JANUARY 10 - 11, 2014 | INDIANAPOLIS
NSCA.COM/COACHES2014

DISTINGUISH YOU. DRIVE OTHERS.
Advance Methods in Triphasic Training

Cal Dietz @gmail.com
University of Minnesota
Olympic Sport Strength Coach
30 BIG TEN Titles
10 National Champions
Over 400 All Americans
Advance Methods in Triphasic Training

• A Brief Review
• Newest Methods
  – Supra-Maximal
  – High Velocity Potentiation Clusters
  – Biochemical Adaptation
Organizing Peaking Training

Periodization vs. Undululating Model

Classic linear vs. Undulating model.
Organizing Weekly Training

Classic Undulating Model

Day 1 | Day 2 | Day 3
---|---|---
80% | 85% | 92%

Intensity / Load

Volume = Green
Shifted – Day 1 goes to 3

Day 1

Day 2

Day 3

Intensity / Load

Volume = Green
High Force at Low Velocity

ABOVE 80%
HIGH FORCE AT LOW VELOCITY

<table>
<thead>
<tr>
<th>Day</th>
<th>Intensity</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>82-87%</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>90-97%</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>75-80%</td>
<td></td>
</tr>
</tbody>
</table>
High Force at High Velocity

80% - 55%

High Force at High Velocity

| Day    | Intensity (%) | Volume (%)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>65-70%</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>72%-80%</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>55-62%</td>
<td></td>
</tr>
</tbody>
</table>
Undulated Versus/ Traditional Block

• Method 1
  – 6 Straight workouts over 2 weeks at 85% Load

• Method 2

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>85% load</td>
<td>92% Load</td>
<td>80 % load</td>
</tr>
<tr>
<td>Week 2</td>
<td>85% load</td>
<td>92% Load</td>
<td>80 % load</td>
</tr>
</tbody>
</table>
Undulating Periodization

- Undulating periodization involves the acute variation of volume and intensity on a weekly (microcycle) or daily basis.

Figure 20: Increase in power in the vertical jump in place after 6 weeks of training with various weights: 1) 50% of maximum. 2) 90% of maximum and 3) combination of 90% and 50% of maximum.
Triphasic Action
Eccentric Phase

Throwing Sample
Isometric Phase
Concentric Phase
Tri-Phasic Undulating Block Method – Squat Example

**Block 1**
- Weeks 1 & 2
- Eccentric
- **Eccentric Squat 6:0:0:0**

**Block 2**
- Weeks 3 & 4
- Isometric
- **Isometric Squat 0:3:0:0**

**Block 3**
- Weeks 5 & 6
- Concentric
- **Explosive Squat 0:0:0:0**

Technique: Ecc, Iso, Con

**Throwing Sample**

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INDIANAPOLIS, IN
Tri phasic Undulating Block Method - Peaking

Block 1
Weeks 1 & 2
Eccentric

Block 2
Weeks 3 & 4
Isometric

Block 3
Weeks 5 & 6
Concentric
Most Advanced Method

- Supra-maximal Loading
- 120 to 100 % + Loading During Eccentric/Isometric
- Most Effective Results in Speed and Reactiveness
- Compressed Training Effect
Supramaximal Loading

- **Monday**: 120-110%
- **Wednesday**: 90-97%
- **Friday**: 110-105%

Legend:
- **Red**: Intensity
- **Blue**: Volume
Example of the Methods

- Safety Bar Single Leg Squat – Ecc – Iso
  - Concentric Movement is 80 to 92% Load Blk3
  - Spotter Used on Both Sides and Back
  - Safety Pins are Positioned so only 5 or 6 inches Drop if lift is Missed.
  - Examples Females 136 pounds – Single leg 305
  - Examples Male 190 pounds – Single leg 585
    500/10 sec
## Weekly Block Loading Model

<table>
<thead>
<tr>
<th>Block Focus</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1-2 Weeks</td>
<td><strong>Loading Day 1</strong></td>
<td><strong>Loading Day 2</strong></td>
<td><strong>Loading Day 3</strong></td>
</tr>
<tr>
<td><strong>Eccentric</strong></td>
<td>120-110%</td>
<td>90-92%</td>
<td>110-105%</td>
</tr>
<tr>
<td>Block 2-2 Weeks</td>
<td>De-load week</td>
<td>De-load week</td>
<td>De-load week</td>
</tr>
<tr>
<td><strong>Isometric</strong></td>
<td>120-110%</td>
<td>90-92%</td>
<td>110-105%</td>
</tr>
<tr>
<td>Block 3-2 Weeks</td>
<td>De-load week</td>
<td>De-load week</td>
<td>De-load week</td>
</tr>
<tr>
<td><strong>Con- Strength</strong></td>
<td>85%</td>
<td>90-92%</td>
<td>85%</td>
</tr>
<tr>
<td><strong>Con- Speed</strong></td>
<td>65%</td>
<td>80%</td>
<td>55%</td>
</tr>
</tbody>
</table>
Various Aspects of Supramaximal

• Strength for powerlifting movements
• Strength for sport—Enzyme
• Maximal Muscle Recruitment
• Maximal Fast Twitch
• Taxing on CNS
• Hyperplasia of myofibrils in muscle fibers

• Increase in free creatine in muscle fibers
• Increase concentration of hydrogen ions if duration enough and or rest reduced
• Hyperplasia of myofibrils in fast muscle fibers
  ¬ Negatives
  Joints and safety, tissue damage
### Male 3 day Model – French Contrast

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Set</th>
<th>Reps</th>
<th>Pair Work</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL Safety Squat</td>
<td>5</td>
<td>215 - 260</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>3</td>
<td>280 - 310</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>1</td>
<td>370 - 380</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>1</td>
<td>425 - 450</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>Hurdle Hop</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>SQ Jump Weighted</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>Acc Band Jump Pause</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
</tbody>
</table>

### Safety Squat

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Set</th>
<th>Reps</th>
<th>Pair Work</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Squat</td>
<td>3</td>
<td>340 - 415</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>Safety Squat</td>
<td>1</td>
<td>445 - 495</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>Safety Squat</td>
<td>1</td>
<td>590 - 605</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>Safety Squat</td>
<td>1</td>
<td>680 - 700</td>
<td>Pair w/</td>
<td></td>
</tr>
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</table>

### SL Safety Squat

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Set</th>
<th>Reps</th>
<th>Pair Work</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL Safety Squat</td>
<td>3</td>
<td>280 - 310</td>
<td>Pair w/</td>
<td>Fly 60</td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>1</td>
<td>370 - 380</td>
<td>Pair w/</td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>1</td>
<td>425 - 450</td>
<td>Pair w/</td>
<td></td>
</tr>
</tbody>
</table>

### Hurdle Hop

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Set</th>
<th>Reps</th>
<th>Pair Work</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW / no Rest</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>Height</td>
</tr>
<tr>
<td>USSR Plyo Box</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>Pause</td>
</tr>
<tr>
<td>PW / no Rest</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>Rest</td>
</tr>
<tr>
<td>Acc Band Jump Pause</td>
<td>4</td>
<td>#N/A</td>
<td>#N/A</td>
<td>Rest HR 110</td>
</tr>
</tbody>
</table>

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**JANUARY 10 - 11, 2014**

**INDIANAPOLIS, IN**
# My Sample Program

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Reps</th>
<th>Load</th>
<th>Sets</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL Safety Squat</td>
<td>5</td>
<td>160-195</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pair w/ Safety Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>3</td>
<td>210-230</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pair w/ Safety Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>1</td>
<td>275-285</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pair w/ Safety Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>1</td>
<td>320-340</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pair w/ Safety Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SL Safety Squat</td>
<td>T</td>
<td>390-425</td>
<td>4</td>
<td>7:0:0:10:7:10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Cluster Cycle</td>
</tr>
<tr>
<td>Hurdle Hop</td>
<td>4</td>
<td>$H/A$</td>
<td>4</td>
<td>Height</td>
</tr>
<tr>
<td>Pair w/NO REST</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SJ Jump Weighted</td>
<td>4</td>
<td>$H/A$</td>
<td>4</td>
<td>0:1:0:0:0:0</td>
</tr>
<tr>
<td>Pair w/NO REST</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acc Band Jump Pause</td>
<td>4</td>
<td>$H/A$</td>
<td>4</td>
<td>0:1:0:0:0:0</td>
</tr>
<tr>
<td>4 way neck</td>
<td>T</td>
<td>$H/A$</td>
<td>3</td>
<td>0:7:0:7:20</td>
</tr>
<tr>
<td>PW / 45 rest/BB/RT</td>
<td>EU</td>
<td></td>
<td></td>
<td>7 sec 2-way</td>
</tr>
<tr>
<td>Bench Add Groom</td>
<td>T</td>
<td>$H/A$</td>
<td>3</td>
<td>0:7:0:7:20</td>
</tr>
<tr>
<td>PW / 45 rest/BB/RT</td>
<td>EU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANT TIB BND</td>
<td>T</td>
<td></td>
<td>3</td>
<td>0:7:0:7:10</td>
</tr>
</tbody>
</table>

- Video Split Squat
- Safety Bar
- Accelerated Band Jumps
- Reading My Sheets
Potentiation Clusters

• French Contrast Model
  – Exercise Selection
  – Acceleration/ Top End Speed
  – Bio Chemical Aspect of Method
  – Various Samples
Potentiation Clusters

• Simple Contrast Model for high school - Acceleration
• Sport Back Squat - 1 rep 65-80% + Box Jump / 1 rep...15-20 seconds Rest
• Sport Back Squat - 1 rep 65-80% + Box Jump / 1 rep...15-20 seconds Rest
• Sport Back Squat - 1 rep 65-80% + Box Jump / 1 rep...15-20 seconds Rest
• Sport Back Squat - 1 rep 65-80% + Box Jump / 1 rep
• Rest 2-3 minutes, then repeat for a total of 2 to 4 sets
Potentiation Clusters

• Top end Speed Running
• Hex Dead lift - 1 rep 65-80% + Hurdle Hop / 1 rep...15-20 seconds Rest
• Hex Dead lift - 1 rep 65-80% + Hurdle Hop / 1 rep...15-20 seconds Rest
• Hex Dead lift - 1 rep 65-80% + Hurdle Hop / 1 rep...15-20 seconds Rest
• Hex Dead lift - 1 rep 65-80% + Hurdle Hop / 1 rep
• Rest 2-3 minutes, then repeat for a total of 2 to 4 sets
Potentiation Clusters

• Peaking Focus for Team Sports, Basic Approach
• 25-30% Load Squat jump 1 rep + Drop box Jump / 1 rep…15-20 seconds Rest
• 25-30% Load Squat jump 1 rep + Drop box Jump / 1 rep…15-20 seconds Rest
• 25-30% Load Squat jump 1 rep + Drop box Jump / 1 rep…15-20 seconds Rest
• 25-30% Load Squat jump 1 rep + Drop box Jump / 1 rep
• Rest 2-3 minutes, then repeat for a total of 1 to 3 sets
Potentiation Clusters

• Peaking Focus for Team Sports, Advanced Athletes
• 25-30% Load Squat jump/1 rep + Drop box Jump/1 rep + Acc. Band Jump/1 rep...15-20 seconds Rest
• 25-30% Load Squat jump/1 rep + Drop box Jump/1 rep + Acc. Band Jump/1 rep...15-20 seconds Rest
• 25-30% Load Squat jump/1 rep + Drop box Jump/1 rep + Accelerated Band Jump/1 rep
• Rest 2-3 minutes, then repeat for a total of 2 to 4 sets
Theories based on Advance Biochemical Programming

• Intensity and Duration should be the focal point of the program for that day.

• Specificity of exercise program is critical to adaptation

Theories based on Advance Biochemical Programming

• Train in a method so all Systems, Organs, Plastic Structures of the metabolism, Grouping of Cells and Cells Adapt to same Stress- Results are going to be deep adaption with less negative stress response because of less stress on the functional reserves of adaption energy.

• Pull the organism in multiple directions is not optimal for the highest result. Ex-Triathlon and Powerlifting
Biochemical Programming/High Speed

• Training at high-speed, intensive loads is accompanied by the largest changes in the nervous system apparatus of muscle – CNS, myelination – sarcoplasmic reticulum (site of calcium release, facilitates muscular contraction, and the myoglobin and creatine phosphate contents – How?

High Speed Methods

Biochemical parameters of fitness of the organism - Russian

• Work is Key to All Adaptions for Sport.
• Dynamic System Theory
Theories Based on Advance Biochemical Programming

• Biochemical Control of your programming through - Intensity and Duration should be the focal point of the program for that day.

• Your use of Block Methods or Conjugate you can controlled by the Biochemical aspects of training.
Theories Based on Advance Biochemical Programming

• Since biochemical adaptive changes do not develop simultaneously, blocks of oxidative, lactic, and alactic work is needed. This can be done in the offseason - Protasenko B - N.N Yakovlev -

“Preparation that entails the use of both types of training concurrently demand energy needs that surpass the limits of homeostatic regulation. Correspondingly, stress reactions become stronger. This more strained metabolic and hormonal body environment suppresses homeostatic responses and has a deleterious effect on workloads intended to develop basic athletic abilities. Such conflicting responses, which are typical of mixed training among high-performance athletes, lead to a decline in general aerobic abilities, a reduction in muscle strength, and cases of overtraining.”

- Vladimir Issurin
Key Reason For Biochemical

• Regular physical exercise leads to the expression and multidirectional biochemical and morphological changes in the human organism. All of these changes are specific, and they are closely related to the nature, intensity and duration of exercise.

• The specificity of the adaptive changes in the body, developing under the influence of training is clearly evident in terms of both immediate and cumulative training effect, and can be traced at all levels - from the molecular to the organismic
New Tissue Consideration

• You should never lose sight of the ultimate goal, to add new tissue. This requires balancing the hyperplastic effect of the training against the strong tendency of the body toward catabolism. Cortisol is the body's biochemical agent for catabolism. Training, particularly heavy training, raises Cortisol levels. When Cortisol levels rise, new tissue is favored over old tissue. This raises the potential for a net loss of muscle tissue. This is clearly counterproductive. Wesley James

• Triphasic tissue remodeling – the consideration to keep cortisol down should play a role in programing

• Triphasic first to blocks with eccentric and isometric with maximal tissue adaption with 20 and 25 second sets.

• After those sets possible sets rest periods are extended and sets are reduced to under 10 seconds. Cluster Training concept. Or all blocks 10s
Biochemical Adaption Considerations

• Gleeson 2005 –
• Group 1 –
• Aerobic training with carb’s provide greater performance results in 3 weeks
• Group 2 –
• Aerobic training low carb’s provide greater adaption results in 3 weeks.
Benefits Of Time Training

• Increased Density Per Set
• Competitiveness/Competition of athletes
• **AFSM – Dynamic Correspondence**
• Relaxing – Enzyme Control -
• Regulation of Specificity of sport in Regard to duration and energy systems
• Regulation of the Biochemistry of Training
Speed and Skill Optimization
A Proposal for a New Practice Paradigm
### Speed and Skill Optimization

A Proposal for a New Practice Paradigm

**Table 1. Guidelines for Duration, Rest Intervals, and Repetitions**

<table>
<thead>
<tr>
<th>Duration of the Drill</th>
<th>Rest Period</th>
<th>Repetition Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 seconds</td>
<td>50 to 75 seconds</td>
<td>8 - 12</td>
</tr>
<tr>
<td>5 seconds</td>
<td>75 to 90 seconds</td>
<td>6 - 8</td>
</tr>
<tr>
<td>7 or 8 seconds</td>
<td>90 to 120 seconds</td>
<td>4 - 6</td>
</tr>
</tbody>
</table>
Enzyme Considerations

• mTORC1
• AMPK

Genetic Marker – for Mitochondria Density
• PPARDelta
• PRC
• PGC-lalpha
References


• Biological Principles in the Body's Adaptation to Training Loads  OGOLTSOV
References

- Physical exercises as a cybernetic system Nosko NM, Vlasenko, S., B. Sinigovets
- Biochemical changes in the muscle on repeated work depending on the duration of rest intervals between loads. Ihill. 30:661-668, 1958.
- Kuznetsov VV, Novikov AA The main thrust of the theoretical and experimental studies of the modern system of training athletes // Theor. andPract. nat. the cult. 1971
- Biochemical changes in the caused by protracted work once or several times.Ibizl. 312204-214, 1959
- Биохимические показатели пригодности организма