Weightlifting Exercises and their Derivatives: Appropriate Application Across Mesocycles
About Todays Webinar

Today’s webinar is being produced jointly by the British Association of Sport and Exercise Sciences (BASES), UK Strength and Conditioning Association (UKSCA) and Human Kinetics.

It is scheduled to last for about an hour and will be recorded and made available for download and playback. You will receive an email containing a link to the recording when it is available.

All microphones and phone lines are muted so we ask that you submit questions by typing them into the question box located in the lower right corner of your screen and click “send.”

We’ll collect any questions sent throughout the presentation for Paul and he will answer as many as possible during the Q&A segment at the end.

Join the conversation through Twitter

@HumanKineticsEU @PaulComfort1975 @BASESUK
Dr Paul Comfort is the programme leader of the MSc Strength and Conditioning at the University of Salford.

He has a wealth of applied experience and is currently consulting with numerous professional and semi-professional sports teams.

Paul is a founder member and accredited member of the UKSCA, where he is also an editorial board member for Professional Strength and Conditioning and joint editor of its ‘Professional Insights’ column.

He is a senior associate editor for the Journal of Strength and Conditioning Research, and has published around 100 peer reviewed journal articles along with numerous book chapters.
Aims:

- To explore the effects of exercise variation and load on the force-velocity characteristics of weightlifting derivatives.
- To discuss the practical application of the manipulation of exercise variation and load to train the force-velocity profile in athletes.
Why weightlifting derivatives?
Methods of Increasing Strength & Power

• Strength Training (...Deceleration...)

• Ballistic Training (...Safety / Load...)

• ‘Olympic’ Lifts (...Competence...)

![Image of weightlifting]
Effects of exercise variation and load on kinetics and kinematics

HISTORICAL PERSPECTIVE
Figure 2: The vertical component of the ground reaction force, as measured by the force platform, during the pull for a 100% lift of Subject 2.

Figure 2 — Barbell velocities for the first attempt snatch of SW with 120 Kg and the second attempt snatch of DL with 172.5 Kg.
Exercise Variation

*significantly greater (p < 0.001) compared to PC & HPC

Comfort et al., JSCR. 25 (5): 1235-1239. 2011
*significantly greater ($p < 0.001$) compared to PC & HPC

Comfort et al., JSCR. 25 (12): 3269-3273. 2011
Figure 6. Exercise main effects for peak force. *Significantly greater than HC and HP ($p < 0.001$); HC = hang clean; JS = jump shrug; HP = high pull.

Figure 7. Exercise main effects for peak velocity. *Significantly greater than HC and HP ($p < 0.001$); +Significantly greater than HC ($p < 0.001$); HC = hang clean; JS = jump shrug; HP = high pull.
Figure 5. Exercise main effects for peak power output. *Significantly greater than HC and HP ($p < 0.001$); +significantly greater than HC ($p = 0.001$). HC = hang clean; JS = jump shrug; HP = high pull.
Effect of Load:

Caution:
Athletes Jumping with ~90 kg

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Height</th>
<th>Landing Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>30% 1RM</td>
<td>25 ± 4 cm</td>
<td>4771 ± 489 N</td>
</tr>
<tr>
<td>45% 1RM</td>
<td>21 ± 3 cm</td>
<td>4568 ± 775 N</td>
</tr>
<tr>
<td>65% 1RM</td>
<td>14 ± 2 cm</td>
<td>4380 ± 868 N</td>
</tr>
<tr>
<td>80% 1RM</td>
<td>9 ± 2 cm</td>
<td>4202 ± 1035 N</td>
</tr>
</tbody>
</table>

Mid-Thigh Pull

*\( p \leq 0.02 \), than 40, 60, 80, 100, 120%

*\( p \leq 0.004 \) greater than 40, 60, 80 & 100%

*Comfort et al., JSCR. 26 (5): 1208-14. 2012*
Practical Application

SURFING THE FORCE VELOCITY CURVE
Adapted from Suchomel et al., SCJ. 39 (1): 10-20. 2017
Catching vs. Pulling
VOLUME & INTENSITY MATCHED TRAINING STUDY
# Changes in Isometric Force

<table>
<thead>
<tr>
<th>IMTP Variable</th>
<th>Force @ 100 ms</th>
<th>Force @ 150 ms</th>
<th>Force @ 200 ms</th>
<th>Force @ 250 ms</th>
<th>Relative Peak Force (N/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group Mean</td>
<td>SD</td>
<td>%CV</td>
<td>d</td>
<td>Group Mean</td>
</tr>
<tr>
<td>Catch (N=16)</td>
<td>Pre</td>
<td>1423 ± 361</td>
<td>5.48</td>
<td>0.52</td>
<td>1762 ± 443</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>1626 ± 421</td>
<td>4.21</td>
<td></td>
<td>2034 ± 469</td>
</tr>
<tr>
<td>Pull (N=18)</td>
<td>Pre</td>
<td>1191 ± 248</td>
<td>6.68</td>
<td>0.58</td>
<td>1466 ± 412</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>1343 ± 274</td>
<td>8.20</td>
<td>0.60</td>
<td>1681 ± 358</td>
</tr>
</tbody>
</table>

Currently unpublished data
So what’s next...?

CATCHING VS. PULLING WITH OPTIMISED LOADS
So how do we apply all of this?
## Example Programmes

### Strength-Speed

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Sets</th>
<th>Rep's</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull Variation</td>
<td>3</td>
<td>3</td>
<td>≥ 100%</td>
</tr>
<tr>
<td>Single Leg RDL</td>
<td>3</td>
<td>3</td>
<td>DB</td>
</tr>
<tr>
<td>Squat Variation</td>
<td>3</td>
<td>5</td>
<td>≥ 85%</td>
</tr>
<tr>
<td>Hop ‘n’ hold</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Jump Shrug</td>
<td>3</td>
<td>5</td>
<td>45-60%</td>
</tr>
<tr>
<td>CMJ</td>
<td>3</td>
<td>6</td>
<td>Body Mass</td>
</tr>
<tr>
<td>Nordics</td>
<td>3</td>
<td>3</td>
<td>Body Mass</td>
</tr>
</tbody>
</table>

### Speed-Strength

*Cluster Sets

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Sets</th>
<th>Rep's</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump Shrug</td>
<td>3</td>
<td>5</td>
<td>30%</td>
</tr>
<tr>
<td>Triple Hop ‘n’ hold</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hang Power Clean</td>
<td>3</td>
<td>6*</td>
<td>60-80%</td>
</tr>
<tr>
<td>Squat Variation</td>
<td>3</td>
<td>3</td>
<td>85%</td>
</tr>
<tr>
<td>Single Leg Drop Landing</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CMJ</td>
<td>3</td>
<td>12*</td>
<td>Body Mass</td>
</tr>
<tr>
<td>Nordics</td>
<td>3</td>
<td>3</td>
<td>Body Mass</td>
</tr>
</tbody>
</table>

*Neuromuscular Control During Rest Period
Thank you!
Any Questions?

We have already received quite a number of questions and we will now try and answer as many as possible in the time remaining.

Any that remain unanswered will be forwarded to Paul and he’ll try and email you a reply in due course.
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What’s Coming Up?

We have some great webinars coming up:

- **Exercise Training in Youth: What do we know?** By Melitta McNarry  
  **Date:** Wednesday 21st February 2018  
  **Time:** 15.00 GMT

- **Should we reframe how we think about Physical Activity and sedentary behaviour measurement** By Dr Paul Kelly  
  **Date:** Wednesday 28th February 2018  
  **Time:** 15.00 GMT

Registration for these webinars are open so please join us.

Further details on: www.humankinetics.me  
@HumanKineticsEU
Thanks For Joining Us

Thank you to everyone for joining us today and thanks also to Paul for the great presentation.

Please take a few moments when your webinar window closes to complete a short survey on today’s presentation – we appreciate your feedback as it helps us continually improve our webinars.

Earn your BASES credits with our endorsed CE courses.

We will email everyone a link to the recording of today’s presentation, so you can view it yourself or pass it along to friends or colleagues.

Thank you again for your participation, enjoy the rest of your day.