

ATHLETICS OMNIBUS - STRENGTH TRAINING WITH WEIGHTS

From the Athletics Omnibus of Richard Stander, South Africa

For the novice athlete to continuously improving to the next level of excellence, the basic ingredients of the training programme should be technique, endurance and speed training. However, even the best technique, endurance or speed training methods in the world have a limited capacity to improve the performance of the athlete.

For an athlete to continuously improve to more advanced levels of excellence, irrespective the event, the basic ingredient of the training programme should be strength training.

1. THE VALUE OF TRAINING

- 1.1. Muscle enzymes (protein catalysts) increase
- 1.2. The number of units (mitochondria) in which energy conversion takes place increases
- 1.3. Storage of fuel for the production of energy increases
- 1.4. The capillary network increases
- 1.5. Muscular volume increases (hypertrophy)

This combination of effects increases strength, stability, endurance, and a capacity for rapid contractions in the muscles.

2. THE VALUE OF STRENGTH TRAINING

- 2.1. More strength improves the capacity to develop basic speed.
- 2.2. Ensure an effective application of technique.
- 2.3. The quality of a performance can be maintained over a longer period of time.
- 2.4. Early season strength training enables the athlete to do more intensive training later in the year.
- 2.5. There is less fluctuation in the athlete's performance level.
- 2.6. The performance of the athlete can be predicted with more accuracy.

3. TERMINOLOGY USED DURING STRENGTH TRAINING SESSIONS

3.1. MAXIMUM WEIGHT

Before a strength programme can be designed the athlete will have to know what the maximum weight that can be lifted is in a particular exercise. The maximum weight is measured at the end of each training cycle of 4 to 6 weeks of strength training.

3.2. EXERCISE

Exercise is the physical activity required to develop a specific muscle for a specific event. The type of event that an athlete prepares for (e.g. Shot Put) will determine what type of exercises will be done (e.g. maximum Strength).

3.3. RESISTANCE (INTENSITY)

The maximum weight an athlete can lift in a specific weight exercise will serve as a norm to determine the resistance that must be used e.g. 90% of maximum weight of 100kg will be 90kg. 90% will be the resistance or intensity of the exercise.

3.4. REPETITIONS

Repetitions are the number of times an exercise is performed without stopping. The number of repetitions an exercise is performed without stopping will determine the type of strength that will be developed e.g. strength endurance requires many repetitions at low intensity).

EXAMPLE:

- 3.4.1. 100% resistance = 1 repetition
- 3.4.2. 95% resistance = 2-3 repetitions
- 3.4.3. 90% resistance = 4-6 repetitions
- 3.4.4. 80% resistance = 7-9 repetitions
- 3.4.5. 70% resistance = 10-12 repetitions

3.5. SET

A specified number of repetitions comprises of one set. Three sets of 10 repetitions would be written: Calf Raises: 3 x 10 x resistance.

3.6. CIRCUIT

Three or more different types of exercises within one training session will define a circuit.

3.7. TRAINING SESSION

A training session will consist of all the exercises done in one continuous period of time on the same day.

4. THERE ARE 3 TYPES OF STRENGTH TRAINING

The three types of strength training will be used in different stages of the athlete's training programme.

- 4.1. Maximum strength consists of weight training with high resistance and low repetitions.
- 4.2. Elastic strength consists of weight training with medium resistance and medium repetitions. The repetitions are executed with fast movement of the limbs.
- 4.3. Strength endurance consists of weight training with light resistance and high repetitions.

5. STRENGTH CONDITIONING

The following laws must be taken in consideration when preparing a strength conditioning programme:

5.1. LAW OF OVERLOAD

When an athlete trains on a lighter level of intensity, the initial response of the body will be fatigue. When the training (loading) stops, there will be a process of recovery from fatigue and adaptation to the training load during the rest period.

The body will overcompensate to prepare for the next training session. Every new level of training load, followed by a correctly applied rest phase will lead to a higher level of fitness. The athlete in training needs more rest than non-athletes.

The body repairs its own tissues, but it requires its "off" time every day. The average athlete requires 8 - 10 hours of sleep each day to recuperate sufficiently for the next training session.

5.2. LAW OF REVERSIBILITY

The training ratio/quality (training with a higher load followed by a recovery phase) has a direct influence on the increase or decrease of the performance level of the athlete. The level of loading can be increased by means of:

- 5.2.1. the number of repetitions, (3 to 10 reps)
- 5.2.2. faster repetitions, (time of execution more or less)
- 5.2.3. heavier weights or
- 5.2.4. shorter recovery (rest between reps or sets)

Once the body has adapted to a particular training load, adaptation ceases. If the rest periods are too long between repetitions, the athlete's fitness level will increase very slowly.

However, if the training load is repeatedly too much or too closely spaced, the athlete will not recover sufficiently to cope with the next training load, causing overtraining and a subsequent decrease in performance. When decrease of performance takes place, the training load must be reduced.

An active rest phase is suggested. With young athletes this means a high intensity training session every 4th day rather than every second day. If the athlete does not respond to the increased active rest, the training load must be reduced, e.g. reduced number of repetitions, lighter weights, etc.

5.3. LAW OF SPECIFICITY

The training loads must be specific to the event the athlete is preparing for, to ensure an increase in the performance level.

However, specific training will be of very little value, without a proper general training preparation period.

The greater the volume of general training, the greater the capacity of the athlete will be to cope with specific training. This means a smaller risk factor of overtraining and the need for a longer rest period to recover from overtraining.

5.4. THE LAW OF REST

Rest is the most important cornerstone of three very basic rules:




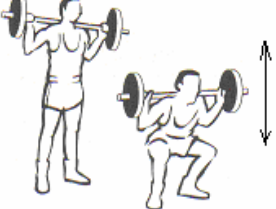

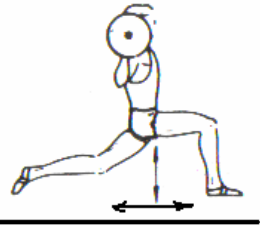

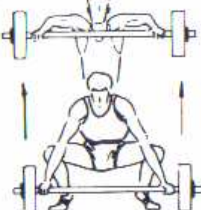
- 5.4.1. Moderation must always be kept in mind during training to avoid serious injuries. The human body can take far more stress than we generally give it. However, it needs to adapt to heavier stresses gradually, by making use of sufficient rest periods.
- 5.4.2. Consistent training on a reasonable level should be done every day. If a few days of training are missed, the body loses its form. A day or two of extra-hard training does not make up for the loss, and will lead to injury and illness due to a lack of rest.
- 5.4.3. To rest is very important. More training load creates extra physical stress, which calls for more recovery time. The body makes its adaptation to stress when the body is at rest, rather than during stress. This is a part of the principle of overloading. Peak performance can only be achieved after a moderate, constant increase in training load, followed by sufficient rest.


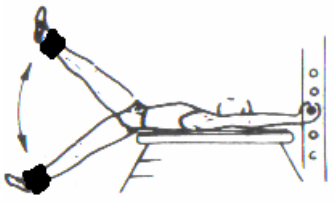
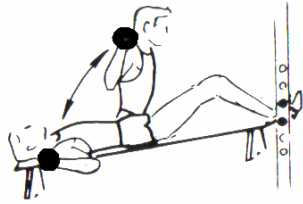
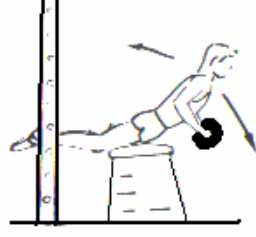
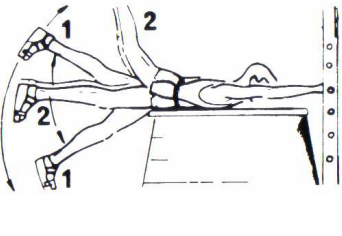


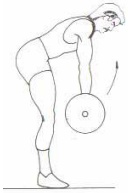
5.5. PREPARING THE PROGRAMME USING THE 4 LAWS OF CONDITIONING




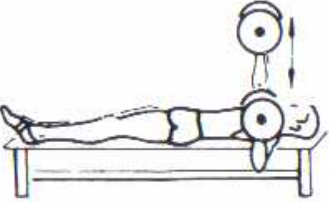



- 5.5.1. Use an over distance approach.
- 5.5.2. First use a quantity approach, then as the athlete become stronger, focus on quality strength training. Build a foundation of strength endurance and then develop maximum strength. This will prevent injury.
- 5.5.3. For the first month of training you will do no maximum strength exercises.
- 5.5.4. As you near a competition date, you will do less quantity strength training and more maximum strength training.
- 5.5.5. Workouts will generally be a hard day followed by an easy day, with a lightening up of work two days before competition.
- 5.5.6. Your schedule is flexible. You may change the daily routine because of weather, body condition, or emotional outlook.
- 5.5.7. You should completely recover from one workout to the next. If you are not completely recovered, do less work, or rest.
- 5.5.8. You should never train when you are ill or have an injury.
- 5.5.9. If your training schedule is limited, you may telescope this schedule into two-week periods instead of monthly periods.
- 5.5.10. Your workouts must be fun or rewarding, preferably both.

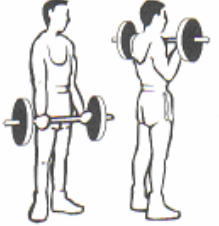
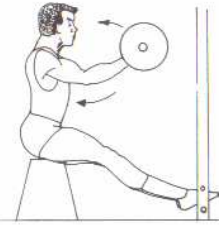
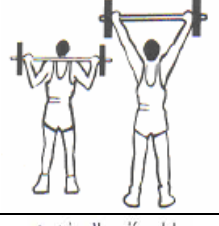
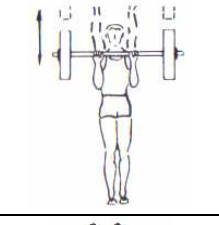
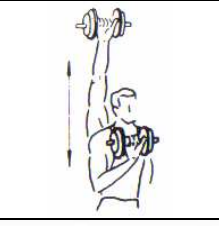
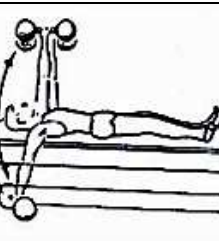
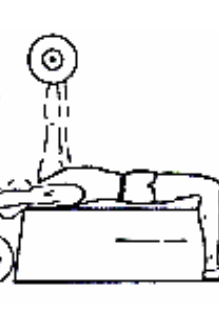
5.6. TABLE TO DEVELOP MAXIMUM STRENGTH AND STRENGTH ENDURANCE DURING 2-4 SETS OF EXERCISES IN ONE TRAINING SESSION



Type of strength exercise	Resistance (Weights exercises only)	Number of repetitions in an exercise	Duration of 1 exercise in sec.	Recovery between sets in sec.	Recovery between circuits in min.
Maximum	100%	3	15	30	3
Maximum	95%	4	15	30	3
Maximum	90%	5	15	30	3
Maximum	85%	6	15	30	3
Endurance	80%	7	15	30	3
Endurance	75%	8	15	30	3
Endurance	70%	9	15	30	3

<p>SQUAT JUMPS To strengthen the hips, legs and calves. Squat jump with a medium weight on the shoulders as high as possible. Place protective material between the bar and the neck.</p>										X	X	X	X			
<p>KNEE PICK-UPS To strengthen the knee flexors and extensors and the groin muscles. Place a weight around the ankle. Lean against a wall and lift the knee fast.</p>		X	X	X	X					X	X	X	X			
<p>LEG EXTENSIONS To strengthen the knee flexors and extensors and the upper leg muscles. Place a weight around the ankle. Sit on a chair and extend the knee.</p>		X	X	X	X					X	X	X	X	X	X	X
<p>HALF SQUAT To strengthen the lower part of the body and legs that is used in all phases of movement. Carry out squats with weights on the shoulders, keeping the trunk as upright as possible.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>POWER CLEAN To strengthen the lower part of the body and legs that is used in all phases of movement. Carry out squats with weights on the shoulders, keeping the trunk as upright as possible.</p>		X	X	X	X					X	X	X	X	X	X	X
<p>JUMP AND STEP To strengthen the muscle groups used in the jumps, with the feet far apart. Place a weighted bar bell ¼ body weight on the shoulders, and do successive jumps while alternating the foot in front.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>LEG CURLS To strengthen the hamstrings, stand hold onto a pole while lifting the lower leg with a weight around the ankle as high as possible.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>HIGH PULL Over-all development of the legs, trunk, shoulders and arms. Grasp the bar wide. Extend the legs strongly and pull with the shoulders and finally with the arms until the bar reach chin height.</p>		X	X	X	X					X	X	X	X	X	X	X

<p>POWER SNATCH To strengthen the legs and back, bend the knees to take a wide grasp of a bar loaded with discs and lift the bar above the head, with both legs and arms taking part in the movement. Keep the trunk as upright as possible at all times.</p>										X	X	X	X	X	X	X	X
<p>ALTERNATE LEG RAISES To strengthen the lower back, hip and groin muscles. Lay on the back and raise the legs with ankle weights alternatively through a wide range</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>ELEVATED SIT-UPS To strengthen the stomach and shoulder muscles. Lay the back with feet elevated. Hold a light weight behind the neck and do sit-ups.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>CHEST RAISES To strengthen the lower back lie on a bench with the hips resting on the bench. Hold a light weight in the hands and lift the chest up and down through a wide range.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>EXTENDED LEG CURLS To strengthen the hamstring and lower back, lie with the stomach on a bench with the legs hanging down. Alternate leg-raises through a wide range.</p>										X	X	X	X	X	X	X	X
<p>ROWING To strengthen the lower back and hamstrings, lean forward and lift the weights until the bar touches the stomach.</p>		X	X	X	X				X	X	X	X	X	X	X	X	X
<p>GOOD MORNING To strengthen the lower back and hamstrings, lean forward with a weight held behind the back. Raise the torso up and down.</p>				X					X	X	X	X	X	X	X	X	X
<p>FORWARD RAISE To strengthen the upper back and shoulders, lean forward, lift the weight up in a forward direction with extended arms.</p>				X					X	X	X	X	X	X	X	X	X

<p>SITTING TRUNK TURNS To mobilise the hips and trunk, sit on a bench with the feet resting on the ground at each side of the bench. Place a weighted bar on the shoulders and hold the bar with a wide grip. Rotate the trunk in both directions.</p>																			X	X	X	X	
<p>STANDING TRUNK TURNS To mobilise the hips and trunk, stand with the feet apart. Place a weighted bar on the shoulders and hold the bar above the shoulders. Rotate the trunk in both directions.</p>																			X	X	X	X	
<p>CROSSOVERS To strengthen the back, arms and shoulders, lean forward with dumbbells in the hands. Swing the arms sideways as high as possible.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>BENCH PRESS To strengthen the arms and shoulders, lie on a bench, with dumbbells in each hand. Alternatively push the dumbbells upwards.</p>		X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>SITTING TWIST AND BEND To strengthen the upper body, sit on a bench and hold a weight against the chest. Turn alternatively sideways touching the floor with the weights.</p>														X	X	X	X	X	X	X	X	X	
<p>STANDING TWIST AND BEND To strengthen the upper body, stand with dumbbells above the head. Turn alternatively sideways bending sideways touching the floor with the weights.</p>																			X	X	X	X	
<p>SIDE BENDS To strengthen the lateral muscles, stand with the feet astride, with a weighted bar resting on the shoulders and held with a wide grasp. Bend the trunk sideways and back.</p>																			X	X	X	X	

<p>BICEPS CURL To strengthen the upper arms and upper body, stand up straight and hold the bar with fingers pointing forward. Lift the bar from the hip to the chest and back.</p>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<p>BACKWARD ROWING To strengthen the shoulders and arms, sit on a bench and hold dumbbells to the chin and extend the dumbbell forwards and back towards the chest.</p>												X	X	X	X	
<p>BEHIND NECK CLEAN AND PRESS To strengthen the back and shoulders, stand upright, hold the weight behind the head on the neck and push the weight up and down.</p>								X	X	X	X	X	X	X	X	X
<p>CHIN CLEAN AND PRESS To strengthen the chest and shoulders, stand up straight, hold the weight chin high and push the weight up and down.</p>												X	X	X	X	
<p>SINGLE ARM PRESS To strengthen the arm and shoulder hold a dumb-bell at shoulder height, stretch upwards vigorously alternating the arms.</p>								X	X	X	X	X	X	X	X	X
<p>DOUBLE ARM ROWING To strengthen the waist, lie on a bench with a weighted bar in the hands. Lift the weights until the two weights make contact above the chest and then lower the weights again.</p>												X	X	X	X	
<p>TRICEPS EXTENSION To strengthen the muscles of the arm, lie on a bench with the feet resting on the ground at each side of the bench. Reach back with the arms well bent to grasp a weighted bar with a narrow grip, and raise the bar to a position above the chest with the arms extended. Keep the elbows well forward.</p>		X	X	X	X			X	X	X	X	X	X	X	X	X

<p>DUMBBELL SPRINTING To strengthen the arms and shoulders, stand upright, with dumbbells in the hands. Move the arms forward and backwards in a running motion without moving the feet.</p>		X	X	X	X	X	X	X	X	X	X	X					
<p>DUMBBELL WALKING To strengthen the arms and shoulders, stand upright, with dumbbells in the hands. Move the arms forward and backwards in a race walking motion while walking in a high knee motion and the feet crossing the path of the trailing foot.</p>								X	X	X	X	X	X	X	X	X	X

BIBLIOGRAPHY

1. Basic Coaching Manual - I.A.A.F., 3 Hans Crescent, Knightsbridge, London SW1X, England.
2. But First - B.A.F. 225A Bristol Rd, Edgbaston, Birmingham B5 7UB.
3. Discus throwing, Max Jones, - B.A.F. 225A Bristol Rd, Edgbaston, Birmingham B5 7UB.
4. Focus On Middle Distance Running - Humphreys And Holman, A+C Black Publishers Ltd, 35 Bedford Row London, WC1R 4JH
5. Hammer throwing, Carl Johnson, - B.A.F. 225A Bristol Rd, Edgbaston, Birmingham B5 7UB.
6. High Jump, Frank Dick, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
7. How to teach the jumps, David Johnson, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
8. Hurdling - Malcolm Arnold - British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
9. Long Jump, Malcolm Arnold, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
10. Middle Distance Races - Jess Jarver - Tafnews Press, P o Box 296, Los Altos, California, 94022, U.S.A.
11. Middle and Long Distance, Marathon and Steeple Chase - British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
12. Pole vault, Peter Sutcliffe, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
13. Race Walking - Peter Markham - British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
14. Shot putting, Max Jones, - B.A.F. 225A Bristol Rd, Edgbaston, Birmingham B5 7UB.
15. Strength training, Max Jones, - B.A.F. 225A Bristol Rd, Edgbaston, Birmingham B5 7UB.
16. Sprints and Relays - Frank Dick - British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM
17. So You Want To Start - Winter Enterprises, 1430 Cherrydale Drive, San Jose, California 95125.
18. Sprints and Relays - Jess Jarver - Tafnews Press, Book Division of Track and Field News, 2570, Elmino Real, Suite 606 Mountain View, CA 94040 USA.
19. Techniques of Athletics and Teaching Progressions - I.A.A.F., 3 Hans Crescent, Knightsbridge, London SW1X, England.
20. The Triple Jump, Malcolm Arnold, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.