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@PaulComfort1975

Weightlifting Exercises and their Derivatives:
Appropriate Application Across Mesocycles

DR PAUL COMFORT

University of Salford MANCHESTER

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

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About Todays Presenter

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…)

Effects of exercise variation and load on kinetics and kinematics

HISTORICAL PERSPECTIVE

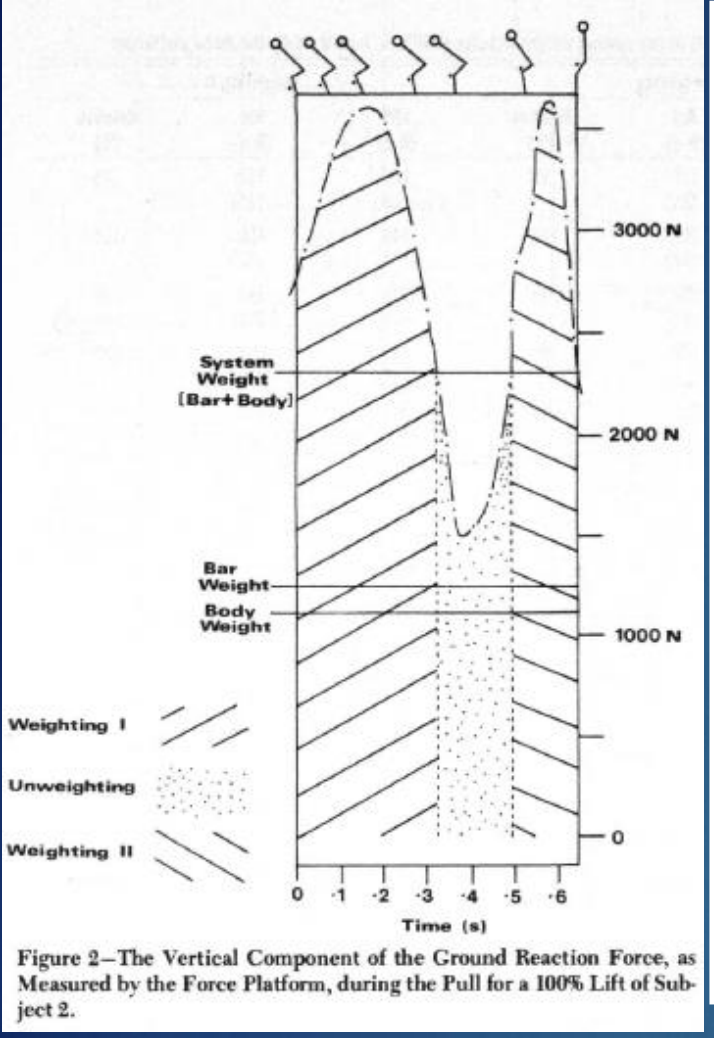


Figure 2—The Vertical Component of the Ground Reaction Force, as Measured by the Force Platform, during the Pull for a 100% Lift of Subject 2.

Enoka. MSSE. 11(2): 131-137. 1979

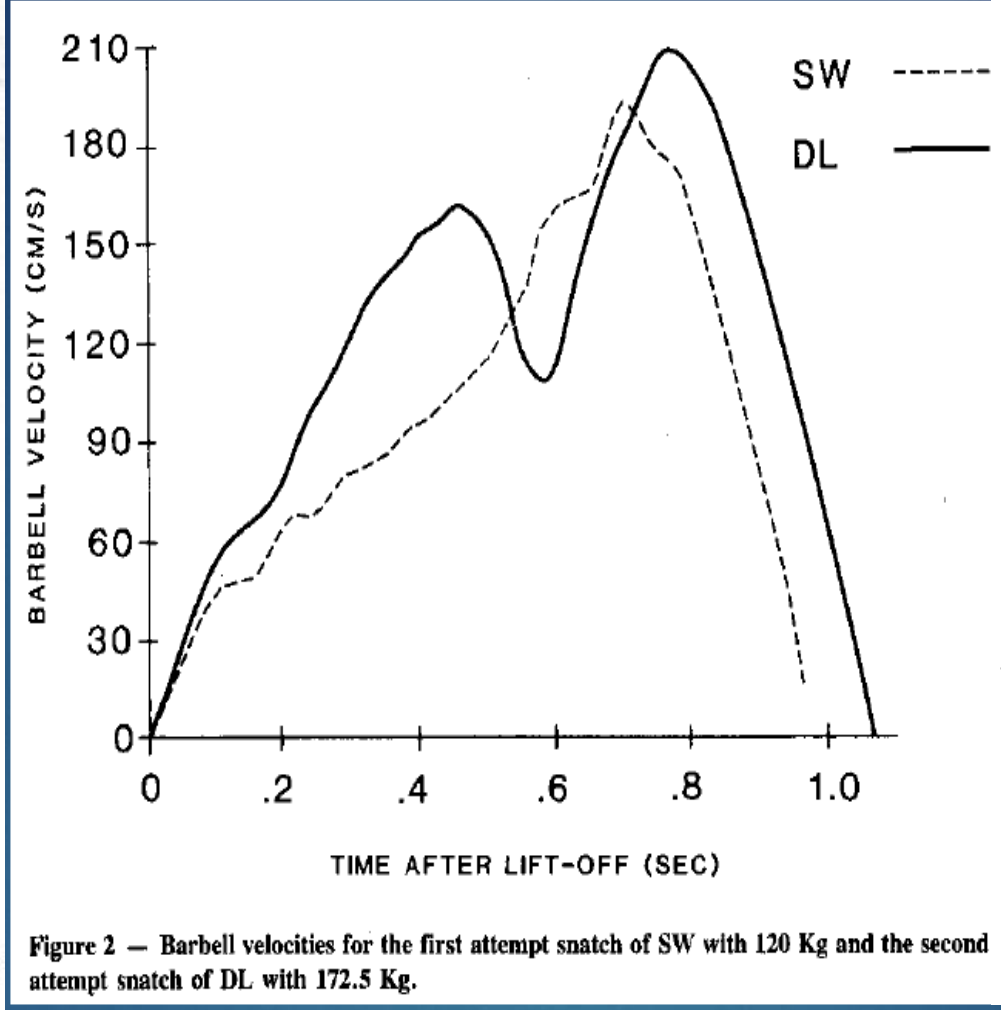
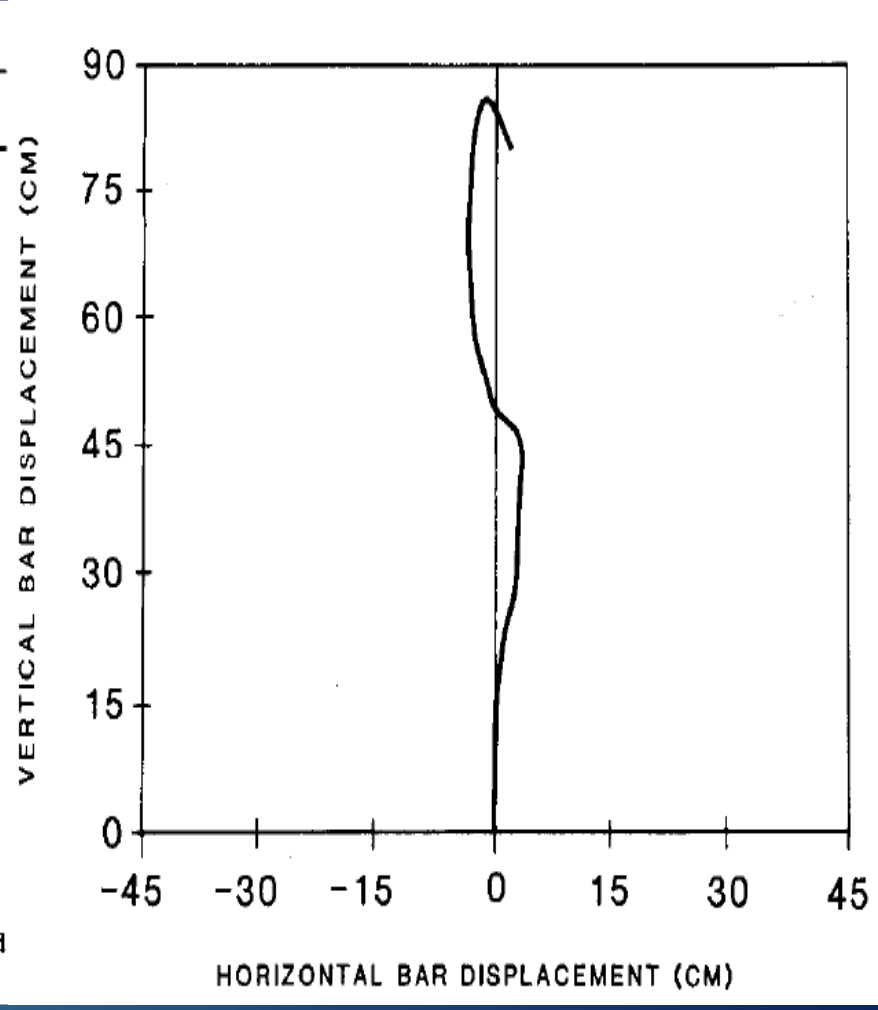
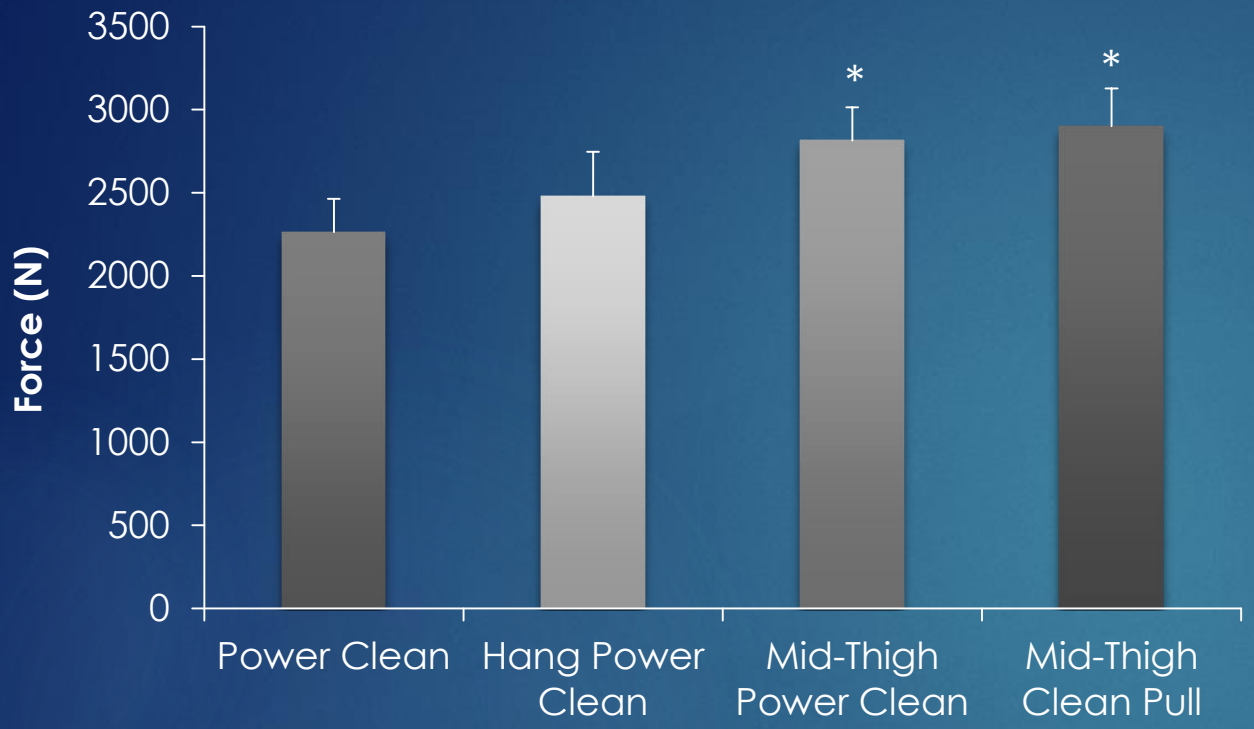


Figure 2 — Barbell velocities for the first attempt snatch of SW with 120 Kg and the second attempt snatch of DL with 172.5 Kg.



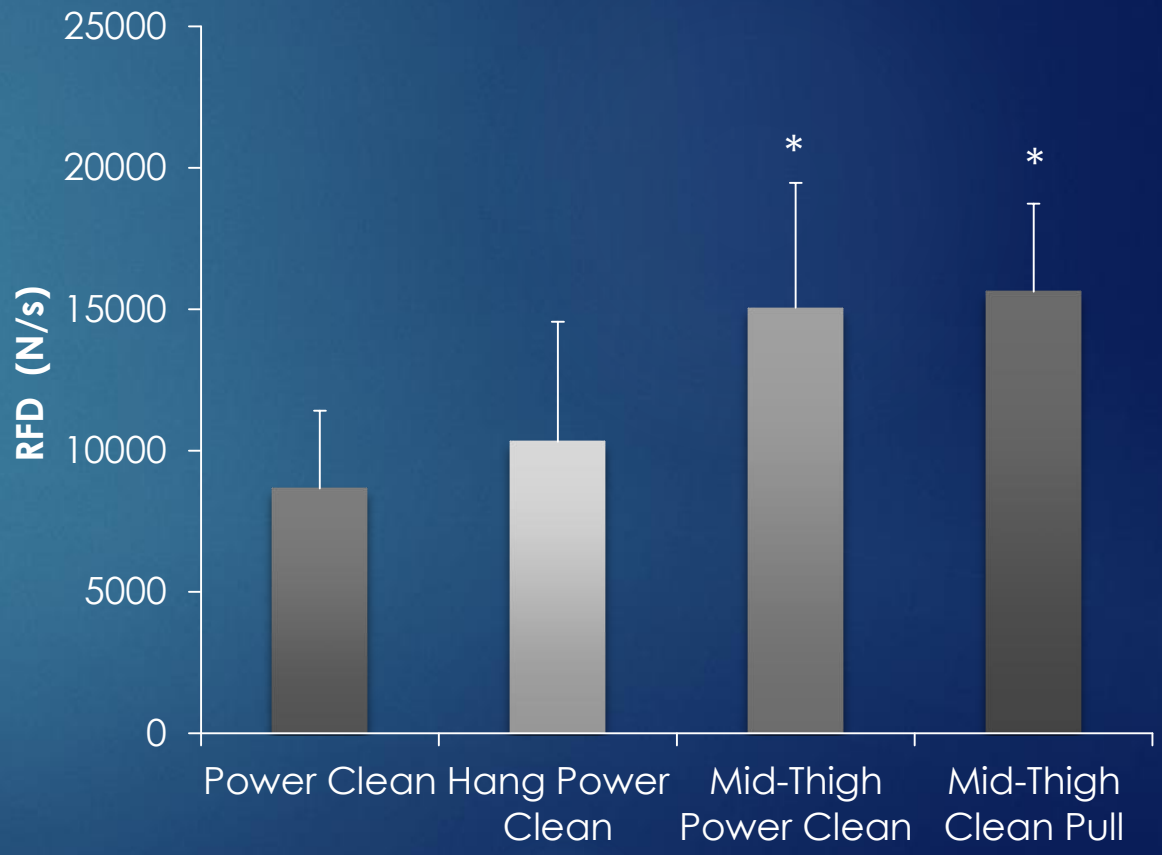
Garhammer. Int J Sports Biomech. 1: 122-130. 1985

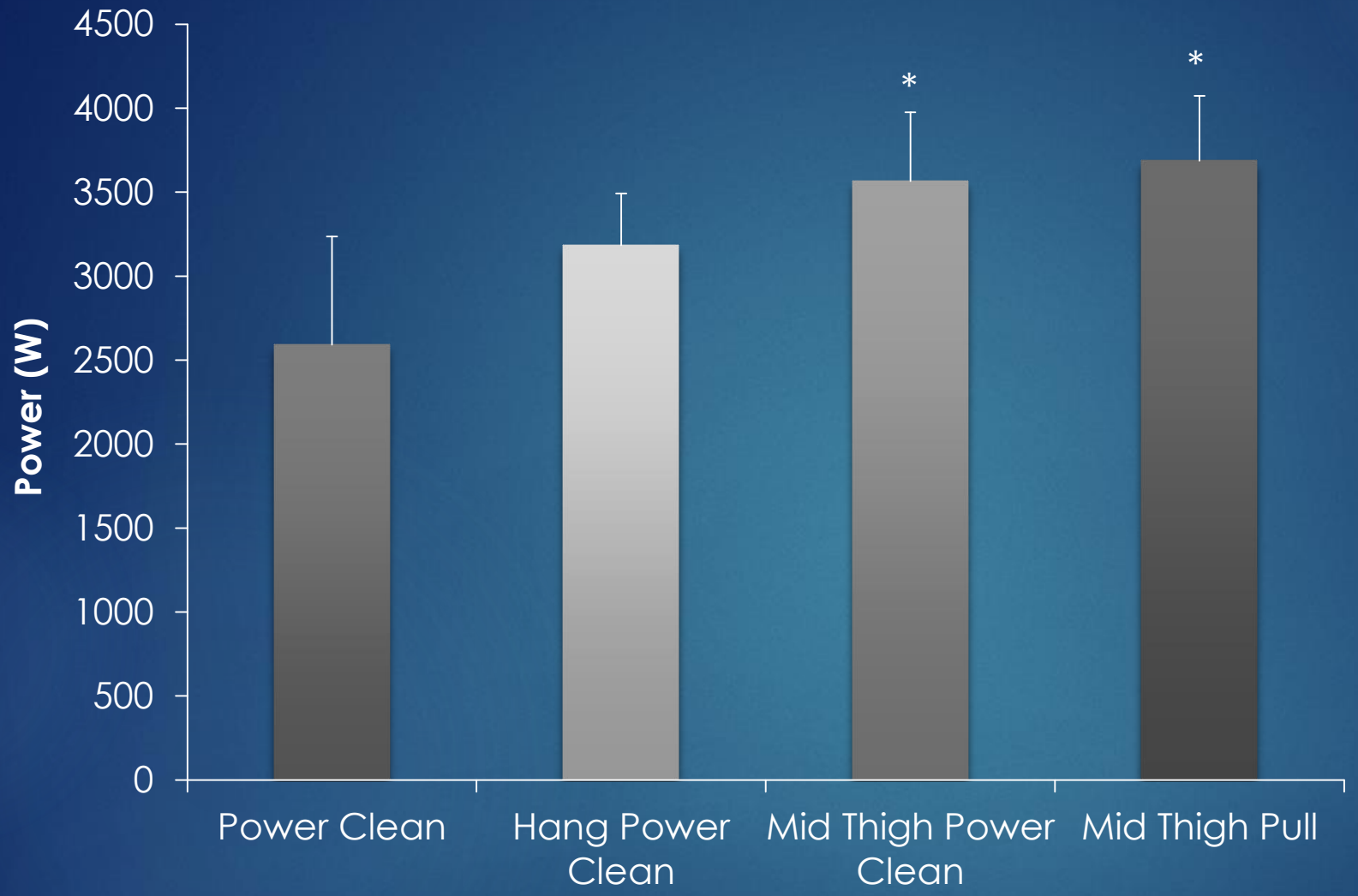
Exercise Variation



*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

Suchomel et al. JSCR. 28(2):350-360. 201

Upright start Position inc. countermovement

HPC Catch Position

Jump Shrug

Hang High Pull

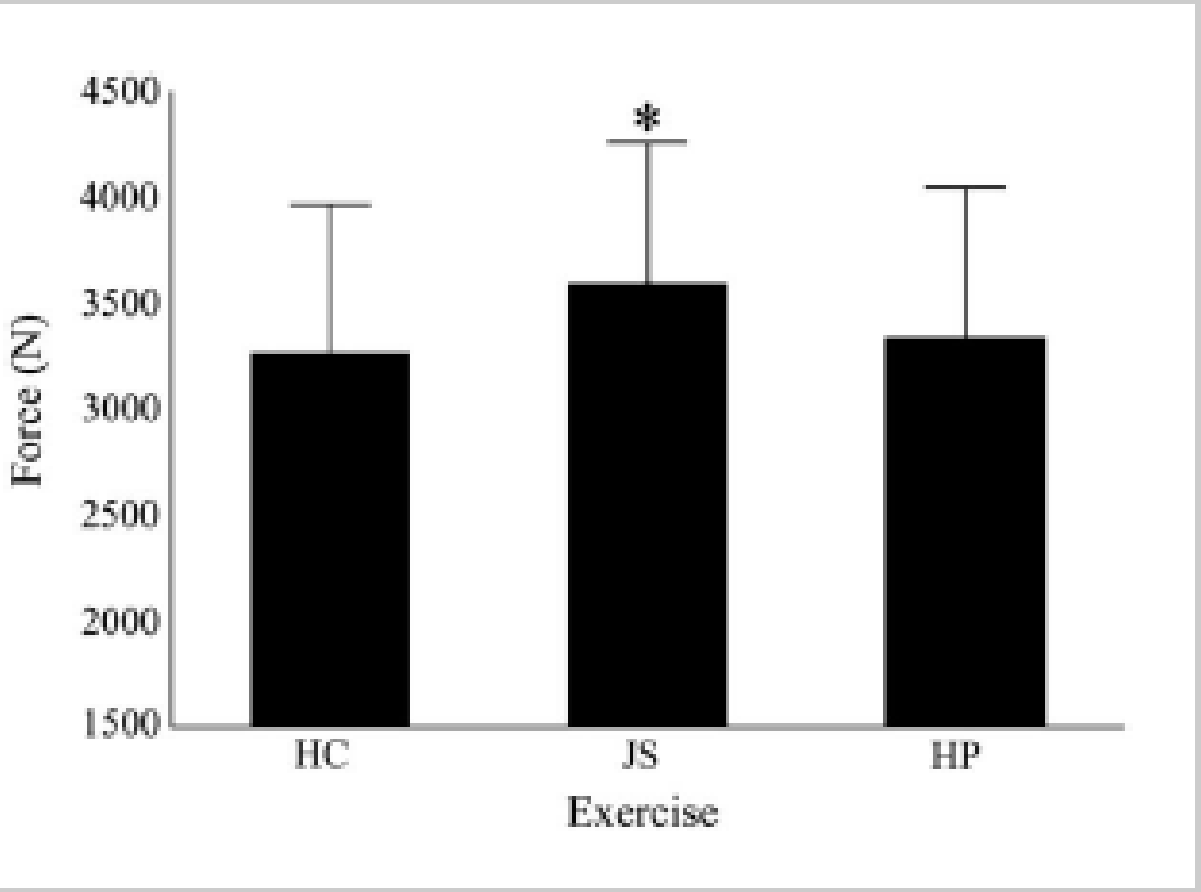


Figure 6. Exercise main effects for peak force. *Significantly greater than HC and HP ($p < 0.001$); HC = hang clean; JS = jump shrug; HP = high pull.

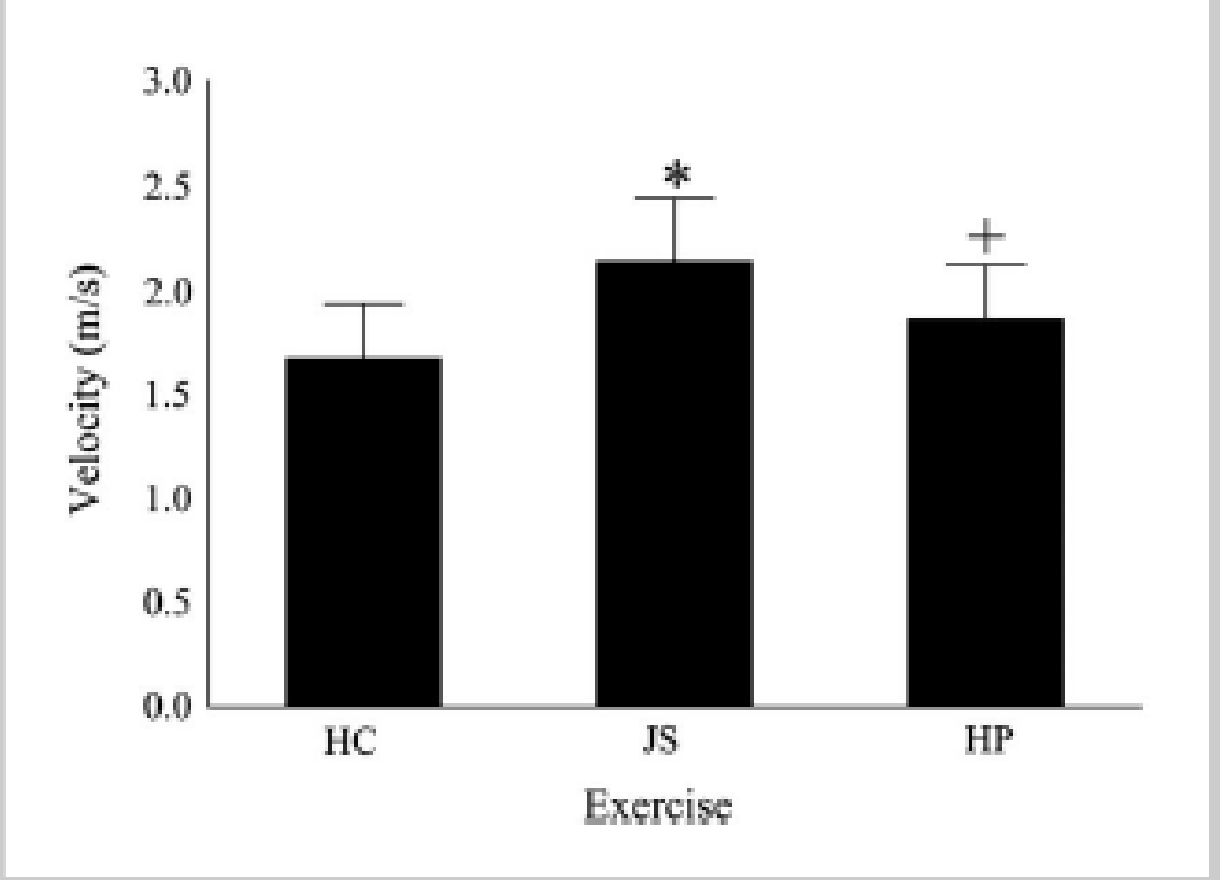


Figure 7. Exercise main effects for peak velocity. *Significantly greater than HC and HP ($p < 0.001$); +Significantly greater than HC ($p < 0.001$); HC = hang clean; JS = jump shrug; HP = high pull.

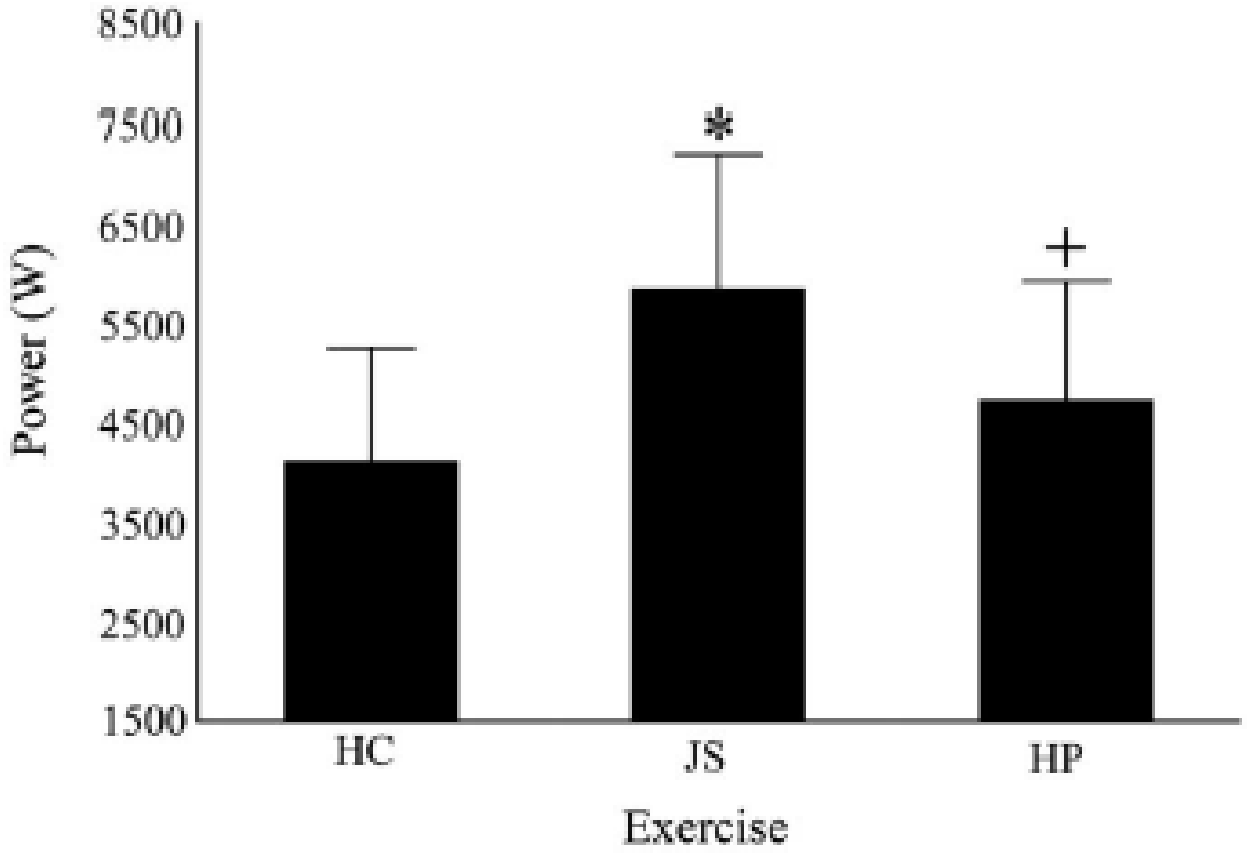


Figure 5. Exercise main effects for peak power output. *Significantly greater than HC and HP ($p < 0.001$); +significantly greater than HC ($p = 0.001$). HC = hang clean; JS = jump shrug; HP = high pull.

Effect of Load:

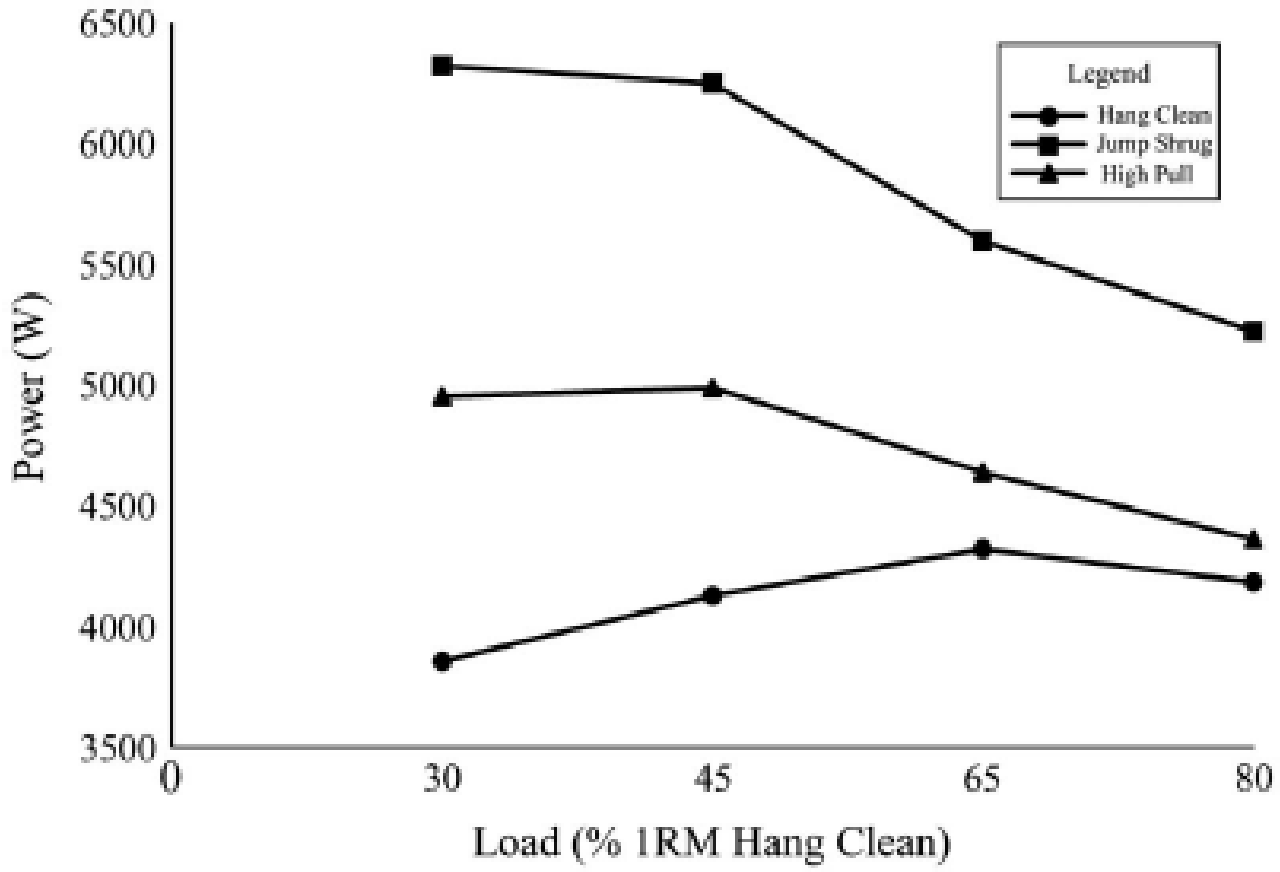


Figure 11. Exercise and load interaction for peak power output ($p < 0.001$). 1RM = 1 repetition maximum.

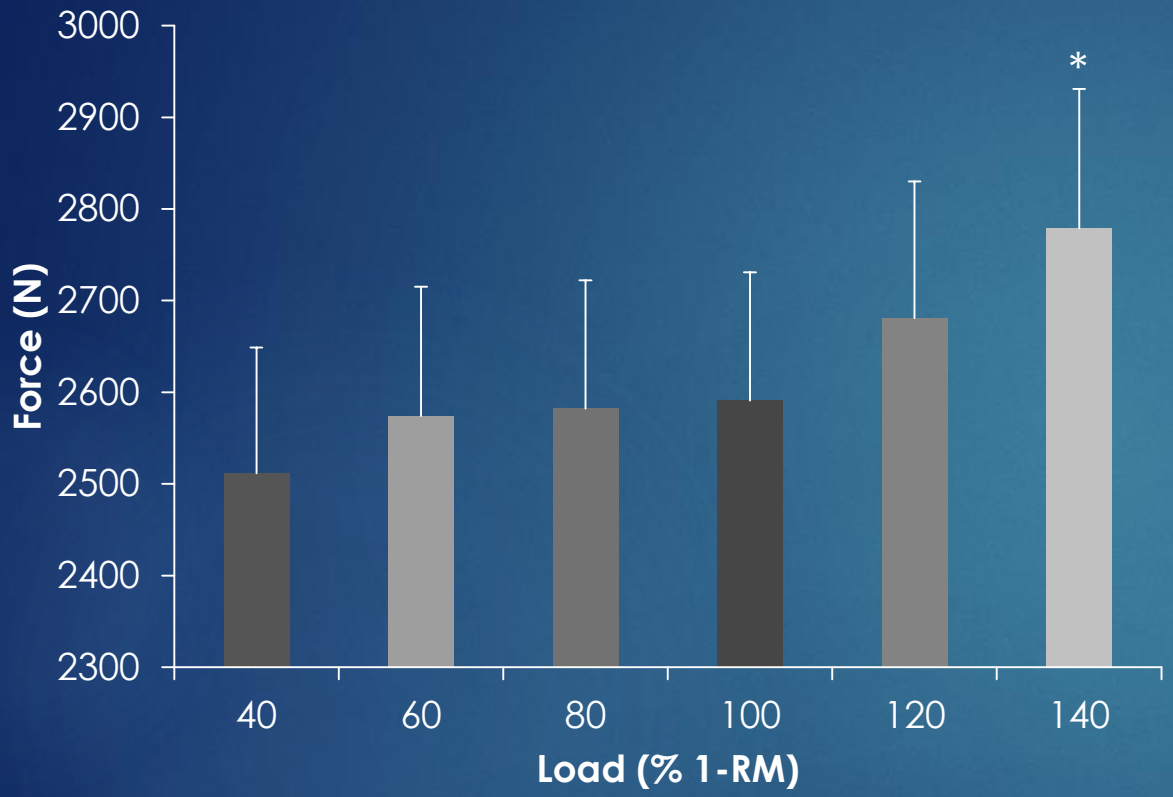
Caution:

Athletes Jumping with ~90 kg

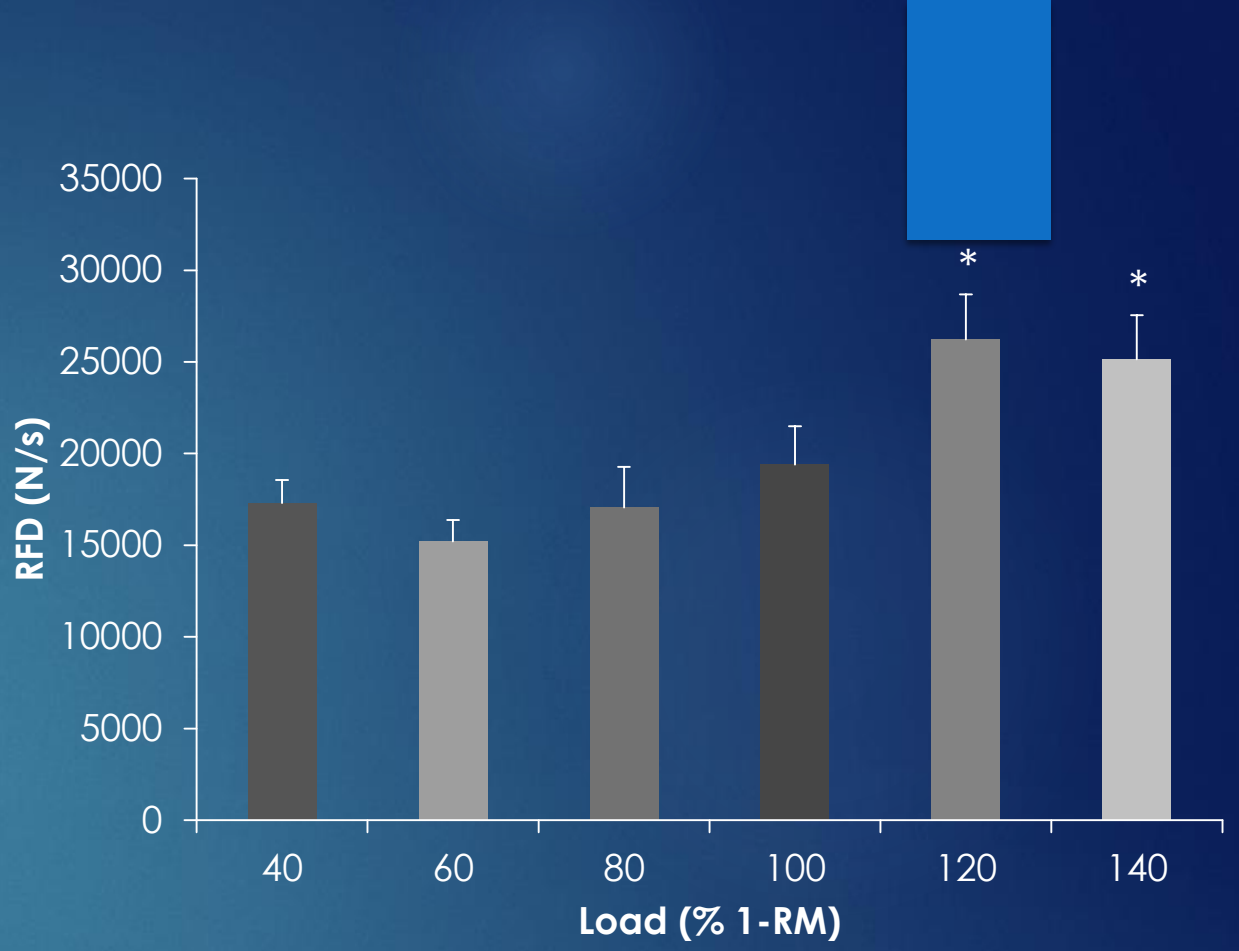
Intensity	Height	Landing Force
30% 1RM	25 ± 4 cm	4771 ± 489 N
45% 1RM	21 ± 3 cm	4568 ± 775 N
65% 1RM	14 ± 2 cm	4380 ± 868 N
80% 1RM	9 ± 2 cm	4202 ± 1035 N

Suchomel et al, IJSPP. 11 (1): 61-65. 2016

Mid-Thigh Pull

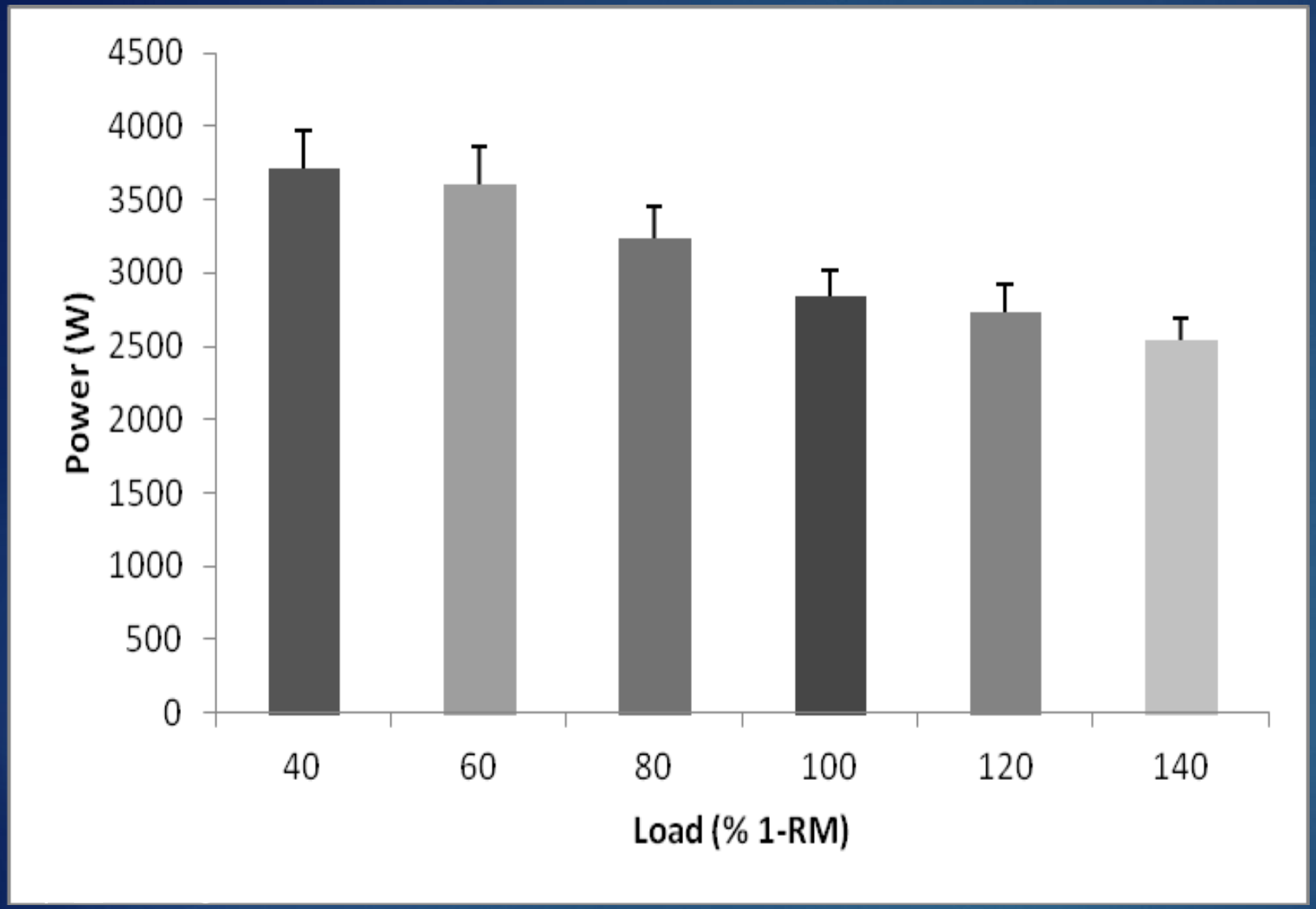


*p≤0.02, than 40, 60, 80, 100, 120%



*p≤0.004 greater than 40, 60, 80 & 100%

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

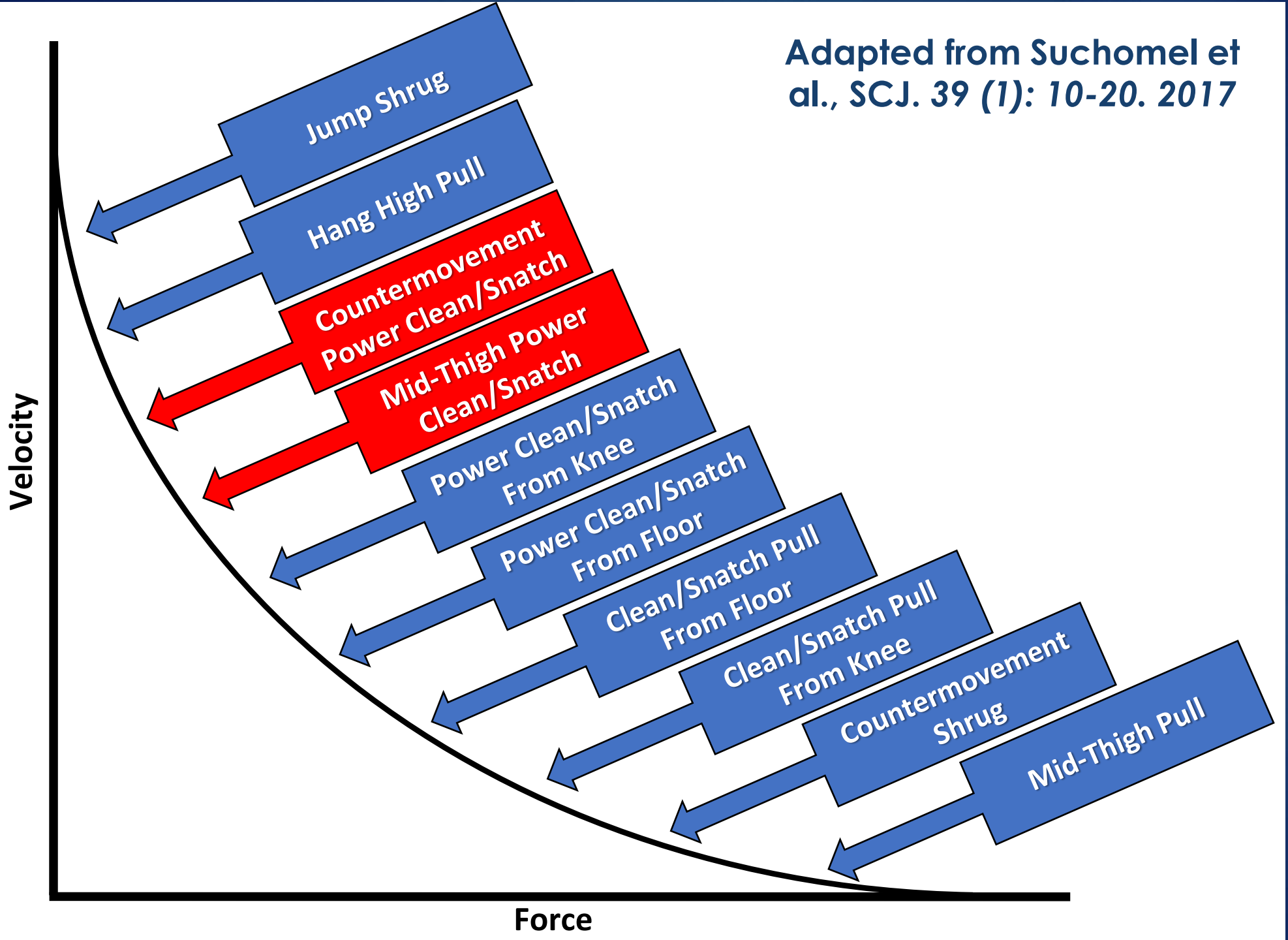


No differences in kinetic trends between males and females:

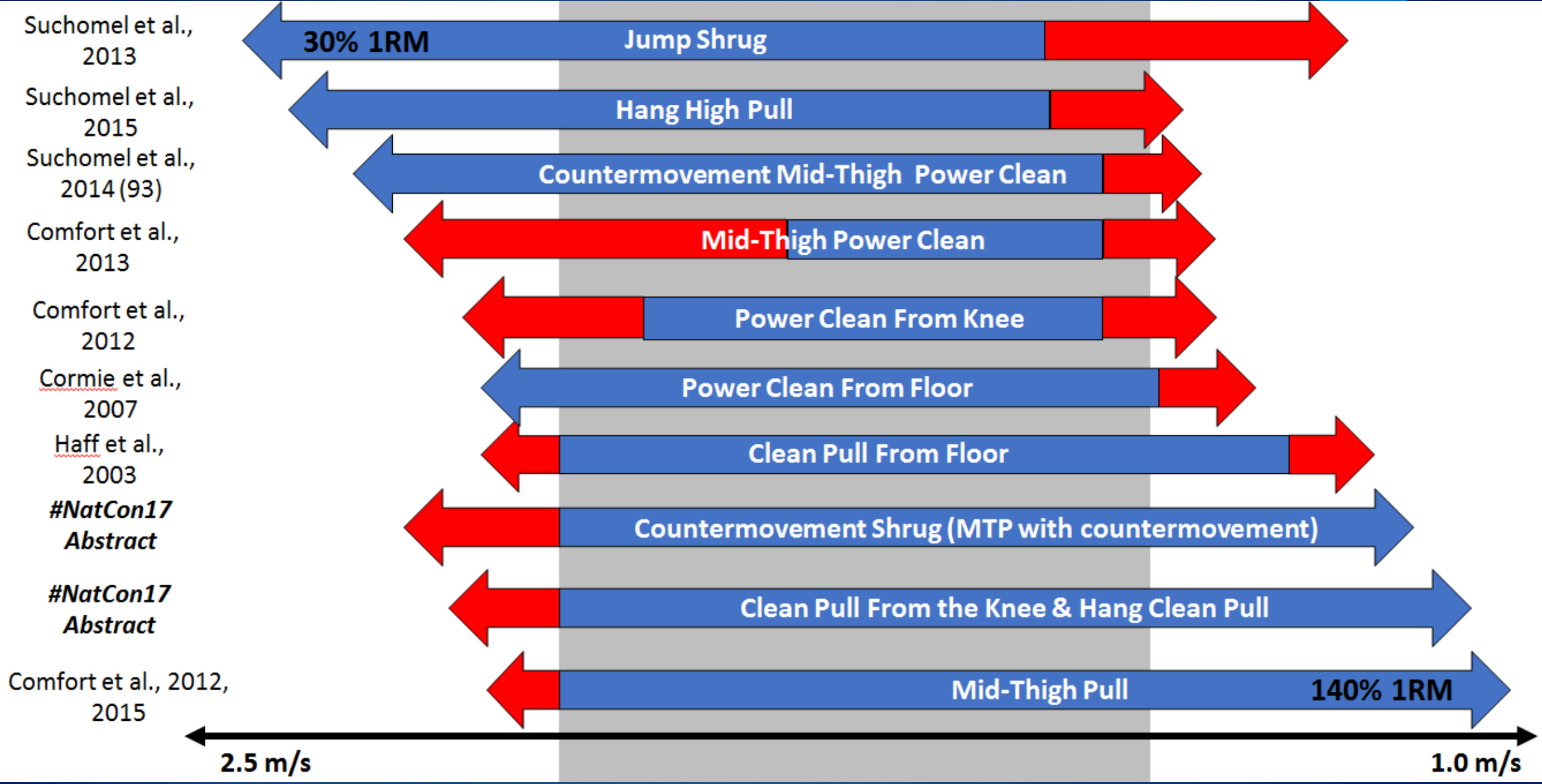
Comfort et al., Sports Biomech. 14 (2): 139-56. 2015

Practical Application

SURFING THE FORCE VELOCITY CURVE



Countermovement velocity



Adapted from Suchomel et al., SCJ. 39 (1): 10-20. 2017

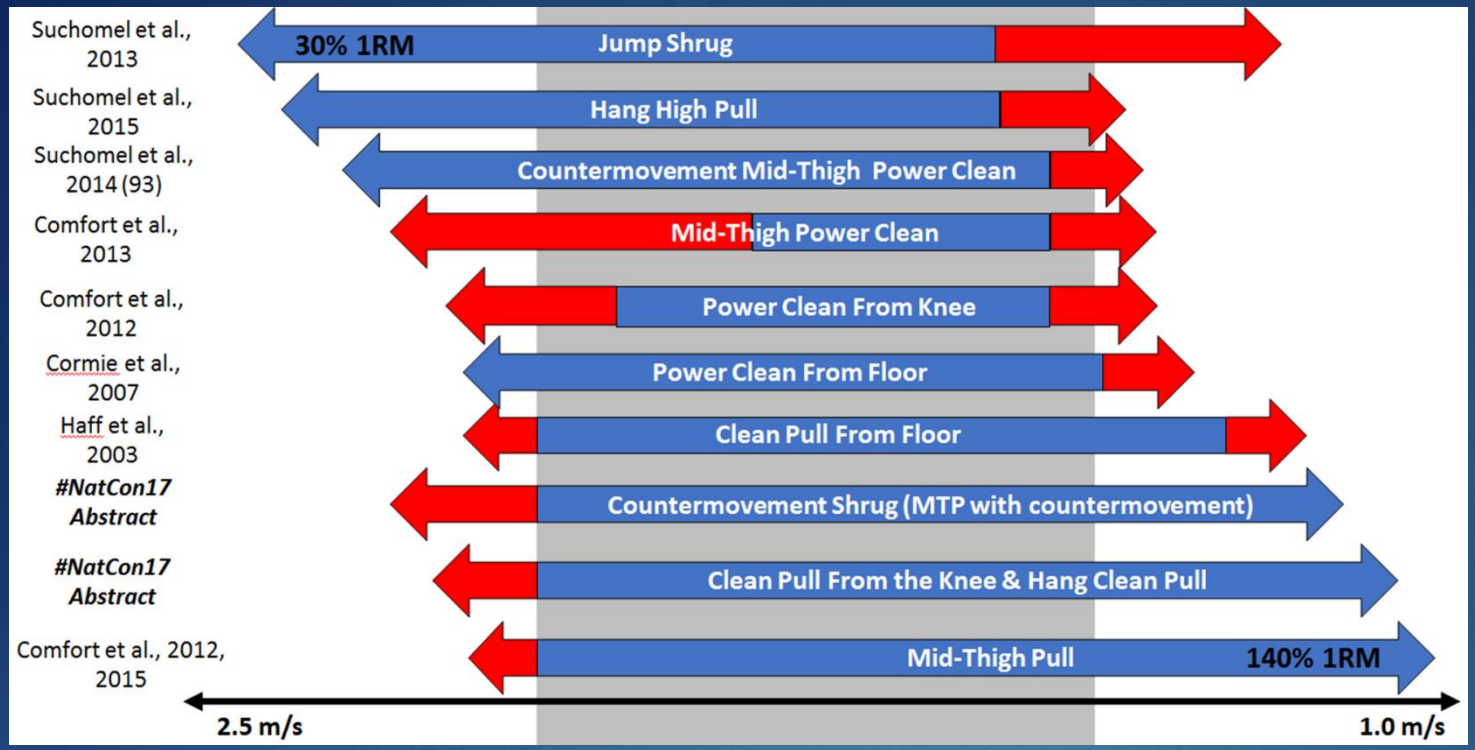
Catching vs. Pulling

VOLUME & INTENSITY MATCHED TRAINING STUDY

Changes in Isometric Force

IMTP Variable		Force @ 100 ms				Force @ 150 ms				Force @ 200 ms				Force @ 250 ms				Relative Peak Force (N/kg)			
Group		**Mean**	**SD**	**%CV**	***d***	**Mean**	**SD**	**%CV**	***d***	**Mean**	**SD**	**%CV**	***d***	**Mean**	**SD**	**%CV**	***d***	**Mean**	**SD**	**%CV**	***d***
Catch (N=16)	Pre	1423	± 361	5.48	**0.52**	1762	± 443	5.66	**0.60**	2006	± 443	4.75	**0.48**	2115	± 448	4.18	**0.42**	36.83	± 8.00	3.72	**0.56**
	Post	1626	± 421	4.21		2034	± 469	5.83		2225	± 474	4.04		2304	± 447	2.89		41.20	± 7.51	3.74	
Pull (N=18)	Pre	1191	± 248	6.68	**0.58**	1466	± 412	9.26	**0.60**	1689	± 366	7.56	**0.56**	1787	± 362	5.75	**0.47**	34.69	± 5.66	3.58	**0.48**
	Post	1343	± 274	8.20		1681	± 358	8.75		1903	± 397	8.95		1978	± 438	8.54		37.98	± 7.95	3.06	

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

Exercise	Sets	Rep's	Intensity
Pull Variation	**3**	**3**	**≥ 100%**
Single Leg RDL	*3*	*3*	*DB*
Squat Variation	**3**	**5**	**≥ 85%**
Hop 'n' hold	*3*	*5*	
Jump Shrug	**3**	**5**	**45-60%**
CMJ	**3**	**6**	**Body Mass**
Nordics	3	3	Body Mass
Neuromuscular Control During Rest Period			

Speed-Strength

Exercise	Sets	Rep's	Intensity
Jump Shrug	**3**	**5**	**30%**
Triple Hop 'n' hold	*3*	*3*	
Hang Power Clean	**3**	**6***	**60-80%**
Squat Variation	**3**	**3**	**85%**
Single Leg Drop Landing	*3*	*3*	
CMJ	**3**	**12***	**Body Mass**
Nordics	3	3	Body Mass

***Cluster Sets**

Neuromuscular Control During Rest Period

Thank you!

@PaulComfort1975

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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

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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.