



eBook

Training with velocity

A lifters guide to applying velocity
based training in the gym

1st edition
Jacob Tober

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DISCLAIMER

TLDR: Be smart, lift safely and don't push through injury or pain. This program does not substitute medical advice.

This is an intermediate to advanced program, through the training blocks you will be expected to make estimates for training loads and rep ranges. If you do not have experience doing this, or are uncomfortable with your ability to do so safely then continuing with this program is not recommended. Do not complete heavy lifts without supervision, a spotter, or appropriate and correctly installed safety equipment.

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BEFORE YOU START

WHAT IS VELOCITY BASED TRAINING?

Strength training is a numbers game.

How much weight, how many reps and how long you rest between sets all play a crucial role in driving training outcomes.

But there is a problem.

These numbers only paint half the picture. Reps and sets quantify the volume of your training, eg. "*how much did I do this session?*" But they provide almost no insight into the quality of your training, eg. "*how well did I perform this session?*".

Yes, you lifted 100kg for five reps, but how well did you lift it? Was it faster than last week? Was the range of motion consistent? Did you fatigue across the set, or maintain your speed for every rep?

THIS IS WHERE VELOCITY COMES IN.

Velocity is the missing metric in your training, enabling an objective way to track training quality in real-time.

With velocity based training you can answer all these questions and calibrate your training accordingly. When applied well, velocity tracking enables precise optimisation of the training dosage, minimises excessive fatigue, and helps achieve greater gains in strength and power.

Unlike many subjective methods of auto-regulation, it's hard to cheat on velocity. As long as you don't compromise technique,

there is no disguising a slow day and there aren't many shortcuts to increasing bar speed for a given movement.

Regular velocity tracking helps us better understand readiness in real time, while helping shift focus towards lifting with intent on every single set, instead of just chasing more and more weight on the bar for your top sets of the day.

VELOCITY RECORDING TECHNOLOGY

This program requires you to record velocity for certain key exercises every training session.

In order to follow this 12 week program you will need a method for tracking and recording your velocity. There are a number of VBT products, so do a little research before you pick which is right for your budget and needs.

Errors in data are not uncommon for some technologies, so take the velocity measurements as a guideline, and not a hard and fast rule.

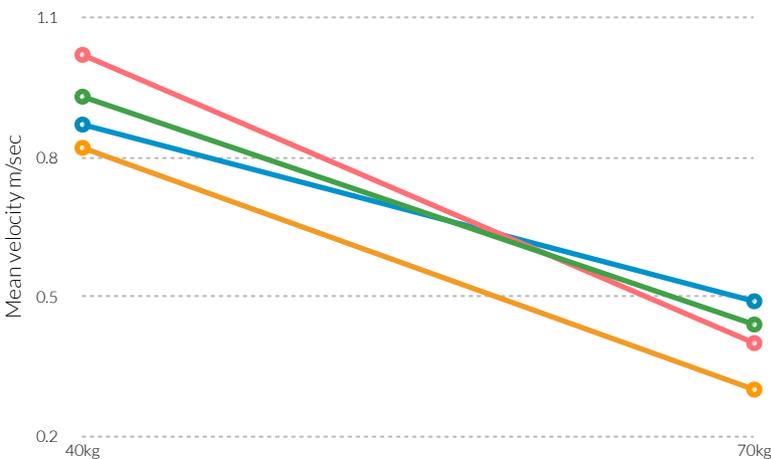


Fig1: Four different devices recording a fast and light set

Without passing judgement on any one particular VBT product, most research points to linear positional transducers (stringed devices) and camera based systems being more precise and consistent, while accelerometers seem to be less consistent and reliable (this has also been my anecdotal experience).

Whatever option you choose, it is safe to assume that specific device it will remain fairly consistent to itself as long as it is used according to the specifications. Just be aware that mixing different velocity tracking devices (even from the same producer) will likely result in discrepancies in your lifting velocity between sessions.

If you are using a less precise velocity tracking device or method, I recommend a blended approach to data collection. Combine the velocity information with your own subjective assessment of a given set to help make decisions.

NUMBERS AND METRICS TO FOCUS ON

Throughout the program you will be required to review and analyse data from your velocity recording system to help calibrate your training in real-time.

There are many different metrics and data points available with velocity tracking, but I recommend focusing on just a few. Below is an explanation of the best metric variations to use.

- ▶ Use **mean propulsive velocity** or **mean velocity** as your focus metric throughout this program. Peak velocity is less effective when measuring strength movements and can be an overly sensitive and at times inaccurate.
- ▶ When recording velocity data use the **best single repetition** for each set. Average velocity across a set is heavily

influenced by number of reps completed and does not give an accurate picture of fatigue or readiness over time.

- ▶ **Percentage fatigue** is calculated automatically by most VBT technologies. If yours does not, please use the difference from your best rep (the fastest of the first three reps in a set) and the velocity of your final repetition to calculate the percentage decrement in output (fig 2).

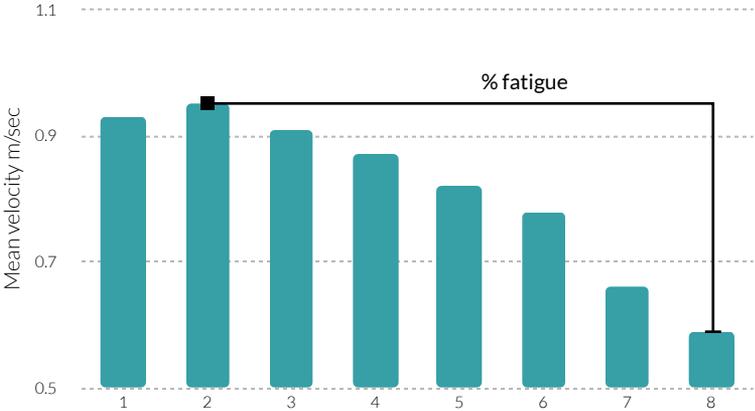


Fig 2: Fatigue as the decrement from the fastest rep to the final rep of a set

HOW THE PROGRAM WORKS

ADJUSTING TO TRAINING WITH VELOCITY

Traditionally, pre-built strength programs have relied on a progression plan based around calculations derived from a 1RM test score.

These programs have you input a 1RM value and plan out a phase of training calculated with percentages and fixed loads, building to a point where strength levels surpass this old maximum and a new maximum can be set or estimated at the end of the training phase.

Unfortunately, these rigid percentage based approaches are flawed: **they do not account for your strength capacity on a given day.** This can lead to the prescription of sessions more than 10% too heavy or light for what would have been optimal.

Velocity tracking allows for a more dynamic and flexible approach to your training loads, allowing you to make accurate and informed decisions about how hard you should push on any given day with real-time data. If you are coming from the world of pre-planned, fixed percentage programs it can be an adjustment to working with velocity, so be patient over the first few weeks as you develop a sense for what the numbers mean!

Tracking your progress, planning repetition targets, and moving through the program may introduce some new concepts that you have not worked with before. Stick with it! In just a few

workouts these new metrics will become second nature, and after a few weeks the results will start speaking for themselves.

This program is designed for intermediate to advanced lifters with a focus on developing maximal strength. The program could be applied to powerlifting, general strength training, in strength and conditioning or athletic development settings.

Lastly, none of the prescriptions in this program are fixed rules. What this program offers is a series of guidelines and frameworks to help you start training with velocity. You may choose to go slightly off-script on some parts of the plan. For example you may need to add or subtract working sets, change up the exercises, or add more accessories, etc.

THE TRAINING BLOCKS

The 12 week program is broken down into four blocks, each building on the one before.

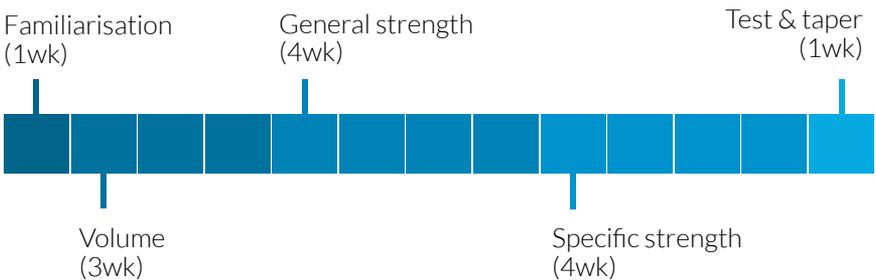


Fig 3: The 12 (or 13) weeks of the training program

You can repeat the program on a continuing loop, rotating exercises or variations and getting stronger each time through the 12 weeks. By rotating exercises and using velocity tracking on a weekly basis means you shouldn't accumulate too much

fatigue, so tapers can be less frequent. On any additional cycles through the 12 week plan, the test/taper week from the last cycle along with the familiarisation week for the next cycle can be merged together.

More details on each of the training blocks can be found in part 3 of this book.

THE WORKOUTS

The program remains fairly consistent through each training block, with two full body workouts (labeled A and B) used in every stage.

You will complete three strength training sessions per week with at 2-3 days rest between each, alternating between the A and B workouts. So in week one you will do A, B, A, then in week two it will go B, A, B, completing three of each session per fortnight.

I particularly like this method of split training as compared to the more typical “On Monday we bench, Wednesday we squat” approach, as it schedules key exercises in a way that they get equal love throughout the training block, instead of always falling on the same day of the working week. It also means that each key exercise is only four to five days apart instead of seven so that if you miss a session you can easily just pick up that missed session without throwing the entire training week out of rhythm and potentially going 14 days without a bench or squat day.

Each workout consists of six exercises; two key lifts, two complementary lifts, and two accessory lifts. In part 3 of this document you will find a breakdown of each training block and a

spreadsheet to help you log your training velocities. There are also print-friendly templates with space for you to write in the exercises and loads you do for the 12 week program. I have written the templates with supersets in mind, but if you have the time and prefer to straight set don't let me stop you.

EXERCISE SELECTION

You won't be tracking velocity on every single exercise in the program, just the two key exercises in each workout.

These **key exercises** are the big, compound exercises of the program, for Powerlifters, these would be your competition lifts, plus an upper body pulling movement, or key secondary lift you are working on (floor press, rack pull etc). For non powerlifters, you need to pick four key exercises for the entire 12 weeks.

You will also need to pick **secondary exercises** and accessories for each training block. Use these exercises is a chance to balance out your main lifts, maybe including some unilateral patterns or movements that target weak links or sports specific patterns you might want to give some extra love.

Tracking velocity on these secondary exercises is very much optional and you could even rotate these exercises with each block of the program.

Lastly, you will need to choose **two accessory exercises** per workout, I have offered some suggested qualities and body parts to work on but you have complete freedom in this section to choose your top ups. These movements will most likely have a higher rep, isolation emphasis to them.

Below is a list of exercises that you might pick from. This is not an exhaustive list but serves as inspiration for your program.

Key exercises

These are the major exercises of the 12 week plan. You will be tracking velocity for these lifts. Options include:

- ▶ Bench Press, Overhead Press
- ▶ Deadlift, Trap bar deadlift
- ▶ Back squats, Front Squats
- ▶ Power clean
- ▶ Pull ups, Barbell rows

Secondary exercises

These movements will help you round out the key exercises above. Tracking velocity on these movements is not essential, but you can if you like. Exercises in this section could also be used as key exercises:

- ▶ Romanian Deadlift, SL deadlift
- ▶ Cable rows, landmine press
- ▶ Push ups, dumbbell bench press
- ▶ Walking Lunges, rear foot elevated split squats

Accessory exercises

These movements will help you round out the key exercises above. Tracking velocity on these movements is not essential, but again you can if you like.

- ▶ Bicep curls, tricep press
- ▶ Nordic curls, machine isolations
- ▶ Ab rollouts, planks, stir the pot
- ▶ Farmers carry, sled marching

PROGRESSING WEIGHTS AND REPS

Throughout this program you will use velocity to determine weight and rep targets in real time.

This is a form of autoregulation, allowing you to adjust the training stressors to match your readiness and fatigue levels on a day to day basis.

Because we assume you have not been recording velocity data for the key lifts previously, the program starts with a familiarisation week. This week allows you to record some baseline velocities across a range of weights on your key exercises. This week will also serve as a "before" test and provide context in the early stages of the program.

SETTING LOADS WITH TRAFFIC LIGHT PROGRESSIONS

The most important element in developing strength is the weight on the bar.

Whether you train with velocity tracking or not, ultimately the aim of training is to develop the ability to lift more weight (and produce more force) than you could before.

Despite this fact, adding more weight every single workout may not actually be the best approach to becoming stronger and is realistically not even possible for all but the novice lifter.

Training tends to be more productive in the long term if we are patient in playing the long game of strength development. This allows us to avoid compromised form or grinding through sets beyond our capacity and readiness, two factors that lead to accumulated fatigue, burnout and possibly even injury.



Fig 4: Training to failure leads to increased fatigue which compromises recovery, reduces performance in the next session and slows progress.

Velocity gives us an objective measurement of daily readiness guiding better choices surrounding the most appropriate load for that day, balancing the need to make progress with the need to avoid accumulated fatigue that can have a negative impact on our next training session.

To put this in action you will use velocity from your warm up sets as a guide to determine how recovered and ready you are to train hard. The faster the bar moves on these sets (relative to your own recent context), the better recovered you are for another hard training session.

As you complete each warm up set, log the details in your velocity logbook and keep an eye on the colour codes in the status column. This percentage score pulls your velocity data for that exercise and weight combination from the last time you completed it along with a 30 day average to calculate today's performance relative to your recent history.

The next pages contain specific criteria for progressing repeating or regressing loads, but the basic idea is this: if you are feeling good, and the velocities are also good (all sets above

95%), then today is a good day and you should be looking to increase the weight!

	A	B	C	D	E	J
1	Date	Exercise	Weight	Reps	Velocity	Status:
174	09/07/21	Squat	60	4	0.71	101%
175	09/07/21	Squat	70	3	0.62	94%
176	09/07/21	Squat	75	3	0.61	102%
177	15/07/21	Bench	40	8	0.81	95%
178	15/07/21	Bench	60	6	0.51	98%
179	15/07/21	Bench	70	5	0.37	90%
180	15/07/21	Bench	70	6	0.43	109%
181	15/07/21	Bench	70	5	0.40	99%
182		Select				-

Fig 5: Velocity logbook data highlighting each set relative to this athletes recent history for that exercise and load. Status column is colour coded to show readiness.

Warm up sets

- ▶ These sets should all be easy, with an RPE of 6-7.5 and plenty of reps left in the tank.
- ▶ I like an ascending pyramid approach to warm up sets, where the gaps between loads get smaller as you get closer to the working sets. The heavier you go the more warm up sets you typically need.
- ▶ For example: 40*8, 80*6, 100*5 works perfectly for 110*3 as a first work set.

Green light: Increase weight

If you meet the following criteria you should be aiming to increase the load on the bar.

- ▶ You are feeling strong, weights and form feels smooth.
- ▶ Warm up set status column is mostly green in the velocity logbook (above 98%).
- ▶ The 1st work set reaches the top of the prescribed rep range for your training block.

Yellow light: Repeat weight

If you meet the following criteria you should probably repeat the weights from last session and maybe even slightly reduce volumes.

- ▶ You are feeling ok, the weights and form are moving alright, but not amazing.
- ▶ Warm up set status column is mostly yellow in the velocity logbook (above 92-98%).
- ▶ The 1st work set only reaches the lower end of the prescribed rep range before the fatigue cut-off.

Red light: Decrease weight

If you meet the following criteria you should probably consider a deload session, reducing load and/or volume. Today is not a day to be going hard.

- ▶ You are feeling flat, the weights are moving slow, form is suffering, you might be sore, tired or both.
- ▶ Warm up set status column is mostly red or yellow in the velocity logbook (below 92%).
- ▶ The 1st work set doesn't even reach the prescribed rep range before you reach the fatigue limit.

You might not meet all of the criteria exactly for each category but this will serve as a guide to help you make more informed training decisions. The ability to assess your own readiness in terms of green, yellow & red readiness days can be a really helpful life-long skill for your training, whether you use velocity or not.

If in doubt, be conservative and round down for your first working set. You can always increase the weight for sets two and three if this first set has good velocities.

REP ZONES WITH FATIGUE CUT-OFFS

Instead of completing a fixed number of reps each working set, we use two guardrails to guide your rep targets.

Your sets should finish when:

1. You reach the end of the repetition range (in which case you should probably increase the weight), or
2. You fall below the prescribed percentage of velocity drop recommended for the training block.

This is a training strategy focused on controlling the amount of fatigue accumulated in each workout, with the goal of helping you optimise recover between sessions. Following this method will significantly improve your freshness and hopefully maximise peak strength levels come testing week (or competition).

As an example, during Block 1 each working set is to be completed for 7-10 repetitions **or** until a 25% fatigue cut-off is reached. Therefore a working set ends once you fall below 25% fatigue or reach 10 repetitions, whichever comes first.

Example sets

Both these examples are from training block 1, where 7-10 reps and 25% fatigue are the goals.

A good series of working sets might look like this:

- ▶ 100kg *10 (23% fatigue)
- ▶ 110kg *7 (27%)
- ▶ 110kg *9 (25.5%)

If this was the numbers from a single session, it is probably time to increase the first set weight next session to 105kg or 110kg (depending on the best rep velocities).

While a lower performing day might look like this:

- ▶ 140kg *6 (29% fatigue)
- ▶ 135kg *7 (28%)
- ▶ ~~135kg * (—%)~~

* Did not complete the third set due to the 135kg barely reaching the rep range. Weights feel extra heavy today.

This was a rough session, fatigue built up in the sets quickly, even after reducing the loads. The athlete made the decision to not proceed with set three as it would not have been very productive. Next session they will start with 130kg for an easy first work set and hopefully get back to 137.5kg or 140kg if the velocities are feeling better.

RESOURCES AND TEMPLATES

Now it's time to get stuck in to lifting some weights!

On the following pages you will find the resources you need to make some incredible gains with velocity based training.

VELOCITY LOGBOOK

Remembering the velocities for all your exercises can be quite tricky, so we have created a mobile friendly Google Sheet to log every set as you go.

There currently aren't any great options for getting real-time context from commercially available VBT products, so a little manual transcribing is required. I strongly recommend downloading a copy of this sheet and using it while you are training. The context it provides is incredibly valuable to help you make better training decisions and adapt your training load.

The sheet is scaled to be mobile friendly, but you will need a Google account to get your copy. Then you can download the Google sheets app onto your phone. It's free and available on iOS and Android. Just search "Sheets".

As you train, enter the date, exercise, weight, and velocity of the best rep from each set into the logbook. It automatically filters your sets to deliver context on that exercise, providing a readiness score as a percentage of your recent history.

[You can download a copy of this spreadsheet here.](#)

BLOCK BY BLOCK TRAINING TEMPLATES

You will also need to download the training templates to fill in each block of the training program.

You can use this paper template to log your weights and reps for all the exercises within a training block.

[You can download a printable training block template here.](http://www.vbtcoach.com/resources)
www.vbtcoach.com/resources

This webpage is password protected so use **VBResources** to get in (the password is case sensitive).

I understand it is far from perfect to be double handling your training data like this, but for the time being it is the simplest way we could implement the system. After a few weeks of training with velocity tracking the process will become slick and automatic, and the gains will be worth it.

TRAINING GOALS

Included in the template sheets is a goal setting table. It is kept intentionally vague allowing you to use whichever metric you like to mark a successful training cycle.

You could use a predicted 1RM, actual 1RM, best actual weight lifted (for any number of reps), velocity at a given weight or anything else important to you. I personally like best mean velocity at a 90kg (my bodyweight) and the best actual weight lifted during the program as my goal scores for each key exercise.

There are plenty of empty rows so that you can include additional metrics, performance tests or additional exercises

you might want to track over the program to see how much progress you make.

Tests like body composition, speed, vertical leap are all great to include for monitoring athletic progress.

BLOCK DETAILS:

Below is an overview for each of the training blocks. You will find exact sets and reps within the training templates PDF.

Familiarisation block: One week

In this week you will only do two workouts, collecting a baseline profile for all four of your key lifts. Rest 72 hours between sessions.

Complete 6-8 sets for each key exercise, recording velocity as you go. Work through a range of weights ideally building to roughly 85% of your 1RM. You will complete the lower body hinge and upper body push movement in workout A, then lower body squat and upper body pull in workout B.

Use this as a chance to familiarise yourself with your chosen velocity tracker and begin entering data into your velocity logbook during training.

Volume block: Three weeks

This is a higher volume, hypertrophy focused block to start the training program. You will do three workouts per week, alternating between workouts A and B.

You may want to skip ahead to the general strength block instead, this is fine if you are an experienced lifter, however it can be beneficial for your nervous system to take a break from

the really intense weights from time to time. And complete some higher rep training.

During this block you will train in the 7-10 rep range, working up to and even beyond 25% fatigue on your key exercises. The weights might not be heavy, but these session might leave you a little sore and even gassed if you are more familiar with the <5 rep range.

General strength block: Four weeks

This is a transition phase with reduced repetitions, tighter fatigue thresholds and increasing loads.

We are now in a strength training sweet spot, with an emphasis on gradually increasing the weights but with low enough fatigue to leave plenty of reps in the tank. You will do three workouts per week, alternating between workouts A and B.

During this block you will train in the 4-6 rep range, working with a 15-20% fatigue cut-off on your key exercises.

Specific strength block: Four weeks

This block brings a further reduction in training volume, with very little fatigue allowed on the key lifts, this should enable continued progression of training loads as you push towards a testing week. Three workouts per week, alternating with workouts A and B.

During this block you will train in the 3-4 rep range, working with a tight 10% fatigue cut-off on your key exercises. This block will also have a reduced volume on secondary and accessory exercises. 10% is a tight cut-off but is aimed at reducing the neural fatigue and really restricting the grind of your work sets.

You should leave each work set feeling like there is two reps left in the tank. **Comfortably.**

Test & taper week

In this week you will again only complete two sessions, completing the profiles from week one for the same exercises and loads, aiming to beat the previous velocities.

Keep these test sets low in volume (it is a taper week as well), the aim is to get one or two great reps for each load to see how much faster you can move them.

You will do minimal accessories in this week, but may also like to rotate one or more of your key lifts and collect a baseline profile for these too in order to start the next 12 week cycle.

Repeat!

Once you have gone through the 12 week cycle, you are now ready to begin again from block one, rotating exercises or variations and going through another 12 week build. This process can be completed again and again, taking your strength to new heights while lowering your training fatigue, lessening the risk of injury and burnout as you train with autoregulation.

Welcome to the future of strength training.

OTHER APPLICATIONS

This program is just one example of how to use velocity in your training.

There are countless ways to use velocity tracking in the gym to enhance your training outcomes, some more complex and some more simple than what has been laid out in this program.

If you want to learn more about the options available when training with velocity you should check out my free velocity based training video course and blog online, you can find it at:

vbtcoach.com/course

And if you have any questions, thoughts or feedback, I would love to hear from you. Feel free to get in touch.

via email: jacob@coreadvantage.com.au

Or on Instagram: [@VBTcoach](https://www.instagram.com/VBTcoach)

Happy lifting!

ABOUT THE AUTHOR



My name is Jacob and I am passionate about uncovering how velocity based training can transform the way humans train in the gym.

I have been working as a full time coach in the private and professional sectors with Core Advantage Athletic Development since 2013.

From around 2015, I have been quietly developing an obsession with all things velocity based training. As soon as I started experimenting with VBT it was clear I could use the data to make more informed and calibrated training decisions. The technology and education material available just wasn't enabling the full potential of velocity based training.

As a result I have dedicated plenty of time since then uncovering the meaningful principles and science of velocity tracking, and how we can better implement it in real-world training environments (including our busy high performance centre in Melbourne, Australia).

In 2018 I launched a comprehensive velocity based training course at coreadvantage.com.au. Then in 2021 I started sharing my thoughts and ideas on all things VBT via instagram ([@VBTcoach](https://www.instagram.com/VBTcoach)) and on vbtcoach.com with free velocity based training material and resources.