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From the lab to your weight room

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Effect of an Unstable Load on Muscle Activity and Arm Motion during the Bench Press

Effect of an Unstable Load on Muscle Activity and Bar Motion during the Bench Press

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ABSTRACT

Unstable load exercises are typically performed to strengthen stabilizing muscles so they are better adapted for sports participation, injury prevention, and performing activities of daily living. Anecdotal evidence supports training with unstable loads; however, there is little evidence of how control strategies change. PURPOSE: To determine if bench pressing with an unstable load alters muscle activity and bar motion compared to bench pressing with a standard load. METHODS: Twelve male powerlifters (age 28.6 ± 5.2 y, mass 105.6 ± 14.5 kg, height 1.80 ± 0.04 m, lifting experience 9.8 ± 6.0 y, and bench press five-repetition maximum [5-RM] 133.6 ± 30.9 kg) volunteered for this study. Subjects pressed their 5-RM in one stable condition with a standard barbell, and three unstable conditions using a flexible barbell with weights suspended from elastic bands: 1-1/8" medium bands and plates, ½" mini bands and plates, ½" mini bands and kettlebells. Mean muscle activity of the anterior/middle/posterior deltoid, long/medial/lateral triceps, pectoralis major, latissimus dorsi, biceps brachii, trapezius, infraspinatus, supraspinatus, and subscapularis were measured. A Lyapunov exponent (LyE) and sample entropy were calculated to determine differences in bar control. RESULTS: All 5-RMs were significantly ($p \leq 0.05$) different from each other, with the stable condition having the highest 5-RM. Medium bands and plates 5-RM was lower than the stable by 9.1%; mini bands and plates, 19.2%; and mini bands and kettlebells, 32.3%. Muscle activity of the prime movers was greater in the stable condition than all other conditions; except for the medial tricep (no change between stable and medium bands and plates) and the long tricep (stable and medium bands and plates were both greater than conditions with mini bands). Stabilizer muscle activity did not change across conditions except for the biceps, which increased in the all the unstable conditions (medium bands and plates +102%; mini bands and plates, +130%; and mini bands and kettlebells, +173%) compared to the stable condition. Sample entropy indicated that bar movement was significantly less predictable in all unstable conditions when compared to the stable condition in respect to superior/inferior motion. Furthermore, conditions using mini bands were less predictable than the unstable condition using medium bands for superior/inferior motion. Similarly, LyE values showed that bar superior/inferior motion was more variable in all unstable conditions when compared to the stable condition. CONCLUSION: Differences in sample entropy and LyE indicate the unstable loads were more challenging to control, despite decreased loads. Although less weight was used in the unstable 5-RMs, stabilizer muscle activity (except for the biceps) was not different between conditions; suggesting lighter unstable load training (up to 32.3% less load) activates stabilizing musculature no differently than a stable condition.

INTRODUCTION

Training with unstable loads is becoming more popular in gyms, performance centers, and rehabilitation clinics. Flexible barbells and elastic bands are used to increase the instability of the load. The general assumption is that an unstable load will increase activation of stabilizer muscles and strengthen them more effectively than traditional resistance training.

Ostrowski et al. found increased muscle activity of the biceps and left middle deltoid as compared to a normally loaded barbell. Furthermore, there was no decrease in stabilizer muscle activity, even though the unstable load was 60% of single-repetition maximum and the normally loaded barbell was 75% of single-repetition maximum (1).

A secondary analysis on the same dataset found that even though stabilizer muscle activity level was not different between conditions, during the unstable load condition subjects attempted to more tightly constrain how they activated the stabilizer muscles (8). This suggests a different motor control strategy is being utilized to control the unstable load. Coaches commonly refer to this as 'staying tighter'. However there is very limited research focused on unstable load training, with no research comparing different setups or using a well trained group with experience using unstable loads.

METHODS

Twelve competitive male powerlifters (age 28.6 ± 5.2 years, mass 105.6 ± 14.5 kg, height 1.80 ± 0.04 m, 9.8 ± 6.0 years lifting experience, and bench press 5-RM 133.6 ± 30.9 kg) volunteered for this study.

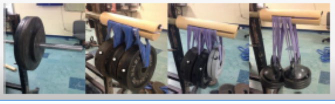
A (5-RM) was determined for each condition (4 sessions):
- Normal bench press (stable)
- 1-1/8" light bands, folded in half suspending center-hole plates (unstable)
- 1/2" mini bands, folded in half suspending center-hole plates (unstable)
- 1/2" mini bands, folded in half suspending kettle bells (unstable)

All unstable pressing conditions utilized a flexible bar (Bandbell, Columbus, OH) with weights suspended from the bar with elastic resistance bands (Serious Steel, Roanoke, VA); Figure 1.

Participants then repeated their 5-RM presses while motion of the bar and electromyography of the superficial musculature (biceps, triceps, deltoids, upper/middle/lower trapezius, pectoralis major, latissimus dorsi, serratus anterior, and infraspinatus) and deep stabilizing musculature (supraspinatus and subscapularis) were recorded. Mean muscle activity was determined for both concentric and eccentric portions of the lift. Bar motion was analyzed by estimating the Lyapunov exponent (LyE) of the filtered trajectory of a marker placed on the end of the bar and by numerical estimation of sample entropy (SE) of the same trajectories. LyE was estimated using a method similar to Wolf's algorithm (2).

Differences in muscle activity analyzed using a multivariate analysis of variance (MANOVA; condition x phase [concentric vs. eccentric]). A repeated measures ANOVA was used to compare differences in the LyE and SE.

Figure 1: Setup of pressing conditions



RESULTS

Figure 2: Motion of markers and weights

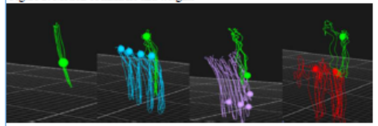


Table 2: Lyapunov Exponent Analysis of Bar Motion, Mean (SD), N=12

	Direction of Movement		
	Superior/Inferior	Mediolateral	Vertical
Stable	0.61 (1.03)	0.79 (1.35)	1.18 (1.10)
1-1/8" Bands and Plates	2.33 (1.93)*	2.08 (2.05)	1.11 (1.23)
1/2" Bands and Plates	2.38 (0.93)*	3.61 (2.40)*	0.89 (0.99)
1/2" Bands and Kettlebells	3.17 (2.48)*	2.60 (1.15)*	1.41 (1.04)

Table 1: Five Repetition Maximum in Pounds, Mean (SD), N=12

	5-RM	% of stable 5-RM
Normal Barbell	294.2 (67.5)	–
1-1/8" Band and Plates	265.8 (53.8)*	90.9 (4.8)
1/2" Bands and Plates	236.7 (55.1)*†	80.8 (7.6)
1/2" Bands and Kettlebells	196.3 (39.0)*†‡	67.7 (8.3)

*Significantly less than Normal Barbell ($p<0.05$)
†Significantly less than 1 1/8" Band and Plates ($p<0.05$)
‡Significantly less than 1/2" Bands and Plates ($p<0.05$)

Table 3: Sample Entropy Analysis of Bar Motion, Mean (SD), N=12

	Direction of Movement		
	Superior/Inferior	Mediolateral	Vertical
Stable	0.03 (0.02)	0.06 (0.03)	0.03 (0.02)
1-1/8" Bands and Plates	0.09 (0.05)*	0.13 (0.10)	0.03 (0.02)
1/2" Bands and Plates	0.16 (0.09)*†	0.17 (0.07)*	0.03 (0.02)
1/2" Bands and Kettlebells	0.14 (0.07)*†	0.20 (0.09)*†	0.04 (0.02)

Overall, the primary movers (pectoralis major, anterior deltoid, and tricep) were significantly more active in the stable condition than all other conditions.
The primary movers, as well as the supraspinatus and infraspinatus were significantly more active during the concentric phase in all conditions.
Of the stabilizers, only the bicep was significantly more active in the stable and 1-1/8" bands and plates condition and during the eccentric phase of all conditions.

Bar path was significantly more variable (Table 2) and less predictable (Table 3) in the superior/inferior and mediolateral directions in the unstable conditions.

DISCUSSION

Activity of the primary movers (pectoralis major, anterior deltoid, and tricep) were significantly more active in the stable condition than all other conditions. This is not surprising as this condition was significantly heavier than any unstable load and would thus require more muscular force to complete the repetitions. Even though 5-RMs decreased by as much as 32.3% in the unstable trials, integrated stabilizer muscle activity was not different across conditions except for the bicep. The bicep was significantly more active in all unstable conditions compared to the stable condition, and more active in the two conditions utilizing the 1/2" bands compared to the 1-1/8" bands and plates condition. These results are similar to those of Ostrowski et al (1) where the biceps were the only stabilizers to become more active in the unstable condition, despite the lower load. This may indicate an increased role of the biceps group as shoulder stabilizers when loading is unstable, possibly as a mechanism by which energy transfer is regulated across the shoulder and elbow joints.

The results of this study confirm that it is more difficult for lifters to control unstable loads while pressing. This is evident not only in the results of the Lye and SE results, but also in the large decreases in 5-RMs when comparing conditions. Most of the stabilizer muscles were not challenged differently across conditions; therefore, it may be that the stabilizing muscles were the limiting factor in all conditions, except for the bicep which seemed to provide increasing support as the load became more unstable. This may also be an insight into how trained individuals react to unstable loads, first fully utilizing the deeper (rotator cuff) shoulder stabilizers, and then relying on the bicep to stabilize and transfer energy across the shoulder and elbow joints. Practitioners should note that even though much less resistance (up to 32.3%) may be utilized for unstable load training, stabilizer muscles are under similar stress levels as a much heavier load in a stable condition.

Acknowledgements:

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References:

1) Ostrowski S, Carlson, LA, Lawrence, MA. Effect of an Unstable Load on Primary and Stabilizing Muscles during the Bench Press. *J Strength Cond Res*: In press, 2016.
2) Wolf A, Swift, J., Swinney, H., Vastano, J. Determining Lyapunov Exponents from a Time Series. *Physica* 16D: 285-317, 1985.

The Population

- 12 males
- 28.6± 5.2 years of age, 105.6 ± 14.5kg, 1.80 ± 0.04m height
- Experienced Powerlifters- 9.8 ± 6.0 years of training
- Bench Press 5RM 133.6 ± 30.9kg

Overview

- There's a lot of unstable load used in popular training today
- Does it work?
- How?
- Is one better than another?

Loading type	5RM (lbs)2	% of Normal 5RM
Normal Barbell	294 (67.5 SD)	-
1-1/8” Band and Plate (bandbell)	265.8 (53.8)	90.9 (4.8)
½” Bands and Plates	236.7 (55.1)	80.8(7.6)
½” Bands and Kettlebells	196.3(39.0)	67.7(8.3)

Lyapunov Exponent Analysis of Bar Motion

Bar Type	Superior/Inferior	Mediolateral	Vertical
Normal	0.61(1.03)	0.79(1.35)	1.18(1.10)
1-1/8” Bands and Plates	2.33(1.93)	2.08(2.05)	1.11(1.23)
½” Bands and Plates	2.38(0.93)	3.61(2.40)	0.89(0.99)
½” Bands and Kettlebells	3.17(2.48)	2.60(1.15)	1.41(1.04)

EMG

- EMG readings were higher for each unstable load, congruent with Lyapunov
  - Biceps only though received the greatest increase
    - Indicates role of biceps in shoulder stabilization
  - No other changes indicate it has a similar intensity muscularly

Original Questions

- Does it work?
  - Yes. There are differences of the types of resistances
- How
  - Instability causes the same activation with a reduced load
    - 2/3's of the load and same effect on the muscles
- Is one better than another?
  - No. Just different

My take on it

- Unstable loads serve as an alternative
- Athletes experiencing joint pain may benefit
  - Think older offensive and defensive linemen
- You can potentially increase strength at reduced loads
- Remember- this was done with experience powerlifters, use caution when going heavy with this movement with athletes.

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No Effect of Smelling Salts on Vertical Jump Height or Sprint Time

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No Effect of Smelling Salts on Vertical Jump Height or Sprint Time

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ABSTRACT

The use of inhalants in weightlifting, resistance lifting sports, and field sports have been popularly reported to psych up athletes so they can perform at a higher level. However, there is little scientific research on their use, particularly related to non-resistance explosive performance. **PURPOSE:** To investigate the effects of inhalants on vertical jump height and sprint time. **METHODS:** Eight men and three women with at least two years of resistance training experience volunteered to participate (age=24.4±2.2yrs, ht=171.53±9.57cm, mass=77.52±11.03kg). The first day was used as baseline (B) with no inhalant. Subsequent days were three random conditions of inhaling a smelling salt (S), menthol oil (M), or high potency ammonia (HP). Participants performed three countermovement vertical jumps on a force plate and two 20m sprints indoors on a basketball floor with electronic timing gates. Before each trial of jump or sprint, they took a deep breath of one of the inhalants through the nose then waited 30s before testing. The best of the trials was used for analysis. **RESULTS:** For vertical jump height, a 1x4 ANOVA revealed no significant differences between conditions (B=57.32 6.16cm; S=56.98±7.82cm; M=57.73±7.60cm, HP=56.97±7.51cm).There were also no differences for 20m sprint time (B=3.39±0.21s; S=3.36±0.16s; M=3.38±0.19s, HP=3.37±0.18s). **CONCLUSIONS:** Inhalants did not enhance vertical jump or sprint performance compared to baseline. **PRACTICAL APPLICATIONS:** Strength coaches should not encourage their athletes to use inhalants prior to explosive performance.

INTRODUCTION

The use of inhalants in weightlifting, resistance lifting sports, and field sports have been popularly reported to psych up athletes so they can perform at a higher level. However, there is little scientific research on their use, particularly related to non-resistance explosive performance.

PURPOSE

To investigate the effects of inhalants on vertical jump height and sprint time.

METHODS

Eight men and three women with at least two years of resistance training experience volunteered to participate (age=24.4±2.2yrs, ht=171.53±9.57cm, mass=77.52±11.03kg). The first day was used as baseline (B) with no inhalant. Subsequent days were three random conditions of inhaling a smelling salt (S), menthol oil (M), or high potency ammonia (HP) (Figure 1). Participants performed three countermovement vertical jumps (Figure 2) on a force plate and two 20m sprints indoors on a basketball floor with electronic timing gates (Figure 3). Before each trial of jump or sprint, they took a deep breath of one of the inhalants through the nose then waited 30s before testing. The best of the trials was used for analysis.

Figure 1. Inhalants.

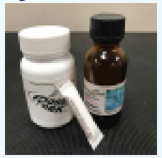

Figure 2. Vertical jump.

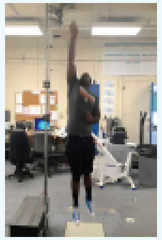

Figure 3. 20 meter sprint.

RESULTS

For vertical jump height, a 1x4 ANOVA revealed no significant differences between conditions (Table 1).There were also no differences for 20m sprint time (Table 1).

Table 1. Mean and (SD) of vertical jump (VJ) height and 20 meter sprint time by condition.

	Baseline	Menthol	Smelling Salts	High Potency Ammonia
VJ (cm)	57.32 (6.16)	57.73 (7.60)	56.98 (7.82)	56.97 (7.51)
20 m sprint (s)	3.39 (0.21)	3.38 (0.19)	3.36 (0.16)	3.37 (0.18)

CONCLUSIONS

Inhalants did not enhance vertical jump or sprint performance compared to baseline.

PRACTICAL APPLICATIONS

Strength coaches should not encourage their athletes to use inhalants prior to explosive performance.

- Does it work?
- How?

The Population

- 8 men, 3 women
- 24.4± 2.2yrs of age
- 1.71 ±.09m height
- 77.52 ±11.03kg mass
- 2+ years of resistance training

What they did

- 4 testing days for CMJ and 20m sprint on a basketball court
- Pre-test- no inhalant
- Subsequent Tests- inhalant use
  - Smelling Salt
  - Menthol
  - High Potency Ammonia
  - Deep breath of inhalant through nose, wait 30 seconds and do the test

Results

Test	Baseline	Menthol	Smelling Salts	High Potency Ammonia
Vertical (cm)	57.32 (6.16)	57.73 (*7.60)	56.98 (7.82)	56.97 (7.51)
20 m Sprint	3.39 (0.21)	3.38 (0.19)	3.36 (0.16)	3.37 (0.18)

- Does it work?
  - No.
- How?
  - It doesn’t work, so there’s no how

My take on it

- The inhalant fad is just that
  - There's nothing to it
- What about powerlifting?
  - That is sports specific
    - The proximity of time to powerlifting may be a factor
      - Immediate vs 30 second delay
    - HOWEVER- you can't use inhalants on the field of play.

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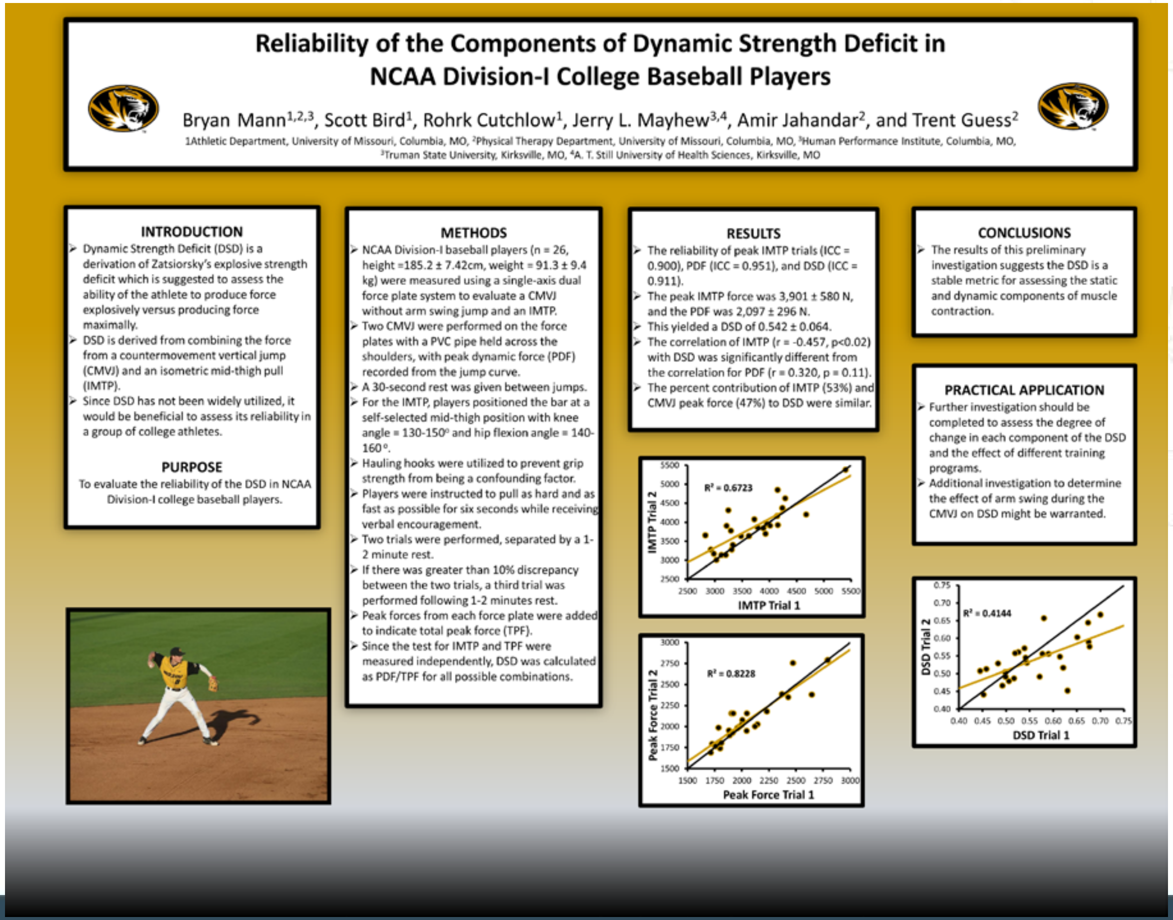
Relaibility of the components of the Dynamic Strength Deficit in NCAA Division 1 College Baseball Players



Reliability of the Components of Dynamic Strength Deficit in NCAA Division-I College Baseball Players

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INTRODUCTION

- Dynamic Strength Deficit (DSD) is a derivation of Zatsiorsky's explosive strength deficit which is suggested to assess the ability of the athlete to produce force explosively versus producing force maximally.
- DSD is derived from combining the force from a countermovement vertical jump (CMVJ) and an isometric mid-thigh pull (IMTP).
- Since DSD has not been widely utilized, it would be beneficial to assess its reliability in a group of college athletes.

PURPOSE

To evaluate the reliability of the DSD in NCAA Division-I college baseball players.

METHODS

- NCAA Division-I baseball players (n = 26, height =185.2 ± 7.42cm, weight = 91.3 ± 9.4 kg) were measured using a single-axis dual force plate system to evaluate a CMVJ without arm swing jump and an IMTP.
- Two CMVJ were performed on the force plates with a PVC pipe held across the shoulders, with peak dynamic force (PDF) recorded from the jump curve.
- A 30-second rest was given between jumps.
- For the IMTP, players positioned the bar at a self-selected mid-thigh position with knee angle = 130-150° and hip flexion angle = 140-160°.
- Hauling hooks were utilized to prevent grip strength from being a confounding factor.
- Players were instructed to pull as hard and as fast as possible for six seconds while receiving verbal encouragement.
- Two trials were performed, separated by a 1-2 minute rest.
- If there was greater than 10% discrepancy between the two trials, a third trial was performed following 1-2 minutes rest.
- Peak forces from each force plate were added to indicate total peak force (TPF).
- Since the test for IMTP and TPF were measured independently, DSD was calculated as PDF/TPF for all possible combinations.

RESULTS

- The reliability of peak IMTP trials (ICC = 0.900), PDF (ICC = 0.951), and DSD (ICC = 0.911).
- The peak IMTP force was 3,901 ± 580 N, and the PDF was 2,097 ± 296 N.
- This yielded a DSD of 0.542 ± 0.064.
- The correlation of IMTP (r = -0.457, p<0.02) with DSD was significantly different from the correlation for PDF (r = 0.320, p = 0.11).
- The percent contribution of IMTP (53%) and CMVJ peak force (47%) to DSD were similar.

CONCLUSIONS

- The results of this preliminary investigation suggests the DSD is a stable metric for assessing the static and dynamic components of muscle contraction.

PRACTICAL APPLICATION

- Further investigation should be completed to assess the degree of change in each component of the DSD and the effect of different training programs.
- Additional investigation to determine the effect of arm swing during the CMVJ on DSD might be warranted.

- Does it work?
- How?
- Is one better than another?

Overview

- College Baseball Players
- N=26
- Height 185.2± 7.42cm
- Mass 91.3± 9.4kg

- The DSD (aka DSI)
  - Explosive strength/Absolute Strength
  - CMJ/IMTP
- Countermovement jump- no armswing- 2 attempts
  - Dual Single Axis Force plate
    - Peak Force metric used
- Isometric Midthigh Pull- 2 attempts
  - Dual Single Axis Force plate- Metal hooks used for grip
    - Peak Force metric used

Results

- Reliability of trials were good
  - IMTP- ICC=.900
  - CMJ- ICC=.951
  - DSD- ICC-=.911

Questions?

- Does it work?
  - It is reliable.
- How?
  - It illustrates how much force someone can express in time restricted and non time restricted domains
- Is one better than the other?
  - Both are considered important to athletics
    - Strength and COD, Injury resistance/resilience
    - Power in power based sports

My Take on it

- Everything needs context
  - Based off of Sheppard's work
    - IMTP- if below 5x's bodyweight, get them stronger

DSI Table

Rating	DSI	Training Emphasis Recommendation
Low	<0.60	Ballistic Strength Training
Moderate	0.60-0.80	Concurrent Training
High	>0.80	Maximal Strength Training

Relationship Between Mean Barbell Velocity and %1RM with Power for Trap Bar Deadlift and Bench Press in D1 Hockey

RELATIONSHIP BETWEEN MEAN BARBELL VELOCITY AND %1RM WITH POWER FOR TRAPBAR DEADLIFT AND BENCH PRESS IN DIVISION-I COLLEGE HOCKEY PLAYERS

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ABSTRACT

The use of velocity based training (VBT) has become common for prescription of exercise load in recent years. As research translates from laboratory to practice, some unknowns still exist. Most notable is the fact that most exercises have been performed in rigidly controlled environments, typically using a Smith machine to eliminate extraneous motion. It would be beneficial to determine if employing typical weight room exercises produces similar relationships between percent one-repetition maximum (%1RM) and mean bar velocity (MBV). **PURPOSE:** To determine the relationship between MBV and %1RM for free weight bench press (BP) and trap bar deadlift (TDL). **METHODS:** NCAA Division-I hockey players (n= 22, age= 21.0 ± 1.5 yrs, height= 182.9 ± 7.3 cm, weight= 86.2 ± 7.3 kg) performed a standard progression to establish 1RM for each exercise. A portable accelerometer was used to measure MBV at selected %1RM between 60-90 %1RM for each exercise. Multiple repetitions were performed at each %1RM, and the best MBV from each set was utilized for analysis. BP was performed with a self-selected grip using a standard free-weight bar. TDL was performed by standing to an erect position as fast as possible while maintaining a straight back. Mean power (MP) was calculated from load and MBV. **RESULTS:** The correlation between MP and MBV was significantly higher for BP (r = 0.93) than for TDL (r = 0.83). The slope and intercept for the BP (MP = 618.1 MBV + 81.6) regression equation were significantly less than TDL (MP = 999.3 MBV + 284.9). The correlation between %1RM and MP was significantly higher for BP (r = 0.80) than for TDL (r = 0.57). The slopes for the regression equations of BP (MP = – 7.21 %1RM + 908.0) and TDL (MP = – 8.48 %1RM + 1468.8) were not significantly different, but the intercept for the BP regression equation was significantly less than for the TDL regression (908.0 and 1468.8, respectively). For every 10% increase in %1RM, MBV decreases linearly by 0.13 m/s for BP and 0.11 m/s for TDL. **CONCLUSION:** MBV appears to be a more accurate predictor of MP than %1RM for both BP and TDL free weight exercises in college hockey players. **PRACTICAL APPLICATION:** MBV can be utilized to determine appropriate training loads (%1RM) in each exercise investigated. MBV appears to be an effective means of accounting for the individual differences and assessment of daily status when determining the maximal training stimulus.

INTRODUCTION

- Velocity-based training (VBT) has emerged as the premier technique for prescribing training loads.
- The strict confines of the laboratory are now being translated to the field setting to improve training.
- Thus, it would be beneficial to utilize a typical weight room exercise to evaluate strength of the relationship between percent one-repetition maximum (%1RM) and mean bar velocity (MBV).

PURPOSES

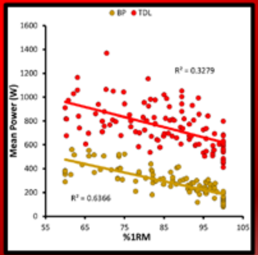
The purpose of this study was To determine the relationship between MBV and %1RM for free weight bench press (BP) and trap bar deadlift (TDL) in college hockey players.

METHODS

- NCAA Division-I hockey players (n= 22, age= 21.0 ± 1.5 yrs, height= 182.9 ± 7.3 cm, weight= 86.2 ± 7.3 kg) performed a standard progression to establish 1RM for BP and TDL.
- A portable accelerometer was used to measure MBV at selected %1RM between 60-90 %1RM for each exercise.
- Multiple repetitions were performed at each %1RM, and the best MBV from each set was utilized for analysis.
- BP was performed with a self-selected grip using a standard free-weight bar.
- TDL was performed by standing to an erect position as fast as possible while maintaining a straight back.
- Mean power (MP) was calculated from load and MBV.

RESULTS

- The correlation between MP and MBV was significantly higher for BP (r = 0.93) than for TDL (r = 0.83).
- The slope and intercept for the BP (MP = 618.1 MBV + 81.6) regression equation were significantly less than TDL (MP = 999.3 MBV + 284.9).
- The correlation between %1RM and MP was significantly higher for BP (r = 0.80) than for TDL (r = 0.57).
- The slopes for the regression equations to estimate mean power for BP (MP = – 7.21 %1RM + 908.0) and TDL (MP = – 8.48 %1RM + 1468.8) were not significantly different.
- The intercept for the BP regression equation was significantly less than for the TDL regression (908.0 and 1468.8, respectively).
- For every 10% increase in %1RM, MBV decreases linearly by 0.13 m/s for BP and 0.11 m/s for TDL.

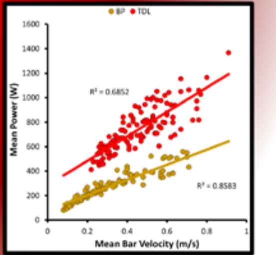


CONCLUSIONS

- MBV appears to be a more accurate predictor of MP than %1RM for both BP and TDL free weight exercises in college hockey players.
- The SEE decreased from 43 W (BP) and 102 W (TDL) to 27W (BP) and 76 W (TDL) as the MBV decreased from 0.62 to 0.20 m/s.

PRACTICAL APPLICATION

- MBV can be utilized to determine appropriate training loads (%1RM) in each exercise investigated. MBV appears to be an effective means of accounting for the individual differences and assessment of daily status when determining the maximal training stimulus.



Overview

- N=22
- Age 21± 1.5 years
- Height =1.82 ± .07m
- Weight= 86.2 ± 7.3kg

All D1 Hockey Players

- Subjects were measured while performing 1RM test
- Instruction was to complete the concentric portion of the lift rapidly
  - This is the same instruction as during a normal training session

Results

- Mean Velocity has better relationship to power than % of 1RM
- Mean Velocity can be used to predict 1RM
- For every 10% increase in % of1RM, MBV decreases 0.13m/s for bench press and 0.11m/s for trap bar deadlift
  - Congruent with general recommendation of .06m/s for every 5% of 1RM
- Increasing load decreased standard error for power
  - Decreased time spent decelerating barbell

- Does it work?
  - Yes, to predict 1RM
- How?
  - Concrete relationship between % and velocity
- Is one better than another?
  - Velocity is better at predicting power than 1RM

My Take

- Use velocity to enhance power

Contact info

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My Last Challenge as Chair of the SIG

- If you want to find out what works or what doesn't, get your info out there
- Work with a local professor or contact me and we'll put you in touch with those who can help

Science & Practice

- For those who say science is behind them- it’s your fault
- For those who complain of no applicable research due to populations- it’s your fault
- You must publish work
- You must push the field
- Figure out what works and why later
  - Practitioner vs Researcher

How to get it published?

- Abstracts are due March 1 to the NSCA
- Must come to the NSCA National Conference if accepted
- Why do it?
  - 1) Push the field
  - 2) 1.0 CEU per abstract accepted
    - Great way to earn distinction
    - Great way to get greater insight into your program