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MAXIMUM RECOVERABLE VOLUME

PROVEN
PRINCIPLES AND
PRACTICES FOR
GROWING
STRONGER,
LEANER AND
BIGGER FASTER




INTRO

You want to put on muscle. Of course you do, because why else would you be reading this? You're serious about gaining size, but you also know that serious goals require serious approaches.

When NASA launches a spacecraft into orbit, they don't just guess their way through the project. Nor do they "just do what's worked in the past, bro." They use science, because science is the **ONLY** tool accurate and precise enough to ensure the kind of thin margins on which spaceflight occurs.

If you want to be bigger and you're serious about it, take a look at what science has to say about the very basics of how to go about that.



How do you get more muscular?

Fundamentally, there are three main ingredients in every successful mass-building operation:

- **Hard Training**
- **Diligent Eating**
- **Proper Recovery**

Fundamentally, there are three main ingredients in every successful mass-building operation: Hard training is the biggest stimulus for muscle gain. It's what actually tells your cells to begin the process of muscle mass construction. Yes, it's true that you don't actually grow any muscle in the gym, but the gym is where you turn the switch so that growth can occur later. Without training, muscle growth doesn't happen outside of some freaky conditions you can't depend upon. And while eating and recovering are important, just about every overweight American eats and recovers more than enough but isn't exactly exploding with muscle. For eating and recovering to build you any appreciable muscle, you've gotta give them something to work with, and that stimulus is hard training; the very key to growth. So whatever details I give you later about how to train hard in such ways that will be maximally beneficial, just set your expectations right now and understand that there will be no easy road offered here. If you're not interested in brutally hard training, you can stop reading now.

Training hard sets in motion the processes of growth. But growth needs building blocks. If it doesn't have them, no amount of training will make you any bit more muscular. If your body is a skyscraper, then food is the bricks, electricity, glass, and steel and training is the funding to pay for all the costs of the project. You can have the backing of all the money in the world to build your skyscraper, but if you don't get bricks and steel to the building site, no amount of money will make that building any taller than ground level.

Just the same way, training turns on the growth processes but it's eating that supplies the building blocks out of which new muscle is actually built. You can think of calories as all the building materials together. If the construction foreman doesn't have them all in line, he won't be authorizing any rapid expansions.

If you don't eat enough food, your body won't allocate much effort to building muscle. Protein can be thought of as the bricks, glass, and steel. It's the very basic stuff out of which the skyscraper and your body are made from. Not enough protein and construction grinds to a halt or slows considerably in the very least. Carbs can be thought of as electricity. Electricity actually gives life to all the machines that construct buildings, and carbs power not only the muscle growth process, but the training process itself!

Without carbs, you can build some muscle. I mean, the Egyptians did build the pyramids without any electricity... it only took them hundreds of years. If you don't want the slow road to gains, carbs are essential. Lastly, fats are like the air conditioning ducts, the water pipes, and the internet hookup to the skyscraper. Fats give the support for body health and muscle growth to run smoothly. Without enough of them, you can grow, but the process will be needlessly difficult.

Lastly we have recovery. Training stimulates the musculature by providing an overload to the system... a shock bigger than it's used to and one that disturbs the physiology enough to give it reason to adapt. This is a great and essential element to muscle growth, but it comes with a downside; fatigue. Every single overloading workout in the gym, every workout that leads to growth, also causes disruptions to the system that require healing.

And this healing MUST take place over the course of the training process if muscle growth is the desired outcome. If you try to build a skyscraper by working all of the construction crew, architects, and even the financial employees for 18 hour days and no weekends, you'll at first get a slowdown in construction, then a stop in construction as many workers quit and leave, and then, worst of all, overly fatigued engineers might miscalculate and put a pylon in the wrong place, causing a cascade of cracks in the structure and a possible partial building collapse!

Just the same way, if you train hard without attending to your recovery, you'll first slow in progress, then progress will stop altogether. If you keep pushing it, you'll eventually be likely to get hurt. If you're training hard and eating right for growth, you need to do what it takes to recover so that all of your efforts aren't in vain.



How hard do you need to train?



You need to train hard to make gains. So there's definitely such a thing as not training hard enough. Look around you... whoever you see that doesn't train... they don't train hard enough to be jacked! Pretty obvious conclusion. But let's say we only did one set per week for each muscle group. One set of squats, one set of pullups, and one set of bench presses, just once a week. On our way to jacked city, right? Of course not. Yeah, maybe a total beginner to training might put on a bit of muscle just training one set per week, but for anyone who's trained longer than a couple of months, this is not a reality. If only training were that easy!

One set per week is definitely not gonna cut it, but what about 5 sets per week per bodypart... what about 10 sets per week? In a recent review of the scientific literature, researchers compared lots of different training programs to see which ones caused the most growth. And you know what, the ones that had 5-9 sets per muscle group per week caused more growth than the ones that had fewer than 5 sets. But the ones that had more than 10 sets per week caused even more growth. So is more really better with training?

To a point, yes. But just like there is such a thing as too little training, there is such a thing as too much training. If you train hard, your body has the energy and resources to recover your damaged systems and make brand new adaptations (actually grow new muscle and not just re-build and fix damaged older muscle). If you train harder still, too hard for best growth, you might be training so hard that your body only has the energy and resources to recover from the effort but not to adapt. That is, if you're training too hard, you might just be treading water... just surviving to train hard another day and not making improvements. If you do more training still, you might find that your body doesn't have the resources with which to even recover! At this point, more training just means more muscle loss instead of gain. So yes, there is such a thing as too hard.

What's the ideal amount of training? It's the amount of training between "not hard enough" and "too hard" to recover from. Put another way, it's just a bit less than the MOST training your body can recover from. Just a bit less so that you have energy and resources to spare not just for recovery but for adaptation as well. To put it formally, the best amount of training for maximum muscle growth is the amount just below your maximum ability to recover, otherwise known as the Maximal Recoverable Volume or MRV for short.

Now, since MRV is the most training you can just barely recover from, it's not the ideal amount for you to be doing week to week. But it is the ideal amount for you to aim for as the last week in a multi-week (usually 4-6 week) accumulation phase of a training block. Sound complicated? It's actually pretty simple.

The Overload Principle tells us that training needs to be hard if we want to grow, but it also says training must get harder week to week. That means if we want progress, we have to put a bit more weight on the bar week to week or do more reps or sets or some combination of all of those. But we also know that we can't train much past our body's MRV because then we don't have the energy and resources to adapt to training and actually get any growth out of it. So what do we do?

We start our training with something challenging (overloading) enough to grow from, but that's well within our ability to recover from. Week to week we add to the stimulus, increasing some combination of weights, reps, and/or sets. This causes consistent growth but also adds fatigue to the system and is thus not infinitely sustainable. But the good news is that it doesn't have to be. As soon as we hit our MRV, we can be sure that pushing it further would be pointless. At that point we can take a week or so (known as a deload) to drop our accumulated fatigue, and re-start the climb from the bare minimum overload to our MRV.

Sounds great! But how the hell do we know our MRV? The clue is in the term itself. Maximal Recoverable Volume. If we go past it, we're by definition no longer able to recover. How do we gauge recovery for muscle growth? We use the best performance proxy for growth; the ability to do a weight for moderate reps. It's the best correlate of size for sure... show me a guy who can bench 405 for 10 and I'll show you a guy who has huge pecs, shoulders and arms. And in training, the way you make gains is mostly by doing sets of 8-12 reps and over time using heavier and heavier weights for those reps. So how do you know if you're recovered from last week?

Well, what did you bench last week? Let's say it was 225 for 3 sets of 10 with 2 reps or so left in the tank for each set. If this week you hit 230lbs for 4 sets of 10 with a rep or so left in the tank, that's about the same level of performance... we definitely can't say you didn't recover your rep strength from last week. But the week after you only hit 235 for a set of 10, then a set of 7, then 5, then 4 and then 3 reps... something is definitely off. Someone who can bench 225 for 3x10 with some reps in the tank should be able to hit 235 for hard 10s... at least for hard 9s! But when you are so fatigued that you're under-recovering, your performance will tank just like that. Once it does, that's a pretty clear sign that the week before had gone OVER your MRV and it's time to regroup and drop fatigue.

Sounds pretty straightforward, but there's just one complication we have to attend to before we switch gears to talk about eating to grow. What if last week was just a bad week for sleep and eating... what if you'd been training for 9 weeks instead of 4-6 and it's the accumulated fatigue from all those previous weeks that's causing recovery problems, not just the volume of your last week like the MRV calculation assumes? What if today's workout was just a bad one for a million different reasons and your true MRV is actually much higher?

That very much could be, and that's a problem. Because now, how do we know if we've found our actual average MRV (under normal conditions) or just gotten a measurement error. Well, the two most powerful scientific instruments ever devised are repetition and recording. You work your way up in volume through each phase of training (each mesocycle's accumulation phase) and you record your responses. When you notice an inability to recover, you back off, deload, perhaps switch up the exercise selections, and repeat. Note how many total sets per bodypart came in the week before you were unable to recover... that's your first guess at your MRV. For your next cycle, pick a set number under that one perhaps by 6 sets or so, and add sets and weight each week until you're at your hypothetical MRV in 4-6 weeks. If you under-recover earlier than expected, you need to adjust your MRV estimate down in set number per week. If you can go even further this time than last before experiencing recovery problems, you need to adjust your estimate upwards. After 3 or 4 cycles like this, two things will become apparent:

1.) You're getting much more jacked training like this! (Especially if you're eating well and recovering your best... more on that later.)

2.) Your MRV estimate is floating at a pretty tight range. Maybe within about 3-5 sets per week difference.

Maybe on one of the mesocycles you made it only to 18 sets a week before you overreached (couldn't recover), and maybe on one of the mesocycles you made it all the way to 22 sets per week before you had to drop it off. But if your eating and recovery are fairly stable, you'll have noticed that your MRV is fairly stable too, in this example perhaps around 20 sets per bodypart per week.

You can now take whatever set number that MRV estimate is and use it as the goalpost for your future training. Yes, it will be different for different bodyparts and yes it will change over time, but so long as you keep tracking your training and recovery, you'll be able to make adjustments to keep your MRV in your line of sight at all times... and be reasonably assured of the fact that you are training just about the right amount you need to grow the most!

Now that your training stimulus is in place, let's talk about the building blocks that your hard training will use to build up your physique.



How can you supply proper building blocks?

If size is your goal, you can't just train hard. While hard training sets the stage for growth, actual growth is fueled by the food you eat. And because you don't "just train" to get big but you train with science-backed focus, you don't "just eat" to get big, but you eat with the nutritional priorities in mind. Those priorities are like a checklist; eat in a way that checks off certain items and you grow the most you can. Eat in a way that doesn't check some of the specific items and your growth won't be as impressive. Eat in such a way that doesn't check off the fundamental basics and you'll hardly grow at all. Let's look at the checklist of nutritional priorities for size:

- **Calories**
- **Proteins, Carbs, Fats (Macros)**
- **Meal Timing**
- **Food Composition**
- **Supplements**

Now, calories are the most important feature of dieting for size, and they probably contribute to something like 50% of the growth you'll get with a scientific diet. Macros together account for about 30%, timing for 10%, and both food composition and supplements for about 5% each. Let's dive in to each category to give you some quick tips on your way to eating for growth.

Calories

Calories are the fuel for growth, in the very literal sense. Without enough calories, your body won't adopt the right hormonal and intracellular actions to propel muscle growth to its maximum. If you under-eat, you might be doing everything else right and still end up with disappointing muscle gains... and because calorie balance is the only variable that determines bodyweight, you won't get any bigger if you under-eat, even if you do manage to put on a small bit of muscle at the expense of fat.

So how do you know you're getting in enough calories? A good rule of thumb is to shoot for about 15 calories per pound of bodyweight per day as a starting point. So a 200lb lifter would start at about 3000 calories per day.

Track your bodyweight carefully 2-3x a week and see if it's going up over the course of several weeks. Your goal should be to gain about a pound of weight a week for about 12 weeks straight (after which you probably want to maintain the weight for a month or so and then take another 6-8 weeks to get leaner). If 15x bodyweight in calories works to put on the weight, awesome, keep eating that many calories per day. If it doesn't put on enough weight and you're not gaining between ½ and 1lb per week, up the calories by 500 per day. You might have to do that a few times if you have a fast metabolism, but in the end the principle is the same for everyone; if you aren't gaining weight, eat more.

Proteins, Carbs, Fats (Macros)

When you take in calories, they are going to be in the form of proteins, carbs, and fats, and each one has an essential role to play. Protein is what literally makes up your muscles, so you need plenty of it. About 1g per pound of protein per day is a great start for most lifters trying to get bigger, so if you weigh about 200lbs, 200g of protein per day should be your target. Consistency is key and you should try to meet this target every day. Eating much more than this won't help you get any bigger, so there's no such thing as extra credit with protein, but eating much less will cost you, so be diligent.

Carbs fuel the training process, the muscle growth process, and the recovery process, so they are critical to take in for best results. About 2g of carbs per pound of bodyweight per day is a good start for most hard trainers, so if you weigh around 200lbs, you'll be eating about 400g of carbs per day to support training and growth. You can try to low-carb it, but that will hamper your results in nearly every case.

Lastly, fats support your overall health and hormonal pathways, as well as acting as messengers in the muscle growth cascade in your cells. You need a minimum of 0.3g of fat per day to support vital functions, so if you weigh 200lbs you should be taking in at least 60g of fat per day and no less. You can definitely have more, and if you need more calories to fill your allotment once your protein and carbs have been calculated, eating extra fats is a great way to go.

Meal Timing

Together, calories and macros account for about 80% of your mass gaining results. An awesome start, but not quite the whole picture. After all, you're probably interested in a bit better than a B- in muscle growth! Meal timing, at 10% of total effect on muscle size, will take you from the B grades into the A range. Meal timing is pretty simple at the base of it. First of all, you want an even spread of protein-containing meals through the day, about 4-7 equally spaced meals. If you wake up at 8am and go to sleep at midnight, your first meal might be at 8:30am and your last might be at 11pm, with your other meals spaced evenly in between.

The big rules with meal frequency is to have your protein spread evenly to each meal (so if you're 200lbs and eat 5 meals a day, it should be about 40g per meal) and not go super long without eating... even spacing is key. In addition to even spacing, you want to make sure that your pre- and post-workout meals have plenty of carbs in them to support the training, growth, and recovery processes. In fact, most of your daily carbs should be placed in the meal before training (1-3 hours before), and in the 2-3 meals after training, with the first of those post-training meals being about as soon as you can eat after the gym. Keeping fats low in the pre- and post-training meals is likely a good idea, eating most of your fats in the meals either well before or well after your workouts. Meal timing won't make or break your muscle gain plans, but it will have a noticeable effect, so being consistent here pays off.

Food Composition

This one is pretty basic. Healthy food tends to support your training better than junk. Eating a diet of mostly lean meats, fruits, veggies, whole grains and healthy fats (like nut butters and olive oil) will lead to just a slight enhancement in your results. Yeah, you can have some junk here and there for sure, as long as most of your daily meals are made of the good stuff.

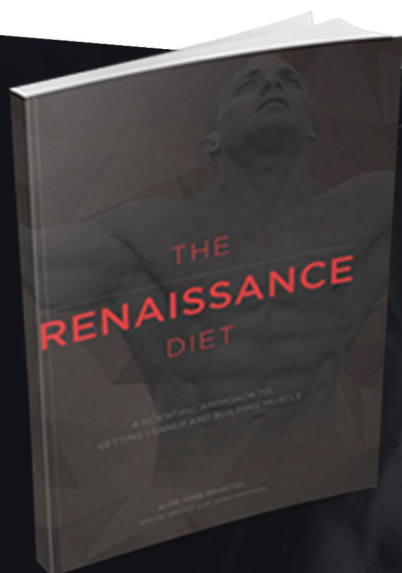
Supplements

Most supplements are bullshit and you've probably already figured that out. There are only a few supplements that work well, and even their total combined effect on your muscle gain is less than 5%. So if you've got trouble being consistent with your calories, macros, and timing, don't even bother with supplements. However, if you do have all of your ducks in a row, you might benefit from taking a few of the supps that are science-backed:

- **Whey Protein (best used during/after your workouts)**
- **Glycemic Carb Powders (best used with whey in/after your workouts)**
- **Casein Protein (best used at night or between long meal stretches at it digests slowly)**
- **Creatine (monohydrate is best, 5-10g per day)**
- **Stimulants (either coffee/tea/diet soda, energy drinks, or preworkouts... only use on your hardest lifting days and don't do anything dumb like taking double servings)**

There are lots of great supplement companies out there and lots of shady ones too. For a no-BS line of products, check out the ones I personally designed. Yep, other stuff out there that works just as well, I'm not gonna lie to you, but our line is one of those that has the actual ingredients listed and no frills.

That's about it for diet... if you want to learn much more detail and the science behind it, check out the Renaissance Diet ebook. Now onto our last pillar of size: recovery.



Click on the book.

How do you best recover?

As mentioned earlier, recovery is the return back to your normal state after a disruption has occurred. It's the re-building of broken muscle fibers, the repair of frayed tendons, the re-loading of lost muscle glycogen (the main fuel for workouts), the re-wiring of the nervous system, and the general repair of your body's systems so that you can hit it hard in the gym next time and keep progressing. Recovery is great and essential, but just recovering isn't enough. You've gotta restore your body's systems completely at first, and then have the energy and resources to make adaptations as well... to actually get better instead of just returning to baseline. Adaptation is like a luxury watch or car... a responsible person only buys those when times are good and the basics are paid for... and your body is a VERY responsible entity in this regard. It won't authorize growth (the adaptation we want) unless recovery is feasible.

If you chronically under-recover, you will run into several problems. You won't be able to train as hard as you need to, and because we've already seen how critical hard training is to making gains, this is bad news by itself. Secondly, if recovery is compromised, the very chemical signals for turning on adaptation-generating machinery can be muted. That's right, lifters who are chronically under-recovered might still be able to will themselves through hard workouts with sheer balls, but those workouts no longer activate much muscle growth because the stingy body doesn't allow for adaptations to occur in a low-recovery state. How crappy is that? All that training, and you're just spinning your wheels?! Lastly, if you really push it too long without proper recovery, you'll be under-healing literal breaks and tears in your muscular, facial, tendinous, ligamentous, and bone tissues. Sooner or later, one of those will snap, and you' be sidelined with injury.

Sounds like recovery is important, so let's get right into what you can do to make sure yours is on the right track.

Sleep

Sleep is absolutely critical to restoring your body's worn out systems and is essential in direct muscle growth as well. Missing a few hours here and there is ok, but chronic (several days on end) sleep insufficiency can lead to seriously compromised recovery. Getting the sleep you need on a regular basis is a must... 7-9 hours a night for most. How much sleep do you need? You know that better than anyone... whatever amount leaves you rubbing your eyes and trying to stay awake the next day isn't enough.

Rest and Relaxation

Your body has two main autonomic (involuntary) nervous system pathways; the sympathetic and parasympathetic. The sympathetic nervous system (NS) is your "fight or flight" system. It's activated during stress that's either physical or mental. It liberates energy for fuel and it gets your body ready to react and perform at seconds' notice. But... it doesn't promote any healing or recovery processes and in fact actively shuts them down. It does this so that you can have your body's full abilities at your disposal when you need them, (kind of like not being able to drive your car when it's in the shop) but the problem is that it's delaying recovery to be able to give you this ability.

The parasympathetic NS is the recovery/healing arm of the system. It activates after big meals and during sleep and relaxation. It promotes all of the body processes that recover, restore and adapt your physiology between times of stress. Sounds good right?

The problem is when you have chronically high stress and you don't relax enough (both mentally and physically), the sympathetic NS predominates and you end up shortchanged on recovery. So if you're always stressing out, always running around, always worrying, you're literally preventing muscle growth from happening at a cellular level by keeping your sympathetic NS turned up at the expense of the recovery-promoting parasympathetic NS.

There are two take-home points here for those interested in maximal muscular development... first... don't stress with stuff you have no control over... such as the actions of other people, traffic, or the weather. And the stuff you DO have control over (like your schoolwork, your job, your relationships), be the best you can be and do your best work in a calm and rational demeanor... don't freak out all the time and you'll be more muscular... it's that simple. Secondly, make sure that every day leaves you with an hour or more of relaxation time that you get just to yourself or for you and your close friends/partners. Watching some TV, browsing social media, reading for pleasure, or anything else you do to relax can have a big effect on switching your sympathetic NS down, switching your parasympathetic NS up, and getting you to recover.

Food

Even with perfect sleep and a relaxed approach to life, the best recovery cannot come without sufficient food and enough calories, protein, carbs, and fats. Since we already covered this in the section on eating, we won't beat around the bush... get your nutrition in check, or else forget about your best recovery.



A full-page background image of a muscular man in a gym, overlaid with a red tint. The man is wearing a black tank top and shorts, and is looking directly at the camera. The gym environment is visible in the background, with other people and equipment.

CONCLUSION

How about that? A whole document about getting muscular and not a single weird quirky trick. Don't feel let down... you've probably tried enough "weird tricks" to know they don't do hardly anything. The basics of hard training, diligent eating, and proper recovery ARE the "tricks" to getting huge... though they take time and require your efforts... not very tricky.

But that's the good news and the bad news all at once... science doesn't give you any tricks... it just tells you what's effective. But doing the work to actually get bigger? That's all on you.