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ABSTRACT

This paper begins with a discussion of terminology and of the distinctions between bodybuilding, powerlifting, and weightlifting. Weightlifting is presented as the only weight training-associated sport in the Olympic Games. The overhead movements and bodyweight classes involved in the sport are described, and advantages of free weight training are outlined. The paper emphasizes that training programs designed for bodybuilding, which utilize high repetitions and emphasize isolated muscles/muscle groups, do not replicate natural body movements which entail the sequential and simultaneous recruitment of many muscles. Coaches, trainers, and fitness instructors need to be knowledgeable about weight training in order to design training programs that simulate human movement patterns and contribute to the development of functional strength. An appended list of resources for further information lists a strength-training consultant, two organizations, and three publications. A chart displays a yearly plan of training for resident athletes of the United States Weightlifting Federation, and activities are listed for a typical training week for a female weightlifter in the preparation phase and the competition phase. (JDD)

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WEIGHTLIFTING
AND
HOW WEIGHTLIFTING BENEFITS OTHER SPORTS

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- > AMERICAN RECORD HOLDER (48 and 52 kg classes)
- > WORLD RECORD HOLDER (PAST)

SIBBY FLOWERS

- > 6-TIME NATIONAL CHAMPION
- > 5-TIME WOMEN'S WORLD CHAMPIONSHIPS TEAM MEMBER
- > 3-TIME OLYMPIC FESTIVAL CHAMPION
- > AMERICAN RECORD HOLDER (44 and 48 kg classes)

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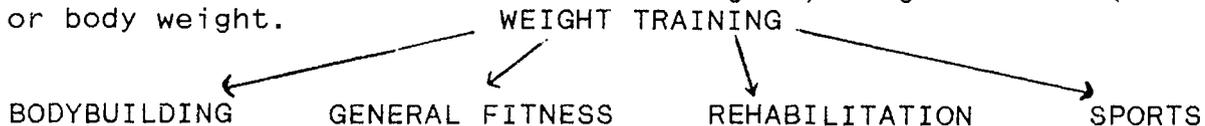
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TERMINOLOGY ASSOCIATED WITH WEIGHT LIFTING

Basically, **WEIGHT TRAINING**, **WEIGHT LIFTING**, **RESISTANCE TRAINING** and **STRENGTH TRAINING** are all general terms that refer to the lifting of weighted objects to bring about a desired effect, but they differ in the specific area in which they are most often utilized.

WEIGHT TRAINING - A general term that refers to a wide variety of activities that may have different goals, but use the same basic tool (resistances) to achieve those goals. Technically, the term **WEIGHT TRAINING** refers to the use of free weights, weight stacks (on machines) or body weight.



WEIGHT LIFTING - A general term, synonymous with **WEIGHT TRAINING**. Refers to the general use of weighted equipment and/or objects to bring about a variety of objectives. [NOTE: this term is two words; the sport of **WEIGHTLIFTING** (described below) is one word.]

RESISTANCE TRAINING - Also a general term. **RESISTANCE TRAINING** includes the use of free weights, weight stacks (on machines), hydraulics, body weight, elastic bands, water, etc. anything that provides a resistive effect. This term is most often used when the goal is rehabilitation.

STRENGTH TRAINING - Also a general term. This term is most often used in reference to training programs designed to enhance sports performance or for general fitness when the primary goal is to improve overall muscular strength.

* * * * *
There are 3 sports associated with **WEIGHT TRAINING**:
BODYBUILDING, **POWERLIFTING**, and **WEIGHTLIFTING**

These 3 terms in NO way mean the same thing. An analogy that best describes the inaccuracy of comparing these 3 endeavors is to say that **TENNIS**, **RACQUETBALL**, and **BADMINTON** are the all the same. They are the same only in that they are all racquet sports!! Likewise, **BODYBUILDING**, **POWERLIFTING**, and **WEIGHTLIFTING**, are the same ONLY in that they all utilize **WEIGHT TRAINING** to achieve their specific goals.

BODYBUILDING can be defined as a competitive or recreational endeavor in which the goal is to develop an idealized, muscular physique. The training for **BODYBUILDING** typically involves performing high repetitions and the use of weight training exercises that isolate individual muscles or muscle groups. In competition bodybuilders DO NOT lift weights, rather, they pose in several different rounds of judging to display their physiques which are then evaluated by a panel of judges.

In *POWERLIFTING*, competitors attempt to lift the maximum amount of weight possible in 3 exercises (common to most weight training programs). By definition, *POWERLIFTING* is a misnomer. *Power* is defined as work divided by time, or, $F \times D / t$ (where F =force, D =distance and t =time). In *POWERLIFTING*, the 3 competitive lifts are performed through a limited range of motion over an extended period of time, i.e. the element of speed (which is fundamental to power) is not an important factor for success. By limiting the range of motion in these movements, distance is reduced and less work must be performed. The 3 competitive lifts in *POWERLIFTING* are:

- 1) (*POWER*) *SQUAT* - with barbell on back of shoulders, the lifter descends to a point where the thighs are approximately parallel with the floor and returns to an upright standing position.
- 2) *BENCH PRESS* - while lying on a bench, the lifter takes the barbell from an arms extended position, lowers the barbell to the chest and presses the weight upward to return to an arms extended position.
- 3) *DEADLIFT* - the lifter grips the barbell and stands to an upright position where the shoulders are behind the hips.

In *WEIGHTLIFTING*, athletes compete in two overhead movements: 1) the *SNATCH*, and, 2) the *CLEAN & JERK*. *WEIGHTLIFTING* is truly a *Power* sport; successful performance of the 2 competitive movements is dependent on the athlete's ability to overcome the force of gravity and therefore, the element of speed (power) becomes critical.

The *SNATCH* and *CLEAN & JERK* require technical mastery, flexibility, mental focus, strength, power and athletic ability; the objective is to lift the greatest amount of weight from the floor to an overhead position in a continuous movement. [See *SNATCH* and *CLEAN & JERK* brochures provided for sequence photos and a more detailed explanation.]

WEIGHTLIFTING is the *only* weight training-associated sport in the Olympic Games (to date males only), therefore, the *SNATCH* and *CLEAN & JERK* are often referred to as the "Olympic Lifts". To avoid confusion, the sport of *WEIGHTLIFTING* is often called "Olympic-Style Weightlifting". However, the correct term is *WEIGHTLIFTING*, and the history of strength sports reveals that *WEIGHTLIFTING* was the predecessor of both *BODYBUILDING* and *POWERLIFTING*. In fact, Arnold Schwarzenegger began his *BODYBUILDING* career in *WEIGHTLIFTING*; by his own admission, when he realized he was not talented enough to make the Austrian weightlifting team he turned his efforts to a career in *BODYBUILDING*.

WEIGHTLIFTING was included as an official sport in the first modern day Olympics and has been a regular feature of the Olympic Games since 1920. Women have competed in World Championship competitions since 1987. To date, U.S. women weightlifters have competed in 11 National Championships and 3 Olympic Festivals. The national governing body for weightlifting in the U.S. is the USWF (U.S. Weightlifting Federation). The USWF and its women's committee have been working toward the inclusion of women weightlifters in the Olympic Games since 1989 and we hope to realize this goal by 1996.

There is no difference in the competition format or in the competitive movements between male and female weightlifters; all athletes compete in the *SNATCH* and the *CLEAN & JERK*. The only difference is that men compete in 10 bodyweight classes and women compete in 9.

<u>MEN'S BODYWEIGHT CLASSES</u>		<u>WOMEN'S BODYWEIGHT CLASSES</u>	
	<u>Pounds conversion</u>		<u>Pounds conversion</u>
54 kg	= 118.8	46 kg	= 101.2
59 kg	= 129.8	50 kg	= 110
64 kg	= 140.8	54 kg	= 118.8
70 kg	= 154	59 kg	= 129.8
76 kg	= 167.2	64 kg	= 140.8
83 kg	= 182.6	70 kg	= 154
91 kg	= 200.2	76 kg	= 167.2
99 kg	= 217.8	83 kg	= 182.6
108 kg	= 237.6	83+ kg	= 182.6 and above
108+ kg	= 237.6 and above		

Throughout the training year *WEIGHTLIFTING* training is divided into 2 basic phases: *PREPARATION* and *COMPETITION*. There are 3 variables in a *WEIGHTLIFTERS* training that are manipulated to bring about progress. These variables are:

- 1) the *intensity* (amount of weight)
- 2) the *volume* or *load* (total number of repetitions)
- 3) *technique* - the full *SNATCH*, full *CLEAN & JERK*

During *PREPARATION* phases the *intensity* is low to moderate, the *volume* is high and the emphasis on *technique* is low to moderate. The *PREPARATION* phases prepare the athlete to handle the higher intensity training of the *COMPETITION* phases. *COMPETITION* phases of training take place immediately prior to major competitions. Generally, the *COMPETITION* phase is characterized by higher intensity work with less total volume. As one gets closer to a meet, the number of repetitions between 80 and 100% of the athletes' maximums increase. Lesser volume during the *COMPETITION* phase aids in recovery which is important during higher intensity training but becomes critical as the competition day draws nearer. On a daily and weekly basis, fluctuations in *intensity* also serve to aid in the athlete's recovery. As the name implies, the *COMPETITION* phase prepares the athlete to lift the greatest weights possible in the competition. [See bar graph for illustration of above.]

Not only is *WEIGHTLIFTING* a competitive sporting endeavor, *WEIGHTLIFTING* can also be a methodology of training which is highly effective in enhancing the performance of athletes in other sports. The use of *WEIGHTLIFTING* as a methodology of training entails the use of the *WEIGHTLIFTING* movements (*SNATCH* and *CLEAN & JERK* and variants of these) to enhance the performance of athletes that compete in other sports. *Effective* program design is *functional*, that is, the training program is designed to produce specific adaptations which directly influence performance. *Effective* program design will:

- 1) addresses the anatomical basis of movement in a particular activity, and,
- 2) considers the versatility of human motion, i.e. the ability of muscles to serve in different capacities for different movement

3) employs specificity by selecting exercises that most closely mimic the movements that an athlete performs in their particular sport. Only functional program design will provide the basis for the transfer of skills and neuromuscular adaptation from the weight room to the playing field. When the objective of weight training is to simulate the most common, reproducible movement patterns that occur in sports, namely jumping, then the obvious choice of exercise equipment is free weights.

ADVANTAGES OF FREE WEIGHT TRAINING:

- 1) Mechanical mimicry of the way in which the human body moves, i.e. movements occur "freely" - not within a restricted plane of movement.
- 2) Neuromuscular feedback is same as that encountered in sport performance.
- 3) Free weight training requires the athlete to balance the weight so that in effect, synergistic and stabilizing musculature is also trained = similar to movements occurring in the real world.
- 4) Free weights are truly an accommodating resistance, i.e. as one moves into an advantageous lever position and can produce the most force, the barbell accelerates. In all sports, force is directly proportional to acceleration.
- 5) Free weight training provides greater sport specificity.

The most effective means of simulating the jumping movements which occur in sport is to utilize specific free weight exercises such as (*Olympic*) squats, power cleans, clean pulls, power snatches, snatch pulls and other variations of Olympic-Style Weightlifting such as push press and power jerks. [NOTE: the term power used as a prefix means the athlete does not descend into a full bottom position, i.e. the difference between a power snatch and a snatch is the depth of descent under the barbell - in a power snatch, power clean, etc., the athlete only partially descends under the bar.]

In Olympic-Style Weightlifting movements, the athlete basically jumps with a resistance which produces several beneficial effects:

- 1) strengthens the musculature involved in jumping,
- 2) reinforces the sequential pattern of muscle recruitment in jumping (i.e. neuro-muscular adaptations), and,
- 3) produces a plyometric training effect - because inherent these movements is a combination of eccentric-concentric contractions that result in an explosive, whole body extension.

This is not to say that free weights or Olympic-Style movements be utilized at the exclusion of all other exercise equipment. Although a qualified weight training instructor would be able to train every muscle group with a barbell alone, there is a time and a place for utilizing all types of exercise equipment.

The majority of training programs designed for athletes today, and even for general fitness, resemble training programs designed for **BODYBUILDING**, i.e. the training program utilizes high repetitions and emphasizes isolated muscles/muscle groups and/or splits the body into upper and lower body segments. This is simply NOT the way the human body is designed to function. There is NO movement occurring in

athletics (or in human motion) in which only one muscle group is employed, or a muscle is strictly confined to a prescribed plane of motion. Rather, human movement entails the sequential and simultaneous recruitment of many muscles. This is why scientists have had so much difficulty replicating walking patterns in victims of spinal cord injuries.

Weight training has traditionally been criticized by coaches for making athletes slow and inflexible. The explanation and rebuttal to this fallacy is actually quite simple: *YOU GET WHAT YOU TRAIN FOR!* If an athlete trains with slow, isolated muscle movements, then slow uncoordinated muscle movements will result. However, if an athlete trains in a manner in which they must coordinate several muscle groups simultaneously in a rapid, whole body extension - similar to jumping which occurs in all sports - then the objective of enhancing sports performance will be better met. Likewise, if the fitness enthusiast trains with whole body or multi-joint movements the result will be the development of FUNCTIONAL strength, that is, strength that can be utilized in the performance of their daily activities.

Why do coaches or trainers or fitness instructors continue to design training programs that do not simulate human movement patterns and therefore do not contribute to the development of FUNCTIONAL strength? Simple. They lack the education, for all their seemingly impressive credentials they most likely have only scratched the surface of strength training knowledge. There is a *much* more than meets the eye in *really* being knowledgeable about weight training - it has become a science in its own right. Typically, one does not receive this education while pursuing a Physical Education degree. Liability concerns make the issue receiving a thorough education in weight training an important consideration.

RESOURCES FOR FURTHER INFORMATION

For information on:
Developing Weight Training Curriculums.
Sport Specific Training Programs for Athletes/Teams
Or for
Faculty/Student Seminars

CONTACT: Lynne Stoessel-Ross, M.S., C.S.C.S.
Consultant, All facets of Strength Training
5013 - 70th Street
Lubbock, TX, 79424 (806) 794-5741

For more information on the field of Strength and Conditioning:

CONTACT:
The National Strength & Conditioning Association (NSCA)
P.O. Box 81410
Lincoln, NE
(402) 472-3000
-> National Certification Program Available: Certified Strength and
Conditioning Specialist (C.S.C.S.)
-> Publications: The NSCA Journal and Journal of Applied Sport Science
Research

For more information on the sport of WEIGHTLIFTING:

CONTACT: The United States Weightlifting Federation (USWF)
One Olympic Plaza
Colorado Springs, CO 80909
(719) 578-4508
-> National Coaches Certification Program Available:
Different levels; CONTACT PERSON: Lyn Jones, National Coaching
Director
-> Publication: Weightlifting U.S.A.

PUBLICATIONS:

Fleck, S. & Kraemer, W. Designing Resistance Training
Programs, Human Kinetics Publishers, Champagne; IL. (1987).
ISBN 0-87322-113-3

Garhammer, J. Sports Illustrated Strength Training.
Harper & Row; NY. (1986). ISBN 0-06-015134-X

Stone, M. & O'Bryant, H. Weight Training: A Scientific Approach
Burgess

**TYPICAL TRAINING WEEK
IN
PREPARATION PHASE
(120 lb. Female Weightlifter)**

MONDAY

BACK SQUAT 88x5*, 121x5, 154x5, 176x5, 176x5, 198x5, 220x5,
220x5, 242x3, 242x3, 242x3

POWER SNATCH 88x3, 110x3, 121x3, 121x3, 121x3, 121x3

POWER CLEAN 110x3, 132x3, 143x3, 143x3, 143x3

MILITARY PRESS 66x6, 77x5, 77x5, 77x5

WEDS.

SNATCH HIGH PULLS 88x3, 110x3, 110x3, 110x3, 110x3

CLEAN HIGH PULLS 121x3, 132x3, 132x3, 132x3, 132x3

POWER JERK 88x3, 110x2, 121x2, 132x2, 143x2, 143x2, 154x2
(OFF RACK)

THURSDAY

FRONT SQUAT 88x5, 132x3, 154x3, 176x3, 192x3, 203x3,
203x3, 203x3, 214x2

POWER CLEAN & JERK 88x2, 110x2, 121x2, 132x2, 143x2, 154x2,
154x2, 165x1, 170x1, 170x1, 154x3, 159x2

POWER SNATCH W/PAUSE 88x2, 110x2, 110x2, 121x2, 121x2,
(STANDING ON BLOCK) 110x2, 110x3

SNATCH-DEADLIFT 121x2, 137x2, 137x2, 137x2
(STANDING ON BLOCK)
W/PAUSE

SATURDAY

SNATCH 88x2, 110x2, 126x3, 132x2, 137x2, 143x2,
148x1 (1 miss), 148x2, 154x2, 154x2, 154x2,
159x1, 159 miss, 159 miss, 132x3

CLEAN & JERK 88x2, 110x2, 132x2, 154x2, 165x2, 170x1, 176x1,
181x1, 187x1, 192x1

CLEAN DEADLIFT 198x2, 209x2, 209x2, 209x2, 209x2

* 1st number represents weight in lbs.; 2nd number is the
number of repetitions performed

TYPICAL TRAINING WEEK
IN
COMPETITION PHASE (2 WEEKS BEFORE COMPETITION)
(101 lb. Female Weightlifter)

MONDAY

BACK SQUAT 66x2*, 88x2, 99x2, 110 x1, 115x1, 121x1, 126x1,
132x1, 137x1

SNATCH DEADLIFT 143x2, 154x2, 165x2, 165x2

RACK JERKS 66x3, 88x3, 110x3, 126x3, 143x3, 154x2, 154x2,
159x2

POWER CLEAN 88x2, 110x2, 121x1, 132x1, 143x1, 143x1

TUESDAY

BACK SQUAT warm-ups 209x2, 209x2, 209x2

INCLINE PRESS 75x5, 75x5, 75x5

THURSDAY

CLEAN & JERK 88x2, 110x2, 126x1, 137x1, 148x1, 159x1, 159x1

HACK SQUAT 20x5, 40x5, 60x5, 60x5, 60x5

SATURDAY

SNATCH 66x2, 88x2, 99x2, 110x2, 115x1, 115x1, 115x1

SNATCH DEADLIFT 132x2, 132x2, 132x2

POWER CLEAN & JERK 88x2, 110x2, 121x2, 121x2, 121x2

BACK SQUAT 88x3, 121x3, 143x3, 165x3, 176x3, 187x3,
187x3, 187x3

* 1st number represents weight in lbs.; 2nd number is the
number of repetitions performed