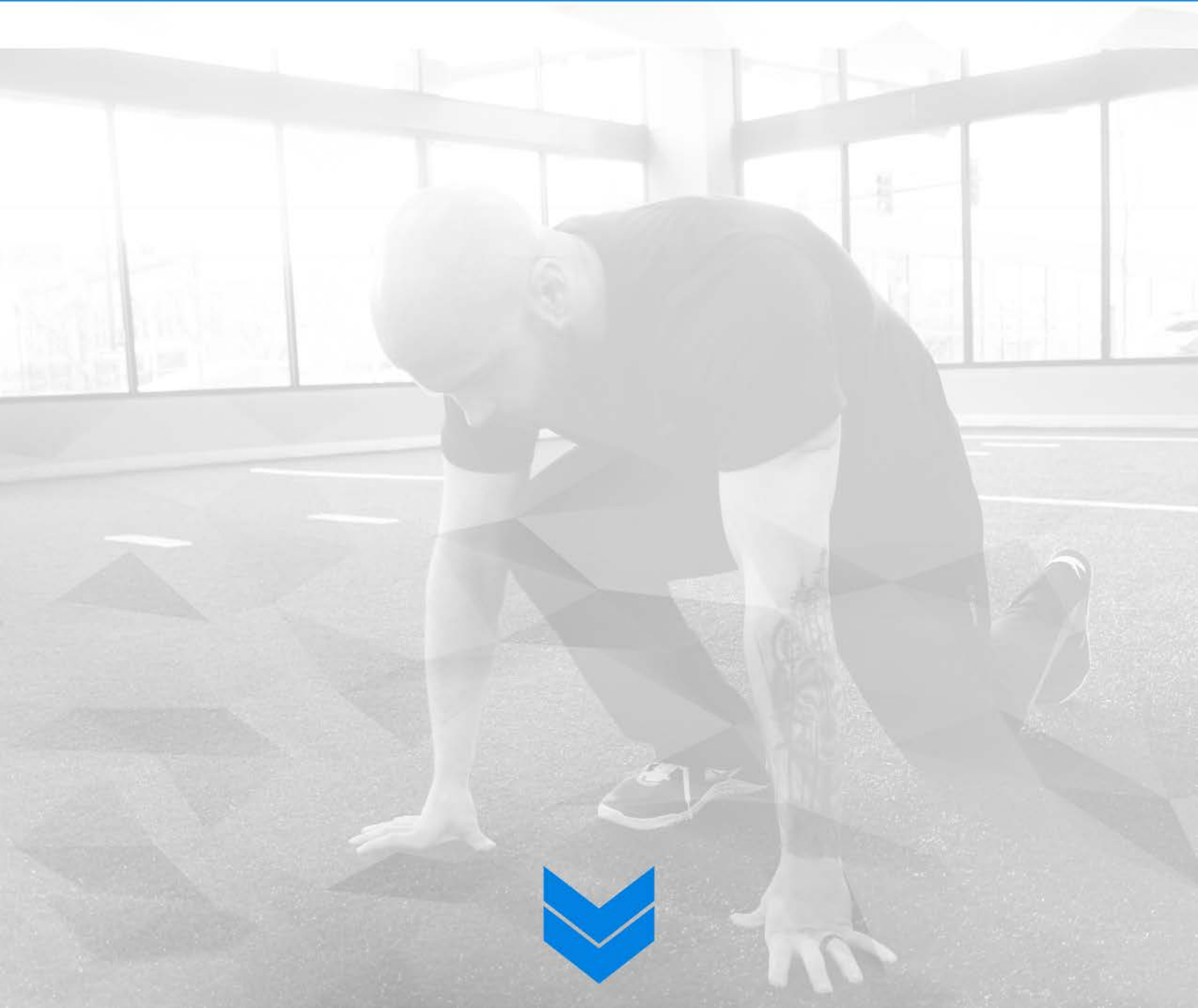




**THE ULTIMATE
TRAINING MENTORSHIP**

CRASH COURSE ON ANATOMY



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Anatomy is a topic that has full textbooks dedicated to discussing incredibly detailed and complicated structures. To cover it all would not only be exhausting for you, but also not make you that much of a better trainer either.

When was the last time you needed to discuss the three principal cell shapes associated with epithelial cells?

Probably never?

But just in case you're at a REALLY COOL party and it comes up in conversation, they are squamous epithelium, cuboidal epithelium, and columnar epithelium.

Outside of being super cool, this type of extreme detail is not required in order to become a world class trainer. The purpose of this section will be to provide you a crash course on anatomy and discuss only the most relevant muscle groups involved in training and what unique qualities they bring to the table that we need to be aware of when designing a program.

These unique qualities can be the difference between a "good" program, and an **optimal** one. If you want to put on size and strength at the fastest rates possible, it's vital that you understand its physical structure, functional role in movement, and fiber type composition.

This crucial information allows us to be more selective and choose the correct rep ranges, rest periods, and overall weekly training volume for the best results. Not only will your clients get better results, but you will stand out from the pack at your gym because almost every trainer paints a broad brush over every muscle group and give them the same rep ranges.

Hypertrophy = 8-12 reps

Strength = 3-6 reps

Relative strength = 1-2 reps

And so on...

This is definitely a mistake and is a great way to not generate an optimal result within a training program. The hamstrings do not have the same fiber type and biomechanical leverages as the lats, and thus shouldn't be trained as such.

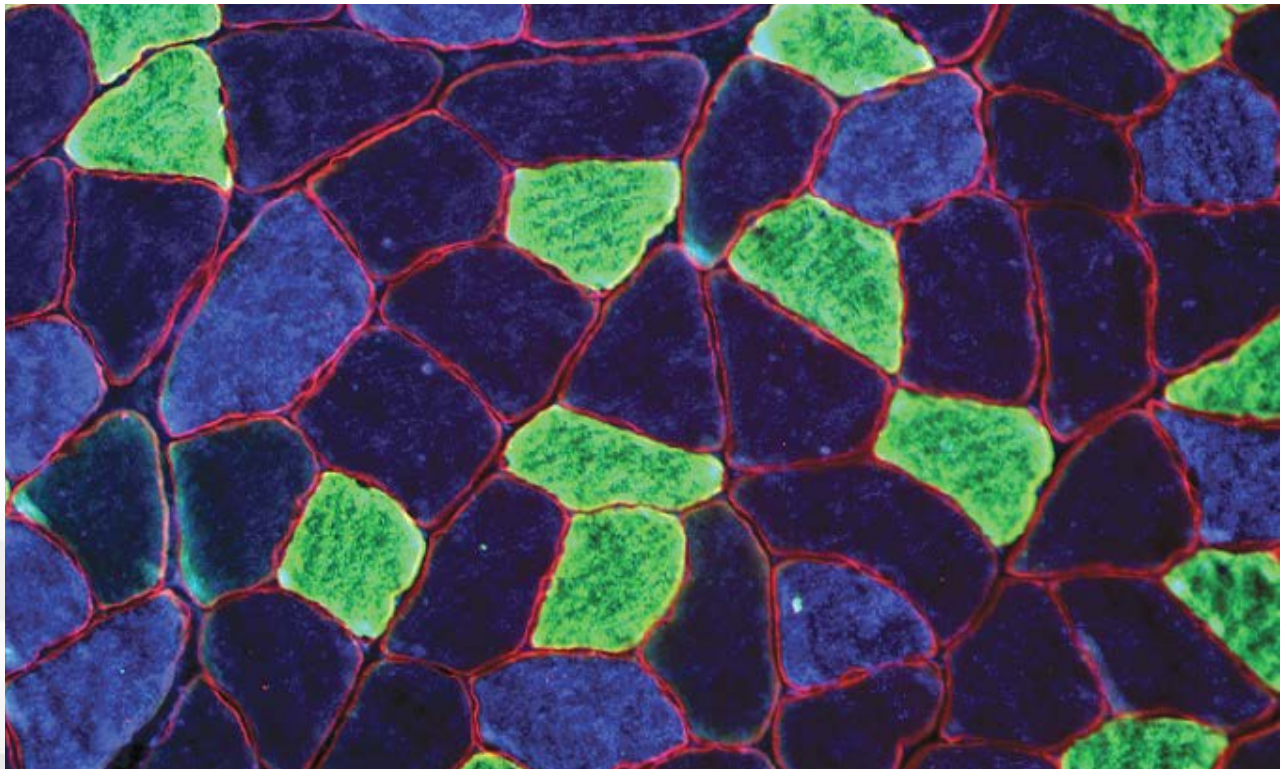
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Fiber types are quite simple on the surface to get a firm grasp on. There are three primary types of muscle fibers within our muscle tissue:

1. Type I muscle fibers
2. Type IIa muscle fibers
3. Type IIb muscle fibers

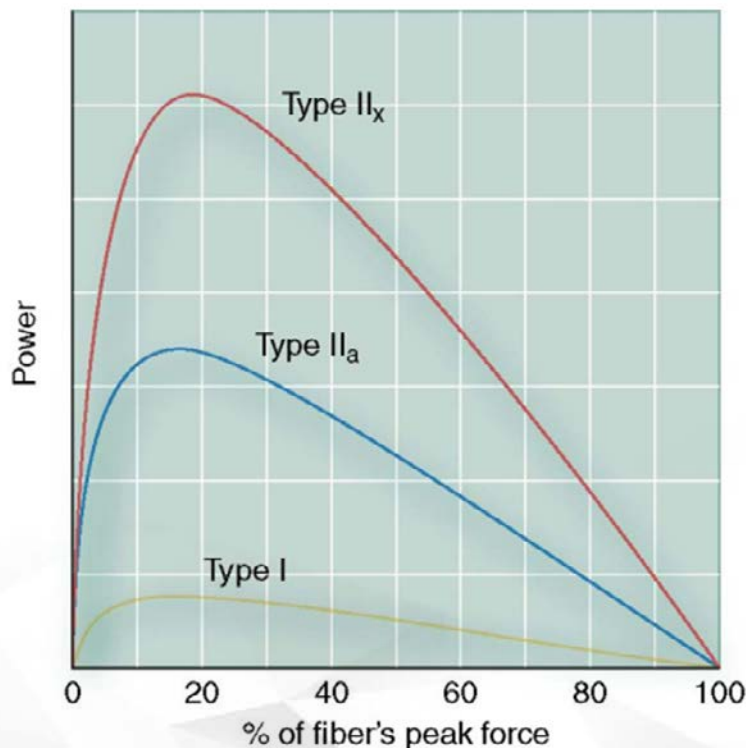
Put simply, Type I muscle fibers are slow twitch fibers that are very resistant to fatigue, but cannot contract at the rate of the fast twitch muscle fibers (type IIa and type IIb). This makes Type I fibers much more suitable for endurance-based work, and Type II fibers more suitable for high force produce, explosive work. This is important to care about because each muscle group has different fiber compositions and should therefore be trained in a manner to optimize the muscle specific fiber make up.



Above is a picture of an immunohistochemical staining of skeletal muscle which gives us insight on composition distribution. The blue is Type I fibers, the green are Type IIa fibers, and the black is Type IIb fibers. The red that you see in between is what is known as dystrophin, which is a protein in the sarcolemma (more on the sarcolemma during “pump” week)



Although you can alter your muscle fiber type slightly with enough training, your fiber type is largely genetically driven. The fast twitch fibers are going to respond better to heavier movements and longer rest periods, whereas your slow twitch fibers are the polar opposite and tend to respond better to lighter movements and shorter rest periods. Of important note, due to the difference in overall weight lifted between the two fiber groups, the fast twitch fibers need more time to recover in between workouts than the slow twitch fibers—thus allowing the slower twitch fibers to be trained with a greater weekly training frequency than the fast twitch fibers.



As you can see, the power output varies dramatically from one fiber to the next, which is why we can't really justify training them all identically. Above you will see the stark differences in power output between the Type IIx (also known as Type IIb), Type IIa, and Type I fibers.

Population differences in fiber composition don't vary too much, with everyone in the general population typically being within 10% of one another. While the genetic freaks lie on the extreme ends of the spectrum and perform either phenomenally well in things like the 100m sprint (fast twitch dominant) or in marathons (slow twitch dominant). These are the type of people you want as clients, and fall in that very small percentage of people in the world who are naturally gifted.



For your hypertrophy clients, it's important to point out that Type II fibers have a much greater potential for size and can even double the size of their Type I counterparts. Not surprisingly, as you get older you start to decrease in Type II fibers distribution which results in a decrease in size, strength, and explosiveness. Also not surprisingly, if you weight train into your older years you can decrease the rate at which this occurs.

With that explanation out of the way, let's get to the muscle groups.

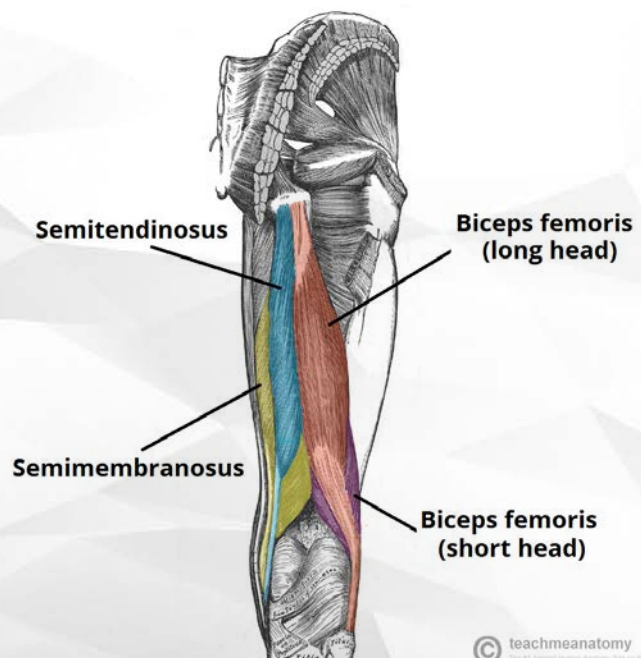
HAMSTRINGS

The hamstring consists of three muscles:

- The biceps femoris
- Semitendinosus
- Semimembranosus

Understanding the functions of these muscles is how we can design optimal programming. The hamstrings are involved in extending the hip, flexing the knee, turning the foot outwards, and turning the foot inwards. Additionally, the hamstrings are one of the most fast-twitch dominant muscle groups in our entire body, composing a crazy 70% fast-twitch presence.

Of important note, although the hamstrings are both a hip extender and knee flexor, it cannot perform both simultaneously. This means, for hip extension exercises such as deadlifts, the more your knees are bent the less emphasis you are placing on your hamstrings and the more emphasis you are placing on your glutes. This is one reason why the hip thrust has worked so well for glute development, it forces knee flexion and maximizes hip extension at the same time—placing complete dominance on the glutes.





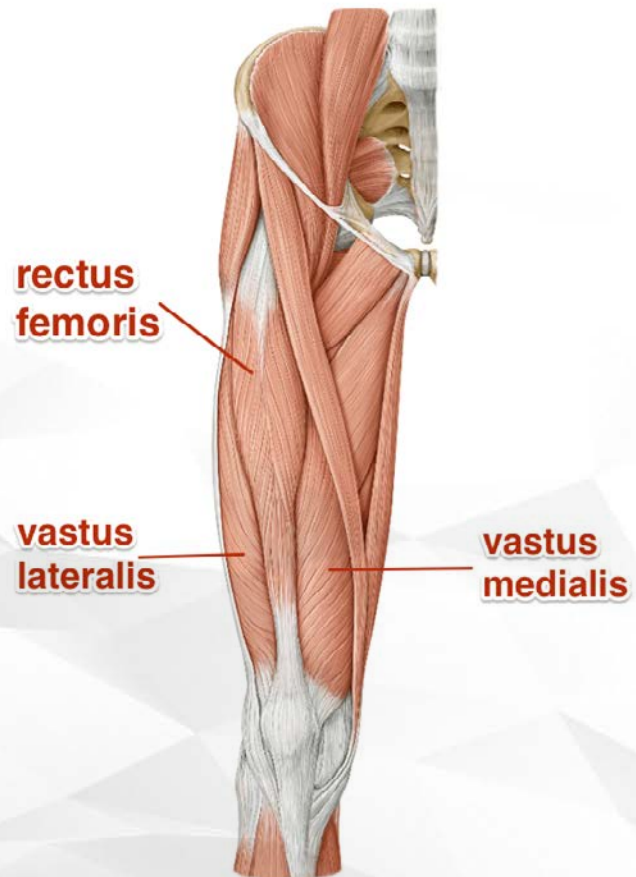
Main notes: The hamstrings should be trained with relatively low reps (8 or less in most all cases), and are inactive as a hip extender when the knee is bent. Straight leg movements such as Romanian deadlifts, stiff-legged deadlifts, and good mornings are ideal here.

QUADS

The main muscles of the quadriceps include:

- Vastus medialis oblique
- Rectus femoris
- Vastus lateralis

The primary function of the quadriceps is to extend the knee, but they also play a more minor role in hip flexion. The quadriceps are a very large muscle group that can generate a significant amount of both local (quad muscle) and systemic (nervous system) fatigue when trained hard enough. For example, you can hit your abs fairly often in training and still recover fine, but nobody is smashing their quads everyday – it's simply too hard on the body. Keeping structural balance between the vastus medialis oblique (that tear drop looking muscle on the inside of your knee) and your vastus lateralis (the giant piece of meat on the outside of your thigh) is super important as they both pull on the knee during knee extension. So, if one is stronger than the other, you have a greater susceptibility for damage as it will pull it with greater force than the other muscle will and you will thus have an offset patella during extension.





The fiber composition for the quadriceps is tough because there are many different muscles in the quads with different fiber types, but the end ranges for the entire quadriceps fall within 50-65% fast-twitch. This puts the quads in more of a “middle of the road” category that respond well to both lower and higher volumes, but slightly better to lower volumes with more weight.

Main notes: To maximally hit the quads, use a wide variety of rep ranges (8-20 reps per set. The lower or upper range being context specific to what phase you’re in) and use quad dominant exercises such as the front squat, hack squat, lunge, and leg press.

CALVES

The main muscle of the calves include:

- Soleus
- Gastrocnemius

The primary functions of the calves are to create plantar flexion of the ankle, curl your toes, and aid the hamstring in knee flexion (like during a lying hamstring curl). The calves can be a tough muscle group to grow, and one of the biggest deciding factors here is if you’re blessed with long muscle bellies. That is, where your muscle belly inserts in your

bone (you will notice some people’s calves are bunched up right under their knee, whereas others have a much longer muscle belly and therefore more potential for size).

The calves are almost exclusively slow twitch dominant, upwards to 90% slow-twitch in almost all cases. This makes sense with the amount of walking/standing we do each and everyday, so it’s not really wise to focus on low reps here.





Main notes: The calves respond best to higher rep and higher frequency work (training twice per week in the rep ranges of 15-30 reps per set) and you're going to want to use a range of exercises that allows for the development of both the soleus and the gastrocnemius. This includes seated calve raises, smith machine calve raises, single leg calf raises on an elevated surface, and calf extensions on the leg press. Of extreme importance, you're going to want to stretch at the bottom of every rep and control the eccentric portion of the movement. Additionally, if your calves aren't growing, place an emphasis on them like you would anything else. Train them more, and train them first in your workouts.

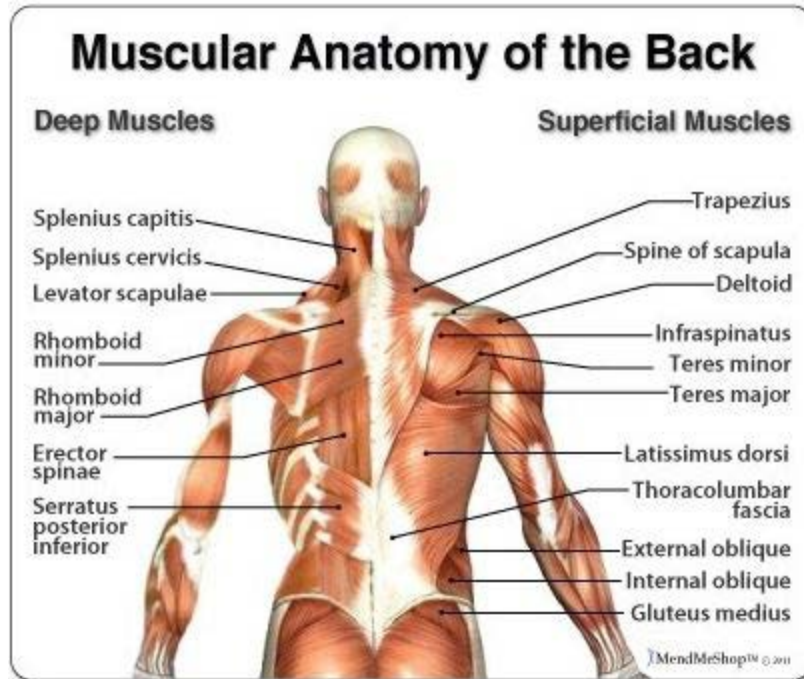
BACK

Because the back isn't a single muscle, but a combination of dozens of muscles, it has the same issue as the quadriceps for breaking down the exact rep range you should be following as an exercise prescription.

To put it very simply, the function of the lats and teres major are to aid in shoulder adduction (pulling elbows into the sides) and shoulder extension (think straight bar pull downs, or, the exact opposite of front raise). The function of the traps is to depress and elevate the scapulae (raise up and down the shoulder blades), and the erector spinae stabilizes the spine, laterally flexes the spine, and rotates the spine.

Since this can all get pretty complicated with so many moving parts happening at once, it's easiest to break it up in your mind that the back is always active in pulling motions. Some of your back is better trained when pulling vertically (like in a pull up or lat pulldown), and the rest of your back is better trained when pulling horizontally (like in a cable row or barbell row).

Luckily for us, all of these muscle groups fall within a pretty average distribution of fiber type – with a slight emphasis on being slow twitch. So, training with a moderate to high rep range for your back is ideal in almost all cases.



Main notes: Your workouts need to include an even distribution of both vertical and horizontal pulling exercises. Some of the best vertical pulling exercises include all variations of pull ups, all variations of chin ups, and all variations lat pulldowns. Whereas the best horizontal pulling exercises include BB row, Pendlay row, Rope face pulls, one arm or two arm DB rows, seated cable row variations, and the chest supported row machine. Additionally, due to the wide range in fiber distribution it is wise to incorporate a range of 6-20 within your programming. Again, this is not to mean your rep range for all workouts should be 6-20, I mean this is the range that is best to work within throughout the year. For example, for one phase your rep range may be 6-8, but the next could be 18-20. Just don't escape the high or low-end recommendation.



CHEST

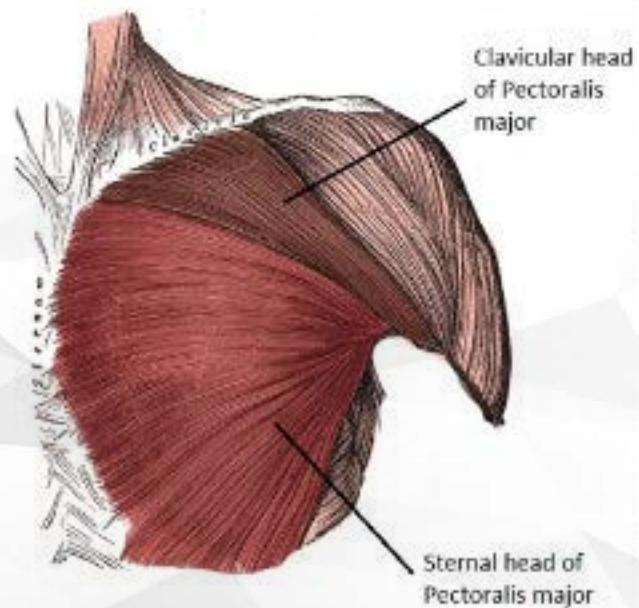
The chest contains two muscle heads that we need to concern ourselves most with:

- Sternal head (lower chest)
- Clavicular head (upper chest)

The chest muscles primary functions are shoulder adduction (think pulling a dumbbell towards you during a pec fly), and transverse shoulder flexion (put your arms straight out in front of you, now, rotate your hands so you palms face the floor and your elbows face out sideways. This is shoulder flexion and the chest is involved in movements when you're in shoulder flexion, like during a bench press).

To ensure you're hitting the two heads of the chest with everything you got, you want to incorporate incline movements that tackle the upper chest, isolation movements that are good at hitting the inner chest, and horizontal movements that simply smash the whole chest. Additionally, the chest musculature is highly explosive and composes approximately 60% fast-twitch muscle fibers.

Main notes: Incorporate incline movements (incline BB/DB press, incline machine press, incline close grip press), horizontal movements (flat BB/DB press, close grip bench press, machine presses, guillotine press, and push ups), and isolation movements (flat/incline DB flys, cable flys, and machine chest flys) for complete and balanced chest development. Reps of 12 or less are ideal in almost all cases for pressing movements due to fast twitch dominance, but, in the case of isolation work you're going to want to keep the reps higher due to injury risk. Nobody cares about your 1RM in the cable fly.





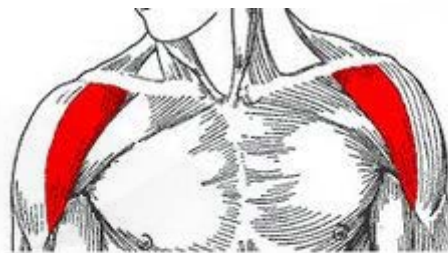
SHOULDERS

In the training world, it's pretty common to see that people have over-developed anterior deltoids, half-decent lateral deltoids, and pretty embarrassing posterior deltoids. This is normally because people incorporate lots of horizontal and vertical pressing work in their plans (which always targets the anterior delt, even when you think you're chest training), only do probably 3-4 sets per week of lateral raises, and then heavily neglect upper back work.

The anterior deltoids flex and medially rotate the arm by pulling your humerus towards your clavicle (think a front DB raise, or, throwing a ball in an underhand motion). The lateral deltoids abduct the arm by pulling the humerus towards the top of the shoulders (think DB side delt raises). Lastly, contraction of your posterior deltoids extends and laterally rotates the arm by pulling your humerus towards the spine (think winding up to throw a baseball pitch overhand).

The shoulders are also largely involved in maintaining posture, and stabilizing nearly every upper body movement. For this reason, it's no surprise they are approximately 60% dominant in slow-twitch muscle fiber distribution and are best stimulated with medium to high rep sets.

Your chest work and overhead press work alone is more than enough stimulation for your anterior delts, so in almost all cases I never prescribe front raises of any kind within resistance training programming. In fact, the imbalance from anterior to posterior deltoids is so severe I normally work them in a 2:1 ratio (twice the amount of posterior work) in the beginning in order to balance out these issues.



Anterior Deltoid



Medial Deltoid



Posterior Deltoid



Main notes: Train the shoulders in a medium to high rep range using 8-20 as your end point markers. In the beginning, it's wise to work your clientele at a 2:1 ratio from back to front in order to improve structural balance and remove the very common internal rotation people are walking around with. My favorite exercises for anterior delt development are all of your horizontal and vertical pressing movements. A tip for you in order to better isolate the lateral deltoids is to work them on a 30 degree incline in the bench press, as standing or seated versions worked vertically tend to allow the anterior deltoid and supraspinatus to take over. Lastly, the best exercises for posterior development include upright rows, bent over db rear delt flys, rear delt machine flys, rope face pulls, and EZ bar face pulls.

TRICEPS

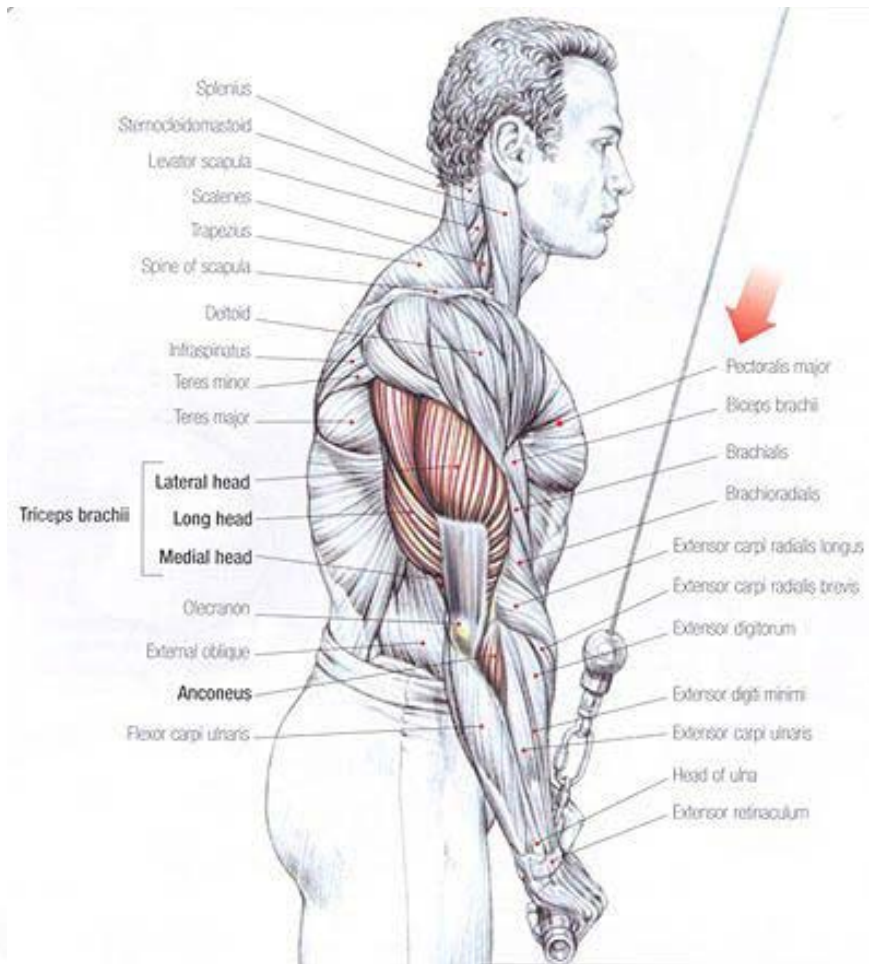
Something that is important to note is that the triceps make up about 2/3rd's of the upper arms mass, so if you're looking to have big arms, it is definitely wise to make sure your targeting the triceps correctly and not just doing curls day in and day out.

From a fiber type standpoint, we are looking at a muscle group that is approximately 67% fast twitch (one of the most dominant fast twitch distributions in the body, hanging just behind the hamstrings). Because of this, incorporating higher intensity, low to low/medium rep work is going to be ideal for maximal stimulation.

Keep the low intensity, high rep work in your programming not as often as the high intensity/ lower rep work (if size/strength is your goal that is) and when you do utilize low intensity techniques, running them to failure will still stimulate fast twitch fibers so I recommend running them to, or close to failure when you utilize those set / rep schemes.

Moving on to bio-mechanics, the triceps have 3 distinct muscle heads, the long head, the lateral head and the medial head. These three heads function together to extend the arm and also pull the arm towards the body.

Long story short, it's typically the long head that gets left out of most people's programming. The long head is best stimulated with overhead work whereas the lateral and medial head get stimulated quite effectively with most of the standard triceps exercises people already use.



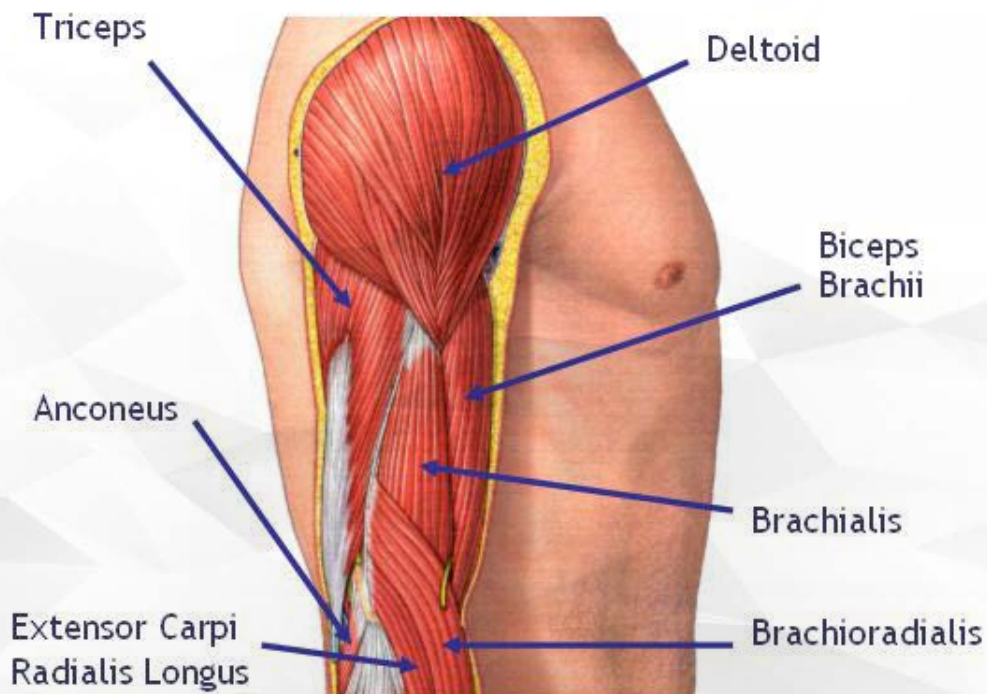
Main notes: To create a balanced and complete development of your triceps, you're going to want to have a combination of both long head work and medial/lateral head work and generally work in rep ranges of less than 12 due to fiber type composition. My favorite long head dominate exercises include EZ bar French press, high pulley triceps rope overhead extension, EZ bar skullcrushers to the top of the head, and low pulley triceps rope overhead extension. For medial/lateral work, it's best to always incorporate dips, close grip bench press, skullcrushers, DB skullcrushers, close grip push ups, JM press, triceps rope pressdown, and straight bar cable triceps pressdown.



BICEPS

It's more technical to call this entire group the forearm flexors, as it contains the biceps, brachialis, and several other supporting muscles. But, I'm just calling it biceps in this document for the sake of simplicity and because we're all after the gun show. Their primary function is elbow flexion, and they are also heavily involved in shoulder flexion (which is why they can sometimes fatigue and even be sore after a high amount of chest fly work). The biceps are made up of two different muscle heads, the short head and the long head. The long head is what provides the biceps the "peak" look, and is better trained in movements that have your elbows out in front of you, such as the preacher curl. Whereas the short head is hit to a larger degree during movements where your elbows are at your sides.

Something that is important to not leave out is the tremendous availability for arm development within the brachioradialis, which is best targeted with a neutral grip (think hammer curls). The brachioradialis is approximately 60% fast twitch muscle fiber dominant, so heavier work is ideal here in comparison to the rest of your elbow flexors which are predominantly slow-twitch based.

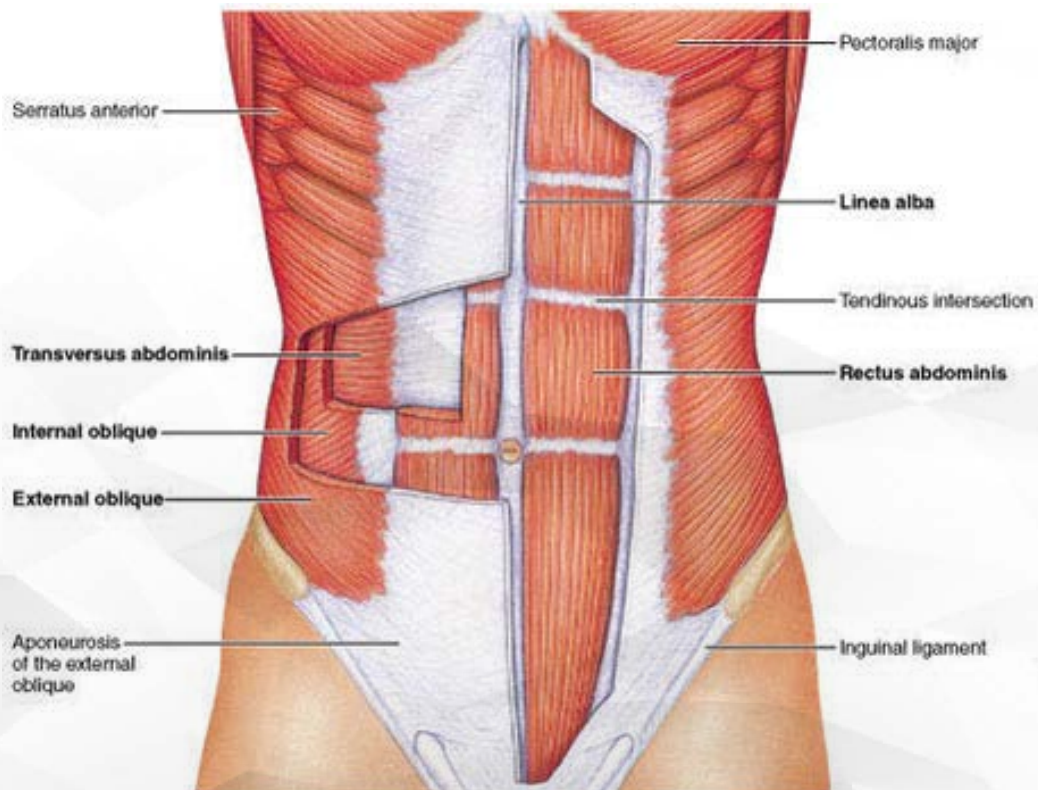




Main notes: Your neutral grip work should be heavier in nature due to brachioradialis fiber type distribution, opting more often than not to incorporate sets lower than 10 reps in length – whereas your biceps are more slow twitch in nature and should be trained in the 10-25 rep range. Biceps have an incredible ability to recover quickly and can be trained nearly everyday if you consider how much activation they get during all back work and still manage not to get sore. Although the most growth and development is going to come from targeting them directly, some of the best exercises here include DB hammer curls, EZ bar supinated curls, BB curls, DB spider curls, incline DB curls, and EZ bar low pulley cable curls.

ABS

The anterior core chain involves the much more familiar rectus abdominis, internal/external obliques and the hip flexors. The combination of this musculature provides trunk flexion, anti-rotator force, rotator force, posterior pelvic tilt, hip flexion, and also provides solid structural protection of the inner organs.





The anterior chain definitely plays its role in sports performance due to its contribution in bracing the core and providing rotational power and strength. Naturally, this has a very underrated role in stabilization during the main core lifts and without the core's help we would be an incredible weak species.

The anterior core is pretty resistant to a ton of hypertrophy. For example, you never see abs the size of quads. But, nevertheless, they do have hypertrophic potential and consist roughly of 55% fast twitch dominance. Beginners should always develop the “inner core” first via stabilization movements such as plank variations before moving on to an anterior core focus as they need the stability first in order to remain injury-free in their training career.

Main notes: Although a complete review of the core would be exhaustive, the most popular and most discussed muscle include the anterior core as they are the most aesthetically pleasing. They should be trained in a medium rep range of 10-15 reps, and do not be afraid to use weight here.

I hope this crash course on anatomy was able to open your eyes to the importance of training muscles in a unique fashion for optimal results, give you a refresher on your basic anatomy, and offer you important frequency and rep range guidelines to follow when programming for your clientele.

After this document, I know you may have many questions, but we will be discussing how to piece all this together in extreme detail as the weeks carry on. For now, just grab the basic concepts here and understand that each muscle group has its own unique subset of musculature that follows its own rules for allowable intensity and volume.



-Dan Garner

DAN GARNER
TEAM GARNER FOUNDER AND CEO