loss of each wrestler could not be compared significantly to his chronological age.

Conclusions

On the basis of the findings of this study the following conclusions were drawn:

1. The mean percentage of weight loss for a high school wrestler during the 1966-67 wrestling season was 5.91 per cent of his body weight.
2. Percentage of weight loss was not directly influenced by the chronological age of the wrestler.
3. At least one out of every ten of the subjects in the study exceeded the 10 per cent maximum amount of weight loss.
4. The percentage of weight loss varied from one school to another.

Recommendations

It is suggested that in any future study of this nature, the following recommendations may be of value:

1. There should be no dietary tampering, by the coach, with the delicate mechanisms of bone, muscle and tissue development during the crucial period when a young boy is growing from childhood through adolescence to adulthood.
2. The larger the number of subjects used for a study of this type the more reliable and valid would be the results.
3. A follow-up study should be conducted during the 1967-68 wrestling season, the mean and overall percentage of weight loss should be compared with the results of this study.
4. If the time and money were available the writer could contact every coach at the onset of wrestling season, either by telephone or personal visit. This would enable the writer to gain subjects from all 63 high schools participating in wrestling in the state of North Dakota.
5. A correlation study comparing the won-lost record of each wrestler to his percentage of weight loss should be completed to discover if there is a positive or negative correlation between these two factors.

6. Results of a similar study should be used along with this study to set up norms to be used by coaches for future recommended weight reduction programs.
7. A similar study should be conducted on weight loss as it relates to somatotype or body build.
8. A coach rarely has justification in recommending reducing the weight of a maturing boy beyond the 10 per cent limits, unless it can be proven that normal growth and development are not hindered.

APPENDIX A

University of North Dakota
Grand Forks, North Dakota 58201
August 29, 1966

Dear Coach:

While doing graduate work at the University of North Dakota, I am also serving as Freshmen Wrestling Coach. The topic I have chosen for my Masters Thesis is, "A Survey on Percentage of Weight Loss in Comparison to Chronological Age of Selected North Dakota High School Wrestlers." The study is being conducted under the direction of Mr. Walter C. Koenig, Director of Graduate Study in the Department of Health, Physical Education and Recreation.

It seems apparent that very little study has been attempted in the area of weight reduction on the high school level in North Dakota. One of the primary interests of the writer is to use the information gained as a basis for recommending percentage of weight loss to North Dakota high school wrestling coaches.

Your help is essential in collecting the data for the survey; please fill out the questionnaire and return it no later than September 30, 1966. I will gladly send you a summary of the results of the survey if you so indicate on the questionnaire.

The information needed will only take about ten (10) minutes to complete.

Enclosed you will find a stamped, self-addressed envelope for your convenience.

Your help and cooperation are greatly appreciated.

Yours truly,

Emil R. Bedard
Graduate Assistant, U. N. D.

Name of School _____ Date _____

Please list the names of each boy who you feel will be participating on your 1966-1967 varsity wrestling squad. List his age in years and months, and his weight the first week of school.

	NAME	AGE		WEIGHT
		Years	Months	
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
11.	_____	_____	_____	_____
12.	_____	_____	_____	_____
13.	_____	_____	_____	_____
14.	_____	_____	_____	_____
15.	_____	_____	_____	_____
16.	_____	_____	_____	_____
17.	_____	_____	_____	_____
18.	_____	_____	_____	_____
19.	_____	_____	_____	_____
20.	_____	_____	_____	_____

Please list any comments or personal feeling which you think are important in weight reduction or weight control.

Would you be interested in a summary of the results of this survey?

Yes

No

21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____
26.	_____	_____	_____
27.	_____	_____	_____
28.	_____	_____	_____
29.	_____	_____	_____
30.	_____	_____	_____

NAME AGE Years Months WEIGHT

University of North Dakota
Grand Forks, North Dakota
November 5, 1966
58201

Dear Coach:

Now that wrestling practice is in full swing, I would like to remind you about the questionnaire which I sent to you the first week of school. I would like to encourage you to fill out the questionnaire and return it in the very near future. The information is of the greatest importance to me and I have hopes that the finished study will be very useful to you and your wrestling squad.

If you do not have the original copy of the questionnaire, the information needed is:

1. The name of each boy on your varsity squad.
2. His chronological age, in years and months.
3. His actual weight the first week of school.

Your time and cooperation are greatly appreciated. If there is any way in which I can assist you or your program do not hesitate to contact me.

Yours truly,

Emil R. Bedard
Graduate Assistant, U. N. D.

NORTH DAKOTA

	Return received	No return
Alexander		X
Belcourt		X
Bismarck	X	
Bismarck (St. Mary's)		X
Bowman	X	
Carrington	X	
Casselton	X	
Cavalier	X	
Devils Lake	X	
Dickinson	X	
Dickinson (Trinity)		X
Edgeley	X	
Ellendale	X	
Enderlin		X
Fargo (Central)	X	
Fargo (North)		X
Fargo (Shanley)	X	
Fargo (Oak Grove)		X
Flaxton		X
Forman (Sargent Central)		X
Ft. Yates	X	
Garrison		X

	Return received	No return
Glen Ullin		X
Grand Forks (St. James)	X	
Grenora		X
Harvey		X
Hatton		X
Hettinger	X	
Jenastown		X
Kennare	X	
Lakota	X	
LaMoure		X
Langdon	X	
Larimore	X	
Lisbon	X	
Litchville		X
McVille		X
Mandan	X	
Meyville		X
Minot	X	
Minot (Ryan)	X	
Nepoleon		X
New England (St. Mary's)	X	
New Rockford		X
New Salem	X	
Northwood	X	

	Return received	No Return
Parshall		X
Portland		X
Richardton		X
Richardton (Abbey)		X
Rolla	X	
Rugby	X	
Stanley		X
Tioga		X
Turtle Lake	X	
Valley City	X	
Velva	X	
Wahpeton		X
Walhalla	X	
Watford City	X	
West Fargo	X	
Williston	X	
Zealand		X
Total	34	29

Per cent return=fifty-four per cent

Valley City, North Dakota
October 14, 1966

Emil Bedard
Physical Education Department
University of North Dakota
Grand Forks, North Dakota 58201

Dear Mr. Bedard:

Thank you for your inquiry. I am most happy to comply with your request. I am glad to see that you are so interested in high school wrestling.

I wish to take issue with one of your statements, however. You say "it seems evident that very little study has been attempted in the area of weight reduction on the high school level in North Dakota." I think you'll find that a great deal of study has been devoted to weight reduction. In 1961, the high school wrestling coaches' association adopted a planned weight program that has worked so well that similar organizations in other states have adopted it. This was adopted only after a great deal of research was done, and we are continually looking for ways to improve upon it.

Its two basic tenets are:

1. Every wrestler should have a physician's opinion of his maximum weight reducing capability.
2. A wrestler must be certified in a particular weight class by December 15, and may not compete in a lower weight class after that date.

The purpose of the cutoff date is to allow a reducing wrestler to stabilize his weight, and to prevent him from (voluntarily or involuntarily) attempting to reduce to an injurious point.

Further, I think most wrestling coaches recommend a maximum weight loss of ten per cent of body weight, depending on musculature and bone structure. This is purely up to the individual coach and athlete, but I have found it fairly standard with very few exceptions.

So you see, Mr. Bedard, there has been some work done in this area. I am in no way trying to belittle your efforts, however, and I am looking forward to receiving a copy of your survey. Good luck.

Sincerely,

Don Kollie
President, North Dakota High
School Wrestling Coaches Association

University of North Dakota
Grand Forks, North Dakota 58201
August 3, 1966

Mr. Earl Abrahamson
North Dakota High School Activities Association
Valley City, North Dakota

Dear Mr. Abrahamson:

I am writing this letter regarding the telephone conversation which I had with you concerning the survey which I am conducting on North Dakota high school wrestling.

Weight reduction and weight control are areas in the sport of wrestling which seem to obtain a great deal of criticism each year. It is my hope, that through this study, high school coaches in the state may gain an insight with respect to these areas.

By obtaining the weight of the boys during the first week of school who will be participating in wrestling, and then using the certified weights, I will be able to determine the weight loss of each wrestler. By dividing the pounds of weight lost by the body weight when school started, I will be able to find the percentage of weight loss of each wrestler. Along with this percentage of weight and the chronological age I plan to set up tables enabling me to determine the areas of the least and the greatest amount of weight loss. Also I will be able to find the average amount of weight loss for each weight class.

Any encouragement which you could give the coaches in filling out my questionnaire would be greatly appreciated. You mentioned a small article in the September bulletin; I certainly think this would help the outcome as far as the number of returns received.

Enclosed is a copy of my cover letter and the form which I will be sending to each wrestling coach in the state on the 29th of August.

I will keep in touch with you by telephone, in case there are any questions, and also to report the progress of my study.

Thank you for your time and consideration. Your help and the help of your organization is highly appreciated in encouraging this study.

Yours truly,

Earl R. Bodard
Graduate Assistant, U. N. D.

SUBJECTS IN THE 95 POUND WEIGHT CLASS

Subject	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of weight loss
Ardel T.	14-1	102	95	6.86
Tim S.	13-5	100	95	5.00
Anie P.	14-11	107	95	11.21
Jon B.	12-9	105	94	10.48
Richard S.	13-1	97	95	2.06
Wayne W.	14-3	89	86	3.37
Lee L.	13-0	79	76	3.80
Tony S.	12-11	82	81	1.22
Phillip S.	14-4	95	92	3.16
Kirk R.	14-4	96	94	2.08
Mick G.	15-9	103	95	7.77
Tom O.	15-5	103	95	7.77
Allen M.	15-1	105	95	9.52
Kent S.	13-4	96	94	2.08
Brian I.	13-1	88	86	2.27
Chris J.	16-1	110	95	13.64
Tom C.	15-2	92	91	1.09
Ken H.	15-6	94	92	2.13
Gordon D.	14-1	93	89	4.30
Dave M.	13-4	110	95	13.64
Kevin K.	15-8	101	95	5.94

SUBJECTS IN THE 95 POUND WEIGHT CLASS

Subject	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
John E.	15-0	97	93	4.12
Lyle K.	16-7	99	93	4.12
Scott M.	16-4	104	95	8.65
Rod B.	14-2	97	95	2.06
Bill B.	13-6	99	95	4.04
Don D.	14-3	97	95	2.06
Geyle S.	15-3	98	94	4.08
Curt S.	14-0	98	93	3.06
Dave K.	14-11	96	93	1.04
Bruce O.	14-6	110	93	13.64

Number of Subjects = 31

Mean Chronological Age = 14 years 4 months

Mean Percentage of Weight Loss = 5.44 per cent

SUBJECTS IN THE 103 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Mark E.	13-10	105	102	2.86
Adolph F.	15-3	108	103	4.63
Kent C.	15-7	105	103	1.90
Jim J.	17-0	108	103	4.63
Jerry D.	16-1	105	101	3.81
Neil H.	16-6	129	103	20.16
Daryl F.	17-0	107	103	3.74
David G.	16-1	114	102	10.53
Glen B.	16-0	110	102	7.27
Virgil L.	13-4	106	102	3.77
Kenneth Z.	15-2	106	102	3.77
Patrick G.	16-6	110	101	6.18
Randy W.	15-1	104	103	.96
Doug K.	16-9	108	103	4.63
Kenny G.	15-1	104	103	.96
Jerry S.	16-0	111	103	7.21
Stan S.	14-1	108	103	4.63
Mike J.	14-8	106	103	2.83
Morris B.	14-11	107	103	3.74
Mike V.	16-1	114	103	9.65

SUBJECTS IN THE 103 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Ron A.	15-6	110	102	7.27
Lynn D.	15-1	110	103	6.36
Ron N.	17-3	122	103	15.57
Lawrence P.	17-8	110	103	6.36
Roger J.	13-9	109	102	6.42
Pat M.	15-3	112	103	8.04
Cornelius H.	16-6	111	102	8.11
Ed. G.	15-7	107	101	5.61
Don S.	16-2	110	103	6.36
Robert S.	14-3	116	103	11.21
Dan V.	15-2	105	103	1.90
Curt J.	16-5	115	103	10.43
Marc S.	15-1	105	103	1.90
Lance J.	16-5	107	103	3.74
Tex B.	17-1	114	103	9.65
Park P.	16-2	106	102	3.77
Robert C.	13-11	105	103	1.90
Joel J.	15-0	115	102	11.30
Jerome H.	16-4	110	103	6.36
Dave S.	14-6	112	103	8.04

SUBJECTS IN THE 103 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
John S.	14-5	110	103	6.36
Don E.	17-5	110	102	7.27
Gordon W.	18-0	110	102	6.67

Number of Subjects = 43

Mean Percentage of Weight Loss = 6.28

Mean Chronological Age = 15 years 6 months

SUBJECTS IN THE 112 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Wesley D.	15-11	114	112	1.75
Dennis S.	13-4	112	109	2.66
Randy E.	16-10	123	112	8.94
Tom H.	15-9	118	112	5.08
Randy M.	15-10	117	111.5	4.70
Ralph B.	16-0	115	111.3	3.22
Ken R.	15-6	120	112	6.67
Bill B.	17-9	120	112	6.67
Daryl S.	16-0	113	111	1.77
Tom V.	16-11	124	111	10.48
David I.	16-7	125	111	11.20
David W.	16-8	118	112	5.08
Larry M.	17-6	120	110.8	7.67
Armand L.	14-4	125	112	10.40
Spencer M.	14-9	120	112	6.67
Kelly H.	16-7	122	112	8.20
Steve A.	15-7	115	112	2.61
Jerry V.	15-3	124	112	9.68
Dave E.	14-7	119	110	7.56
Ray S.	17-4	121	111.5	7.85
Mark S.	14-11	117	112	4.27

SUBJECTS IN THE 112 POUND WEIGHT CLASS

Subject	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Keith K.	15-0	116	111	4.31
Roger P.	15-9	120	112	6.67
John S.	17-2	118	112	5.08
Terry M.	16-5	118	110	6.78
Mike C.	15-6	114	112	1.75
Steve K.	14-11	114	112	1.75
Thurmen W.	16-11	125	111	11.20
John B.	14-4	125	110	12.00
Jim N.	14-11	114	110	3.51
Mike M.	14-8	109	108	.92
Rollie A.	14-5	118	112	5.08
Lynn H.	17-2	125	111	11.20
Mick C.	17-6	115	111	3.48
Mike L.	16-9	124	112	9.68
Kyle H.	14-2	119	111	6.72
Alan B.	14-3	121	111	8.26
Terry S.	16-9	122	111.5	8.61
Kenny D.	15-4	118	111	5.93
Richard D.	15-7	118	112	5.08
Boyd N.	15-5	125	111	11.20
Marvin O.	13-9	118	111.5	5.51

SUBJECTS IN THE 112 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Grover H.	16-5	120	112	6.67
Joe T.	15-8	117	111	5.13
Kelly W.	16-5	127	111	12.60
Craig S.	15-9	121	112	7.44
John W.	17-9	116	112	3.45
Terry S.	15-6	117	112	4.27

Number of Subjects = 48

Mean Percentage of Weight Loss = 6.40

Mean Chronological Age = 16 years 5 months

SUBJECTS IN THE 120 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Eugene O.	17-6	133	120	9.77
Roger T.	15-7	135	120	11.11
Clancy W.	16-5	124	120	3.23
Cliff B.	16-4	126	118	6.35
Dennis M.	16-2	125	119	4.56
Terrance D.	14-10	120	117.5	2.08
Jerry L.	15-6	125	120	4.00
Robert F.	17-6	125	120	4.00
Rick R.	17-4	130	120	7.69
Tim S.	17-2	125	120	4.00
Darrell H.	15-4	122	120	1.64
Stan P.	16.3	125	120	4.00
Thomas H.	16-10	125	120	4.00
Dale C.	13-3	121	119.3	1.40
Art D.	15-6	125	120	4.00
Joe F.	16-1	118	116	1.69
Frank Y.	17-3	128	120	6.25
Bill E.	17-0	130	119	8.46
Larry H.	17-1	121	120	.83
Roger L.	15-9	125	116	7.20
Russel L.	17-1	128	119	7.03

SUBJECTS IN THE 120 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Terry L.	16-10	135	120	11.11
Dave H.	17-7	141	120	14.89
Loyld H.	16-8	124	120	3.23
Greg B.	15-1	128	119	7.03
Leland T.	16-9	129	119	7.75
Dan L.	14-9	125	120	4.00
Dave B.	18-1	143	120	16.08
Roger H.	16-3	128	119	7.03
Sydney S.	16-10	125	118	5.60
Steve G.	17-6	125	120	4.00
Larry S.	16-5	126	120	4.76
John H.	16-11	129	120	6.98
Dennis S.	17-9	127	119	6.30
Bruce K.	15-8	122	118	3.28
Samuel P.	17-9	120	119	.83
Terry S.	15-3	122	118	3.28
Jim B.	14-10	125	120	4.00
Harry H.	16-9	124	120	3.23
Doug H.	15-3	124	120	3.23
Vern H.	17-11	130	118	9.23
Bob M.	16-0	133	118	11.28

SUBJECTS IN THE 120 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Russel M.	15-5	128	119	7.03
Paul L.	15-11	139	120	13.67
Bill N.	16-5	125	119	4.80
Joe E.	17-5	130	119.5	8.08
Duane M.	17-6	125	120	4.00
Greg J.	15-7	127	120	5.51
Ben H.	15-2	125	120	4.00
Greg D.	17-4	125	120	4.00
Terry M.	16-5	125	120	4.00

Number of Subjects = 51

Mean Percentage of Weight Loss = 5.79

Mean Chronological Age = 16 years 5 months

SUBJECTS IN THE 127 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Gary W.	17-8	134	127	5.22
Darry G.	13-11	137	127	7.30
John A.	14-1	131	126	3.82
Don F.	17-1	133	127	4.51
Rick B.	16-10	134	127	5.22
Dennis J.	17-2	130	127	2.31
Mike C.	15-3	125	120	.80
Fat A.	15-4	128	126	1.56
Dale L.	16-4	137	126	8.03
Mike A.	18-6	139	126	9.35
Tom A.	16-9	129	127	1.55
Royce C.	17-8	136	127	6.62
John B.	16-7	140	126	10.00
Bill B.	17-11	135	126.3	6.44
Charles L.	16-3	130	127	2.31
Jim J.	16-5	145	127	12.41
Greg M.	17-9	130	127	2.31
Jerry S.	16-6	128	127	.78
Darris L.	14-9	133	126	5.26
Lee P.	18-1	140	127	9.29
Wayne N.	16-4	136	127	6.62

SUBJECTS IN THE 127 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Jerry G.	16-7	142	127	10.56
Gary H.	17-9	146	127	13.01
Evan W.	16-0	135	127	5.93
Frank M.	17-6	140	127	9.29
Paul G.	15-4	134	127	5.22
Doug K.	16-1	130	127	2.31
Barry B.	16-7	130	123	5.38
David H.	15-4	135	125	7.41
Michael S.	16-2	135	123	8.89
Allen H.	15-5	136	126	7.35
Dennis H.	15-4	140	126	10.00
Rodell K.	17-3	132	126	4.55
Damin L.	17-10	142	127	10.56
Duane J.	17-10	135	127	5.93
Dan H.	17-4	138	127	7.97
Dale D.	15-8	135	127	5.93
Howe B.	17-1	135	126	6.67
Ken W.	14-2	130	127	2.31
Matt M.	15-11	130	127	2.31
Tim N.	15-10	130	127	2.31
Dave J.	15-8	141	127	9.93
Elden H.	15-3	130	126	3.08

SUBJECTS IN THE 127 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Louis N.	16-2	128	127	.78
Gerald E.	16-3	130	125	3.85
Richard G.	15-3	140	127	9.29
Pat D.	17-6	143	127	11.19
Foster D.	16-1	131	127	3.05
Rick M.	17-8	132	127	3.79
Hal E.	15-7	130	127	2.31
Rick F.	17-3	135	127	5.93
Bruce K.	15-1	145	127	12.41
Bob K.	16-9	135	127	5.93

Number of Subjects = 53

Mean Percentage of Weight Loss = 5.97

Mean Chronological Age = 15 years 7 months

SUBJECTS IN THE 133 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Steve K.	17-8	149	133	10.79
Greg R.	16-0	145	133	8.28
Bruce S.	15-5	138	132	4.35
Mike V.	16-6	145	132	8.97
Mark G.	17-5	140	133	5.00
Leroy G.	17-9	138	133	3.62
Jerome E.	15-11	135	132	2.22
Wade A.	16-7	135	132	2.22
Blake C.	16-2	140	133	5.00
Kevin R.	16-8	150	133	11.33
Chuck R.	17-6	136	131	3.68
Ted D.	16-5	138	133	3.62
Mike H.	14-4	142	132.8	6.48
Lynn F.	16-10	142	133	6.34
Larry B.	17-11	142	132	7.04
Lee H.	16-11	136	132.5	2.57
Pat D.	15-9	135	133	1.48
Jim L.	16-5	137	133	2.92
Gaylen S.	15-8	140	133	5.00
Don S.	15-11	134	133	.75

SUBJECTS IN THE 133 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Scott M.	15-0	135	133	1.48
Graig I.	17-2	145	132	8.97
Victor W.	17-0	147	131	10.88
John B.	15-4	136	131	3.68
Mike K.	16-11	136	132.5	2.57
Victor W.	16-3	139	132	5.04
Mike B.	15-8	147	133	9.52
Rick H.	15-11	140	133	5.00
Rick P.	16-11	142	133	6.34
Larry S.	17-2	138	131	5.07
Doane S.	15-8	135	133	1.48
Darryl E.	15-9	136	133	2.21
Paul S.	14-8	135	133	1.48
Tom W.	14-8	135	133	1.48
Dave B.	16-5	135	133	1.48
Leon K.	17-4	140	132	5.71
Kant V.	17-9	145	133	8.28
Gene D.	16-6	145	133	8.28
Robert G.	17-7	148	131	11.49
Dennis F.	17-7	149	133	10.74

SUBJECTS IN THE 133 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Dan F.	16-4	136	133	2.21
Ken S.	16-3	135	133	1.48
Dan K.	15-6	143	133	6.99

Number of Subjects = 43

Mean Percentage of Weight Loss = 5.19

Mean Chronological Age = 16 years 8 months

SUBJECTS IN THE 138 POUND WEIGHT CLASS

Subject	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Bob K.	18-0	150	138	8.00
Doug K.	16-2	140	137.5	1.79
Leon F.	15-5	145	138	4.83
Gary H.	17-4	145	138	4.83
Jeff S.	16-2	143	138	3.50
Dale N.	17-6	145	138	4.83
Timothy S.	14-11	150	136	9.33
Joe N.	17-2	144	138	4.17
Dave A.	17-3	140	137	2.14
Keith R.	15-3	144	138	4.17
Bruce L.	16-11	146	138	5.48
Kenneth L.	17-4	145	138	4.83
Dean G.	17-8	155	138	10.97
Roy S.	14-10	148	138	6.76
Ted M.	16-11	140	138	1.43
Lynn Q.	17-2	150	138	8.00
Kirk N.	16-3	143	138	3.50
Dennis E.	15-9	140	138	1.43
Gordon B.	17-11	150	138	8.00
Norris T.	17-7	146	137	6.16
Michael S.	15-4	147	138	6.12

SUBJECTS IN THE 138 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Brad B.	17-0	137	148	7.43
James S.	17-3	137	136	.73
Doug B.	16-4	143	135	5.59
Keith P.	15-2	145	138	4.83
Monte K.	16-1	153	137.5	10.13
Thomas D.	16-2	145	138	4.83
Clint D.	17-5	145	138	4.83
Bob W.	16-11	139	136.5	1.80
Art H.	15-7	141	138	2.13
Mark L.	17-5	148	138	6.76
Kip F.	16-5	148	138	6.76
Mike V.	17-11	140	136	2.86
Karl K.	15-8	150	137.5	8.33
Dan K.	15-9	139	138	.72
Terry K.	17-1	150	138	8.00
Frad F.	17-4	147	138	6.12
Robert H.	17-8	147	138	6.12
Paul B.	17-3	141	138	2.13
Jerry R.	16-5	147	138	6.12
Robert K.	18-1	146	138	5.48
Leroy F.	17-5	142	138	2.82
Mark W. B.	17-11	145	138	4.83

SUBJECTS IN THE 136 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Richard P.	14-8	156	138	11.54
Dale M.	16-6	171	138	19.30
Rodney L.	16-0	157	138	12.10
Dennis R.	16-9	150	137	8.67
Ken L.	17-1	157	138	12.10
Mike H.	15-9	147	137	6.80
Greg S.	17-0	143	147	4.20
Ron B.	16-0	137	135	1.46
Steve O.	16-3	145	138	4.83
Dave L.	17-10	148	138	6.76
Jerry C.	16-9	154	138	10.39
Doug H.	17-7	152	138	9.80

Number of Subjects = 55

Mean Percentage of Weight Loss = 5.95

Mean Chronological Age = 16 years 7 months

SUBJECTS IN THE 145 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Josh S.	18-2	150	144.5	3.67
Joel Z.	17-6	169	144	14.79
Jerry D.	15-1	156	145	7.05
Doug B.	17-9	146	145	.68
Leon B.	16-3	157	145	7.64
David W.	17-6	162	141	12.96
Dave E.	16-4	154	144	6.49
Curt S.	16-3	152	143	5.92
Steve H.	14-1	147	144	2.04
Allen S.	16-3	160	145	9.38
Dave H.	15-8	147	145	1.36
Bob H.	16-6	158	145	8.23
Jim F.	17-1	155	144	7.10
Gary S.	18-0	160	145	9.38
Joel S.	17-2	170	144	15.29
Joe B.	15-11	149	145	2.68
Dale L.	17-4	144	143	.69
Clint D.	17-3	150	143	4.67
Mike K.	16-1	159	144	9.43
Mark H.	16-9	155	145	6.45
Don S.	16-9	151	145	4.61

SUBJECTS IN THE 145 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Jim S.	16-7	155	144.5	6.77
Larry V.	15-2	150	145	3.33
Mac G.	16-5	154	145	5.84
Dave D.	16-4	150	145	3.33
Roger A.	16-0	148	145	2.03
Jeff W.	17-7	155	145	6.45
Dennis F.	16-5	149	142	4.70
Don S.	17-5	154	145	5.84
Neil S.	14-10	160	145	9.38
Larry K.	17-4	144	142	1.39
Lowell I.	17-4	157	145	7.64
Milo W.	14-6	146	143	2.05
Randy G.	16-3	145	144	.69
Jim V.	16-11	156	145	7.05

Number of Subjects = 35

Mean Percentage of Weight Loss = 5.91

Mean Chronological Age = 16 years 3 months

SUBJECTS IN THE 154 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Bill J.	17-2	174	154	11.49
Terry S.	15-3	153	152	.65
Howard R.	17-5	161	154	4.35
Bill S.	15-10	172	154	10.47
Dewayne L.	16-4	170	153	10.00
Terry B.	16-5	163	152	6.75
Ted M.	15-4	165	153	7.27
Dick H.	17-0	170	154	9.41
Jerry J.	17-10	155	154	.65
Larry S.	16-10	170	154	9.41
Guy H.	15-1	156	154	1.28
Michael K.	17-8	170	153	10.00
Wilson E.	17-8	160	153	4.37
Douglas P.	16-4	164	153	6.71
Tom S.	17-6	160	152	5.00
Dave S.	15-7	161	153	4.97
Arlen R.	16-7	161	153	4.97
Leo B.	16-0	163	153	6.13
Harv O.	15-6	155	154	.65
Jordon K.	17-3	155	152	.72

SUBJECTS IN THE 154 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Sidney E.	17-8	154	152	1.30
Lee M.	16-1	158	154	2.53
Steve D.	16-8	158	154	2.53
Harold A.	15-9	157	154	1.91
Clark R.	15-2	159	154	3.14
Dick A.	15-8	165	154	6.67
Maurice J.	16-3	162	154	4.94
John B.	17-4	160	154	3.75
Dale B.	16-3	155	150	3.23
Leonard B.	16-8	163	154	5.52
Jerry D.	15-1	153	154	.65
Richard F.	16-1	160	154	3.75
Monte J.	16-7	155	154	.65
Craig G.	16-8	175	152	13.14
Rodney R.	17-2	165	154	6.67
Lyle W.	16-7	163	154	5.52
Ron U.	18-2	155	152	1.94
Jerry T.	18-1	155	153	1.29
Terry N.	17-2	155	152	1.94

SUBJECTS IN THE 154 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Leroy B.	18-0	160	134	3.75
Bruce S.	17-9	166	153	7.83

Number of Subjects = 31

Mean Percentage of Weight Loss = 6.38

Mean Chronological Age = 16 years 6 months

SUBJECTS IN THE 165 POUND WEIGHT CLASS

Subject	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Steve A.	16-9	185	163.5	11.62
Knute E.	19-0	170	163	4.12
Richard D.	17-5	165	161	2.42
Ken T.	19-6	170	161	5.29
Gary P.	15-6	215	165	23.26
Dennis M.	16-1	169	165	2.37
John S.	15-1	173	160	7.51
Bob S.	17-1	171	164	4.09
Mark K.	16-5	183	165	9.84
Brad S.	16-9	165	163	1.21
Ron H.	16-3	171	165	3.51
Ron R.	15-10	185	165	10.81
Carl K.	17-4	165	163	1.21
James M.	16-3	170	163	4.12
Larry M.	17-9	172	165	4.07
Myron H.	17-1	170	165	2.94
Jerry H.	16-11	165	160	3.03
Dave F.	16-5	166	162	2.41
Mike E.	15-7	172	162	4.65
Tom S.	15-10	185	165	10.81
Bill S.	17-7	172	165	4.07

SUBJECTS IN THE 165 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Douglas D.	15-11	170	164	3.53
Tom W.	15-10	160	158	1.25
Pat S.	14-7	170	164	3.53
Ervin B.	18-0	166	163	1.81
Henry H.	16-5	165	159	3.64
Steve S.	17-0	184	164	10.87
Earl P.	14-3	171	165	3.51
Dave M.	19-0	176	165	6.25
Don A.	17-1	170	160	5.88
Greg B.	16-7	172	164	4.65
Clifford E.	17-8	173	164	5.20
Larry S.	17-6	193	165	14.51

Number of Subjects = 33

Mean Percentage of Weight Loss = 5.69

Mean Chronological Age = 16 years 7 months

SUBJECTS IN THE 180 POUND WEIGHT CLASS

Subjects	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Dick P.	17-7	220	180	18.18
Mike E.	17-6	195	179	8.21
Terry S.	15-3	190	178	6.32
Richard M.	17-8	192	180	6.25
Mike T.	17-4	200	179.5	10.25
Glenn P.	15-10	190	179	5.79
Dave S.	17-9	195	180	7.69
Kevin S.	16-2	188	176	6.38
Harley H.	17-3	185	178	3.78
Richard P.	16-8	175	172	1.71
Glen W.	18-11	187	179	4.28
Byron P.	17-4	185	180	2.70
Mike D.	15-10	185	180	2.70
Dave W.	16-7	175	173	1.14
Dick V.	16-4	190	179	5.79
Bill R.	17-4	183	180	1.64
Warren R.	17-11	183	173	5.46
Thomas A.	15-4	187	176	5.88
Clinton S.	14-7	194	174	10.31
Duane M.	17-11	187	180	3.74

SUBJECTS IN THE 180 POUND WEIGHT CLASS

Subject	Chronological Age Years-Months	Weight First Week of School	Weight Certification	Percentage of Weight Loss
Ken R.	17-0	182	176	3.30
Robert S.	16-1	199	180	9.55
Jim S.	17-0	193	180	6.74
Dick G.	15-9	169	167	1.18

Number of Subjects = 24

Mean Percentage of Weight Loss = 5.79

Mean Chronological Age = 16 years 7 months

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Docket Card