

DEVELOPMENT AND USE OF AN EIGHT STATION  
CONTINUOUS ACTION POWER CIRCUIT TO INCREASE  
THE EXPLOSIVE POWER OF COLLEGE FOOTBALL PLAYERS

by

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## Introduction

Football players and coaches across the nation have in recent years shown increasing interest in including weight lifting routines as part of their overall training programs.

This interest has resulted in many publications on weight training programs designed to develop strength and explosive power. However, coaches should continually strive to develop and devise better training methods by continuous experimentation and research.

It is easy to accept theories and programs developed by others. We tend to accept traditional procedure without question. As James J. Parrine said "We should never assume that we have reached the limits of understanding in any general theory or specific phenomena; things that appear simple become complex as they are viewed from a different viewpoint. Complicated relationships follow clear patterns when they are studied in light of new theories. So it is with a basic ingredient of physical education - exercise."<sup>1</sup>

The program presented in this paper does just that. It presents a fresh, new look at weight training for football and offers a quicker and better way of developing the explosive power necessary for playing football well. The gain in strength recorded for players using this program offers convincing proof of its effectiveness.

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<sup>1</sup>Parrine, James J., "Isokinetic Exercise and the Mechanical Energy Potentials of Muscle," Journal of Health Physical Education Recreation, May, 1968, p. 40.

## CHAPTER I

## BASIC PRINCIPLES BEHIND THE PROGRAM

## The Overload Principle

It is known that muscle use promotes strength and muscle size, while disuse promotes weakness and atrophy. It is also known that how fast and to what degree muscle strength increases depends upon how much and how often the muscle is required to overcome a resistance.

The system outlined in this report is a high resistance program calling for the use of power racks, olympic bars, and gradually increasing resistance heavy enough to activate the deeper muscle fibers of the body.

The exercises are designed to involve the muscles that are most directly related to the sport of football, the muscles that aid a man to explode across the line from a football stance with top acceleration in the least amount of time and with enough sustained force to carry out his assigned objectives against opposing players.

## Effect of Heavy Lifting on Speed

Some coaches are reluctant to adopt any form of heavy resistance training because they believe that it will slow down the reactions of their players. However, results in this study indicate that heavy resistance training actually lessens the time required to carry out a given movement.

William S. Zorbas and Peter V. Karpovich conducted a study that was published in 1951 to determine what happens to the speed of weight lifters who have engaged in heavy weight lifting for several years.<sup>1</sup> Both Zorbas and Karpovich at the beginning shared the opinion that heavy weight training slowed down the speed of movements, but the final results of the study changed their minds.

The following chart exemplifies the findings of Zorbas and Karpovich and reveals that weight lifters actually excel in movements requiring speed.

Table 1 Effect of Weight Lifting on Speed<sup>2</sup>

Time Required for Twenty-four Arm Rotations by Weight Lifters and Nonweight Lifters		
Group	Mean time in seconds	Excess time over Group I
1. Weight lifters	5.491	----
2. Nonweight lifters	5.665	.174
3. Springfield College	5.55	.06
4. Liberal Arts College	5.78	.29

#### Training with a Purpose

The program to follow for developing explosive power for football players is not just an ordinary weight program. It

<sup>1</sup> Weight Training in Athletics by Jim Murray and Peter V. Karpovich, M. D., Prentice-Hall, Inc., Englewood Cliffs, New Jersey, pp. 157-158.

<sup>2</sup> Ibid.

is a program with a well-defined and specific purpose. That purpose is to use the best methods known to develop the most important muscles involved in football to their maximum in a minimum amount of time.

#### Weight Lifting and Football

Weight lifters and football players are comparable in many ways because their sports call for many isolated efforts involving maximum or near maximum exploding power directed at overcoming a resisting object. Also, the muscle groups involved are close to being the same except for the olympic press.

As Karpovich and Murray said in their book on weight training in athletics, "A weight lifter, to be a champion, must be more than a well muscled man who can grind heavy poundages overhead with strength alone. He must be an athlete in every sense of the word, with coordination, speed, balance, and competitive spirit, in addition to strength. He needs endurance to a lesser degree than men in some sports, but must condition himself to the point that his body is able to recuperate and ready itself for another great explosive effort after only a short rest."<sup>1</sup>

Let us compare the charge of a football player and the pull of the weight lifter by considering each one separately, comparing major muscle groups and the exercises that will develop those groups.

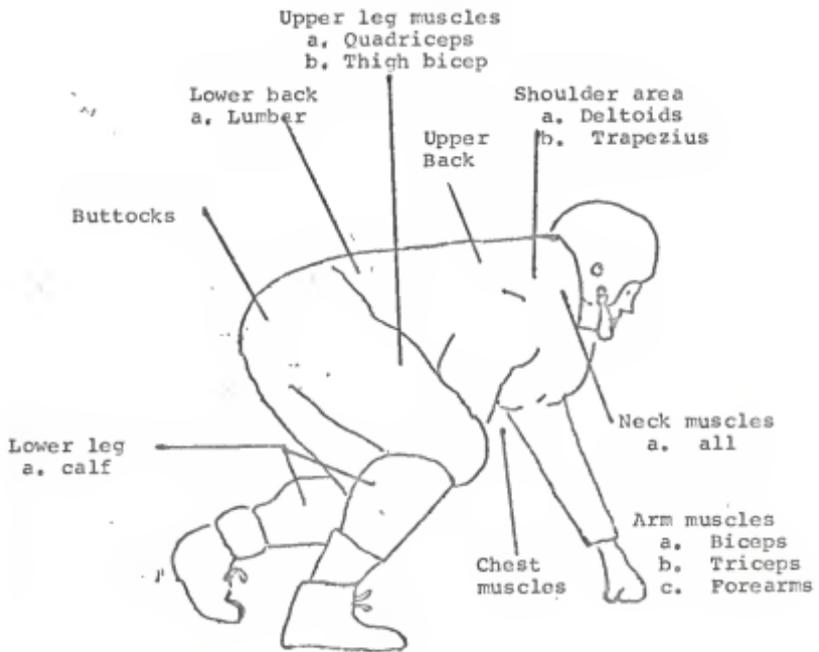
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<sup>1</sup>Weight Training in Athletics by Jim Murray and Peter V. Karpovich, M. D., Prentice-Hall, Inc., Englewood Cliffs, New Jersey, pp. 157-158.

The Football Player: (Lineman Charging Out)

- I. Primary launching muscles. (the start)
  1. Upper legs.
    - a) Primary exercise - squats.
  2. Lower legs.
    - a) Primary exercise - heel raises.
  3. Buttocks.
    - a) Primary exercise - squats.
  4. Lower back.
    - a) Primary exercise - dead lifts and pulls.
- II. Primary Impact Muscles. (contact with opponent)
  1. Shoulder area.
    - a) Primary exercise - uprow or high pulls.
  2. Trapezius and neck area.
    - a) Primary exercise - isometric or neck bridges and high pulls (uprow).
- III. Special Muscles.
  1. Chest area.
    - a) Primary exercise - bench press.
  2. Upper back.
    - a) Primary exercise - bent over pulls or rowing.

Fig. 1. Primary Exploding and Impact Muscles for Football



The Weight Lifter: (Pull Part of the Lift). An asterisk (\*) indicates that the major muscle group involved is the same as for the football charge.

I. Primary pulling muscles lower part of the pull.

- \*1. Upper legs.
  - a) Primary exercise - squats.
- \*2. Lower legs.
  - a) Primary exercise - heel raises.
- \*3. Buttocks.
  - a) Primary exercise - squats.
- \*4. Lower back.
  - a) Primary exercise - dead lifts and pulls.

Note - Arms are not usually flexed during first part or lower part of the lift. They serve more as hooks, and the work is done by one through four above.

II. Primary pulling muscles upper part of the pull.

- \*1. Shoulder area.
  - a) Primary exercise-uprow or high pull.
- \*2. Trapezius and neck area.
  - a) Primary exercise - high part of pull (uprow) and iso or neck bridges.
- \*3. Upper back area.
  - a) Primary exercise - bent over rowing or pulls from floor.

III. Primary pushing muscles (during press or jerk).

- \*1. Shoulder area.
  - a) Primary exercise - uprow or press.

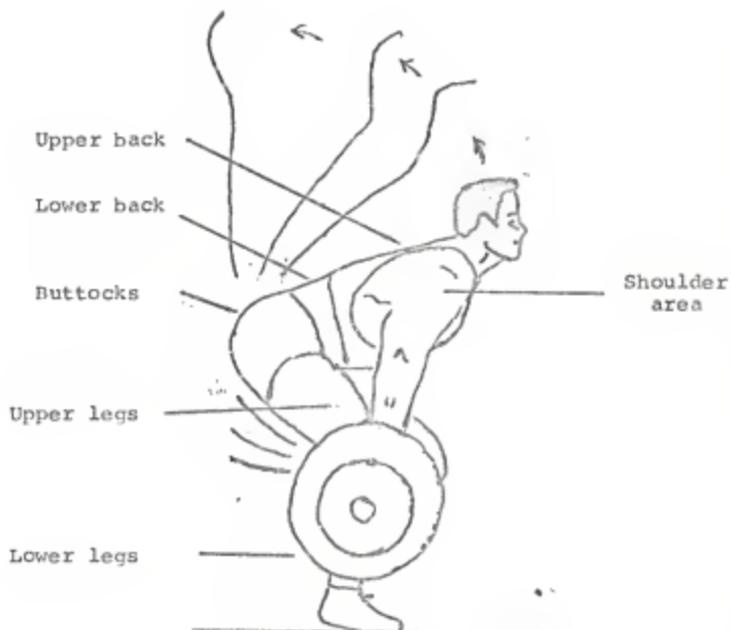
2. Triceps area.

a) Primary exercises - press or bench press.

\*3. Chest area.

a) Primary exercises - bench press and incline press.

Figure 2. Primary Exploding and Lifting Muscles



The muscles involved in weight lifting and in the football charge are essentially the same. It is reasonable then that proficiency in selected weight lifting exercises will transfer to football.

#### The Psychological Lift

Rack exercises with heavy resistance during short movements will give the players added self confidence and help erase any feelings of "I'm not as strong as that guy across the line," or "That guy is bigger than I am." Size alone is not the answer, "This is the age of strength and speed."

Self-confidence and pride build as the resistance builds. To a good athlete, weight training can be a propellor--when he sees improvement, he wants more--seeks more--expects more--and gets more from it every workout.

This is the type of attitude that the coach wants, and after it catches on, it may be necessary to lock up the weight room on the off days to keep eager athletes from overworking. It has happened before and will happen again, but the days of rest are just as important as the workouts--give the muscles time to recuperate for the next workout.

#### Motivating the Group

In the beginning, everyone trains vigorously, but then the enthusiasm begins to wear off. Since success depends on regular training and adherence to perfect or near-perfect form, the coach has to be alert for aids that will rejuvenate the group and keep them going.

### Motivational Aids

#### 1. Testing and measuring before and after the program:

- a) Take physical measurements down to 1/16 or 1/8 of an inch:

- |                               |            |
|-------------------------------|------------|
| 1. Weight.                    | 5. Calves. |
| 2. Shoulders.                 | 6. Arms.   |
| 3. Chest - normal & expanded. | 7. Neck.   |
| 4. Thighs                     | 8. Waist.  |

- b) Physical skills and strength tests:

1. Standing broad jump.
2. Vertical jump and reach.
3. Stool jumps or agility course.
4. Sprints.
5. Rope climb.
6. Chins.
7. Sit ups.
8. Pushups.

- c) Special strength tests:

1. Back and leg dynamometer.
2. Cable tensiometer
3. Hand dynamometer.

If results are posted and emphasis is placed on being in the upper percent, it can be a good motivating aid.

#### 2. Stress intergroup competition:

- a) Take care in pairing up the small groups of 3 or 4, taking into consideration each one's strength, personality, drive, and the position played. Players must learn how to help and drive their buddies--they should try to make everyone an All-American.
3. Post inspirational signs at each station and change as needed: (14" by 22" cards).

## Station # 1, High Pulls

Good, better, best;  
 Never let it rest,  
 Till your good is better,  
 And your better, best!

Pull Bar Up to Chin

HIGH PULL CARD.

## Station # 2, Low Pulls

The man who says,  
 "It can't be done"  
 Is interrupted by the  
 man who is doing it!

Pull Above Belt Line

LOW PULL CARD.

## Station # 3, Dead Lifts--Shrugs

When a man is no longer anx-  
 ious to do better than well,  
 He is done for!

Keep Adding Weight

DEAD LIFT CARD.

## Station # 4, Bench Press--Shrugs

Where there's a will,  
 There's a way!

Inhale - Lower - Push

BENCH PRESS CARD.

## Station # 5, 3/4 or Full Squat

We must all hang together, or  
 assuredly, we shall hang  
 separately!

Keep head up-back straight -  
 Inhale & squat deep.

SQUAT CARD.

## Station # 6, 3/4 or 1/2 Back Squats

It's a good idea to aim high,  
 but stay low while doing it!

Keep bar low (#10) Weight  
 high. Inhale and push up.

BACK RACK SQUAT CARD.

## Station # 7, 1/2 Front Rack Squats

There is no man living who  
 isn't capable of doing more  
 than he thinks he can do!

Keep Elbows Up - Push Up.

FRONT SQUAT CARD

## Station # 8, Heel Raises

The difficult is what we can do  
 immediately; The impossible might  
 take us a little longer!

Keep reps in 10-20 range.

HEEL RAISE CARD

Signs can be changed every so often to meet the needs of the players or the situation.

4. Coaches must circulate among stations correcting form and talking it up--Keep interest high.
5. Exercises can be changed at stations 1, 2, or 7, but only for a few workouts, then go back to original plan.

Use: Instead of High Pulls (#1) Use Power Clean & Jerk.  
Instead of Low Pulls (#2) Use Bent Over Row.  
Instead of Front Squats (#7) Use Power Press.

\*It would be wise to stick with the rest of the exercises.

6. "Contest" one station each week, go for record performance -- Record and post results.

Note: Body weight can be divided into pounds lifted for "strength per pound of body weight."

## CHAPTER II

## EQUIPMENT NEEDED

## Weight Training Equipment for the Eight Stations

The ideal situation for large groups is to set up an eight station circuit. The equipment needed, including suggested weight ranges, at each station is listed below:

1. Station A1 - High Pulls.
  - a) Olympic bar - 135 to 180 pounds.
  - b) Lifting platform or 3/4 inch plywood sheet.
  - c) Two doormats used between platform and weights.
  - d) One lifting belt.
2. Station A2 - Low Pulls.
  - a) Same as A1 except olympic bar weight should have a range of from 185 to 225 pounds.
3. Station A3 - Dead Lifts and Shrugs.
  - a) Regular barbell - 200 to 425 pounds.
  - b) 3/4 inch plywood sheet.
  - c) Two door mats.
  - d) One lifting belt.
4. Station A4 - Bench Press and Shrugs.
  - a) Regular barbell - 175 to 225 pounds.
  - b) Bench press bench.
5. Station B1 - Three-quarter to Full Squats.
  - a) Regular barbell or olympic bar - 250 to 300 pounds.
  - b) Squat stands.
  - c) Lifting belt.
  - d) Heel board - 2 inches high.
6. Station B2 - Three-quarter to One-half Rack Squats.
  - a) Power rack with four pins.
  - b) Bar, collars and 225 to 425 pounds.
  - d) Lifting belt.
  - e) Pad for bar.

## 7. Station B3 - One-half Front Rack Squats.

- a) Power rack with four pins.
- b) Bar, collars and 200-325 pounds.
- c) Lifting belt.
- d) Pad for bar.

## 8. Station B4 - Rack Heel Raises.

- a) Power rack with four pins.
- b) Bar, collars and 250 to 325 pounds.
- c) Pad for bar.
- d) Lifting belt.
- e) Toe board - two inches high.

## The quick list of equipment:

- 3 - Barbells.
  - 2 - Olympic bars.
  - 3 - Lifting platforms or 3/4 inch plywood sheets.
  - 6 - Rubber doormats.
  - 6 - Lifting belts.
  - 1 - Set of squat stands.
  - 3 - Power racks with bars.
  - 12 - Power rack pins.
    - 6 - for support pins.
    - 6 - for safety and isometric pins.
  - 3 - pads for power rack bars.
  - 1 - Bench press bench.
  - 1 - Toe board.
  - 1 - Heel board.
- Weights as indicated for each station.

## Equipment needed by the individual player for home use:

- 1. One barbell or olympic bar.
- 2. One low bench.
- 3. One power rack with pins.
- 4. Lifting belt, if available.
- 5. Weights sufficient for individual strength.

Safety Items

While weight lifting is intended to be of benefit to the lifter, injury can occur. The following pieces of safety equipment should be used as indicated.

1. Use leather belt for back support on all heavy lifts:

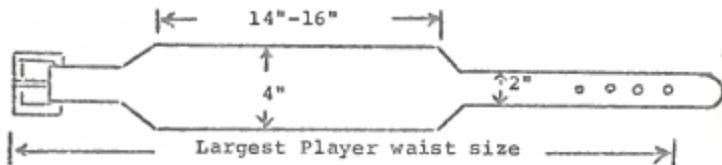


Figure 3

2. Use four-pin setup on racks:

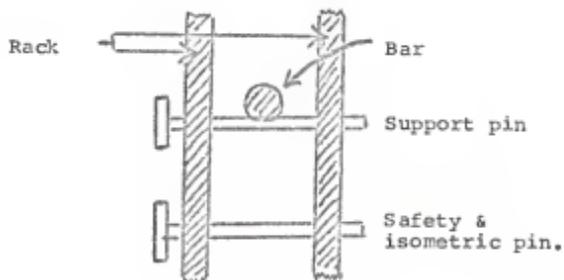


Figure 4

In the event that the support pin works out during the explosive movements, the second pin will catch the weight. (See Fig. 4). However, other lifters present should be charged with watching the support pin and keeping it in place.

## CHAPTER III

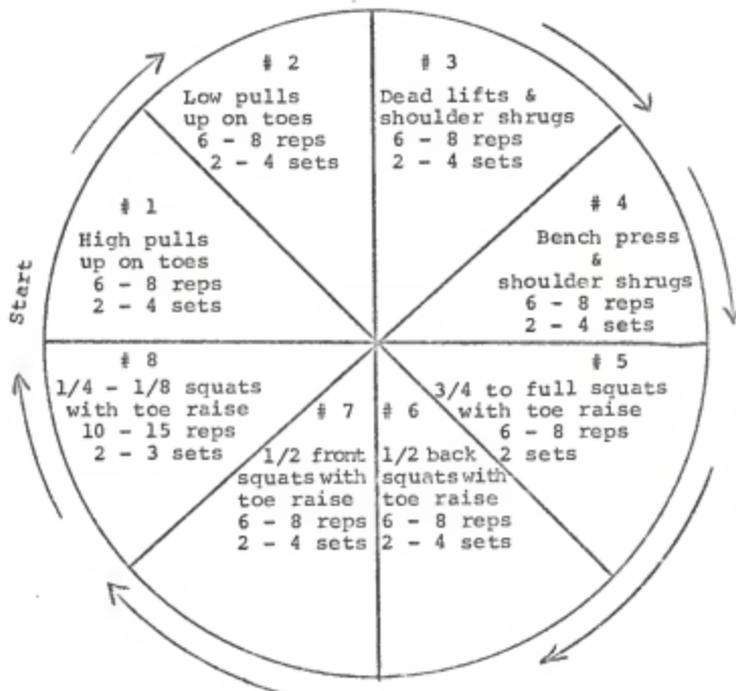
## THE EIGHT STATION CONTINUOUS ACTION POWER CIRCUIT

## The Exercise Wheel

The basic weight program for football conditioning centers around just eight exercises. These exercises have been chosen because they are of greatest transfer value to the kinds of resistance encountered in football. By being limited in number, all exercises can be carried out with a suitable number of repetitions in a thirty-minute session. Two such sessions a week are enough to provide effective resistance training, therefore the players are free for speed, agility and skill drills.

The eight basic exercises prescribed comprise an eight station continuous action power circuit which can be arranged as shown by the exercise wheel (Fig. 5). If a player wishes to work individually beyond the regular off-season conditioning period, he may begin at station #1 and continue around the circuit clockwise until each station has been completed. However, off-season programs are designed for entire squads, and force of numbers and limitations of time and equipment make coordinated group activity necessary.

Figure 5 The Exercise Wheel



### Organizing the Large Groups

An entire squad can be divided into smaller groups for weight training in the following manner:

Offense	Defense
Group A - Interior linemen	Interior linemen.
Group B - Tight ends and blocking backs.	Ends - linebackers.
Group C - Quarterbacks and receivers.	Monsters - cornermen.
Group D - Backs and specialty men.	Defensive backs.

If the training program is organized on a five-day week, groups A and B work out with weights on Mondays, Wednesdays, and Fridays. On Tuesdays and Thursdays, groups A and B should report for agility and running work. Groups C and D should work out with weights on Tuesdays and Thursdays. On Mondays, Wednesdays, and Fridays, they should report for agility, running, and work on their specialties.

This schedule gives the linemen and blocking backs the three-day plan of weights for the added strength required for their assignments, while the backs and specialty men get more work on agility, speed, and specialty work.

### Division into Smaller Groups

In order to make greatest use of time and equipment, the groups outlined above should be subdivided into smaller units of two, three, or four players. There should be eight of these smaller units with each unit exercising at a station. Therefore for each thirty-two or fraction thereof exercising at

one time, there should be eight stations with equipment. Although this subdividing requires that each station of the exercise wheel (Fig. 5) be fully equipped, it also assures through the rotation system outlined below that the equipment will be in use throughout the practice period.

The smaller units should be formed according to individual strength, personality, motivation, and position played. Competition and criticism should be encouraged both within and among the smaller units. Players must learn both to help and to drive their teammates.

#### Small Unit Rotation

It is obvious that small units consisting of only two players will have one lifter and one observer at each station. For the three-or-four player unit, some kind of orderly procedure must be followed to avoid confusion. The players should take the positions indicated in Figures 6 and 7. The man at the bar is the only worker. The one at his right should serve as his spotter or critic because he will lift next and should be concentrating on form and achievement. The other one or two should serve as encouragers or cheerleaders.

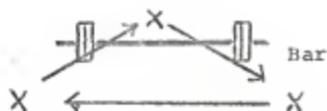


Figure 6 Three Man Rotation

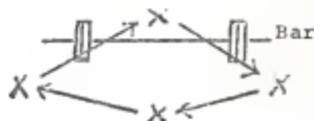


Figure 7 Four Man Rotation

## Group Rotation

The eight station continuous action power circuit is divided in half giving circuits A and B.

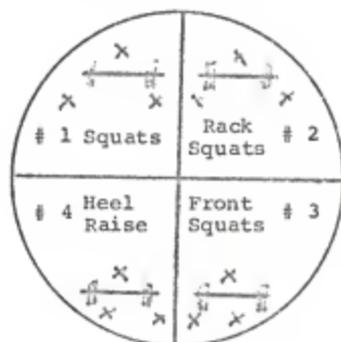
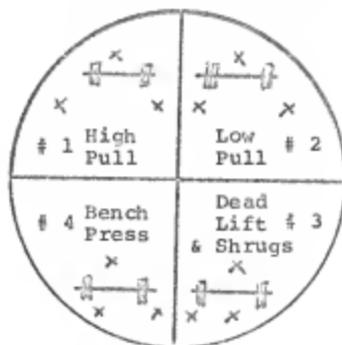
## Group Rotation

Figure 8

## Continuous Action Power Circuit

Circuit A Pulls &amp; Bench

Circuit B Squats &amp; Toe Raises



The players at all stations may not complete their exercises at the same time. Competition among stations to complete their work quickly will not add to the value of the program. It is more important to do the exercise correctly than to go through them fast.

The leader at each station will give the command "Breakdown!" Each player will then assume the football ready position (Fig. 9) until the command "Go to work!" The worker will then break for the bar and go to work. Those not lifting will carry out their duties outlined above. When every member of a unit has completed the exercise, the command "Breakdown!" will be given again, followed by "Move!" (See Fig. 8) This requires a clockwise rotation to the next station, where again the commands "Breakdown!" and "Go to work!" are given.

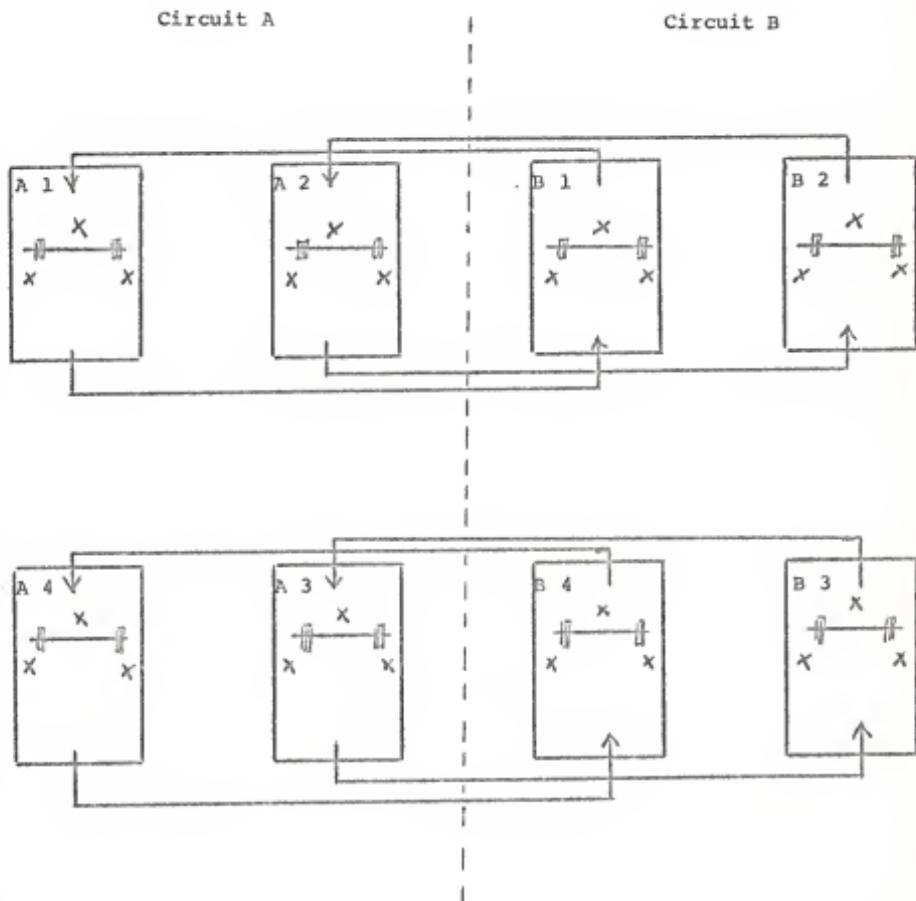


Figure 9 The Breakdown or Ready Position

After completing the four stations, personnel will switch between circuits A and B and repeat the process described above. Figure 10 below illustrates the exchange of personnel between circuits A and B.

## The Big Switch

Figure 10



## CHAPTER IV

## WORKOUT PLANS

## Eight Station Continuous Action Power Circuit Program.

## First Two Weeks Workout Plan

1. The players at each station will perform one set of six repetitions each and then rotate within circuit. After completing the power exercises for one circuit, they will switch circuits and repeat the process.

Example:

Group A

One set - six repetitions  
at each station then  
switch to Circuit B



Circuit A

Group B

One set - six repetitions  
at each station then  
switch to Circuit A



Circuit B

2. Switching circuits

When the players at each station of circuit A and circuit B have completed the stations in their own circuit, they will switch circuits as follows:

- = Players at station A-1 exchange position with those at B-5,
- = Players at station A-2 exchange positions with those at B-6,
- = Players at station A-3 exchange positions with those at B-7,
- = Players at station A-4 exchange positions with those at B-8.

At the end of two complete exchanges between circuits, each player will have performed each exercise for two sets of six repetitions. This routine allows maximum rest time between exercises.

#### Third Week

For the third week of off-season training, the players will assume their group and station positions as for the first two weeks. However, each player will make two complete rotations within his circuit before changing circuits. Exchange of personnel between circuits will be as in the first two weeks.

After one exchange of circuits, each player will have performed each exercise for two sets of six repetitions, but the rest period between repetitions of the same exercise will be less than before because both sets of the exercise will be completed before changing circuits.

#### Fourth Week

For the fourth week, players will begin as before, but the players at each station will perform two sets of six repetitions per station before changing stations. Exchange between circuits will be as before.

After one exchange of circuits, each player will have performed each exercise for two sets of six repetitions, but the rest period between sets of the same exercises will be less than before because both sets of the same exercise are performed before leaving the station.

#### Fifth Week

The procedure for the fifth week will be the same as for the fourth, but the sets of each exercise should be increased

to three sets. The procedure for the sixth week will be the same as for the fifth, but the weight of the bars should be increased.

#### Remainder of Off-Season Training Period

The schedule for the sixth week should be followed for the rest of the season. However, as the players become better conditioned, increased weight should be used to develop each player's maximum strength or explosive power. Care should be used to avoid overworking the players during this period.

As the real goal of this advanced period of training is maximum power, an aid in beginning the weight movement should be used for circuit A, station one, two, and three. There should be no shrug at station three. This aid is the bumpboard. (See Figs. 11 and 12 for illustration on use of bumpboard.)

The isometric principle should be introduced on the power racks in circuit B, stations two, three, and four. Isometric training involves moving a loaded bar six to eight inches between four pins on a power rack (Fig. 13), sustaining an isometric effort against the top pin for from four to six seconds.

Players must develop the strength and endurance required for isometrics. For the first week of isometric training, each player will exert an isometric effort only on the last repetition of the last set at each indicated station. For the second week of isometrics, the players will exert the isometric effort on the last repetition of both sets at each station. The third week will find the players exerting an isometric

## Plans for Bump Boards

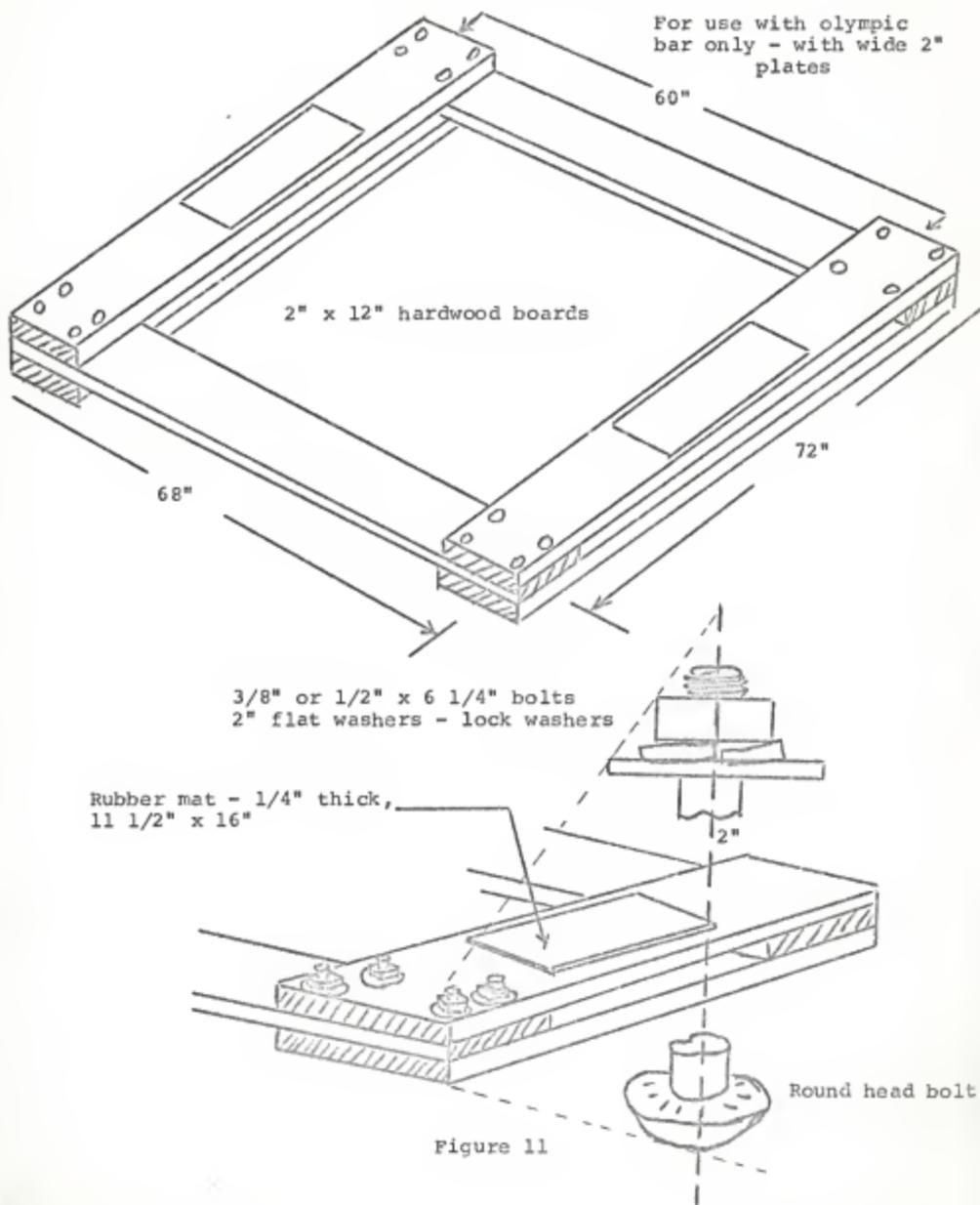


Figure 11

## High pulls with bumpboards

To start pull,  
 press down on  
 bar and then  
 begin pull  
 with aid of  
 board spring

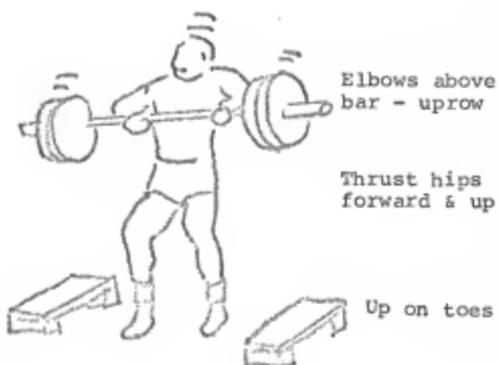
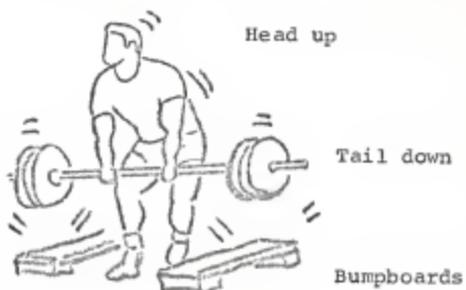


Figure 12 High Pull With Bumpboards.

effort on each repetition of the last set at each station. The fourth and following weeks the players will exert an isometric effort on each repetition of every set.

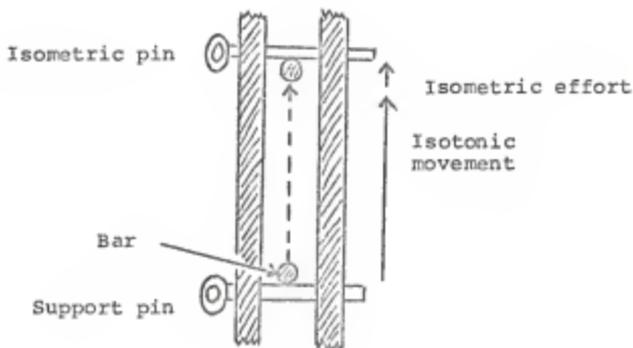


Figure 13

#### Basic Rules of Isometronics

As the isometronic program is a difficult one, three basic rules should be followed at all times.

1. Players should be properly warmed up before beginning.
2. Players should wear belts at all times.
3. Players should never jam or jerk the bar against the top pin. Apply maximum effort gradually.

## CHAPTER V

## THE BASIC EXERCISES

## The Warmup

Before starting the basic exercises, the players must go through a series of warmup exercises. Those below are recommended. Instructions accompany each exercise.

- I. Exercise:        Jumping Jacks  
 Sets:                One  
 Repetitions:      Ten to fifteen, fast.

Stand erect with the feet together and the hands at the sides. Perform a slight jump and spread the feet twenty-four inches apart while raising the arms from the sides to arms' length overhead. Jump back to starting position and repeat rapidly.



- II. Exercise:        Prone Jack Knife  
 Sets:                One  
 Repetitions:      Ten to fifteen slowly, stressing bounce.

From starting position as shown below proceed to raise the buttocks up to the high position shown. Be sure to keep the legs and arms straight throughout the exercise.



- III. Exercise: Situps and twists  
 Sets: One  
 Repetitions: Ten to fifteen at medium speed

Lie on the floor or incline board; then sit up far enough to touch the knees with the elbows. Exhale sitting up and inhale lying back. Repeat.



- IV. Exercise: Leg-ups.  
 Sets: One  
 Repetitions: Ten to fifteen, medium speed.

From the floor or on the end of a bench, raise the legs, bending them at the knees. Bring the knees to the chin and then quickly straighten them.



- V. Exercise: Neck Isometrics  
 Efforts: One repetition for six seconds on all sides.

- VI. Exercise: Step-ups  
 Sets: One  
 Repetitions: Six to eight, rapidly.



A good quick-cal program can also be used to take place of the above six warmup exercises.

## Circuit A Exercises

## Basic Stance for Lifting.

Stations A 1, 2, and 3 are dependent upon strong pulls. To get a good pull, a lifter has to start from the proper position (Fig.14). Assume the following body position:

- A. Feet shoulder width and instep up under the bar. (Fig.15)
- B. Arms outside the knees and locked out.
- C. Buttocks down low but higher than the knees.
- D. Back flat.
- E. Head up.



Fig. 14 Stance for Lifting



Fig. 15 Bar-shin Line

### 1. Station A, High Pulls

- A. Begin all pulls with full lungs and fixed chest and shoulder muscles. Exhale on the way down or at the bottom.
- B. Begin the pull by straightening the legs and back. Do not use the arms at this point.
- C. After straightening the legs and back, start the pull with the arms. Keep the elbows above the bar all the way, raising them out and up until the bar reaches the chin.
- D. At the top of the pull (chin level), come up on the toes, extending the body as far as possible. Do not try to get under the bar. Pull it as high as possible, and then lower it to the floor. On the high pulls, do not try to clean or catch it at the chest -- this requires a relaxation of the muscles and to drop under and catch it is against the principle of follow-through training. (See Figs. 16, 17, 18 and 19)
- E. Look up throughout the pull, stretching the neck muscles.
- F. Sets and repetitions:
  - 1) Keep repetitions per set at six.
  - 2) Add weight each set.

### 2. Station A 2, Low Pulls

The low pull is just like the high pull except that the bar is loaded to the point that it cannot be raised above the bottom of the rib cage, but it must be raised higher than the belt.

For correct form, sets, and repetitions, refer to high pulls and figures 16 and 17.

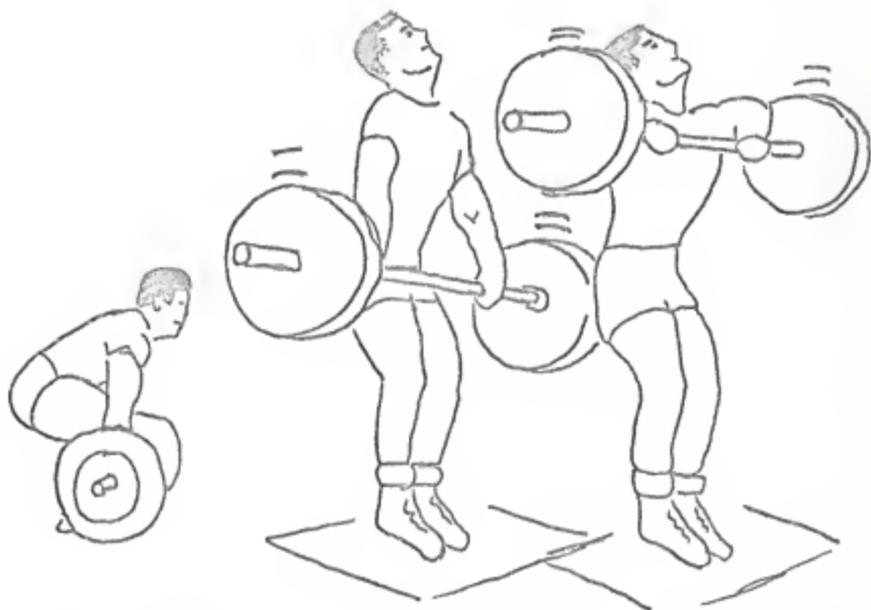


Fig. 16 Start

Fig. 17 Middle  
of PullFig. 18 Top  
of PullFig. 19 Wing Elbows Out  
at Top of Pull

## Low Pulls

1. Start



Fig. 20

2. Middle



Fig. 21

3. Finish



Fig. 22

## 3. Station A 3, Dead Lifts and Shrugs

- a) Inhale and fix chest and shoulder region solid.
- b) Use dead lift grip.
- c) Pull bar up by extending the legs and back-- hold the bar at arm's length. (See Fig. 24)
- d) Execute three shoulder shrugs, and lower the bar to the floor. (See Fig. 25)
- e) Use same number of sets and repetitions as high pulls.

Back Straight  
Tail Down  
Head Up



Fig. 23

Starting Position for Dead Lift



Fig. 24

End of Dead Lift

Fig. 25  
Shrug Part of  
Dead Lift

#### 4. Station A 4, Bench Press with Shrug

- a) With the bar at the top, inhale, lower to the chest and press up. Exhale.
- b) At the top, shrug the shoulders up and off the bench to flex the chest muscles tighter.  
(See Fig. 27)

(The shrug move has been known to add 10 - 15 yards to the throwing ability of quarterbacks.)

- c) Add weight each set.



Fig. 26 The Bench Press

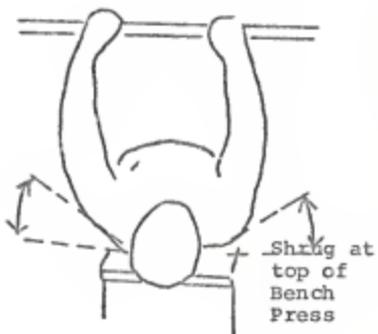


Fig. 27 The Shrug

## Circuit B Exercises

5. Station B1, Three-quarter to Full Squats
- Use a two-inch board under the heels, and keep the feet at least shoulder width apart.
  - Inhale deeply at the top.
  - Sink to a deep squat.
  - At the bottom, look up and push.
  - Exhale at the top. (See Figs. 28 and 29)
  - Add weight each set.



Fig. 28



Fig. 29

6. Station B2, Three-quarter to One-half Back Rack Squats with Heel Raise

For positioning, refer to the diagrams in Figs. 30, 31 and 32.

- a) Inhale at the start.
- b) Push up, straightening the legs and back.
- c) Raise on the toes as high as possible.
- d) Lower, exhale, and repeat the process.
- e) Add weight each set.

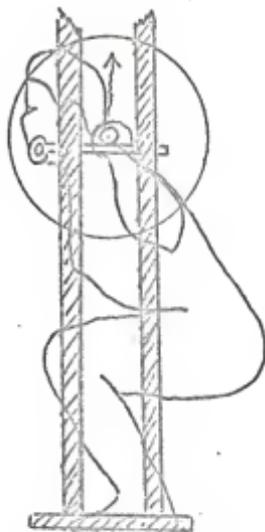


Fig. 30



Fig. 31

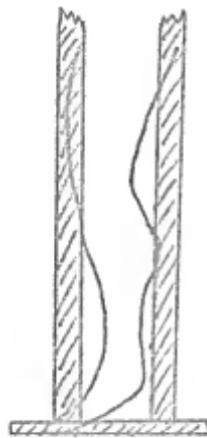


Fig. 32

7. Station B3, One-half Front Rack Squats with Heel Raise  
For positioning, refer to the diagrams in Figs. 33,  
34, and 35.

- a) Keep bar up close to the neck, resting on the shoulders and palms of the hands.
- b) Thrust elbows forward and up.
- c) Inhale deeply.
- d) Push up, straightening the legs and back.
- e) At the top, rise on the toes as high as possible.
- f) Lower the weight and repeat the process.
- g) Add weight each set.

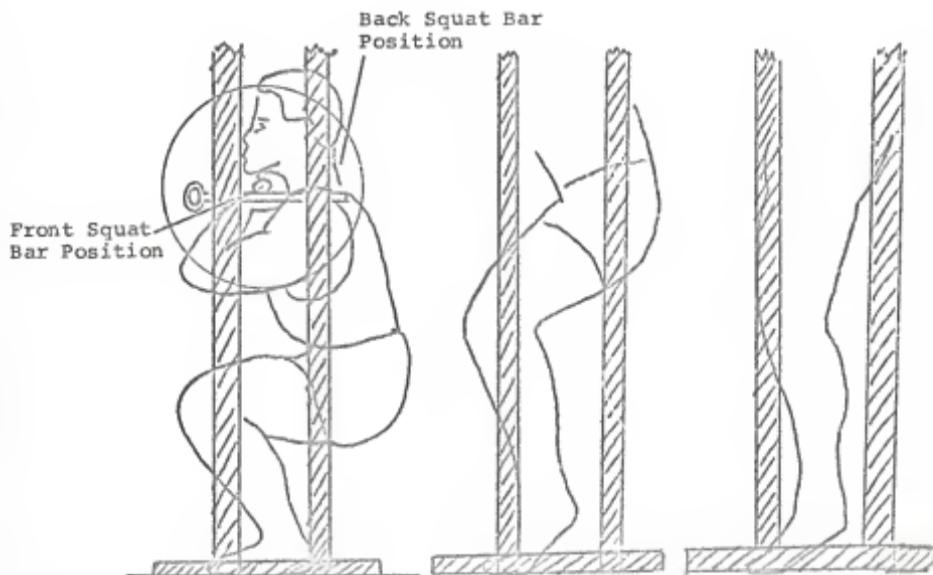


Fig. 33

Fig. 34

Fig. 35

## 8. Station B4, Rack Heel Raises

On power rack number three, raise the weight until the back and legs are locked out.

- a) Move up and down, using only the lower part of the legs.
- b) Change positions of the toes on each set. See Figs. 36 and 37.

Fig. 36 - Lock out on one-eighth the squat and then do the heel raises: one-fourth to one-eighth rack squat with heel raises

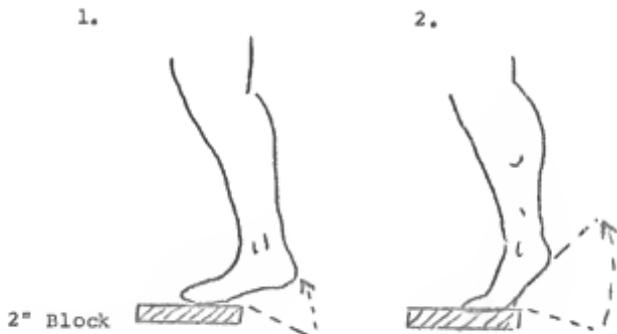


Fig. 37 - Change the position of the toes on each set. A. Toes out. B. Toes in. C. Toes straight.



## CHAPTER VI

INTEGRATION OF THE EIGHT STATION CONTINUOUS ACTION  
POWER CIRCUIT INTO AN OFF-SEASON PROGRAM

The primary purpose of the weight lifting program outlined in this report is, of course, development of strength. But any program for developing strength must also be integrated into one developing the other skills necessary for playing football well. The weight program offered in this paper fits well into an integrated over-all program.

The off-season program used by Coach Vince Gibson at Kansas State University has attracted favorable attention from coaches and players throughout the Midwest. His program has four tangible areas of development plus an intangible, morale. The tangible areas are agility and reaction, running and conditioning, skill and tests, and strength. Coach Gibson has adopted the weight program outlined in this paper because it does achieve the development of strength which he desires while leaving time for the other areas.

The off-season training schedule for a week shown below indicates how well the weight program can fit into an over-all one. In studying the schedule, remember the division of players into groups A, B, C, and D mentioned earlier. Also notice that the schedule is for only the hour per day during which resistance training will be going for a part of the squad.

While the schedule for Friday is listed as varied, it does have a kind of loose pattern. Usually interior linemen and tight ends and the blocking backs and fullbacks require greater emphasis on strength than running backs, receivers, and quarterbacks. Those players requiring strength development then will often use the weights on Fridays, while the other players will stress agility, running, and conditioning. Friday also lends itself to a consideration of the individual's particular needs for development.

The fifth area in which Coach Gibson and all other coaches like to develop their squads is morale. The weight program helps morale in three ways. First of all, the player who knows he is strong carries out his assignments with confidence. Second, the player who uses his time on the weights so well that he needs only a total of one or one-and-one half hours a week on the weights has plenty of time to develop himself in other areas. This development adds further to his morale. Finally, the flexibility of the Friday schedule allows the coaching staff more time to consider every player's needs as an individual. This consideration further bolsters a player's morale.

Table 2 Off-Season Schedule for the Week

OFF-SEASON SCHEDULE FOR THE WEEK								
Player Group	Time	Monday	Tuesday	Player Group	Wednesday	Thursday	Friday	Saturday & Sunday
A	1st. 30 min.	Weights	Running	B	Condi- tioning	Agility	Varied	Rest
	2nd. 30 min.	Condi- tioning	Agility		Weights	Running	Varied	Rest
B	1st. 30 min.	Condi- tioning	Running	A	Weights	Agility	Varied	Rest
	2nd. 30 min.	Weights	Agility		Condi- tioning	Running	Varied	Rest
C	1st. 30 min.	Agility	Weights	D	Agility	Condi- tioning	Varied	Rest
	2nd. 30 min.	Running	Condi- tioning		Running	Weights	Varied	Rest
D	1st. 30 min.	Agility	Condi- tioning	C	Agility	Weights	Varied	Rest
	2nd. 30 min.	Running	Weights		Running	Condi- tioning	Varied	Rest

## CHAPTER VII

A COMPARISON OF LIFTING ABILITY (EXPLOSIVE POWER)  
AT THE END OF THE 1967 AND 1968 OFF-SEASON PROGRAMS

Two lifts were selected to measure explosive power at the end of the 1967 and 1968 programs, the power clean and the bench press.

For the power clean, the bar was placed horizontally in front of the lifter's legs. The lifter grasped the bar, palms downward, and brought it in a single movement from the floor to the shoulders, while either splitting or bending the legs. After the bar hit the chest and he straightened his legs, he held the position one second before returning the bar to its resting place on the floor.

For the bench press, the lifter assumed a supine position with head, trunk, and buttocks resting on the bench while the feet remained flat on the floor.

From this position, with arms extended over the chest the lifter lowered the bar and held it at the chest for two seconds before starting the uplift movement.

At the signal the bar was pressed vertically to full arms' length and held for two seconds.

The bars were loaded with a weight well under the limit required for the weakest player. Additional resistance was added in five pound jumps until the strongest player could no longer execute the movement required. Players could start with any weight desired and compete as long as they performed the

exercise correctly. Once a lift was missed, a player dropped out of the competition, recording the last successful lift as his maximum.

Both the 1967 and the 1968 off-season programs allowed for two thirty minute sessions of weight lifting per week for seven weeks. However, there was a difference in the eight basic exercises used. The 1967 program used shoulder shrugs, three-quarter squats, dead lifts, bench presses, power presses, explosive thrusts, and lateral pull-downs. The 1968 exercises were those outlined in this report.

#### Subjects

Sixteen college football players at Kansas State University were selected as the subjects for this study. Their personal data appear in Table 3.

In order to keep the study reliable, only those who participated fully in both the 1967 and 1968 off-season weight programs are listed.

The following classifications of players are not included for the reasons given:

1. Sophomores in 1968 were not in the 1967 off-season program.
2. Quarterbacks and receivers did not attend the weight training regularly.
3. Seniors did not participate in the 1968 program.
4. Others were omitted because of absentees, injuries or illness.

Table 3. Personal Data

Subject	Class (1967-68 term)	Height	Weight	Positions Played
1	Jr.	6'3"	209	fullback
2	Jr.	5'10"	196	linebacker
3	Jr.	5'10"	205	defensive end
4	Jr.	5'9"	174	defensive halfback
5	Jr.	5'10"	203	defensive end
6	Jr.	6'1"	202	defensive monster man
7	Jr.	5'11"	202	offensive guard
8	Jr.	6'1"	186	offensive end
9	Jr.	6'1"	217	offensive tackle
10	Jr.	6'2"	208	offensive guard
11	Jr.	6'2"	235	offensive tackle
12	Jr.	6'1"	202	defensive monster man
13	Jr.	5'9"	195	defensive linebacker
14	Jr.	5'10"	197	offensive center
15	Jr.	6'1"	206	defensive end
16	Jr.	5'11"	217	defensive tackle

The sixteen players listed in Table 3 include both starters and non-starters, from various positions, thus giving a fair cross-section of the whole squad.

Table 4. A comparison of maximum explosive power at the end of the 1967 and 1968 off-season programs.

POWER CLEAN				BENCH PRESS			
Subject No.	1968	1967	Gain	Subject No.	1968	1967	Gain
1	250	160	90	1	215	195	20
2	255	165	90	2	235	195	40
3	205	150	55	3		195	
4	235	155	80	4	295	260	35
5	240	155	85	5	245	185	60
6	215	175	40	6	315	245	70
7	235	155	80	7	235	185	50
8	205	180	25	8	200	175	25
9	225	155	70	9	270	205	65
10	220	175	45	10		195	
11	260	155	105	11	230	205	25
12	205	165	40	12	250	195	55
13	205	185	20	13	225	195	30
14	225	185	40	14	295	225	70
15	225	180	45	15	215	185	30
16	210	160	50	16	225	200	25
16	TOTAL		960	14	TOTAL		610
Average gain for power clean - 60 pounds				Average gain for bench press - 43 pounds			
Percentage gain of 36% of 1967 record				Percentage gain of 21% of 1967 record			

## CHAPTER VIII

## SUMMARY AND CONCLUSIONS

In general, the present investigation indicates that higher levels of strength can be developed by using the eight station continuous action power circuit than by the usual weight programs. The degree of strength increase that can be attributed to a year's growth and maturation is uncertain, but it is highly improbable that it would be nearly as great as the percentage indicated in this study, particularly since the 1967 figures represent achievement at the end of a season's training.

The results do establish that the eight circuit continuous action program achieves a great increase in explosive power with a minimum of time.

Plausible explanations for the large gains in explosive power may reside in the following principles.

1. The exercises were selected to develop explosive power for football and not for general body conditioning and strengthening.
2. The repetitions were held to a maximum of six so that greater weight could be handled by the players without inducing fatigue.
3. The leg exercises were performed on a power rack at such levels that maximum force could be exerted throughout the upper one-half of the range of joint movement.

4. Additional stress was placed upon the muscles by using a combination of isotonic and isometric training periodically during the program.
5. The players moved from one station to the next within the circuit to avoid undue local muscle fatigue that would reduce ability to overcome resistance in later repetitions.

## ACKNOWLEDGMENTS

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DEVELOPMENT AND USE OF AN EIGHT STATION  
CONTINUOUS ACTION POWER CIRCUIT TO INCREASE  
THE EXPLOSIVE POWER OF COLLEGE FOOTBALL PLAYERS

by

GAILORD HORACE BELLAMY

B. A., Wichita State University, 1959

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AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

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Football players and coaches across the nation have in recent years shown increasing interest in including weight lifting routines as part of their overall training programs.

This interest has resulted in many publications on weight training programs designed to develop strength and explosive power. However, coaches should continually strive to develop and devise better training methods by continuous experimentation and research.

The program presented in this paper develops strength and power for football. It presents a fresh, new look at weight training for football and offers a quicker and better way of developing the explosive power necessary for playing football well. The gain in strength recorded for players using this program offers convincing proof of its effectiveness.

The system outlined in this report is a high resistance program calling for the use of power racks, olympic bars, and gradually increasing resistance heavy enough to activate the deeper muscle fibers of the body.

The exercises are designed to involve the muscles that are most directly related to the sport of football, the muscles that aid a man to explode across the line from a football stance with top acceleration in the least amount of time and with enough sustained force to carry out his assigned objectives against opposing players.

Weight lifters and football players are comparable in many ways because their sports call for many isolated efforts

involving maximum or near maximum exploding power directed at overcoming a resisting object. Also, the muscle groups involved are close to being the same except for the olympic press.

The basic weight program for football conditioning centers around just eight exercises. These exercises have been chosen because they are of greatest transfer value to the kinds of resistance encountered in football. By being limited in number, all exercises can be carried out with a suitable number of repetitions in a thirty-minute session. Two such sessions a week are enough to provide effective resistance training, thereby freeing the players for speed, agility and skill drills.

The eight station continuous action power circuit is comprised of eight exercises divided into two smaller circuits of four exercises each. This training program can be used by large groups or by individual players.

An entire squad can be divided into smaller groups for weight training. Dividing into small groups allows flexibility in the exercise program so that those players who require greater strength can spend more time on weights, while the other players can practice agility, speed, and specialties.

The time between repetitions of an exercise gradually decreases during lifting program. The unique isometric principle is introduced after the fifth week to develop the maximum strength possible in each player.

The eight station continuous action power circuit offered in this report was designed by the author and

adopted for use by Coach Vince Gibson at Kansas State University.

Comparative achievement tests between 1967 and 1968 participants in the off-season program show that individual players lifted an average of 36 per cent more weight in the power clean and 21 per cent more for the bench press at the end of the 1968 season than at the end of the 1967 season. No player participated in a weight program between the two seasons.

On the basis of actual achievement by participants, the eight station continuous power circuit can be of significant value in developing explosive power for football players.