Advanced Weightlifting & Sport Performance Manual
Chapter 1
Principles of Coaching

Coaching in the 21st Century

Coaching is in its most dynamic era in history. Coaches work with an increasingly diverse populations and face heightening demands from their athletes and the general public. Coaching and the role of the coach have experienced a significant change as we move into the second decade of the 21st century.

There are broader aims, higher expectations and more defined roles. There is access to greater information and visibility to a larger community in this digital age. All these factors make coaching both more exciting and taxing than ever before. The International Council for Coaching Excellence has established a framework of six (6) primary functions of a coach that will help to fulfill the core purpose of guiding development and improvement.

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<th>VISION AND STRATEGY</th>
<th>SHAPE THE ENVIRONMENT</th>
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<td>The coach creates a vision and a strategy based upon the needs and development of the athletes and the organizational and social context of the program.</td>
<td>The coach recruits and contracts to work with a group of athletes and take the responsibility for setting out plans for both training and competition. The coach also seeks to maximize the learning environment in which the program occurs through personnel, facilities, resources, best practices and the management of other coaches and support personnel.</td>
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<th>BUILD RELATIONSHIPS</th>
<th>CONDUCT PRACTICE AND STRUCTURE COMPETITIONS</th>
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<td>The Coach builds positive and effective relationships with the athletes and others associated with the program. The coach is responsible for engaging, contributing and influencing the atmosphere of the organization and program.</td>
<td>The Coach organizes suitable and appropriate practices that challenge the athletes and targets preparation for competitions for the athletes. Positive competitions are required experiences for continued development and improvement.</td>
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<th>READ AND REACT TO SITUATIONS</th>
<th>LEARN AND REFLECT</th>
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<td>The Coach observes and responds to all events (practice and competitive) appropriately. Development of effective decision making is essential to fulfilling this function.</td>
<td>UCLA Basketball Coach John Wooden made the comment “You have not taught until they have learned.” When the coach focuses on what the athletes are learning instead of what the coach is saying development and improvement will occur at a more effective rate.</td>
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The Coach is constantly evaluating the program, as a whole, as well as each practice and competition. The Coach also supports the development and education of other coaches. Recent studies have shown that novice coaches are ill prepared in the following areas:

- Motivating athletes
- Managing and resolving conflict
- Building relationships
- Effective communication
- Management topics
- Competition preparation

People who are attracted to and find satisfaction from coaching weightlifting come from many areas. There are those who take the traditional pathway from competition. These individuals typically have a long background in the sport, and gravitate to coaching when their competitive careers have come to or are ending. In many cases, these coaches never achieve the levels as a competitor that they strived for, but find true fulfillment in helping others to maximize their talents. However, other pathways bring people to coaching weightlifting. Some just enjoy the sport and others are involved in it. Some coaches may be attracted to weightlifting because they may have applied the weightlifting movements to their own training to improve performance in another sport. These are just a few examples of the different personalities attracted to weightlifting.

Coaching Skills

Most successful coaches have developed a love and commitment to the sport that almost borders on obsession. The deep commitment is evident in all successful coaches and is easily recognized and appreciated by weightlifters. Individuals who become involved in coaching, no matter what the sport, find themselves in the "people business." In order to be effective, coaches must create the right conditions for learning to happen and to find ways of motivating their athletes. Most elite-level athletes are highly motivated and therefore the task is to maintain that motivation and generate excitement and enthusiasm. Therefore, coaches must develop or have available a plethora of skills to meet the needs of the athletes who they aspire to service. These include:

- Knowing how to effectively communicate with the athletes
- Understanding the learning process and training principles
- Understanding and implementing the appropriate training methods
- Understand the various coaching styles
- Advise athletes on safety
- Understand the causes and recognize the symptoms of over-reaching and over-training
- Understand how to reduce the chance of injury for your athletes
- Understand individual differences between athletes
- Assist athletes to develop new skills
- Use evaluation testing to monitor training progress and injury prevention
- Advise athletes on appropriate nutritional regimen
- Understand and know how to develop the appropriate energy system
- Effectively communicate competition performance

**Coaching Roles**

Not only do coaches have to develop skills, they also have to play many roles. These roles include being a:

- Leader
- Educator
- Facilitator
- Technician
- Organizer
- Manager
- Guide
- Philosopher
- Friend
- Arbitrator
- Critic
- Taskmaster

The myriad of roles a coach plays is dictated by the various circumstances in which coaches find themselves. The goals of the coach and lifter can also dramatically alter the role the coach might take. Therefore, communication between the coach and lifter is paramount. The first thing the coach should determine is the goals of the lifter. What is he or she trying to accomplish? If the lifter's objective is to be a "social" lifter with enjoyment being the primary criteria, the coach will need to adopt a very different role than if the lifter’s goal is to become an accomplished Olympic weightlifter.

Once the coach determines the goals and expectations of the lifter, he must ask himself “Are these expectations realistic?” If so, “Is the timeframe realistic?” From here, the coach develops a realistic plan to try to accomplish the goals and expectations. Another aspect the coach must realize is his own ability as a coach. An objective, self-evaluation of his abilities is vital. If the athlete expects to make it to the highest level as an athlete, the coach must reassure himself he is doing everything in his abilities to get the athlete there.

However, as crucial as role-playing is to the achievement of objectives with individuals; ultimately, the coach's own personality will have an enormous bearing, and maybe the ultimate bearing, on a lifter’s success. The coach will find some roles easier than others may only last for limited periods of time and some roles that turn out to be a total disaster. An example may be the coach who is incredibly effective with young lifters. This coach has a tremendous rapport with kids and can teach and develop skills as well as create an excellent, secure and supportive club program. However, when some of his lifters progress, mature, and develop into perhaps national or international class lifters, demanding a greater time commitment and individualized attention, the coach may be less effective.

**Coach/Athlete Training Roles**

Over time, the roles of the athlete and coach will change dramatically. Athletes will mature physically, mentally, emotionally and psychologically in the years spent with the coach. Equally, coaches will develop and refine their roles and skills in the time spent with numerous athletes.
Further, training requirements for the athlete will change over time as he progresses from the beginner to elite.

When the athlete first begins weightlifting, the coach’s role is to direct the athlete in all aspects of training. The coach must guide and teach the athlete in numerous phases. These phases include not only training, but recovery, nutrition, injury prevention, etc. Relaying these ideals to the athlete early in the training process is crucial to prevent unfavorable habits, which may limit performance in the future.

As the athlete develops and demonstrates a sound, technical understanding of the various weightlifting movements, then gradually, the coach’s role changes. The change shifts from an autocratic role to a more democratic role where there is more communication between the coach and athlete. In some cases, the athlete will have more input on the workouts based on recovery, health, personal issues and various training methods.

Eventually, as the athlete matures, many will have a better understanding of training principles and methods. Different training methods will work better than others will and the athlete should communicate this to the coach. This communication process will enable the athlete and coach alike to reach their full potential.

**Characteristics of the Respected Coach**

It is difficult for a coach to be effective in any situation if he has not gained the respect of the athletes he coaches. Characteristics, which contribute to gaining respect and coaching effectively, include:

**Knowledge**
Coaching has become a science as well as an art where knowledge of sporting performance demands more than simply the rules and skills of the sport. Successful coaches have a foundation built on the principles of kinesiology, physiology, psychology and biomechanics. Weightlifting is objective and measurable. To be effective, the coach must constantly expand his/her knowledge and make adjustments and modifications to their methodology.

**Organization**
Organization of a training program is necessary for the success of a coach and athlete. One can judge the organization of a coaching program by the final outcome, competition. Linking together efficient, systematic practices with successful performance also builds confidence and respect for the coach.

**Communication**
This is a vital and necessary characteristic of successful coaches. All effective and successful coaches are good communicators. If they cannot communicate well, it is useless having the best possible knowledge and skills. In fact, the bulk of the time spent with athletes is spent via communicating and transferring knowledge.
The methods used for effective communication will vary with individual coaches and individuals athletes and may vary from sport to sport. The most effective communication occurs on a one on one basis, which in weightlifting is typically the norm. However, all communication should be a two-way street and not a dictatorship.

A good coach communicates with a positive approach. The coach will praise a job well done by the athlete in order to reinforce desirable behaviors and to promote self-confidence. Conversely, the negative approach uses punishment or negative comments which results in fear or failure and lower self-esteem. The positive approach should be consistent and fair but not over-exaggerated. Even if the athlete does not perform or behave satisfactorily, the coach should analyze the poor performance in a positive way.

A good coach communicates both verbally and nonverbally. Verbal communication is positive, brief and to the point. Too much talking can be a distraction and can make the athlete cautious and too concerned with evaluation by the coach rather than his performance. Nonverbal communication can include such simple things as body language, gestures and body movement. Touching behavior such as a pat on the back or using the hands to help position the athlete during a lift can be an effective communication device. Even various voice inflections can convey the real message implied by the coach: remember, it is not what you say, but how you say it.

**Personality**

Leadership, in simple terms, is the capacity of a person to direct and coordinate the activities of a group of people. It is essentially a position of power but in sport demands consent and compliance from talented but highly individualistic people. The individual personality of the coach will have an enormous bearing on how s/he handles his leadership and power base. What works for one will not necessarily work for another simply because of the individual’s personality. Assuming technical expertise, the qualities found most desirable in a coach by athletes are a pleasing personality, the ability to show warmth and compassion, a sense of humor, enthusiasm, security and sense of fair play.

**Is Coaching an Art or a Science?**

To support the coach, there is enormous scientific literature based on specific research conducted with athletes. This information is available to support the coach and athlete in all areas of training and development including nutrition, biomechanics, psychology, physiology and sports medicine. The coach however, must have access and the desire to use this information.

The art of coaching comes when the coach has to analyze the scientific data and convert it into coaching and training programs to help develop the athlete. Much of this analytical process depends on the coach’s experience and knowledge of weightlifting and the athletes they are working with. Scientific information is useless unless the coach understands and is willing to implement the data.
By understanding science, which is the foundation of training, the coach can develop a well-designed training program that will help an athlete reach his full potential. The art is to understand the research and then to apply it in a way that will help the athlete reach full potential.

**The Four C’s:**

Concentration, confidence, control and commitment are generally considered the main mental qualities that are important for positive and successful performance in most sports.

- **Concentration-** the ability to maintain focus
- **Confidence-** the belief in one’s abilities
- **Control-** the ability to maintain emotional control regardless of distraction
- **Commitment-** the ability to continue working toward agreed goals

**Concentration**

This can be defined as the ability to focus on the task at hand. A lack of concentration by the athlete will affect the athlete’s ability to complete the lifting movements as efficiently as possible. In weightlifting, the athlete must possess the ability for intense concentration. Since most weightlifting movements, especially the competition lifts, are completed in a short period, the athlete must be able to have complete focus for that duration. However, the coach should be aware that distractions do exist, sometimes without his knowledge. Some common distractions are:

- Anxiety
- Fatigue
- Technique issues
- Family
- Opponent
- Negative thoughts

Strategies to improve concentration are individual but the coach can lend support on a majority of issues. One example is to set goals for each workout. The athlete should know and understand what the expectations of the coach are for that day. A second example is mental preparation. The athlete should begin to prepare for the workout prior to it not at the beginning of it. A final example is relaxation. The lifter should do as little as possible physically prior to the workout. This will give the athlete the best chance for achieving set goals in the workout. Hopefully, these examples will assist athletes in improving concentration.

**Confidence**

Confidence results from the comparison athletes make between their goals and their abilities. Typically, if athletes achieve their goals, the results are increased self-confidence and self-esteem. Usually, confident athletes tend to persevere even in extremely challenging situations. They have the ability to adapt, overcome, and still try to accomplish what they have set out to do. In addition, if athletes do not reach their goal they are willing to accept or share in the responsibility of failure.
Control
Athletics, especially at elite levels, can take an enormous toll on an athlete emotionally. An athlete’s ability to maintain control of their emotions in the face of adversity and remain positive is essential for successful performance. The coach can have a massive influence on the athlete in certain stressful situations. If the coach can identify when an athlete feels a particular emotion and understand the reason for the feelings, he may be able to help the athlete gain composure and confidence. Two emotions, which are often associated with poor performance, are anxiety and anger.

Anxiety can be physical (butterflies, sweating, and nausea) or mental (worry, negative thoughts, lack of concentration). Relaxation, mental imagery and input from the coach may help to alleviate these symptoms. When an athlete becomes angry, the source of anger often becomes the focus of attention. This then leads to lack of concentration, which may lead to poor performance. Many times if an athlete has a poor result in the snatch this has a direct correlation with how well the athlete will clean & jerk. The coach must do his best to calm the athlete down and to refocus his thoughts to the next lift.

Commitment
Athletes, as well as coaches, spend an enormous amount of time training and preparing to train. Much of what coaches do, especially in the sport of weightlifting, is on a volunteer basis. Because both coaches and athletes have other obligations, it is imperative the time spent training is efficient. It is the coach’s responsibility to keep the athlete interested and to make continual progress. It is the athlete’s responsibility to follow the training regime and to communicate with the coach regarding any important issues. Hopefully, when both make a deep commitment the fruits of their labor will be rewarded!

Legal Responsibilities of the Coach
A weightlifting coach is required to comply with USA Weightlifting’s Code of Conduct. With increased issues of liability and inappropriate behavior by coaches who take advantage of their relationship with athletes, it is crucial that all coaches follow the sport’s legal requirements. The influence a coach has on his lifters can be enormous, especially when they are maturing and impressionable. The coach has to reflect on his philosophies not only in weightlifting but also on many other aspects of life, as his athletes will often use him as a role model. The coach is a standard setter, a point of reference by which young lifters meet on a regular basis. The coach should not take this responsibility lightly. In addition, coaches also have a legal responsibility to:

- Give appropriate advice and guidance
- Not offer advice beyond their level of qualification

Health and Safety
When athletes walk into the gym, they are now under the guidance and supervision of the coach. When athletes first begin training the coach should go over the rules and regulations of the weight room. USA Weightlifting also recommends that coaches review Chapter One of the Club Coach Manual periodically and know the first aid and emergency evacuation procedures of their
facilities. Although the chances of serious injury are remote, one can never predict when a serious injury or event may occur.

**Protection from Abuse**
Coaches also have the responsibility to protect children from all forms of abuse. Four recognized forms of abuse are:

- Neglect
- Emotional abuse
- Sexual abuse
- Physical abuse

Coaches should be able to recognize indicators, which may signify abuse and take appropriate action if concerned. Coaches must also recognize these signs to prevent them from becoming abusive. All organizations (e.g. sports governing bodies, local authorities, clubs) should have a policy statement and guidelines regarding child abuse. Please contact the National Office for USA Weightlifting’s Code of Conduct and Ethics forms.

USA Weightlifting is proud to be actively involved in the USOC Safe Sport Program. Information on Safe Sport can be found at [http://safesport.org/](http://safesport.org/).

**Insurance**
To be covered by USA Weightlifting’s insurance and liability policy, all coaches must be current USAW members, certified and their club must be registered with the National Office. Due to frequent policy changes, coaches are encouraged to look online for the most recent policy procedures.

**WEIGHTLIFTING ETIQUETTE**

In weightlifting, as in many activities, there is a standardized code of conduct and etiquette. It allows for the various procedures of training and competing to proceed smoothly and in a predictable manner. It minimizes the possibility of misunderstanding and allows for the emphasis to be placed on the actual training and lifting of weights.

The sport has a history reaching back over a century, and during that span the decorum and civility of competition have developed. Any coach seeking to advance in a coaching career needs to become familiar with these procedures and practices in order to insure that the athletes in his or her charge are not distracted or provide distraction from the task at hand.

A standardized code of conduct, ethics and etiquette provides a measure of predictability for the national and international competitions, the latter being especially important in light of the wide variety of languages spoken in these events.
Etiquette in the Training Hall/Weightlifting Gym

A weightlifting gym typically involves a number of corpulent athletes moving about in a somewhat confined space. They are involved in explosive actions that are potentially hazardous. With a pre-defined etiquette, the chances of random injuries and accidents are minimized. Etiquette also allows for the training to proceed smoothly, efficiently and productively. The following points will enable training to take place most effectively.

- Athletes not lifting should be seated behind the platform to minimize movement around the lifting area and hence distractions for the athlete on the platform.
- Training bags and other personal items should be kept well away from the area immediately adjacent to the platform in order to minimize clutter.
- When two or more lifters are using the same bar, loading should be undertaken equally with the last lifter and the next lifter each loading one end of the bar.
- Chalk dust can cause footing problems on the platform, so chalking should take place over the chalk tray or bowl.
- Lifters should not pass through the sightlines of a lifter on the platform as it may interfere with the viewing of a focal point.
- Music should not be played during training, nor listened to on personal listening devices. This may interfere with the hearing of verbal warnings and coaching cues.
- All equipment should be properly replaced after training sessions.

Warm-up Room and Competition Etiquette

The warm-up room should be a separate enclosed area, and as such it can get crowded and congested. The IWF recognizes this fact by limiting the number of coaches that can accompany each athlete. The limit is 2 for a single athlete and 3 for 2 athletes. It is also a very purposeful time, and one given to deep concentration before entering the competitive arena. For this reason a certain decorum needs to be maintained in order to insure optimal performances by all competitors. Overcrowding is not conducive to maintaining the proper atmosphere. Observing these points will aid in maintaining an environment that will lead to the best possible performances.

- Keep your entourages and posses out of the warm-up room. If they are knowledgeable about the psychological preparation for competition, they wouldn’t be there. Furthermore they irritate the other competitors.
- Do not “borrow” plates from other athletes without asking.
- If you are one of the later lifters, don’t monopolize a warm-up platform while the lesser lifters need to warm-up.
- Keep out of the sight lines of lifters taking warm-up lifts.
• Do not hover around the doorway between the warm-up room and the competition arena. Tell your friends not to either.
• Weightlifting does not require high rep sets for warm-up. Don’t show off your ignorance by engaging in this practice. If you need that much of a warm-up, you are not in shape to compete and shouldn’t be in the event.
• Onlookers should not inhibit access to the area behind the score table, as coaches need to view the expediting cards.
• If you are not at latest the “in the hole” lifter, do not occupy the seats in the pre-staging area.
• If you have your cell phone in the vicinity of the competition platform, put it in “vibrate” mode.
• Coaches should not offer coaching advice to other lifters that have a coach. Advice should pass through the coaches.
• Announcers and coaches should know the progression rules and not bother to determine whether a failed lift will result in a repeat, or a successful attempt will be followed by an attempt greater than 1 kg. It is always the coach’s option and time is wasted by these practices.

Careful observance of the accepted etiquette will result in fewer occurrences that can inhibit the procedures of training and competition. Everyone and the sport will prosper by making these procedures more efficient and productive.
Chapter 2
Skill Acquisition

Much of weightlifting coaching is devoted to the development of skilled performance. Skill has many definitions. Skill can be defined as the “learned ability to bring about predetermined results with maximum certainty, often with the minimum amount of time or energy or both,” (Knapp, 1963). This is true when teaching beginners the techniques of the competition lifts. In fact, the teaching and coaching of technique, especially in the early years, tends to dominate the coaching scene. There is also constant refinement of the production of excellence with the elite performer.

However, the development of technique alone does not improve the skills of the weightlifter. Although we are primarily concerned with the physical development of motor skills in our sport, we cannot ignore the effects of psychological environment and situational preserves on this development. So perhaps another definition of skill comes closer to the mark. Welford (1969) defines skill as, “an organized, coordinated activity in relation to an object and/or a situation which involves a whole chain of sensory, central or motor mechanisms.”

Open and Closed Skills

In the coach’s pursuit of the development of skilled performance with his athletes, he needs to deal with open and closed skill acquisition. In an open situation, such as basketball, white water canoeing or soccer, the athlete has to produce skilled movements in a multitude of differing situations. The athlete does not control the situation as in a closed skill but other players or changes in the physical environment contribute to the skill.

In closed skills, such as swimming, running or bowling, the athlete tries as efficiently as possible to perform the movement or technique in a standard environment. There may be some variables like weather, crowd noises, etc., but, largely, one 50-meter pool is the same as the next. In this example, the swimmer aims to produce the most refined and efficient stroke pattern possible to propel him to the end of the pool as fast as possible. Weightlifting utilizes both types of skills. Although we are endeavoring to reproduce efficient, stylized constant movement patterns, we are subject to a changing situation as the barbell becomes heavier.

Different coaching methods and approaches are required for the various types of skills. In coaching the performance of closed skills, the coach tries to encourage the performer to concentrate and shut out the external influences so that the skilled movement can be produced as perfectly as possible. However, in the open skill situation, the coach has to
make the performer constantly aware of the changes brought about by the heavier weights so that he may react in a positive way.

**Stages of Skill Acquisition**

As mentioned in the Level 1 Coaching Course the learning and development of skill (the translation from unskilled to skilled performance) is a continuous process. Here is a review of the three step process: cognitive, associative, and autonomous. During the cognitive stage, the athlete is learning in a conscious way what is to be done and how. Performance can improve dramatically during this period in terms of approximating a correct movement pattern, but it tends to be erratic and movements may not be optimally timed. During the associative stage, the athlete is learning by going through the motion and receiving feedback that enables him/her to refine the skill. Finally, in the autonomous stage, after much correct and consistent practice, the athlete is able to perform the skill correctly without conscious direction. This latter stage is in some sense desirable in that efficient and consistent performance has been achieved if the skill was learned properly. But if no conscious effort is applied to improve the skill any further, performance will stagnate. So while consistency is in many ways desirable, it inherently limits improvement. Therefore, while the lifter should always strive for consistency of proper movement, there is always room for improving certain aspects of the skill. For instance, the lifter can never move under the bar fast enough nor can he/she can become too strong or powerful. Improving consistency, while making small changes in finer technical movements, must be relentlessly sought.

**Factors Affecting the Acquisition of Skill**

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<th>Athlete Quadrants</th>
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<td><strong>A</strong> Acquisition</td>
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<td>What are the skills the athlete needs to know?</td>
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<td><strong>C</strong> Assimilation</td>
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<tr>
<td>Can the athlete successfully complete these skills routinely and automatically?</td>
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*Athletes will pass through all quadrants, each at their own pace.*
The Stages of Skill Acquisition can be, simply, explained and seen in the table shown above. The challenge of the coach is to allow each athlete to advance through the quadrants at their own pace. Of all the attributes that an athlete needs in order to be successful, patience may be the most vital.

Bearing in mind the skill learning process outlined above, we now consider the vital area of teaching and coaching skills. Experience and research has shown that proper teaching and coaching has a dramatically higher success rate in skill acquisition than merely providing basic instruction or leaving performers to learn by trial and error. In addition, studies show that skills learned first are extremely difficult to overcome. Therefore, quality of teaching and coaching is of paramount importance. Many factors, which can ensure quality coaching include:

A) **Visual Guidance:** When introducing a new skill, it is essential to show the athlete a demonstration of the skill in good form. The coach, fellow athlete or a video can demonstrate the skill. The prospective performer can immediately apply this through imitative powers. Initially, it is important not to complicate this process with talking or instruction. Allow the beginner to see the movement and appreciate the function, speed and timing of the skill. Let them build an image in his mind of what he is going to do. Then, follow with simple instruction and commentary before allowing the performer to attempt the skill.

B) **Verbal Directions:** This aspect is crucial in all facets of coaching. Brevity is the key, especially when the coach is introducing a new skill. Research indicates that spending considerable time describing a movement before the individual has had the opportunity to experience it is counterproductive. Give a few brief comments on what is happening in the demonstration, then talk the performer into the correct starting position, and let them perform the movement. After they have attempted to experience the movement, stop them and give more verbal direction, which now has far more relevance.

C) **Manual and Mechanical Guidance:** Some performers find difficulty in translating what they see or hear into appropriate movement. The coach can often get results by actively placing the performer’s body into the movement pattern. For example, when setting the back to pull the bar, many athletes achieve the hollow back position only when the coach actually positions the body parts for them manually. However, this works well with static positions like the start, but is a little more difficult, and sometimes impossible, when fast movements are involved.
D) **Knowledge of Results:** It is often unclear to the performer if he is achieving success in learning the new skills. Throughout the learning process, feedback of the results from the coach to the athlete is vital for success. Today’s technological resources can be used to the benefit of both the coach and athlete. However, the coach must learn to use these efficiently since it may prove time consuming.

Knowledge of results may not always produce the desired improvement. Individuals tend to be either “visiles” or “motiles.” Visiles can see and do. Motiles have to feel and do. They recognize the problem but need more help and must experiment with attempting to “feel” an adjustment with immediate feedback from the coach.

E) **Self-efficacy:** The coach must create an environment in which the athlete believes that he/she can succeed. Athletes must practice correct technique with an “optimum” weight to build confidence under the supervision of the coach. If the athlete trains with competition in mind, when the athlete goes to compete, he/she will feel prepared and be confident in their performance.

The idea of self-efficacy, or self-belief, is the driving force behind longevity in sport as well as competition and training results. High levels of self-efficacy is what leads to motivation and eventually success. An athlete’s view of performance is also directly related to self-efficacy. An athlete with low self-efficacy is more inclined to attribute poor performance with poor skill and ability rather than look for other factors that may have influenced his/her performance.

F) **Speed and Positioning:** These two qualities are inter-related and influential in weightlifting. The bar can only move as fast as it can be positioned correctly. Consequently, the speed of movement and accuracy of positioning the barbell are essential elements of weightlifting technique. Realize also, that weightlifting technique, in particular the explosion phase of the pull and the drive for the jerk, is ballisitic in nature.

In addition, there is also a proportionate speed to make most of the skills in weightlifting possible. It is impossible to do a slow snatch with any kind of weight. All research indicates that when learning new weightlifting skills, the athlete must eventually learn them at the speed in which they will occur. In fact, there should be an emphasis on speed from the start. Initially, coaches would teach weightlifting skills at a slow speed and then increase the speed as the athlete becomes more proficient. This was based on the theory that it was easier to speed up accurate movements than to correct fast, inaccurate movements.
G) Teaching Methods: There are several recognized teaching methods for skill acquisition: whole method, part method, and whole-part-whole method and progressive part method. In terms of skill acquisition, the whole method entails teaching the whole skill from the outset. The part method entails learning the skill in parts and then fitting them together to form the whole. An offshoot of these methods is the whole-part-whole where the coach teaches the performer the whole skill, and then the coach chooses one phase or part to practice in isolation and then apply those parts to the whole skill. Another derivative of these methods, which we use a great deal in coaching weightlifting skills, is the progressive part method. Also known as chaining, the movement is broken down and practiced individually and in order then linked together. In weightlifting, this is done by using the top/down progression taught in both the Sport Performance and Advanced Sport Performance Coaching Course.

The benefit of the Progressive Part Method and why it is used by the US Resident Team and Promoted by USA Weightlifting is that remediation of skills are built into the training model. The model uses a concept called backwards design. Similar to the afore mentioned Top/Down Model. The skill is taught from the end position back to the starting position. An example would be in the instruction of the Snatch. The progressions would be

1. Snatch Press
2. Block Snatch Pull + Power Snatch
3. Block Power Snatch + Overhead Squat
4. Block Snatch

Once the athlete can properly snatch off of the blocks the next series of snatch exercises can be placed into the training. Referring back to the Athlete Quadrant, the athlete only progresses through the exercises as they show proficiency. If they have difficulty in learning a skill they return to the exercise previous to the skill they are having difficulty with and review that. They then return to the next exercise and renew their efforts to acquire that skill.

To summarize, the coach has numerous methods to draw and combine from, if necessary:

- Whole Method
- Part Method
- Whole-Part-Whole Method
- Progressive Part Method

The coach must analyze each skill he is going to teach and decide which of these methods he will employ. The coach’s decision will depend on the complexity of the skill, as well as the ability and experience of the athlete.

**Individual Factors**

This is an intricate area and very frequently calls for value judgments by the coach. The coach should consider the following factors:

1) **Age and Maturation**: This has an enormous effect on the ability to learn skills. The actual chronological age is not as much a factor as the level of maturation. We all have seen
cases where 12-year-old boys show enormous maturational differences. One is almost a man physically while the other is still very much a child.

Coaches may begin to teach weightlifting at a much earlier age than previously thought. It was always felt that weightlifting should not begin before puberty but the Bulgarians experimented with 10 and 11 year olds with magnificent results. However, at this age, skill learning and general physical training are stressed and not the heavy loading, which produces results later.

Children in this age range (10-12) learn skills quickly. In addition, there are no inhibitory problems from movement patterns, which are already established. This is in contrast when older people try to learn new skills. Earlier activities may have established autonomous movement patterns, which may inhibit new skill acquisition. Therefore, there really is a sound basis for saying, “You can’t teach an old dog new tricks.” This does not mean, however, that we should not be teaching weightlifting to anyone over twelve. The older the performer, the longer the skill learning process will likely be. Post-pubescence is the most result producing stage when considering weightlifting training. The trade-off is that youngsters may learn the skills of weightlifting easily, but they will not be as capable of developing the strength and power of the post-pubescent.

2) Gender: It was thought, at one time, that gender had an effect on an individual’s capacity to learn skills but recent findings have shown this is not the case. Obviously, post-pubescence will show a marked difference between male and female in terms of power performance if all other things are equal. This is physiological in nature due to muscle mass in males. However, the actual skill levels will be approximately the same for males and females.

3) Intelligence: Although it would appear that intelligent people should learn skills quicker than less gifted people, this may not be true in actual practice. Although people that are more intelligent might understand verbal instructions more clearly, the transfer of learning to the physical may not occur. With proper coaching, there should be no difference in skill acquisition.

4) Innate Ability: A popular expression states, “In sport and in life, there is no substitute for ability.” This tends to be true. People appear to have innate abilities in various areas of learning new skills and this is certainly one of them. Some learn skills completely while others learn some but not all skills easily.

Some people are genetically and psychologically gifted for weightlifting. Coaches enjoy working with this population as they progress quickly and with equal work, achieve the
highest results. Many times, we find these athletes through talent identification. Other times, an athlete just walks through the gym doors unexpectedly. Many Elite High Performance American Weightlifters were not the product of any intense identification program but merely a person who wanted to give the sport a try and met up with a competent, confident and dedicated coach.

There is a school of thought, which believes that if coaches are to achieve results they should only work with people with innate ability. This is doubtless a very efficient, cost effective way to do business, but not all coaches are fortunate to get the “cream of the crop.” We all must work with the talent we get.
Chapter 3
Anatomy and Physiology

Importance of Anatomy and Physiology in the Role of a Coach
Coaching is an art and a science. Successful coaches mold athletes by implementing the knowledge they have gained through experience, continuing education and coaching courses. Knowledge of anatomy and physiology serves multiple purposes in weightlifting:

1) Helps in the evaluation of athletes
2) Creates an understanding of what occurs in the body during training
3) Can help prevent injuries
4) Allows coaches to explain the “why” of a specific workout or training plan
5) Allows coaches to create plans based on concrete evidence
6) Provides coaches with the knowledge necessary to correct dangerous behavior and create athletic gains

This chapter is meant to provide baseline knowledge necessary to meet the aforementioned purposes, not to be a complete look into the body’s functions and roles. Further study of anatomy and physiology may be beneficial for the continued advancement of your athletes.

Body Systems
There are 11 main systems working together as one unit that allows us to perform the daily functions required of our lives. These systems serve the following purpose:

<table>
<thead>
<tr>
<th>System</th>
<th>Components</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skeletal</td>
<td>Bones, Cartilage</td>
<td>Provides Structure, Supports and Protects Internal Organs, Allows Movement</td>
</tr>
<tr>
<td>Muscular</td>
<td>Muscles (Skeletal, Cardiac, Smooth)</td>
<td>Provides Structure, Supports and moves trunk and limbs, Moves substances</td>
</tr>
<tr>
<td>Integumentary</td>
<td>Skin, Hair, Nails</td>
<td>Protects against pathogens, Regulates Body Temperature</td>
</tr>
<tr>
<td>Circulatory</td>
<td>Heart, Blood Vessels, Blood</td>
<td>Transports nutrients, oxygen and waste</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Air Passages, Lungs</td>
<td>Transports oxygen into and out of lungs, Gas Exchange (Elimination of CO₂)</td>
</tr>
<tr>
<td>Immune</td>
<td>Lymph Nodes and Vessels, White Blood Cells</td>
<td>Provides protection against infection and disease</td>
</tr>
<tr>
<td>Digestive</td>
<td>Mouth, Esophagus, Stomach, Liver, Pancreas, Small and Large Intestines</td>
<td>Stores and digests food, Absorbs Nutrients, Eliminates Waste</td>
</tr>
</tbody>
</table>
### Weightlifting Application

Coaches can reduce the chance of joint injury by:
- Ensuring Proper Warmup Habits
- Identifying and Correcting Technique Early
- Evaluating Equipment on A Regular Basis
- Recognize and Address Early Signs of Pain
- Recognize Signs and Symptoms of Overtraining and Reduce Volume
- Resist the Urge to Increase Weight to Quickly

---

<table>
<thead>
<tr>
<th>System</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excretory</strong></td>
<td>Kidneys, Ureters, Bladder, Urethra, Skin, Lungs</td>
</tr>
<tr>
<td></td>
<td>• Eliminates Waste</td>
</tr>
<tr>
<td></td>
<td>• Maintains Water and Chemical Balance</td>
</tr>
<tr>
<td><strong>Nervous</strong></td>
<td>Brain, Spinal Cord, Nerves, Sensory Organs, Receptors</td>
</tr>
<tr>
<td></td>
<td>• Controls and Coordinates Body Movements</td>
</tr>
<tr>
<td></td>
<td>• Controls Consciousness</td>
</tr>
<tr>
<td></td>
<td>• Helps Maintain Other Body Systems</td>
</tr>
<tr>
<td><strong>Endocrine</strong></td>
<td>Adrenal Gland, Thyroid, Pancreas, Hypothalamus</td>
</tr>
<tr>
<td></td>
<td>• Maintains Homeostasis</td>
</tr>
<tr>
<td></td>
<td>• Regulates Metabolism</td>
</tr>
<tr>
<td></td>
<td>• Water and Mineral Balance</td>
</tr>
<tr>
<td></td>
<td>• Growth and Sexual Development</td>
</tr>
<tr>
<td><strong>Reproductive</strong></td>
<td>Ovaries, Uterus, Mammary Glands, Testes</td>
</tr>
<tr>
<td></td>
<td>• Produce Offspring</td>
</tr>
</tbody>
</table>

While not all of the systems are discussed in this manual, it is important to note that every system plays a role in performance and athlete development.

**Skeletal System**

The skeletal system provides stability, support, protection, red blood cell production and a framework for the attachment of muscles. The skeletal system is divided into two subsections, the axial and appendicular skeleton. The axial skeleton is comprised of the skull, vertebrae, ribs and sternum. The appendicular skeleton includes the bones of the extremities, hips and shoulders.

Bones by themselves lack the suppleness required to create extraordinary movement. Therefore, the body is made up of multiple bones that are interlocked by joints which allow for movement and added support.

Several different types of joints make up the overall skeletal system and can be broken down into two types of joints: immovable and moveable. Immoveable joints allow for little to no movement and are used to simply hold bones together such as the bones of the skull. There are two types of moveable joints, slightly moveable and freely moveable. Slightly moveable joints are created when two bones are interconnected by ligaments and sometimes include a fibrous cartilage. Freely moveable joints allow for the most movement and are created when bones are connected with ligaments, cartilage and a synovial membrane which contains synovial fluid to keep the joint lubricated.

It is not uncommon in athletics for injuries to occur at joints due to the damage of the cartilage, ligaments, or synovial membrane.
Planes of Movement and Joint Actions

Movement of the body occurs in three planes: frontal, sagittal and transverse. The frontal plane divides the body into front and back. The sagittal plane divides the body into left and right sides and the transverse plane divides the body into top and bottom halves. There are thirteen universally understood terms to describe the joint actions within these planes of movement. These movements are listed in the chart below. Teaching your athletes these actions will allow for clear understanding of verbal feedback and instruction.

<table>
<thead>
<tr>
<th>Movement</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion</td>
<td>Decreasing the angle at a joint (bending or curling)</td>
</tr>
<tr>
<td>Extension</td>
<td>Increasing the angle at a joint (straightening or extending)</td>
</tr>
<tr>
<td>Hyperextension</td>
<td>Movement beyond the joints normal limit</td>
</tr>
<tr>
<td>Abduction</td>
<td>Moving away from anatomical position in a vertical direction</td>
</tr>
<tr>
<td>Adduction</td>
<td>Moving toward anatomical position in a vertical direction</td>
</tr>
<tr>
<td>Rotation</td>
<td>Turning the body part around the axis</td>
</tr>
<tr>
<td>Circumduction</td>
<td>Movement that creates a full circle</td>
</tr>
<tr>
<td>Dorsal Flexion</td>
<td>Bringing the toes back towards the head</td>
</tr>
<tr>
<td>Plantar Flexion</td>
<td>Pointing the toes</td>
</tr>
<tr>
<td>Protraction</td>
<td>Moving a body part away</td>
</tr>
<tr>
<td>Retraction</td>
<td>Moving a body part back</td>
</tr>
<tr>
<td>Elevation</td>
<td>Lifting a body part</td>
</tr>
<tr>
<td>Depression</td>
<td>Lowering a body part</td>
</tr>
</tbody>
</table>

Coaches can use these terms to understand the movement patterns that occur during sports or the weightlifting movements. Coaches should be aware of the cumulative stress placed on a joint and in which plane the stress has been applied, and work with athletes of other sports should aim to research and analyze the sport specific movement in order to not overload certain movement patterns. Creating a training plan that balances out the types and planes of movement can help to protect the joints from injury and increase performance and joint stability, for example incorporating pushes and pulls.

Muscular System

The muscular system is comprised of approximately 650 muscles that circulate blood and provide strength, balance, posture and heat production. The muscular system is adaptable and thus responds extremely well to training stimuli. All muscles have four common characteristics:

<table>
<thead>
<tr>
<th>Excitability</th>
<th>The ability of the muscle to respond to stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractility</td>
<td>The ability of the muscle to generate force</td>
</tr>
<tr>
<td>Extensibility</td>
<td>The ability of the muscle to be stretched</td>
</tr>
<tr>
<td>Elasticity</td>
<td>The ability of the muscle to return to its original shape</td>
</tr>
</tbody>
</table>

The combination of these four characteristics allows the body to take on feats such as running and weightlifting.
**Muscle Fibers**
A muscle is made up of multiple muscle fibers. These fibers each have unique characteristics that are genetically influenced that directly impact sport performance. There is a misconception that only two types of muscle fibers are apparent, fast twitch and slow twitch. However, new research has suggested that muscle fibers fall into a continuum at either extreme or in-between. The individual characteristics of each muscle fiber can be found in the chart below.

A firm understanding of this concept will allow coaches to implement training programs that stimulate each individual fiber type. For instance, training for long distance running will have very little impact on the adaptations of Type 2b fibers.

It is important to note that there is evidence that with training, some of the fiber isoforms in the middle of the continuum can be trained to act more like ones on the ends of the continuum. This has been found more with aerobic training where Type IIa fibers “act” more like Type I fibers. In weightlifting, some of this transitioning towards the Type IIx can be seen. However, the verdict is still out on how transferrable these fibers are and therefore further research is required.

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>Type 1</th>
<th>Type 2a</th>
<th>Type 2x</th>
<th>Type 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Contraction</td>
<td>Slow</td>
<td>Moderate</td>
<td>Fast</td>
<td>Very Fast</td>
</tr>
<tr>
<td>Size of Motor Neuron</td>
<td>Small</td>
<td>Medium</td>
<td>Large</td>
<td>Very Large</td>
</tr>
<tr>
<td>Resistance to Fatigue</td>
<td>Very High</td>
<td>High</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td>Activity Used For</td>
<td>Aerobic</td>
<td>Long-term Anaerobic</td>
<td>Short-term Anaerobic</td>
<td>Short-term Anaerobic</td>
</tr>
<tr>
<td>Maximum Duration</td>
<td>Hours</td>
<td>&lt;30min</td>
<td>&lt;5min</td>
<td>&lt;1min</td>
</tr>
<tr>
<td>Power Production</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Very High</td>
</tr>
</tbody>
</table>

**Muscle Actions**
Similar to that of the joint actions, the movement of muscles can be described in three ways:

<table>
<thead>
<tr>
<th>Type of Muscle Contraction</th>
<th>Explanation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentric</td>
<td>• The target muscle is shortening (i.e. quadriceps muscles in the extension of a squat)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Concentric muscle action usually works against gravity</td>
<td>Extension of arms in the bench press and jerk;</td>
</tr>
<tr>
<td></td>
<td>• Usually less force capability than eccentric</td>
<td>Extension of legs in the clean, snatch, jerk;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexion of arms in bicep curl</td>
</tr>
<tr>
<td>Eccentric</td>
<td>• The target muscle is lengthening (i.e. quadriceps muscles in the descent of a squat)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Eccentric muscle action occurs in the same direction as gravity</td>
<td>Flexion of arms in the bench press and jerk;</td>
</tr>
<tr>
<td></td>
<td>• Muscles can produce the most force eccentricially</td>
<td>Flexion of legs in the clean, snatch, jerk; Extension of arms in bicep curl</td>
</tr>
<tr>
<td>Isometric</td>
<td>• Contraction in which the muscle is neither shortening nor lengthening</td>
<td>Wall sit, static plank hold, plank</td>
</tr>
</tbody>
</table>
Nervous System
The nervous system acts as the driver for almost all of the functions within the body, whether it is innervating skeletal muscles, keeping the heart beating or telling us when we are hungry and thirsty. The nervous system is broken up into two distinct parts, the central and peripheral nervous system which house the somatic nervous system and the autonomic nervous system. The central nervous system (CNS) consists of the brain and spinal cord, and the peripheral nervous system (PNS) contains all the nerves, organs, muscles that originate from the CNS. Within the PNS is housed the somatic and autonomic nervous system. The somatic nervous system is involved in voluntary and controlled movement. The autonomic nervous system is involved in the internal control of organs and bodily functions.
Both the somatic and autonomic nervous systems are at play during training, competition and recovery and are adapted based on the stimuli encountered by the body. Adaptations to the autonomic nervous system may include changes in heart rate, blood pressure, and blood flow. The nervous system also releases neurotransmitters to control different aspects of the body and hormone release.
The nervous system is responsible for a large portion of our athletic ability and performance. However, when the body is over trained, the nervous system does not work properly in conjunction with the hormonal system to bring the body back to a state of equilibrium and the body cannot be repaired. This state of overtraining can lead to prolonged fatigue, changes in heart rate, decreased testosterone, illness and loss of performance and work capacity.
The nervous system acts as the body’s battery and provides the energy and stimulus to the working body. If we fatigue the system, the body won’t function properly. Therefore, it is important that coaches monitor their athletes training stress in conjunction with the other stressors the athlete may encounter (work, school, family, kids, etc.). Stress is cumulative and must be combated with proper rest.

Training Stress + Life Stress
Must be Greater Than or Equal to
= Rest and Recovery

Weightlifting Application
Coaches can improve performance by:
• Developing training programs that mimic the demands placed on the athlete during competition
• Train muscles in multiple planes of movement
• Identify weak muscles that are undertrained (Prevent Injuries)
• Understand the proper way to create adaptations within the varying muscle fiber types
Energy Systems
As coaches working with a variety of different athletes, whether they are primarily weightlifters or multisport athletes, we must understand the demands of each individual sport. This manual has already talked about the vehicle for movement (Muscles), and the electrical system (Nervous System); finally we must discuss the fuel system.

The body works within the bounds of 3 energy systems: ATP-PCr, Glycolytic and the Oxidative system. Each system is always at play in the body, however the contribution of each system to the overall energy usage differs with changes to intensity and time.

Adaptations to the energy systems through training includes: increased efficiency, energy storage, and energy utilization along with decreased interval recovery rate and metabolic waste.

In order for a coach to provide the proper stress during training, he/she must understand the demands of the sport and the demands placed on the energy system as well as an understanding on the recovery of such energy systems.

The following chart provides a breakdown of the energy systems:

<table>
<thead>
<tr>
<th></th>
<th>ATP-PCr</th>
<th>Glycolytic</th>
<th>Oxidative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Fatigue</td>
<td>Very High (~10sec)</td>
<td>High (~3min)</td>
<td>Low (hrs)</td>
</tr>
<tr>
<td>Time to Availability</td>
<td>Very Fast</td>
<td>Fast</td>
<td>Slow</td>
</tr>
<tr>
<td>Supply</td>
<td>Low</td>
<td>Moderate</td>
<td>Very High</td>
</tr>
<tr>
<td>Oxygen Needed</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Work to Rest Ratio</td>
<td>1:6-1:20</td>
<td>1:3-1:5</td>
<td>1:1-1:3</td>
</tr>
</tbody>
</table>

ATP-PCr System
The ATP-Phosphocreatine system, also known as the Phosphagen system, is an anaerobic system which means that energy can be produced regardless of whether or not oxygen is present in the body. The Phosphagen system is the first responder to increased work and makes energy readily available for high power movements. However, the Phosphagen system is the slowest energy system to recover and requires significant time to reboot.

The majority of weightlifting training occurs within this energy system due to the high power movements required. Therefore, coaches must be vigilant as to the amount of rest taken in between sets. Too little rest may lead to under recovery of the system and in response decreased power output.

Glycolytic System
The Glycolytic system, sometimes referred to as the anaerobic system, is fast to kick in and provides large amounts of energy to working muscles. This system can last upwards of 3 minutes in trained athletes and has decent availability. The glycolytic system takes significantly less time to be refreshed and work again, however it still requires adequate rest to keep power outputs high.

The majority of track and field events from the 200m to the 800m and swimming events such as 100 and 200m events use the glycolytic system primarily. Other sports such as soccer, lacrosse, and hockey have periods which demand the use of the glycolytic system significantly. Examples of training the glycolytic system may include repeated 2 minute cycling or running intervals, work capacity training (such as combination movements in weightlifting) or higher repetition movements.

Oxidative System
The Oxidative system is the primary energy system in place for activities lasting an extended duration. The system takes a while to kick in, but once it does, it has a large supply of energy available to the body and can last for hours. The oxidative system is an aerobic system, therefore if the intensity becomes too high, the primary source of energy will shift to the glycolytic system until the intensity decreases or fatigue sets in. The body is continually in a state of refueling the energy supply as long as oxygen is present, therefore significantly reducing recovery time necessary between efforts.

Long distance running, cycling and swimming, as well as sports where athletes are moving about for long periods of time (basketball, soccer, lacrosse, golf, tennis, etc.) require the use of the aerobic system either in conjunction with or primarily independent of the other two. Training may include long runs (over 20 min), bike rides, swims or sporting practices lasting a significant duration.
Chapter 4
Phases of Nutrition and Daily Regimen

A good nutrition regimen is an incredibly important part of training for a weightlifter. Good nutrition regimens should focus on properly timing meals, balancing composition of meals with the demands of training and energy expended as well as the necessary quality of foods, nutrients and supplements consumed. An athlete does not need to wait until they reach the elite level to begin to introduce a good nutrition philosophy into his/her training and lifestyle. Nutrition education can begin at a young age but should focus on achievable and realistic expectations.

Nutrition for Development

Phase 1 (<6 yrs old)- Nutrition focus during this stage of development should consistent of introduction of new foods and encouraging a variety at meals. The various types of animal and plant protein should be introduced.

Phase 2 (6-10 yrs old)- This is the perfect age to begin to introduce good habits around training. Children who are practicing or involved in activity should be encouraged to have a water bottle with him/her. Additionally, children should be encouraged to have some sort of snack directly after practice or structured activity.

Phase 3 (pre-growth spurt)- During this phase of development the focus can be on balancing nutrition. Young athletes should begin to understand the importance of food as fuel and a great way to achieve this is through balance in meals. Gone are the days of noodles with butter and now pasta with chicken or meat sauce to encourage consumption of all the macronutrients to support growth and development.

Phase 4 (during growth spurt)- This is a tricky time because athletes’ attention is often directed to supplements but food for fuel should remain the focus as his/her body is still developing. This phase can be a great time to introduce principles of sports nutrition such as timing meals and snacks before and after practice/training. The balance of nutrition should now be further encouraged around timing carbohydrates and protein for training fuel and recovery from training efforts.

Phase 5 (after growth spurt)- Since nutrition and balance has been encouraged since an early age, the focus can now be placed on developing training and competition strategies. In addition proper weight cutting techniques should be introduced and implemented as part of competition. Individualized hydration and recovery should be encouraged (i.e. each athlete is selecting recovery and meals appropriate for his/her body size and training load as opposed to one size fits all).
**Phase 6 (full maturation)** - As the athlete develops at the competitive level, nutrition and fueling can be individualized based on weight class, training load, intensity and goals of training. Nutrition can be divided into various phases of training: prep, pre-comp, competition. Weight cutting strategies should be individualized to reflect the athlete and competition schedule. Lastly, this is the proper time to begin to introduce safe and approved supplements and ergogenic aids as a part of an athlete’s training and nutrition plan. Athletes should now focus on his or her own individual daily nutrition plan.

<table>
<thead>
<tr>
<th>Phase 1 (&lt;6yrs old)</th>
<th>Phase 2 (6-10yrs old)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Encourage variety in eating</td>
<td></td>
</tr>
<tr>
<td>• Introduce all fruits and vegetables</td>
<td></td>
</tr>
<tr>
<td>• Begin trying various protein</td>
<td></td>
</tr>
<tr>
<td>• Encourage children to drink water during practice/lifting</td>
<td></td>
</tr>
<tr>
<td>• Encourage a snack after practice/lifting (fruit, yogurt, jello, granola bar, milk, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase 3 (Pre-Growth Spurt)</th>
<th>Phase 4 (During-Growth Spurt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Begin the focus on balancing nutrition</td>
<td></td>
</tr>
<tr>
<td>• Begin to educate the athletes on the difference between macronutrients</td>
<td></td>
</tr>
<tr>
<td>• Focus around training on good carbohydrates and lean protein</td>
<td></td>
</tr>
<tr>
<td>• Begin the focus on sports nutrition</td>
<td></td>
</tr>
<tr>
<td>• Encourage food over supplements</td>
<td></td>
</tr>
<tr>
<td>• Begin to focus on timing meals/snack and recovery</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase 5 (After-Growth Spurt)</th>
<th>Phase 6 (Maturation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Training and Competition Nutrition</td>
<td></td>
</tr>
<tr>
<td>• Proper weight cutting techniques introduced</td>
<td></td>
</tr>
<tr>
<td>• Begin to teach fueling/hydrating for individual goals</td>
<td></td>
</tr>
<tr>
<td>• Individual nutrition periodization</td>
<td></td>
</tr>
<tr>
<td>• Focus nutrition on phases of training: prep, pre-comp, competition</td>
<td></td>
</tr>
<tr>
<td>• Individual weight cutting plans</td>
<td></td>
</tr>
</tbody>
</table>

### Daily Nutrition for Strength and Power Athletes

**Table 5.1- Average amount of energy expenditure and replacement needed for different sports**

<table>
<thead>
<tr>
<th>Sport</th>
<th>Expenditure (kcal/kg/day)</th>
<th>Replacement (kcal/kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untrained</td>
<td>&lt;40</td>
<td>2,000-3,000</td>
</tr>
<tr>
<td>Basketball</td>
<td>50-80</td>
<td>5,000-6,000</td>
</tr>
<tr>
<td>Sprinting</td>
<td>55-70</td>
<td>4,300-6,000</td>
</tr>
<tr>
<td>Middle Distance</td>
<td>55-70</td>
<td>3,000-5,000</td>
</tr>
<tr>
<td>Marathon</td>
<td>50-80</td>
<td>2,500-6,000</td>
</tr>
<tr>
<td>Judo</td>
<td>55-65</td>
<td>3,000-6,200</td>
</tr>
<tr>
<td>Throwing</td>
<td>60-65</td>
<td>6,000-8,000</td>
</tr>
<tr>
<td>Weightlifting</td>
<td>55-75</td>
<td>3,000-10,000</td>
</tr>
</tbody>
</table>

The Table 5.1 should not act as a guide to recommending daily calorie intake levels to athletes, but rather represent the problem with focusing on the one dimensional aspect in nutrition that is
Total calorie intake. Total calorie intake in athletics is only one tiny piece of the performance puzzle.

Elite athletes need to individualize:
- Timing of meals
- Balancing intensity of training with adequacy and composition of meal intake
- Managing weight class goals
- Daily weight goals
- Hydration status
- Vitamin and mineral intake

A focus on total calorie intake can easily distract from the idea of fueling for performance by neglecting to take into account the aforementioned points. Additionally, you may notice the range of daily caloric needs represented in Table 1. This range represents the various weight classes found in weightlifting, but there is an additional variability not listed which is that found in each individual; and that is the components of energy expenditure.

The components of energy expenditure are those metabolic and physiological factors that make up our daily energy expenditure and thus dictate the daily caloric replacement needs. The components are comprised of: basal metabolic rate, physical activity, growth and the thermic effect of food. Interestingly, each of these components can vary on a daily basis which would change the total energy expenditure for that day and thus change the daily caloric needs. This variability in daily energy expenditure and caloric needs only further enforces the need for athletes to focus on more than just calories. So the golden question shouldn’t be “how many calories do I need?” but should rather be “how do I eat for MY training?”

Meal Timing

Meal timing is more than just how an athlete should eat on competition day but also should apply for training days as well as days off. Small frequent meals (5-7 per day depending on needs/goals) are a great way to ensure proper fueling pre/post workout can help improve metabolic efficiency by reducing blood sugar and insulin spikes. Carbohydrates in our diet are converted to blood glucose in the body and blood glucose stimulates the release of insulin to drive the glucose into the cells for storage as glycogen. Glycogen is the stored form of energy to be used at a later time. While glycogen is essential for training, the release of insulin suppresses fat oxidation so it is important to balance the amount of carbohydrates consumed throughout the day to maximize the body’s metabolic efficiency. A smaller meal, especially one with fewer carbohydrates and/or sugars will create less of a spike in blood sugar and thus less of an insulin spike after the meal which means the body’s ability to oxidize fat for fuel will not be inhibited as long.

Pre-Exercise/ Competition

Prior to a workout or competition, athletes should eat foods that they are comfortable digesting. These foods should optimize hydration and not upset the stomach. Foods high in carbohydrate content and low in fiber, may help to avoid any gastrointestinal discomfort. This will vary athlete
to athlete, but can include foods like peanut butter sandwich, granola bars, fruit, cereal with milk, scrambled egg and toast or even chicken noodle soup.

How much food an athlete should eat will depend on the individual based upon his or her own experiences. However, some guidelines indicate 30-40 grams of carbohydrates and 10-20 grams of protein may be appropriate. Under no circumstances should an athlete eat “new foods” prior to a competition. The athlete may have a negative reaction to it and this may interfere with performance. New foods should be “tested” only in training.

**Post-Exercise/ Competition**

Following a workout or competition, athletes must restore glycogen levels, repair and rebuild damaged muscle and rehydrate to enhance recovery. This is achieved by consuming food or supplements with both carbohydrate and protein immediately within 30 minutes post workout. This can be chocolate milk and piece of fruit, fruit and yogurt smoothie, turkey sandwich and milk, eggs and toast or an approved protein shake. Athletes should chose the appropriate recovery based on the intensity of the training! The major questions that can help you determine what to eat are: How intense was my session? How long did I train? When is my next session? As a general rule, the more intense the session the greater the utilization of carbohydrates and thus the greater the need to consume them post workout. Protein should be a consistent amount based on an athlete’s body size and lean muscle mass.

**Hydration Timing = All the time**

The body uses water for thermoregulation, digestion, elimination of waste, recovery from strenuous exercise, transport and as a medium for cellular activity and pH balance. When the body becomes dehydrated, these processes are compromised and the body can become fatigued, cramped or overheated; which shuts down or diminishes vital bodily functions and decreases performance.

Athletes must be aware of fluid loss during strenuous activity especially during hot or humid weather and when training at altitude. Thirst is not a good indicator of fluid needs, because the body can already be dehydrated by this time; further increasing the risk of decreased performance. It is best to drink fluids consistently throughout the day and not just during activity. As a general guideline, for every pound of body weight an athlete loses during activity equals 12-20oz of fluid lost and thus 12-20oz of fluid that must be replaced to maintain hydration.

**Meal Composition**

The composition of each athlete’s meals/snacks should be composed of carbohydrates, protein and fats; with the amount of each macronutrient being determined by the athlete’s goals, training type and intensity.

**Carbohydrates and Performance**
Carbohydrates should generally account for a slight majority in the diet. Forty to sixty percent of one’s total calories should come from carbohydrate; depending on the type and intensity of training. Carbohydrate intake recommendations range between five and twelve grams per kilogram of bodyweight. This range represents the type, duration and intensity of the workout. For athletes who depend heavily on carbohydrate energy and glycogen stores, ample carbohydrate intake is critical for optimal sports performance.

Glycogen is the storage form of carbohydrates which is found in the muscle and in the liver. The body uses glycogen when it cannot get enough oxygen to burn fat for energy. The body’s use of glycogen is determined in a number of ways including a person’s diet, fitness level and type and intensity of exercise being performed.

- Higher intensity, short term exercise depends the most on glycogen stores
- Medium intensity, intermittent burst exercise also depends heavily on glycogen stores
- Moderate intensity exercise depends on glycogen stores for about 50% of its energy
- Low intensity, long duration exercise depends mostly on fat oxidation for its energy

Carbohydrates can be divided into two categories: complex (starches) and simple (sugars). Complex carbohydrates provide the body with a slow, steady supply of glucose because it is composed of chains of glucose that must first be broken down during digestion. Simple carbohydrates do not need to be broken down and therefore enters the bloodstream immediately, providing a quick supply of energy.

The glycemic index can be used to determine the speed of carbohydrate breakdown. The index scale ranges from 0-100 with 0 representing the slowest breakdown of carbohydrate into glucose and 100 representing the fastest breakdown of carbohydrate into glucose.

**Fiber**

Fiber is a type of carbohydrate that is not digested by the body and has no nutritional value. However, it does play an important role for gastrointestinal and overall health. There are two types of fiber in our diet, soluble and insoluble, with each playing a distinctive role.

Soluble fiber is in fruit, legumes, vegetables and oat bran. It is an absorbent, gel like substance, which helps slow down the movement of food through the upper intestine. This helps in the absorption of nutrients from the food, which passes through the upper intestine. Soluble fibers also assist with the regulation of blood glucose levels and help to lower blood cholesterol levels by removing fat-digesting bile acids from the intestine.

Insoluble fiber, found mostly in unrefined grains and cereals, adds bulk to the food matter passing through the lower intestine thus speeding up the food’s passage through the gastrointestinal tract. Conversely, to soluble fiber, insoluble fibers speed up the movement of food through the lower intestine. This effect reduces the amount of time the lower intestine is exposed to certain toxins that might be present in the digested food. This reduces the risk for developing colon cancer and helps prevent constipation.

**Protein**
Protein, in the human body, is responsible for tissue repair and growth; it is used to make hormones, enzymes and hemoglobin and is an energy source in prolonged exercise. However, there are many misconceptions and unfounded claims regarding protein.

Athletes, especially weightlifters, require greater amounts of protein than sedentary people; they still do not need to load up on it excessively. Compared to carbohydrates, proteins make up approximately twenty to thirty percent of total daily caloric intake. On average, a weightlifter should consume about 2 grams per kilogram of bodyweight to support the amount of cell turnover and muscle repair associated with training.

The amount of protein a person can absorb in 1 hour will depend on muscle mass and cellular demand; but as a general rule it will not exceed 20-35g/hr. This limitation in the amount absorbed per hour makes meal timing and managing the composition of meals to ensure each meal contains protein critical to an athlete absorbing the necessary amino acids.

Good sources of protein include egg whites, lean beef, chicken, turkey, lean pork, fish, shellfish, soy and also beans.

**Fats**
Fat is a necessary part of the human diet. Fat is not only responsible for fuel but also for the absorption of fat-soluble vitamins A, D, E and K and essential fatty acids can only be obtained from dietary fat. In addition, fat is essential for protection of the organs and cell structure. However, only twenty to thirty percent of total calories should come from fat. Athletes should focus on consuming unsaturated fats from foods such as olive oil, nuts, seeds, avocado and fish as they promote good heart health and can enhance the immune system and reduce inflammation. Saturated fats are primarily found in foods like butters, cream and fast foods can increase inflammation in the muscle and can even increase ones risk for developing heart disease.

**Nutrition Quality**

**Vitamins and Minerals**

Vitamins are a group of naturally occurring nutrients found in foods that are required in the diet for the maintenance of health, metabolic functioning growth, recovery and athletic performance. Vitamins are necessary for health and essential in the diet because the body either does not produce them or does not produce them in adequate amounts. If one or more are lacking in the diet, metabolism is affected and symptoms may arise. They are also essential parts of the enzyme system. This means they are not nutrients in themselves but aid and facilitate other body functions. They are involved in the formation of red blood cells, the building of bones and protein metabolism. Some vitamins act as co-enzymes in the energy-releasing chemical reactions in metabolizing carbohydrates and fats. Vitamins however, are not direct sources of energy themselves. Vitamins are divisible in two groups: fat-soluble and water-soluble.

Fat-soluble vitamins are A, D, E, and K. They are soluble in lipid and organic solvents. This lipid solubility allows these vitamins to be stored in large amounts in the liver along with fat. Water-
soluble vitamins include the B and C vitamins. The B vitamins act as co-enzymes and are involved in the metabolism of fat, protein and carbohydrates. C vitamins act as antioxidants and are best known for their ability to combat a cold.

Minerals are inorganic substances that are required by the body to function. While minerals are found throughout the body, they make up only four to six percent of it. Minerals are major components of body structures such as bone, muscle and skin. From an athletic point, minerals are just as important as vitamins however, athletes will not benefit from taking mega doses of minerals.

There is little, definitive scientific evidence from human studies that supplemental intakes of vitamins and minerals provide significant ergogenic actions above the Recommended Daily Allowance (RDA). However, inadequate intake of many essential nutrients can lead to impaired performance. Optimal intake of nutrients will not overcome deficits in training and consumption of excessive quantities of dietary supplements can be toxic and impair performance. If appropriate, athletes may seek a dietary evaluation from a health professional and food intake patterns can be adjusted if necessary to promote optimal health.

Supplements

Many athletes ask the question “Which supplement is right for me?” The answer to this question applies to each individual and depends on many other factors such as diet, volume and intensity of training, sleep, school or work schedule and family obligations, to name a few. There are however, general guidelines for supplement usage.

Supplements should only supplement a healthy diet. They should not compensate for nor take the place of a nutrition regimen. Supplements may prove helpful for athletes who may need more calories and nutrients, especially during a high volume or intensity phases. However, athletes should remember to be realistic and that there is no “miracle” supplement. Supplements can never take the place of a good nutrition regimen or will not make the athlete better physically.

When selecting a supplement for an athlete, it is critical to choose a product with the NSF certification to ensure safety and fair play. NSF certified products undergo third party testing to ensure they contain what the label states and that they are free of contamination by the 165 WADA banned substances including: Stimulants, Narcotics, Steroids, Diuretics, Beta-2-Agonists, Beta Blockers, Masking Agents and other substances.

More information on anti-doping efforts and education can be found at USADA.org or WADA-AMA.org.

Travel

When traveling, especially abroad, athletes must be aware of potential problems. One is dehydration. Spending several hours on a plane and traveling across time zones can affect the body negatively. If the athlete is trying to keep his bodyweight up, ample food and drink must be consumed to achieve this. Conversely, if the athlete is trying to lose or monitor bodyweight,
he/she must be cautious not to lose too much. It is not uncommon to lose two kilograms of bodyweight on a transatlantic flight. Thus, athletes should be encouraged to pack food and supplements to maintain the consistency he/she has made a part of training. Snacks and sandwiches can easily be packed in carry-ons for fueling during the flight and items like canned tuna, peanut butter, oatmeal, rice packets and protein powders can be packed in a check bag so that the athlete can maintain a consistent routine leading into competition.

Another precaution one may take is for jetlag. Although one cannot prevent jetlag from occurring, there are steps one can take to minimize it. Upon arriving, athletes should try to acclimatize their bodies by adjusting to the current time of day. Athletes should try to eat at normal times. Taking a nap upon arrival should also be discouraged. This will only exacerbate jetlag. The athletes should try to stay awake until their normal bedtime and sleep until their normal wake times.
Chapter 5
Theory of Athletic Power Production

- Newton's laws of motion as applied to lifting
- Understanding power capacity
- Comparing Power Values: Olympic style lifting vs powerlifting
- Power Production: athletic-type lifting vs machines

Power - Power - Power! This is the name of the game in today’s world of highly charged athletic competition. Powerful athletes are the ones who have the greatest impact on their sports. When discussing athletic power what does the term mean? How is it defined? Here, in this chapter, you will see that the concept of athletic-type power does not mean the ability to lift heavy weights, but rather the ability to apply force throughout a full range of body-joint movement with speed for maximum time and/or distance. Athletic power production involves torso kinetic energy, torso rotational energy, and stored kinetic energy. And it is the combined interaction of these elements that exert the greatest influence on shifting the force-velocity power curve to the right (Fig. 5.2b). The concept of athletic power production will be illustrated by comparing the power generated during execution of a deadliest versus an Olympic style clean.

In this chapter we also look at the individual roles plyometrics and mental imagery can play in the generation of power. The chapter concludes with an evaluation of machine training and how it fails from a scientific standpoint to qualify as legitimate form of athletic power training. As illustrated in Fig. 5.0, only athletic-type lifting (snatches, cleans, pulls, and squats) has the capacity to effectively train your body's power zone (Fig. 5.3a and 5.3b) A highly developed power zone offers the greatest opportunity for the transfer of weight trained power to your sport.
Muscle Force

**Strength** may be defined as the ability of the muscles to contract and exert force. **Force** is the effect one body has upon another. A weight can be lifted only when force has been applied; however, it is possible to have force without motion, as in functional isometric lifting. Force does not affect motion when its result is zero (as in isometric lifting) though the effects can be seen and measured in terms of magnitude, direction, and point of application.

In power snatching and power cleaning, for example, we are mainly concerned with the use of force for changing the state of motion and the bar and weights. Internally, the lifter obtains his/her force through muscle contraction. The magnitude of muscle force generated is in direct proportion to (1) the size and the number of fibers contracting and (2) the speed at which active fibers are forced to lengthen (eccentric contraction), which involves the elements of stretch reflex facilitation and stored kinetic energy. Force is inversely proportional to the speed with which fibers shorten (concentric contraction). This means the heavier the weight to be lifted, the greater the required muscle force and the slower the fibers contract. Likewise, the lighter the weight, the less force required and the faster the fibers contract. This relationship is illustrated by the force-velocity curve (Fig. 5.1). Its implications for training are discussed shortly.

Force and Motion

**Newton's laws of motion.** The whole science of force is based upon three fundamental laws known as Newton's laws of motion. Simply stated they are:

1. Everybody continues in its state of rest or uniform motion in a straight line except insofar as it is compelled by force to change that state.

Newton's first law is known as the law of inertia (inertia is Latin for idleness). In simple terms, the law of inertia says that everything in the universe is at rest. Force is necessary to initiate motion; and once something is in motion, further force must be applied to slow, stop, speed up, or change direction.
Thus, to get a weight moving (as in power cleaning) you must first overcome its inertia and then keep the weight moving until the lift is completed. Overcoming inertia when lifting maximum to near maximum weight requires the generation of a strong ballistic impulse, which involves self-arousal (i.e., thinking strength and thinking speed). This relates back to the neuropsychological factors of strength performance.

2. The acceleration of a body is proportional to the force causing it.

In effect, Newton's second law says that a greater force is required to reach a certain speed in a given time if one starts from a stationary position than if one is already in motion. Applied to power snatching or cleaning, the acceleration and speed of the bar during the second pull will be dependent upon the magnitude and direction of the first pull. Thus, the first pull must be strong and as fast as body leverage permits.

3. For every action there is an equal and opposite reaction.

The effect of force upon one body is known as the action and that upon the other the reaction. For example, in executing a power clean, the lifter applies a ballistic force to the bar to overcome inertia and lift the weight from the floor (the action) and, at the same time, pushes against the floor with a force equal to that which moves the bar upward (the reaction). To generate a powerful action and reaction requires strong kinetic movement force from the hips, thighs, and lower back.

**Lever system.** Related to Newton's laws of motion and their application to weightlifting are the principles relating to *levers* both within the body and outside.
While the force of muscle contraction is dependent upon fast-twitch motor unit recruitment capabilities and muscle mass, the actual load lifted by the lifter depends on the leverage system of the skeleton. In weightlifting, a difference exists in the force a muscle is able to generate within itself and the force acting through a lever-age system. For instance, in power snatching or cleaning, poor technique or poor anatomical structure would prevent a lifter from assuming a body position which provides maximum pulling leverage and hence reduce the effectiveness of the generated muscle force.

The human body acts predominately through third-class levers such as the elbow joint. Three factors present in a lever system are \( R \) (the load of resistance), \( F \) (the muscle force), and \( A \) (the axis) (Fig. 5.1).

**Expression of Power**

Understanding power capacity and how it can be created is one of the keys to optimizing athletic performance. Power should not be confused with strength. **Power is the capacity to do a given amount of work as rapidly as possible.** By this definition, power includes the elements of strength and speed. It is dynamic strength coupled with movement speed. **Speed is the ability to apply force rapidly** (e.g., when cleaning, jumping, throwing, sprinting).

A powerful athlete has explosive strength, exceptional acceleration, and speed.

**Acceleration.** One of the major advantages of being physically powerful is the ability to accelerate. An athlete who is powerful can get up to full speed faster than an athlete who is just strong.

Being able to accelerate is not the same as simply being fast. **Acceleration refers to the ability to change velocity quickly.** Velocity is speed in a given direction. For instance, in cleaning a weight, the velocity of the bar is equal to its speed and the upward direction it is moving. Later in this chapter, we will take an in-depth look at speed and acceleration.

**Force-Velocity Curve**

![Force-Velocity Curve](image)
One of the purposes of athletic-type Wang, if not the main one, is to train and condition an athlete to generate maximum muscular force at higher and higher movement speed. In competitive athletics, when all other factors are equal, power is the deciding factor between winning and losing.

Strength times speed equals power. The working relationship between strength and speed is illustrated by the force-velocity curve, also known as the power-velocity curve (Fig. 5.2a). To become a power athlete, your training must focus on shifting the middle portion of the curve to the right by either increasing strength or speed, or both (Fig. 5.2b). Let's look at how this can be accomplished.

**Muscle power.** Power as defined as the rate at which work is done is represented by the formula

\[
\text{Power (P)} = \frac{\text{Force (F)} \times \text{Distance (D)}}{\text{Time (t)}}
\]

**Where:**
- \( P \) = Power
- \( F \) = Force (strength)
- \( D \) = Distance
- \( t \) = Time

**Since:**
- Velocity \( (V) = \frac{\text{Distance (D)}}{\text{Time (t)}} \)

Then:
- \( P = \frac{F \times D}{t} = F \times V \)

This suggests four ways to increase power through training, each of which will result in a shift of the force-velocity curve. To increase power, you can:

1) Increase strength through athletic-type lifting, powerlifting, and functional isometrics, keeping distance and time constant.

\[
\text{P} = \uparrow F \times \text{D/t} = \uparrow F \times V
\]

2) Increase speed (decreased movement time) through acceleration, speed, and jump drills, keeping force and distance constant. Example: repetition dead hang snatchs and cleans using 70-80 percent of the 1-RM, along with jump drill, develops quickness and movement speed.

\[
\text{P} = F \times \text{D/t} = \uparrow F \times \uparrow V
\]

3) Increase power production by combining 1 and 2. To generate maximum or near maximum power output, perform snatches, cleans, and squats of high velocity, using as heavy a load as possible (90% or greater of the 1-RM), along with jump and speed drills. A bonding between mental and physical processes related to strength and speed work must occur in order to produce maximum power.

\[
\text{P} = \uparrow F \times \text{D/t} = \uparrow F \times \uparrow V
\]

4) Increase distance that a force acts on a body or object through technical drills, and keep force and time constant. Examples: increased power is reflected in one’s
ability to apply pulling force to the bar through a full range of movement in snatching or cleaning, or to apply force to a shot or discus through a full range of movement.

In any given time frame, the more work that is done, the greater the power output. As you will shortly see, power-oriented athletic-type lifting is necessary to develop the ability to produce maximum power output.

**Power values.** In metric terms, power is defined as work per unit of time measured by watts (1 W = 6.12 kp m/min and 1 kp = 9.80665 N). Power values for strength athletes are best expressed in watts of power per kilogram of body mass (watts/kg body mass). The International System of Units (SI) for mass and weight are the kilogram (kg) and the newton (N), respectively (1 kg 9.80665 N and 1 N = 0.101972 Kp).

It is common to use the terms "mass" and "weight" interchangeably, especially in making reference to an athlete's body mass in kilograms as a measure of weight. In strict terms, this is not proper use of the term "weight." The weight of an object is equal to its mass multiplied by the acceleration due to gravity, thus

\[
W = mg
\]

*Where:*

- \(W\) = Weight
- \(m\) = mass
- \(g\) = acceleration due to gravity (9.80665 m/s\(^2\))

Example: An athlete with a body mass of 80 kg would have a body weight of 784.5 N (80 kg x 9.8 m/s\(^2\)).

**Power lifting vs. Olympic-style lifting**

In the sport of powerlifting the squat, bench press, and deadlift have been designated as the power lifts. This is technically incorrect and misleading; for as you will soon see they are not true power lifts. Only the Olympic-style lifts (snatch and clean) rightfully qualify. In powerlifting, muscle force is required, but ', as measured in watts per kilogram of body weight, is low in comparison to that generated in Olympic-style lifting. This is easily illustrated by comparing the power values for world record lifts made by two former world champions, powerlifter Doyle Kenady (USA) and Olympic-style lifter Alex Pisarenko (Russia).

**Power values: powerlifter vs. olympic lifter.** Kenady, at a body weight of 140 kg, executed a 405 kg deadlift. Approximately 2 seconds was required for him to lift the bar/ weight .40 meters off the floor and stand erect. Pisarenko, at a body weight of 120 kg, executed a 265 kg clean. It took him .90 seconds to squat clean the weight and stand up. The bar/weight traveled .90 meters from the floor to the chest. Calculations of the power values for each lift are as follows.
In comparing the power values of the world record lifts made by these two former champion lifters, we see that Pisarenko’s 265 kg clean produced 21.64 watts/kg body weight and Kenady’s 405 kg deadlift produced 5.67 watts/kg body weight. As this example shows, the so-called power lifts are actually strength lifts.

Conversely, the snatch and clean are true high velocity power lifts; they have the greatest capacity to shift the force-velocity curve to the right.

Peak power values for world class olympic lifters in lighter classes average about 30 watts/kg body weight. This means that lighter lifters have a much higher strength-to-body weight ratio, compared to heavier lifters. Kilo for kilo they are stronger athletes.

Comparative Anatomy of Elite Weightlifters (Olympic lifters and Powerlifters)

Both groups of athletes are predominately mesomorphs and they train for widely different purposes. The difference in training focus determines the difference in their appearance. Both are genetically endowed with fast twitch muscle fibers, which is the main reason they are elite strength athletes. Fast twitch fibers are known for their ability to contract with greater speed and generate force than slow twitch fibers, Olympic lifter’s fast twitch fibers are utilized for explosive lifting. Powerlifters need fast twitch fibers to generate the force necessary for lifting heavy loads.

**Elite Powerlifters**
- Large muscle development in thighs, buttocks, lower back, chest, anterior deltoids & triceps
- Broad shoulder girdle structure
- Wide hip structure
- Short torso in relation to leg length
- Generally large joints, especially knees
- Longer arms than normal, which is an advantage in deadlifting
- Specialists in generating high muscular force as required for maximum heavy lifting

**Elite Olympic lifters**
- Large trapezius muscles, triceps, quadriceps, and erectors spina
- Long torso in relation to leg length
- Hyperextensive elbows (or slightly hyperextensive)
- Flexible wrist, shoulders, hips, knees & ankle joints
- Longer arms than normal, which is an advantage in snatching
- Specialists in performing explosive-reactive-ballistic lifting movements.
Principles of Power Production

ATHLETIC POWER PRODUCTION involves:
- Torso Kinetic Energy
- Torso Rotation Energy
- Stored Kinetic Energy

**Kinetic energy** is the energy of motion and is related to both the mass of the body and velocity. (momentum = MV). **Torso kinetic energy** is the movement which can be generated with athletic-type lifts that produce **torso rotational energy**, allowing you to exert force in multiple directions. Torso rotational energy is the energy that comes from a body segment. It involves large muscle groups generating great force through and around the center of mass (body's power zone) (Fig. 5.3). For example, bending the hip joint when jumping, squatting, or cleaning, the hip joint creates a high torque, or movement force situation.

### PHASES OF ENERGY INTERACTIONS

<table>
<thead>
<tr>
<th>Description</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The act of squat cleaning begins with the generation of a strong ballistic impulse in the thighs and hips to overcome inertia and get the bar moving off the floor.</td>
<td>Torso kinetic energy develops rapidly as you begin to accelerate the upward thrust of the body. As the bar passes the knees, torso rotational energy from the upward movement of the hip joint increases the velocity of the bar. This is followed by a strong forward thrusting rotational movement of the hips as you begin the final drive to full body extension. Maximum upward extension is achieved by extending on the balls of the feet.</td>
<td>When you are at full body extension, the bar is given a final burst of momentum by a vigorous upward rotation of the shoulders, which elevates the bar to maximum height.</td>
<td>At the completion of the pull, the bar serves as a fulcrum; you jump and pull yourself under, in a full squat, catch the bar at the chest, then stand erect. The final standing movement utilizes stored kinetic energy from hip and thigh extensors.</td>
</tr>
<tr>
<td>Key Concept</td>
<td>ballistic impulse</td>
<td>forward thrusting rotational movement</td>
<td>stored kinetic energy</td>
<td></td>
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**Stored kinetic energy**, also referred to as **stored elastic energy**, applies to all movement involving eccentric forces. When a muscle contracts eccentrically under external force, it stretches and stores (absorbs) energy. Subsequently, stored energy is added to the muscle force generated during concentric contraction as both are converted to kinetic energy of motion.
Application of the concept of stored kinetic energy is the key to maximum high power output during athletic-type lifting and all other activities requiring high instantaneous power (e.g., gymnastics, shot, discus, jumping, striking, football line play).

Analysis of the squat movement illustrates the role stored kinetic energy plays in high power production (Fig. 5.4). In the execution of a squat, during the flexion phase (descent), energy generated from eccentric hip and quadriceps contraction and stretch reflex contraction, in resisting gravitational force, is stored as kinetic energy. On the squat recoil (extension), the lifter utilizes stored kinetic energy to generate greater quadriceps force, and greater hip and torso rotational energy to accelerate and power out of the bottom position.

The Body's "Power Zone"
Concentric circles radiate out from the body's largest and strongest muscle groups to the smaller weaker groups.

Tendon Power

Tendon strength is a critical component of explosive high power movement.

In performing instantaneous high power movements, tendons in conjunction with muscles play an important role. Like muscle fibers, tendons have the functional capacity to store elastic energy. In the stretch-shortening cycle, where the working muscle stretches and stores potential energy while contracting eccentrically, the muscle tendon is stretched and stores energy. The combined energy is then released for forceful concentric contraction as required for performance of high velocity power movements. One of the advantages of having tendons store energy is that there is less stress imposed upon the muscles while executing high velocity movements.

Tendon and force. The amount of energy that a tendon will store is dependent upon the force that is applied together with its length change, which can be represented by:

\[ W_t = SF_t dl_t \]

Where:
- \( W_t \) = Work performed on the tendon by
- \( F_t \) = Force by which the tendon is stretched
- \( dl_t \) = length change of the tendon

The larger the force \( (W_t) \) applied to the tendon, the greater the stretch of the tendon. And the greater the stretch, the greater the amount of potential energy stored and available for generating maximum concentric force. For the execution of instantaneous high power movements, stored energy must be released quickly. For quick energy release requires a rapid switch from eccentric to concentric movement, such as is required in the execution of a heavy clean or squat (Fig. 5.4).
Implications for training. Developing high velocity explosive power capacity for athletics demands power-oriented weight training. The power snatch, power clean, and a variety of high pulling movements train and condition the body to generate maximum torso kinetic energy through a full range of multi-joint movement. That is what athletic-type strength training is all about—developing high velocity power.

The greatest transfer of training for athletics results from athletic-type lifting movements which allow power to exert itself to the greatest degree.

To gain a clear understanding of the capacity of athletic-type strength training to maximize torso kinetic energy production, we need to analyze how movement forces are generated and flow through the multi-linked muscle-skeletal system when an athletic-type lift is executed. Let's analyze the squat clean... For each phase of the analysis, note how energy interaction plays a key role in high power production. At the same time, try to visualize how so-called powerlifting or body building movements fail to duplicate the high velocity power produced during athletic-type lifting.

Energy Interaction in Squat Cleaning

Summation of force. As each phase of the clean is executed, there occurs a summation of force within the multi-linked muscle-skeletal system. Energy generated by large muscle groups of the lower body (power zone) flows to smaller muscle groups of the upper body, resulting in a summation of torso kinetic energy, which is essential for maximal lifting (Fig. 5.3). Torso kinetic energy generated during the clean is imparted to the bar as kinetic and potential energy (stored energy). The higher the bar is pulled from the floor, the more potential energy it has. If the bar is allowed to fall, its potential energy changes into kinetic energy (energy of motion).

Acceleration and Speed

Up to this point we have focused on the strength component of power. What about speed? As stated earlier, speed is the ability to apply force rapidly. A more comprehensive view is that speed is determined by reaction time (quickness), explosiveness (ballistic movement), acceleration, absolute strength, and speed endurance (anaerobic power).

Speed has long been considered one of the hallmarks of a great athlete. It is one of the major physical attributes National Football League (NFL) scouts look for in a collegiate player. However, while great speed may be an important asset to have, not every speedy athlete becomes a star player. There are other qualities of equal or greater importance. Throughout NFL history, many of the outstanding running backs and receivers have not been known for their great speed. What accounts for their success have been reaction time, acceleration, and explosiveness. On the snap from center, great receivers explode off the line of scrimmage, accelerate to full speed in a stride or two (leaving faster defenders a step or two behind), snare the pass, then with quick elusive moves head for the end zone.
Reaction time, acceleration, and explosiveness are equally important for success in other sports. For example, in bike racing a rider needs quick acceleration to break away from the pack. Cyclists may demonstrate blazing speed on the flats, but if they lack the explosive power to attack and accelerate on the hills, they won’t win races.

Acceleration and speed are enhanced through explosive power training such as speed drills and plyometrics (jump training). Both types of training require strong ballistic action and stretch reflex facilitation, which are the keys for the sudden release of energy for acceleration and speed (Fig. 5.5).

**Developing Explosive- Reactive Power**

The reactive neuromuscular apparatus of muscles can be singled out as the specific factor of the athlete’s strength-speed abilities, abilities that demand explosive-reactive movements.

The ability to overcome resistance quickly and execute quick forceful movements (e.g., jumping, sprinting, throwing) requires **explosive-reactive power**. Neuromuscularly, executing explosive movements involves a rapid stretching of a muscle(s) that is undergoing eccentric contraction, and followed by fast concentric contraction. The **stretch reflex**, also known as the **myotatic reflex**, is utilized to accomplish this rapid movement.

The definition of stretch reflex is: “When a muscle with an intact nerve supply is stretched, its response is strong concentric contraction.” Thus, during the performance of explosive-reactive movements such as high jumping, a slight eccentric contraction or pre-stretching occurs at the knee, hip and ankle joints in the jump takeoff. When done quickly, a slight lengthening of muscles will produce a faster, more forceful concentric movement in the opposite direction. The key point here is: the faster a muscle is lengthened, the greater the concentric force developed. If the switch from muscle lengthening to shortening is done as rapidly as possible, then the maximum advantage of the release of stored kinetic energy to produce explosive-forceful movement can be taken.
Chapter 6
Weightlifting Technique

The most fundamental element of weightlifting is the training of technique. This chapter will take a thematic look at this topic and the factors that influence the development of safe and effective technique.

Only proficient technical input can bring about efficient output. For this reason it is vital that attention be paid to the initial stages of preparation.

Practical and effective technique is a system of complex movements that respects the individuality of the athlete as it relates to the theoretical model.

The result of positive technique is the athlete channeling their physical abilities onto the barbell to create a personal model of productivity that at the same time respects the ideals of the theoretical model of proper weightlifting.

High level technique is both complex and difficult to attain and is influenced by the following athletic skill sets:

- Sensory Skills
- Joint mobility
- Flexibility
- Coordination
- Skeletal Levers
- The ability to develop force and speed

If the above physical qualities are developed in a harmonious manner the maintaining of technique even while lifting heavy loads is possible.

The Basic Requirements of Effective Technique

- Balance Skills, both static and dynamic
- Differentiation Skills, the ability to apply force in an effective and economic manner
- Fluidity of Motion, The coordination of the distinct phases of weightlifting movement both internally and externally to maintain correct trajectory as it relates to the most efficient theoretical models.

Performance technique has not undergone radical changes in recent years. While an individuals somatotype may result in subtle changes adherence to the accepted theoretical models is maintained.
How Barbell Trajectory Indicates the Quality of Technique

In theory the most economical way of lifting a barbell is to carry out as much vertical displacement with a minimum of horizontal displacement.

However as the amount of weight on the barbell increases the human body is challenged to maintain this ideal relationship.

In order to lift significant *weights* on a barbell in the most effective manner it is necessary to reduce the moments of force on the various body joints. Since a decrease in acceleration is not a positive factor the next available item that can be reduced is the lever arm. Therefore bringing the center of the barbell closer to the athlete is of great benefit.

The following factors, as previously mentioned in the Level 1 course emphasized, influence these phases.

Research studies have shown that there are standards and measures that relate to the specific ways that force can be applied to a barbell to make it move more efficiently.

The rational for an effective position is to maximize the performance of the 3 pulls that are used in weightlifting. A correct starting position is used to create a successful first pull, that sets up and effective second pull that allows the athlete to perform optimal third pull.

An effective first pull maintains an upright torso posture that minimizes horizontal movement. The closer the barbell is to the athlete the greater the acceleration will be in the second pull.

An effective second pull is where the power produced has enough upward momentum on the barbell that the athlete can descend under the barbell and support it over head, which is the third pull.

The Clean and Snatch

**START:**

- All body levers tight. Eliminating as much “slack” as possible before pulling will reduce horizontal displacement and prevent the barbell from acting on the lifter.
- Shoulders are ‘set’ even to or in front of barbell
- Back is flat, with a concave curve to it
- Feet hip width apart
- Arms Straight at the elbows
- Athlete’s weight is equally distributed on the balls of the feet.
1\(^{st}\) PULL:
- *Barbell comes back towards lifter, immediately*
- Hips and shoulders raise at the same rate
- Lifter stays flat-footed
- Arms remain straight at the elbows
- Transition Phase occurs between the time the barbell reaches the knee level and the athlete attains the power position. It is important that the athlete stay flat-footed as the torso becomes vertical

2\(^{nd}\) PULL:
- Barbell will attain maximum velocity
- Full torso extension
- *Barbell remains close to body. It does not pass in front of the original line*
- Arms are still straight at the elbow
- Shoulder muscles (trapezius) contract to provide the fulcrum for the pull under

3\(^{rd}\) Pull
(The Pull Under)
- Using the contracted shoulder muscles the lifter should actively pull themselves under the barbell with their arms
- *The drop is quick and as straight as possible with the lease amount of horizontal displacement*
- The pull under should be close to the body (do not allow the bar to
swing away from the lifter)
  - The feet move quickly and low to the ground.

<table>
<thead>
<tr>
<th>RECEIVING</th>
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</thead>
<tbody>
<tr>
<td>• The feet contact the ground as quickly as possible</td>
</tr>
<tr>
<td>• The lifter actively pushes up against the falling barbell</td>
</tr>
<tr>
<td>• Feet move to a position that is approximately a shoe width wider than the pulling position. (and should be the same position as the squat exercise).</td>
</tr>
<tr>
<td>• Stable Squat position, Muscles tight</td>
</tr>
<tr>
<td>• Elbows locked</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PATH OF THE BARBELL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <em>The bar stays behind the vertical line throughout the entire lift</em></td>
</tr>
<tr>
<td>• The bar does not move around the knees during the 1st pull</td>
</tr>
<tr>
<td>• The bar stays close to the body during the 2nd pull</td>
</tr>
<tr>
<td>• The bar stays close to the body during the 3rd pull (the pull under)</td>
</tr>
</tbody>
</table>

Whether it is a snatch or a clean adhering to these statements; as they relate to the trajectory of the barbell…
1. *The bar comes back to the athlete immediately upon leave the platform*
2. *The bar does not pass in front of the original vertical line during the second pull.*
3. *During the decent horizontal displacement is minimal*
   
   … will give the athlete the best opportunity to successfully complete the attempt.

Most technique concerns are the result of excessive horizontal displacement that are influenced by the athletes inability to hold the body levers that allow for the proper trajectory to occur.

The Jerk

<table>
<thead>
<tr>
<th>START</th>
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</thead>
<tbody>
<tr>
<td>• The body is straight with the body levers tight</td>
</tr>
<tr>
<td>• The head is in a neutral position</td>
</tr>
<tr>
<td>• The head is positioned on the anterior deltoids</td>
</tr>
<tr>
<td>• The grip on the barbell is relaxed</td>
</tr>
<tr>
<td>• The feet are hip width apart</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Dip is shallow, straight and flat-footed at the bottom at the bottom</td>
</tr>
<tr>
<td>• <em>Conventional advise is that the dip should be 10% of the lifters height</em></td>
</tr>
<tr>
<td>• Shoulders and torso remain erect</td>
</tr>
</tbody>
</table>
Avoid a backwards tilt of the hips during the dip

**DRIVE**
- The dip is ‘countered’ as soon as the lifter feels their heels they should drive up against the weight.
- Maximum velocity is achieved
- Drive up (neither forward or back)

**DROP**
- Move quickly under the bar by ‘stepping through the jerk’
- There is a short time of losing contact with the ground
- Feet move quickly and flat to the platform
- The athlete pushes themselves downwards to locked arms

**RECEIVING**
- Upon ground contact immediately press up against the bar
- Bar, shoulder, hip are all in same vertical line
- Front foot is flat on the platform with knee behind the toe
- Rear leg is slightly bent with rear heel off of the platform but solid

**PATH OF BAR**
- Dip Straight downward
- Drive straight upward
- The barbell goes backwards as a result of the athlete stepping through the jerk

Coaching Observations of Snatch Technique

1. Once the start position has been established, ensure that the shoulders are not behind the line of the barbell.
2. When the barbell passes over the level of the knee the torso must still be in line with the barbell (It is important to avoid the classic error of excessive forward tilt of the hips and the consequent arching of the torso itself. This will not have a positive effect on the upward traction as there will be a shift horizontally rather than vertically. The Torso-Hip relationship must always be positive and to do so the feet must be firmly planted on the platform for the duration of complete extension of the legs and hips).
3. Pay particular attention to the movement of the elbows during the final pull phase and ensure that they only ‘bend’ during the descent motion.
4. Additional focus should be paid to the pace of the movement so that the athlete is acting on the barbell.
5. Excessive forward or backward jumping during the catch phase is the result of an improper pull.

Coaching Observations of Clean Technique

1. At the start the same observations in the clean are observed.
2. When the lift begins the elbows carry out the same movement of the snatch but at a lower level
3. The Catch on the chest should be made with a straight back and not adversely affected by the tilt of the barbell.
4. The barbell coming in contact with the chest must occur before full flexion of the legs so that the final reception is supported.
5. Recovery should be immediate.
Coach Observation of Jerk Technique

1. Be aware of the pace of the jerk Focus on the *Dip-Drive-Jerk* of the leg movement.
2. Pay attention to the vertical position of the athlete during the Dip Phase.
3. The *impulse* from the barbell must be proportioned in order to maximize force in order to reach an optimal split.
4. Avoid a backward tilt of the hips during the dip as this will have a negative effect on rear leg position which will result in poor movement of the front leg.
5. Excessive head movement lessens the productivity of the catch. Keep the head in a neutral position throughout the jerk.
Chapter 7
Assistance Exercises

Current discussions with coaches have brought about a new approach to assistant exercises. *The benefit of using assistant exercises is that coaches should select assistance exercises that focus on technique concerns work capacity issues, injury prevention and improving performance while the athlete is training, effectively.*

One may classify the assistance exercises or lifts into the succeeding groups for convenience, however, realize there is a great deal of crossover with many. In addition, by no means is this a complete list but rather recommended exercises.

<table>
<thead>
<tr>
<th>Competition Lifts</th>
</tr>
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<tbody>
<tr>
<td>Snatch</td>
</tr>
<tr>
<td>Clean and Jerk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semi-Competition Lifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
</tr>
<tr>
<td>Jerk from Rack (Blocks)</td>
</tr>
<tr>
<td>Snatch from Different Positions</td>
</tr>
<tr>
<td>Clean from Different Positions</td>
</tr>
<tr>
<td>Lifts from the Blocks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lift Related Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Snatch</td>
</tr>
<tr>
<td>Power Clean</td>
</tr>
<tr>
<td>Power Jerk</td>
</tr>
<tr>
<td>Jerk Recovery</td>
</tr>
<tr>
<td>Jerk Balance</td>
</tr>
<tr>
<td>Power Jerk Behind Neck</td>
</tr>
<tr>
<td>Overhead Squats</td>
</tr>
<tr>
<td>Snatch Balance</td>
</tr>
<tr>
<td>Drop Snatch</td>
</tr>
<tr>
<td>Power Jerk Behind Neck + Overhead Squat</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exercises for Power and Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Squat</td>
</tr>
<tr>
<td>Front Squat</td>
</tr>
<tr>
<td>Lunges</td>
</tr>
<tr>
<td>RDL/Halting RDL</td>
</tr>
<tr>
<td>Good Mornings</td>
</tr>
<tr>
<td>Push Press Behind Neck</td>
</tr>
<tr>
<td>Military Press</td>
</tr>
<tr>
<td>Bench Press</td>
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<tr>
<td>Incline Press</td>
</tr>
<tr>
<td>Seated Press</td>
</tr>
<tr>
<td>Press Behind Neck- Seated</td>
</tr>
<tr>
<td>Lockouts</td>
</tr>
<tr>
<td>Snatch Shrugs</td>
</tr>
<tr>
<td>Clean Shrugs</td>
</tr>
<tr>
<td>Clean Pull</td>
</tr>
<tr>
<td>Clean Pull-to knee</td>
</tr>
<tr>
<td>Snatch Pull</td>
</tr>
<tr>
<td>Snatch Pull-to knee</td>
</tr>
<tr>
<td>Functional Dumbbell Exercises</td>
</tr>
<tr>
<td>Combination Exercises</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Remedial Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper Extensions</td>
</tr>
<tr>
<td>Reverse hypers</td>
</tr>
<tr>
<td>V-ups</td>
</tr>
<tr>
<td>Abdominal Crunches/Sit-ups (weighted)</td>
</tr>
<tr>
<td>Hanging Leg Raises</td>
</tr>
<tr>
<td>Isometric Holds</td>
</tr>
</tbody>
</table>
Performance of ADVANCED Assistance Exercises

By the time a coach enrolls in the Level 2 Coaching Course the, he or she has been exposed and used the standard movements listed above.

In his time as Resident Coach Zygmunt Smalcerz has shown an ability to look at an athlete and intuitively know, exactly, which exercises will address an area that needs improvement? The movements listed below are the ones most commonly used by the USA Resident Team at Colorado Springs and have shown to be effective in attaining the goals listed in the opening paragraph of this chapter.

Video Clips of these Movements may be found at:
http://www.teamusa.org/USA-Weightlifting/Weightlifting101/Instructional-Videos

<table>
<thead>
<tr>
<th>SNATCH MOVEMENTS</th>
<th>CLEAN MOVEMENTS</th>
<th>JERK MOVEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press in Snatch</td>
<td>Clean Hip, Clean Above Knee, Clean Below Knee (From Blocks)</td>
<td>Press is Split</td>
</tr>
<tr>
<td>Block Snatch Pull + Power</td>
<td>Clean Pull + Power Clean + Front Squat</td>
<td>Jerk Step</td>
</tr>
<tr>
<td>Snatch + Overhead Squat</td>
<td>Clean from low Block</td>
<td>Split Clean from Blocks</td>
</tr>
<tr>
<td>Snatch from low block</td>
<td>Clean without moving feet</td>
<td>Jerk behind Head + Jerk</td>
</tr>
<tr>
<td>Snatch without moving the feet</td>
<td>Clean stop after start</td>
<td>Press is Split</td>
</tr>
</tbody>
</table>

Explanation of Movements

Press in Snatch

**Starting Position:** Barbell on the Shoulders
Snatch Grip

**Movement:** Athlete descends into bottom position of snatch
Press the barbell into a straight overhead position

**Key Points:** Proper position with the chest and head in upright position

**Benefits:** Warm-up exercise that teaches the athlete proper positioning in the bottom of the snatch.
Also teaches the athlete to push against the bar at the bottom.

**Weight:** Very light weight 30-40%

**Reps/ Sets**
3-4 Sets/ 3 Reps

Snatch from Low Block

**Starting Position:** Snatch Grip
Low block should be 2” – 5” or Mid-shin level

**Movement:** Athlete performs the full snatch movement.

**Key Points:** This exercise also re-enforces the proper trajectory of the barbell and has the greatest benefit when the lift is received in the deepest position

**Benefits:** Strengthens the “transition” muscles that are used as the barbell comes off
### Block Snatch Pull + Power Snatch + Overhead Squat

**Starting Position:** Barbell on Blocks  
The block can be of different heights but, typically, the block is low enough that the barbell is below the knee at the start of the lift.

**Movement:** Athlete performs 2 pulls followed by a Power Snatch.  
After completing the Snatch the athlete executes 2 Overhead Squats

**Key Points:** The key factor is the athlete SHOULD NOT readjust their feet in order to perform the Overhead Squat movement.  Whether or not the athlete is doing a Power Movement or a Classical movement the “land” position should be the same.

**Benefits:** Reinforces proper pulling technique  
Speed of power movement  
Proper landing position

| Weight: | Up to 80% |
| Reps/ Sets | 2 reps / 3-4 sets |

### Snatch Without Moving the Feet

**Starting Position:** Feet begin in landing/receiving position of the Snatch

**Movement:** Athlete performs the full snatch movement without moving the feet.

**Key Points:** Remind the athlete to extend up on to their toes  
The barbell will move significantly slower than it does during a ‘normal’ lift

**Benefits:** Forces the athlete to maintain proper position  
Teaches the athlete to be patient and forcefully push up against the bar.

| Weight: | 70-80% |
| Reps/ Sets | (2+1+2) x 3 reps / 3 sets |

### Snatch Stop After Start

**Starting Position:** From the Platform

**Movement:** Once the athlete pulls the barbell from the platform they pause the bar at mid-shin

**Key Points:** The coach can, actually, tell the athlete when to snatch or allow the athlete to count for a ‘second’ and then snatch

**Benefits:** Reinforces holding the proper levers  
Assists in diminishing horizontal displacement

| Weight: | Up to 75% |
| Reps/ Sets | 2 reps / 2-3 sets |
### 3 Stage Clean

**Clean from Hip, Clean above Knee, Clean below Knee (From Blocks)**

| **Starting Position:** | Barbell on Blocks  
1st Movement from Power Position |
|------------------------|------------------------------------------------|
| **Movement:**          | Athlete performs a clean from the power position  
Following the first clean the athlete eccentrically lowers the bar to above the knee and performs a clean followed by an attempt below the knee. |
| **Key Points:**        | The key focus should be on proper position |
| **Benefits:**          | Diminishes horizontal displacement  
Speeds descent under the bar  
Catch the weight in correct position |
| **Weight:**            | Up to 80% |
| **Reps/ Sets**         | 1 reps / 2-4 sets |

### Block Clean Pull + Power Clean + Front Squat

| **Starting Position:** | Barbell on Blocks  
The block can be of different heights but, typically, the block is low enough that the barbell is below the knee at the start of the lift. |
|------------------------|------------------------------------------------|
| **Movement:**          | Athlete performs 2 pulls followed by a Power Clean.  
After completing the Clean the athlete executes 2 Front Squats |
| **Key Points:**        | The key factor is the athlete SHOULD NOT readjust their feet in order to perform the Overhead Front Squat movement. Whether or not the athlete is doing a Power Movement or a Classical movement the “land” position should be the same. |
| **Benefits:**          | Reinforces proper pulling technique  
Speed of power movement  
Proper landing position |
| **Weight:**            | 70-80% |
| **Reps/ Sets**         | (2+1+2) x 3 reps / 3 sets |

### Clean from Low Block

| **Starting Position:** | Clean Grip  
Low block should be 2” – 5” or Mid-shin level |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Movement:</strong></td>
<td>Athlete performs the full clean movement.</td>
</tr>
<tr>
<td><strong>Key Points:</strong></td>
<td>This exercise also re-enforces the proper trajectory of the barbell and has the greatest benefit when the lift is received in the deepest position</td>
</tr>
<tr>
<td><strong>Benefits:</strong></td>
<td>Strengthens the “transition” muscles that are used as the barbell comes off the floor</td>
</tr>
<tr>
<td><strong>Weight:</strong></td>
<td>Up to 80%</td>
</tr>
<tr>
<td><strong>Reps/ Sets</strong></td>
<td>2 reps / 3-4 sets</td>
</tr>
</tbody>
</table>
### Clean Without Moving the Feet

<table>
<thead>
<tr>
<th>Starting Position:</th>
<th>Feet begin in landing/receiving position of the Clean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement:</td>
<td>Athlete performs the full snatch movement without moving the feet.</td>
</tr>
<tr>
<td>Key Points:</td>
<td>Remind the athlete to extend up on to their toes &lt;br&gt;The barbell will move significantly slower than it does during a ‘normal’ lift</td>
</tr>
<tr>
<td>Benefits:</td>
<td>Forces the athlete to maintain proper position &lt;br&gt;Teaches the athlete to be patient and forcefully push up against the bar.</td>
</tr>
<tr>
<td>Weight:</td>
<td>70-80%</td>
</tr>
<tr>
<td>Reps/ Sets</td>
<td>2 reps / 2-3 sets</td>
</tr>
</tbody>
</table>

### Clean Stop After Start

<table>
<thead>
<tr>
<th>Starting Position:</th>
<th>From the Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement:</td>
<td>Once the athlete pulls the barbell from the platform they pause the bar at mid-shin</td>
</tr>
<tr>
<td>Key Points:</td>
<td>The coach can, actually, tell the athlete when to snatch or allow the athlete to count for a ‘second’ and then snatch</td>
</tr>
<tr>
<td>Benefits:</td>
<td>Reinforces holding the proper levers &lt;br&gt;Assists in diminishing horizontal displacement</td>
</tr>
<tr>
<td>Weight:</td>
<td>Up to 75%</td>
</tr>
<tr>
<td>Reps/ Sets</td>
<td>2 reps / 2-3 sets</td>
</tr>
</tbody>
</table>

### Press in Split

<table>
<thead>
<tr>
<th>Starting Position:</th>
<th>Barbell in the “catch” position of the clean &lt;br&gt;Athlete is in split jerk position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement:</td>
<td>Press the barbell into a straight overhead position</td>
</tr>
<tr>
<td>Key Points:</td>
<td>Proper position with the chest and head in upright position</td>
</tr>
<tr>
<td>Benefits:</td>
<td>Warm-up exercise that teaches the athlete proper positioning. Also teaches the athlete to push against the bar in the split.</td>
</tr>
<tr>
<td>Weight:</td>
<td>Very light weight 30-40%</td>
</tr>
<tr>
<td>Reps/ Sets</td>
<td>3-4 Sets/ 3 Reps</td>
</tr>
</tbody>
</table>

### Jerk Step

<table>
<thead>
<tr>
<th>Starting Position:</th>
<th>Barbell in the “catch” position of the clean &lt;br&gt;Athlete is standing erect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement:</td>
<td>Athlete steps forward quickly and effectively until they achieve the “Catch” position &lt;br&gt;The athlete returns to the erect position to finish reps</td>
</tr>
<tr>
<td>Key Points:</td>
<td>Proper position with the chest and head in upright position</td>
</tr>
<tr>
<td>Benefits:</td>
<td>Teaches the athlete proper landing position and distance</td>
</tr>
<tr>
<td>Weight:</td>
<td>40-60%</td>
</tr>
<tr>
<td>Reps/ Sets</td>
<td>3-4 Sets/ 3 Reps</td>
</tr>
</tbody>
</table>
### Split Clean from Blocks

<table>
<thead>
<tr>
<th>Starting Position:</th>
<th>Barbell on the Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement:</td>
<td>Athlete performs a clean and lands in a split jerk position</td>
</tr>
<tr>
<td>Key Points:</td>
<td>Focus is on the landing position</td>
</tr>
<tr>
<td>Benefits:</td>
<td>This exercise is very beneficial for athletes that are not “stepping through’ the jerk and leaving their front foot ‘short’ of the preferred position and if the athlete has a tendency to lean backwards in the receiving position of the jerk and if the rear leg is too straight at the knee.</td>
</tr>
<tr>
<td>Weight:</td>
<td>Up to 75%</td>
</tr>
<tr>
<td>Reps/ Sets</td>
<td>3-4 Sets/ 2-3 Reps</td>
</tr>
</tbody>
</table>

### Jerk Behind + Jerk

<table>
<thead>
<tr>
<th>Starting Position:</th>
<th>Barbell on the shoulders in clean grip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement:</td>
<td>Athlete performs a jerk from behind the neck followed by a jerk from the rack position</td>
</tr>
<tr>
<td>Key Points:</td>
<td>Typically, when an athlete jerks with the barbell behind their head they, naturally, point the elbows downward. The bar is positioned below where it should end up and this makes the dip, drive and the step through straighter. The hope is that a jerk from behind the head will influence the athlete to perform the same Dip, Drive, and step through is a similar manner.</td>
</tr>
<tr>
<td>Benefits:</td>
<td>This exercise should be used for athletes that lose their positions and put the barbell out in front.</td>
</tr>
<tr>
<td>Weight:</td>
<td>Up to 80%</td>
</tr>
<tr>
<td>Reps/ Sets</td>
<td>2-3 Sets/ 2-3 Reps</td>
</tr>
</tbody>
</table>
Chapter 8
Faults and Corrections

Correcting faults is an essential part of coaching, and can be challenging to learn. An understanding of the technical principles of weightlifting is as vital as how the coach interprets the technical model. Developing the ability to evaluate an individual’s technique problems and provide immediate feedback is an ongoing process. In a competition setting, the ability by the coach to assess a technical problem and be able to communicate this to the lifter may mean the difference between a good performance and a poor performance. However, it is in the training situation where most of the technical work and reinforcement takes place. This setting allows the coach and lifter to develop a mutual understanding and develop a communication process, which will carry over into the competition.

The coach must work at developing his ability to assess and develop the essential "coaching eye" that all successful coaches possess. A majority of coaches have the ability to evaluate a lift and relay the fault to the lifter. However, having the ability to relay to the lifter why the fault occurs is a different set of circumstances. Once the coach recognizes the fault, then he can prescribe a remedy. Most developing coaches are not able to recognize the fault initially. This is when working with an experienced coach and seeing and learning on a practical level in the weight room is an excellent way to develop the coaching eye.

Fortunately, our weightlifting techniques are standardized movements recognized by elite level coaches and scientists around the world. USA Weightlifting considers the following observations the most common technical errors, which result in failure. The remedies may assist the coach in adjudication and coaching tips while suggesting a solution.

The Snatch

Fault: The lifter loses the bar in front in the receiving position.

Possible Cause:
- Incomplete pull, the lifter pulls himself under the bar before the explosion phase.

Corrections:
Reinforce technique. Perform Snatches from different positions (High Hang, Above the knee, below the knee and from blocks) Tell the athlete to finish the pull. Have the athlete focus on turning the wrists over quickly and pushing up against the barbell. Snatch Balances are also recommended.
Fault: The lifter swings the bar during the pull.

Possible Causes:
- The lifter throws the head and shoulders back at the top of the pull, trying for greater extension. This action causes the reaction of the bar swinging away.
- The lifter drives up on the toes too early then using the hips to generate more force, which causes the bar to swing.
- The lifter allows the elbows to rotate back and the bar swings away during the explosion phase.

Corrections:
Reinforce technique. Combination Work from Blocks (both above and below the knee). 2 pulls + Power Snatch + Overhead Squat. Emphasize that the lifter should finish the pull in a vertical position. From the blocks remind the lifter that they should keep their shoulders over the bar longer, which will assist in staying on flat feet for a longer period. The Overhead Squat will remind the lifter to push up against the barbell during the decent under the bar. Snatch with feet in receiving position. Have the lifter put their feet in their Land position. They may rise up onto the balls of the feet but they should not loss contact with the ground. This will make the barbell move much slower forcing the lifter to stay flat-footed longer and hold their levers longer. When the bar makes contact on the thigh the athlete now extends the torso and actively pulls under the bar. The bar stays closer and allows the athlete to push up more efficiently.

Fault: The lifter sits back from the bar at the start and maintains this throughout the pull.

Possible Cause:
- The lifter's hips are too low in the start position causing the weight distribution to be too far toward the heels, which results in the lifter being in a poor position to produce force throughout the pull position.

Corrections:
Change the start position. Shift the athlete forward so the weight distribution is in the middle of the foot. Furthermore, the lifter needs to raise the hips until they are higher than the knees at the start of the first pull.

Stop Snatches. Once the athlete is in their “adjusted” start position they pull the barbell off the floor until it is AT mid-shin (not touching mid-shin). The athlete then holds the bar motionless for a 1 count and then performs the snatch. This stopping of the barbell will force the lifter to both be in a flat-footed stance and hold the body lever.

Perform Snatches from LOW blocks. Setting the block at mid-shin the athlete performs snatches from this position. Combination lifts (2 pulls + snatch) will also re-enforce staying flat-footed and holding the body levers in the correct position.
**Fault:** During lift-off, the lifter actively pulls the bar back instead of pushing the knees back.

**Possible Causes:**
- Many novice athletes are excited or are "psyched up" for the lift and this emotion results. Another cause may be a lack of strength in the lift-off position. To overcome this deficit, athletes develop a pendulum effect in which they intentionally develop momentum from lift-off by rolling the bar back toward them, then using this momentum to aid in the lift. This lack of strength results in the bar swinging out and forward as the lifter extends the hip.

**Corrections:**
Many athletes have a football player mentality. Coaches must convince the lifter to channel their emotions in a positive way. Coaches can work with athletes in training to develop an appropriate and efficient start position. Furthermore, athletes must improve general core strength.

Once again, Snatches without moving the feet (feet already in land position) Snatches with an eccentric slide to the below the knee position. Snatches from the low block position. These movements will strengthen the body levers and allow the athlete to smooth out the initial pull from the floor. Remind the athlete that Slow is smooth, and smooth is fast.

**Fault:** The lifter jumps back or away from the barbell after the second pull.

**Possible Causes:**
- The lifter finishes the second pull beyond 180 degrees because he holds on to the barbell too long to "try to really finish" the pull.
- The athlete does not stay over the barbell throughout the pull.
- The athlete swings the barbell.

**Corrections:**
Convince the athlete to finish the pull in a vertical position. In addition, help the athlete understand when to pull himself under the bar at the appropriate time. Keeping the shoulders over the bar will also help in assuring a proper receiving position. The athlete will not try to over pull to overcome leverage issues when the shoulders stay over the bar. The athlete will also reduce bar displacement due to a more vertical bar trajectory.

Exercises that will ensure a more vertical pull position are pulls, shrugs and lifts from different positions, as well as combination movements (pulls + snatch)

**Fault:** The lifter loses the bar behind.

**Possible Causes:**
- Throwing the head and shoulders back i.e. not finishing the pull in a vertical position
- Swinging the bar away from the body
- The athlete not keeping his shoulders over the bar
- Poor receiving position
- Lack of general strength in the low squat position
Corrections:
The first two bullet points outline the two primary reasons a lifter may lose the bar behind. Throwing the head and shoulders back creates an effect on the bar. This effect is the bar moving away from the body.

The coach can correct the first two points by emphasizing to the athlete to finish in the vertical position and to choose a focal point to prevent him from throwing the head back. By keeping the elbows out and above the bar, especially during the second pull, and stressing arm speed, the athlete will keep the bar close to his body.

To improve the receiving position, the athlete must first develop confidence in this position. Some exercises to improve confidence are higher intensity overhead squats, snatch balance, drop snatches and snatch grip push press or power jerk behind the neck plus overhead squat. Speed and meeting the bar in the low position with these higher intensity weights will develop confidence.

Fault: The lifter presses out the snatch in the receiving position.

Possible Causes:
- The lifter does not impart enough force at the finish of the pull
- The lifter is slow in moving under the bar
- Weakness in the receiving position

Corrections:
If the athlete does not apply enough force or does not give sufficient energy for developing maximal momentum, the lift may result in a press out. This insufficient force application will most likely result in the lifter being slow in moving under the bar and into the receiving position. If the athlete has weakness in the low receiving position, it will only exacerbate the problem.

Exercises, which emphasize the pull and force application, are pulls, shrugs, and lifts from different positions, particularly from the blocks as well as 3 stage snatches (1 snatch from high hang, 1 from above the knee, a final one below the knee. Snatch grip push presses as well as presses from the receiving position of the snatch (Sots press)

The Clean

Fault: The athlete's elbow touches the knee or thigh and/or the athlete does not meet the bar properly in the receiving position.

Possible Causes:
- Incomplete pull; the lifter moves under the bar too early
- The lifter does not meet the bar properly in the receiving position
- The lifter bends the arms too early
- The lifter shifts the knees forward, or goes on the toes, too soon
- The lifter jumps back too far in the receiving position

**Corrections:**
If the lifter "rushes" the pull and moves under the bar without full extension, therefore limiting force production, this infraction may occur. In addition, this technical flaw may also lead to another fault. If the lifter does not meet the bar well, it may "crash" on him. This resulting crash may force the upper body and elbows forward with a knee touch ensuing. Should the lifter bend the arms too early, limited force production will be the consequence. The lifter may bend the arms to reinforce his belief of really finishing the pull however, the opposite will occur. The lifter's power source, which he will use to pull himself under the bar, will be limited. Also, if the lifter does not stay over the bar long enough or pushes the knees forward too soon, this will affect power output as well. Finally, a result that may happen is if the lifter jumps back too far. Usually if the lifter throws the head and shoulders back, this will result. Once the action occurs there must be a reaction, which is the lifter jumping back to receive the bar. Typically, the lifter will receive it in a poor position with the bar crashing on him resulting in an elbow touch.

Exercises which will assist the lifter with finishing the pull are shrugs, pulls, lifts from different positions and back strengthening exercises such as good mornings, hyperextensions and reverse hypers. These exercises will also remedy arm pulling. During these exercises, the coach should reinforce correct arm position. When performing Front Squats remind the lifter to push up against the bar when the accent begins

**Fault:** Lifter jumps forward during the clean

**Possible Causes:**
- Poor start position
- The barbell moves away from the lifter at lift-off
- Incomplete extension during the pull
- Poor core strength

**Corrections:**
If the lifter is in a poor start position, there is a greater chance for him to miss the lift. The weight distribution should be toward the center of the foot or toward the heels. In addition, poor chest and hip positions, will likewise adversely affect the lift. During lift-off, the barbell should immediately move back toward the lifter. If the lifter allows the weight to control him, it will most likely move forward. This means the lifter will be on his toes almost from lift-off. If the action were that the weight distribution is on the toes, the reaction would be for the lifter to jump forward to "catch-up" to the weight. In addition, this poor position will also affect the pull. By being so far forward, the lifter is not able to finish the pull. This makes the problem worse. However, many times the athlete is not physically prepared to lift heavy weights and the lifter must address fundamental core strength issues.
Stop Cleans. Lifter pulls barbell to mid-shin position, holds for a 1 count and then performs the clean. Since this movement forces the lifter to hold their levers it is a good strength exercise as well.

**Fault:** Excessive Foot Stomp.

**Possible Causes:** Weight is too far forward from start of the lift. Lifter is overly anxious or aggressive.

**Correction:**
Excessive foot stomp is not effective. It can lead to the barbell Crashing onto the lifter. It slows the turnover of the barbell and hampers the timing of the lifter to push up against the bar.

Snatches and Cleans with the feet already in the land position. This will slow the barbell forcing the lifter to hold their levers, keep the barbell close to the body and push up against the bar.

Snatches and cleans onto low blocks. Actually these low blocks are merely 18” square pieces of ¾’ plywood. Place the plywood pieces to either side of the athletes feet (In their normal start position. The lifter then performs either a snatch or a clean and lands their feet onto the plywood. The fact that the plywood is ¾” higher forces the lifter to really react to the feet hitting the “platform” quickly. This makes the lifter pull under and push up faster than they typically do. It gets them to get their feet back onto the platform quickly and efficiently and reduces the foot stomp.

**The Jerk**

**Fault:** The lifter loses the lift forward either in the receiving position or during the recovery.

**Possible Causes:**
- The dip is forward due to incorrect weight distribution
- The athlete allows the chest and/or elbows to drop during the dip
- The dip and/or drive is incomplete
- The athlete steps away from the bar during the split
- The athlete pushes the head forward during the split

**Corrections:**
The weight distribution during the dip should be on the heels. Should the weight be on the toes, the lifter will thrust the bar forward. If, during the dip, the athlete lets the elbows or chest drop, this will not only compromise the rack position, but it will also affect force production therefore decreasing the amount of watts produced during the drive. If the dip of the athlete is premature or the drive is incomplete, the athlete will have a much more difficult time making the jerk. This incomplete drive may cause the lifter to step away from the attempt during the split. Another way a lifter can miss a lift forward is due to pushing the head forward in the receiving position.
The action of pushing the head forward leads to the reaction of the hips moving backward and the chest forward. This puts the lifter in a compromising position.

Exercises to assist with proper weight distribution, with keeping the chest and elbows in the proper position and correct dip and drive skill are technique reinforcement, rack jerks, Power jerks, jerks behind the head and combination jerks (1 behind the head followed by 1 in front. Press in Split. Lifter assumes the split position and holding the barbell on the shoulders performs presses. This teaches the lifter to push up and lock out the elbows.

Jerk Steps. Taking the barbell from the rack the lifter steps forward until the front foot is in the proper receiving position and the rear leg bends at the knee and the rear foot’s heel is off the platform.

Split Cleans from Blocks. As strange as this sounds this *Clean* exercise has shown solid results in improving an athlete’s jerk.

Placing the barbell on a block that is just below the knee the athlete performs power split cleans (only splitting the lead leg of the jerk forward). The athlete needs to focus on keeping the torso upright when receiving the barbell and ‘stepping through’ with the lead leg. The back leg moves to its correct position as well. The reason the lift being performed from the blocks is that the bar is in a high enough position that the lifter can focus on the *Stepping through* phase that is related to the jerk and not on the pull phase related to the clean.

**Fault:** The jerk is lost behind in the receiving position or in the recovery.

**Possible Causes:**
- Incorrect dip and drive; the lifter throws his hips forward as he drives up
- The lifter steps too far through with the leading leg in the jerk
- The lifter steps back too far or too aggressively with the leading leg in recovering

**Corrections:**
The dip and drive should be as vertical as possible. If the lifter throws the hips forward or allows the chest to deflate, this will affect bar trajectory negatively. Also affecting the jerk adversely is if the lifter steps too far through with the leading leg. This will not only put the lifter at a disadvantage for recovering but also with stability. If the lifter steps back too aggressively with the lead leg while recovering, this may lead to stability issues due to the momentum created by the front leg.

Any overhead strength, stability or technical exercise will assist with these issues. Any type of pressing movement, power jerk, jerk from the rack (or blocks), jerk from behind the neck, jerk balance and jerk recoveries.

**Fault:** The lifter presses out the jerk

**Possible Causes:**
- Poor or weak dip and drive
- The lifter tries to push the bar with the arms during the drive
- Immobility of the shoulder girdle
- Poor arm lockout

**Corrections:**
If the athlete has a poor dip and/or drive, the result may be the lifter pressing out the jerk. To compensate for the poor dip and drive, the lifter may try to "muscle" up the weight. Here the lifter actively pushes up with the arms to try to get to the finishing position. In addition, poor shoulder flexibility in the shoulder girdle may also affect the jerk adversely. Finally, lifters must have a good lockout or finishing position. Lifters can be successful with a below average arm lockout however, they must be diligent in their remedial training to not lose a lift due to a poor arm lock.

To prevent a poor dip and drive, athletes can due a variety of exercises including push press and power jerks from in front and behind, jerks from the rack (or blocks), jerk dips and jerk drives from the blocks. Split Cleans from blocks.

These are examples of the more common faults and suggested corrections in the sport of weightlifting. However, we must stress that coaches should not just look at the end result but what may have affected the end result. Assisting with this is viewing the lift from different angles as the coach may notice some faults at different areas around the gym. Novice coaches may try several corrections at first and see which exercises work best with each athlete. This will give the coach a better understanding of the different exercises.

A review of Chapter 9 Assistance Exercises will also be helpful in selecting movements that can address additional flaws.

Split Cleans from Blocks. As strange as this sounds this Clean exercise has shown solid results in improving an athlete’s jerk

Placing the barbell on a block that is just below the knee the athlete performs power split cleans (only splitting the lead leg of the jerk forward). The athlete needs to focus on keeping the torso upright when receiving the barbell and ‘stepping through’ with the lead leg. The back leg moves to its correct position as well. The reason the lift being performed from the blocks is that the bar is in a high enough position that the lifter can focus on the Stepping though phase that is related to the jerk and not on the pull phase related to the clean.

Foremost is the technical vigilance of the coach. Especially with beginning lifters, the coach should be at every training session and make every attempt to watch each repetition. Lifters, who develop poor technical habits initially, find it very difficult to correct later. The coach too, should try to develop his own coaching style. Developing trigger words (words or short phases that remind the lifter to focus on a particular aspect of a skill can be very effective. Coaching, however, is an ongoing process. The better rapport the athlete and coach develop the better the communication will be in training and competition. This then, will lead to positive results.
Chapter 9
Competition Preparation

One of the great challenges for Weightlifting Coaches, especially at the National and International level is to understand and be able to deal with the nuances of the competition structure itself.

**Items that a Weightlifting Coach needs to be aware of**

**Qualifying Period:** The dates between which a lifter must meet or exceed in competition the qualifying total necessary to compete in a different competition.

**Qualifying Total:** The minimum combined snatch and clean and jerk required to be eligible to compete in a competition.

**Entry Deadline or Qualifying Deadline:** The date by which an entry form must be submitted in order to compete in a competition.

**Becoming a member of USAW**

**Competing in a locally-sanctioned USAW competition**

At that competition, make sure to meet or exceed the qualifying total in your weight class for the National-level competition you’d like to attend.

*For a list of membership benefits, information on hosting a competition and a list of sanctioned competitions visit usaweighting.org*

**Compete in the National competition.**

At that competition, make sure to rank in the Top 8 overall men or Top 7 overall women eligible for the international team you’d like to qualify for.

-Further information on athlete ranking methods, eligibility criteria, such as age and/or enrollment in a University, qualifying periods, and other information specific to each international team may be found at usaweighting.org

-Results from some locally-sanctioned competitions may also be used to qualify for an international competition.

-Athletes selected to compete on an international team must register and comply with United States Anti-Doping (USADA) Out-of-Competition (OOC) testing pool protocols and procedures prior to competing in the international competition for which they qualified. If you think you may qualify to represent the United States internationally within the coming year, please contact USA Weightlifting’s High Performance Director by emailing usaw@usaweighting.org with the subject line “Attn: High Performance Director” to inquire further into registering with USADA.
Qualified athletes will be notified by USA Weightlifting.
Should you or one of your athletes qualify to compete on an international team, such as the Youth/Junior/University/Senior World, Pan Am, or Olympic Team, USA Weightlifting will provide further information to you at that time.

**Duties and Responsibilities of a Weightlifting Coach**

**Travel**
The Head Coach should be involved with travel arrangements and receive the individual travel itineraries of all team members. For international competitions, the team will often assemble from various parts of the country at the international departure airport. Early arrival at this departure point is an advantage as the Head Coach can then supervise seating, etc. and a planned early arrival allows for possible domestic flight delays. On long flights, aisle seats are advantage for athletes as it enables them to get up and move around regularly without disturbing others. The Head Coach should encourage athletes to drink fluids regularly (unless they are making weight) and also to walk around the plane as often as possible.

**On Arrival**
The Head Coach should assist the Team Manager with baggage retrieval and aid in facilitating travel to the accommodation. Check in and rooming arrangements must be supervised. The Head Coach should make a note of all team members’ room numbers and make sure that they, in turn, are acquainted with all staff room numbers. As soon as possible the Head Coach needs to ascertain the whereabouts of a weight check scale, the location and opening times of the dining hall or restaurant, and the location and available times of the training hall. A short team meeting should be called to disseminate information to all members.

**Venue appraisal**
As soon as possible the Head Coach should locate and visit the training and competition venue. These are often at the same location but not always. Distances from the accommodation and times of travel should be noted. Any transportation schedules available need to be collected. The Head Coach should check the competition venue and attempt to ascertain any problem areas. The following are a guide to some of the items that need attention.

- Location of weigh-in room
- Location of sauna
- Distance of warm-up room from competition area
- Type of barbell to be used in competition & warm-up
- Lighting and temperature of auditorium and warm-up area
- Position of time clock
- Position and audibility of “Down” signal
- Platform surface
- Location of warm-up room scoreboard
- Location and operation of any closed circuit TV
- Location of announcer
- Availability of chalk & resin
- Layout of warm-up room
- Appraisal of best warm-up room platforms
- Availability of drinks, food etc.
- Availability of rest area for post weigh-in & between lifts
- Location and availability of ice
- Availability of chairs
- Location of Marshals table
Entries & Competition procedure

All Weightlifting Championships are conducted within bodyweight categories. The International Weightlifting Federation (IWF) rules allow teams to consist of eight (8) men and seven (7) women, with no more than two (2) athletes competing in any one bodyweight category. The rules also allow for a Team to nominate two (2) male and two (2) female reserves. Reserves are not permitted to compete in the championship unless they are substituting for a previously nominated team member who is withdrawn.

Prior to the start of a championship, the Competition Secretary will convene a meeting to verify the entries submitted by each Team. This meeting is termed the Technical Conference. This meeting provides the final opportunity to make changes to the team composition by substituting reserves and/or changing the bodyweight category of nominated Team members. The Head Coach/Team Manager must supply to the organizers a list of team members in the categories in which they wish to start at this conference. The competitor’s best-recorded total (verifiable) is also included as is their date of birth. Competitors are allocated – usually by a computer program – lot numbers at this conference. These lot numbers govern the order of the weigh-in and are also used in deciding the order of lifting. The competitors are listed on the scoreboards in the order of the lot drawn. Following completion of the Technical Conference a start list is produced and distributed to all teams. This list shows the allocation of lifters into groups within each category, which is based on the entry total that is also listed. In many large competitions each category may be divided into two or more groups. It also shows the start times of each category and group and the officials who will be in charge. The Head Coach needs to appraise this start list and share the contents with staff and athletes.

Weigh-in

Competitors should be accompanied at the weigh-in by their coach or other team official. They must provide evidence of athlete identity (passport for international competitions) and proof of age (passport again or other documents). The competitors are weighed while either nude or in underclothes, in the presence of officials of the same gender. The officials verify the competitor’s weight which is then recorded on the Competitor’s Card. The coach must verify that the bodyweight recorded on the Competitor’s Card is correct and write the weights for the competitor’s first attempts in snatch and clean & jerk on the card in the spaces provided. Once the coach is satisfied that all of the information on the Competitor’s Card is correct, he or she signs the card in the appropriate space. The Head Coach must ensure that the addition of the starting attempts comes to within 20kg of the qualifying total verified on the entry form for men and within 15kg for women. If an athlete does not adhere to this policy the Jury can disqualify them. For each attempt lifters are allowed to make two changes from the initial chosen weight. These changes can be increases or decreases or a combination of both. Whenever a weight is nominated, be it initial or a change, the coach must sign the Competitors card. Lifters will be called for an automatic 1kg increase between 1st and 2nd attempts and a 1kg increase between 2nd and 3rd attempts, if the coach has not nominated a weight for the next attempt. If the weight of the first snatch is decreased then the weight of the first clean and jerk must give a total, which is within 20kg/15kg of the entry form qualifying total.
Competition Warm Up

The purpose of the warm up is to prepare the athlete physically and psychologically for maximal performance in the competition. The routine should include general warm up and mobilization, stretching, and the specific warm up. The specific warm up consists of performing the competition lifts, starting with light weights and progressively increasing the weights up to a final lift which is close to the weight of the athlete’s first attempt. The content and timing of the specific warm up is critical. It should include sufficient repetitions at light and medium intensity to practice speed and technical accuracy; and sufficient high-intensity repetitions to recruit muscle fibers and instill confidence in the athlete. The warm-up should not excessively tax their energy stores. The specific warm up should be completed with enough time for the athlete to recover from their last warm up lift before making their first attempt in the competition. There are a number of factors to consider when directing the specific warm up of an athlete at a competition, such as:

- The weight of the competitor’s first attempt
- The level of the competitor’s experience
- The competitor’s position in the order of calling
- The prevailing conditions within the venue, e.g. temperature and humidity

Following is an example of a specific warm up for a competitor starting the snatch with a first attempt of 100kg:

- Movement Weight Repetitions
- Power snatch 20kg 3 reps
- Snatch squat 20kg 3 reps
- Power snatch + snatch 30kg 2 + 2 reps
- Power snatch + snatch 40kg 1 + 2 reps
- Snatch 50kg 2 reps
- Snatch 60kg 2 reps
- Snatch 70kg 2 reps
- Snatch 80kg 1 rep
- Snatch 90kg 1 rep
- Snatch 95kg 1 rep

Competition Tactics

It is always an advantage in weightlifting to be able to follow your opponent so that you know exactly what is needed to move into the lead. However, to be able to put your athlete into this advantageous position the Head Coach must have a thorough knowledge of the rules governing weight changes and lifting order. Making last minute changes of attempts can often upset opponents and the timing of these changes is often crucial. Sometimes this involves taking risks especially on the clean and jerk, which will ultimately decide the medals. On the snatch, it is a good idea to be risk adverse, as this lift relies so much on balance and precision that the pre-competition game plan should be adhered to. Knowing the fighting qualities of your athletes and
their reaction to pressure has a great deal of bearing on the decisions as to weight increases. The more experience the Head Coach has in high-pressure competitions the better. Developing the judgment to make the right call in a tactical battle is a quality all coaches aim for. However, the bottom line in all tactical situations rests with the lifter, if they cannot lift the weight all the tactics are for nothing. The only thing the Head Coach can ensure is that they send the lifter out for attainable weights that give the lifter the opportunity to place high – then it is up to the lifter.

**Anti-Doping Control**

Competitors in weightlifting are subject to drug testing both in competition and out-of-competition by USADA. If a team member is notified that they are selected for drug testing at an event, the Head Coach should direct a suitable adult person to accompany the athlete throughout the drug testing procedure. The Head Coach should ensure that both the athlete and the person accompanying him or her are aware of the drug testing procedure and their rights and responsibilities in this regard. If a lifter is selected for doping control, the anti-doping team will on completion of the lifter’s final attempt, send an appointed “spotter” to accompany the lifter and provide them with a document to sign agreeing they have been informed they are to be tested. The spotter will stay with the lifter and keep them under observation – through Medal Ceremonies and any press interviews – and then accompany them to the doping control area.

**Post Competition**

Following the completion of the competition a closing banquet is often held (compulsory at World Championships). Normally the Head Coach accepts any team awards on behalf of the team. Consequently it is essential the Head Coach attends the banquet and is appropriately dressed. The full printed results are normally given out at the banquet and the Head Coach or Team Manager must ensure they gain a copy. Unless there are extenuating circumstances, the entire team is expected to attend this function.

**Reporting**

Following every event, the Head Coach is responsible for making a comprehensive written report to the association or federation represented by the team.
Topics to be covered in the Head Coach’s Report:

- Competition venue
  - Facilities
  - Equipment
  - Training facilities
- Coaching staff
  - Assessment of Team coaches’ performance
  - Other Team support personnel
- Team Meetings
  - Timing
  - Topics covered
- Overview of the athletes’ performance
  - Individual performances and results
Counting Attempts for Weightlifting Competitions

Of all the challenges that face weightlifting coaches none are as fluid and as important as the ability to effectively count attempts so that the athlete is prepared both physically and emotionally when they are called to the platform.

The first attempt is important as it sets the tone for the rest of the competition so the selection of, exactly, what weight is loaded onto the barbell is essential. Athletes want to set personal records therefore opening too low may prevent that goal from being reached. However throwing caution to the wind with the hope that something good will happen is a disservice to the athlete.

Training results are the best way to determine what the opening attempts should be and coaches must be aware of any qualifying totals at national events as the 15kg and 30kg rules are in effect.

(Note: The 15kg rule for women and the 20kg rule for men means that the athletes opening attempts in the snatch and clean and jerk must add up to a total no less than 15kg under the qualifying total for the women and 20kgs for the men.

While the adage “Hit your opener!” is a good rule of thumb just what that opener is needs to be decided upon through objective reflection between both the coach and athlete.

Opening 10kg to 5kg under the athlete’s previous best lift is an acceptable 1st attempt if training has gone well. The opening attempt needs to be a weight that the athlete and coach have complete confidence in. It needs to be kept in mind that an athlete may select any weight for a second attempt. Many veteran coaches remember a day back in 1975 when Lee James (90kg class) set an American record in the snatch of 165kg his opening attempt was 150kg.

Once the opening attempts have been determined the coach and athlete need to decide on the strategy used to get to that opening attempt. In a conservative approach the coach will right down the opening attempt 10 to 5kg less than the intended opening attempt, not because they lack confidence in the athlete but to allow for the changes of attempts by other coaches or in case the official count experiences confusion. This is approach is very sound as the rules allow for 2 changes per attempt and knowing this rule can be used by the coach to allow the athlete to receive more time between lifts if necessary.

The 1kg Rule needs to be understood as the barbell progression can be such that another adage Hurry up and wait can also come into play. How many athletes want the same weight on the bar and the number of missed attempts that result in repeating an attempt at the same weight will also affect the warm-up count.

With all the above been stated an acceptable method of counting attempt is this.

The 5kg 3 attempt Strategy

This approach focuses on the idea that most athletes take increase of 5kg between their 1st and 2nd attempts and 2kg to 5 kg between their 2nd and 3rd. (Even if the actual amount is less the count is not adversely affected by using this approach.) For every 3 attempts on the competition platform the athlete performs one attempt on the warm-up platform. Using the philosophical
Backwards Design approach the coach and athlete can fill out their warm-card as listed below. The 1st card is blank the second card is filled in. (NOTE: In the event that the athlete is going out to the competition platform before the number of warm-up attempts counted can be completed just treat the attempt as a minute. 9 attempts becomes 9 minutes. A warm-up attempt every 3 minutes fits very well into the accepted neural stimulus activity studies data results concerning athletic warm-up regarding weightlifting.)

| DATE | | |
| EVENT | | |
| ATHLETES NAME | | |
| CLUB | | |
| Bwt: | Total |
| SNATCH | C&J |

<table>
<thead>
<tr>
<th>Attempt</th>
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<th>Intended</th>
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<td>30'</td>
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| DATE | | |
| EVENT | | |
| ATHLETES NAME | | |
| CLUB | | |
| Bwt: | Total |
| SNATCH | C&J |

<table>
<thead>
<tr>
<th>Attempt</th>
<th>Actual</th>
<th>Intended</th>
<th>Intended</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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<td>1'</td>
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<tr>
<td>70</td>
<td>1'</td>
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<td>3'</td>
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<td>60</td>
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<td>55/2</td>
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<td>50/2</td>
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<tr>
<td>45/2</td>
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<td>35/3</td>
<td>18'</td>
<td>55/2</td>
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<tr>
<td>35/3</td>
<td>21'</td>
<td>45/3</td>
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<td>B/3</td>
<td>24'</td>
<td>45/3</td>
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<tr>
<td></td>
<td>27'</td>
<td>B/3</td>
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<tr>
<td></td>
<td>30'</td>
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</tbody>
</table>

While nothing is etched in stone and only actual experience will improve the ability to count attempts effectively following the suggestions in this article should provide a foundation for becoming proficient in this area of coaching.
Chapter 10
Advanced Programing Design

Training in weightlifting or Sports Performance is a complicated task and does not respond to any theory without giving careful attention to the fundamentals principles that govern it. There must be a functional relationship between the factors of Volume, Intensity, Frequency and the Selection of Exercises.

Parameters
- Realistic Expectations
- Attention to Technique
- Ongoing Analysis
- Results

Keys to Proper Programming
- Adhering to the parameters can prevent the most frustrating result possible - that of good training followed by a poor performance.
- Another critical aspect of program design is the willingness to be flexible.
- All training is merely a template and nothing is etched in stone.
- Each and every training session is subject to adjustments.
- The quality of movement drives the training
- Aspects of Training
- Putting the Training into Practice
- Managing the Training
- Control the Training
- Constant Assessment

The Coach’s Tasks

Planning
Shape and organize the training to ensure adequate progress

Programming
Effective ordering of exercises and the training plan

Application:
Adjusting the training to meet the demands of individual athletes

Observe:
Authentic observation and adaptation of the training

Analyze:
Dealing with the factors that interrupt the progress of training

Assess:
Controlling variables that impede the connection between goals and results

Conclusions:
Objective summary and evaluation of the Program and the Results

New Training:
Edit, add, delete modify and adjust for the next training cycle

OVERVIEW OF PERIODIZATION

Types of Training “Cycles”
Research has shown that the processes of adaptation are better suited to a cyclic nature than that of a linear one. A series of stages are needed in order to increase adaptation and improve performance:

- **Microcycle:** What is occurring within a week of training.
- **Mesocycle:** What is occurring within a month of training
- **Macrocycle:** What is occurring within a competition cycle

All cycles have a set of activities and exercises that are repeated in relationship to the focus of each cycle. Each cycle relates to every other cycle and is subject to constant revision and evaluation.

GOALS OF PROGRAM DESIGN

- Improve Performance
- Reduce Injury (rate and intensity)
- Refine Technique
- Increase work capacity
- **All Training Programs should contain the Following Qualities:**
  1. *Easy to Understand and monitor*
  2. *Be of a cyclic nature*
  3. *Have built in checks of progress*
  4. *Allow for individual creativity*
  5. *Allow for the inclusion of remedial movements for error correction*

Contributors to Periodization

The key to be a successful cyclist is a fundamental scientific approach to training. As early as 1936, scientists like *Hans Selye* started to investigate the mechanisms of load, overload, and recovery. Later, in the 1940's, Russian scientist discovered that athletic performance improved by varying the training stress throughout the year rather than maintaining a constant training load.

In 1959 *Ivan Beritov* was given credit for the concept of *Supercompensation* Training when, after several studies he released this comment

"When an athlete is training, his body undergoes stimulations which traumatize it, wear it down, tire it out, and even destroy it. If a recovery period follows these training sessions then the tissues will be restructured and the athlete’s body will come back, not only to its former level, but even surpass this level in the case of a sufficient stimulus. If appropriate control measures are not used such a preponderance of break-down and build-up leads rapidly to injuries."

*Leonid Matveyev* developed a basic periodization model in 1964 which set the standard through his understanding the relationship between volume, intensity, and technique.
East German and Romanian scientists, especially Dr. Tudor Bompa, further developed that concept and the system of Periodization was born. Bompa studies, also known as the "father of periodization", helped the Eastern Block countries to dominate in sports from the 1960's on.

Pat O’Shea was able to to explain the relationship between the physiological, muscular, neurological, and psychological adaptations with his S.A.I.D Principles. Specific Adaptations to Imposed Demands. Adaptations will occur in direct response to the imposed demands placed upon it in a systematic manner.

The less experienced the weightlifter, the greater the number of exercises will be in their 'menu'. Placing exercises into specific categories, based upon their focus will allow the athlete to progress more quickly.

Vladimir Zatsiorsky and Mel Siff also made significant comments to the concept of periodization and supercompensation when they suggested the following:

“During periods of strenuous training, athletes cannot achieve the best performance results for two main reasons. First, it takes time to adapt to the training stimulus. Second, hard training work induces fatigue that accumulates over time. So a period of relatively easy exercise is needed to realize the effect of the previous hard training sessions- to reveal the delayed training effect. It is assumed that for none workout with an average training load, the durations of the fitness gain and the fatigue effect differ by a factor of three: As can be seen, there are general guidelines to fatigue values and when to workout again. This is not an exact science.”

Following the recommendations of Siff and Zatsiorsky, an inducement of fatigue every 4th – 7th day could be optimal for most athletes. (This means if you induce a fatigue value during your workout, you will need to wait another 4 days until training a similar motor unit pattern to promote supercompensation). If an athlete wanted to train at a higher intensity, a greater fatigue rate would be induced every 7-9th day. The end result is supercompensation from each. These are strong scientific guidelines only, remember, each athlete is an individual, so each program/system has to be individualized to increase his/her performance. After all, isn’t the goal of training… to increase performance?

<table>
<thead>
<tr>
<th>Categories of Exercises</th>
<th>Snatch</th>
<th>Clean &amp; Jerk</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Competition Lifts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Derivatives of Competition Lifts</td>
<td>Cleans</td>
<td>Rack Jerks</td>
</tr>
<tr>
<td>C. Strength and Power Movements</td>
<td>Power Snatch</td>
<td>Power Clean</td>
</tr>
<tr>
<td></td>
<td>Clean Pull</td>
<td>Back Squat</td>
</tr>
<tr>
<td>D. Combination Movements</td>
<td>Pulls + Snatch</td>
<td>Pulls + Clean</td>
</tr>
<tr>
<td></td>
<td>Front Squat +Press</td>
<td>3 Position Snatch</td>
</tr>
</tbody>
</table>

75
Sets, Reps and Weight Selection

First and foremost technique drives the training. Skills incorrectly learned early on are the most difficult to correct. Correct technique is always re-enforced.

Studies have shown that the nervous system of a novice athlete will fatigue much quicker than the muscular system. Maintaining neural integrity is a critical component to mastering proper technique.

Other studies have also shown that when performing "Higher skill" movements, fatigue sets in quickly and that sets of 3 reps seem to maintain neural integrity. It is recommended that when dealing with novice lifters a total volume of 30 reps per Skill Exercise is followed.

Coaches should consider the following statement by German Coach Michael Kellmann:

"In the real training world the concept of less is more seems to be hard to sell. Most coaches feel that coaching is their job, and it is the duty of their athletes to follow their regimes. In addition, when coaches back off too much, performance may decrease. This shows that there is a careful balance between practice and recovery. Practice is important to improve performance, but the focus should be on the quality rather than on the quantity of training. During long and hard training sessions athletes tend to take “hidden rests,” for example, by going at a slower pace during the exercises. A thoughtful variation of the training exercises includes a recovering element. An increase of the overall quality of training occurs when the standard regular training routine is modified, when new exercises are introduced, or simply when different types of training are applied.

Underrecovery and overtraining: Different concepts—similar impact? This question can clearly be answered with a yes and a no. Yes, they have the same impact—performance declines; No, they are not similar—underrecovery is the precursor/cause of overtraining. Consequently, the key to prevent overtraining is an active and proactive enhancement of recovery. Coaches and athletes need to be educated about the importance of optimal recovery and its impact on performance.”

Weightlifting skills are best learned when the weight is 70% to 75% of a one rep max. But when dealing with a novice when a one rep max is not known, the coach needs to consider the quality of movement as the beginning point, and then adding or subtracting weight in accordance with the technique.
SETS ARE MORE IMPORTANT THAN REPS.

For the Novice Weightlifters it is more important to complete a few reps correctly than to do reps until failure or until technique is lost. (In fact poor quality reps at the end of a training session are more likely to become the muscle memory.)

Novice Athletes and their coaches should place Sets in Front of Reps.

If we use the 30 rep formula for quality maintenance and that for the Novice athlete 3 reps per set for the High Skill Movements then we have established 10, TOTAL, sets for novice athletes when training the Olympic Lifts and their derivatives.

Sets and reps for other movements. Once again research has shown that Power Production begins to go down after 5 reps.

In fact Hypertrophy for Weightlifters is completely different than it is for other athletes.

A Canadian study showed that once an athlete decides to do a set of 12 or more, the weight is so light that the exercise becomes completely an endurance exercise.

Weightlifters compete ONE REP AT A TIME and the training needs to mimic this in order for the proper body energy system to become functional.

When Training Weightlifters Consider Three Cycles:

**Cycle One:** Preparing the body for the work that lie ahead
**Cycle Two:** Power the Muscles
**Cycle Three:** Recruit the Nerves

COMPETE

If the Olympic Movements are trained for 3 reps per set (To maintain Quality of Movement) and all other movements are trained 5 reps per set (To maintain Power Production) we are now getting to the understanding of Volume for our First Cycle.

It is suggested that athletes should perform 3 to 5 warm-up sets prior to their TARGET SETS (In Target Setting the athlete performs multiple sets at the Same weight. The rationale for this is the get the athlete into the Second Quadrant of Training (Assimilation)). The rational for Volume comes from Pat O'Shea and his book Quantum Strength Training.

_O'Shea (Oregon State University) stated in his book Quantum Strength Training the S.A.I.D. principle of training. SAID stands for Specific Adaptation to Imposed Demands. In this training the relationship between frequency, duration and intensity is examined. O'Shea recommends the following Reps for the related percentages of a One Rep Max._
Once again it is important to remind athletes and coaches that these are the sets and reps recommended to develop power and strength while focusing on correct technique.

Exercises may be placed into 4 main groups:

<table>
<thead>
<tr>
<th>“A” Lifts</th>
<th>“B” Lifts</th>
<th>“C” Lifts</th>
<th>“D” Lifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition Movements</td>
<td>Squats</td>
<td>Pulls</td>
<td>Remedial Movements</td>
</tr>
</tbody>
</table>

Here is what Supercompensation training looks like as an Overview

<table>
<thead>
<tr>
<th>Cycle 1 Preparation Phase</th>
<th>Cycle 2 Strength Phase</th>
<th>Cycle 3 Competition Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Train the Joints</strong></td>
<td><strong>Train the Muscles</strong></td>
<td><strong>Train the Nerves</strong></td>
</tr>
<tr>
<td>Week</td>
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<tr>
<td>%</td>
<td>70</td>
<td>75</td>
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<tr>
<td>Target Sets “A” Lifts</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Reps “A” Lifts</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Target Sets “B &amp;C” Lifts</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Reps “B” Lifts</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Creating Competition Programs for Novice Weightlifters**

All Training Programs should contain the Following Qualities

1. Easy to Understand and monitor
2. Be of a cyclic nature
3. Have built in checks of progress
4. Allow for individual creativity
5. Allow for the inclusion of remedial movements for error correction
6. It is recommended that each training session contain
   One Olympic Movement (Classical or a Derivative)
   One Pushing Movement
   One Pulling Movement
   One Leg Movement
   One "Core" movement

All Training Programs should also consider the following outcomes
   1. Improve Performance
   2. Refine Technique
   3. Increase Work Capacity
   4. Reduce Injury

Training Programs are essentially regimens of stress and recovery to which the athlete adapts. All programs can only have 1 of 3 outcomes
   1. Insufficient stress; No Progress
   2. Too much stress; Collapse and or injury
   3. Optimum stress; Ongoing improvement

   *Once again it is proposed that Novice Athletes be exposed to the Supercompensation Model to maximum the opportunity for ongoing progress.*

**Training for National Level Competitions**

As the athlete improves their performance, their training must constantly improve as well. Typically weightlifters with two years of training, and competition experience, but not yet qualified for national championships are referred to as a *Club Lifter*.

Training for a National Championship Competition means attaining a specific qualifying total which requires training to become more focused and challenging.

Many training programs that are published in other countries must be viewed with a level of skepticism for a number of reasons as the enormous amount of volume and the level of intensity are unrealistic circumstances for the *typical* American Weightlifter who has many obligations outside of being a professional, fulltime, Weightlifter.

However Americans cannot be lulled back into the thought that we can expect to compete at the international level with a 3 day per week training program.

Once again programs from other countries are usually the result of a high level identification and selection process which began at a tender age. Therefore we (USA Weightlifting Coaches) need to be very selective as to what we can and cannot use in our own environment.
American Weightlifters can become competitive at the international level but in order to do so we must move our athletes through a series of training modalities.

A Club Weightlifter can expect to see an increase in their training loads and with that an expectation of improved performance. It is, again, recommended that a Club Lifter still be exposed to the Supercompensation Model.

It is suggested that in order to increase the volume portion of a training model two methods be considered. Increasing the Number of Days of training per week and increasing the number of Sets at the Top End or Target Area.

Novice Weightlifters train 3 to 4 days per week. It is suggested that Club Weightlifters train 4 to 5 days per week. (It is also suggested that Club Weightlifters stay at ONE SESSION per day and not, as of yet, move to multiple training sessions per day unless they are training under ideal circumstances)

“There is a strong opinion, that is backed by research and results that indicate that spreading a given workload or volume over an increased number of workouts will produce an enhanced training effect by allowing the athlete to handle an increase in intensity.” (USA Regional Coach Training Manual 2004)

Comparing Novice Training to Club Training

<table>
<thead>
<tr>
<th>Club Training is Different:</th>
<th>as the Volume and Intensity has increased, especially in Weeks 2 and 4.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>in that the expected outcomes of each Cycle has changed</td>
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<tr>
<td></td>
<td>as Fault Correction will have a greater degree of exercise selection change in the training. (The Programs listed are examples and it is expected that coaches will fine tune the exercise selection to fit the specific needs of their athletes.)</td>
</tr>
<tr>
<td>Club Training is Similar:</td>
<td>in that it still follows the Supercompensation Format and uses the Same Exercise Categories.</td>
</tr>
</tbody>
</table>

Goal of Cycle One: Hypertrophy, and Conditioning
Goal of Cycle Two: Power, Strength, and Skill
Goal of Cycle Three: Skill, Neural Adaptation, and Competition Preparation

Examples of Club Training Programs may be found in the Appendix

Training and Exercise Selection for the Advanced Weightlifter

Advanced Weightlifter Designation
Advanced Weightlifters are those athletes who have qualified for National Championships and are looking to the challenge of International Competition. In previously discussed programs Cyclic Training was explained and illustrated. Now training will move to a more individualistic and sophisticated model. The Training Model will now move from a monthly cycle to a yearly cycle with competitions built into the training. Much of what took place during the Novice and
Club periods was the development of technical skills, training capacity, athleticism, competitive aplomb and biochemical pathways that would enable the weightlifter to embark upon the more demanding Advanced Training. This training is geared to produce results approaching the elite level and is in effect developmental for the Elite Athlete Designation.

The Yearly Calendar

The first item to accomplish is to map out the years training, based upon major competitions. For most National Level Weightlifters the American Open, held in early December, is the first major competition of the upcoming tear. This is then followed by a series of National Championships, Juniors, The National Championships The Youth Nationals and the University Nationals. Once the national calendar has been set for the athlete the time between competitions are broken into Preparation Periods and Competition Periods. Competition Periods are usually 5-8 weeks in length but will need adjustments as the yearly competition calendar does not always balance out to meet 4 week cycles. In the periods between the meaningful competitions, the athlete may participate in other lesser competitions to determine the effect of training and to gauge the progress.

Preparation Periods are, typically, twice the length of Competition Periods and its emphasis is on Strength and Power. Competition Periods will place the majority of training on the execution of the Snatch and Clean and Jerk. For weightlifters, early season training could be 75% Strength and 25% technique and slowly crossover by year’s end. Here is how noted strength coach and Author Pat O’Shea sees yearly cycling.

Yearly Volume (number of repetitions)

Volume must also be calculated for these factors: Age, Experience, Gender and Bodyweight. Lightweight females can carry higher volumes then Heavyweight Males, while the heavyweights can handle higher intensities. The number of training sessions per week, total hours of training per week, as well as rest and recovery days are also planned.

Weekly Loading

Using the Supercompensation Model the weekly rep count would look like this:
The number of training sessions will be determined by two factors: time and volume.

**Individual Session Considerations**

Studies have shown that hormonal levels drop off after 60 to 90 minutes of training and that technique starts to ebb after 25 to 30 reps. Since most models of training contain One Olympic Movement, One Pull, One Press, One leg and One remedial movement, sessions may contain no more than 120 to 150 total repetitions. If quality of movement needs to be maintained 100 to 120 total reps per session may be a more conservative approach that will yield improved results.

**Twice Daily Training**

It is now time to consider Multiple Training Days. An easy way to maintain quality of training is to spread out the sessions over a 5 day training week.

Twice day training can be a real challenge to the typical American Weightlifter. The work demands on Americans are both high and intense. Finding time to train during a 40 to 50 hour work week will be difficult, but the rewards can be great and it is something to consider. It can be noted that 7 and 8 session weeks are becoming common for high level weightlifters under *ideal* environments. The USA Weightlifting Resident Team has twice daily training on Monday, Wednesday and Friday. Once daily training occurs on Tuesday, Thursday and Saturday with Sunday being an off day.

NOTE: All training is subject to modification. Coaches must realize that any session’s workload is just a template and that adjustments must be made based upon the athletes health, career and family commitment, and technique display. Athletes must realize that quality of movement receives the highest priority and when the coach suggests that the athlete lower the weights from the days expected training that is not a negative observation nor does it bring into question the athletes desire or resolve. The speed of movement of the bar is one of the most reliable indicators by which to judge training efficacy. One of the functions of the coach is to develop the visual acuity skills to make accurate assessments of speed. This is especially true when determining the intensity of pulls.

**The focus of each Cycle:** As with all training programs that are cyclic in construction Cycle One will deal with Hypertrophy training and motor neuron recruitment. Cycle Two will focus on strength and power development while Cycle Three will look at neural training and competition preparation. Although the primary focus of each cycle is prescribed here, it does not mean that other aspects of training should be ignored. They are rather de-emphasized.

For those wishing to attempt Multiple Training Days a workable schedule is listed below.
A Five Day 7 Session Training Routine May look like this.

**SAMPLE TRAINING PROGRAM CYCLE ONE**

<table>
<thead>
<tr>
<th></th>
<th>Saturday</th>
<th>Sunday</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AM</strong></td>
<td>Back Squat</td>
<td>Jerk from Rack</td>
<td>Power Snatch</td>
<td>Snatch</td>
<td>Power Clean + Power Jerk</td>
</tr>
<tr>
<td></td>
<td>Press Clean Pull</td>
<td>RDL</td>
<td>Behind Neck Press</td>
<td>Back Squat</td>
<td>Back Squat</td>
</tr>
<tr>
<td><strong>PM</strong></td>
<td>Power Snatch C&amp;J</td>
<td>Power Clean</td>
<td>Power Snatch</td>
<td>Snatch</td>
<td>Clean &amp; Jerk</td>
</tr>
</tbody>
</table>

**SAMPLE TRAINING PROGRAM CYCLE TWO**

<table>
<thead>
<tr>
<th></th>
<th>Saturday</th>
<th>Sunday</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AM</strong></td>
<td>Back Squat</td>
<td>Rack Jerk</td>
<td>Hang Snatch</td>
<td>Snatch</td>
<td>Clean &amp; Jerk</td>
</tr>
<tr>
<td></td>
<td>Push Press Clean</td>
<td>Clean Pull RDL</td>
<td>Behind Neck Push</td>
<td>Back Squat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pull</td>
<td></td>
<td>Press</td>
<td>Clean Pull</td>
<td></td>
</tr>
<tr>
<td><strong>PM</strong></td>
<td>Power Snatch C&amp;J</td>
<td>Power Clean</td>
<td>Power Snatch</td>
<td>Snatch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Snatch Pull</td>
<td>Front Squat</td>
<td>Behind Neck Press</td>
<td>Back Squat</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Press</td>
<td>Clean Pull</td>
<td></td>
</tr>
</tbody>
</table>

**SAMPLE TRAINING PROGRAM CYCLE THREE**

<table>
<thead>
<tr>
<th></th>
<th>Saturday</th>
<th>Sunday</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AM</strong></td>
<td>Back Squat</td>
<td>Rack Jerk</td>
<td>Power Snatch</td>
<td>Snatch</td>
<td>Clean &amp; Jerk</td>
</tr>
<tr>
<td></td>
<td>Snatch Pull</td>
<td>Front Squat</td>
<td>Behind Neck Press</td>
<td>Back Squat</td>
<td></td>
</tr>
<tr>
<td><strong>PM</strong></td>
<td>Hang Snatch C&amp;J</td>
<td>Snatch Clean Pull</td>
<td>Power Snatch</td>
<td>Snatch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Back Squat</td>
<td>Push Press Behind Neck</td>
<td></td>
</tr>
</tbody>
</table>

It is critical for the reader to know that this is an example. Every advanced program should be set up with the specific needs of the athlete being addressed. The only menu to follow is that skilled movements go first in a session and when the athlete is training twice a day how they respond to training under that situation determines the set-up.

**The distribution of repetitions by sets and percentage ranges**
The arrangement of sets and repetitions will now be discussed. Once again muscular hypertrophy for weightlifters is considered to be no more than 5 sets of 5 reps in the Strength and Power Movements and no more than 5 sets of 3 reps in the Olympic movements in order to maintain skill levels.
There are several, acceptable, approaches to attaining proper weightlifting adaptation

Method #1: Target Setting, after performing 3 to 5 warm-up sets the athlete performs repeated sets at a prescribed load

<table>
<thead>
<tr>
<th>Set</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>50%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>70%</td>
<td>70%</td>
</tr>
<tr>
<td>Reps</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Method #2: American Pyramid, An increase in weight combined with a decrease in Volume

<table>
<thead>
<tr>
<th>Set</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>Reps</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Method #3: Segment Work, A double pyramid

<table>
<thead>
<tr>
<th>Set</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>80%</td>
<td>85%</td>
<td>90%</td>
<td>80%</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>Reps</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Method #4: Double Stimulation, Training both the nerve and the muscle

<table>
<thead>
<tr>
<th>Set</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>80%</td>
<td>90%</td>
<td>80%</td>
<td>90%</td>
<td>80%</td>
<td>90%</td>
</tr>
<tr>
<td>Reps</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

The use of these models will be decided upon the line of best fit as determined by the coach and the athlete. There is no magic formula for becoming a successful Advanced Weightlifter. There is only observation and implementation of proven scientific based training models.

The Determination of load within Intensity Zones

The greatest challenge of developing Advanced Training Programs is that of properly manipulating Intensity. Two factors have been determined. Training loads should be measured between 65% and 100% (loads below 60% are considered warm-ups and are not calculated in the training load or volume.)

Training Distribution has also been set up. 75% of the training is Strength and Power with, 25% of the training being devoted to technique.

Once again the athlete’s, age, gender, somatotype and skill level will influence the training areas set up as well as determining the Preparatory phases and the Competition Phases.
Going back to Gene Baker (USA) and his *Zone Lifting* we can create 4 areas of intensity.

There is an adage in weightlifting that states “80% of the time you should be training at 80%.” The bulk of the training should occur in Zone 2, as high as 50% of all training. 15% in Zone 1, 30% in Zone 3, and 5% in Zone 4.

The plan for Advanced Weightlifters is not cast in stone and in fact needs to vary greatly to meet the individual needs of the athlete. However if you look at the models given you will see the proper relationship between intensity and recovery, strength and technique and volume and load.

While the scripting out of yearly plan is critical to attaining the set goals it is important that both coach and athlete be able and willing to go ‘off script’ when necessary.

The original goals of all program design are always in the conversation.

1. Improve performance
2. Increase work capacity
3. Refine technique
4. Reduce and hopefully prevent injury.

One factor that should be taken into consideration when planning the training is the K-value.

The K-value is 100 times the average weight lifted during each repetition of a macrocycle (2....

---

<table>
<thead>
<tr>
<th>Zone</th>
<th>65-75%</th>
<th>76-85%</th>
<th>86-95%</th>
<th>96-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Zone 1: 15%
Zone 2: 50%
Zone 3: 30%
Zone 4: 5%
prep cycles plus 1 competition cycle), divided by the total attained in competition at the end of the macrocycle. For most Class I athletes, the K-value will be in the range of 38 to 42.

If too many repetitions are prescribed in Zone 1 and not enough to compensate in Zone 3 or 4, the K-value will be too low. If the K-value is too low, the speed of movements will be high, but the strength gains may be slightly. This will result in a total where the snatch is high and the clean and jerk is disproportionately low. Conversely, if too many repetitions are in zones 3 and 4, but not enough in zones 1 and 2, the resultant total will show a high clean and jerk result and a low snatch performance.

Championship performances are usually made up of balanced efforts in the two lifts where the snatch is in the 77% to 82% range of the clean & jerk.

**USA Weightlifting Resident Team Training Program**

Currently under the direction of Zygmunt Smalcerz the Resident Team Training Program is based upon both the unique abilities of the High Performance Athletes that are training at the Olympic Training Center in Colorado Springs and Coach Smalcerz’s ability to fine tune the programs to the needs of the individual.

The basic program consists of 6 days per week. 3 days of Single Session Training and 3 days of Double Session Training.

Coach Smalcerz has a *menu* of 39 Snatch movements, 39 clean movements, and 23 Jerk movements. The snatch and the clean & jerk are the end result of all the training that is completed so the athlete can Snatch and Clean & Jerk. What makes Coach Smalcerz’s training unique is that while each session is typically, a Snatch Session or a Clean & Jerk Session, the progressions are placed in order and exercises selected as to the need of each individual athlete.

**THE MAIN MENU**

<table>
<thead>
<tr>
<th>Snatch Movements</th>
<th>Clean Movements</th>
<th>Jerk Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Starting Position Stick</td>
<td>• Starting Position</td>
<td>• Press Stick</td>
</tr>
<tr>
<td>• Pull to Straight Position – Hip</td>
<td>• Pull to the Straight Position</td>
<td>• Press bar</td>
</tr>
<tr>
<td>• Jump Up Hip</td>
<td>• Jump Up – From Knee</td>
<td>• Half Squat</td>
</tr>
<tr>
<td>• Jump Up Knee</td>
<td>• Jump Up – From 2/3 of the Thigh</td>
<td>• Half Squat Bar</td>
</tr>
<tr>
<td>• Jump Up Below Knee</td>
<td>• Jump Up – From Knee to Power Clean Position – Elbows Up</td>
<td>• Push Press</td>
</tr>
<tr>
<td>• Starting Position Bar</td>
<td>• Jump Up – From 2/3 of Thigh to Power Clean Position – Elbow Up</td>
<td>• Jump</td>
</tr>
<tr>
<td>• Starting Position Pull/Jump</td>
<td>• Starting Position Stick</td>
<td>• Jump with Bar</td>
</tr>
<tr>
<td>• Jump Up Knee /Power Snatch</td>
<td>• Starting Position Bar</td>
<td>• Power Jerk</td>
</tr>
<tr>
<td>• Jump Up Box Knee /Power Snatch</td>
<td>• Starting Position – 2/3 of Thigh Pull/Jump/Power Clean</td>
<td>• Split Jerk</td>
</tr>
<tr>
<td>• Jump Up Below Knee /Power Snatch</td>
<td>• Starting Position – 2/3 of Thigh Pull/Jump/Power Clean</td>
<td>• Return</td>
</tr>
<tr>
<td>• Power Snatch Knee</td>
<td>• Jump Up 2/3 Thigh /Power Clean</td>
<td>• Jerk Step</td>
</tr>
<tr>
<td>• Power Snatch Below Knee</td>
<td></td>
<td>• Split Squat Forward</td>
</tr>
<tr>
<td>• Power Snatch Knee non Stop</td>
<td></td>
<td>• Press in Split</td>
</tr>
<tr>
<td>• Power Snatch Hip/Knee/Below</td>
<td></td>
<td>• Jerk in Split</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Split</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Jerk</td>
</tr>
</tbody>
</table>
Knee
- Power Snatch
- Power Snatch Split
- Power Snatch/Squat
- Power Strength Snatch
- Snatch from Hip
- Snatch from Knee
- Snatch Knee non Stop
- Snatch Below Knee
- Snatch Box Knee
- Snatch Box Below Knee
- Snatch
- Snatch Split
- Snatch without moving Feet
- Snatch Standing on Box
- Snatch Jump On Box
- Snatch Stop after Start
- Snatch/Below Knee/Knee/Squat
- Power Snatch/Snatch/Squat
- Snatch with Variable or Changeable Weights
- Walking in Snatch
- Drop Bar
- Drop Bar/Squat Snatch
- Drop Bar/Squat/Press in Snatch
- Squat Snatch
- Pull Snatch
- Grip
  - Open
  - Hook
  - Middle
  - Snatch
  - Straps
- Jump Up Box /Power Clean
- Jump Up Box Below Knee /Power Clean
- Power Clean 2/3 of Thigh
- Power Clean Knee
- Power Clean Below Knee
- Power Clean Knee non stop
- Power Clean 2/3 of Thigh/Knee/Below Knee
- Power Clean Split
- Power Clean/Squat
- Power Straight Clean
- Clean from 2/3 of Thigh
- Clean from Knee
- Clean Knee non Stop
- Clean Below Knee
- Clean Box Knee
- Clean Box Below Knee
- Clean
- Clean Split
- Clean without Moving Feet
- Clean Standing on Box
- Clean Jump on Box
- Clean Stop after Start
- Clean/Below Knee/Knee/Start
- Power Clean/Clean/Squat
- Clean with Variable or Changeable Weights
- Grip
  - Open
  - Hook
  - Middle
  - Snatch
  - Straps
- Power Clean Split
- Split Squat Front
- Split Squat Back
- Walking in Split Bar Front and Back
- Walking in Split Bar Overhead
- Dip and Drive
- Jerk with Changeable Weights
- Static Positions for Jerk

Outline of a Typical Session

Snatch Session (Numbers are percentage of 1RM)

<table>
<thead>
<tr>
<th>AM</th>
<th>Set#1</th>
<th>Set#2</th>
<th>Set#3</th>
<th>Set#4</th>
<th>Set#5</th>
<th>Set#6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reps</td>
<td>3x</td>
<td>3x</td>
<td>3x</td>
<td>3x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press in Snatch</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reps</td>
<td>1x</td>
<td>1x</td>
<td>1x</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Stage Snatch</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reps</td>
<td>2x</td>
<td>2x</td>
<td>2x</td>
<td>2x</td>
<td>2x</td>
<td>2x</td>
</tr>
<tr>
<td>Snatch w/o/m feet</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Reps</td>
<td>1x</td>
<td>1x</td>
<td>1x</td>
<td>1x</td>
<td>1x</td>
<td>1x</td>
</tr>
<tr>
<td>Snatch</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Reps</td>
<td>3x</td>
<td>3x</td>
<td>3x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snatch Pull</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Clean Session

<table>
<thead>
<tr>
<th>PM</th>
<th>Set#1</th>
<th>Set#2</th>
<th>Set#3</th>
<th>Set#4</th>
<th>Set#5</th>
<th>Set#7</th>
<th>Set#8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reps</td>
<td>3x</td>
<td>3x</td>
<td>3x</td>
<td>3x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press in Split</td>
<td>25</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reps</td>
<td>1+1</td>
<td>1+1</td>
<td>1+1</td>
<td>1+1</td>
<td>1+1</td>
<td>1+1</td>
<td></td>
</tr>
<tr>
<td>Jk.Bk+Jk</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Reps</td>
<td>2+2+2</td>
<td>2+2+2</td>
<td>2+2+2</td>
<td>2+2=2</td>
<td>1+1+1</td>
<td>1+1+1</td>
<td>1+1+1</td>
</tr>
<tr>
<td>Blk.ClPl+Cl+Sqt</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Reps</td>
<td>2x</td>
<td>2x</td>
<td>2x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pwr.Clean</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional examples may be found in the Advanced Program Design Chapter on the course website
Chapter 11
Sports Psychology, Gaining the Mental Edge

Have your weightlifters ever:
- Lacked motivation to practice on a regular basis?
- Lost confidence in their abilities, especially after performing poorly?
- Become distracted or lost focus in competition?
- Become anxious and tight under pressure?
- Put more emphasis on outcome then on their own performance?
- Performed poorly after really good practice performance
- Become frustrated or mad after making a mistake or starting off poorly?

If you answered yes to one or more of these situations, then you are in good company. Most athletes (not just weightlifters) have experienced these scenarios, feelings, and thoughts. However, many have not developed the mental skills to effectively cope with these situations and achieve optimal performance. This chapter will attempt to provide a brief overview of some of the key mental skills that are associated with optimal performance along with some practical guidelines, exercises, and tips for coaches to help build these mental skills in their athletes. Before I discuss these specific mental skills, a model to help understand the relationship between technical, physical, and mental skills will be presented.

The three points to a triangle refer to the combination of different kinds of skills needed to achieve maximum performance (see Figure 1). First, athletes need to be proficient in a number of discreet technical skills. For weightlifters, these involve the specific techniques that will help produce a successful lift such as hand positioning, stance, etc. Second, athletes need overall conditioning. In the case of weightlifters, strength in different muscles groups is critical along with flexibility to help with balance, which is especially critical in certain types of lifts such as the snatch. Third, athletes need mental skills. The wrong thoughts can make your heart race, your breathing shallow, and your palms sweat. Some of these mental skills include goal setting, coping with pressure, remaining calm and relaxed, self-talk, attentional control, building and maintaining confidence, and routines.
It is interesting that most coaches feel these mental skills are critical for successful performance. But when asked how often they practice these skills with their athletes, the answer is usually seldom, if at all. Coaches usually say they just don’t have the time to teach mental skills or they don’t know how to teach them. Thus, a major focus of this chapter is to help coaches teach these important mental skills.

**Triangle Model for Optimal Performance**

Most sport psychologists believe in a model that includes three main objectives of performance psychology (see Figure 2). These include (a) optimal performance, (b) optimal development, and (c) optimal experiences.

**Optimal Performance.** This refers to performing to the best of your ability (not simply winning). Oftentimes, the athlete who takes second or third place (or lower) is considered a loser despite the fact that coming in second place might mean you were better than 50 other athletes. Optimal performance should be viewed from the perspective of improving upon your own performance. Thus, if a weightlifter breaks their personal best by 5 kilos, but comes in 8th place, this should be seen as a success because he performed at his best and that is the only thing he can control (i.e., you can’t control your other competitors).

**Optimal Development** refers to the important ways in which participation in weightlifting influences the individual personally. Taking part in competitive sport can help develop a healthy self-image, discipline, leadership skills, social skills, and resiliency. Developing these mental skills and transferring them to other aspects of life is not automatic. Coaches play a central role in whether, how, when, and to what extent athletes develop and transfer these skills to others aspects of their lives.
**Optimal Experience** refers to having fun, gaining personal fulfillment, feeling more competent and worthy, and simply enjoying the experience, regardless of the outcome or how much you are “learning.” Athletes who can truly enjoy their athletic experience will typically continue participation for much longer times than athletes who simply participate for more external reasons (winning competitions, financial reward, publicity, etc.).

**Mental Skills for Performance Enhancement**
Now that we know a little about the importance of mental skills, their relation to physical skills, as well as the central role they play in optimal development and optimal experiences, it is time to discuss development of these specific skills.

**Goal Setting**
Probably at the core of all the mental skills is motivation. If a weightlifter is not motivated, then all the other mental skills probably do not matter too much. Of course, as a coach there are a number of different ways to motivate, but we will focus on goal setting, one of the most scientifically tested and effective ways to motivate. An elite athlete is quoted below: *Motivation depends in a very large part on goal setting. The coach must have goals. Every individual athlete must have goals, real vivid, living goals. Goals keep everyone on target. Goals commit me to the work, time, effort, pain and whatever else is part of the price of achieving success.*

**Definition of Goals.** Attempts to attain a specific standard of proficiency for a task. Goals can be **objective** such as lifting 70 kilos for the snatch or they can be **subjective** such as wanting to increase the enjoyment of practices. In either case a coach needs to be able to measure progress toward a goal. The subjective goal can be trickier to measure. But, for example, if a weightlifter wanted to measure their enjoyment in practice they first would try to understand what makes practice enjoyable (e.g., coach gives positive feedback, most of the lifts were successful, liked their workout partners, etc.). Then, they might rate their enjoyment on a scale from 1 (not enjoyable at all) to 10 (extremely enjoyable).

**Types of Goals.** There are basically three types of goals in sport
- **Outcome** – typically focuses on a competitive result such as winning a weightlifting competition
- **Performance** – focuses on performance in relation to your own standard of excellence. Thus a weightlifter might want to improve their clean and jerk from 120 kilos to 125 kilos
- **Process** – focuses on what you need to do (technique) to be successful and perform well. For example a weightlifter may need to focus on such as “big chest” or “drive up fast.”

Most athletes focus on outcome goals (winning), because society has made these the most important. There is nothing inherently wrong with outcome goals although they should not be an athlete’s focus because winning (or coming in a certain place in a competition) is not under your control. In essence, a weightlifter might beat their personal best but only come in 5th place because the other competitors were simply better. The better focus is on performance and process goals as these are under the weightlifter’s control. In essence, if you reach your process and performance goals, then your outcome goal will also likely come true. Thus a weightlifter can also feel proud of himself if he breaks (or comes near to breaking) a personal best, even though he did not place well in the competition.
Goal Setting Principles. Although research is extremely clear that goal setting can significantly improve performance, goals need to be set in a way to maximize performance. Based on the research literature in sport and business, a number of principles have been developed. Many of them fit into the acronym SMARTS. In essence, this means goals should be

- **Specific** – state exactly what you want to accomplish – “do your best” goals do not provide specific targets for which to shoot.
- **Measurable** – make sure you can quantify your goals so you know if you are making progress toward them.
- **Action-Oriented** – defines what you need to do to reach your goals. These often are process goals which help you reach performance and outcome goals.
- **Realistic** – you can achieve the goal but it will require a good amount of effort. Goals that are too easy or too hard are not as effective as those that are moderately difficult.
- **Timely** – defines exactly when you want to reach your goal. Make sure the timeframe is appropriate for the goal that was set.
- **Self-Determined** – you set your own goal, as opposed to others (e.g., coaches) setting them for you. Coaches can certainly help set goals but weightlifters have to eventually “own” the goals.

Two more principles that do not fit into the SMARTS acronym include reevaluating goals and short and long-term goals. **Re-evaluating goals** underscores the notion that goals should be starting places, not ending places. If a goal is too difficult or too easy (as seen by performance), then that goal should be re-evaluated and changed accordingly. This will keep motivation up and continue to make the goal realistic and moderately difficult. Most goals should be both short-term and long-term. The long-term goal tells the weightlifter where he wants to be down the road (maybe 6 months or a year) whereas short –term goal provide feedback regarding how a weightlifter is progressing to reach his long-term goal. Thus, if a weightlifter’s long term-goal (one year out) is to lift a combined 180 kilos (snatch plus clean and jerk) then his lifts each month (short-term goals) will provide feedback as to how he is progressing toward his long-term goal (maybe he will have to re-evaluate the goal based on his short-term performance). Furthermore, a short-term goal might be a daily goal or weekly goal as there is no specified time frame for a short or long-term goal.

**Self-Talk**

*We are not disturbed by things, but rather the view we take of them* 

Epicitus

*There is nothing good or bad, but thinking makes it so* 

Shakespeare

What athletes say to themselves can have a huge influence on their performance. Thus the 2nd mental skill to be discussed is self-talk.

**Definition** – Self-talk is what you say to yourself, either out loud or inside your head. It could be a cue word (e.g., “bend from the knees”), a statement to get you going (e.g., “I can do it”), although sometimes it can be negative (e.g., I’ll never be able to lift this weight”)

**Types of Self-Talk**

- Instructional - “keep your wrist firm”
- Motivational – “hang in there”
- Negative - “that was the worst lift ever”

Increasing Awareness of Self-Talk
Many athletes are not really in touch with their self-talk, and thus they can’t alter what they don’t know. Therefore, carefully reviewing the way in which they use self-talk can help identify beneficial and detrimental kinds of self-talk, and the circumstances or competitive situations bringing out different kinds of self-talk.

One good time to identify and understand one’s self-talk is right after a competition (or practice). Specifically, as soon as possible after a competition, make a list of thoughts and self-statements, situations in which they occurred, and performance consequences. In essence, weightlifters should try to recall their thoughts and verbal reactions to a variety of situations throughout the competition. If possible, videotape the weightlifter with close ups of their facial expressions and verbalizations. This tape could also be used as a cue to help the weightlifter remember what he was thinking about or saying to himself at specific times. Another strategy is to have the weightlifter try to remember his best and worst performances. As they do this, it usually becomes evident that there is a distinct difference in self-talk between these two situations. Getting a good feel for one’s self-talk will help to begin the process of focusing on self-talk that is beneficial and trying to eliminate or change negative and destructive self-talk.

Model of Self-Talk
A simple way to view self-talk is to think of it as an ABC model. Most performers think that situations cause reactions and responses. However, this model suggests that it is your interpretation or evaluation of the situation (i.e., your self-talk) that in large part determines your responses. This model is shown below.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation</td>
<td>Interpretation/ Evaluation</td>
<td>Response</td>
</tr>
<tr>
<td>I’ll never make this lift</td>
<td>Frustration/ Anger</td>
<td>Missing a Critical Lift</td>
</tr>
<tr>
<td>Missing a Critical Lift</td>
<td>I know what I need to do</td>
<td>Optimism, Motivation</td>
</tr>
</tbody>
</table>

In essence, it’s what you think about (which is under your control) that determines your response to specific situations. So just because you missed an important lift or were doing poorly at the start
of a competition does not mean you will have to be upset, frustrated and mad. You control your thoughts, and your thoughts have a big influence on your behavior and performance.

**Changing Negative to Positive Self-Talk**

In the best of worlds it would be best to totally eliminate negative self-talk, but this is not entirely realistic, as negative thoughts have a way of entering our mind. In fact, research has demonstrated that we have many more negative thoughts than positive thoughts throughout the day. So the next best thing is to change these negative thoughts into positive ones and direct your attention back to the task at hand. There are no special words to use but rather you need to find the words and statements that are meaningful to you, which help you refocus your attention. Below are a few examples of changing negative to positive self-talk.

**Negative Self Talk**  **Change To**  **Positive Self Talk**

I hope I don’t choke again  
Relax and just go through the routine

I can’t believe I missed that lift

Everyone misses—just focus on the next lift

This is your big chance, don’t screw it up

This is what I’ve been practicing for

What will people think if I miss again

Just focus on your cues like in practice

**Imagery**

One of the most often used mental skills by Olympic athletes is imagery. Seeing themselves successfully performing a lift can help in many ways including increasing confidence, refining concentration, and managing emotions (e.g., anxiety, frustration). But what exactly is imagery?

**Definition**

Imagery is creating or recreating pictures in your mind (but should include as many senses as appropriate) without any physical movement. Although the term imagery implies vision or mental pictures, the real goal of imagery is to make the experience seem as real as possible. Therefore to simulate actual competition, a weightlifter should include all relevant senses so, as one imagery researcher has stated, if one’s imagery is really powerful “the mind does not know the difference between real and imagined stimuli.” So besides a weightlifter seeing a successful lift, he should also feel his muscles and body sensations, hear what he normally hears while lifting, feel what his body feels throughout different parts of the lift, and feel what the bar feels like in his hands. Making imagery as real as possible will maximize its effectiveness in enhancing performance.

**How Imagery Works**

There are numerous theories that attempt to explain why and how imagery works. It is difficult to point to one of these theories as the best one (or only one) that explains how imagery works. So three different ones will be briefly explained as research suggests that they all probably contribute
to imagery effectiveness. First, the **neuromuscular theory** (physiological approach) argues that vivid images produce an innervation (activation) in the muscles that is similar to that produced by physically performing the movement (although to a much lesser intensity). When practicing physically, all one is really doing is strengthening the neural pathways that control the muscles needed to perform the skill. Imagery helps strengthen these neural pathways. Second, (mental approach) focuses on imagery helping to understand the movement patterns necessary to perform the skill. In essence, imagery helps athletes form a mental blueprint in the mind regarding how the movement or series of movements should be done. Even though weightlifting requires fairly discrete and quick movements, there is still a series of movements that needs to be understood and performed to achieve a successful lift. Third, the **psychological skills hypothesis** focuses on the fact that imagery can help improve mental skills, which in turn will help performance. Specifically, research has indicated that imagery can have an effect on such psychological states as confidence, anxiety, concentration anger, and motivation. For example, even though a weightlifter may never have lifted 80 kilos in the snatch, he could still seem himself lift 80 kilos (given that this is realistic) which could help provide confidence that he, in fact, could do it.

### Types of Imagery

When athletes use imagery, they usually do it from either an internal or external perspective. **Internal imagery** refers to imagining performance from your own eyes. In essence, a weightlifter could only see what he normally would see; like having a camera on his head, which took pictures of all the things he could see while executing the lift. From this perspective, a weightlifter getting ready to lift might see the audience, the bar and the timing clock, but he could not see anything outside of his normal vision. **External imagery** involves a weightlifter visualizing a movement as if he was watching himself in a movie. Since he is watching himself, as opposed to actually doing the movement (as in internal imagery), he could see things that he would not see doing internal imagery such as his footwork, facial expression, the bar over his head, etc. So the question is, which one of these types of imagery is better for performance? Research has revealed that both perspectives can be effective as it may depend on the task, individual preferences, and stage of skill development. For example, external imagery might be especially important if learning a new technique and it is therefore important to see exactly what it looks like to see if the correct technique was accomplished. Other situations might just require strengthening the neural patterns of the skill or just getting the “feel” of the movement and an internal perspective might be more beneficial.

### Imagery Training

All of the mental skills discussed in this chapter need to be practiced, to help them become more effective. Below are some guidelines if you want to develop an imagery training program for your weightlifters.

- **Start in a Relaxed State** – Research has revealed that imagery preceded by relaxation is more effective than imagery alone. This is only to be done for a short period of time (a couple of minutes) and the breathing technique which is described in the next section could be used here.
- **Have Realistic Expectations** – Some athletes feel that imagery will make them better performers overnight and will magically turn them into the player of their dreams. Conversely, some athletes simply don’t believe in imagery as they feel only physical
practice can help them improve. The truth is somewhere in the middle of these two positions. Specifically, imagery can help improve skills but it needs to be practiced regularly just like physical skills.

- **Image as Realistically (Vivid) as Possible** – As noted earlier, the use of as many senses as possible, makes the imagery as real as possible. The more weightlifters can simulate actual competition in their imagery, the more powerful and effective the imagery will be.

- **Positive/Coping Focus** – Research has revealed that focusing your imagery on the positive aspects of performance will be most effective. Most of weightlifters’ imagery should be positive, seeing themselves make successful lifts with good technique and positive emotions. However, nobody is perfect and there will always be missed lifts and poor technique. Recovering from a mistake or missed lift is one of the key issues for becoming a champion weightlifter. So, occasionally, weightlifters should see themselves miss a lift or have a technical problem. But their next imagery should see themselves recover from this miss, go through their routine, stay relaxed, confident and focused and then make a successful lift.

- **Image in Real Time** – Imagery will be most helpful if it is in real time as opposed to slow or fast motion. This is part of imagery being as real life as possible, and it also helps the muscle memory to remember, since you are imprinting the neurological system to perform in the same time frame as actual performance. For example, if a weightlifter’s pre-lift routine takes him 40 seconds, then his imagery should also take about 40 seconds.

- **Control the Images** – It would seem easy to have the image do whatever it is you want to do. For example, a weightlifter generally would want to see himself make a successful lift. But sometimes, he might see himself miss at a certain weight, especially if it a weight and lift that he has trouble with in the past. So, part of practicing imagery is to make sure the image does what you want it to do.

**Arousal Regulation/Anxiety Management** – One of the most difficult things for any athlete is to keep his emotions under control, especially anxiety. When meets and lifts become more important there is a tendency for weightlifters to put pressure on themselves or for others to put pressure on them. When athletes feel too much pressure they can have negative thoughts, tight muscles, lack of flexibility, sweaty palms, tunnel vision, etc. Every athlete has an optimal level of arousal, but it can differ widely with each athlete. Some like to be all psyched-up, others like to be real relaxed, while others are somewhere in the middle. The coach and the weightlifter need to work together to try and find what their optimal arousal is and then structure the environment and use the proper techniques to help the weightlifter reach this optimal level. In addition, a weightlifter’s optimal arousal might be different from practice and competition. What tends to happen is for a weightlifter to be too anxious and aroused for competitions and as noted above, this can get in the way of an efficient and successful lift. One general rule (like noted in the imagery section above), is to try and make practice and competition as similar as possible in every aspect, including one’s level of arousal. So if the weightlifter does get too anxious (accompanied by muscle tension, worry, and irrelevant thoughts) then they need to practice being relaxed not only for the competition, but also in practice. One quick and easy way to relax when on the platform getting ready to lift (or when waiting to get on to the platform in known as **Breath Control**).
Most people generally think that taking a deep breath is a good way to relax; and they are right, up to a point. However, there is also a science to breath control to maximize its effectiveness. Here are a couple of points to keep in mind:

- Breathing consists of an inhalation and exhalation phase. The inhalation actually increases tension whereas the exhalation decreases tension
- Therefore an athlete who wants to relax should exhale for a longer time than inhale. Research recommends a 1:2 ratio of inhalation to exhalation. In essence, if a weightlifter inhales for 2 seconds, he should exhale for 4 seconds; if he inhales for 3 seconds he should exhale for 6 seconds. These are approximations, not absolutes.
- The taking in of a breath should come from the diaphragm (sometimes called belly breathing) as this allows for the most air to enter the body. Let the air out from the mouth and nose.

Concentration
Research and experience has indicated that Olympic weightlifting poses an unusual challenge to the concentration skills of weightlifters. In both training and competition, the demands of the sport are extraordinary. Hoisting twice one’s body weight overhead is a consuming task. Few individuals can afford to worry about the other competitors, the audience, or a failed previous lift. Weightlifters must be able to focus all of their energies on the lift itself, with no distractions entering the mind. Of course with the pressure of competition, this is easier said than done. However, a couple of strategies will be described to help focus one’s attention. But coaches’ should understand that some of the techniques described earlier (e.g., self-talk, breath control, imagery) will also help focus attention and these can complement each other in maximizing attentional focus and performance.

Pre-Performance Routines
One of the important things that athletes need to understand from a mental perspective is that they should only focus on things that they can control (e.g., thoughts, emotions) and not on things they can’t control (e.g., audience, other competitors). In essence, “Control the Controllable.” One way to do this is through a pre-performance routine.

A routine is basically a consistent and systematic way to think, feel, and behave, especially before or during a competition. Pre-performance routines work by helping performers transfer their attention from task-irrelevant thoughts (“I can’t believe I missed my first lift”) to task-relevant thoughts (“keep a tight back”). In addition, they provide structure to the time right before performance to allow emotions and thoughts to be focused directly on the ensuing performance. Thus, routines decrease the likelihood that individuals will be distracted internally or externally before and during competition. This allows performance to stay automatic without the interference of conscious awareness.

Although routines can vary from short and simple to lengthy and complex, research has revealed that generally, the shorter the time of the routine the more successful the performance. Some routines border on superstition such as wearing a lucky pair of socks. Other routines are more targeted to performance, which might include a deep breath for relaxation, imagining what to be done next, and keeping your eyes focused on the task. But the most important thing is for the weightlifter to feel comfortable with the routine and believe in it. Below is an example of a pre-lift routine by one of the weightlifters with whom I have consulted.
Employ Non-Judgmental Thinking
One of the biggest obstacles athletes have in maintaining concentration is the tendency to evaluate performance as good or bad. Such judgments tend to elicit personal, ego-involved reactions such as “I just choke at big meets” or “I can’t believe I missed that easy lift.” Instead of judging the worth of a performance, and categorizing it as either good or bad, a weightlifter should look at his actions non-judgmentally, weightlifters should become “objective observers.” This does not mean that errors and mistakes are ignored; rather weightlifters should simply see their performance for what it was, without labeling it as good or bad. For example, a weightlifter might have missed a lift. Instead of focusing on the miss, he might simply observe (or maybe felt) that he did not push hard through the ground at throughout the snatch. This objective information then is used constructively by the weightlifter to help him perform successfully on the next lift.

Confidence
Confidence is the belief that you will successfully complete a task. Confidence tends to be situation-specific so a weightlifter might be confident in the snatch but not in the clean and jerk. Research has been consistent in finding that confidence has a strong relationship to performance. In essence, believing that you can do something goes a long way to actually doing it. This is not to say that if you believe you can lift 80 kilos in the snatch it will happen, as you must have the requisite skills to be able to lift 89 kilos. But if a weightlifter goes into a lift not believing that they can do it successfully, then they probably won’t. There are a number of sources of confidence and coaches can use these to help build confidence in their athletes and some of the techniques discussed earlier also have enhancing confidence as one of their benefits.

- **Performance Accomplishments** – Although a coach can’t guarantee winning or success in competition, they can help their weightlifters master skills in practice which will give them more confidence performing in competition
- **Verbal Persuasion** – Unfortunately many coaches feel the way to motivate their athletes is through fear, intimidation and punishment. But one of the ways in which athletes gain confidence is through positive reinforcement by coaches. This does not mean that all of your communication with your athletes needs to be positive. But, in general an encouraging, open positive, instructional attitude will go a long way in enhancing confidence.
- **Modeling** – Watching others perform well can also enhance confidence. The idea here is to have weightlifters watch other lifters like themselves who are performing well. The weightlifters may not be able to relate to an Olympic gold medallist; rather they can take more positive information from other lifters who are good and around their ability level.
• **Mental and Physical Preparation** – Feeling that they have been practicing hard both mentally and physically goes a long way to enhancing a weightlifter’s confidence. But this is not only the lifter putting in the hard work, as it is also the coach for giving the lifter a plan and instructing them to be prepared for all different situations. In this way, a weightlifter can go into a competition feeling that they were physically and mentally prepared and were ready for anything that might happen at the competition.

• **Imagery** – As noted in the imagery section, seeing yourself performing a skill successfully can give you confidence that you can indeed do it. For example, a weightlifter may have been unsuccessful several times with a particular weight but he could still see himself successfully lifting the weight, which can give him some level of confidence that he can do it.

• **Simulations** – We have discussed simulations before, but one of the things that simulations in practice does, is to give the weightlifter confidence because if he can perform well in practice, and practice is very much liked competition, then he should do well in competition. So, making the practices as much like competitions will help build confidence in weightlifters doing the same things in competition as they were doing in practice.

• **Focus on Process Goals** – As noted in the goal setting section, focusing on one’s process goals (things a weightlifter needs to focus their attention on in order to maximize the chance of a successful lift) will help him remain confident because process goals are always under his control. By focusing on what is under his control, a weightlifter can be confident because they know what they have to do and don’t have to be concerned with anyone but themselves.