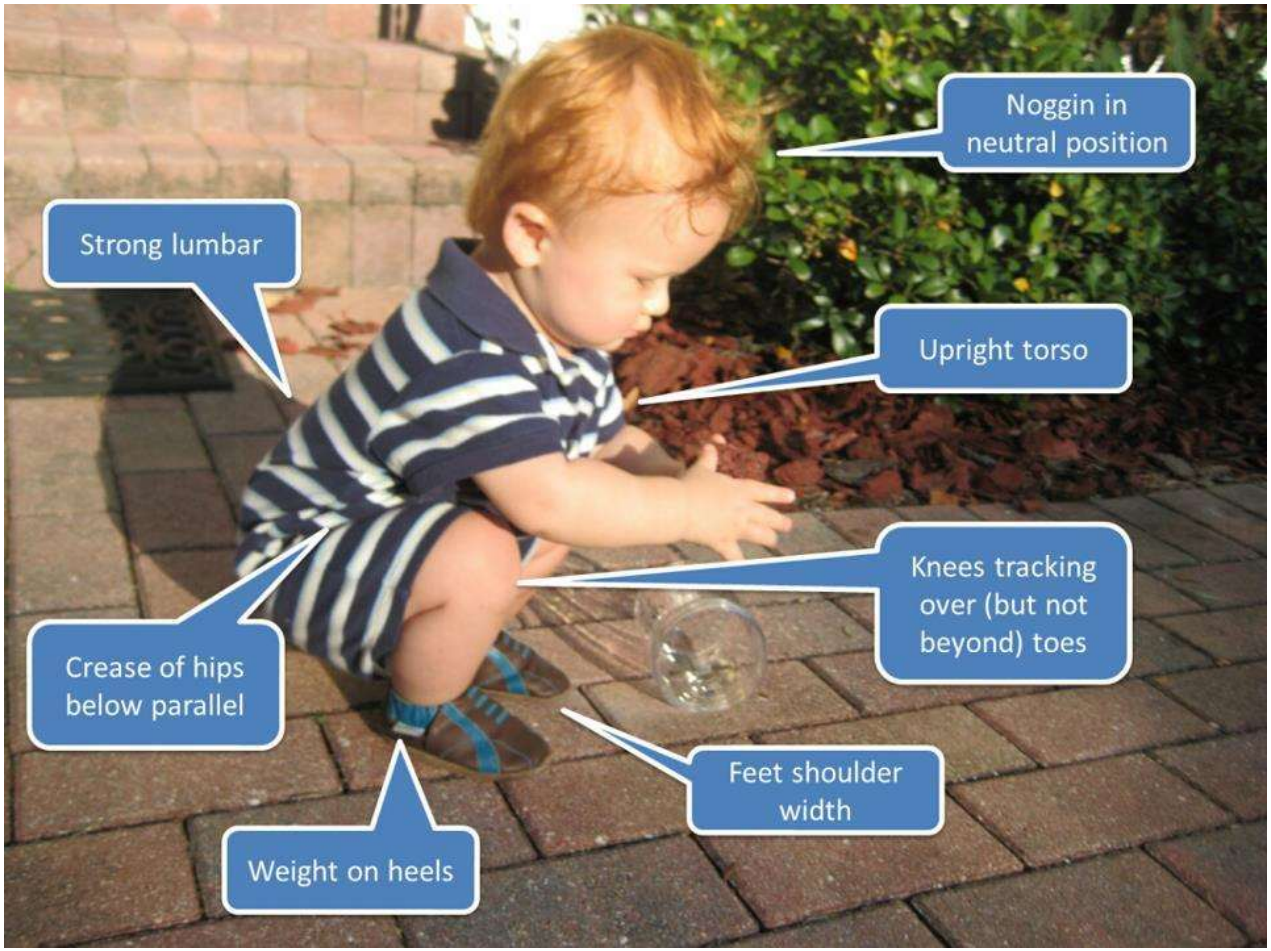
USA Weightlifting
High School Coach Course

Expected Outcomes

- Understand the proper teaching progressions for safely instructing the Weightlifting Movements in the training and competition setting of High School Athletics
- Demonstrate the fundamentals of Age Appropriated Program Design as it relates to Beginning and intermediate athletes
- Demonstrate the understanding of the Rules, Regulations and Procedures for running a local weightlifting competition

Safety In Weightlifting



Sports Injuries

Per 100 participant hours in school sports

Track and Field (XC)	0.57
Badminton	0.05
Basketball	0.03
Football	0.10
Gymnastics	0.044
Powerlifting	0.0027
Tennis	0.001
Volleyball	0.0013
Weightlifting	0.0017

Personal Safety

- Correct Footwear
- Correct Clothing
- Safe, Efficient Technique
- Correct Breathing
- No Horseplay
- Be Aware of Others
- Use Spotters When Appropriate
- Hand Care
- Discourage Limit Attempts
- First Aid

Personal Safety con't

- Ice
- Warm-up, Stretching and Cool-down
- ***"Miss" Correctly***
- Drop Barbell in Controlled Manner
- Know Emergency Procedure
- Discourage Training Alone
- Follow Planned Program
- Low Resistance When Learning New Skills
- Avoid Big Jumps
- Individual Progression

Missing a Lift

If the bar loops behind, push against it and step forward
If the bar falls in front push yourself away from the bar

Equipment/ Organizational Safety

- Ensure Platforms, Barbells etc. Are Well Spaced Out
- Ensure Lifting Surfaces Are Non-stick
- Ensure Barbells Are Loaded Correctly and Evenly
- Ensure All Equipment is Stable
- No drafts in the Training Hall
- Adequate Chalk
- Clean Lifting Areas
- Ensure That Bars Are Straight and Revolve

Position Statement on Supplements

- Every USA weightlifting Certified Coach needs to inform their athletes and their clients of their, personal, position concerning the use of supplements.
- This is especially important in dealing with individuals under the age of 18.
- The term ergogenic, according to Sports Nutrition means to enhance athletic performance by improving energy efficiency, production, or control during exercise. There are several types of ergogenic aids but the main focus needs to be on the pharmacological and nutritional aspects of ergogenic aids.

The body is a complicated machine with many processes taking place at once. The best way to keep your engine running like an efficient, well-oiled machine is to eat a well balanced diet. For peak performance, athletes need to eat a good variety of lean meats, whole grains, fruits and vegetables and milk products. 1 gram of protein per pound of bodyweight per day, understanding that the body can only *absorb* 35 to 50 grams of protein every 2 to 3 hours influences *how* and athlete eats.

Proper sleep, proper water consumption and proper training also effect dietary aspects.

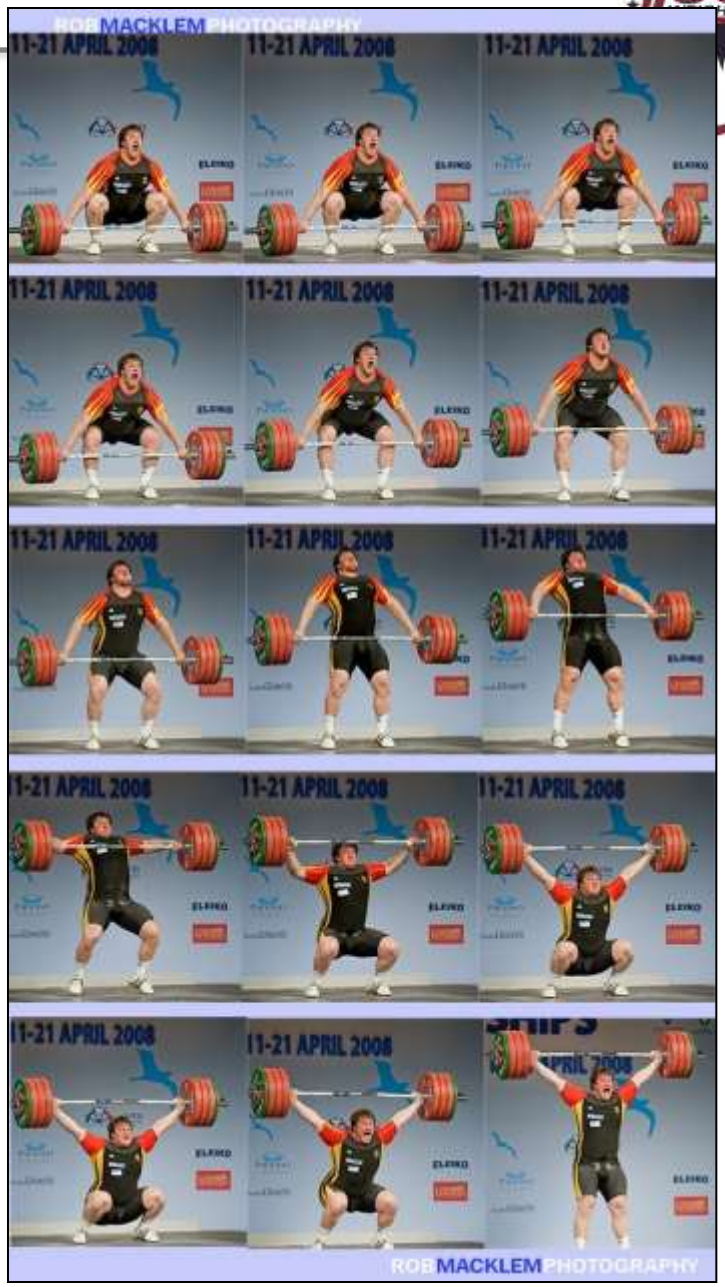
Have your athletes be aware of the most common statement made by supplement companies:

These statements have not been evaluated by the Food and Drug Administration.

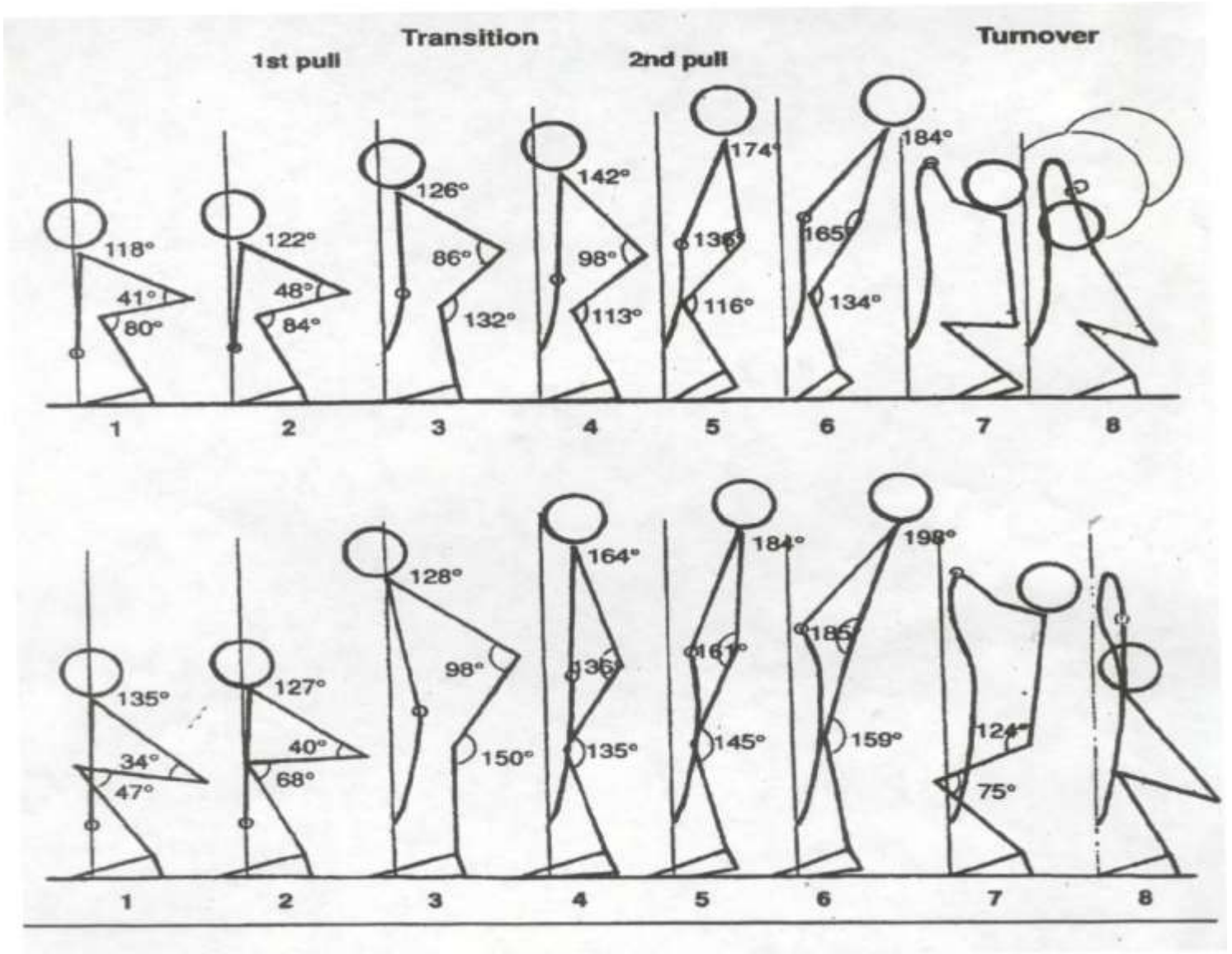
Technique

Of

Weightlifting



Basic Biomechanics



Basic Biomechanical Principles

- **Efficient Technique = Physics Applied to the Human Body**

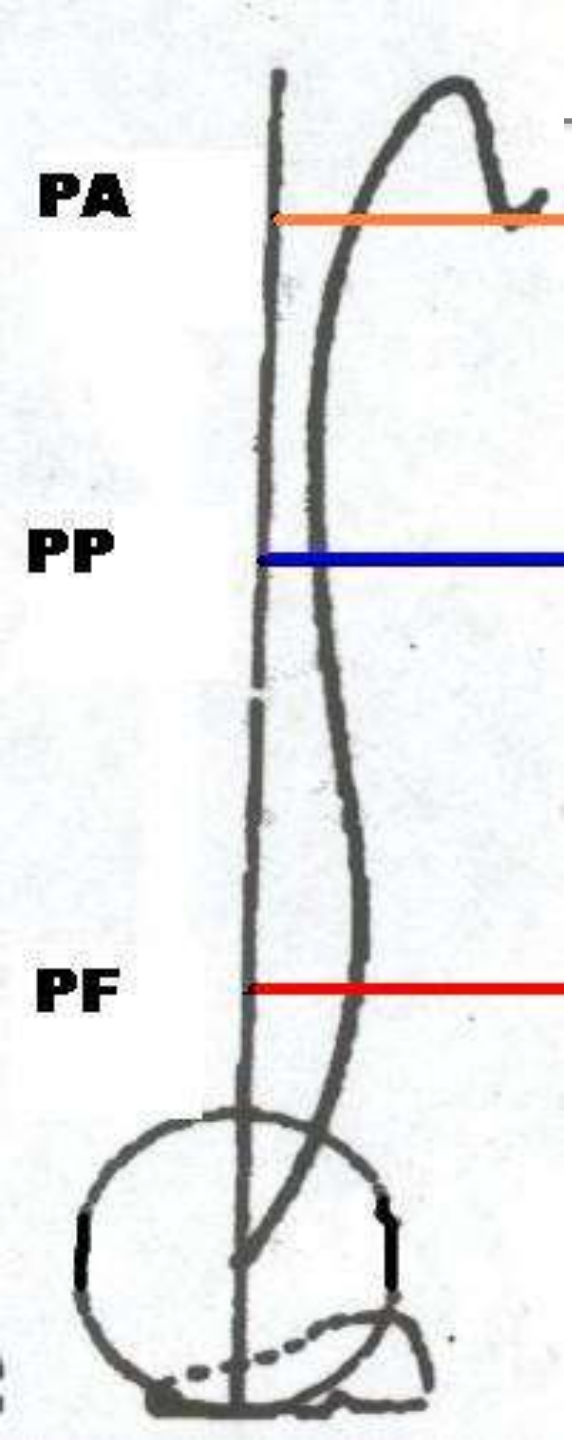
Principles:

- **Center of Gravity (COG)**
  - **Point at which all body parts are equally distributed**
  - **Is always at the center of the barbell**
  - **COG for humans may be diverse**
  - **COG as a unit**

- **Area of Base**
  - **Is the combined area of the lifter and the barbell**
  - **The barbell stays inside the area of base the lift**

Action and Reaction

- **Newton's Third Law of Motion**
  -For Every Action There Is an Equal and Opposite Reaction
- **Examples**
  - Explosive Finish of Top Pull
  - **Throwing the Head Back will cause the barbell to 'loop' away from the athlete.**
  - Swinging the bar
  - Weight Distribution During Jerk
  - Move the body around the bar, no



Barbell Forces

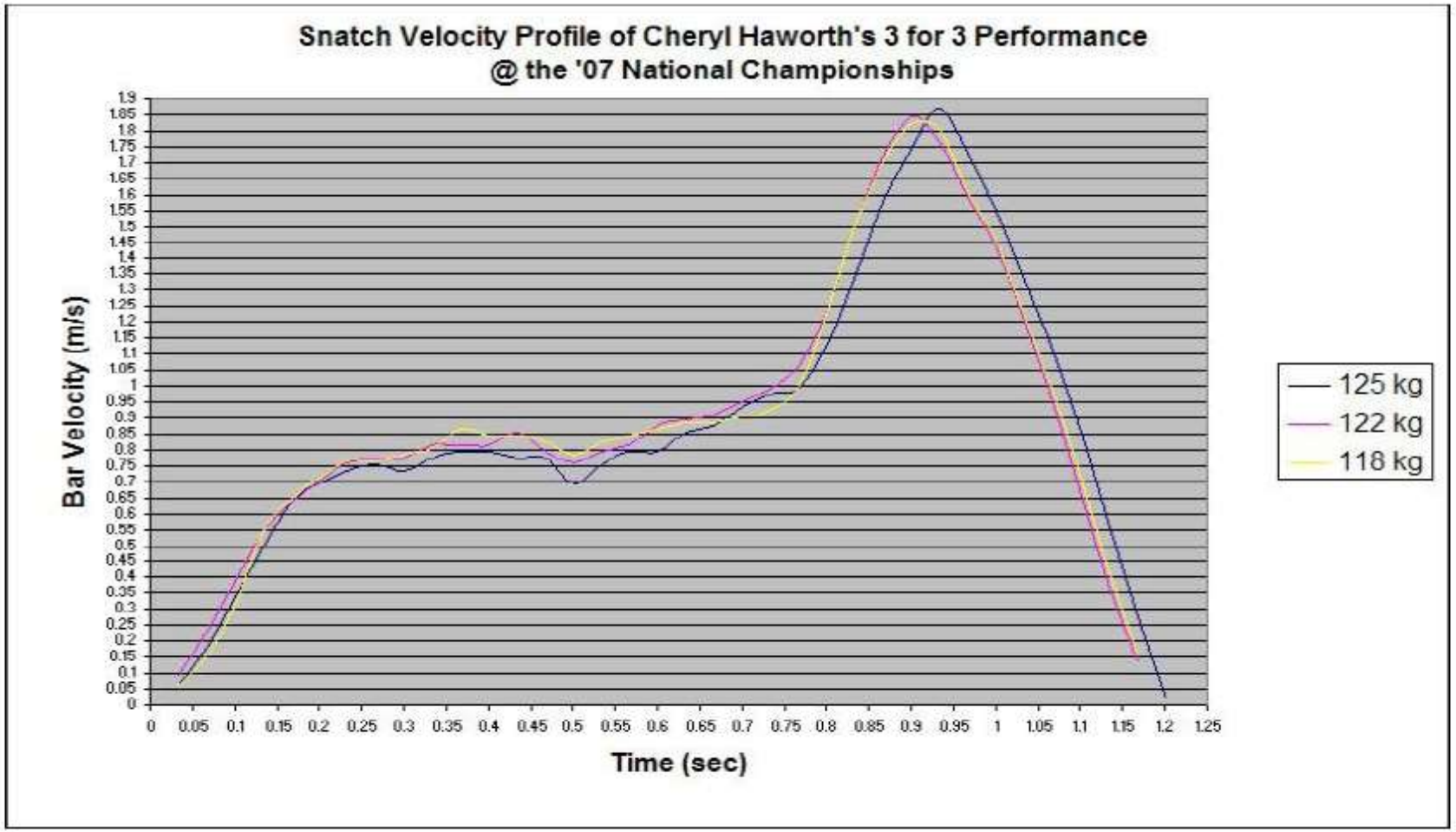
PA: PEAK ACCELERATION; ***To accelerate an object is to change its velocity, which is accomplished by altering either its speed or direction in relation to time*****.**

PP: PEAK POWER; ***Sadi Carnot defined power as "weight lifted through a height",***

PF; PEAK FORCE; ***A body at rest will remain at rest , unless disturbed by an unbalanced force (Breaking inertia)***

Cheryl Haworth

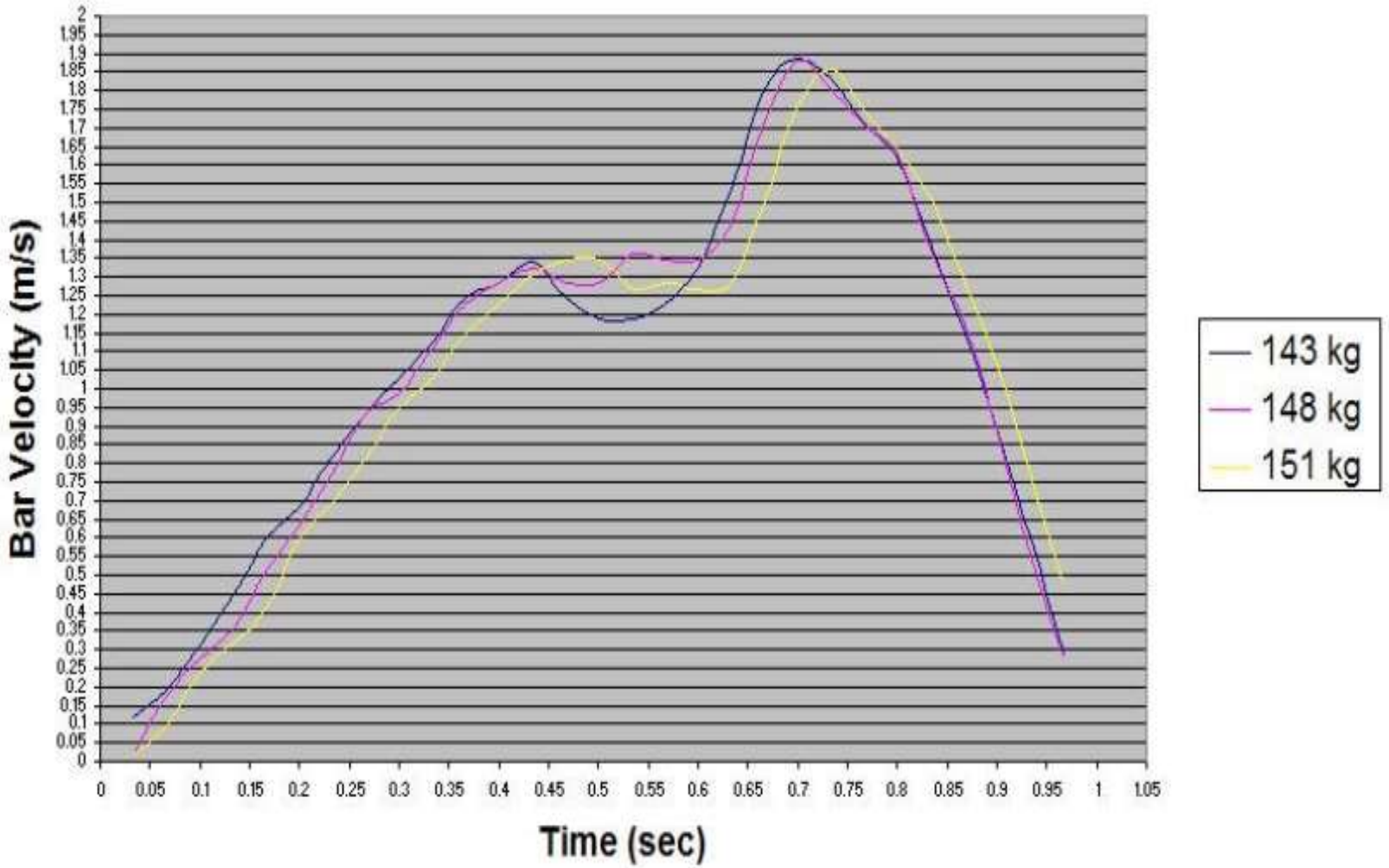
Acknowledgements to TRACY FOBER

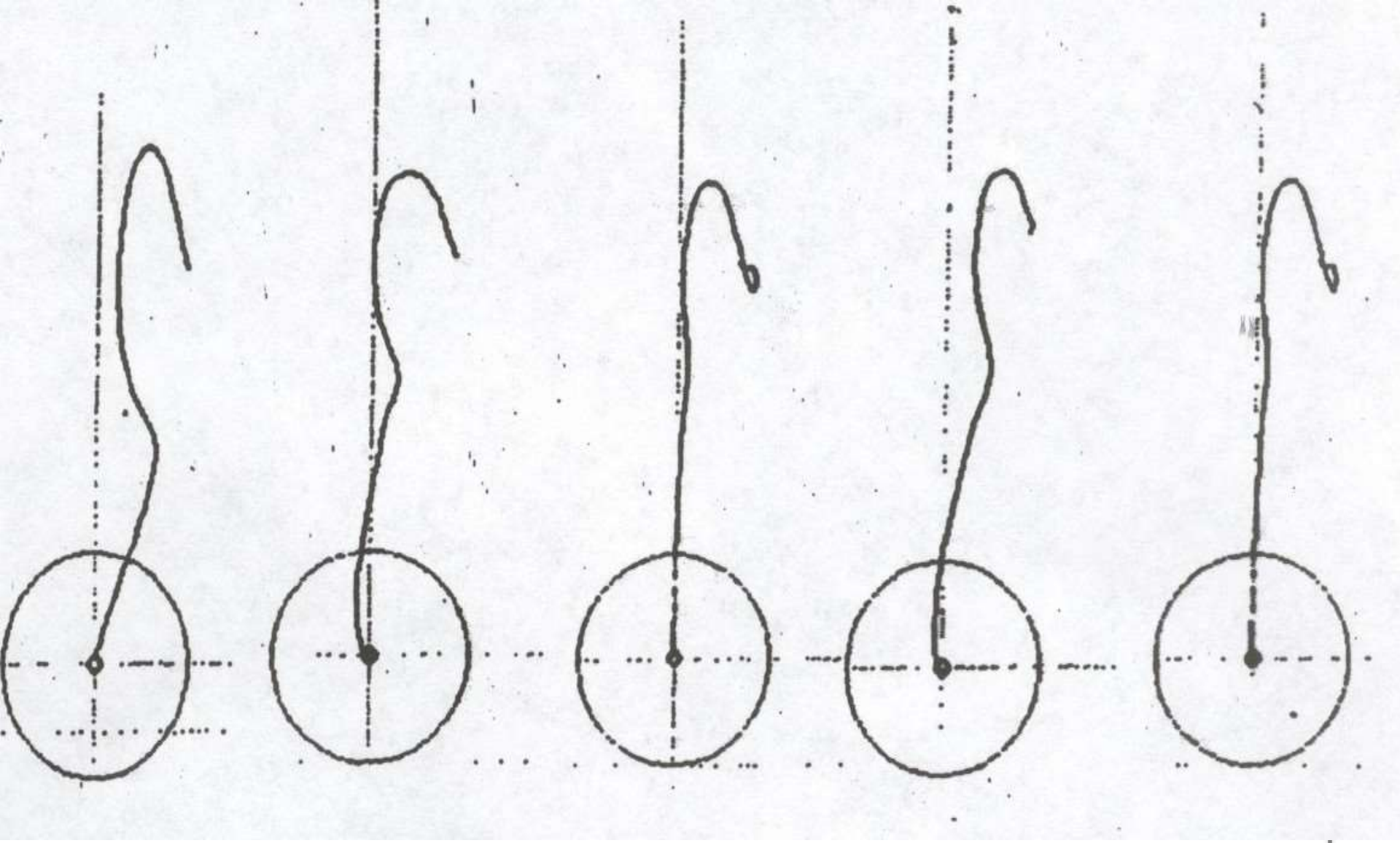

Snatch Velocity Profile of Cheryl Haworth's 3 for 3 Performance
@ the '07 National Championships
Bar Velocity (m/s)
Time (sec)
125 kg
122 kg
118 kg

Norik Vardanian: 151kg National Jr. Record

Acknowledgements to TRACY FOBER

Velocity Profile of Norik Vardanian's 3 for 3 Snatch Performance and 151 kg Junior American Record @ the '07 National Championships

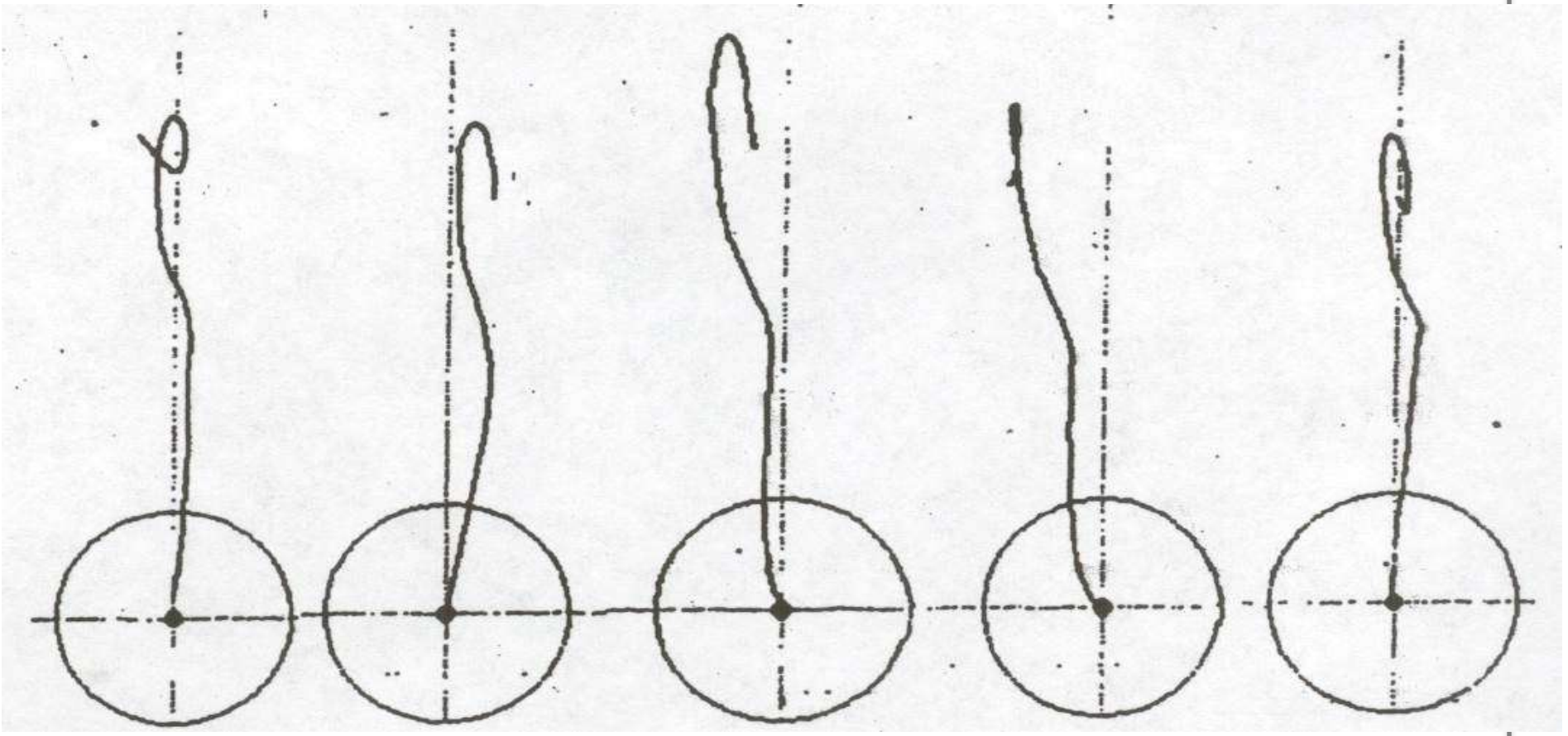




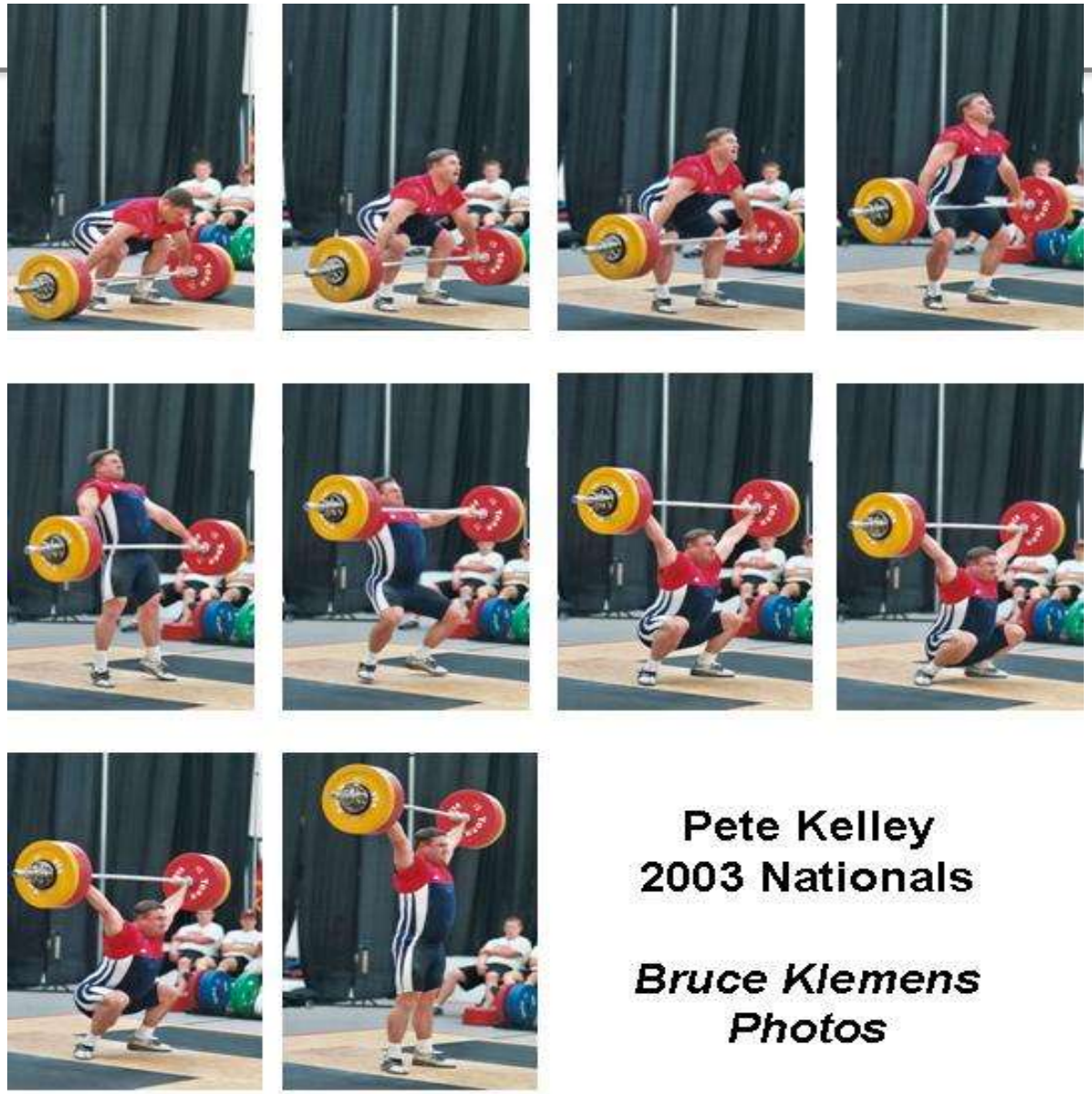
Canadian Hungarian Ukrainian Armenian
Russian

Accepted Barbell Trajectories

Pulling Styles of American Weightlifters



Snatch Sequence

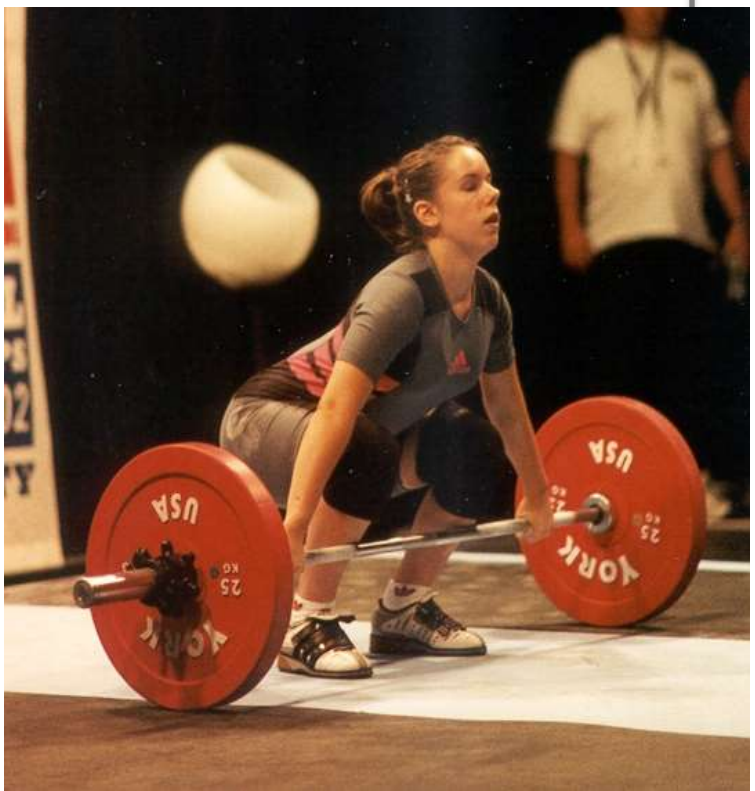


Pete Kelley
2003 Nationals

Bruce Klemens
Photos

Starting Position

- **All Body Levers Are "Tight"**
- **Feet Slightly Turned Out and in the "Vertical Jump" Position (MP Joint underneath the barbell)**
- **Athlete should *feel* their weight on the middle of their feet (Flat-footed)**
- **The Back Is "Flat" and Even Concave**
- **Arms Are Straight and the Elbows Are Out**
- **The Head Is Up and the Eyes Are Focused Straight Ahead**
- **The Hips Are Higher Than the Knees**
- **The Shoulders Are In Advance of the Barbell with knees and elbows in the same plane**



The 1st Pull:

- **The Barbell Moves Back Towards the Athlete**
- **Knees Straighten**
- **The Hips and Shoulders Rise at the Same Time**
- **The Head Stays in a Level Position**
- **If the lifter stays flat-footed during the 1st pull when the barbell 'clears' the knees the knees will re-bend anatomically and place the lifter in the proper position for the second pull.**
-

The 2nd Pull:

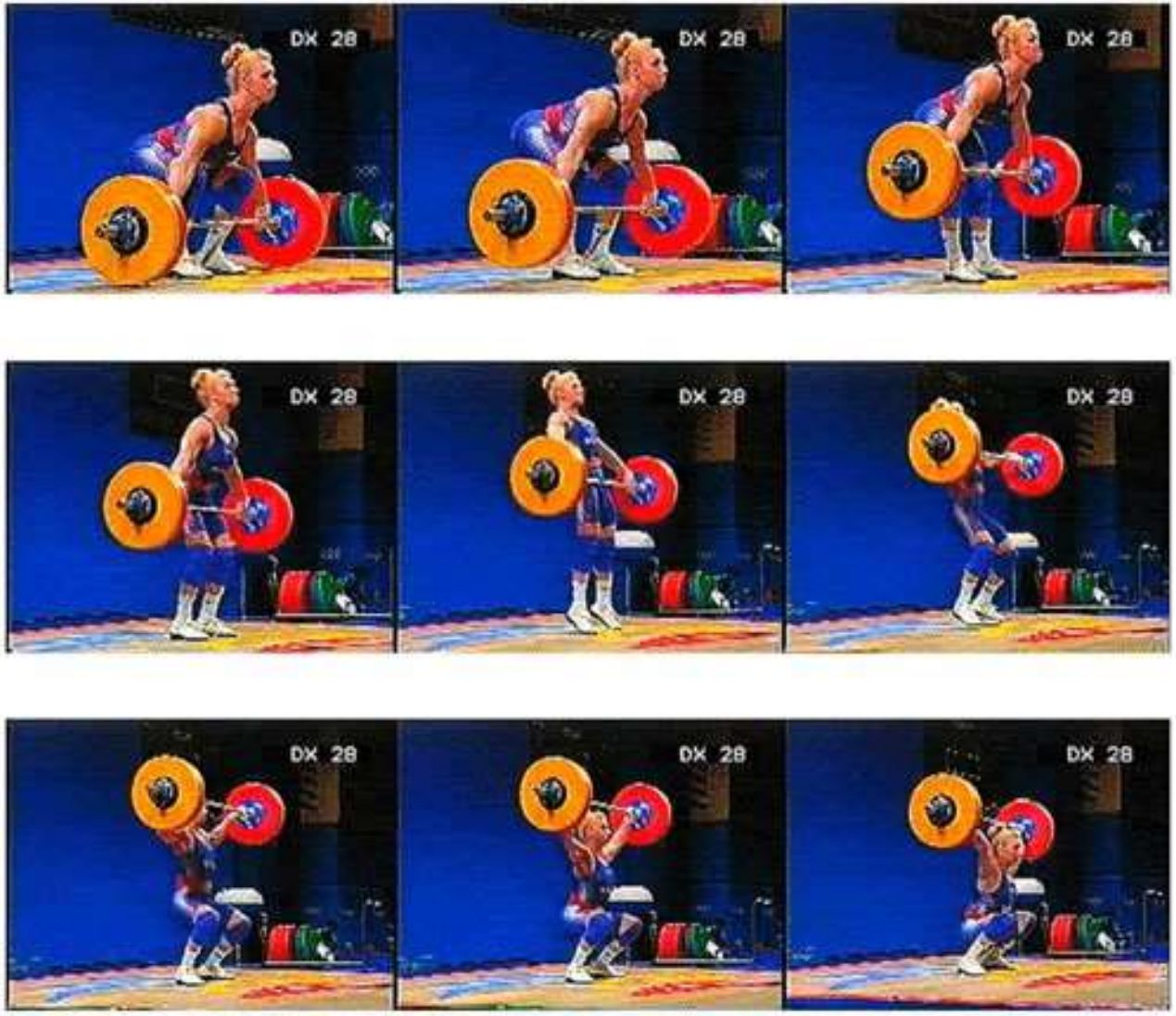
- **The Athlete stays "Flat-footed" until they feel the barbell "brush" their thighs**
- **The Head stays in a neutral position**
- **The athlete 'Shrugs" to a vertical position**
- **The 2nd Pull Must Be Faster Than the 1st Pull**
- **When the second pull is faster than the 1st pull there is less horizontal displacement which allows for a more effective 3rd pull**

The 3rd Pull:

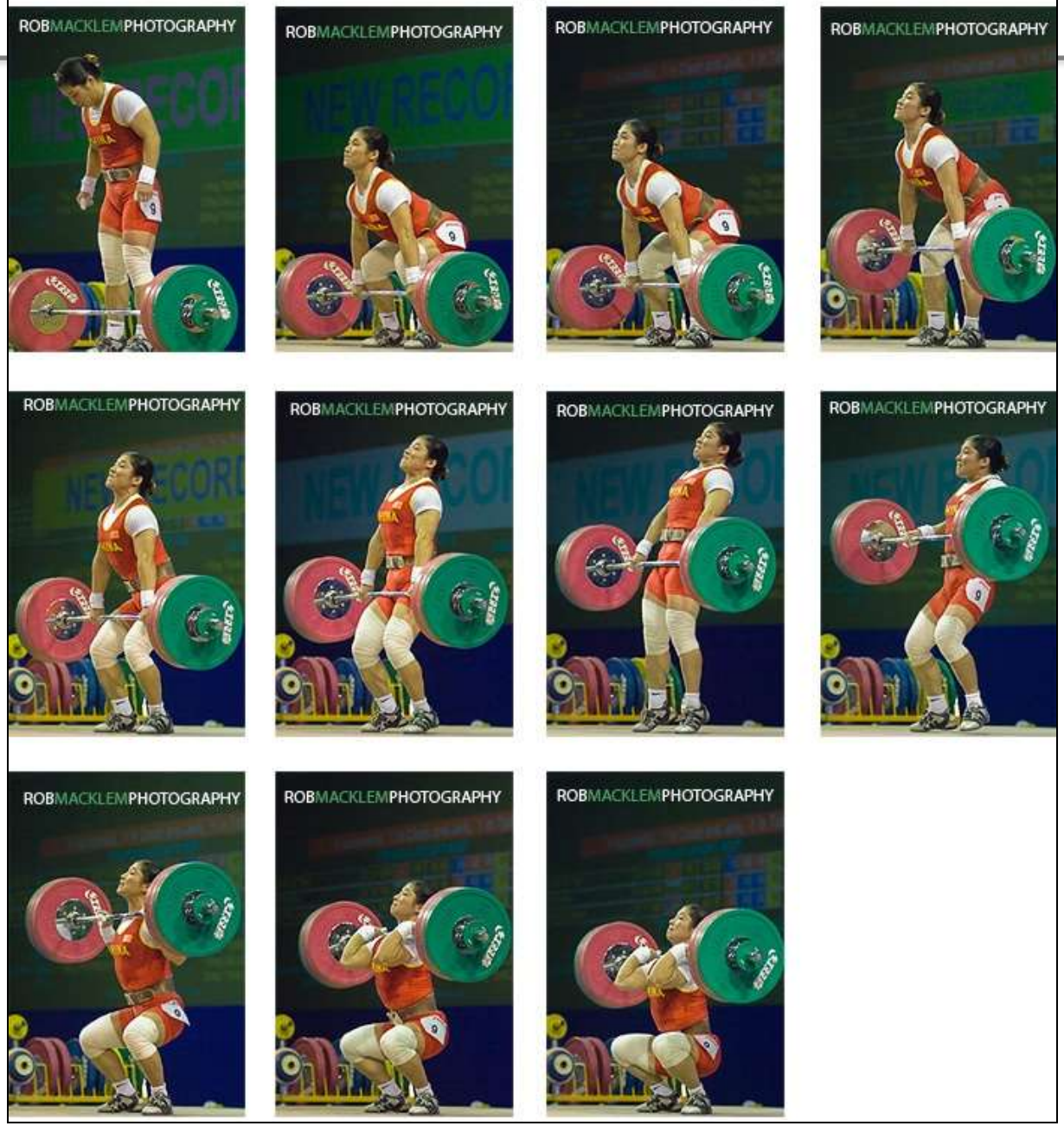
- **The PULL UNDER**
- **The Arms Bend Only To Pull the Athlete Under the Bar**
- **The Feet Move From a Pulling Position To a Receiving Position**
- **(Which should be the same position that they squat in.)**

Analysis of Snatch Lift

Pulling Under

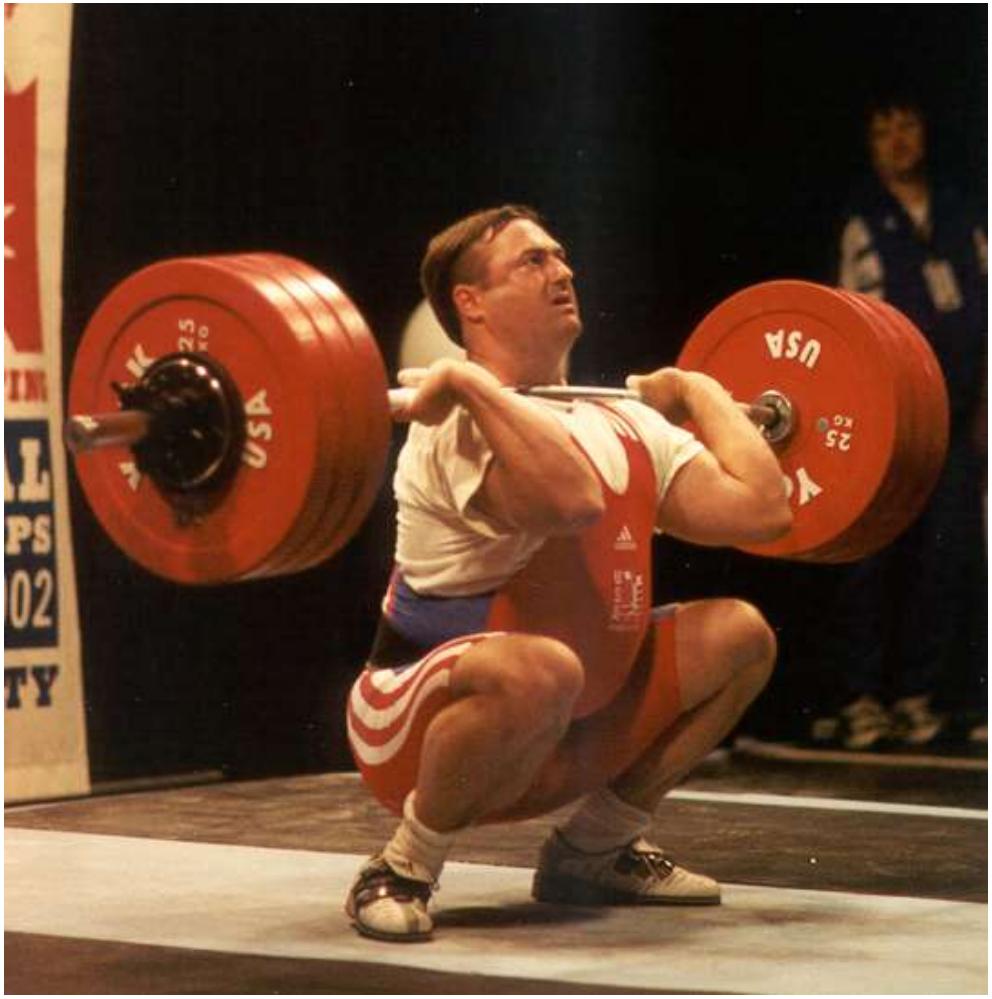


Haixia LIU China 63kg 142kg



Clean Sequence

The Clean

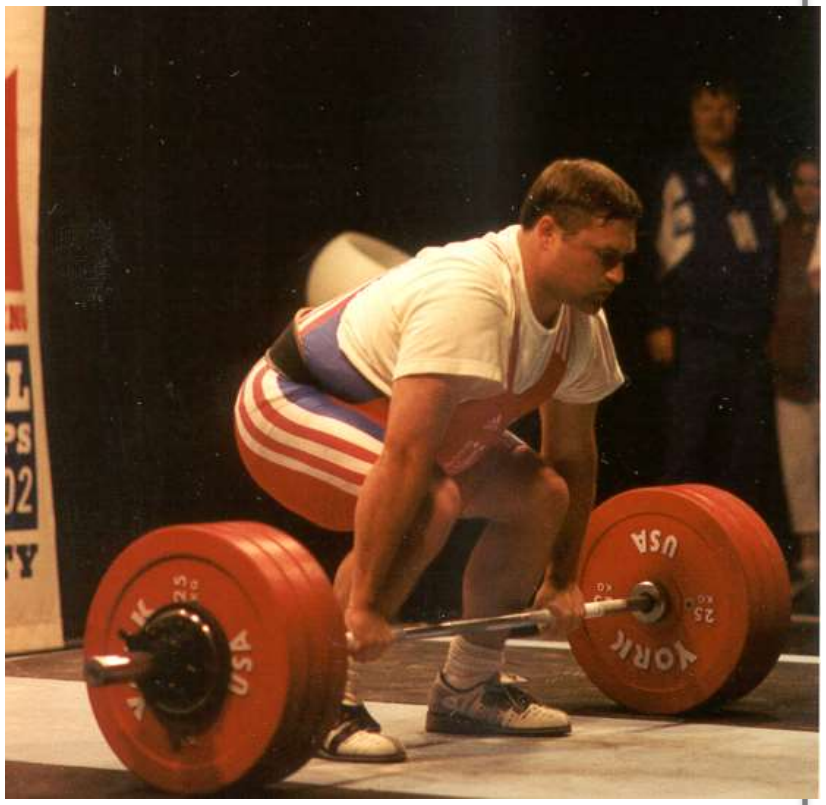


Start Position

- Feet in “Vertical Jump” position with toes turned out slightly
- Back flat
- Hips higher than the knees
- Arms straight and elbows out
- Elbows and Knees in same ‘plane’ (toes under barbell)
- Head position: neutral

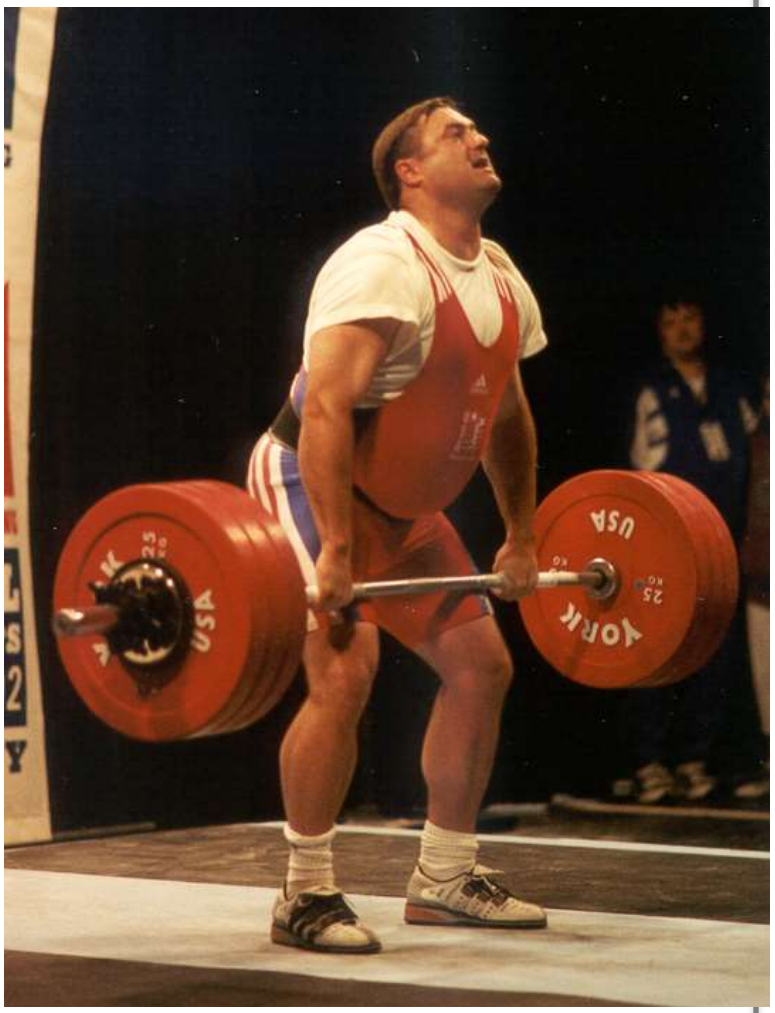
The ‘grip’ is in the ‘rotational’ position. (A position that allows the elbows to come ‘up and through’ and ‘rack’ the barbell on the clavicles with the hands just outside the deltoids)

- **Alignment and Center Of Gravity**
  - **When the athlete 'sets up' The horizontal distance from their buttocks to their nose establishes the original COG.**
  - **The barbell MUST stay inside this original COG during the entire movement**

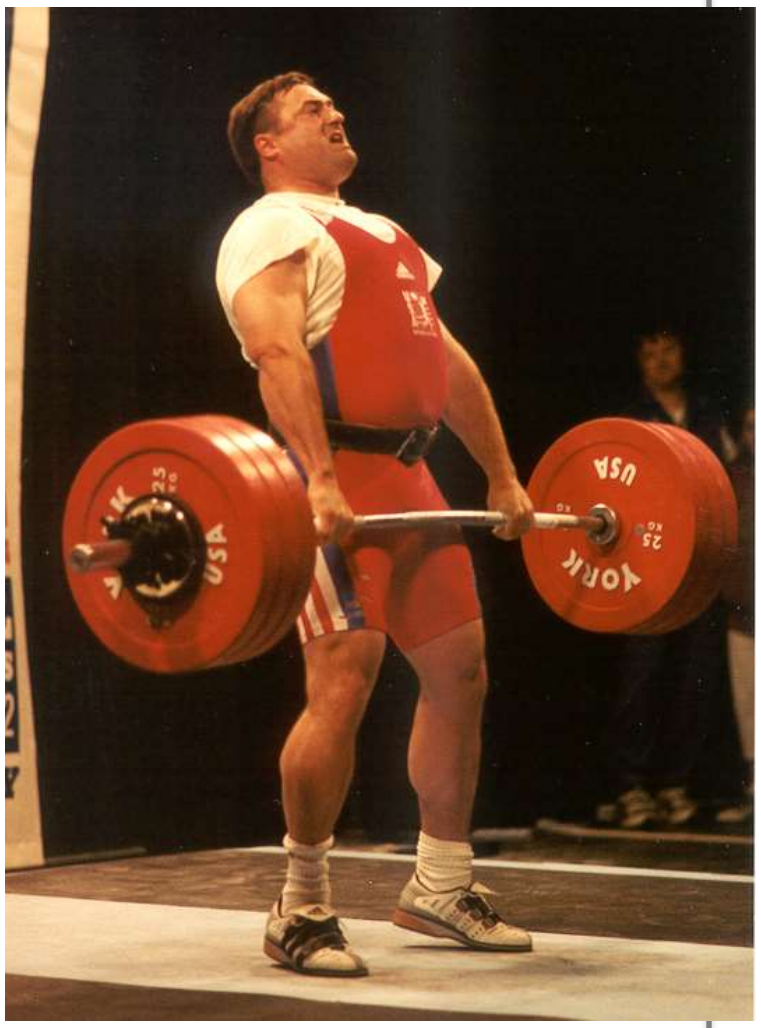


- **First Pull:**
- **(Controlled Speed)**
  - **Legs begin to extend**
  - **Feet stay “flat” on the ground**
  - **Barbell moves ‘back’ towards the lifter**
  - **Hips and shoulders rise at the same rate**
  - **Head position: neutral**
  - **Elbows stay ‘long and locked’**

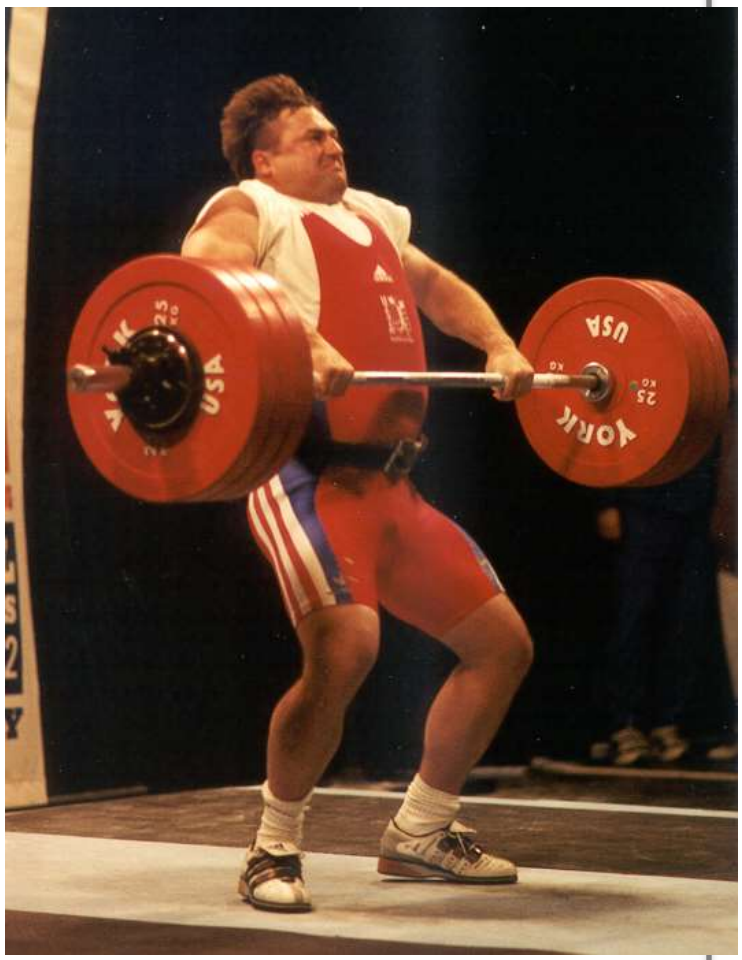
- **Second Pull:**
- **Faster than 1st Pull**
  - **Athlete is still “Flat-footed”**
  - **Bar remains close to body**
  - **Bar will be high on thigh or lower abdomen**
  - **Elbows still ‘long and locked’**



- **The Triple Extension and Power Shrug**
  - **Ankle, knees and hips in full extension**
  - **Bar remains close to body**
  - **Elbows “Still” long and locked**
  - **At the end of the triple extension athlete shrugs ‘traps’. (Shoulders into ears)**

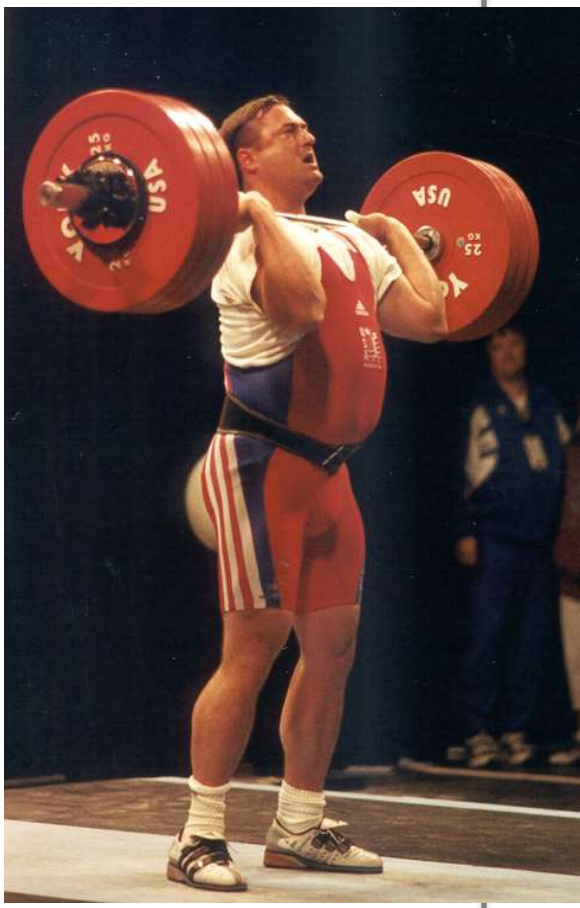


- **Moving Under the Bar**
  - ***Elbows only bend to pull the athlete under the barbell. They NEVER bend to pull to the barbell up.***
  - **Feet move from "Pulling" position into "Receiving" position.**
  - **NOTE: Proper receiving position is the athletes "Squat" position**



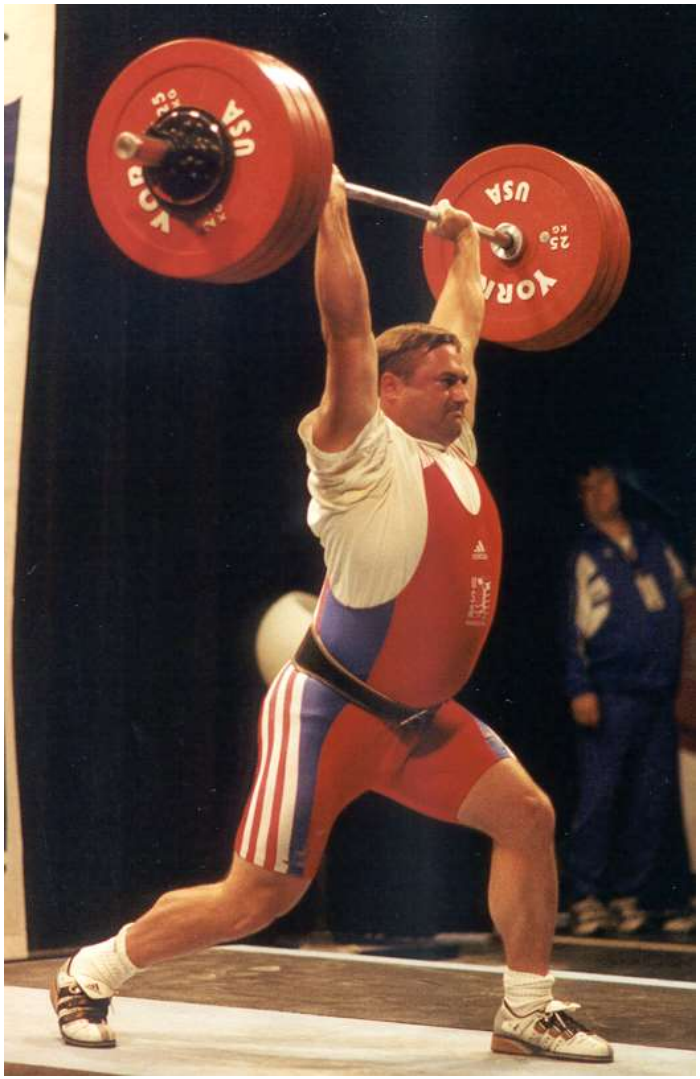
- **The Receiving Position**
  - **Elbows up and Through**
  - **“Pop the Lock”**
  - **Barbell stays inside the original COG throughout the entire movement.**

- **The Recovery**
  - **Drive forcefully out of the receiving position**
  - **Keep Elbows up and back ‘tight’**

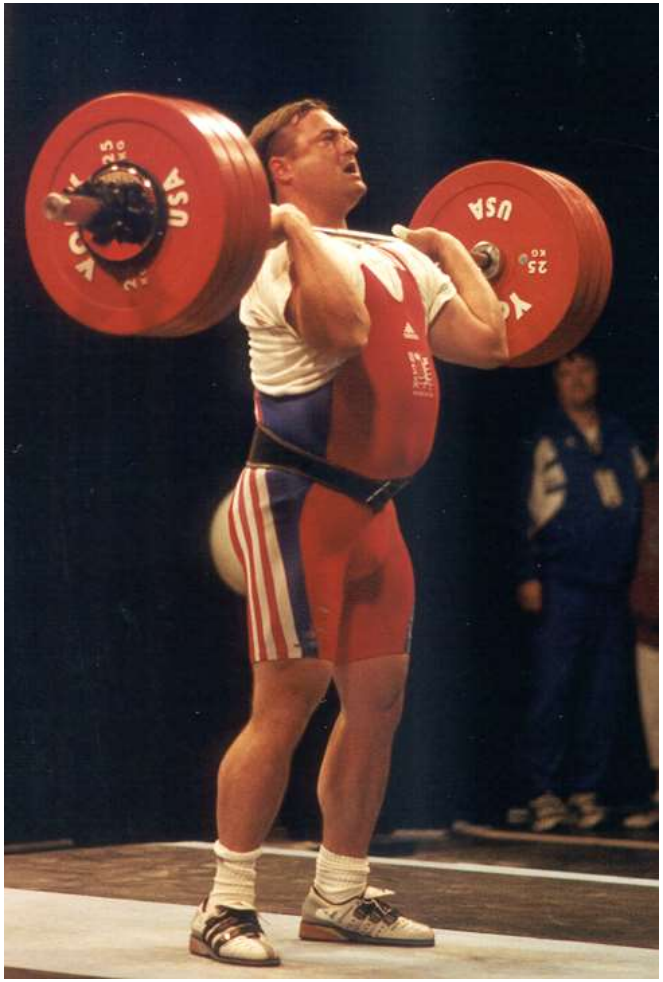


Jerk sequence

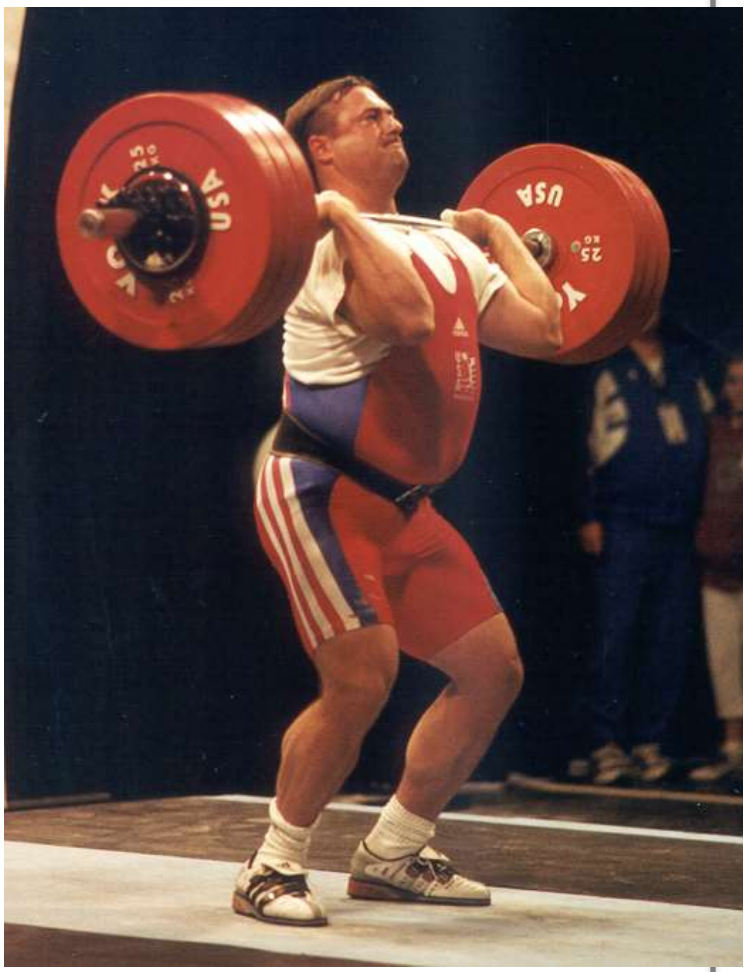
The Jerk



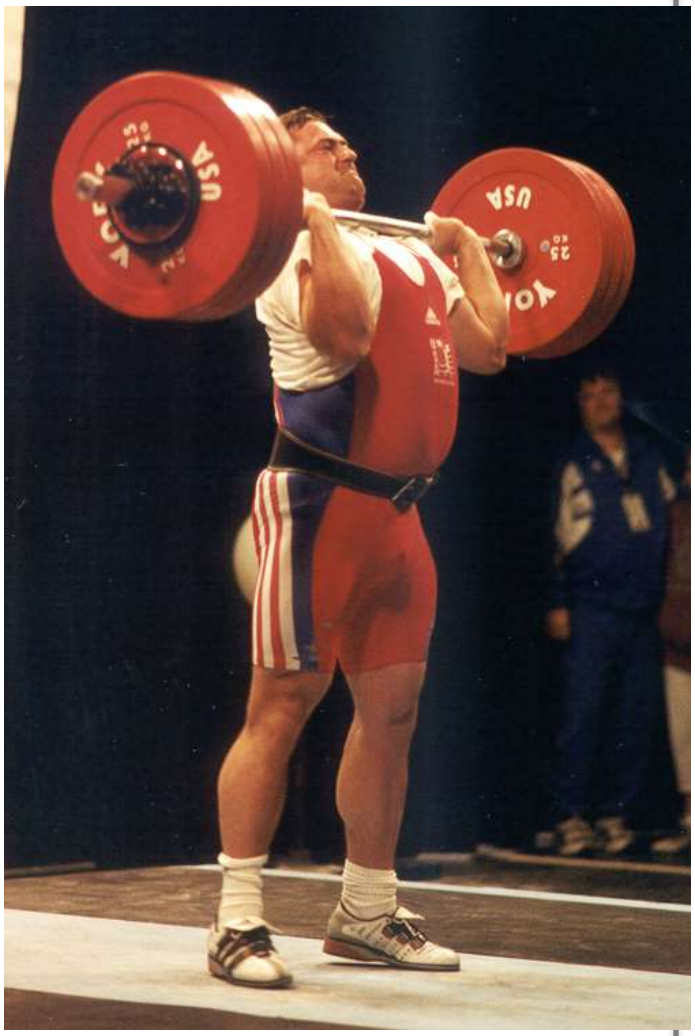
- Setting to Jerk
  - Weight toward the heels
  - Chest and elbows elevated
  - Grip is relaxed
  - Head position is neutral



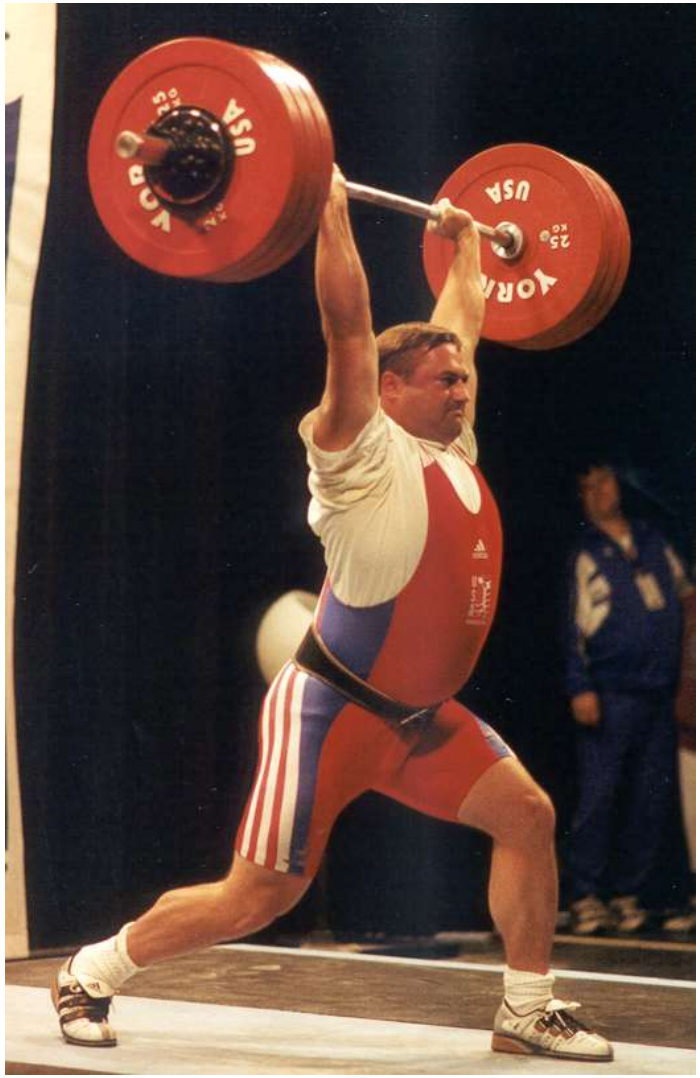
- The Dip
  - Short straight and explosive
  - Weight is on the heels
  - Chest and elbows still elevated



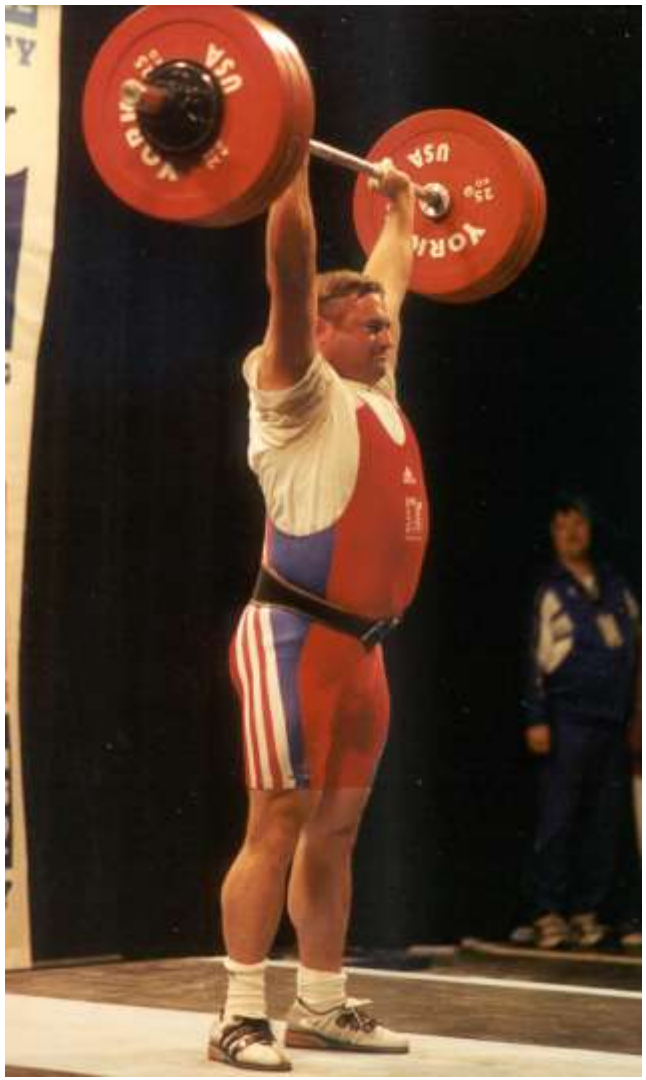
- The Drive
  - As soon as the athlete dips and feels flat-footed they should drive upward using Maximal leg drive
  - The arms are still
  - The head is neutral



- The Receiving Position
- The athlete must *Step through the jerk*
  - The Split. The legs move both fore and aft and equal distance
  - The front foot lands flat with the knee behind the toe. (Proper distance is one and one half shoe lengths from the starting position
  - The back foot lands on the ball of the foot with a slight bend in the knee
  - The barbell is supported on the joints directly overhead



- The Finishing Position
  - Control the weight
  - Foot alignment. The athlete recovers front foot back first (a half step), then the rear foot forward, a half step



Basic Weightlifting Exercises

Athlete Quadrants

Athletes will pass through all quadrants

A **Acquisition** **What are the skills the athlete needs to know?**	**B** **Application** **Can the athlete successfully complete these skills?**
C **Assimilation** **Can the athlete successfully complete these skills routinely and automatically?**	**D** **Adaptation** **Can the athlete successfully complete theses skills routinely and automatically in a unique situation? (Competition)**

The “top/down” approach to teaching the Olympic movements

Studies have shown that the most difficult ‘skill’ for a weightlifter to acquire is that of the initial moving of the barbell from the platform. Getting the hips and shoulders to rise at the same rate is the main challenge. However once the barbell is above knee height the hips and shoulders move together, anatomically.

- **The ‘top/down’ method of teaching allows the athlete to acquire the skills needed to be successful from the floor while getting the benefit of the triple extension, immediately.**

Snatch and Snatch Related Exercises

1. *Overhead Squat*
2. *Pressing Snatch Balance*
3. *Heaving Snatch Balance*
4. *Snatch Balance*
5. *Power Snatch*
    a. *Power Position*
    b. *Hang Above Knee*
    c. *Hang Below Knee*
    d. *Lift Off*
    e. *Floor*

Clean & Clean Related Exercises:

1. Front Squat

2. Power Clean

- ***a. Power Position***
- ***b. Hang Above Knee***
- ***c. Hang Below Knee***
- ***d. Lift Off***
- ***e. Floor***

Jerk and Jerk Related Exercises

Press

Push Press

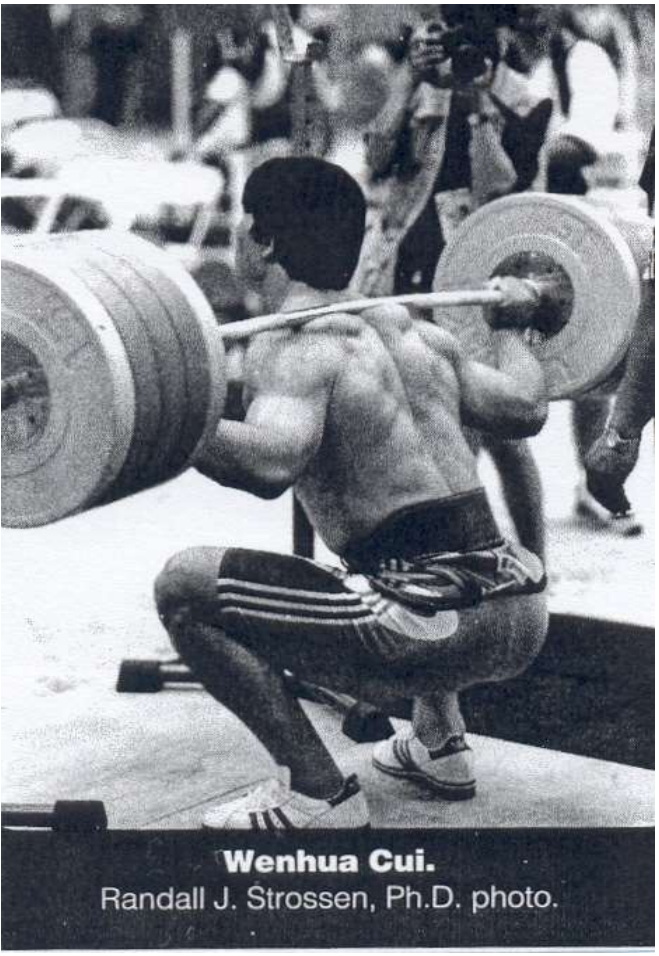
Push Jerk

Foot Work Drills

Split Jerk

The “why” of Full Squats: Bill Starr

It must be noted that it is critical for any athlete to go below the parallel position when he squats. For the weekend athlete, going low may not be important, but for any athlete, it is an absolute must.

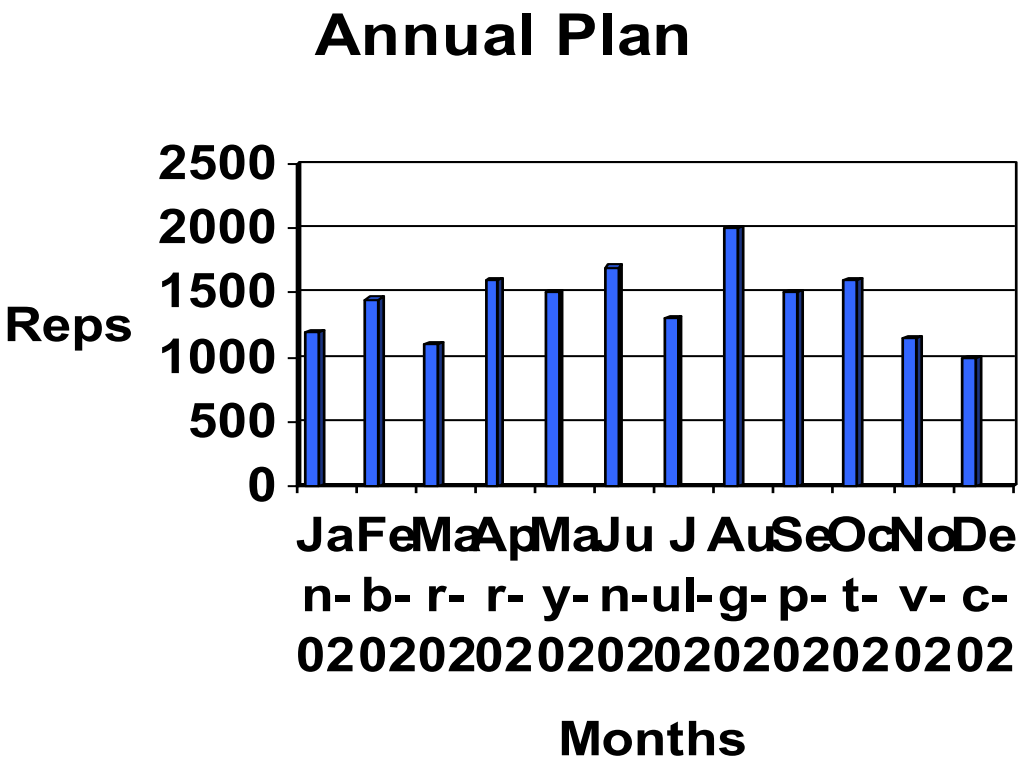


Wenhua Cui.
Randall J. Strossen, Ph.D. photo.

Two reasons justify this statement. When an athlete does partial squats, most of the work is being done by the quads. This is good, but only up to a point for if his quads continue to grow stronger and stronger while the corresponding muscle groups are allowed to fall further and further behind, there will be a problem with disproportionate strength. Partial Squats neglect the muscles of the hips, adductors and hamstrings. If any of these groups fall too far behind, strengthwise, there will either be an injury or all progress will come to a grinding halt.

Partial squats are not recommended for another significant consideration. When an athlete stops his squat above parallel, his knee joints are forced to halt the downward momentum. But once the athlete does break the parallel position, even slightly, that stress is transferred to the more powerful groups in the hips, lumbars, adductors and hamstrings. By the same token full range motion squats keeps all these groups proportionately strong, a critical consideration for any athlete."

Program Design



Program Goals

- Improve Performance
- Reduce Injury (rate and intensity)
- Refine Technique
- Increase work capacity

Programming of Training

- Training Programs Are Regimens of Stress
- Training Effect Produced When the Body/ Organism Adapts to a Given Stress
- To Produce Improvement, the Stress Must Be Systematically Increased to Produce Systematic Adaptation
- This is the Basic Principle of Progressive Overload

Training Program Stress

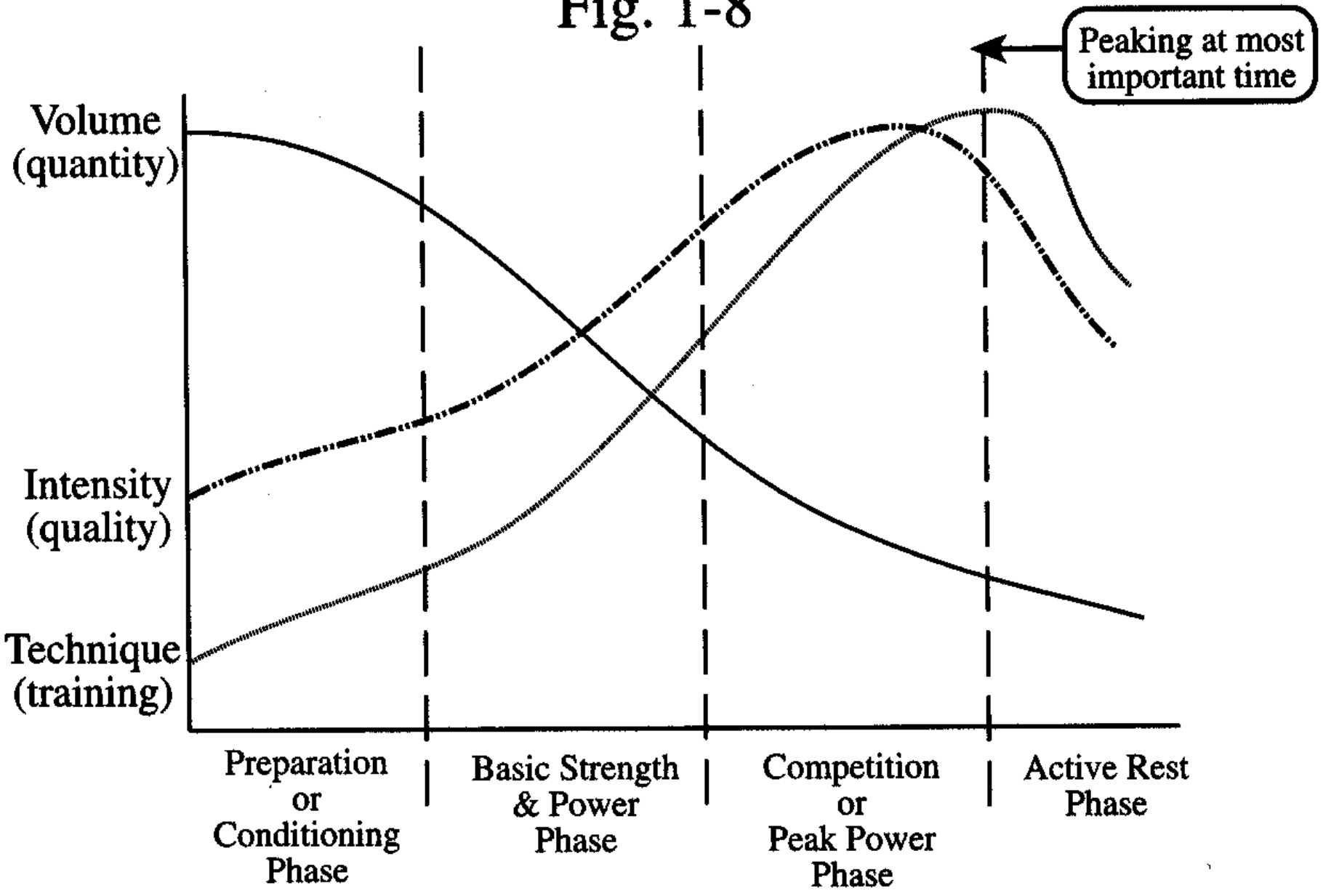
- Three Types
  - Too little stress- no adaptation- NO PROGRESS
  - Too much stress- overwhelms adaptation- NO PROGRESS/ INJURY
  - Optimum stress- progressive adaptation- ONGOING PROGRESS

Matveyev's Principle

As Volume Increases Over Time, Intensity Decreases and Vice-Versa

MATVEYEV'S MODEL OF PERIODIZATION

Fig. 1-8



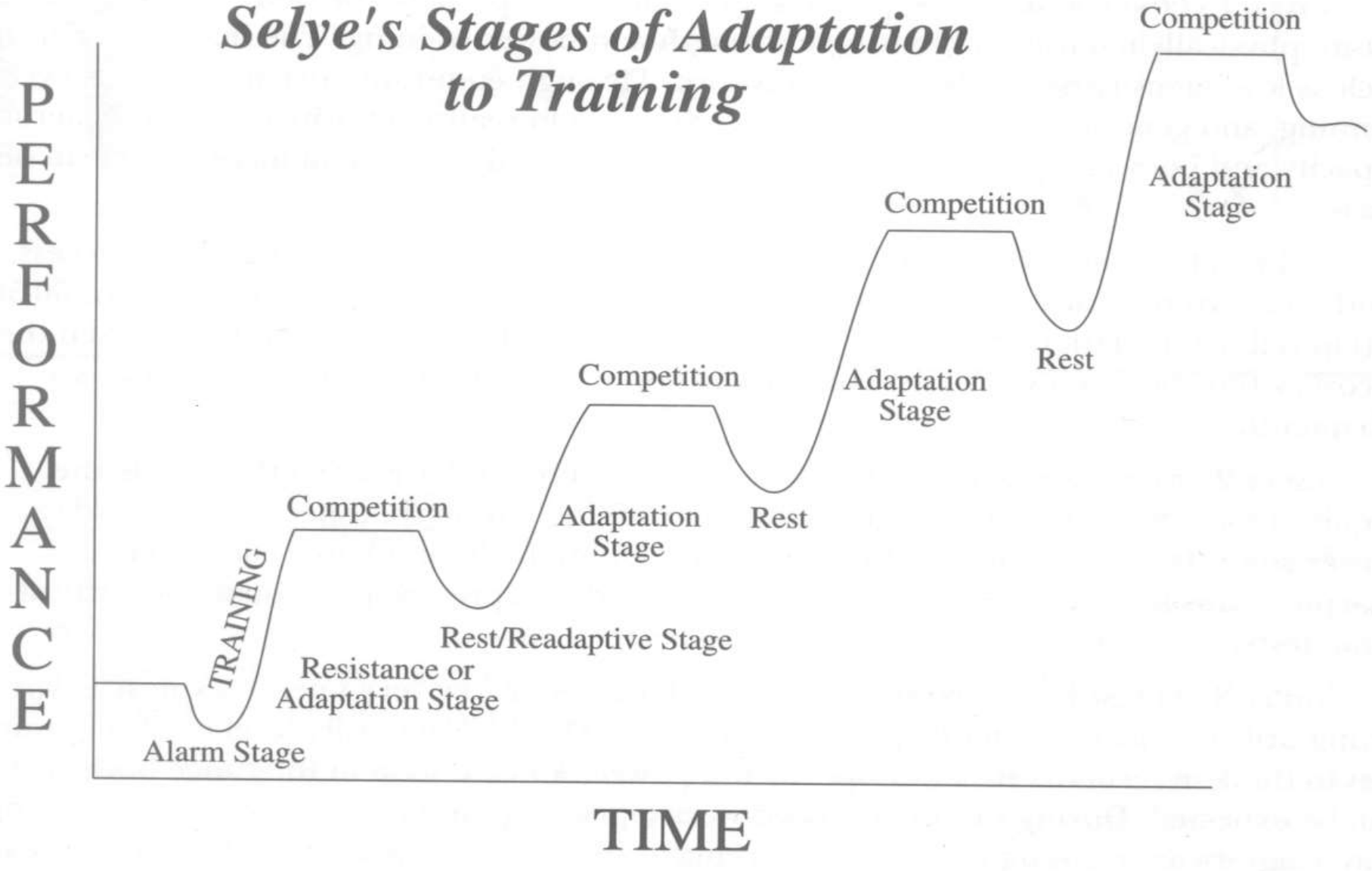

Selye's Stages of Adaptation to Training
PERFORMANCE
TIME
Alarm Stage
TRAINING
Resistance or Adaptation Stage
Competition
Rest/Readaptive Stage
Adaptation Stage
Competition
Rest
Adaptation Stage
Competition
Rest
Adaptation Stage
Competition

Fig. 1-7

Progressive Overload

- Systematic Increase of Training Load, Over Time, In Accordance With the Individual's Capacity
- Goal is Improved Performance Over an Extended Period
- Increases in Performance = Long Periods of Training and Adaptation
- Workload Continuously Increases from Beginner to Elite Athlete

Repetitions and Sets

- Dependent Upon Intensity and Lift Being Performed
- The Higher the Intensity, the Lower the Number of Repetitions Per Set
- Also, Higher Skill/ Multiple Joint Movement Lifts Demand Lower Repetitions Per Set

Principles for the Daily Program

- Always Warm-up Thoroughly
- High Skill Level Lifts Early in the Training Session
- High Skill, Faster Movements Before Slower, Strength Movements
- Partial Movement Exercises Are Performed at the End of the Training Session
- Try to Alternate Pushing and Pulling Movements
- Try to Include All Qualities in the Workout
- Combine Exercises to Expedite the Workout
- Beginners Should Have More Variety

Beginners Training Program

- 1 RM Is Not Known
- Adaptive Abilities to Stress Are Not Known

- Guidelines
  - Stress high skill/ multiple joint movement exercises with lighter weights
  - Incorporate some lower skill/ large muscle group exercises with higher repetitions (6-10 repetitions)

Beginners Progression

- High Skill Movements
  - Increase resistance each set until athlete's technique starts to breakdown
- Lower Skill Strength Movements
  - Increase resistance each set until the last repetition is challenging

Alphabetical Categorization

- “A” Movements Are Power and Power Related Movements
- “B” Movements Are Leg Strengthening and All Pulling Movements
- “C” Movements Are All Assistance Exercises

Examples of Exercises Using Alphabetical Categorization

Monday

1.	Warm up/ stretching	5- 10 minutes
2.	Medicine ball throws	Dynamic warm-up
3.	Power clean	"A"
4.	Push press behind neck- clean grip	"A"
5.	Front squat	"B"
6.	Clean pull	"B"
7.	Upper body strength exercise	"C"
8.	Abdominal/ low back exercises	"C"
9.	Stretching and mobility	

Examples of Exercises Using Alphabetical Categorization

Wednesday

1.	Warm up/ stretching	5- 10 minutes
2.	Medicine ball throws	Dynamic warm-up
3.	Power snatch	“A”
4.	Push press behind neck- snatch grip	“A”
5.	Back squat	“B”
6.	Snatch pull- below knee	“B”
7.	Upper body strength exercise	“C”
8.	Abdominal/ low back exercises	“C”
9.	Stretching and mobility	

Examples of Exercises Using Alphabetical Categorization

Friday

1.	Warm up/ stretching	5- 10 minutes
2.	Medicine ball throws	Dynamic warm-up
3.	Power clean + front squat	"A"
4.	Push press from chest	"A"
5.	Lunges	"B"
6.	RDL	"B"
7.	Upper body strength exercise	"C"
8.	Abdominal/ low back exercises	"C"
9.	Stretching and mobility	

Supercompsenation Training

Ivan Beritov 1959,

"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.

Practice is important to improve performance, but the focus should be on the quality rather than on the quantity of training.

"Under recovery is the precursor/cause of overtraining.

Consequently, the key to prevent overtraining is an active and proactive enhancement of recovery. Supercompensation Training has *built in* recovery periods

In general, overtraining is described as *an imbalance between training and recovery* (Kuipers & Keizer, 1988). However, according to Lehmann and colleagues (Lehmann et al., 1999), overtraining is due to an *imbalance between stress and recovery*, that is, too much stress combined with too little regeneration. Both descriptions sound similar, but the definition by Lehmann and colleagues explicitly asserts that stress includes all training, competition, and additional *non-training stress factors*. Social, educational, occupational, economical, nutritional, and travel factors; time stress; and the monotony of training act to increase the risk of developing an overtraining syndrome.

3 Phases of Supercompensation

- Cycle One
  - Hypertrophy Training (Off-Season)
- Cycle Two
  - Strength and Power Training (Pre-Season)
- Cycle Three
  - Maintenance Training (In Season)
  - Competition Training if Weightlifting

Examples of actual Supercompensation Training

Cycle One

Cycle Two

Cycle Three

In Season