



# Velocity Based Training

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# What is VBT?

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- Technology that measures the speed at which a person is training at.
- Positive response to training (Zhang et al, 2022).





# Literature

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Positive effects on competition season training stimulus, reduced training stress and power specific adaptations (Orange et al, 2019).

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Male beach volleyball players saw an increase in CMJ with a 10% velocity loss cut off for quarter squats (Aquino et al, 2025).

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Percentage based training and VBT training yielded the same strength results, but VBT induced greater gains in peak velocity of CMJ, sprinting speed, and change of direction (Banyard et al, 2021).

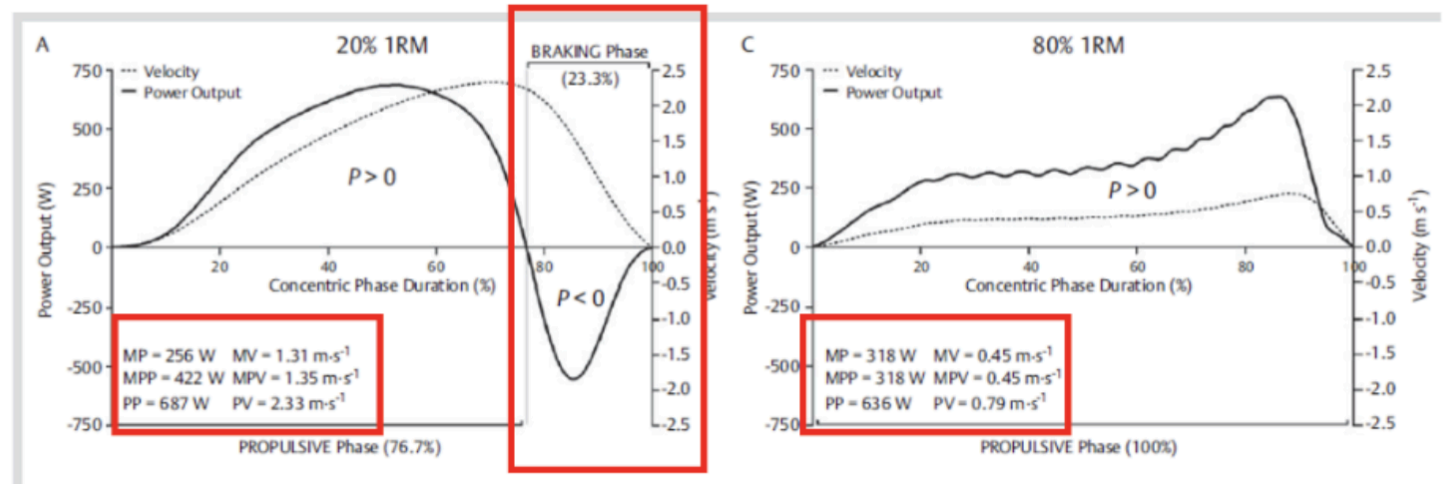
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Velocity loss as little as 10% showed increases in neuromuscular gains (Rodríguez-Rosell et al, 2020) with no significant difference in strength gains (Pareja-Blanco et al, 2020).

# Mean Propulsive Velocity (MPV) vs Mean Velocity (MV)

Figure 4. Concentric phase of one repetition with 20% 1RM and one with 80%1RM in the bench press exercise

- MPV → lighter loads and accurate relative load to 1RM (González-Badillo & Sánchez-Medina, 2010)
- MV → ballistic and heavy loads (García-Ramos et al, 2018).

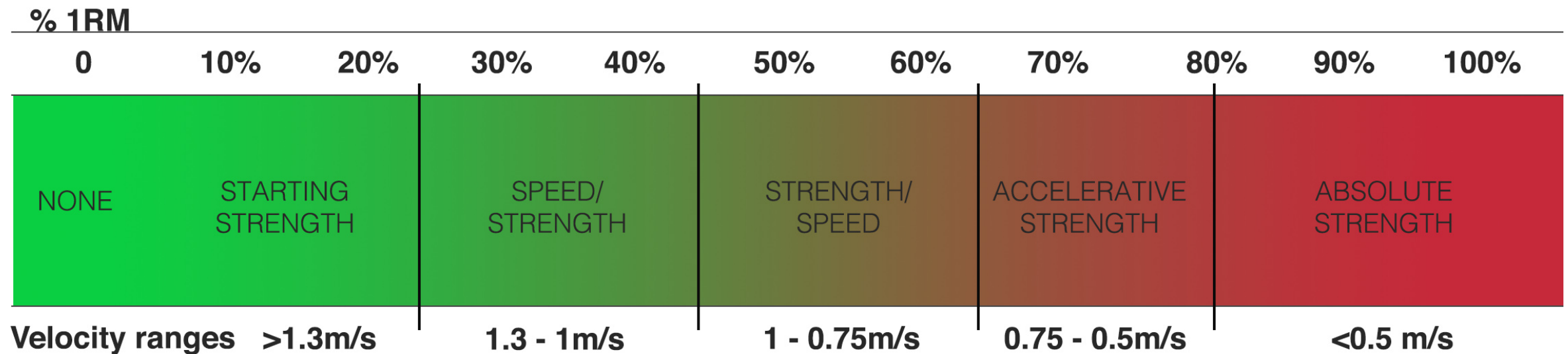


Adapted from Sanchez-Medina et al. (2010)



# Velocity Zones

## VELOCITY ZONES



# Load Velocity Profile

**MEAN PROPULSIVE VELOCITY (m/s)  
FOR EACH % OF 1RM**

**VBT**

**VITRUVUS**

|                |                                                                                       | 1RM                                                                                                        | 95%  | 90%  | 85%  | 80%  | 75%  | 70%  | 65%  | 60%  | 55%  | 50%  | 45%  | 40%  |
|----------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Bench Pull     |    | Sánchez Medina et al (2014) Prone lying rowing on bench with Smith machine                                 |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.53                                                                                                       | 0.59 | 0.65 | 0.72 | 0.78 | 0.85 | 0.92 | 0.99 | 1.06 | 1.13 | 1.21 | 1.28 | 1.36 |
| Back Squat     |    | Sánchez Medina et al (2014) Deep squat with Smith Machine and pauses                                       |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.32                                                                                                       | 0.42 | 0.51 | 0.59 | 0.68 | 0.76 | 0.84 | 0.92 | 1.00 | 1.07 | 1.14 | 1.21 | 1.28 |
| Pull Up        |    | Sánchez Moreno et al. (2017) Prone Pull up                                                                 |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.22                                                                                                       | 0.31 | 0.39 | 0.50 | 0.57 | 0.65 | 0.74 | 0.83 | 0.91 | 1.00 | 1.09 | -    | -    |
| Military Press |    | Muñoz et al. (2014) Militar Press behind the neck with Smith Machine                                       |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.20                                                                                                       | 0.27 | 0.34 | 0.41 | 0.49 | 0.55 | 0.62 | 0.69 | 0.75 | 0.81 | 0.86 | 0.92 | 0.97 |
| Bench Press    |    | González Badillo and Sánchez Medina (2010): Bench press with Smith machine and pauses                      |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.18                                                                                                       | 0.25 | 0.32 | 0.39 | 0.47 | 0.55 | 0.62 | 0.70 | 0.78 | 0.87 | 0.95 | 1.07 | 1.13 |
| Deadlift       |   | Helms et al. 2017: Dead-lift with expert powerlifters 1RM=237,3kg                                          |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.14                                                                                                       | 0.21 | 0.29 | 0.37 | 0.46 | -    | -    | -    | -    | -    | -    | -    | -    |
| Hip Thrust     |  | Hoyo, M, Núñez et al (2017) Predicting Loading Intensity Measuring Velocity in Barbell Hip Thrust Exercise |      |      |      |      |      |      |      |      |      |      |      |      |
|                |                                                                                       | 0.24                                                                                                       | -    | 0.36 | -    | 0.48 | -    | 0.6  | -    | 0.72 | -    | -    | -    | -    |

# Velocity Loss (VL)

10% VL and 30% VL = same hormonal response, 10% VL = greater neuromuscular gains, no significant strength gains differences  
(Rodríguez-Rosell et al, 2020, Pareja-Blanco et al, 2020)

| Group | 70% of 1RM<br>AVG Reps = 9.6 |     |     | 75% of 1RM<br>AVG Reps = 7.7 |     |     | 80% of 1RM<br>AVG Reps = 6.0 |     |     | 85% of 1RM<br>AVG Reps = 4.5 |     |     |
|-------|------------------------------|-----|-----|------------------------------|-----|-----|------------------------------|-----|-----|------------------------------|-----|-----|
| VL    | Reps                         | RIR | RPE | Reps                         | RIR | RPE | Reps                         | RIR | RPE | Reps                         | RIR | RPE |
| 0     | 1.0 ± 0.0                    | 8.6 | 1.4 | 1.0 ± 0.0                    | 6.7 | 3.3 | 1.0 ± 0.0                    | 5.0 | 5   | 1.0 ± 0.0                    | 3.5 | 6.5 |
| 10    | 3.7 ± 0.9                    | 5.9 | 4.1 | 3.1 ± 0.8                    | 4.6 | 5.4 | 2.5 ± 0.9                    | 3.5 | 6.5 | 2.2 ± 0.9                    | 2.3 | 7.7 |
| 20    | 4.2 ± 1.2                    | 5.4 | 4.6 | 3.8 ± 1.2                    | 3.9 | 6.1 | 2.9 ± 0.8                    | 3.1 | 6.9 | 2.3 ± 0.8                    | 2.2 | 7.8 |
| 40    | 7.6 ± 2.5                    | 2.0 | 8.0 | 7.0 ± 2.3                    | 0.7 | 9.3 | 5.3 ± 1.5                    | 0.7 | 9.3 | 4.3 ± 1.5                    | 0.2 | 9.8 |

Data from Pareja-Blanco et al. (2020); cross-referenced with data from Rodríguez-Rosell et al. (2019).  
VL = Velocity Loss; RIR = Repetitions in Reserve; RPE = Rating of Perceived Exertion; AVG = Average.



# What does it all mean?

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- Minimum effective dosage
- Individual feedback to daily training load and intensity
- Limiting overtraining and non-functional overreaching



# Strengths and Limitations

## Strengths

- Safe and effective
- Athlete conversations
- Individual
- Instant feedback

## Limitations

- Time
- Cost

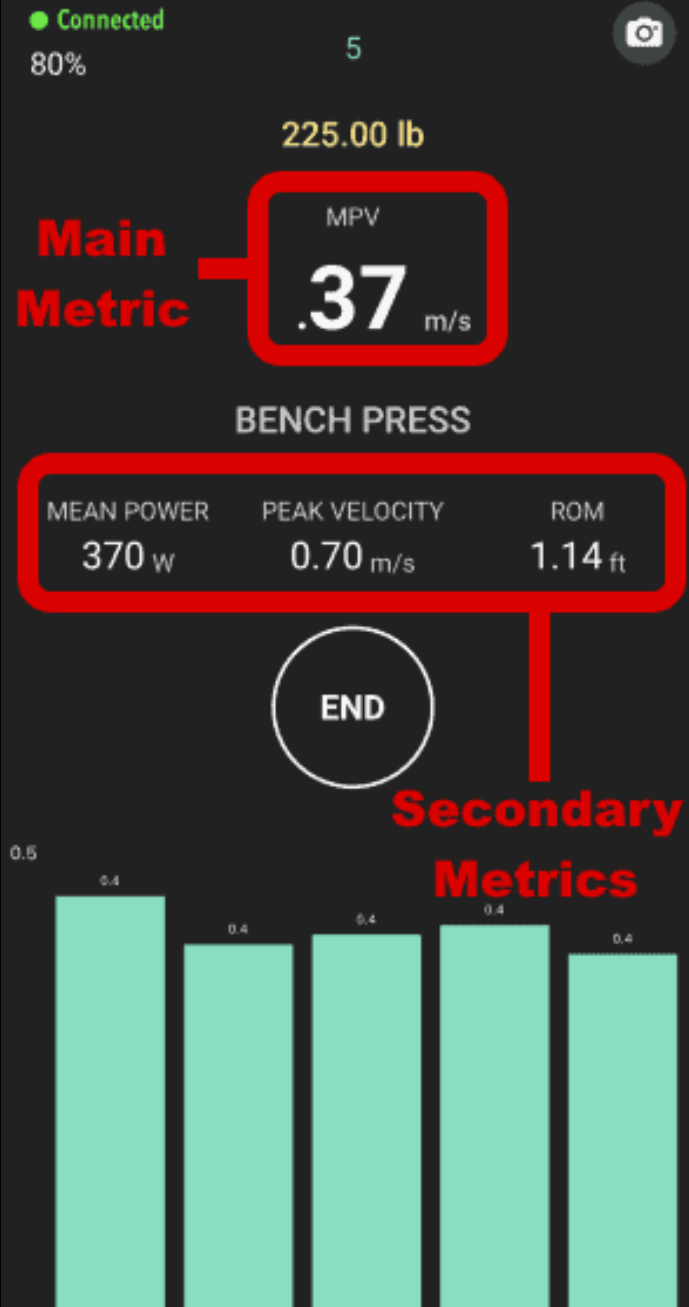
## Future Research

- Female data

The background is a collage of financial data visualizations. It includes a line chart at the top left with a y-axis from 110 to 150 and an x-axis with days of the week. A bar chart is at the top right. A large, semi-transparent number '262.28' is on the left. A line chart with a y-axis from 150 to 170 is in the middle. A large, semi-transparent number '3457.71' is in the middle right. A table titled 'Stock Market Report' is at the bottom right, containing numerical data. The entire image has a warm, orange-brown color scheme with a grid pattern.

# Part 2: Future Application





Colby-Sawyer  
VBT







# Hex Bar Deadlift

4 x 5, 5, 4, 2 - Stay within 10 lbs of the percentages, talk to a coach if you have questions



☐ Update all future occurrences of this exercise on this calendar

## Exercise Name

Hex Bar Deadlift

## Sets

4

## Reps/Time

Reps

CUST

☐ Each Side  
Left & Right Side

## Custom Reps

5

5

4

2

Set 1

Set 2

Set 3

Set 4

## ☒ Custom Percentages

%

%

%

%

Set 1

Set 2

Set 3

Set 4

## ☐ Prescribe Load

## Additional Information (optional)

Stay within 10 lbs of the percentages, talk to a coach if you have

Instructions specific to this workout (max 255 chars.)

## Workout Grouping

B

Used for Supersets

## Tempo

Exercise tempo

## Rest Time

120

Rest (secs) between sets

## Additional Options

☐ Completion Lift  
No user input

☐ Body Weight Lift  
Input # of Reps only

☐ Coach Completion  
Coach inputs data

☐ Disable Max Tracking  
Will not update max

☐ Force Max/PR Update  
Replaces current Max/PR

☐ Peak Power

☒ Track Rep Count

☒ Track Volume Load

☒ Bar Speed  
Adds m/s input



**SUPERSET 1 OF 2**



## REPS

## PEAK VELOCITY

200

5

0.81

**⌚ REST TIMER (120 SECS)**

210

5

0.72

**⌚ REST TIMER (120 SECS)**

220

4

**0.56**

**⌚ REST TIMER (120 SECS)**

230

2

0.45

# History

17  
DEC  
WED  
2025

|    |      |      |      |      |
|----|------|------|------|------|
|    | 1    | 2    | 3    | 4    |
|    | 200  | 210  | 220  | 230  |
|    | 5    | 5    | 5    | 4    |
| ry | 0.83 | 0.79 | 0.65 | 0.54 |

ormation

17  
DEC  
WED

|           |      |      |      |      |
|-----------|------|------|------|------|
|           | 1    | 2    | 3    | 4    |
|           | 200  | 210  | 220  | 230  |
|           | 5    | 5    | 4    | 2    |
| <b>TY</b> | 0.81 | 0.72 | 0.56 | 0.45 |

formation

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