Periodization Planning Overview

Current training status/needs assessment

Individualize goals

Accessible resources

Time and schedule

Strategically plan phases

Ongoing evaluation

Systematic progression

Creativity
Periodization Models: Linear vs. Non-linear
What Can We Learn From the Research?
**Linear vs Non-linear Periodization**

**Linear**
- Volume
- Intensity
- Technique

**Non-linear**
- Volume
- Intensity
- Technique
A Comparison of Linear and Daily Undulating Periodized Programs With Equated Volume and Intensity for Local Muscular Endurance

Matthew R. Rhea, Wayne T. Phillips, Lee N. Burkett, William J. Stone, Stephen D. Ball, Brent A. Alvar, and Aaron B. Thomas

Exercise and Wellness Research Laboratory, Department of Exercise Science and Physical Education, Arizona State University, Tempe, Arizona 85212.
60 subjects (30 m, 30 f, age=21) with ≥ 12 months resistance training experience; randomly assigned to groups LP (10 m, 10 f), RLP (10 m, 10 f), DUP (10 m, 10 f) Training equated: (reps x sets x weight lifted)

Lower body studied in 15-week study (2x/week train) Reps performed on a 1-s upward, 2-s lower cadence 1-2 minute rest between 3 sets

Testing

Muscular endurance: as many reps as possible with 50% of body weight (test repeated for reliability); knee extension tested (just trained knee flexion)
Results: Endurance Performance, Percent Increase

- Reverse Linear Periodization
- Linear Periodization
- Daily Undulating Periodization
A Comparison of Linear and Daily Undulating Periodized Programs with Equated Volume and Intensity for Strength

MATTHEW R. RHEA, STEPHEN D. BALL, WAYNE T. PHILLIPS, AND LEE N. BURKETT

Exercise and Wellness Research Laboratory, Department of Exercise Science and Physical Education, Arizona State University, Tempe, Arizona 85287.
Linear (L) vs. Daily Undulating (DUP) in Strength

- 20 male (age=21) with ≥ 2 yrs resistance training experience; randomly assigned to L and DUP groups
- Training equated: (reps x sets x weight lifted)
- Training: 3 sets of bench & 3 sets of leg press
- 12-week study training 3x/week
- Also did biceps curls, lat pull-downs, crunches (no other exercises)

Testing
- 1 RM of bench press & 1 RM of incline leg press
- Did three separate days of testing for reliability
Linear (L) vs. Daily Undulating (DUP) in Strength

**Linear Periodization**

- **Wk 1-4**: 8 RM
- **Wk 5-8**: 6 RM
- **Wk 9-12**: 4 RM

**Daily Undulating Periodization**

- **Mon**: 8 RM
- **Wed**: 6 RM
- **Fri**: 4 RM
- **Mon**: 8 RM
- **Wed**: 6 RM
- **Fri**: 4 RM

12 Weeks
Results: Strength, Percent Increase

**Bench Press**
- % Increase

**Incline Leg Press**
- % Increase

- Linear Periodization
- Daily Undulating Periodization
COMPARISON OF LINEAR AND REVERSE LINEAR PERIODIZATION EFFECTS ON MAXIMAL STRENGTH AND BODY COMPOSITION

Jonato Prestes,1 Cristiane De Lima,2 Anelena B. Frollini,2 Felipe F. Donatto,2 and Marcelo Conte3

1Physiological Sciences Department, Exercise Physiology Laboratory, Federal University of São Carlos, São Paulo, Brazil; 2Health Sciences Department, Physical Education Post-Graduation Program, Methodist University of Piracicaba, Piracicaba, São Paulo, Brazil; and 3Superior School of Physical Education, Jundiaí, São Paulo, Brazil

2009 Journal of Strength and Conditioning Research
**Linear (L) vs. Reverse Linear (RL) in Strength**

- 20 females (age~27) with ≥ 6 months resistance training experience; randomly assigned to L (10 subjects) and RL (10 subjects) groups
- 12-week study training 3x/week

**Testing**

- 1 RM of bench press, lat pull-down, arm curl, leg extension

### Linear (L) vs. Reverse Linear (RL) in Strength

#### STRENGTH TRAINING PROGRAM

<table>
<thead>
<tr>
<th>Performed exercises</th>
<th>M &amp; F Training A</th>
<th>W Training B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Inclined chest fly</td>
<td></td>
<td>2. Leg extension</td>
</tr>
<tr>
<td>3. Dumbbell shoulder press</td>
<td></td>
<td>3. Leg curl</td>
</tr>
<tr>
<td>4. Lateral raise</td>
<td></td>
<td>4. Glute kickbacks</td>
</tr>
<tr>
<td>5. Standing arm curl</td>
<td></td>
<td>5. Hip abduction</td>
</tr>
<tr>
<td>7. Triceps extension</td>
<td></td>
<td>7. Standing calf raise</td>
</tr>
<tr>
<td>9. Seated row</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Series X Repetitions

- 3 X 12 - 14 repetitions: 45s
- 3 X 10 - 12 repetitions: 1min
- 3 X 8 - 10 repetitions: 1min and 20s
- 3 X 6 - 8 repetitions: 1min and 40s
- 3 X 4 - 6 repetitions: 2min

<table>
<thead>
<tr>
<th>Repetition Zone</th>
<th>Percentage Range</th>
<th>Training Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 Reps</td>
<td>100% - 85%1RM</td>
<td>Strength</td>
</tr>
<tr>
<td>6 - 8 Reps</td>
<td>84% - 77%1RM</td>
<td>Strength &amp; Hypertrophy</td>
</tr>
<tr>
<td>9 - 12 Reps</td>
<td>76% - 70%1RM</td>
<td>Hypertrophy</td>
</tr>
<tr>
<td>13 - 20 Reps</td>
<td>69% - 60%1RM</td>
<td>Endurance gains</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less hypertrophy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less strength</td>
</tr>
</tbody>
</table>

Traditional Linear Periodization (Health/Fitness)
Kravitz (removed power phase)
**Proposed theoretical mechanism**

<table>
<thead>
<tr>
<th></th>
<th>Hypertrophy</th>
<th>Strength &amp; Hypertrophy</th>
<th>Strength</th>
<th>Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sets</strong></td>
<td>1-5</td>
<td>1-5</td>
<td>1-5</td>
<td>1-2</td>
</tr>
<tr>
<td><strong>Reps</strong></td>
<td>9-12</td>
<td>6-8</td>
<td>1-5</td>
<td>13-20</td>
</tr>
<tr>
<td>Type I, IIa</td>
<td>Type IIa</td>
<td>Type IIbx</td>
<td>Type I</td>
<td></td>
</tr>
<tr>
<td><strong>Weeks</strong></td>
<td>2-3</td>
<td>2-3</td>
<td>2-3</td>
<td>1-2</td>
</tr>
</tbody>
</table>

Fleck & Kraemer. The Ultimate Training System, 1996.
Undulating

2-4 sets per exercise (7-10 exercises)

Undulating

2-4 sets per exercise (7-10 exercises)

Random Order Undulating Periodization

Every 4 to 6 weeks plan a transition week(s)

- Circuit training
- Single set training
- Calisthenics only
- Tubing workouts
- Stability/Function

Week

Ratamess, N. et al. (2009) Progression models in resistance training for healthy adults. Medicine & Science in Sports & Exercise, 23(2), 687-708
Why Does Daily Undulating Periodization Work? Any Theories?

Fiber Type Theory???
What if your client only does resistance training 2x a week?