

**THOR'S**



**THOR FALK**

**GUIDES**

# **Strength Training**

**Barbell, Kettlebell, Bodyweight,  
and Machines**

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## About Thor Falk

I am a 40-something father and husband who currently lives in France. I spent most of my working life so far “flying-high” in professional services and finance, based out of London, with a fair amount of travel. I had been a chubby teenager who struggled, more or less successfully, to keep his weight under control during school and university. However, the perks of my job – working lunches, hotel breakfasts, too many drinks – and a sedentary lifestyle had over the years taken their toll, and I ended up over 130kg at 186cm. Fat. And out of shape.

I was of course always thinking about doing something about it – I somehow just never did. Priorities! Until that one day when ... nothing really, actually. I started dieting, and I started working out, and I lost 20-30kg of body fat, gained some muscle, and I just started feeling better overall. It wasn’t an easy journey, and was not without hiccups but I am content. One thing is very clear though: things would have been much simpler had I known then what I know now!

## About Thor’s Guides

If you are on a quest to lose weight, to get fitter, and to generally improve your health – especially after decades of abusing your body – then there are a number of things you simply need to know about the functioning of the human body. Many people have ignored this, and they might have done more harm than good – think yoyo-dieting, injuries, and lasting metabolic damage.

You don’t need to know everything there is – you can’t anyway – but there is a minimum level of knowledge that everyone simply should have. I have been down that particular rabbit hole – in fact, I am still in it – and I spent a lot of time researching everything related to the human body. I have come across a lot of information – too much, really – and the *Thor’s Guides* series is my attempt to separate what is important from what isn’t, in order to save you the time to reinvent the wheel.

To be clear: I am not promising an entertaining read. The information in Thor’s Guides is dense, and focused on the area at hand. I am in particular not usually providing much information why a certain piece of information is important, and how the whole puzzle fits together. This is part of a forthcoming project – my book – and the Guides will be an important part of that.

## Disclaimer

You know that this had to come somewhere, so here it is:

(1) Nothing in this book constitutes advice. The author is not licenced to advise in matters related to health, nutrition, and exercise, and he does not propose to do so.

(2) The author has carefully researched the information provided in this publication. Despite of this, this information could be false, and it the author can not be held responsible should such incorrect information cause damage, be it directly or indirectly.

(3) The reader is advised to independently check all the information provided, especially if he or she relies on it in circumstances where damage could occur.

In brief: whatever you do (or don’t do), get all the information and advice you need, use your head, make your judgment, go for it, and take responsibility for what you are doing.

## About Beta

Some of the Guides are in Beta. This means that I was not yet able to source and/or verify some specific of the specific facts contained in the Guide, and that I therefore had to make some assumptions. I will usually point out where exactly this is the case.

Whether or not a Guide is labelled Beta does not really make a difference. In either case, the Disclaimer and use-your-head-policy apply – just a bit more so on the Beta Guides than on the more settled ones.

Good Luck, and Enjoy !!!  
-Thor Falk

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## Strength training

Like endurance or mobility training, strength training is a bit tricky to define. The reason for this is that every effort has (at least) three aspects – endurance, strength, and mobility – and whilst some efforts are clearly dominant in one aspect (powerlifting, and running marathons come to mind), other one’s are more within a grey area, eg CrossFit-style metcons.

Be that how it may, strength training has to do with having the muscles work against a significant resistance, usually it involves a near-complete recruitment of all relevant muscle fibres<sup>1</sup>, and the cardio-vascular system is comparatively little taxed. The main goal of strength training is usually – drumroll – increasing strength, but also “looking good neckid”, ie muscle hypertrophy, and potentially also fat loss.

Probably there are more strength training protocols under the sun than for any other training purpose, and they are not only different, but also often mutually exclusive. This has three reasons – a good one, a bad one, and one in-between. The bad one first: there is a significant pressure for differentiation in the fitness industry, and doing the same as everyone else does not sell books or training sessions if one does not have a good and long track record. So sometimes a new, sexy angle is advantageous for marketing purposes.

The reason in-between is that people might simply not know better. They might have had this grand idea, it worked well with a few people, and now they are convinced that this is the one-and-only way to go. Of course, as Rip does not fail to point out, you can’t really go wrong on a beginner’s program. There will be strength gains whatever they do, and whether or not the gains on another program would have been better or worse is a question that is impossible to answer with certainty<sup>2</sup>.

And now finally the good one: people come from different starting points, and hence they respond differently to the same training stimulus. This is particularly important for advanced athletes who are close to their genetic potential, and where even the smallest improvement requires a well-planned effort. Moreover, different people have different goals and – last but not least – different preferences and different resources (time, money, willpower, ...) to spend on this effort. As a result, different training protocols will suit different athletes, and this effect will be the more important the more experienced an athlete is.

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<sup>1</sup> See Thor’s Guide on the Musculoskeletal System

<sup>2</sup> You might want to point out that certainly there must be scientific studies that can assess the different training protocols. Maybe. But to obtain reliable results they would be incredibly difficult because there are so many confounding variables, and very expensive because a large number of people would need to be followed for a very long time. And ultimately they only can answer what the best protocol “in average” is, but not for any given athlete

The scope of this Guide however is not the advanced athlete – and not even the “advanced” intermediate athlete. If you are at this level, you have enough experience to judge for yourself what works and what not, and in any case you will either have a knowledgeable trainer, or you have read enough of the pertinent books to form your own opinion. If not, read on, and if you have the time, do make sure you read the books of the experts in the field<sup>3</sup>.

### The fundamentals: practice, progressive overload and recovery

Before I go into the different protocols, I want to point out the commonalities amongst them: practice, progressive overload, and recovery. I will take those concepts in turn.

**Practice.** Practice refers to simply doing a certain movement over and over again to groove its movement pattern, ie to teach the nervous system how to best stimulate the muscles to perform the task at hand, and to stimulate the muscles, tendons, and bones to get stronger and to adapt to the stress they are exposed to.

**Progressive overload.** Progressive overload refers to making the body do something it is not quite equipped to do yet in order for it to “catch-up” and adapt to it by getting stronger. Progressive overload has two major aspects: the force production (usually the weight used), and the volume (usually the number of reps at a given weight). Biologically those aspects relate to the percentage and duration of muscle fibre recruitment. There are other aspects – eg the speed at which a movement is performed – but those are secondary.

**Recovery.** Often overlooked by rookie lifters, recovery is an important part of the training process. Strength and muscle is not built during the training session, but after a training session, provided the body has enough nutrients and enough rest to do so. How much is enough is difficult to say, and it depends highly on the program. Many beginner programs have alternate lifting and rest days, and more advanced lifters might take significantly longer between heavy workouts<sup>4</sup>.

The art of programming a training schedule is really to balance overload and recovery; too little recovery, especially if cumulative, leads to overtraining, and this in turn can lead to injury, and will in any case regress the athlete. Too much recovery at best leads to slower-than-optimal progress, and in the worst case to little or no progress at all.

### Grinding strength – barbell, dumbbell & Co

*Grinding strength* is about applying a constant level of strength throughout the full range of motion, as opposed to *ballistic strength* where the implement is accelerated at the beginning, and then typically only guided along its path. The major implements for this style of training are barbells, dumbbells, and kettlebells.

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<sup>3</sup> In no particular order my recommendations are Dan John for general strength, Mark Rippetoe for barbells, Pavel Tsatsoulin for kettlebells (and more), and Paul Wade for bodyweight. There are more specific book recommendations on my blog

<sup>4</sup> Dan John famously quipped about a squat workout he did back in the 1979, and that he’d do again “as soon as he had recovered”

**Barbell.** A barbell is essentially a long bar<sup>5</sup> – typically 220cm and 20kg/44lbs<sup>6</sup> – that can take plates on both sides. Those plates are typically metal or plastic coated metal. They can also be bumper plates, which I will discuss in the section on the Olympic lifts. The plates come in different weights. A typical gradation in metric plates is 25-20-10-5-2.5-1.25kg, and in imperial plates it is 55-45-35-25-10-5-2.5lbs, which makes it possible to load the bar with several hundred kilos, in steps of 2.5kg/5lbs<sup>7</sup>. Barbells are optimally suited for handling maximal loads, and therefore are the core implement for all absolute strength work.

**Dumbbell.** A dumbbell is a short bar with (typically non-removable) weight plates fixed on the sides. Typical gradations are in steps of 1kg/2.5lbs (0.5kg if they are pink) up to 15kg/30lbs, then in steps of 2kg/5lbs up to 50kg/125lbs. As opposed to a barbell they are meant to be handled with one arm only, and hence they come often in pairs. Weights per arm that can be handled are significantly lower than with a barbell due to the additional stabilisation requirement, but the additional stress on the stabiliser muscles makes dumbbells very well suited for some types of assistance exercises.

**Kettlebell.** A kettlebell is like a cannonball with a handle attached. It is more often used for ballistic movements, but it can be substituted for dumbbells. In this case the shifted centre of gravity provides an interesting stimulus. Pavel Tsatsoulin is credited with introducing the kettlebell – which is a traditional Russian training tool – into western training practice. Traditionally, kettlebells are measured in pood, where 1 pood = 16kg, and gradations are in half-pood (8kg) steps. Nowadays kettlebells are usually available in steps of 4kg, up to around 52kg.

People who just start strength training – or who migrate from using machines to using free weights – can sometimes be overwhelmed by all the different possible exercises; I certainly was. One reason for this is that the information on that subject is dominated by the figure competitors (also known as body builders) and this skews the picture. It might well be that after a couple of years of building mass it is important to use very specific exercises to “sculpt” the body, but for building mass in the first place – or if the goal is simply to have a strong, balanced and functional body – the number of exercises is surprisingly low.

There is a surprisingly homogenous view of what the best exercises to build strength (and muscle) are. On the fringes, things might vary, but everyone agrees that the *squat*, the *deadlift*, and a *press* are part of it. As for the press, it nowadays is usually the *bench press*, but some people consider the *overhead press* (often just called press) the more important pressing movement, and often the (*weighted*) *dip* is also recommended. Generally a pulling movement is also included – this might be a *row*, or a (*weighted*) *pull-up*. Finally, some people also in-

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<sup>5</sup> Apart from the standard bar there are a number of other bars available that allow to change the muscle recruitment pattern, eg safety bars, or trap bars

<sup>6</sup> The conversion is 100kg=220lbs or 100lbs=45.4kg

<sup>7</sup> Note that smaller “fractional” plates for even smaller increments are also available

clude a *loaded carry*, eg a *suitcase walk* or a *waiter’s walk*, and some also include ballistic movements, eg a *power clean* or a *kettlebell swing*.

**Squat.** The *squat* – often termed the king of exercises – is the basic human movement of sitting down and standing up. Usually it is performed with the feet next to each other, but *split* variations exist. For barbell squats there are five fundamental bar positions: *low bar (back)*, *high bar (back)*, *front*, *overhead*, and *Zercher*. Those different positions fundamentally change the character of the exercise as due to the changed positioning (mainly, the back angle) the biomechanics and hence muscle recruitment patterns are significantly altered. Whilst usually classified as a posterior chain exercise, under near-maximal weights most of the muscles in the body are engaged when squatting. It is often claimed that squats are bad for the knees, a claim that is refuted by many of the experienced strength and conditioning coaches, provided that correct form is maintained, and the squat at least breaks parallel. Whilst maximal weight squats are typically performed with barbells, kettlebells or dumbbells can be used for front squat variations, eg the goblet squat.

**Deadlift.** The *deadlift* is another basic human movement, that of picking something off the floor. There are fewer variations than in the squat, the main one’s being the *sumo deadlift*, and the *straight leg* (or a *Romanian*) *deadlift*<sup>8</sup>. Again this is usually classified as a posterior chain exercise, but at near maximal weight it does become a full body exercise. It is probably the most taxing of all strength exercises, and many programs go comparatively easy on deadlifts<sup>9</sup>. It is often claimed that deadlifts are bad for the back, which again is refuted by many experts, provided that proper form is maintained, which implies that the weights lifted are not excessively heavy<sup>10</sup>.

**Press and dip.** Press and dip are again fundamental human movements – pressing something away from the body, in various directions. The *dip* is a downward press, and can be weighted if desired. The (*overhead*) *press* is an upward movement from the shoulder that can be significantly supported by the legs in the *push press* or the *jerk*. The bench press is a movement towards the front where the force that can be produced is maximal due to the involvement of the very strong pecs. It can be brought closer to the dip or the overhead press by using a decline or incline bench respectively. Those exercises – in particular the bench press – can and often do lead to rotator cuff injuries if done with bad form or too high intensity. All presses can be performed with a dumbbell or a kettlebells, leading to slightly different muscle recruitment patterns.

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<sup>8</sup> According to some, there is a significant difference between the straight-leg and the Romanian deadlift, in that the former allows for rounding the back whilst the latter keeps the neutral back position (and therefore usually starts/ends higher up, maybe mid-shin)

<sup>9</sup> In the sense that there are fewer sets of deadlifts than of the other big exercises. *Starting Strength* for example prescribes 3x5 in squats and presses, but only 1x5 in deadlifts

<sup>10</sup> This does not mean that one should not lift heavy – it simply means that one should not get ahead of oneself and attempt lifts beyond what one is capable of handling safely

**Pull-up and row.** The pull-up and the row are the reverse of the press and the dip respectively. The pull-up is significantly influenced by the hand position (which can be pronated, supinated, or parallel/neutral), and it is important to understand the terminology. The standard pull-up is with a pronated grip, ie palms of the hands facing away. The *chin-up* is done with a supinated grip; this variation is heavier on the biceps. In CrossFit, the *kiping pull-up* is popular where the momentum from a swinging body aids in the movement. A (very) advanced version is the *muscle-up*, where the athlete pushed himself up until the hands are at hip level. The pull-up is a pure overhead pull, and all the other angles are covered by the *row*. Performed with weights it can either be *upright*, bent-over, or it can be *inverse/body-weight*.

**Loaded carry.** The loaded carry is another fundamental human movement – moving a heavy load around. Depending on the position of the weight it can be a suitcase walk, or a waiter’s walk, or a rack walk. It can be one-handed, or two-handed, with the asymmetric variations providing an interesting stimulus for the core muscles. Dan John – who is a big proponent of this exercise – also suggests other types of carries (eg, sandbag or backpack) as well as sled-pulls.

**Turkish get-up.** The Turkish get-up is an exercise that is nowadays mainly associated with kettlebells, but really any implement can be used (including friends and family). It is difficult to explain without pictures (essentially it is standing up from a lying position, holding a weight straight over the head), and I will not attempt to do so here, but rather refer to the T-Nation tutorial. It is an excellent exercise for core stability and mobility.

The *power clean* and *kettlebell swing* are dealt with in the section on ballistic strength.

### Ballistic strength – barbell and kettlebell

The implements – barbells and kettlebells – have already been described in the section on grinding strength. Whilst grinding “powerlifting” movements can be performed with any kind of bar<sup>11</sup> and weights, for ballistic “Olympic” lifting a bar with *rotating sleeves* is used (so that the rotation of the bar does not rotate the weights), as well as *bumper plates*, ie plates with a rubber ring around them, and that can be dropped without tearing up the floor.

With barbell’s, the main ballistic movements are the *clean* (bringing the weight from the floor to the rack position, close to the shoulders), the *jerk* (bringing the weight overhead from the rack position using leg-drive), and the *snatch* (bringing the weight overhead from the floor). I will not discuss those highly technical movements further as in my view it is unwise to attempt them without the help of a competent (!) trainer, other than pointing out that the main work is done by the legs, and that the bar is usually caught in a deep squat, hence there is a grinding component to those lifts as well. Arguably the power clean – where the bar is

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<sup>11</sup> Often, powerlifting is done with Olympic equipment, unless the weights get very heavy when the bars might need to be sturdier and longer



caught in a position higher than full squat – is the most ballistic of those exercises, and it is part of Mark Rippetoe’s Starting Strength program that other than that only uses grinding lifts.

Even though some of the main kettlebell movements have the same names as the corresponding Olympic movements – clean and snatch – they are fundamentally different. The ultimate goal in the Olympic lifts is max-weight singles<sup>12</sup>, and there is a definite lockout and restart at the top. Their kettlebell counterparts on the other hand are “rounder” in that one-rep transitions into the next one in a smooth and “swinging” movement. This also changes the application: the Olympic lifts are fundamentally max-strength efforts similar to powerlifting, except that the strength is explosive rather than grinding. Kettlebells on the other hand require a *repetitive strength – strength endurance* – which is a different quality.

Due to their nature, kettlebell exercises are often at the boundary between strength and conditioning – metabolic conditioning or metcon in newspeak, but this is the topic of a separate Guide.

**Swing.** The *kettlebell swing* is the most fundamental kettlebell exercise. In the grinding world it is comparable to the deadlift, or rather a deadlift variation, the good morning. Is it fundamentally what Dan John calls a “hinge movement”, ie its power comes from the hips. In the Russian variant, the movement ends with the bell on eye-level, whilst Americans often like to swing it all the way to the zenith. In the *hard-style variant* the bell is stopped mid-movement – usually on eye-level – and accelerated back downwards, requiring significantly more force and also allowing for significantly more reps in the same time period. This latter variant provides a particular interesting contract/relax muscle recruitment pattern.

**Snatch.** The *kettlebell snatch* is very similar to the (one-arm) swing, except that the bell is briefly locked out overhead. Due to the requirement to support the bell at the top of the movement, the shoulder muscles are more involved, and also the asymmetric nature of the exercise results in a different – more “transversal” – recruitment pattern of the core muscles.

**Clean.** The *kettlebell clean* is like the snatch, except that it ends in the rack position (in front of the shoulders) rather than overhead. It is not a particular useful exercise in its own right (the snatch is usually superior) but it is used to bring the bell where it needs to be for exercises like the *press*, and a great building block for a combo – eg the *clean & press* (one clean for each press) is a great full-body exercise.

The coarse gradation of the kettlebells poses a particular challenge. Paraphrasing Dan John, you have to really “own the movement” at a given weight before moving up a step. So typically in a kettlebell movement – ballistic or grinding – one would work on increasing the reps for a while before moving on, which is very different from barbell training with its small increments. One popular form

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<sup>12</sup> Except in CrossFit programming, where the Olympic lifts are often integrated into metcons in a more kettlebell-like manner

of structuring sets in the kettlebell world are *ladders* (eg “1-2-3-1-2-3”) and *pyramids* (eg “1-2-3-2-1”), and one can either add one rep across (ie “2-3-4-2-3-4”) or add one step (“1-2-3-4-1-2-3-4”) at each session.

## Natural strength – bodyweight

Bodyweight training is both the easiest way and the most difficult way to do strength training. It is the easiest way because there are no tools needed, and many of the key bodyweight movements – plank, push-up, squat, pull-up – are technically not very challenging, and they are a great way to get started.

It is the most difficult way because progressions are complicated, and many of the exercises move from “too easy” to “too difficult” very quickly, so there is no middle ground where to progress easily. Moreover, in many exercises one can “cheat”, ie making them less difficult than they should be by not performing them correctly. Those two things together make it more likely to stall in bodyweight exercises than in other forms of strength training.

The most popular bodyweight exercises for beginners and intermediate athletes are the *squat*, *plank*, the *push-up*, the *pull-up*, the *dip*, and various *sit-ups* and *crunches*. Other popular exercises at this level are the *handstand push-up* (against a wall, if necessary for stability), various *bridges*, and other core exercises such as *leg raises*.

For many of the exercises, the progressions involve using one arm or leg only, eg *one-legged squat* (“*pistol squat*”) or *one-arm pull-up/push-up*. Those are more difficult to execute than the arithmetic would suggest – someone squatting or benching bodyweight would not generally be able to perform the one-legged squat or the one-armed push-up respectively, despite comparable loading amounts. There are also exercises that can only be executed at very high levels of performance, and that do not really have easier version, like the *muscle-up*, the *iron cross*, and the *flag*.

## Strength training terminology

Like all activities, strength training employs a dedicated terminology. Here the basics of it:

**Sets x reps.** I use a notation of 5x3 to indicate that 5 sets of 3 reps each should be performed. Those are only the *working sets* – ie the sets with a weight of 90% of the respective maximum and above – not *warm-up sets*. There is no pause within the sets. Between sets it is anything from 30sec to 5min, with typical values being 2-4min.

**RM.** The *repetition max* (“*RM*”) is the maximum weight one can lift for a certain number of reps. The *1RM* is the absolute max, the *5RM* the max for sets of 5 etc. As a rule of thumb, an increase in reps by 3 reduces the max by 10%, ie the *4RM* is typically about 90% of the *1RM*.

**Working sets.** *Working sets* are the sets above about 90% of the personal max – the 1RM for sets of 1, the 5RM for sets of 5 etc. It is those that are targeted in a program – warm-up sets are not counted.

**Warm-up sets.** *Warm-up sets* refers to sets performed that are not working sets. Warm-up is highly individual, but usually it starts with an empty bar (20kg) and high reps (5-10), and then weights increase in steps of 10-20kg whilst the reps decrease (to 1-2) in order not to induce fatigue during the warm-up.

**Sets across.** *Sets across* means that all (working) sets that are performed with the same weight. Sometimes – especially for kettlebells – it can also refer to sets that all have the same number of reps.

**Ladders and pyramids.** *Ascending (descending) ladders* are working sets where the weight increases (decreases) in the later sets. *Pyramids* are a combination – the weight first increases, and then decreases. Sometimes – especially for kettlebells – it can also refer to sets where the number of reps per set is varied.

## Popular strength programs

There are numerous strength-training programs. Below is a collection of those that I found notable and relevant for beginners and almost-beginners, very well knowing that in the interest of brevity I have probably left more notable programs out than I included.

**Starting Strength.** Starting Strength is Mark Rippetoe’s beginner’s barbell program, detailed in the eponymous book. Its focus is on the *Big Five* exercises: squat, deadlift, press, bench press, and power clean. It is a 3x5 program, ie there are 3 work sets of 5 reps each (except for deadlifts which are 1x5, and power cleans which are 5x3). Training frequency is 3x per week, and the goal is to increase the weight from session to session.

**StrongLifts 5x5.** StrongLifts 5x5 is Mehdi’s beginner’s barbell program, laid out in his free eBook. It is very similar to Starting Strength, except that it is a 5x5 program, ie there are 5 work sets instead of 3 (deadlifts are still 1x5).

**5/3/1.** Jim Wendler’s 5/3/1 program (as detailed in his eBooks) is in principle an intermediate’s barbell program, but many novice or almost-novice lifters are following it, especially older one’s who are worried about insufficient recovery and about injuries. It is based on the *Big Four* exercises, which are Rip’s Big Five minus the power clean. The program operates under a 3+1 weeks cycle (1 week deloading), and it “waves” its way up to a new PR once every cycle. Thereby both the weight and the number of reps per set are modulated to work up to the new max. The name 5/3/1 comes from the rep scheme used in the PR attempt – 5 reps for set 1, 3 reps for set 2, and 1 rep for the PR (the weights are evidently increasing from set 1 to set 3)

**Westside Barbell.** Westside Barbell is Louie Simmons’ training facility where elite powerlifters train using what he calls the conjugate method. This is definitely not a beginners program, but as it is so pre-eminent every lifter should at least

be aware of it, and some of the underlying ideas might be beneficial even for a novice. The idea of the program is that the athletes are at their maximal strength level all-year<sup>13</sup>. To avoid overtraining, exercises are constantly modified (eg different bar, addition of chains or elastics), and the week is split into max-effort work and speed-work, the goal of the latter being to lift less weight faster. Westside is known for its liberal attitude vis-à-vis anabolic steroids.

**Five-a-day.** Five-a-day<sup>14</sup> is a program that Pavel developed for Dan John, and that the latter has successfully used with a number of his athletes. The idea is to pick five “big” exercises (eg similar to Rip’s big five, except that ballistic work is often performed with kettlebells), and to do them every day for 20 to 40 days. Given the limited recovery time it is evident that weights should not be maximal – except on some days when the athlete feels particularly strong – and reps should be constrained to 2x5 for grinding work (possibly 1x5 for deadlifts) and 1x20-50 for ballistic kettlebell work.

**One-lift-a-day.** One-lift-a-day is another one of the program developed by Dan John. In the words of the master, on this program, *“if you’re only doing squats, you do squats. If you’re only doing chins, you’re going to chin for 45 minutes!”* and *“You can’t convince yourself that you had a good day because you did 41 different lifts or a lot of volume or you did a lot of abs after blowing off the stuff you hate”*. It is a 3+1-week-program (week 4 is recovery). The rep-scheme is 7x5 in week 1, 6x3 in week 2, and 5/3/2 in week 3. The exercises are flexible, for example the weeks could look like *bench-press / row / squat / day-off / press / deadlift / day-off*.

**Mass-made-simple.** *Mass-made-simple* (“MMS”) is a six-week bulking program developed by (you guessed it?) by Dan John. If you want to do it, you should probably consider buying the book – it is cheap enough, especially on the Kindle. The exercise part of the program comprises of upper-body-work, complexes, and high-rep squats one a one-on/two-off schedule. Given the bulking focus, Dan also discusses nutrition, recovery, supplementation and *tweaks* (the latter being mainly protein and creatin).

**MMS Induction aka Squat-the-Goblet.** The MMS induction program is recommended by Dan John for those punters who want to do MMS, but who have not squatted before. In weeks 1&2, it is 2-3x5-20 goblet squats with a light dumbbell (or a heavy book) to groove the technique. Weeks 3&4 are sets of 5 goblet squats, 3 days a week. Day 1 is ladder up to a (comfortable) max weight, day 2 a ladder down from that weight, and day 3 is a pyramid. Week 5, day 1 is 2x20, day 2 is 3x8, and day 3 is a 3-rep ladder. Week 6’s motto is *“if you can pick it up, you can squat it”*. Day 1 is a 3-rep ladder, starting with a medium heavy weight. Day 2 is the same, but twice. Day three is graduation day – use heaviest dumbbell you can find (it should be at least 50kg). Do not forget to warm up!

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<sup>13</sup> This is unusual in the strength-training world, where athletes often try to peak for an event

<sup>14</sup> The official name is the “40-day-program”. As Dan and Pavel point out however most of the goals are often already achieved after 20 days and one might want to stop there, hence I felt that five-a-day (every day) is a more accurate name of what the program is about

**Enter the Kettlebell.** Enter the Kettlebell is Pavel’s book on kettlebell fundamentals. It provides two programs, the “Minimum” program, and the “Rite of Passage” program. The former is a combination of kettlebell swings and get-ups, each performed twice a week on different days for 15 and 5 minutes respectively. The latter program adds kettlebell cleans, presses and snatches and the workload is increased substantially.

**Convict conditioning.** Convict conditioning is a body-weight-only program written by the alleged ex-con Paul Wade. It is based upon six fundamental exercises: pull-ups, push-ups, squats, leg-raises, bridges, and handstand push-ups. For each of those exercises are 10 progression levels, from very easy (eg, standing push-up against a wall) to very difficult (eg, one-arm push up).

### Strength machines and the HIT training protocol

Most strength training in modern health clubs is done using resistance machines – in fact, when visiting a gym in France I was told that the ministry of health had forbidden the use free weights because they were “too dangerous”. On the face of it, this is a reasonable claim: as opposed to say barbells, machines seem to be idiot-proof – but are they?

Their advantage is that, even with minimal coaching, one must make a real effort to do the movement terribly wrong. On the other hand it is nearly impossible to get the movement biomechanically right – even using the optimal setting for one’s body dimensions (and very few people manage to get those), chances are that the movement is slightly awkward. This might be OK for high-rep / moderate-weight style protocols, but for max singles or doubles this is probably not a good idea.

At least as important is that the muscle recruitment is unnatural, unpredictable and unverifiable from the outside. To explain what I mean with this I take the example of a squat in a Smith machine, which essentially is a barbell fixed to very stable rails, only allowing it only to move vertically. It is possible to change the load balance between quads and hamstrings simply by pushing not straight-upwards, but forwards-upwards or backwards-upwards. This is *unnatural*, as this muscle recruitment pattern in a free-weight setting would make the athlete tip over, and it is *unpredictable* and *unverifiable* because exactly the same exercise – moving the barbell up and down, with well defined starting, ending, and intermediate positions of the body – can be performed with a variety of muscle recruitment patterns, without anybody at the outside being able to distinguish them.

Does this mean that machine training is bad, or even worse than free-weights training? Not necessarily: the load profile is different and less predictable, but this might not matter for some – work is work after all. For someone not wanting to understand to do free weights with correct form, machine training might indeed be safer and more balanced, especially in the classic 10-15 reps range. And whilst in my view it is much more beneficial to the body to train muscles togeth-

er in a way that correspond to actual human movement – ie involving all the stabilising muscles as well – I know that other people disagree (the famous “body-part-split” philosophy of body building vis-à-vis “functional exercises”), and that there is not too much objective data out there to decide this issue either way. Certainly for hypertrophy – big muscles – machines seem to be doing a good enough job.

**High Intensity Training.** High Intensity Training (“HIT”) is a strength-training protocol, and it has nothing but the name in common with HIIT. It is intimately related to the use of strength machines. In fact, Arthur Jones, the founder of Nautilus, and the man responsible for bringing strength machines into the gym, popularized this type of training in the 1970’s. It’s proponents also like to call it “evidence based training” because they claim that scientific evidence shows that this is the best to train – more on this below.

The two building blocks of HIT are (a) training-to-complete muscle failure, and (b) allowing for complete recovery between sessions. More in detail, the HIT protocol usually prescribes to choose a weight such that failure occurs after 5-20 reps, depending on the exact protocol, and the body part targeted. Often the reps are ultra-slow – 30sec per rep is not unheard of – and with emphasis on the negatives, but again, different protocols prescribe different cadences. Sometimes pure negatives can be added at the end of the set.

As for recovery, there are again two schools: one says to have at least 5 days (often, a week) between exercising the same body part. In this case, the athlete might schedule one weekly visit to the gym to get it all done, he or she might employ a body-part-split method where every part is trained once a week, but on different days. Even in this case typically at least two weekly rest days are scheduled.

The other school uses a more conventional approach, with 3 times-per-week or a one-on/one-off schedule. The pure approach would be to go through the same set of exercises at every session, but some athletes put some variation into this schedule, in which case their training can closely resemble the body-part-split schedule of the first school.

Proponents of the method claim that it achieves maximal impact with minimal effort (as in “in minimal time”) and with minimal risk for injury. I would doubt the latter claim: if the athlete is reasonable with free weights (ie no ego-driven overloading, enough focus on assistance exercises etc) I believe a natural movement is healthier than an artificially restricted movement along biomechanically suboptimal paths. That is a big “if” of course, and it is really up to everyone’s own judgement whether or not they are “reasonable”.

As for maximal impact in minimal time, this claim is yet to prove. Clearly many people have used this method, and it worked for them. On the other hands, many people who have years of experience of actually training athletes – Dan John, Pavel Tsatsoulin, Mark Rippetoe come to mind – do not seem to recommend this

approach for any of their athletes, recreational or other, and chances there is a good reason for that.