

NSCA

COACHES

CONFERENCE 2023

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Charlotte, NC & Online | 2.0 CEUs

#NSCACoaches23

Introducing Weightlifting Movements: What to Look for, What to Emphasize



CONFLICT OF INTEREST STATEMENT

I have no actual or potential conflict of interest in relation to this presentation.

Overview

- Introduction
 - Intro to Double Knee Bend Technique
 - Common Issues
 - Pulling Derivatives
 - Periodizing WL Movements
- * Underlined = video emphasis



The Weightlifting Debate

- “we are training and developing athletes, not weightlifters”
- “weightlifting is too difficult to teach”
- “weightlifting is too technical”
- “weightlifting takes too long to learn”
- “weightlifting is dangerous”
- “I can improve power without weightlifting movements”



Is the Weightlifting Debate Necessary / Helpful?

- Identifying as “pro” or “anti” weightlifting movements doesn’t get at the heart of the coaching process
- Weightlifting movements are simply a programming tool
- Context!
 - Athlete
 - Goals (e.g. adaptation)
 - Situation



Benefits of Weightlifting Movements for Strength Power Based Athletes

- Weightlifting is beneficial for BOTH strength & power development – combination training
- Superior power outputs when compared to other explosive exercises (plyometrics, med ball throws, etc.) have been demonstrated
- Transition phase / SSC



Characteristics of participating youth weightlifters.

Sex	Age Group	Age	Placement	Total (kg)	Sinclair (kg)	BM (kg)	CMJH (cm)
Female (<i>n</i> = 65)	11 and under	9 (<i>n</i> = 1)	12.0	65.0	118.3	40.76	33.27
	(<i>n</i> = 13)	10 (<i>n</i> = 5)	7.4 ± 4.3	59.2 ± 14.7	126.1 ± 38.9	29.74 ± 20.35	32.92 ± 5.12
		11 (<i>n</i> = 7)	8.3 ± 5.9	73.1 ± 17.4	130.5 ± 38.8	41.01 ± 25.52	35.45 ± 7.17
	12-13	12 (<i>n</i> = 1)	5.0	75.0	129.8	43.17	38.86
	(<i>n</i> = 12)	13 (<i>n</i> = 11)	5.6 ± 5.3	95.8 ± 23.5	138.3 ± 31.3	56.91 ± 13.80	38.01 ± 5.58
	14-15	14 (<i>n</i> = 8)	9.0 ± 6.1	107.8 ± 22.6	153.9 ± 27.7	36.64 ± 34.40	38.96 ± 5.14
	(<i>n</i> = 17)	15 (<i>n</i> = 9)	9.9 ± 6.3	112.1 ± 13.1	159.8 ± 17.7	48.86 ± 19.15	40.41 ± 4.53
	16-17	16 (<i>n</i> = 10)	6.9 ± 4.5	128.6 ± 27.5	173.6 ± 26.1	55.32 ± 21.65	42.06 ± 5.81
	(<i>n</i> = 23)	17 (<i>n</i> = 13)	10.1 ± 5.6	126.2 ± 15.2	162.0 ± 19.6	49.66 ± 30.46	42.83 ± 6.02
	Male (<i>n</i> = 65)	11 and under	9 (<i>n</i> = 0)	N/A	N/A	N/A	N/A
(<i>n</i> = 6)		10 (<i>n</i> = 2)	10.0 ± 7.1	59.5 ± 7.8	153.9 ± 5.1	32.03 ± 4.71	34.04 ± 7.18
		11 (<i>n</i> = 4)	10.3 ± 9.1	55.8 ± 12.7	130.3 ± 44.3	36.80 ± 6.59	36.45 ± 7.51
12-13		12 (<i>n</i> = 9)	9.8 ± 4.6	73.3 ± 20.7	146.2 ± 40.1	42.26 ± 9.73	37.62 ± 7.02
(<i>n</i> = 25)		13 (<i>n</i> = 16)	5.6 ± 3.3	101.1 ± 29.0	148.8 ± 30.7	66.15 ± 25.36	38.39 ± 9.56
14-15		14 (<i>n</i> = 8)	5.6 ± 3.3	141.3 ± 26.5	217.1 ± 45.8	61.49 ± 23.18	46.64 ± 8.89
(<i>n</i> = 16)		15 (<i>n</i> = 8)	4.5 ± 3.9	179.1 ± 35.5	234.1 ± 39.6	73.72 ± 18.95	53.82 ± 10.83
16-17		16 (<i>n</i> = 3)	9.0 ± 3.6	141.0 ± 16.6	214.2 ± 23.2	56.65 ± 2.94	65.28 ± 1.32
(<i>n</i> = 18)		17 (<i>n</i> = 15)	7.3 ± 4.6	215.1 ± 31.8	270.2 ± 41.5	79.41 ± 17.66	58.10 ± 7.85

Mizuguchi et al., 2021



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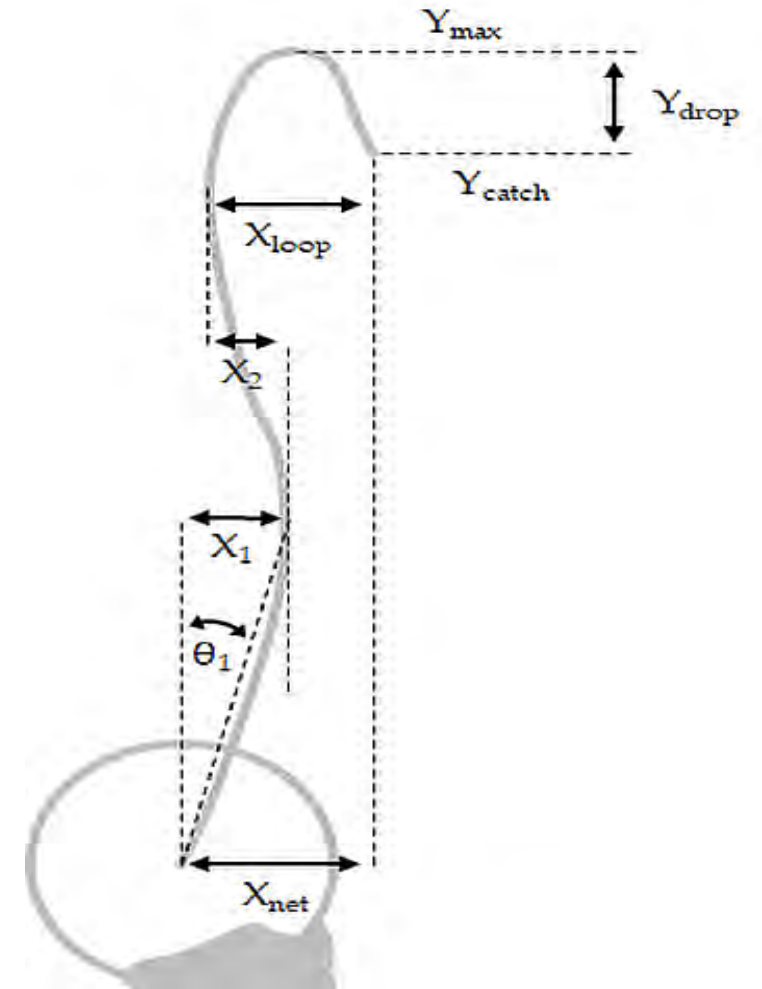
Advanced Weightlifters

- Every competitive athlete has their own situation (sport, stage of development, genetics, anthropometrics, etc.) – successful weightlifters are athletes we can learn from
- Helpful for:
 - Technical model
 - Concepts of strength power development



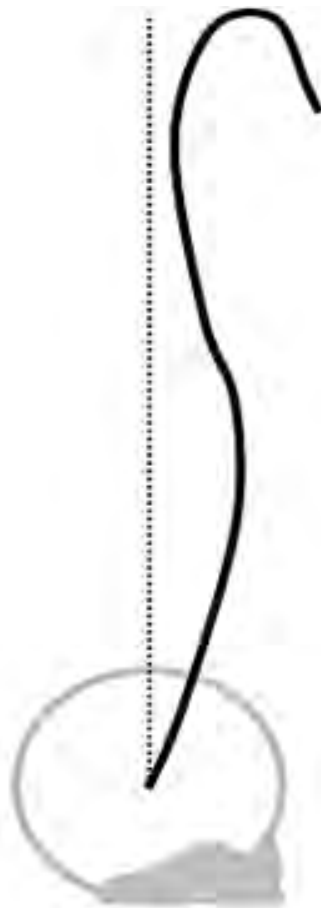
Advanced Weightlifters

- Technique of the pull is well-established
 - Garhammer, Enoka, Bartonietz, Stone, Kipp, Akkus, Baumann, Haribili, Gourgoulis
- Sound technique is likely
 - Better for performance
 - To better transfer to the sport
 - Safer





Type 1



Type 2



Type 3



Type 4

Center of Pressure

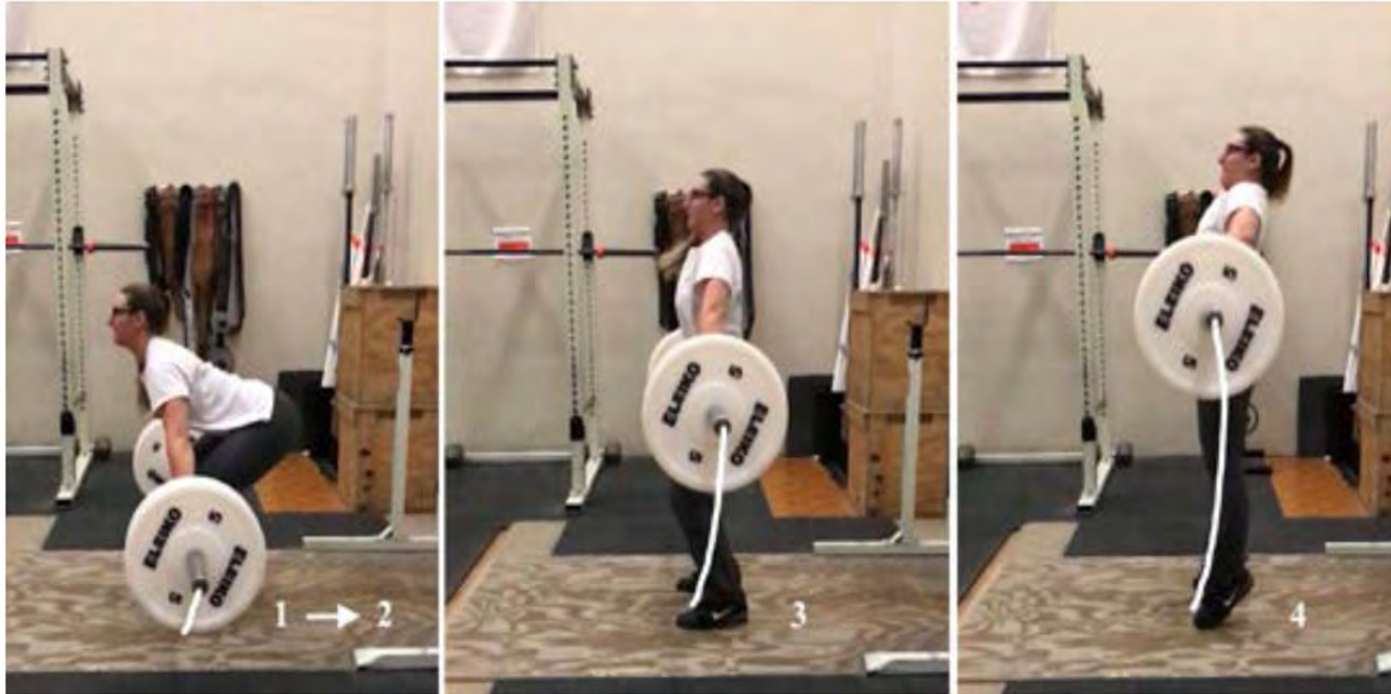


FIGURE 2. BAR PATH AT THE KNEE, POWER POSITION, AND DURING TRIPLE EXTENSION (NUMBERS CORRESPOND TO COP CHANGES IN FIGURE 1)

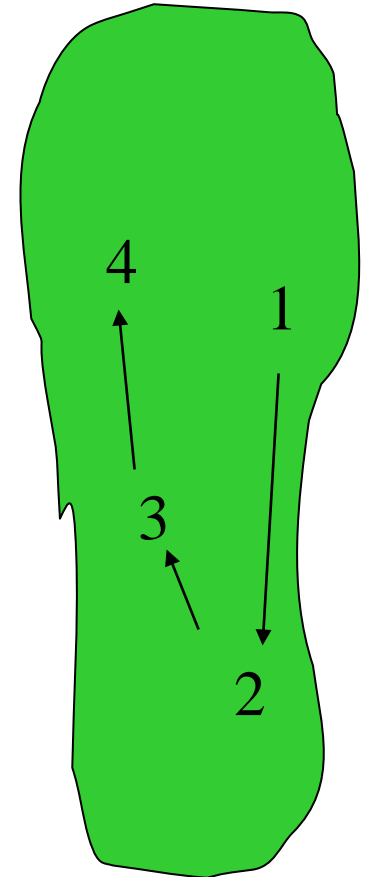
1. Lift-off

2. Knee

3. Power Position

4. Triple extension + shrug

Cedar et al., 2019



Common Issue #1

Don't Get Pulled Forward



Cedar et al., 2019

Common Issue #1

Don't Get Pulled Forward



Cedar et al., 2019

1st Pull Correction



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1st Pull:

Be Tight off the floor



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1st Pull:

**“Toward the heel,
not at the heel”**



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Flat Back



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Transition



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Importance of Power Position



Importance of Power Position



Importance of Power Position



Power Position



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Coaching the Athlete “into” the Power Position



Power Snatch from Power Position



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Power Snatch from Power Position



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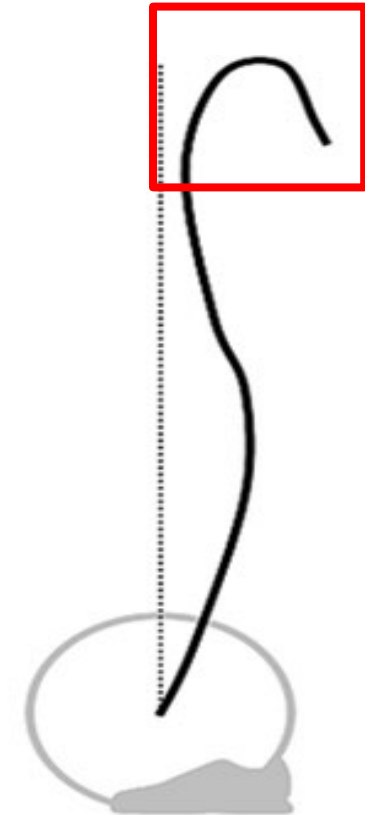
Power Snatch from PP: Don't hip it



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Importance of the Shrug



Shrug



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Shrug



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Shrug Clean



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Pulling Derivatives

Potential Benefits

- Less technical
- A greater spectrum of loading options
- May be beneficial to (at times) avoid the catch (fatigue, joint irritation)
- Helpful for strengthening positions and motor patterns of the pull
- Compared to jumping; softer landing



Pull from the floor



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Pull from the floor: Side View



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Pull from the knee



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Clean Pull from Power Position



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Clean Pull from Power Position: Be Tight at the Start



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Heavy Loading for Pulling Derivatives



Heavy Loading for Pulling Derivatives

TABLE V.—*Throwers 30% of Isometric Mid-thigh Pull Trial Force Time Curve Characteristics.*

Variable		Testing Session 1		Testing Session 2		Testing Session 3		p-value	T1 vs T2	
		Mean±	SD	Mean±	SD	Mean±	SD		η^2	% Δ
Peak Force	N	4540.0±965.0		4533.0±960.0		4601.0±990.0		0.46	0.20	1.30
Rate of Force Development (0-200 ms)	N/s	11943.0±2890.0		12471.0±2852.0		13190.0±3147.0		0.15	0.46	10.40
Peak Velocity	m/s	1.31±0.11		1.32±0.17		1.28±0.17		0.73	0.08	2.30
Peak Power	W	3338.0±986.0		3396.0±1069.0		3451.0±1143.0		0.64	0.10	3.90
Impulse		826.0±254.0		793.0±270.0		589.0±278.0		0.024	0.12	4.00

Note: Significant difference = $P \leq 0.05$

Clean Pull from Power Position

160kg



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Barbell Displacement

Exercise	Mean Displacement (m)
Snatch	2.21 (± 0.12)
Clean	1.88 (± 0.08)
Power snatch	1.53 (± 0.14)
Snatch grip pull from floor	1.08 (± 0.10)
Clean grip pull from floor	1.01 (± 0.07)
Push press	0.76 (± 0.10)
Back squat	0.71 (± 0.04)
Push jerk	0.70 (± 0.10)
Jerk	0.68 (± 0.10)
Front squat	0.68 (± 0.06)
Overhead squat	0.67 (± 0.05)
Clean grip pull from knee	0.67 (± 0.08)
Snatch grip SLDL	0.58 (± 0.07)
Press	0.56 (± 0.05)
Clean grip SLDL	0.55 (± 0.06)
Behind Neck Press	0.53 (± 0.05)
Mid-thigh pull—Snatch grip	0.47 (± 0.04)
Mid-thigh pull—Clean grip	0.39 (± 0.05)
Lockouts	0.07 (± 0.01)

Note: Exercises involving two concentric portions required the full movement segments to be measured, and then the segments were added together (e.g., snatch = snatch pull + overhead squat).

Team Teach



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Block Periodization



Suarez, Hornsby, Cunanaan, Marsh, and Stone. (2019). Phase-Specific Changes in Rate of Force Development and Muscle Morphology throughout a Block Periodized Training Cycle in Weightlifters. *Sports*. 7(6)1-13.

Exercises Based on Phases

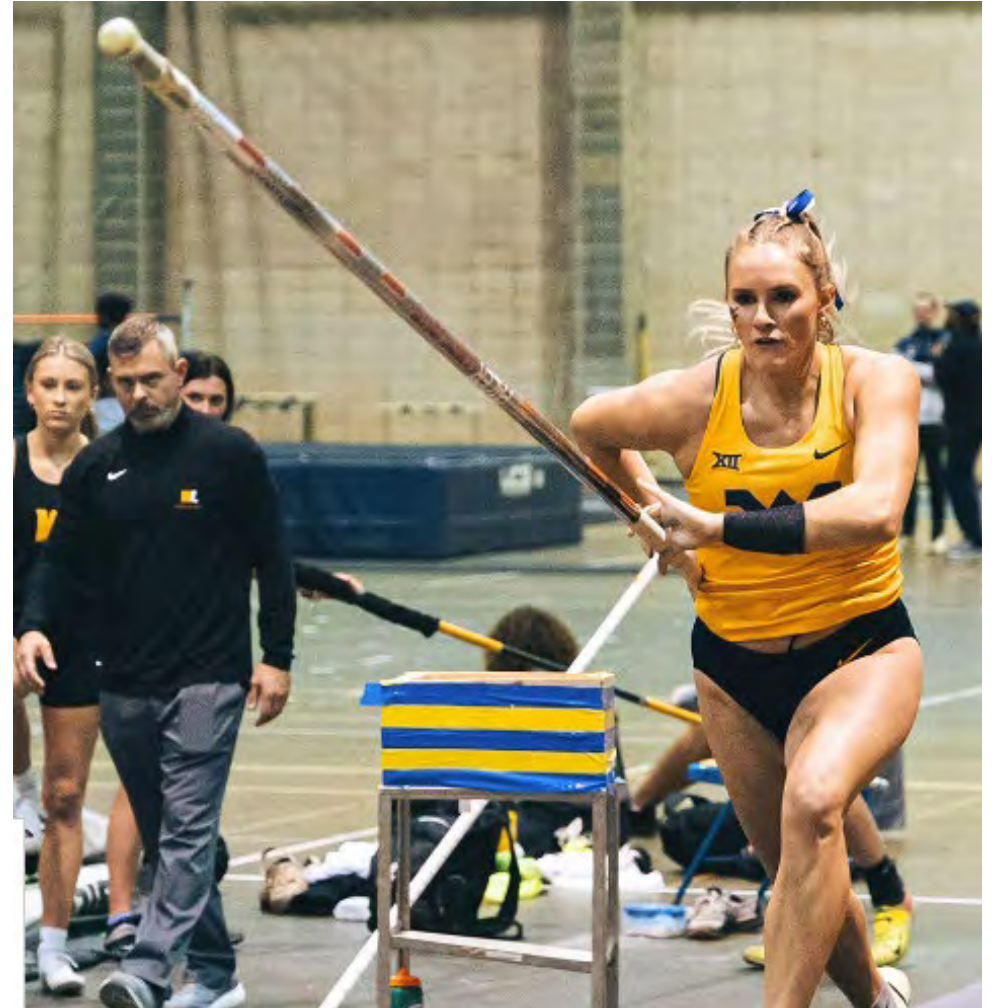
- Not clear cut
- What are the phases? The goals of the phases? The purpose of the phases?
- Similar to commonly used push movements (e.g. back squat, front squat) many exercises can make sense in multiple training blocks
- General progression across blocks = high repeat forces to high force to high power



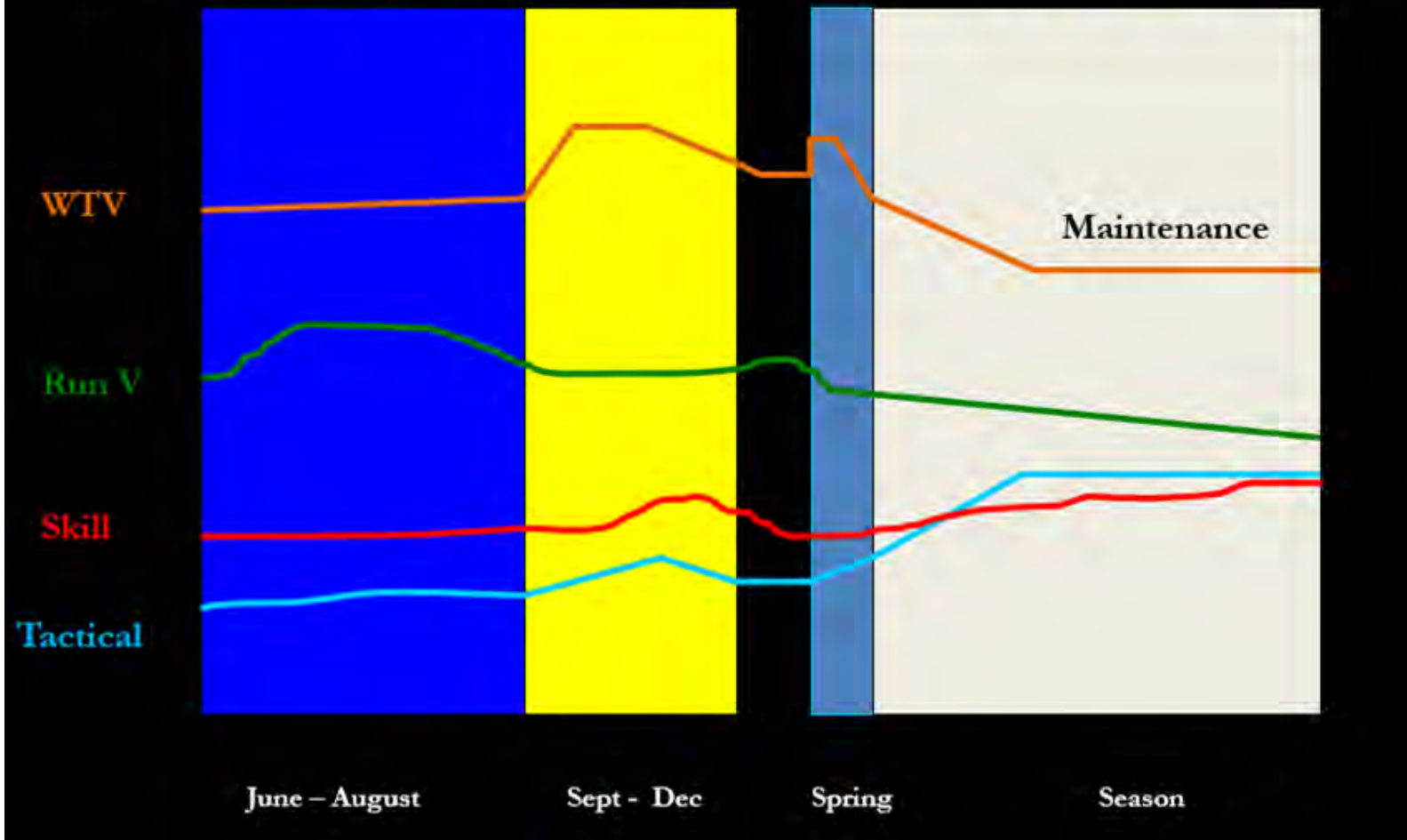
Exercises Based on Phases

Some Things to Consider

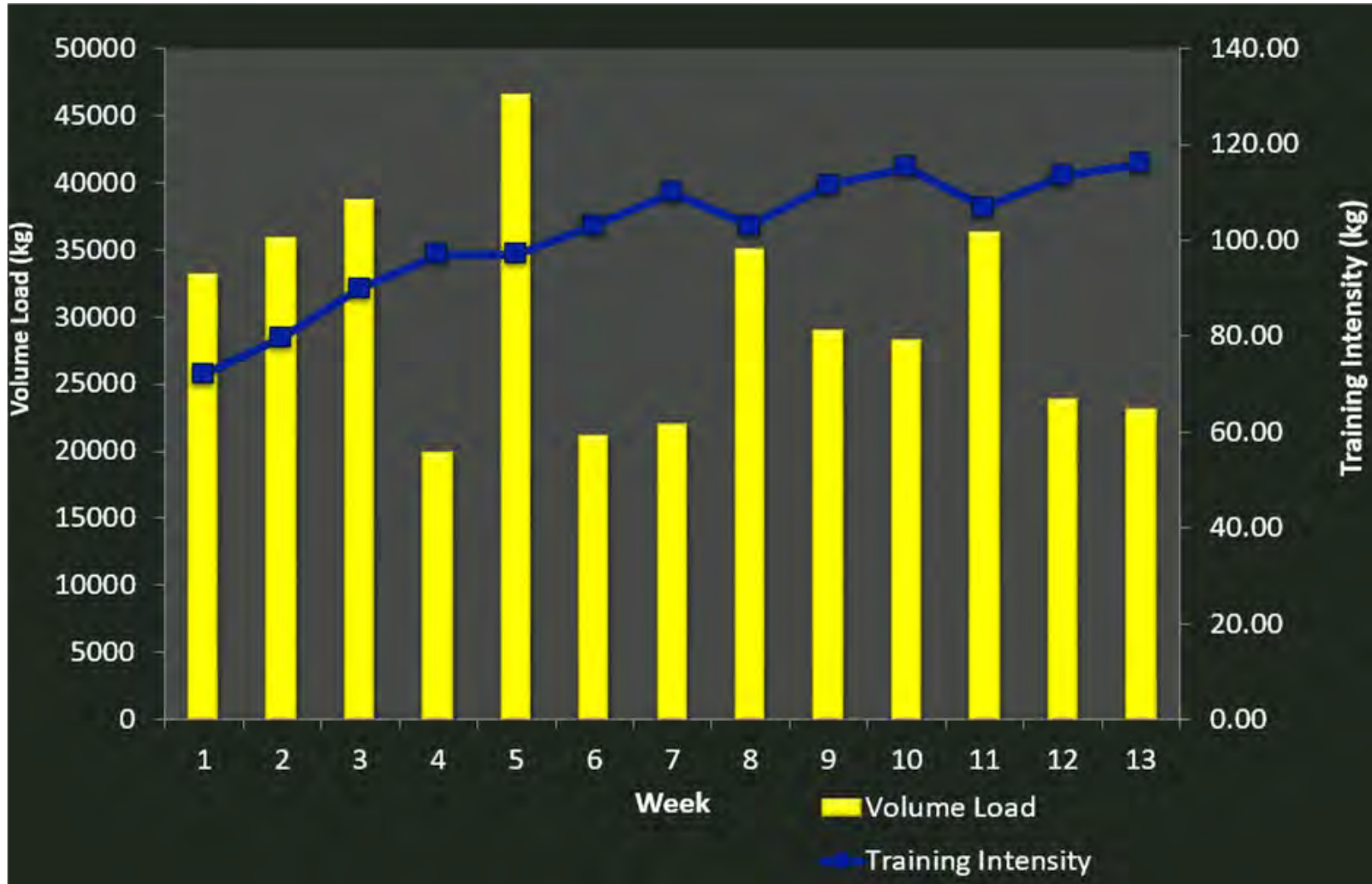
- Very minimal catching (no?) catching for high reps (e.g. 10)
- Utilization of cluster sets
- Overload power position
- Overload SSC
- Employ a range of loads



Annual Periodization Plan for Baseball



Fall Semester



Block 1: Strength Endurance

BLOCK 1 Emphasis: Strength Endurance
W1 3x10
W2 3x10
W3 3x10
W4 3x5

BLOCK 1: Pulling Exercises
Clean Pull from Floor
Snatch pull from Power Position
Clean Grip Stiff Legged Deadlift

BLOCK 1: Relevant Exercises
Overhead Squat (light)
Behind Neck Press



Block 2: Strength

BLOCK 2 Emphasis: Strength
W1 3x10
W2 3x5
W3 3x5



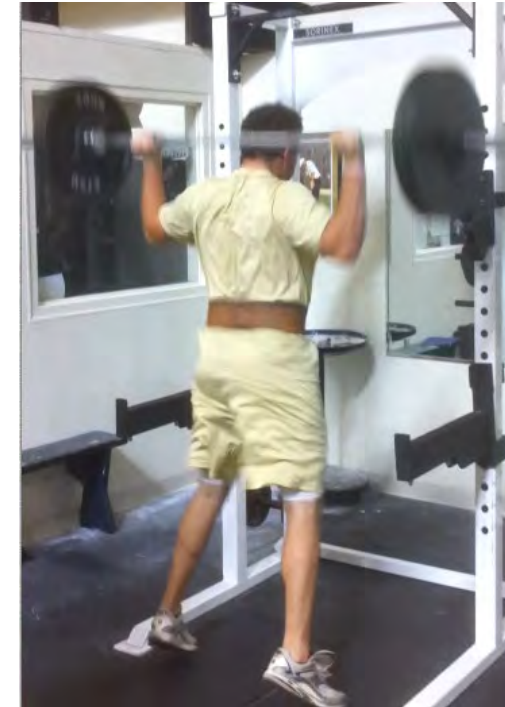
BLOCK 2: Pulling Exercises
Clean Pull from knee
Hang Power Snatch
Clean Pull from Power Position
Snatch Grip Stiff Legged Deadlift

BLOCK 2: Relevant Exercises
Front Squat
Behind the Neck Push press

Block 3: STRENGTH, power

BLOCK 3: STRENGTH > Power
W1 5x5
W2 3x5
W3 3x3

BLOCK 3: Pulling Exercises	BLOCK 3: Relevant Exercises
Clean Grip Shoulder Shrugs	Barbell Jump Squats
Power Clean	Behind the Neck Push Press
Clean Grip Stiff Legged Deadlift	Overhead Med Ball Throw



Block 4: Power

BLOCK 4: POWER
W1 5x5
W2 3x3
W4 3x2

BLOCK 4: Pulling Exercises
Hang Power Snatch
Snatch Pull from Floor
Snatch Grip Stiff Legged Deadlift

BLOCK 4: Relevant Exercises
PAP Box Jump Protocol
Behind Neck push Jerk



Athlete Monitoring

Isometric Mid-thigh Clean Pull

Group	IPF	RFD
1 st year Avg.	4150 ± 615	6835 ± 2696
2 nd year Avg.	4541 ± 737	8719 ± 1998
3 rd year Avg.	5331 ± 477	10821 ± 2114



In-Season

Various Blocks: Pulling Exercises

- Clean Pull from Power Position
- Snatch Pull from Power Position
- Clean Grip Stiff Legged Deadlift

Various Blocks: Relevant Exercises

- One Third Squat
- Quarter Squat
- Speed Squat

March						
S	M	T	W	T	F	S
1 Team A	2 Lift	3 Team B	4 Cond.	5 Lift	6 Team C	7 Team C (double header)
8	9 Lift	10 Team D	11 Cond.	12 Lift	13 Team E	14 Team E Cond. AM
15 Team E	16 Lift	17 Team F	18 Team J Cond. AM	19 Lift	20 Team G	21 Team G (double header)
22	23 Lift	24 Team F	25 Cond.	26 Lift	27 Team H	28 Team H (double header)
29	30 Lift	31 Team I				

- Conference Game
- Hard Conference Game
- Hard non-conf game
- Medium Non-conf game
- Easy Non-conf game

Thank You!!!

Collaboration and Insight

- Dr. Andrew Layne
- Dr. Mike Stone
- Dr. Tim Suchomel
- Dr. Aaron Cunanan
- Dr. Dylan Suarez

Video Demonstrations

- Bailey Gesteland
- Amanda Barrett
- Lauren White
- Trevor Moore
- Wes Gawel
- Abby Suarez





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