USA WEIGHTLIFTING  
MISSION STATEMENT

“The Mission of USA Weightlifting shall be to enable United States athletes to achieve sustained competitive excellence in Olympic competition and to promote and grow the sport of weightlifting in the United States.”

Goals & Objectives:

Participants will:

- Learn how to teach and perform the Snatch and Clean & Jerk
- Learn how to teach and perform the Power Snatch, Power Clean and variations
- Learn how to teach and perform related Squatting variations, pulling variations and overhead pressing variations
- Learn how to evaluate and correct movement deficiencies that may inhibit weightlifting mechanics
- Learn basic programming for beginner and intermediate athletes
- Learn basic biomechanics and key positions of weightlifting technique
- Learn rationale for incorporating weightlifting movements in sports performance training programs

Two Sections in the course:

1. Understanding and Preparing for Weightlifting: Learn more about the sport of weightlifting and its uses in athletic preparation and general fitness, and learn some simple strategies to better individually prepare athletes to perform the movements.
2. Learning the technique of weightlifting and related movements.

- Approximately ¾ of the course will be “hands-on” weightlifting work
- A written exam will be administered at the conclusion of the course; 75% correct answers required to pass
Section 1: Understanding and Preparing for Weightlifting

Uses for Olympic Weightlifting:
1. Competitive Sport
2. Strength & Conditioning / Functional Fitness

Weightlifting the Sport
- Weightlifting is the only barbell sport in the Olympic Games.
- Weightlifting has been part of the modern Olympic Games since 1896.
- There are regional, national, and international competitive opportunities.
- 8 weight classes for men and 7 for women make it non-size restrictive.
- Weightlifting is a lifetime sport. There are age divisions from u-13 to 80+
Rationale for use of Olympic Weightlifting in training for Sport Performance:

- Ground Based – Create force by driving against ground; triple extension
- Time Efficient – 1 exercise works multiple muscle groups.
- Full Body Development
  - Develops Kinesthetic awareness
  - Increases Muscle Fiber Diameter (Hypertrophy)
  - Increases Neural adaptations:
    - Improved Intramuscular Coordination (Recruitment and Frequency Coding)
    - Improved Intermuscular Coordination (Synchronization)
- Efficient way to train the “core” in healthy population

Activity of the trunk muscles during squats and pulls from the floor (dead lifts) is greater or equal to that produced with many common stability ball exercises.

Power Development – based on work of John Garhammer PhD

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Absolute Power (Watts)</th>
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<tr>
<td>100kg Male</td>
<td>75kg Female</td>
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<tr>
<td>Bench Press</td>
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<tr>
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<td>3000 1750</td>
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<tr>
<td>2nd Pull**</td>
<td>5500 2900</td>
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<tr>
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<td>2950 1750</td>
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<tr>
<td>2nd Pull</td>
<td>5500 2650</td>
</tr>
<tr>
<td>Jerk</td>
<td>5400 2600</td>
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</tbody>
</table>

*Total pull: Lift-off until maximal vertical velocity

**2nd pull: Transition until maximal vertical barbell velocity
Functional Movements that require and promote flexibility:

- Ankle
- Hips
- Spine
- Shoulders

Primary Multi-joint movements in every rep:

- Dead lifting
- Squatting
- Overhead Pressing
- Rowing
- Jumping

Functional Stability:

- Ability to receive a load in strong position
- High Pull vs. “catching”

Safety in Weightlifting
Sports Injuries
Per 100 participant hours in school sports

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Personal Safety

- Correct Footwear
- Correct Clothing
- Safe, Efficient Technique
- No Horseplay
- Be Aware of Others
- Use Spotters When Appropriate
- Hand Care
- Discourage Limit Attempts too often and with beginners

Personal Safety con’t

- Ice
- Warm-up, Stretching and Cool-down
- “Miss” Correctly
- Drop Barbell in Controlled Manner
- Discourage Training Alone with beginners
- Follow Planned Program
- Low Resistance When Learning New Skills
- Avoid Big Jumps
- Individual Progression
Equipment/ Organizational Safety

- Ensure Platforms, Barbells etc. Are Well Spaced Out
- Ensure Lifting Surfaces Are Non-stick and not slick
- Ensure Barbells Are Loaded Correctly and Evenly
- Ensure All Equipment is Stable
- Adequate Chalk
- Clean Lifting Areas
- Ensure That Bars Are Straight and Revolve

Individualism:

- Insure enough mobility to minimize injury.
- Insure enough mobility to achieve proper technical positions.
- Insure enough mobility to minimize "movement pattern overload" once training begins.
- Insure no previous conditions that contraindicate weightlifting training.

Safety con't: Evaluating Readiness for Weightlifting

1. **Questionnaire:**
   - Look for injuries or problems especially in shoulders, back, and knee.

2. **Mobility: (minimum assessment)**
   - Overhead Squat – ankles, hips, shoulders
   - Straight Leg Raise – hamstring flexibility
   - Front Squat (receiving position) – wrists, upper back
   - Upright row w/stick - shoulders

(for comprehensive assessment we recommend: Gray Cook’s Functional Movement Screen)
Overhead Squat: (dowel)

Description:
- Feet approximately shoulder width or slightly greater;
- Hands on dowel, elbows 90 degree angle when stick touches head;
- Press arms overhead;
- Squat as low as possible keeping heels on floor, dowel fully extended over ears, and torso as straight as possible
- If athlete cannot squat below parallel, raise heels on 2” board

Assessment:
- Stick forward = restriction in lats, pecs, thoracic spine
- Not below parallel = tight hips, or ankles (does tibia angle change?)
- If raising heels corrects = tight achilles, gastrocs

Overhead Squat:

Start Position Example of Good Position
**Straight Leg Raise: (dowel)**

**Description**
- Lye supine, head flat, arms at sides;
- Lift the test leg maximally while flexing ankle and keeping hips neutral on floor;
- Drop stick from ankle straight down to point on opposite leg;

**Assessment**
- Stick between mid-knee and ankle = poor
- Stick between mid-knee and mid thigh = pass
- Stick between mid-knee and hips = excellent
Front Squat: (receiving position – light bar)

Description
• Hands on bar just wider than shoulder width;
• Rotate elbows, place bar above clavicle, on shoulders;
• Squat as low as possible while keeping bar on shoulders, elbows parallel to floor, and fingers on bar;

Assessment
• Fingers pop off bar = restriction in wrists, forearms
• Elbows Drop = restriction in lats, pecs, thoracic spine
• Note: lower body assessment already complete from OH Squat
Upright Row with Stick

Description:

- Grasp dowel with overhand grip, hands just wider than thighs;
- Pull bar up towards chest;
- Try to keep elbows over the bar while raising bar as high as possible;

Assessment:

- If elbows rotate behind the bar before the stick gets to the bottom of sternum, improve flexibility in shoulder internal rotation.
Warm-up and Flexibility

General Warm-up
Specific Warm-up

General Warm-up

- Exercising the major muscle groups of the body under light or minimal loading through large ranges of motion

Physiological Aspects
- Increased rate and strength of muscle contraction
- Increased muscle coordination through related movements
- Increased range of motion
- Increased cardiovascular and respiratory efficiency
- Reduced risk of injury
- Increased metabolic rate
- Increased work capacity
- Preparation for specific warm-up/corrections
- Psychological benefits
General Warm-up Examples

Jumping Jacks
Arm Circles
Leg Swings
Lateral Lunge

Specific Warm-up:
- Prescribed according to individual problems found on evaluation
  - Foam Rolling of identified areas: 1-2 sets 10-20 reps
  - Specific ROM exercises for identified areas
    - AIS (Active Isolated Stretching), and PNF (contract-relax) techniques “pre-training”: 1-2 sets 10 reps w/3 sec holds or 1 set of 3-5 contract/relax sets
Specific Warm-up cont:
Correcting Tight Lats:

- Foam Roll 1-2 x 10-20 reps
- AIS 1-2 x 10 reps, 3 sec hold

Correcting Shoulder Internal Rotation:
Sleeper Stretch

Specific Warm-up cont:
Correcting Tight Wrists:

- 1-2 sets x 10 reps, 3 sec holds
Specific Warm-up cont:
Correcting Tight Pecs;

Increasing Thoracic Extension

Specific Warm-up cont:
Correcting Tight Achilles/Gastrocs;

Correcting Tight Piriformis:
Specific Warm-up cont:
Correcting Tight Quads/psoas;

Correcting Tight hamstrings:

Section 2:
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
  - Trajectory
    - Triple Extension

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
  - Swinging the bar
  - Weight Distribution During Jerk
- Move the body around the bar, not vice-versa
Snatch Sequence

Pete Kelley
2003 Nationals

Bruce Klemens
Photos
Clean Sequence
Jerk Sequence
Starting Position: Snatch & Clean

- All Body Levers Are “Tight” Set-Up of Feet Under Bar
- Feet Straight ahead or Slightly Turned Out and in the “Vertical Jump” Position
- The Back Is “Flat” and Even Concave
- Arms Are Straight and the Elbows Are Rotated 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
- Weight Distribution on Feet Changes
Lift-off: Snatch & Clean

- Legs extend at knees
- Balance shifts to heels
- Angle of hips stays consistent
- Shoulders are over the bar
- Elbows out
- Hips and shoulders rise simultaneously
- Head position – neutral
Passing the Knees: Snatch & Clean

- Shins Vertical
- Balance & Weight stays on heels
- Angle of hips stays consistent
- Shoulders are over the bar
- Elbows out
- Hips and shoulders rise simultaneously
- Head position – neutral
Power Position: Snatch & Clean

- Position where “power spike” and impulse against the floor occurs
- Knees and hips shift forward and down slightly to jump position (main reason for slowing of bar)
- Balance shifts towards mid-foot, but heels must stay flat
- Elbows stay out
- Arms straight
- Head position – neutral

Effect of a Good Power Position
Extension – Snatch & Clean

- Quick fast punch against platform
- Extension of ankle, knee, hips
- Traps punch quickly
- Bar jumps
- Elbows stay out
- Arms straight
- Head position – neutral to slightly up

Extension – Snatch & Clean Catch
Pull Under – Snatch & Clean
• Active jump under the bar
• Arms pull actively into position against the bar

Catch – Snatch & Clean
• Feet and hands hit together
• Body tight
• Catch and ride into bottom
**Jerk – Start Position**
- Bar above clavicles on shoulders
- Fingers on bar, elbows down slightly
- Inflate lungs, lift chest

**Jerk – Dip & Drive**
- Hips lower directly under bar, weight towards heels
- Drive quick and strong against floor, weight moves towards ball of feet
- Chest up and strong throughout
Jerk – Split & Catch
• Both Feet Move simultaneously and land together
• Drive body down against bar
• Front Shin almost vertical, weight on ball of rear foot
• Shoulders and Hips in line on catch
• Feet and hands hit together

Basic Weightlifting Exercises
Clean & Clean Related Exercises:

1. Front Squat
2. Power Clean
   1. Power Position
   2. Hang Above Knee
   3. Hang Below Knee
   4. Lift Off
   5. Floor
3. Power Clean + Front Squat (descending positions as above)
4. Clean (descending positions as above)

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Clean & Clean Related Basic Exercises

- Front Squat
  - Take the weight from the rack as shown and assume the starting position
  - The feet are outside the hips (squat width) with the toes turned out slightly
  - The bar rests on the shoulders and clavicles with elevated elbows

- Front Squat con’t
  - Inflate the chest and proceed to squat into the low position while holding the chest and elbows up
  - Exhale when the repetition is complete
- **Power Clean & Clean from Mid-thigh (Power Position)**
  - Feet hip width (Pulling Position) or (Jump Position)
  - Toes turned out
  - Shoulder width grip
  - Inflate chest; set back
  - Unlock knees
  - Moving from the hip only, lower the barbell to mid-thigh position

- The lifter then extends the body upward in a violent motion

- The shoulders shrug, the arms are straight and the weight shifts from the heels to the ball of the feet

- After the lifter finishes the pull, she pulls herself under the bar and catches it in the receiving position (Landing Position)

- The bar should rest across the shoulders and clavicles while keeping the chest and elbows elevated “Big Chest”
Power Clean & Clean from Knee Height

- Moving from the hip only, lower the barbell to knee height
- Inflate chest; set back
- Shoulders are in advance of the bar
- Arms are straight
- Eyes are focused straight ahead
- Weight is felt on the heels
- Proceed to clean the weight

Power Clean & Clean from Below the Knee

- The knees must now bend more to get into the proper position
- Push the knees back or, straighten the legs to get the bar into the above knee position
- From here, extend the body upward and allow the bar to brush the thighs during maximal knee and hip extension

Power Clean & Clean

- The lifter approaches the barbell and sets the feet
- Then adopts the starting position
- Inflate chest; set back
- Shoulders are in advance of the bar
- Arms are straight
- Eyes are focused straight ahead
- Weight is distributed evenly
Snatch & Snatch Related Exercises:

1. Press Behind Neck
2. Snatch Press Behind Neck
3. Overhead Squat
4. Snatch Balance
5. Power Snatch
   1. Power Position
   2. Hang Above Knee
   3. Hang Below Knee
   4. Lift Off
   5. Floor
6. Power Snatch + Overhead Squat (descending positions as above)
7. Snatch (descending positions as above)

- **Press Behind Neck - Clean Grip**
  - Assume the proper start position
  - Grip width is same as clean
  - Bar rests on the trapezius
  - Fill the lungs with air
  - Push the bar up until the arms are locked above the head
  - Hold for at least :01
  - Punch Up - Squeeze
  - Exhale with descent

- **Press Behind Neck - Snatch Grip**
  - Assume the same start position as jerk grip; only with a snatch grip
  - Follow the same principles until the bar is locked out
  - Notice the steady and balanced position
  - Prepares athlete for Snatch
Overhead Squat
- Feet are in squat position
- Snatch grip
- Bar is in a steady, balanced position over the ears
- The chest is inflated
- Eyes are focused straight ahead
- Weight distribution is on the heels

Overhead Squat continued
- Weight distribution is still toward the heels
- Chest is still inflated
- Bar is in a solid position over the ears
- Eyes are focused straight ahead
- Stay tight

Snatch Balance
- Objective
- Foot position
- Weight distribution
- Arm action
- Snatch Balance con't
  - Dip
  - Weight distribution
  - Foot position
  - Arm action

- Snatch Balance con't
  - Solid position
  - Head position
  - Weight distribution
  - Bar position

- Snatch from Power Position then Mid-thigh
  - Feet hip width; toes turned out
  - Correct width grip
  - Inflate chest; set back
  - Unlock knees
  - Moving from the hip only, lower the barbell to mid-thigh position
The lifter then extends the body upward in a violent motion

The shoulders shrug, the arms are straight and the weight shifts from the heels to the ball of the feet

The lifter will exert so much force that the bar will continue to rise while he pulls himself underneath the barbell

After jumping under the bar, the lifter will receive the barbell at arms’ length

Snatch from Knee Height
- Moving from the hip only, lower the barbell to knee height
- Inflate chest; set back
- Shoulders are in advance of the bar
- Arms are straight
- Eyes are focused straight ahead
- Weight is felt on the heels
- Proceed to snatch the weight
Snatch from Below the Knee
- The knees must now bend more to get into the proper position
- Push the knees back or, straighten the legs to get the bar into the above knee position
- From here, extend the body upward and allow the bar to scrape the lower abdomen during maximal knee and hip extension
- Catch the weight in the receiving position

Snatch
- The lifter approaches the barbell and sets the feet
- Then adopts the starting position
- Inflate chest; set back
- Shoulders are in advance of the bar
- Arms are straight
- Eyes are focused straight ahead
- Weight is distributed evenly
- It is imperative to push with the feet initially and as the barbell passes the knees acceleration should constantly increase

Jerk & Jerk Related Exercises:
1. Press
2. Push Press
3. Power Jerk
4. Foot Work Drill
5. Jerk
• Press

Start Position

• Bar on shoulders above clavicles
• Fingers on bar
• Take breath, lift chest
• Hold breath while driving up with arms

• Press (con’t)

• Bar finishes over the ears
• Head Neutral
• Elbows locked, wrists flexed

• Push Press
  ❖ Start position
  ❖ Weight distribution
  ❖ Chest inflated
  ❖ Head position
  ❖ Foot position
Push Press continue

- Dip and drive
- Weight distribution
- Arm action
- Head action
- Bar trajectory
- Finish position

Power Jerk

- Dip and drive
- Chest inflated
- Weight distribution
- Foot position
- Head position
- Finish position

Jerk

- Start position
- Dip and drive
- Foot position
- Bar trajectory
- Receiving position
- Finish position
Power Assistance Exercises

Pull Development:

1. Snatch Pull
   a. Power Position (hang/block)
   b. Hang at Knee (hang/block)
   c. Hang Below Knee (hang/block)
   d. Floor

2. Clean Pull
   a. Power Position (hang/block)
   b. Hang at Knee (hang/block)
   c. Hang Below Knee (hang/block)
   d. Floor

3. RDL

- Snatch Pull
  - May use straps
  - Assume the correct start position
  - Leg extension initiates the pull as the barbell eases back from the platform
  - As the bar reaches knee height the hip extensors take over and the bar begins to accelerate

- The bar should touch the lower abdomen
- The final explosion phase consists of:
  - Hip extension
  - Knee extension
  - Ankle extension
  - Shoulder elevation
Clean Pull
- May use straps
- Assume the correct start position
- Leg extension initiates the pull as the barbell eases back from the platform
- As the bar reaches knee height the hip extensors take over and the bar begins to accelerate

The bar should touch the thighs
The final explosion phase consists of:
- Hip extension
- Knee extension
- Ankle extension
- Shoulder elevation

Romanian Dead Lift (RDL)
- Assume the starting position
- Straps may be used
- Clean grip; pulling foot position
- Inflate chest; set back
- Slightly unlock the knees
Moving only from the hips and not changing the knee angle, lower the barbell to approximately mid-shin. The hips move back to preserve balance; this keeps the COG over the feet. Weight should be distributed on the heels.

From this bottom position, the hamstrings, gluteals and erector spinae pull the barbell to the finishing position. The back must be kept tight and flat for the whole range of motion. The knee angle must not change. Arms are straight. The athlete does not breathe until each repetition is finished.

Power Assistance Exercises
Overhead Strength Development:
1. Push Press Behind Neck
2. Power Jerk Behind Neck
3. Jerk Behind Neck
Push Press Behind Neck
- Assume the proper start position
- Grip width is the same as power clean
- Bar rests on the trapezius
- Fill the lungs with air

Keeping the chest elevated and the weight distributed on the heels, unlock the knees and with a short, explosive dip drive the weight overhead

Push the bar up until the arms are locked above the head
- Exhale upon completion of the repetition
Push Press Behind Neck
- Start position
- Dip
- Head position
- Bar position

Push Press Behind Neck
- Dip and drive
- Arm action
- Trajectory

Push Press Behind Neck
- Finish position
- **Power Jerk Behind Neck**
  - Start position
  - Weight distribution
  - Dip and drive
  - Foot position
  - Bar position

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**Jerk Behind Neck**

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**Power Assistance Exercises**

**Leg Strength Development:**

1. Squat
2. Single Leg Squat:
   - Split Squat
   - Split Squat – Rear foot elevated
**Back Squat**
- Once again, take the weight from the rack as shown and assume the starting position
- Adjust grip; set foot position
- Inflate chest and draw the shoulders back to tighten the musculature
- Increases inter-thoracic pressure

**Back Squat con’t**
- Holding this position, descend to the deep squat position
- Exhale when the repetition is complete
- Use spotters if necessary
- High bar vs. Low bar

**Split Squat Progressions**
- Both Feet on Floor: shoulders and hips in line
- Elevated rear foot
Chapter 8
Program Design

Annual Plan

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
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
- Try to Alternate Pushing and Pulling Movements
- Try to Include All Exercise Categories in the Workout
- Beginners Should Have More Variety

Exercise Categories:

- Lift Related – Snatch or Clean
- Overhead – Snatch or Jerk
- Squat Related
- Pull Related

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 (3-5 repetitions)
  - 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
- After several months of Training, a maximum single MAY be attempted

Repetition Schemes:
5+ reps: Preparation/Hypertrophy, early training phases.
3 reps: Strength, conversion phases.
1-2 reps: Power, competition phases.
# 12-Week Cycle

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<th>Cycle Three</th>
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<tr>
<td>5-6 reps</td>
<td>3 reps</td>
<td>1-2 reps</td>
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(may be higher reps for beginners in each cycle)

Remember every 3rd week of each cycle should have reduction in both volume and intensity

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### Week 1: Introduction of Stimulus

4 sets with 2 at top percentage or weight.

### Week 2: High Volume Week

5 sets with 3 at top percentage or weight.

### Week 3: Unloading Week

3 sets with 1 at top percentage or weight (same as week 1).

### Week 4: Max Week

4 sets with 1 at top new percentage or weight.
Example of a Daily Training Session

Monday
1. Warm up: GPP
2. Snatch (lift related)
3. Jerk from Rack (overhead)
4. Front squat (Squat Related)
5. Clean pull (Pull Related)
6. Abdominal/ low back exercises
7. Jumping Exercise
8. Stretching and mobility

Example of a Daily Training Session

Wednesday
1. Warm up: GPP
2. Snatch Balance (Overhead)
3. Clean (Lift Related)
4. Back Squat (Squat Related)
5. Snatch Pull (Pull Related)
6. Abdominal/ low back exercises
7. 4x 20 meter sprints
8. Stretching and mobility

Example of a Daily Training Session

Friday
1. Warm up: GPP
2. Snatch (Lift Related)
3. Clean & Jerk (Lift & Overhead)
4. Back Squat (Squat Related)
5. Abdominal/ low back exercises
6. Lat Pulldown & Push-Ups
7. Medicine Ball Throws
8. Stretching and mobility
Acknowledgements – Bibliography

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USA Weightlifting Coaching Manuals
USA Weightlifting Coaching & Education Committee