GLUTE LAB

The Art and Science of Strength and Physique Training

"The Glute Guy"

BRET CONTRERAS, PhD

***and* GLEN CORDOZA**

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Foreword

It’s always an honor being asked to write the foreword for a book by someone you respect and admire. It’s particularly gratifying for me when that individual is Bret Contreras. There is no one I respect and admire more, both personally and professionally.

Those of you who are fairly new to fitness may not truly appreciate the magnitude of influence that Bret’s had on the industry. In fact, it’s no exaggeration to state that Bret has changed the way fitness enthusiasts and pros alike approach glute training.

All that’s needed to fully comprehend Bret’s contribution to the field is a perusal of the exercise literature in the years prior to his arrival on the fitness scene. You’ll see that until the late 2000s, virtually every article on glute training advised people to go heavy and hard on squats and deadlifts. The occasional paper might have included a few sets of lunges or stiff-leg deadlifts, but many so-called authority figures were all too quick to dismiss lunges as a

“sissy” exercise. To that end, cable kickbacks and the seated hip abduction machine were also for wimps. Bodyweight exercises, banded exercises, single-leg exercises, and high reps in general were regarded as ineffective for enhancing glute development. Back extensions were performed with the intention of targeting the lower back musculature, and the entire category of glute bridges and hip thrusts didn’t even exist.

Bret spends the bulk of his days figuring out ways to further evidence-based glute training. No one devotes more time and energy to scouring the relevant literature and then testing out his applied theories in the trenches.

Indeed, Bret invented barbell glute bridges, barbell hip thrusts, frog pumps, and nearly every other loaded bridge and thrust variation you can think of.

Moreover, he invented glute-dominant back extensions (rounded back and feet turned out), side-lying hip raises, extra-range side-lying hip abductions, and many other popular glute exercises. He popularized turning the foot inward for frontal plane hip abduction exercises, greatly influenced the rise in popularity of mini bands and elastic loops for glute training, and helped make it acceptable to utilize machines, cables, and higher rep ranges for glute growth. Bret also created force vector terminology to differentiate glute

exercise categories and aid in program design. The list goes on and on…

Bret’s tireless research in the lab and in the gym has revolutionized the way we train glutes today; his reach on the topic spans the globe. While training strategies for the pecs, delts, lats, arms, quads, and hammies haven’t changed much over the past few decades, the science and practice of glute training has progressed exponentially thanks to Bret. In the case of the hip thrust, nobody else in the world can be credited for inventing and popularizing an exercise that is now universally performed in fitness facilities on a daily basis. I still get a kick out of the fact that pretty much every time I hit the gym, I see someone performing an exercise that Bret devised. Suffice it to say, you’ll never meet anyone as passionate about glutes as Bret Contreras, and I’m proud to have collaborated with him on dozens of published research studies, lay articles, and podcasts.

I know that Bret and Glen worked relentlessly on Glute Lab for two years, making sure that it communicates Bret’s complete system of glute training in a manner that is easy for the masses to comprehend. Whether you are a personal trainer, strength coach, athlete, physical therapist, or just somebody looking to improve the strength and

appearance of your glutes, do yourself a favor and read Glute Lab; I guarantee you won't be disappointed.

Yours in Fitness, Brad Schoenfeld, PhD

INTRODUCTION

If you could improve any part of your body, what would it be? For me, it's always been the gluteus maximus, or glutes.* Not because it's the largest muscle in the body or one of the most important. No, I first became fascinated with glutes because I didn't have any.

Long before I was known as the "Glute Guy," I was a skinny, lanky teenager. My flat backside in particular was a constant source of embarrassment. Some guys are shy to talk about it, but we all know that having nice glutes is both attractive and desirable; it's a symbol of health, strength, athleticism, and beauty. But I had nothing.

In high school, I would often overhear girls talking about my friends'

butts. They'd say things like, "So-and-so has a nice butt," or, "His butt looks great in those jeans." I often wondered what they said about me. Then one incident, which I'll never forget, made it clear.

I was out golfing with my sister's boyfriend, and at one point I went to swing the club when he said, "You know, Bret, you have no butt." He was drawing a straight, vertical line in the air with his hand: "Your back just goes right into your legs!" I was devastated. He had just called attention to my biggest insecurity. Even worse, I now knew what the girls at school were saying about me. I thought, if this is what my sister's boyfriend thinks, imagine what all of the girls at school are thinking.

This was a turning point for me. Something needed to change. I needed to get glutes.

From then on, I was obsessed with glute training. My underdeveloped

backside put me on a quest to find the best training methods and techniques for strengthening and developing the glutes. Now, after 28 years of training, coaching, and experimenting—and getting my PhD and publishing numerous research papers—I've developed the world's first comprehensive glute training system. This book is that system. You will learn why glute training is important, how your glutes function, the critical role they play in your body, and, most importantly, how to design a program and perform techniques that maximize glute development and performance.

But before I delve into the system, I want to share my journey because it explains why and how the system and techniques were developed.

When I use the word glutes in this book (and I use this word a lot), I'm actually referring to three gluteal muscles that make up your buttocks: the gluteus maximus, gluteus medius, and gluteus minimus. The names of the gluteals are derived from the Greek word glutos, meaning buttocks, and the Latin words maximus (great), medius (middle), and minimus (least). The gluteus maximus is the main muscle. It is the largest of the three and gives the shape and appearance of what we informally call the butt. For this reason, glutes refers primarily to the gluteus maximus, but also captures the other two smaller gluteal muscles. In Chapter 5, I describe all three muscles in more detail.

THE QUEST TO ATTAIN GLUTES

When I decided to get glutes, the first thing I did was read all of the bodybuilding magazines and books I could get my hands on. I wanted to learn everything I could about training the glutes. There was just one problem: nobody talked about glute training back then. Bodybuilders had a leg day, and it was assumed that the glutes would develop just fine as long as

you included squats and deadlifts in your leg routine. So that is exactly what I did.

For years, I obsessively trained my glutes by squatting, deadlifting, and then eventually performing other leg exercises that worked the glutes, like step-ups and split squats. And it worked for a while. I got stronger, my physique improved, and I felt great. But at a certain point, my glutes stopped developing.

Looking back, there were two reasons for this.

First, my genetics were working against me. It turns out that genetics play a huge role in gluteal development; you will learn more about the role of genetics in Part 2. Some people have never worked out a day in their life and have a perfect butt, while others have to work tirelessly for years to get glutes.

I was in the latter category. (If you're like me, don't let your glute genetics get you down. You can still improve your physique, health, and performance with the glute training techniques and programs outlined in this book.) Second, the squat and the deadlift patterns—though great for building strength and muscle in the lower body—do not work the glutes to the same degree as the quadriceps (quads) and hamstrings (hams): the squat primarily works the quads, while the deadlift primarily works the hamstrings (especially the way I tend to deadlift, with high hips). Sure, multiple muscles are working simultaneously, but there is a dominant muscle powering the movement, one that is contracting to a higher degree than the other muscles.

So my poor glute development was due in part to genetics and the fact that I wasn't performing glute-specific exercises (or, as I refer to them later in this book, glute-dominant exercises). At the time, I was ignorant to the role of genetics, but I had learned enough about squatting and deadlifting to know that the glutes were not the primary muscle being worked.

Realizing that I needed to perform more glute-dominant exercises, I looked to the Internet to see what other coaches were doing. This is when I came across the work of Mark Verstegen, Joe DeFranco, Eric Cressey, Mike Robertson, Mike Boyle, and Martin Rooney. They were teaching a ton of glute exercises like glute bridges, bird dogs, and side-lying clams.

Although these were great glute exercises, they were bodyweight and banded movements. To get a good workout, you had to perform a ton of

repetitions. In fact, these coaches weren't even using them to build glutes.

They were considered low-load activation exercises, meaning that they were used to stimulate the muscles, not strengthen and grow them. For example, these exercises might be used as a warm-up for a workout or as corrective exercises to treat muscular imbalances (one glute that is larger than the other), postural issues (lower back pain), or poor movement patterns (squatting with bad form). They were certainly not being prescribed to build muscle.

It's important to realize that back in those days, everyone thought you had to lift heavy in order to put on muscle. (We now know you can build muscle with high repetitions, which you will learn about in Part 2.) So, when I came across these exercises, I loved them, but I didn't think they would give me the results I was looking for. I wanted bigger and stronger glutes, and to achieve that, I needed to perform a movement that not only targeted the glutes but could also be performed while lifting heavy. From what I could find, such a movement didn't exist.

Then it happened.

It was October 10, 2006. I was watching UFC fights with Jeanne, my girlfriend at the time. Ken Shamrock was facing Tito Ortiz, and I was hoping for a stellar fight. Ortiz had Shamrock pinned, and it looked like it was all but over. Not wanting the match to end just yet, I yelled, "Buck him off, buck him off!"

I suppose I was drawing on childhood memories of wrestling matches with my twin brother, Joel, when I would extend my hips violently in order to gain some wiggle room and get out from under him. (It turns out that this movement, referred to as bridging, is a fundamental technique in grappling arts like wrestling and jiu-jitsu.)

Obviously, in professional mixed martial arts, it's not that easy. But I knew bridging was easy from the floor. Then came the light bulb moment. I thought that if I could just add load or weight to the motion along with more range of motion, it would be a great way to strengthen and build muscle in the glutes.

After the match was over, I hurried out to the garage and called for Jeanne to come help me move some equipment around.

"It's 9:30 at night," she said. "I don't feel like doing this right now."

"Fine! I'll do it myself," I replied, as I shimmied the glute ham raise over to the reverse hyper.

After I got the equipment lined up, I draped a bunch of 45-pound plates around my waist with a dip belt and carefully positioned my back on the glute ham developer and my feet on the reverse hyper. Clearly, this is not the proper way to use the equipment. It was sketchy, to say the least.

I slowly bridged my hips up and down for 15 reps. I'd never felt such an intense glute burn in my life. By the fifteenth rep, my glutes were screaming for mercy. For the first time, I felt like my glutes were actually the limiting factor in a glute exercise; the set ended when they were too fatigued to carry out another rep.

When I look back on that moment, I realize that this experiment was as dangerous as it was effective. If those two machines had slipped apart, I easily could have broken my tailbone. But at the time, I wasn't thinking about safety. I knew that I had found a missing link to glute training: a full-range movement that targets the glutes the same way the squat targets the quads and the deadlift targets the hamstrings. What's more, it could be performed with load (weight).

As cheesy as this may sound, after I finished the set, I went out into the front yard, looked up into the sky, and said, "My life is going to change forever. I am going to make it my life's mission to make this exercise popular."

And so the hip thrust was born.

ORIGINAL HIP THRUST CONCEPT

WHAT TO NAME THE EXERCISE?

Upon inventing the hip thrust, I realized that I needed to name the movement. Several options came to mind. I could go the scientific route and call it the “supine bent-leg hip extension,”

but that seemed too wordy. I could have named it the

“American hip extension” to give us an exercise to compete with exercises like the Bulgarian split squat, Nordic ham curl, and Romanian deadlift, but this didn’t seem like a good strategy if I was striving for maximum popularity. I could have named it after myself and called it the “Contreras glute lift,” but I didn’t want the exercise associated with an individual. After contemplating the various options, I decided to go with “hip thrust” simply because that’s what the exercise mostly mimicked to me: you’re thrusting your hips.

THE THRUST IS A MUST

At this point in my life, I had been lifting weights for 15 years. I had

graduated from college, received a master’s degree, become a Certified Strength and Conditioning Specialist (CSCS), and worked briefly as a high school math teacher. I loved teaching, but my real passion was personal training. It’s all I ever thought about. So, after six years of teaching school, I quit my job and devoted myself full-time to being a personal trainer.

Most of my clients loved glute training, and I was eager to share the hip thrust with them. So the day after that fateful night in the garage, I told my aunt, whom I was training at the time, about the new exercise I had devised.

The downfall, I explained, was that getting the weight into place and worming your back up the pad was a huge chore. Moreover, not many people had access to a reverse hyper and a glute ham developer, and even if they did, the gym wouldn’t allow them to maneuver them around and monopolize both pieces for a different purpose. It was a great exercise, but the logistics were so complicated that I feared no one would actually do it.

“So invent something,” she told me.

To be certain no one had thought of it before me, I spent five days painstakingly searching the web for evidence of the exercise. I tried every pairing of “hip,” “glute,” “pelvic,” “supine,” and “floor” with “bridge,”

“thrust,” “lift,” and “raise.” I also looked through all of the old classic strength training texts.

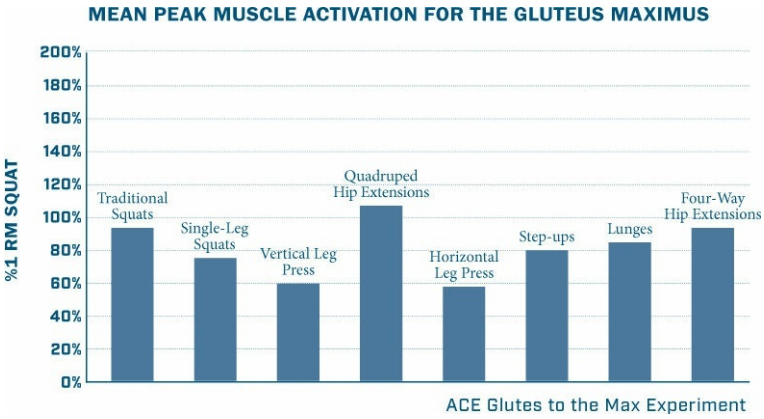
The only thing I found was an old picture in Mel Siff’s and Yuri Verkoshansky’s famous 1977 book, Supertraining, which depicts elevated bridging variations, but only with manual resistance or a kettlebell dangling from the non-working leg, which I didn’t find very practical (or gym appropriate). It looked like I was good to go.

As a former high school math teacher turned personal trainer—and now inventor—I wasn’t exactly the world’s savviest designer. The earliest model of my machine, which I called the Skorcher, was pretty clunky. It was nearly impossible to adjust, and the padding on it was far from optimal. The subsequent model was a step in the right direction, but it still had drawbacks.

To perform the movement with load (weight), for example, two spotters had to load a barbell in place. Nevertheless, it got the job done.

Using the Skorcher, I began incorporating the hip thrust into my clients’

programs at my training studio, Lifts, in Scottsdale, Arizona. The results were



nothing short of astounding. My clients would tell me things like, “Bret, I’m running faster and my butt is growing, and it’s due to the hip thrust. I love it!”

Among all of the glute exercises we did—Bulgarian split squats, step-ups, lunges, squats, deadlifts, RDLs, back extensions, reverse hypers, glute ham raises, and hip thrusts (all of which are featured later in the book)—how could they possibly have known it was the hip thrust?

“When I’m running, I just feel my glutes like I do in the hip thrust. I can tell it’s that,” they would say.

It was clear that the hip thrust was the real deal. But I needed more than just anecdotal evidence. To earn the respect of fellow coaches and practitioners, I needed science to back it up.

At this time, the most comprehensive experiment on glute training I knew of was an unpublished study by the American Council on Exercise (ACE) from 2006 called “Glutes to the Max.” In the experiment, the researchers used electromyography (EMG), which is an instrument that measures muscle activation, to compare the glute activation of several popular lower-body exercises.

I remembered reading that the biggest manufacturer of EMG equipment was located right in Scottsdale. So, without giving it a second thought, I called

them up and ordered my own machine. Fortunately, they were gracious enough to teach me how to use it.

With my new EMG unit, I began testing the glute exercises we did at Lifts on my clients and myself. The initial results were promising. The hip thrust yielded higher levels of gluteal activation than the squat, deadlift, and other common glute training exercises. This is the kind of evidence-based science that I needed to validate the hip thrust as a legit glute-building movement.

But then disaster struck.

The economy collapsed, the plaza in which Lifts was located went out of business, and I was forced to close the studio. At the same time, my efforts with investors to mass-produce the Skorcher went south.

My dreams of popularizing and validating the hip thrust as a legitimate strength training exercise and spreading the benefits of glute training would have to wait.

EMG RESEARCH

ENTER THE GLUTE LAB

With Lifts shut down, I needed a new platform to teach my methods. I started

BretContreras.com and published everything I had learned about glute training through blog posts and articles. And I never stopped training and coaching. Although I was now training people out of my garage, my client base grew and the system continued to evolve. I experimented with different programs and found new, better ways to perform the hip thrust.

At Lifts, we used the Skorcher for hip thrusts. As I experimented with different ways to perform the hip thrust, it dawned on me that you could perform the exercise with your back braced against a bench. This turned out

to be a much more practical approach to the hip thrust, and it is how many people do it today.

Glute training was still in its infancy, however. The strength and conditioning community still considered squats and deadlifts to be the best movements for strengthening and developing the glutes. But I suspected otherwise and set out to prove it.

HIP THRUST WITH A BENCH

To spread my ideas, I started writing for popular strength training and bodybuilding websites and magazines. One article in particular, titled

“Dispelling the Glute Myth,” got some traction. It was written for T-Nation, one of the most well-respected websites for strength coaches, bodybuilders, and powerlifters. The article proposed that the squat and deadlift, though important exercises, were not the best movements for building bigger, stronger glutes.

Those who had been squatting and deadlifting as a primary strategy for developing their glutes had plenty of negative things to say in response.

“What do you mean, the squat and deadlift aren’t the best exercises for the glutes?! This is how it’s been done for years!”

Needless to say, the article and my approach to glute training got people’s attention. And while there were those who challenged my ideas, many were intrigued. The evidence was impossible to ignore. People were posting videos of themselves hip thrusting and commenting about how much they felt their glutes working during the exercise. It’s worth noting here that you don’t

always feel your glutes contracting hard when you perform squats and deadlifts. When you hip thrust, on the other hand, you typically feel your glutes contracting to a high degree on every rep, which I will explain in the pages to come.

I believe that this was the turning point for the hip thrust. The movement was now out there, and it was up to the people to decide whether they wanted to include it in their programs and recommend it to others.

Although there was some negative pushback, I understood why some people were upset and closed off. When you devote yourself completely to a subject or idea and then someone comes along and tells you that there is a better way, there tends to be resistance.

I’ve always done my best to approach training with an open mind. I was lucky to learn this early on in my journey. Moreover, I wasn’t discouraged by what people had to say about the hip thrust, because I knew it was not only safe but also effective. And I knew from EMG experiments that the hip thrust activated the glutes to a higher degree than both the squat and the deadlift.

This was proof enough for me at the time, but if I wanted to popularize the hip thrust and my glute training methods, I needed even more science to back it up.

The problem was, I had no formal education in strength and conditioning. Sure, I had logged thousands of hours training, coaching, and reading, but that would not be enough. After all, who’s going to a listen to a former high school math teacher turned personal trainer?

In order for my ideas to get accepted, I needed more credibility. What’s more, I needed a place where I could innovate, test, experiment, and practice.

So, in 2011, I enrolled in the PhD program at the Auckland University of Technology (AUT) under Dr. John Cronin, specializing in biomechanics. As a doctoral student, I learned that quite a bit of research had been done on the glutes, and I devoured all of it. I was a kid in a candy store, totally obsessed.

My study habits bordered on insane, reading anything and everything related to glute and strength training, day and night. Over time, I amassed a collection of more than 1,200 studies related to the glutes. It’s worth noting here that when I started hunting for articles related to glute training, I didn’t exactly know how to conduct research, nor did I have access to a database of studies. But all of that changed in the first year of my PhD program. I read,

studied, and organized everything I could get my hands on.

The best part about studying at AUT was that I could do it from afar. I spent the first year in Auckland, but after that, I came home to Arizona to resume my studies. While working on my PhD remotely, I not only stayed current with the latest research but also blogged, trained, updated my sports science equipment, and, most importantly, coached clients.

As a personal trainer at Lifts, I had tested glute training methods on my clients and myself. Now I was doing it out of my four-car garage turned strength training gym. I called it the Glute Lab because, in addition to being a gym, it was also a place where I tested my ideas, theories, and techniques. I already had an EMG unit to test muscle activation, but I wanted to investigate more variables of interest, so I purchased a force plate to examine ground reaction forces during different movements and an ultrasound unit to look at changes in muscle thickness over time. The clients working with me at the time, “The Glute Squad,” provided tons of feedback and helped me take a compilation of training methods and turn them into a system.

What’s more, the experiments using EMG, ultrasound, and a force plate, along with the two training studies I conducted for my PhD, further validated the efficacy of what we were doing in the Glute Lab. The benefits of the hip thrust were no longer theoretical. I had science to prove it.

In addition to experimenting and testing new ideas, I continued innovating equipment. Just as the Skorcher was not practical, neither was performing the hip thrust against a bench. I needed something better—a piece of equipment specifically designed for hip thrusting.

So I went back to the drawing board.

WHAT IS THE GLUTE LAB?

The “Glute Lab” is what I called my four-car garage gym at my house in Phoenix, Arizona. It is where I trained my clients and myself and where I conducted most of the research for my PhD

thesis. I used an awesome collection of glute-building

equipment along with sports science technology, including an

EMG unit, a force plate, and an ultrasound machine. In addition to publishing several original, peer-reviewed journal articles pertaining to the glutes, I used this gym and equipment to conduct dozens of smaller experiments and case studies.

Nowadays, the Glute Lab is more than just a gym; it is my system for strength and physique training. This is the book version of that system. And if you want to see me present the ideas contained in this book, you can attend one of my Glute Lab seminars or visit my gym in San Diego, California. In addition to training the Glute Squad, I continue to conduct research to enhance my understanding and application of glute training.

THE HIP THRUSTER

When you perform the hip thrust using a bench, the key is to jam the bench against something stable, like a wall or squat rack, to prevent it from sliding or tipping backward. Even though I was receiving a lot of positive feedback, it wasn't practical for large groups, and if you set it up incorrectly, it could be dangerous. It also was difficult to perform banded hip thrusts because you have to anchor the bands to something (such as heavy dumbbells or the feet of a power rack) that is just the right distance from the bench.

I realized that in order to perform the hip thrust exercise, I needed to attach the bench to a platform. Moving on from the Skorcher model, I developed something new—the Hip Thruster. With this new design, I could safely perform the movement using a barbell and I could perform hip thrusts with band resistance, and it was much more cost-effective.

My team and I loved the Hip Thruster, but it was met with some pretty staunch criticism.

I was reminded of the famous quote from German philosopher Arthur Schopenhauer, "All truth passes through three stages. First, it is ridiculed.

Second, it is violently opposed. Third, it is accepted as being self-evident."

This progression has been especially true for the hip thrust and Hip

Thruster. At first, people were outraged. Some of the biggest names in the industry called it stupid and dangerous. Then the detractors started writing it off as nonfunctional. With the hip thrust, you're lying on your back—referred to as the supine position—and you have three points of contact—your back is on the bench and both feet are on the ground. People view this position as nonfunctional because performing the movement doesn't require a lot of balance (which actually makes it safer) and because you're lying down, which doesn't mimic the actions of sport and life. I'll discuss how glute training can improve function and performance in Chapter 4.

Finally, to my surprise, people started saying that I hadn't invented the hip thrust. People would say that they'd been doing it for the past 20 years. Of course, no one had photo or video evidence to back up their assertions.

There will always be dissenters. But the before-and-after pictures—see

"Transformations" on the next two pages—speak for themselves. And the research and articles I've published (which I cover in Part 2) validate the functional benefits for strength, health, and performance.

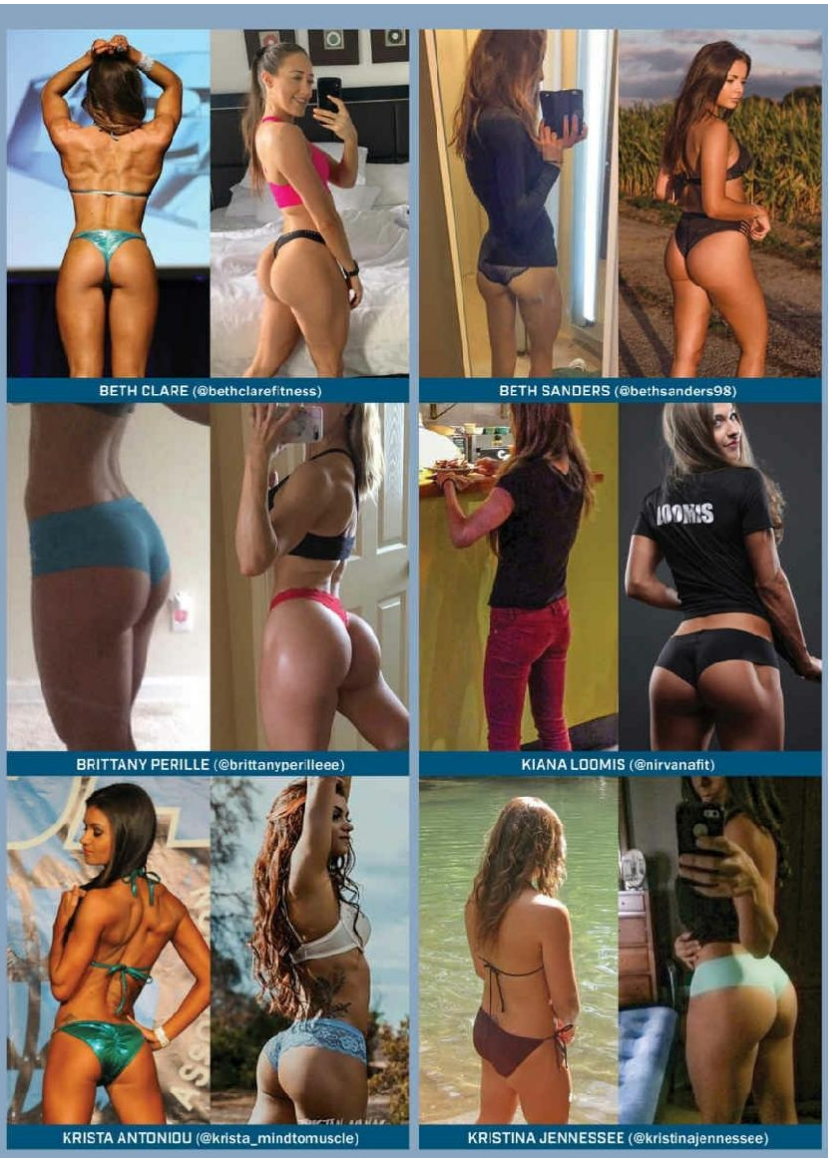
It's important to mention that you can still perform the hip thrust using a bench as described above. And if you don't feel comfortable doing it against a bench, there are other options, which I outline on here. My primary concern is this: I don't want you to think you need to spend money on a Hip Thruster in order to perform the movement. Later in the book, I demonstrate how to safely and effectively perform the hip thrust using a bench as well as using other variations. Put simply, you have options.

Other, more expensive glute-building equipment is becoming more commonplace in commercial gyms.

GLUTE TRAINING IS HERE TO STAY

In the coming years, I expect more data from around the world to corroborate what my clients have been feeling all along: that the hip thrust is one of the most functional exercises there is. In addition to being an incredible glute builder, it is great for improving sprinting, jumping, horizontal pushing force, mid-thigh pulling force, and squat and deadlift strength.

In the meantime, I have learned that you don't simply publish one article, book, study, or thesis and expect everything to change all at once. People need time to adjust their views without feeling pressured. The wheels are definitely in motion, though. Thousands of coaches and athletes are incorporating the hip thrust and embracing my glute training methods. Thanks to social media, hip thrusts are now seen all over the world. The Rock, Kate Upton, and James Harrison have all posted videos of themselves performing hip thrusts.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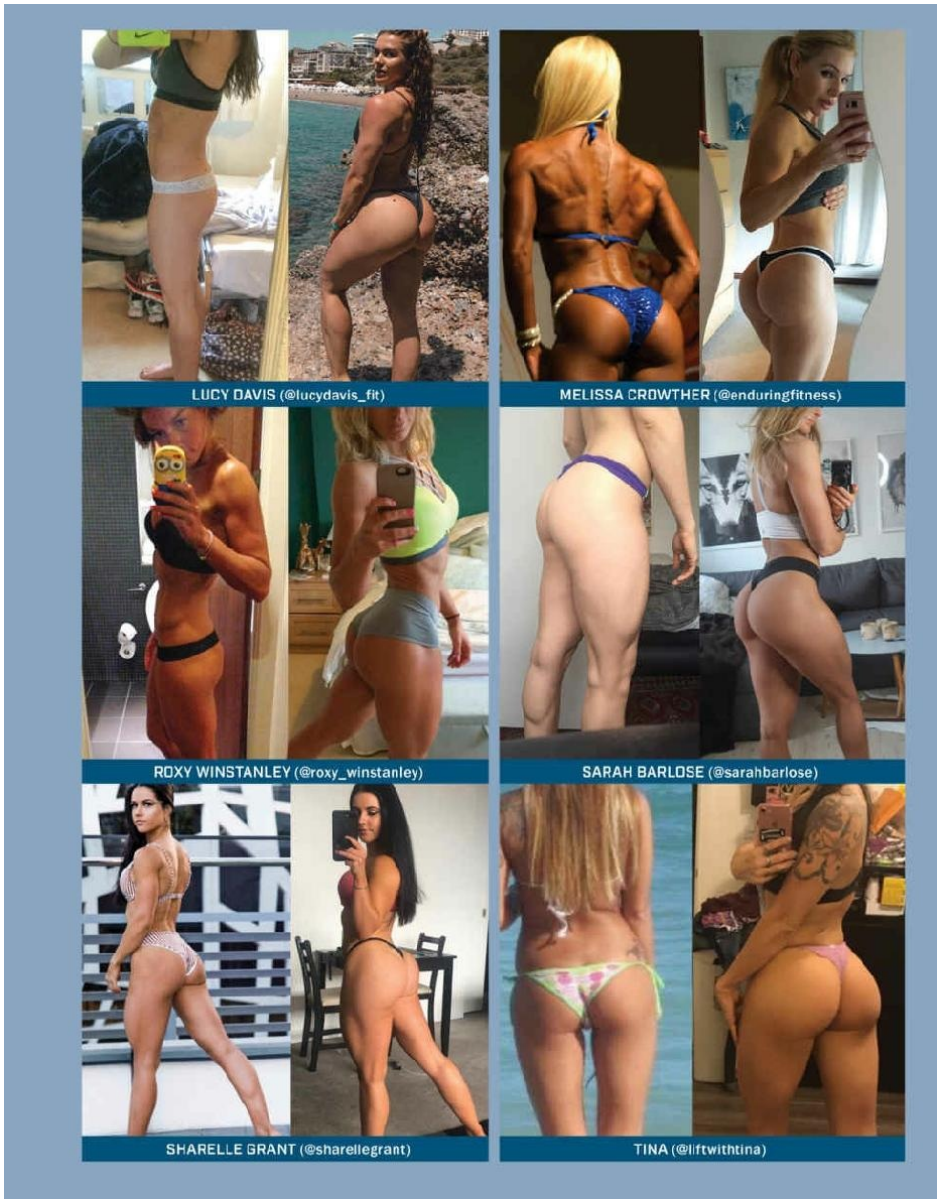


So, while the opposition is busy getting inferior results, I'll stick to what can easily be demonstrated through scientific methods. Sure, science isn't perfect, but at least it allows us to continue to learn, experiment, refine ideas, and push the field forward—whether it's to build a better physique or to improve health, strength, and performance. The nice part is that people don't have to follow the science, or even believe in it, as long as they get results. As the saying goes, the proof is in the pudding.

I don't pretend to have all of the answers. I remain curious, and I do my best to think outside the box. And I will never stop searching for more effective training methods and techniques. If someone comes up with something better, I will embrace it. My goal is not to prove people wrong, but to help them achieve their goals. And I hope this book will help you achieve yours.

ORGANIZATION AND STRUCTURE

The lessons I've learned as a personal trainer, lifter, and student are numerous. And my knowledge of strength and physique training goes far beyond the specificity of glute training. For this reason, I've included strength and physique training principles, methods, and techniques that apply to all body parts. Put another way, this is not just a book about glute training; it's a book about strength and physique training with a glute training emphasis.

For example, you will learn how to perform full-body movements—such as the squat and deadlift—but I keep it within the context of glute training. You will also learn about dietary strategies, training around and recovering from injury and discomfort, the science of muscle growth and progressive overload, and the principles of program design and periodization, which you can apply to all strength and physique training systems.

To make this book easier to navigate, I've organized it into five parts.

PART 1

THE IMPORTANCE OF GLUTE TRAINING

Part 1 explains how training your glutes can improve aesthetics, health,

strength, and performance. In short, you will learn about the many benefits of glute training and why it is crucial to train your glutes—regardless of your goals, experience level, and body type.

PART 2

THE SCIENCE OF STRENGTH AND PHYSIQUE

TRAINING

This part of the book outlines the anatomy and function of the glutes, the role of genetics, how muscle grows (hypertrophy), how to gain strength, and how to categorize glute training exercises. If you're new to science, don't worry; I've boiled it down to the essentials. In other words, don't let the word science turn you away from this section. After learning how your glutes work, the role of genetics, the mechanisms for muscle growth, how to implement progressive overload, and the best way to categorize exercises, you will be better equipped to perform and teach the exercise and programming principles covered in the subsequent parts.

Now, I'm not going to lie; some of this material is a bit dense. But if you can take the time to read and understand the chapters in this section, your knowledge of glute training (and strength and physique training as a whole) will exceed that of 90 percent of personal trainers and coaches.

SCIENCE SPEAK

If you're familiar with my work, or if you follow me on Instagram (@bretcontreras1) or frequent my blog, you know that I am a scientist at heart. I have my PhD in sports science with an emphasis in biomechanics, which applies math and physics to human movement, and—as I explained earlier—I'm constantly reading studies to further my understanding of strength training.

My intention with this book is to make the information

accessible to everyone, regardless of experience and background. For this reason, I decided to keep the main body text as basic as possible and (for the most part) devoid of research studies, which can sometimes convolute the main theme. However, I didn't want to leave out important studies or the biomechanical explanations related to the topics being discussed. This would be a major disservice to my fellow academics or anyone interested in exploring the science behind glute training.

So, for those interested in delving deeper into research and the application of biomechanics, I have included sidebars titled

"Science Speak" in Parts 1 and 2. You'll find the works cited in these sidebars in the references section at the back of the book.

Although this information is important (the science validates the techniques and concepts covered in the book) and I believe that everyone can benefit from reading these sidebars, it's not mandatory.

To put it another way, you don't need to understand all of the complicated terms and studies to effectively employ my

system. If all you do is read the main text, you will learn everything you need to know about glute training. So feel free to skip these sidebars if the science and biomechanics do not interest you.

Another option—and this is a great approach for those who are new to glute training—is to read through the main text in each chapter first. This will give you a basic yet comprehensive overview of my system, as well as introduce some of the terms and definitions covered in the "Science Speak" sections. With this foundational knowledge under your belt, you will be better equipped to understand and digest the information when you revisit these academically dense sidebars.

PART 3

THE ART OF STRENGTH AND PHYSIQUE TRAINING

Part 3 provides the fundamentals for optimal strength and physique training, from training frequency (how often you work out) and set and repetition or rep schemes (how many times your perform the exercise) to creating realistic goals and expectations, as well as dietary guidelines. You will learn both basic and advanced training methods that will help you maximize your time in the gym, as well as troubleshooting solutions for the most common problems relating to physique, exercise, and programming. You will also learn the program design variables, which include exercise selection, training frequency, tempo, rest periods, volume, load, effort, and exercise order. If the exercises are the ingredients, this part shows you how to make the recipe.

PART 4

PERIODIZATION AND PROGRAMS

The fourth part includes sample full-body programs with a glute training emphasis that cater to all fitness levels and templates that you can use for yourself or your clients. I provide beginner, intermediate, and advanced 12-week programs that incorporate most of the techniques and strategies outlined in this book. In addition to providing sample programs, I outline how I approach periodization or a long-term training plan, provide training splits (programming templates), and include sample glute training programs for bodybuilders, powerlifters, and CrossFitters.

I want to emphasize that the sample programs are exactly that—samples.

Although you can follow these programs exactly as they are prescribed, they can and should be modified to cater to your or your clients' individual needs,

which you will learn how to do in Part 3 and in the FAQ portion of Chapter

18. Think of the programs in this part as templates that you can change based on your goals, training frequency, experience level, and background.

PART 5

EXERCISES

This final part of the book contains all of the most important glute training exercises, from which there are a lot to choose. As I repeat throughout the book, performing a variety of exercises is crucial for strengthening and building your best glutes, legs, and body. To make the exercises easy to navigate, this part is divided into three chapters with sections for each movement pattern: Glute-Dominant Exercises, Quad-Dominant Exercises, and Hamstring-Dominant Exercises.

For short videos demonstrating the exercises included in this book, visit glutelabbook.com

Although each of these chapters focuses on exercises that emphasize a specific muscle group, they all work your glutes and body in slightly different ways. This is important because everyone is unique. The majority of people get the best results from prioritizing glute-dominant exercises, but everyone can benefit from performing a variety of lower-body movements. Throughout the book, I discuss specific strategies for exercise selection based on variables like goals, anatomy, anthropometry (torso, arm, and leg lengths), and experience. The important thing to note here is that variety is vital for building the best glutes possible.

WHAT ABOUT UPPER-BODY EXERCISES?

It's accurate to say that glute training is a system for developing your lower body. But it's important to realize that a lot of the glute training movements work your entire body. Squats,

deadlifts, swings, sled pushes, and certain other glute exercises work the lower and upper body. So, even if you follow a glutes-only training program, you can still receive a little bit of upper-body stimulus.

Having said that, I still recommend upper-body-specific exercises. In Part 4, I offer training splits that include upper-body exercises as well as full-body programs with a glute training emphasis.

HOW TO NAVIGATE THIS BOOK

Although this book is supposed to be read in its entirety, it is also designed for browsing. For example, you can start following one of the programs in

Part 4 while referencing the techniques in Part 5. However, I highly recommend you take the time to read and understand the science in Part 2

because it validates the methods presented in Part 3 and the techniques covered in Part 5.

Stated differently, if you're primarily interested in shaping a nicer butt or you're looking for a great glute workout, then you can skip to Part 4 and start following one of the many programs or templates that I offer. If you do, just be sure to reference the technique descriptions in Part 5 to ensure you're performing the movements correctly. But if you want to understand how your glutes work, why you should train them, and how to do it effectively, then you need to read the book straight through to the exercises in Part 5.

I believe in the principles, methods, and techniques broken down in this book because I have seen them work time and time again, both in the gym and in life. Whether you're male or female, and whether you're a bodybuilder, powerlifter, CrossFitter, personal trainer, strength coach, physical therapist, or someone who just wants a better butt and body—this book contains everything you need to know to build bigger, stronger, shapelier glutes.

THE IMPORTANCE OF GLUTE TRAINING

You might be wondering why glute training is important. Sure, a big, strong butt looks great in a tight pair of jeans, and this is a good enough reason for most of you to start training your glutes. But what are the other benefits? And why should you prioritize your glutes in training?

To answer these questions, you first need to understand what makes the glutes special.

For starters, the glutes are the biggest and most powerful muscle group in the human body. In addition to being aesthetically appealing, the glutes control a wide range of functional movements. Walking uphill, getting out of a chair, picking something up off the ground—these actions would be very difficult to carry out without your glutes. What's more, having big, strong glutes sets you up to lift heavier, jump higher, sprint faster, and swing harder and can even play a role in preventing knee, hip, and lower back injuries. The glutes, in a nutshell, influence every aspect of your physical life: from the way you look and how you feel to your ability to run, jump, cut, lift, and twist. It's pretty safe to say that the glutes are the most important and versatile skeletal muscle in the body.

Does this mean you should neglect other areas of your body and focus primarily on your glutes? Well, it depends on your goals.

As you will learn in Part 3, programming is highly individualized, meaning that it is different for everyone. The exercises you like and need to program in order to reach your goals might look very different from the exercises and programs I follow or the ones that I write for my clients. This is why it's important to understand how to design your own programs. I do offer sample program templates in Part 4, and one of them might suit your

needs just fine. But only you or your coach can determine which muscles you need to exercise, which movements you should perform, and how often you should train.

I don't want to leave you with the opinion that glute training is the be-all, end-all system for training. So let me be clear, because I don't want you to avoid training other muscles in your body. All muscles are important, and you should train your entire body.

But when it comes to function and aesthetics, the glutes reign supreme, and for most people, they should be prioritized in training. This might mean training your glutes twice a week as a supplement to your current strength training program, or it might mean training them five days a week. Whatever your commitment, it doesn't mean you're neglecting other areas of your body. Depending on your goals, you still need to train your upper body and perform a wide range of movements.

I also want you to realize that glute training is not muscle specificity training in the sense that you're working and isolating only one muscle group. This is actually impossible when it comes to training your glutes.

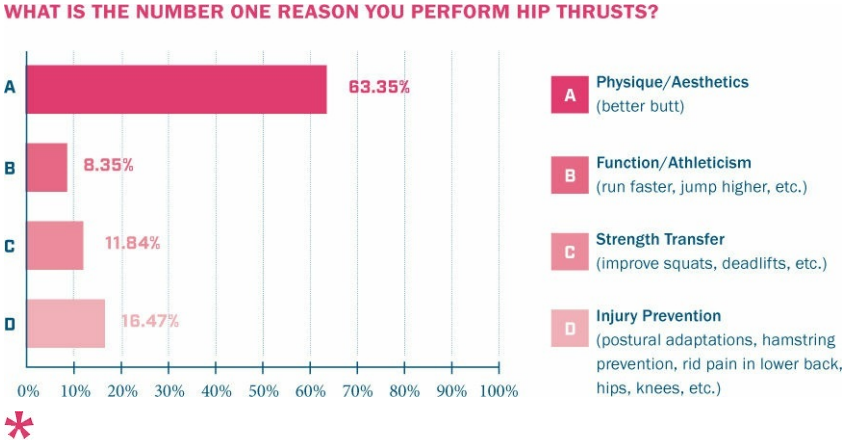
Obviously, there are some exercises that specifically target your glutes, but the majority of movements target multiple muscle groups simultaneously. Hip thrusts, lunges, squats, deadlifts, back extensions—these exercises not only target your glutes, but also work your legs, your core, and (to a lesser degree) your upper body. So, when I say

“glute training,” I mean prioritizing your glutes by selecting exercises that target the gluteal muscles and by extension, your legs and trunk.

When I started my glute training journey, I was interested only in getting big, powerful glutes. I now realize that there is much more to glute training than building a better butt and body. This is important because we all have different reasons for training. Some people care mostly about aesthetics, or how they look: they want to lose fat, gain muscle, and improve body composition. Others train primarily to improve performance: they want to get stronger, faster, and better at their sport. And still others train simply because they enjoy it and want to lead healthier lives.

If you’re like me, you train for all of these reasons. Strong, shapely glutes are my goal—and I will show you how to get exactly that in the pages to come

—but I also want to get stronger overall, look younger, and feel better. And I



want to have fun doing it. The value of a training program can be measured by its comprehensiveness and adaptability. It should cater to a broad range of goals and suit the needs of the individual. This is the basis of my glute training system. It sets the stage for looking and feeling your best and has the potential to improve your health, strength, and performance.

A poll undertaken in July 2017 with 7,628 respondents indicates

that the majority of exercisers (63 percent) hip thrusted for physique and aesthetic purposes (to get a better butt). The remaining respondents hip thrusted for injury/pain prevention (16 percent), strength transfer to squats and deadlifts (12

percent), and functional performance outcomes (8 percent). We need more polls to determine why people train their glutes.

However, it's safe to say that the majority of people train hip thrusts primarily for aesthetics.

CHAPTER

1

Glute Training for Aesthetics

The majority of people who come to me for coaching are

primarily interested in one thing—improving their physique.

They want to develop their bodies to suit their aesthetic goals, which usually means sculpting a bigger, leaner, stronger physique. Glute training is, in this context, a form of bodybuilding.

The term bodybuilding means exactly what it implies: you’re building your body through weight training. Some think of it not as bodybuilding but as body sculpting because you’re trying to change your appearance by lifting weights. Just as an artist creates sculptures using shaping techniques, a bodybuilder lifts weights to sculpt certain areas of the body.

While I love the idea of sculpting physiques, bodybuilding encompasses more than just physique training. It’s a form of strength training and physical exercise. But, at its core, bodybuilding represents an important aspect of how we see each other as humans. For better or worse, we judge one another based on appearance. If someone is lean and muscular, you might see that person as athletic, healthy, and strong. Conversely, you might view someone who is morbidly obese as sedentary and unhealthy.

Whether these judgments are right or wrong, the fact remains: research shows that how you look impacts not only how others see you but also how you think of yourself. This is a complex and nebulous subject because everyone has different tastes and opinions, which are affected by genetics, culture, and environment. What I consider sexy, you might consider ugly. As the saying goes, "Beauty is in the eye of the beholder."

The questions you need to ask yourself are: What do you consider beautiful? How do you want your body to look? What makes you happy when you look in the mirror? Are there areas of your body that you want to change?

If you think big, powerful butts are beautiful and you want stronger, shapelier

glutes, then you can use the methods and techniques in this book to help sculpt your ideal physique. But it's important not to focus solely on the desired results because there are some things you can't change, like your genetics. If you're like me and you inherited horrible glute genetics, then trying to build a big butt may not be in your cards (at least not in the short term). So, when it comes to creating physique goals, it's imperative that you focus on the process (training) rather than the results (aesthetics).

Stated differently, you need to create realistic goals based on your genetics and body type and focus on things that you can control (more on this in

Chapter 11). What you eat, the types of exercise you do, your activity level, how you manage stress, your quality of sleep—these things can have a massive effect on how you look, how you feel, and how you think of yourself.

My job as a personal trainer is to help clients achieve their goals, whether the goal is to lose weight, enlarge muscles, or improve strength. Glute training can do all of these things while sculpting a physique that many people desire.

I suspect that most of you reading this book are interested in glute training because you want (for yourself or someone else) a better butt and body. As long as your goals are realistic and the training is safe and healthy, working to attain your ideal physique is perfectly acceptable. But there is a fine line between caring about how you look and wanting to look better, and obsessing about how you look and needing to look better. There's a spectrum.

On one end, there's the overweight sedentary person who never exercises, and on the other, there's the obsessive lifter who spends all of their time in the gym and can't walk past a mirror without checking themselves out. Neither extreme is healthy, and it's up to you to find a balance.

You can, however, have a goal of getting a better butt and body without feeling guilty or self-absorbed. Wanting to improve your physique doesn't mean you're vain. It just means that you want to improve your body, which is something most people want, whether they're willing to admit it or not. This begs the question: what is it about the glutes specifically that makes them so aesthetically appealing? There are a few explanations.

THE ATTRACTION TO GLUTES

Research indicates a strong association between having big, strong glutes and being attractive and athletic. The instinct to check out a nice butt seems to be hard-wired into our genes. From an evolutionary perspective, it makes sense.

Imagine living in a hunter-gatherer society where activities like throwing, sprinting, and punching were as important as checking your email or driving a car. We know the glutes power functional movements, so it's not a stretch to think that those with powerful glutes were more proficient and capable of performing important actions necessary for survival. This is natural selection at work. The males and females with the bigger, stronger glutes were more likely to survive and triumph in their environment due to increased function and power.

This might be a bit of a stretch and is not proven fact, but it's an interesting idea. In warrior and hunter societies where people were fighting predators and other humans in hand-to-hand combat and sprinting to chase down food, there can be no doubt that the glutes would have played a small yet crucial role.

More likely, though, the glutes played a more prominent role in sexual selection—that is, the selection of traits (strong glutes) that enhanced mating success. It stands to reason that both males and females were attracted to nice glutes, instinctively making the connection between big, strong glutes and survival, reproduction, hunting, and protection. A woman might select a male based on his ability to hunt, fight, and protect. And such abilities might very well have been tied to his powerful glutes. A man might select a female for the same reasons, but with the added perception that bigger glutes meant better childbearing hips. It's the idea that the peacock with the most brilliant feathers gets to mate—but instead of feathers, we have muscles, with the glutes being among the most important and noticeable.

Today, these traits don't serve the same function, but our DNA doesn't know the difference. If you see someone with strong glutes on a balanced, lean, muscular frame, you automatically assume that person is fast, powerful, athletic, and probably attractive. It's the attraction part that typically draws people to my system. They want nice glutes not because it makes them stronger, faster, or more athletic, but because they want to look good from behind.

GETTING GLUTES

If you are glute training for aesthetic purposes, it's important to understand that it is difficult to get and maintain glutes. As you age, your glutes—like all muscles—start to decline. When neglected, they start to atrophy, meaning they weaken and sag. Some people have nice glutes in high school because they're young and active; they're walking around all day, playing sports, and so on. But as time goes on, they start to sit more and more, they're less active, and eventually their hard, round butts become weak and flat. You might look back on your youth and think, "Dang, I used have a nice butt and legs. I used to look really good. I want that back."

These are the people who tend to find me—people who went through the same process I went through. They're not getting the results they are looking for or they aren't satisfied with their physique, so they start following my training methods. They still train other areas of their bodies but perform a wide variety of glute exercises and train their glutes more frequently. Not surprisingly, they start getting the results they're looking for.

As I mentioned in the Introduction, the squat and deadlift develop the glutes but primarily target the quads and hamstrings. A lot of women I work with don't like their physique from just squatting and deadlifting. They tell me about their overdeveloped quads and hamstrings, which take away from their glutes. This is what typically happens when you don't perform glute-dominant exercises like the hip thrust—the quads and hamstrings grow disproportionately to the glutes, which makes the butt look smaller in comparison. But these are clients who are going for a specific look.

At the end of the day, you are your own physique artist. Training your glutes is just one way you can alter your appearance through exercise. If you want your butt to stand out and you're not satisfied with your shape, then following a specialized glute program might get you closer to your ideal physique based on your goals and body type. For example, if you have big quads and hamstrings and you want your butt to pop, then you need to focus on glute-dominant exercises over squats and deadlifts. Conversely, if you want to build your glutes and your legs, then employing all of the exercises in this book will get you closer to your goals.

For physique and aesthetics, women are going to value glutes more than

men, but both need to prioritize them in training. The aesthetics has to be geared toward the individual, but I've developed the best system for helping both men and women develop their physique goals just by identifying which exercises activate the different regions of the glutes best and figuring out how to biomechanically tailor a program to the individual.

I can speak from experience, having always prioritized my glutes. Women I have dated have made comments like, "Oh man, you have a nice butt. My last boyfriend only trained his upper body." Women tend to appreciate nice butts on men just like men appreciate nice butts on women. But a lot of men don't realize this fact. Their egos hold them back. Men are looking in the mirror at their beach muscles while women are making fun of their chicken legs. They don't realize that women like nice glutes, too. When you have a nice set of glutes, you just look better. It gives you a powerful, athletic look that is mesmerizing and attractive.

If getting big, powerful glutes is your goal, then you will love following these programs and implementing these techniques into your exercise routine. But there's more to glute training than looking good from behind. A lot of people mistakenly assume that you sacrifice health, function, and performance when training for aesthetics. While that might be the case with some bodybuilding systems, it's not the case with my glute training system.

It's all about selecting the right exercises and following a well-designed program.

Even if you're training only for aesthetics, as long as your programming and mechanics are good, you will get stronger and healthier and perform better as part of the package. Put simply, you don't need to sacrifice performance, strength, or—most importantly—your health when sculpting your physique.

SCIENCE SPEAK: IMPROVED AESTHETICS

SHAPE AND SIZE

Although your ability to change your appearance is partially determined by your genetics, you can significantly improve the shape of your buttocks through glute training (exercise selection and program design). The improvements in shape happen mostly through changes in muscle cross-sectional area (perpendicular to the muscle fibers). These increases tend to be greatest in the middle region when measuring from end to end, [1, 2] which is often the point of maximum diameter. [3, 4]

Targeted glute training, in a nutshell, makes your glutes look rounder, creating a fitter, more athletic appearance.

BODY COMPOSITION

Training your glutes will also improve your overall body composition (increasing the percentage of muscle while

decreasing the percentage of fat). In order to train your glutes, you need to perform exercises that emphasize powerful hip extension joint actions, such as hip thrusts,

squats, and deadlifts. Performing these exercises ties in a lot of muscle groups, including the prime movers (gluteus maximus, three of the four hamstring muscles, and adductor magnus) and the trunk stabilizers (erector spinae and other core muscles).

What's more, the key hip extension exercises involve many other muscle groups in both the upper and the lower body.

Glute training, in other words, works a lot of muscle groups, which leads to high metabolic cost (burning calories during and after a training session). This "afterburn" effect is called excess post-exercise oxygen consumption, or EPOC for short. 5

Although the number of calories burned during the EPOC

period is relatively small in comparison with the calories burned during the workout, it can reach around 100 kcal per day and last for up to 72 hours! 6 The EPOC effect is greater after strength training than after any type of aerobic exercise, including high-intensity interval training (HIIT). You can maximize the number of calories burned in the EPOC period by

keeping volume fairly high. Shorter rest periods and heavier loads help, 7 and certain advanced training techniques, like rest pause (here), might be beneficial, too. 8

CHAPTER

2

Glute Training for Health

Although the majority of people train their glutes for aesthetic purposes, glute training conveys numerous health benefits that can have a profound impact on your quality of life.

First, training your glutes is a great way to shed unwanted weight. With the glutes being the largest muscle in the body and controlling a wide range of functional movements (see here), training your glutes burns more calories than training other body parts, especially when you perform glute exercises in a progressive manner. This causes you to "recomp," which means that you build muscle while simultaneously losing fat, assuming your diet doesn't change much. And this helps you lose fat all over, including the regions of your body that tend to store a lot of fat, like your hips, legs, and trunk. In addition to improving your physique, maintaining a healthy weight through exercise can reduce the risk of developing certain diseases, like type 2 diabetes and high blood pressure, which can cause a plethora of problems ranging from blood clots and kidney disease to heart attacks and strokes.

Second, training your glutes works your muscular, skeletal, and cardiovascular systems. As Part 2 explains, in order to get the best results based on what we currently know about training for muscular growth, you need to take a shotgun approach, meaning that you need to implement a variety of movements and perform a variety of set and rep schemes. For example, one day you might hip thrust for high reps and perform heavy bench presses, and the next day you might go heavy with deadlifts and perform higher-rep pull-ups.

Performing a variety of movements and hitting your body from different angles with different loads and speeds not only stresses and strengthens the bones and muscles involved in the movement but also gets your heart rate up and your blood pumping. This builds stamina and endurance by strengthening your cardiovascular system, which transports blood, oxygen, and nutrients throughout your body.

Just as training your glutes helps you lose weight and works your cardiovascular system, it also develops and strengthens your bones and muscles, which is very important to your health. As we age, we lose bone density and muscle, and as our bone density diminishes and our muscles weaken, we become more susceptible to injury and pain. So how do we develop and maintain strong bones and muscles? It's simple: by doing resistance training, or weight-bearing activities. This is how you set yourself up to better handle the wear and tear of daily life. To put it another way, you're setting yourself up to have solid, well-equipped knees, hips, and lower back.

But it's not enough to simply lift weights. In order to maintain strength and avoid pain and injury, you also have to perform full-range movements—

that is, exercising through the full motion of a joint. For example, lowering the hips below the knees during a squat, as shown opposite, moves the hips through a full range of motion for most individuals.

In general, people who perform a variety of full-range movements—both in their daily lives and during exercise—have an easier time staying injury-and pain-free, as long as they don't overdo it in the gym. Glute training encompasses these full-range movements, and I have included plenty of options in Part 5 for variety.

SQUATTING TO PARALLEL

To squat to parallel, you must bend your knees and lower your body until the

tops of your legs at your hip joints are lower than the tops of your knees (that is, your hip joints are lower than your knee joints).

STRONG GLUTES, AN ANTIDOTE TO PAIN AND

INJURY

Another important variable in managing and preventing pain and injury is having a strong, well-balanced frame. If one muscle is weak or underdeveloped, other muscles have to compensate by working harder. So, if you have deconditioned glutes, your back and leg muscles have to work extra hard to keep you moving. This means that any muscle or muscle group working in concert with the glutes during functional movements—like the hamstrings in sprinting, the quads and calves in jumping, the adductors in squatting, or the erectors in lifting—are at risk when the glutes are undeveloped or weak.

For example, let's say you rely heavily on your quads to lift and jump. This increases your chances of developing patellofemoral pain syndrome (generic knee pain) because you're loading your knees instead of the big engines of your hips. Stronger hips and glutes can change your mechanics and effectively take some of the loading off your knees, potentially safeguarding you from developing knee pain.

Another common example is an imbalance between the strength of the hamstrings and the strength of the glutes. In this case, you must rely more on your hamstrings to extend your hips. The hamstrings' leverage on the femur (thigh bone) can cause the ball (in the hip joint) to jut forward in the socket, which can lead to anterior hip pain. Strong glutes will pull rearward on the femur, causing it to center itself in the socket and reducing the likelihood of anterior hip pain.

In addition to creating a movement pattern that overworks synergistic muscles, weak glutes change the mechanics of how you move, putting even more wear and tear on the compensating muscles. Having big, strong glutes, on the other hand, can prevent poor mechanics by giving your body balance and stability. Here are a couple of examples:

• Knees: When your glutes are strong, it's easier to keep your knees in a stable position while running and landing from a jump. By stable, I mean that the knees don't cave inward. If the knees do collapse inward (referred to as knee valgus), which can happen in people with deconditioned glutes (other factors that can cause knee valgus, too), it can lead to pain or, even worse, knee injuries such as ACL tears.

• Hips and lower back: Your glutes help carry out hip extension. If your glutes are weak, you will end up using your back more when lifting, and your erector muscles will work extra hard to perform the task, and will do so dynamically rather than isometrically. The added stress on your spinal discs, ligaments, and muscles when lifting in this manner can lead to lower back pain, strains, and injury (such as a herniated disc).

Strong, well-developed glutes can prevent these kinds of injuries and help you avoid lower back pain. The exercises that target the glutes, specifically the glute-dominant hip thrust movements, train your body to rely on your glutes during hip extension—think standing up from a squat—and not your lower back or hamstrings. Moving from your hips and using your glutes make it easier to keep your back flat, which in turn reduces stress on your spine. In fact, training your glutes might even improve your posture by reducing anterior pelvic tilt (hyperextending in your lower back) and decreasing thoracic kyphosis (rounding in your upper back). Many lifters notice that after starting to deadlift, squat, and hip thrust, they begin standing taller and appear more athletic.

I'll take a closer look at how glute training can prevent pain and injury in the Science Speak sidebar that follows. For now, it's important to understand that pain is multifaceted and related to a variety of psychological and social factors, and it's not well correlated with tissue damage. That said, you're dealing with greater forces and

stresses in the weight room and in sports than in everyday life, so the more glute strength and stamina you have, the easier it is to maintain a good position while standing, walking, and moving. And being in a good position while bearing heavy loads or moving rapidly decreases stress on the surrounding tissues, which can prevent pain and injury.

Now, when you look good (according to your own standards), you tend to stand taller and strut your stuff a bit more. In essence, you exude confidence.

This confidence can play a role in how you interpret pain, how people view you, and how you feel about yourself. I'm not saying that glute training will automatically give you perfect movement mechanics and more confidence, but it can influence how you stand and how you carry yourself, which can have a broader impact on your health and outlook.

Activity in the form of movement and exercise is bedrock to a healthy life.

Pain is a natural part of living, and we shouldn't think we can go through life without ever experiencing pain. Have you ever heard of an elite athlete who never suffered here and there? Me neither. If you stand with poor posture, experience lower back pain, or suffer from knee or leg injuries, training your glutes might help you. When you feel healthy and fit, other aspects of your training improve. You not only look and feel better, but your performance and strength also improve.

SCIENCE SPEAK: REDUCING RISK OF INJURY

AND PAIN

JOINT STABILITY

When it comes to training—whether for sport or for leisure—

there is always an inherent risk of injury. Although chance plays a huge role and can make the underlying causes of injury hard to discern, there are things you can do to lower your chances of getting hurt, such as practicing good form,

strengthening your body, and working on your weaknesses.

Training your glutes might also help reduce your risk of injury to some extent.

Although high-quality research showing that glute training reduces injury risk is not available at this time, we can see from certain biomechanical studies (not to mention anecdotal evidence and common sense) that the gluteus maximus

provides stability at several joints—the knee, hip, spine, and sacroiliac joint—which may reduce the risk of knee, hip, and spinal injuries. For example, the glutes prevent anterior tibial translation during lunges,1 which is a mechanism for anterior cruciate ligament (ACL) tears and ruptures, probably through its insertion point on the iliotibial tract. 2

You'll learn more about where the insertion and attachment points are in Chapter 5. Here's what's important to know now: the glutes help provide stability for your lower limbs and trunk, and the more stable the joint, the less likely you are to injure it.

In this case, the additional knee stability provided by your glutes may help prevent ACL injuries. Though the lunge doesn't perfectly translate to all sporting movements, it is a loaded unilateral (single-leg) staggered-stance movement, which is common in most sports and activities.

And there's more: a recent modeling study concluded that excessive hamstring co-contraction (simultaneous contraction of the hamstring around the knee) during squats and other similar hip extension movements might increase the

quadriceps muscle force and therefore raise patellofemoral joint pressure to damaging levels. 3

For example, let's say you're performing a barbell back squat.

If your glutes are weak and underdeveloped, you will rely more heavily on your hamstrings for hip extension power, which will require more output from your quads because hamstring

activation works against them at the knee joint, thereby increasing the pressure on your knees. This pressure can cause a variety of issues in the various structures of your knees.

This underscores the importance of strengthening and

developing your glutes for heavily loaded lower-body exercises, like barbell back squats, and for high-impact lower-body sports, such as volleyball, basketball, and other activities that involve drop landings (landing from a jump).

MUSCLE STRAIN

As I mentioned in the main text, the glutes work synergistically with other muscles during lower-body movements.4 When you squat, for example, your glutes help distribute and share the load placed on your lower body with other muscles, like your quads and hamstrings. If your glutes are weak, in other words, other muscles have to compensate—that is, work harder to carry out the task. This places more stress on those other muscles (quads and hamstrings) during exercise and activity, which can increase your risk of experiencing a muscle strain.

Keeping with the squat, modeling studies show that the glutes work together with the quadriceps, hamstrings, and adductor magnus (the muscle on the inside of your thigh) to perform combined hip and knee extension (standing up from a squat).5,

6 These same studies suggest that a lack of force produced by the gluteus maximus can result in excessive hamstring co-contraction during squats and other similar movements. So, in addition to increasing the risk of knee injury, weak glutes can increase the risk of hamstring muscle strain, which is

common.7 This might also apply to the quadriceps, which are often strained in soccer, 8 and the adductors, which are highly susceptible to muscle strains. 9 And there are good reasons to assume that the glutes work synergistically with the adductors in sprinting.10

KNEE VALGUS

As you will learn in Chapter 6, the gluteus maximus is an important hip external rotator (rotating your leg outward) and hip abductor (moving your leg away from your body). Hip external rotation and hip abduction muscle strength are key predictors of ACL injury.11 In addition, gluteus maximus EMG

amplitude (a measure of muscle activation) is reported to be moderately and negatively correlated with knee valgus (inward caving of the knee, which is a mechanism for ACL injuries)

during step-down12 and jump landings.13

It's important to point out that not all studies report a close relationship between glute strength and the degree of knee valgus. But this is probably due to the many other factors that affect knee valgus, such as ankle dorsiflexion range of motion (the ability to bring your toes toward your shin)14 and motor control (coordination and form). 15

Here's what we do know: the gluteus maximus is a key muscle for controlling knee valgus. It follows that the stronger and more functional your glutes, the more you can control or prevent your knee from twisting inward. And the more you can prevent the valgus knee fault, the less likely you are to injure your ACL.

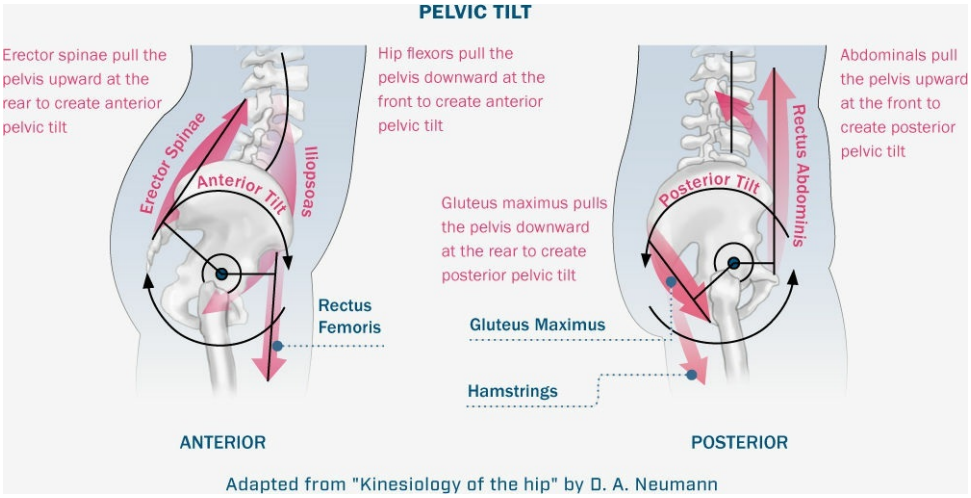
PATELLOFEMORAL PAIN

Pain is a complex issue, and it is certainly not determined solely by postural or biomechanical factors. Even so, there are good indications that hip exercises, particularly those that focus on the gluteus maximus in its multiple roles as a hip extensor, hip external rotator, and hip abductor, are very effective for use in physical therapy programs designed to rehabilitate patellofemoral pain.16

HIP STABILITY

In addition to helping stabilize the knee, the glutes are vital for hip stability. Aspects of hip anatomy (including transverse and sagittal plane—see here for more on planes of motion—neck angles, hip socket alignment, and hip socket shape) vary between individuals, 17, 18 meaning that some people are at greater risk of experiencing anterior hip pain. These individuals often find that their hip pain flares up during squatting.

What's more, the glutes exert a rearward pull on the hip during hip extension movements, which creates more space for the



anterior femoral head to move inside the hip socket. This reduces the force exerted by the bone on the socket in the forward direction,[19] thereby helping it avoid contact with the sides. [20]

SPINAL STABILITY

When it comes to spinal stability, we know that the pelvis is balanced by a pair of force couples (muscles or muscle groups working in concert to move a joint), where one side of each couple (muscle) comprises the gluteus maximus (at the rear) and the abdominals (at the front).[21] The other muscles that produce movement around the hip and help stabilize the spine are the erector spinae (at the rear) and the hip flexors (at the front).

The gluteals, in a nutshell, are well placed to maintain a stable spine. Therefore, glute exercises can be helpful for people with poor spinal stability.[22] In particular, the role of the glutes in performing posterior pelvic tilt can help prevent excessive lumbar extension (hyperextension), which is associated with lower back pain.

SACROILIAC JOINT STABILITY

In addition to their role in stabilizing the pelvis, the glutes may play a specific role in preventing unnecessary movement of the sacroiliac (SI) joint. Anatomical investigations have found a deep region of the glutes with short fibers crossing over the SI joint.[23, 24] In addition, biomechanical models have shown that applying load through the gluteus maximus produces force closure of the joint (the muscles clamp down and pull the joint together, which reduces motion), [25], [26] and one experimental study has confirmed that contracting the hip extensors reduces SI joint mobility.[27]

Based on the research, it's safe to say that the glutes help stabilize the SI joint. Because a large number of lower back pain cases are thought to be SI related, [28] the glutes may help prevent certain types of mechanical lower back pain that arise from instability of the SI joint.

CHAPTER

3

Glute Training for Strength

Getting strong is a common goal for most athletes and

weightlifters, not just because lifting a lot of weight is cool, but also because, as most weightlifters can attest, it gives you something to train for. Put simply, training for strength is a great way to measure your progress. There's something special about setting new personal records (PRs) in the gym and lifting more weight than you've ever lifted before.

Although a lot of variables contribute to lifting more weight, such as technique, diet, rest, and programming, strength is one of the most concrete ways to measure progress. It's definitive. If you can lift more weight today than you did last month with the same form and same range of motion, you're a stronger version of yourself, and you can accurately conclude that your training is paying off.

In my experience as a personal trainer, the people who train to improve their strength are more likely to stay consistent. Unlike physique training, which is a lot harder to measure, training for strength is a powerful tool for building confidence and consistency. For this reason, I recommend that everyone—even those training for a better physique—train for strength. Most of the fitness models and bikini competitors I coach love working toward strength goals. They already look good, but they associate getting stronger with looking better, and rightly so. There's a direct (but imperfect) correlation between getting stronger and growing muscle (hypertrophy) and vice versa.

As your muscles grow, so too does your strength. This is why a lot of bodybuilders use weights as another way of measuring progress in the gym.

Not everyone cares about aesthetics, and sometimes it's difficult to see physical changes. Your mind will play tricks on you when you use the scale or a mirror, but weights don't lie. And not everyone can put on muscle like the guys and gals in bodybuilding shows. For these people, training for strength

1

2

3

4

becomes an important goal.

THE FOUR PRIMARY BENEFITS OF GLUTEAL STRENGTHENING

POSTURAL IMPROVEMENTS

INJURY AND PAIN PREVENTION

INCREASED ATHLETICISM, STRENGTH, AND POWER

PHYSIQUE IMPROVEMENTS

TINY BUT MIGHTY

A small percentage of people simply don't have the genetics to build muscle.

They can train hard for as long as they want, but it's not in their genes to get naturally jacked. If you fall into this category, make training for strength your primary goal. Instead of trying to put on muscle, focus on lifting more weight.

Make it your reason for training. It's a reward for your effort. You may not get buff, but you will get stronger and reap the health and performance benefits. And most people—even those who don't have the best muscle-building genes—will get a leaner, more defined physique by simply training for strength. I call this the "tiny but mighty" concept. You can feel confident in your body, even if it's not what you originally sought to achieve, because you know how hard you've worked and are proud of how strong you've become. Ever seen the athletes who proudly strut their stuff in ESPN The Magazine's annual Body Issue? They don't all have what society deems ideal physiques, but they couldn't care less. They're world-class athletes, and they love their bodies because of what they're capable of doing on the field, regardless of how lean they are or how developed certain muscles are.

How do you improve strength? It's simple. To get stronger, you have to

continually work toward lifting heavier weights. You do this by gradually increasing the resistance on your muscles over a given period. In strength training programs, this is accomplished using the progressive overload principle. If you're new to lifting, progressive overload simply means doing more over time. For example, adding more weight to a lift, performing more reps, and/or having more productive training sessions all fall into the category of progressive overload.

I'll dive deeper into progressive overload in Chapter 9. What I want you to understand here is that in order to improve your strength, you should be working toward lifting more weight. Although you want to improve strength in all of the lifts and movements that you perform, a few lifts are considered to be the ultimate tests in strength. This is where powerlifting enters the picture.

STRONGER GLUTES = HEAVIER LIFTS

Just as bodybuilders use weights to sculpt their bodies and the mirror to gauge their growth, powerlifters use three barbell lifts—the squat, deadlift, and bench press—and total weight lifted to measure their strength and progress. The good news is that you don't need to be a powerlifter to reap the benefits from these movements. In fact, these three lifts are bedrock to almost all strength training programs. Whether you're bodybuilding, CrossFitting, or just focusing on glute training, you can benefit from the big three power lifts.

For instance, the squat and deadlift are excellent ways to measure full-body strength, which includes your glutes. In fact, squatting and deadlifting are critical to glute development and function. Sure, the hip thrust variations and other glute-dominant exercises target the glutes more effectively, but it's still important to squat and deadlift. And because the glutes are involved in these movements, having stronger glutes can improve your strength when performing these movements. So, just as glute training is great for bodybuilders, it's also great for powerlifters, Olympic lifters, strongmen, or anybody who is performing heavy lifts.

Think about it like this. The hip thrust is a hip extension movement, meaning that you're adding load to your hips and then extending your hips

into the weight to reach full extension. Well, what do you think happens when you get stronger in this movement pattern? That's right; you increase your hip extension strength. If you're a powerlifter or someone who wants to increase your strength in the squat and deadlift, working the hip thrust or other glute-specific movements into your routine is a great way to make improvements.

Here's an all-too-common scenario that will help illustrate my point.

Imagine someone trying to deadlift an enormous amount of weight. They've lifted it off the ground and pulled the bar past their knees, and then they start shaking and hitching in an attempt to lock out their hips. In other words, they've managed to get the weight off the ground, but they can't extend their hips and stand upright to complete the lift. You've probably seen this happen to someone you know, or you may have experienced it yourself. I know I have.

How do you prevent this from happening? A lot of variables could be at play here, such as grip failure or poor technique, but weak glutes might be one of them. If your glutes are weak, especially at end range (lockout), extending your hips to complete the lift might be a challenge. And this is the exact motion you're training when you perform glute-dominant exercises like the hip thrust. My point is this: by training your glutes and the hip extension motion (via the hip thrust, glute bridge, and so on), you can improve your mechanics and strength for movements that are most commonly used to measure strength, like the squat and the deadlift.

Although the power lifts are great ways to measure strength, you don't have to limit yourself to the squat and the deadlift. This is one of the main benefits of the hip thrust: it enables you to directly challenge your glutes with load. When it comes to measuring strength, everyone gravitates toward certain lifts. What's important to understand is that all of the popular lower-body exercises involve the glutes. This is true for variations of the squat, deadlift, lunge, good morning, hip thrust, leg press, and split squat. That means you will never be a great squatter or deadlifter if you have ultra-weak glutes. And you certainly can't hip thrust a ton of weight with weak glutes.

INCREASING GLUTE STRENGTH CAN INCREASE AND

IMPROVE:

• Acceleration and top speed in forward sprinting

• Power in bilateral and unilateral vertical and horizontal jumping

• Agility and quickness in changing direction from side to side

• Acceleration and top speed in lateral sprinting

• Rotational power in swinging, striking, and throwing

• Running, jumping, and throwing performance in track and field events

• Squat and deadlift strength

• Snatch and clean and jerk power in weightlifting

• Strength and conditioning in strongman events

• Bridging and abduction strength for escapes, submissions, and defense in mixed martial arts (MMA)

• Incline sprinting and climbing strength and endurance

• Deceleration in backpedaling, lateral running, and rotational movements

• Ground-based horizontal pushing force

TESTING GLUTE STRENGTH

The squat, deadlift, and hip thrust are great ways to measure lower-body strength, but is there a way to test glute strength specifically? I get this question all the time. Unfortunately, there is no simple answer. For some people, simply testing the glutes with the squat, deadlift, and hip thrust is a great starting point. But even though all of these movements heavily involve the glutes, they're not an exact measure of glute strength. All hip extension exercises utilize the glutes, adductors, and hamstrings. When the knees are bent, the hamstrings contribute less and the glutes slightly more, but all three muscle groups are involved. If simultaneous knee extension occurs (think standing from a squat), then the quads are called into play, and if the spine and pelvis must be stabilized, then various core muscles need to work in concert with one another. It's accurate to say that the three aforementioned

lifts are a great way to measure overall lower-body strength, but not strength for a specific muscle. Even hip abduction and external rotation glute exercises call other muscles into play, such as the gluteus medius and minimus, tensor fasciae latae, and deep external hip rotators.

Another way to test glute strength is simply to feel if the muscle is contracting during a movement. This requires a bit of mind-body connection.

In a perfect world, we would all own EMG units and could measure the electromyographic output of the glutes while we performed different movements. However, this isn't realistic, and simply paying close attention can suffice. Do you feel your glutes activate maximally during the squat and the deadlift? Do you feel them more when performing a hip thrust? What about other movements, like the single-leg Romanian deadlift or the Bulgarian split squat? If your glutes are rock-solid and you feel them contracting very hard during a movement, you can say for certain that you're working the muscle, but this wouldn't be a test of glute strength.

In short, there is no single test or exercise that will accurately test glute strength because of the shared responsibilities of the muscles working synergistically to carry out hip extension, hip abduction, and hip external rotation. The closest you can get to measure indicators of glute strength is probably the one-rep max (1RM) hip thrust, but even then you'd want to gauge the density of the glute contraction and make sure the technique and range of motion are solid.

Remember when I said that there is a correlation between growing muscle and getting stronger in a variety of glute exercises and rep ranges? Well, if you're training your glutes and building muscle, you can bet that you're getting stronger with all of the movements that involve the glutes, assuming you're practicing them regularly. This encompasses jumping, sprinting, squatting, pulling, powerlifting, Olympic lifting, and strongman. Put another way, the glutes are involved in just about every feat of strength, whether it's for sport or for everyday activities. So, if your goal is to get stronger, you need to train your glutes.

SCIENCE SPEAK: HIP THRUST STRENGTH

I've been speculating for years as to whether the hip thrust (and glute training in general) improves strength in other lifts, such as the squat and deadlift. I always assumed that glute training—specifically hip thrusting—would improve hip

extension strength and therefore improve strength in lifts that involve the hip extension motion. But until recently, I never had the science to back it up.

Four pieces of evidence definitively conclude that the hip thrust alone will improve squat and deadlift strength as well as overall hip extension strength.

TWIN EXPERIMENT

For this study, I trained a pair of identical twin sisters three times per week for six weeks using a daily undulated (DUP) approach—meaning that they performed the

exercise three times per week in varying set and rep schemes. 1 One twin performed only squats for her lower body, and the other performed only hip thrusts. Here's what they did.

Three times per week, each twin performed 3 to 5 sets of 6 to 15 reps of her individual lift (hip thrusts or parallel back squats). Day one was 4 x 10 with around 75 percent of 1RM, day two was 5 x 6 with around 85 percent of 1RM, and day three was 3 x 15 with around 65 percent of 1RM. However, if the subject could perform more reps on the last set, she did, so the last set was an AMRAP set (which stands for "as many reps as possible").

After the lower-body lift, each twin performed 2 sets of incline presses, bench presses, or close-grip bench presses; then 2

sets of inverted rows, lat pull-downs, or negative chin-ups; and then 2 sets of ab mat crunches, straight-leg sit-ups, or hanging leg raises. The loads were increased each week.

I should point out that the twins were instructed to follow identical caloric and macronutrient plans throughout the study, and their weight didn't change much during the six-week period.

Squatting or hip thrusting 18 times over a six-week period in a DUP fashion elicited the following results:

	1RM SQUAT	1RM HIP THRUST	MAXIMUM HORIZONTAL PUSHING FORCE	UPPER GLUTEUS MAXIMUS THICKNESS	LOWER GLUTEUS MAXIMUS THICKNESS
Squat Twin	↑63%	↑16%	↑20%	↑20%	↑21%
Hip Thrust Twin	↑42%	↑54%	↑32%	↑28%	↑28%

As you can see, the twin who performed the hip thrust

improved her squat strength by 42 percent without ever

squatting. This clearly indicates that the hip thrust transfers very well to the squat and can improve squat strength without having to perform the squat movement itself. Conversely, the twin who performed the squat improved her hip thrust by only 16 percent, suggesting that the hip thrust transfers more to the squat than the squat transfers to the hip thrust.

RUGBY STUDY

The next piece of evidence is a study that I published as part of my PhD thesis. It was carried out on adolescent rugby players and—like the twin study—showed that the hip thrust improved front squat strength by 7 percent. 2 It wasn't a huge improvement, but it did show that the hip thrust improved squat strength without ever having to squat.

BASEBALL STUDY

This eight-week study investigated the effects of hip thrust training on the strength of 20 male college baseball players.3

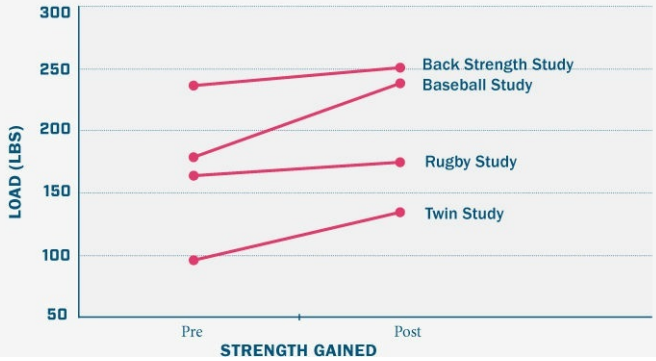
The players were divided into two groups: one group added hip thrusts to their baseball training regimen, while the other group followed only their regular baseball training routine. The results showed a 28 percent increase in squat strength in the hip thrust group (their squat strength increased from around 185 pounds to around 235 pounds)—again, without ever

squatting.

LUMBAR EXTENSION STRENGTH STUDY

HIP THRUST TRANSFER TO THE SQUAT

	POPULATION	DESIGN	PRE	POST	% CHANGE
Twin Study	2 female identical twins	3x/week for 6 weeks DUP back squats	95 lbs	135 lbs	42%
Rugby Study	28 adolescent male rugby players	2x/week for 6 weeks Periodized front squats	171 lbs	183 lbs	7%
Baseball Study	20 male college baseball players	3x/week for 8 weeks Periodized back squats	185 lbs	237 lbs	28%
Back Strength Study	14 trained male subjects	2x/week for 4 weeks	242 lbs	259 lbs	7%



In this study, researchers tried to determine the effects that squatting and hip thrusting had on lumbar extension strength.4

To carry out the study, trained males were divided into two groups: twice a week for four weeks, one group performed only squats, and the other group performed only hip thrusts.

Interestingly, neither the squat nor hip thrust improved lumbar extension strength. But the group that performed only hip thrusts increased their squat strength by 7 percent, providing more evidence of strength transfer from one hip extension exercise to another.

CHAPTER

4

Glute Training for Performance

When I first started lifting weights over 20 years ago, bodybuilding was the most prevalent and widely accepted form of strength training. If you wanted to get strong, improve performance, and build muscle, you lifted weights and trained like a bodybuilder—meaning you performed a wide range of lifts that included both functional and isolated movements.

To clarify, functional movements work multiple joints and muscles simultaneously, and they are considered functional because they mimic the actions of sport and life. Squats, deadlifts, push-ups, and pull-ups are examples of functional movements. Isolated movements are exercises that work only one joint and typically target a specific muscle group. For example, the biceps curl works your elbow joint and primarily targets your biceps.

Why is this important, and how does it relate to glute training, you might ask? It's important because a lot of people consider glute training a form of bodybuilding, which it is. And this is a problem because many people view bodybuilding as being nonfunctional, for two reasons: 1) it incorporates isolated movements; and 2) the majority of bodybuilding is centered on aesthetics or physique training. But this doesn't make bodybuilding nonfunctional.

How did this happen? I'm sure there are a lot of reasons, but here's my observation: As functional fitness grew in popularity, people went through a transition whereby any movement that was not functional was criticized and then tossed out. Isolated movements were exercises for looking good and served no purpose. Though compound movements are important (they are bedrock to my system and to most bodybuilding programs), saying that isolated movements are not functional is simply wrong. Research has shown that lying leg curls, for example, increase sprinting speed, and the lumbar extension machine has been shown to increase Romanian deadlift strength.

And what happens if you get injured? What if you hurt your shoulder and can't do pull-ups, but you can do biceps curls? Should you avoid curls because they're not functional? You're still strengthening your elbow joints, wrists, biceps, and forearms. Just as a carpenter has specific tools for certain jobs, personal trainers and athletes need a set of exercises that not only work the entire body, but also hone specific areas. For example, let's say you're a personal trainer working with an athlete with underdeveloped glutes, and squats and deadlifts are not getting the job done. What are you going to do?

Whether your intention is rooted in aesthetics or performance, you need both compound and single-joint movements to target the underdeveloped and weak areas.

In this book, you will learn how to perform both functional and isolated movements that target your glutes. You can lump glute training into the bodybuilding or physique training category, but saying that it is not functional is a false claim. I can confidently say that glute training is one of the most functional forms of strength training out there. How do I know this?

Because your glutes—as I've established and will elaborate on in the next part

—are one of the most important muscle groups in your body, and the best way to develop your glutes is by implementing the techniques outlined in this book.

Let's not forget that your glutes are responsible for extending your hips, pushing laterally, and rotating your body. This basically covers the entire range of functional movements. It stands to reason that if you train your glutes, you will improve function for movements that involve your glutes, which include sprinting, jumping, squatting, cutting, carrying, throwing, pushing, pulling, punching—the list goes on and on. Everyone can agree that the hips are important for function. Well, your glutes move your hips. And strong, powerful hips are often what separate elite athletes from average ones.

STRONGER GLUTES = BETTER ATHLETE

As athletes progress, they learn to incorporate their hip (glute) and leg muscles into their movements. This is common in boxing and martial arts. A fighter who is just starting out might throw a punch using the power of their shoulder. But as their technique advances, they begin to incorporate their

End-Range Hip Extension

hips and lower body into the movement, adding power and speed.

Another example is comparing a beginner shotputter who uses their upper body when throwing to an advanced shotputter who uses their entire body. Put simply, in order to advance, athletes must learn how to derive maximum power from their hips and legs. And in order for this advancement to take place, a foundation of adequate glute strength (to mention one example) is an absolute prerequisite.

Glute strength and size are important for sports for another reason: well-developed glutes have more potential for force development—that is, the ability to increase the strength or action of a movement. And this is generally true for all muscles. The bigger and stronger the muscle, the more force it can produce, assuming you dedicate ample time to practicing the actions you're trying to improve upon.

Glute-dominant movements also strengthen end-range hip extension, which is the zone involved in ground contact while sprinting—the most important zone for producing force and propelling the body forward.

Everyone can agree that speed and acceleration are critical in most sports. So, by training your glutes, you're strengthening a critical motion involved in sporting action.

FULL HIP EXTENSION

In addition to improving your ability to run, jump, lift, and twist, training your glutes can improve your balance. Whether you're standing on one leg or two, your glutes provide stability for your hips and legs.

Given these facts, it would be silly to make the argument that glute training is not functional. I would argue the opposite and say that you're actually less functional if you don't train your glutes.

The bottom line is that strong, healthy glutes make you look and feel better, help prevent injuries and pain, maximize strength, and improve performance.

For all of the reasons outlined in this chapter, I believe that everyone can benefit from glute training. It doesn't matter who you are or what your goals are; the information in this book will help you tremendously.

I have covered a lot of ground and touched on a lot of topics ranging from glute genetics and aesthetics to glute strength and function. In the next part, you will learn the anatomy of the glutes, the roles of the glutes, the mechanisms for growing muscle (hypertrophy), and a classification system for categorizing exercises.

SCIENCE SPEAK: FUNCTION AND

PERFORMANCE

As we age, we often experience a reduction in our ability to perform basic activities of daily living, which include walking, climbing stairs, stoop and squat lifting, sit-to-stand

movements, carrying objects, and maintaining a single-leg stance. As you can imagine, this can have a big negative impact on our quality of life. The good news is that you can avoid a lot of the negative ramifications of aging by

strengthening and developing your glutes, as the studies outlined below help demonstrate.

Walking: The glutes are involved in walking, and activation increases with faster walking speed.[1], [2]

Stair Climbing: The glutes are involved in stair climbing, and activation increases with faster climbing speed.[3]

Sit-to-Stand Movement: The glutes are highly active in the sit-to-stand movement, and activation increases to a greater extent than other muscles with heavier loads.[4]

Carrying: The glutes are very active in carrying loads, and activation is greater with heavier loads held with two hands than with lighter loads held with one hand.5, 6

The fact that glute muscle activation increases with increasing walking and stair-climbing speeds and with greater sit-to-stand and carrying loads indicates that the glute muscles play an important role in these movements. Simply stated,

strengthening your glutes will improve function in these foundational movement patterns.

IMPROVED HIP EXTENSION

When you extend your hips, you're using your glutes,

hamstrings, and adductors (known as the hip extensors) to carry out the action. The hip extension action is central to a wide range of athletic movements, including sprinting,

jumping, drop landing, climbing, decelerating and changing direction, cutting from side to side, throwing, swinging, striking, and even strongman events like the truck pull. 7, 8

The importance of the glutes (and hamstrings and adductors) is underscored by the fact that their role increases with increasing load and speed. This is called the "increasing role of the hips" theory of sports performance. As loads get heavier (in the squat, lunge, conventional deadlift, and hex bar deadlift exercises) and running speeds and vertical jumps increase, the turning force requirements at the hips (hip extension torque) increase proportionally more to the movement, while turning force requirements at the knees (knee extension torque) increase proportionally less.9

Although the theory has been criticized on the basis that net joint moments are hard to interpret, 10 other methods of

investigation (such as electromyography and musculoskeletal modeling) produce similar results.11

SPRINTING

The hip extensors, specifically the glutes, are responsible for increasing speed through increases in stride frequency at high speed. 12 They are also the most active muscle group in the final part of the swing phase and in the stance phase.13, 14, 15

where they are critical for absorbing braking forces upon ground contact, as illustrated in the chart below.

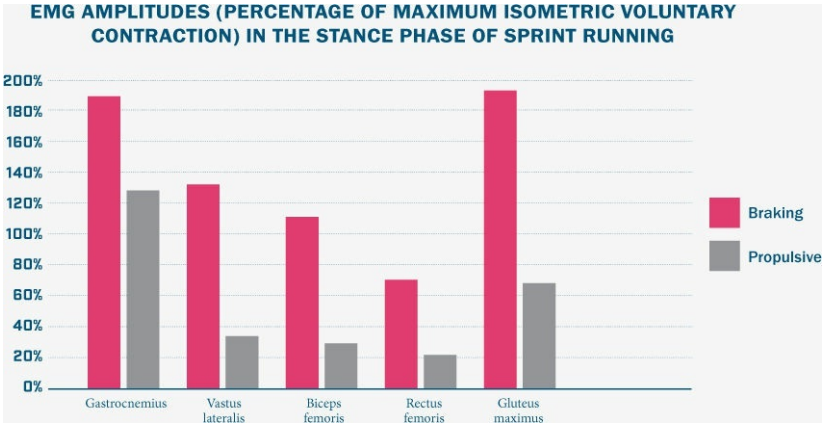
Bear in mind that the glutes are also hip external rotators and abductors. While they extend the hips and help swing the legs downward, they also stabilize the pelvis in the frontal and transverse planes by preventing excessive hip adduction and internal rotation during the single-leg stance phase.16

CHANGING DIRECTION

The glutes play a crucial role in cutting from side to side or changing direction while running. The role of the glutes in producing force in multiple planes simultaneously is likely a feature of cutting from side to side or other lateral movements.

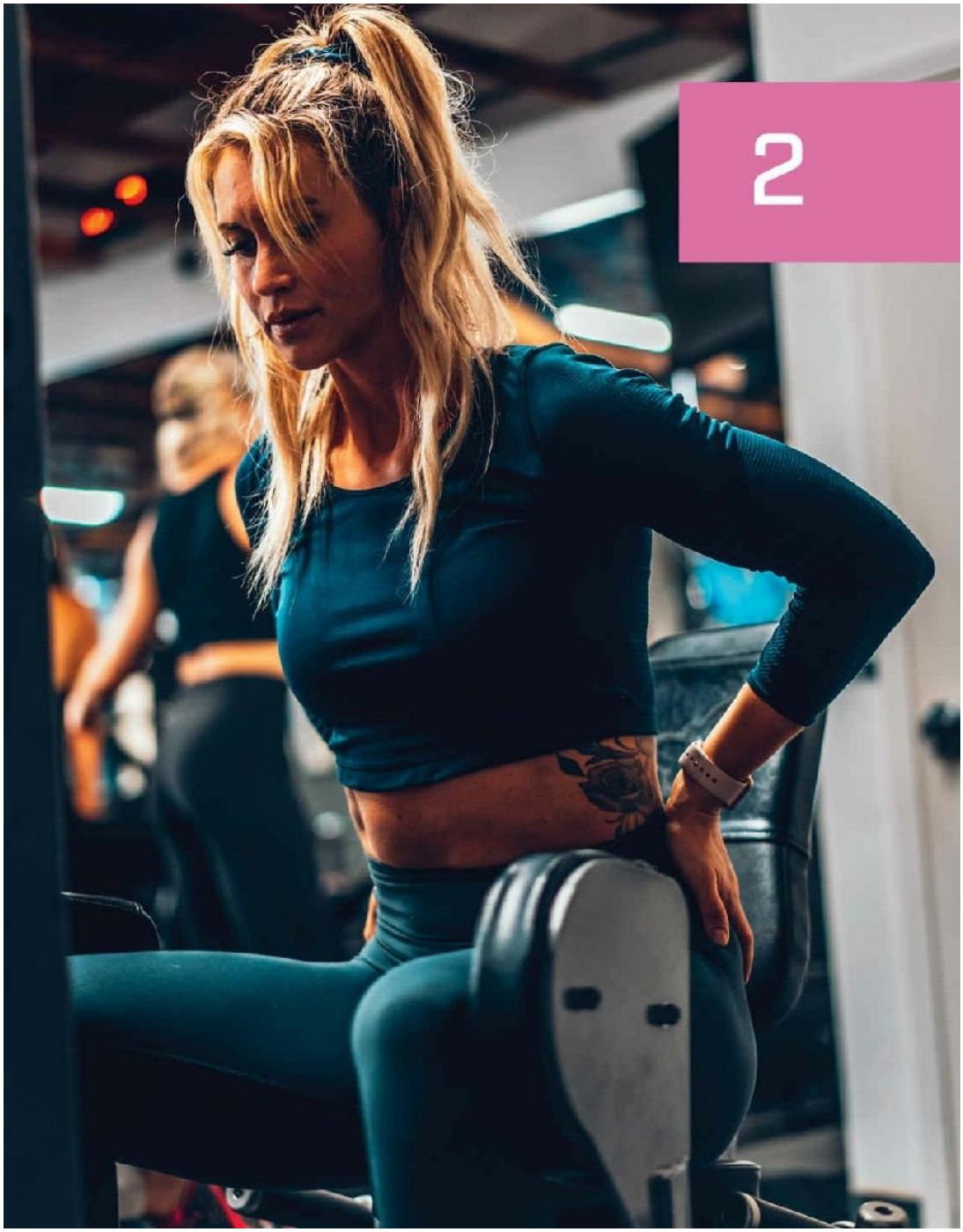
In these scenarios, the different regions of the glutes must contract in a coordinated fashion to produce hip abduction, hip external rotation, and hip extension at the same time. It is commonly thought that hip abduction strength is more

important for lateral movements than hip extension strength, but this is not the case—hip extension strength better predicts lateral movement ability than hip abduction strength. 17, 18



THROWING AND STRIKING

The glute of the rear leg works to perform both hip extension and hip external rotation when throwing19 or swinging a club, bat, or racket. This explains why the glutes are so active during baseball pitching. 20, 21 The glutes, in summary, play a crucial role in sports that involve striking and throwing.



THE SCIENCE OF STRENGTH AND PHYSIQUE

TRAINING

If you were to go back in time and tel my younger self that one day I would be known as the Glute Guy and would be the world's foremost expert on glute training, I never would have believed you. I would have given you a puzzled look and said,

"Me, a Glute Guy?! You're crazy."

But it happened, not because I developed the most amazing glutes that anyone has ever seen (though that would've been awesome), but because I was the first person to start looking into the science of glute training. I wanted to understand why and how the glutes grow, how anatomy and the roles of the glutes affect movement and aesthetics, and the best exercises for targeting the glutes.

And I found the answers. Although there is still much to learn about the glutes and how best to train them, we do know a lot based on research, experiments, and observations. In this part of the book, I distill the most important glute training science into four chapters. You will learn the anatomy and function of the glutes and how they influence your appearance and movement. You will learn the science of muscle growth and the best methods for strengthening and building bigger glutes. Lastly, you will learn an exercise categorization system that explains why certain exercises are well suited for specific goals and why certain exercises work your glutes better than others.

While many people have skipped learning this information and gotten great results simply by performing the exercises and following the programs in the back of the book, you will never be the best physique competitor,

athlete, or trainer or reach your true potential if you don't understand the fundamental science behind what you are doing. Why? Because when you understand how your glutes work and why they work the way they do (the science of glute training), you can attach meaning to the exercises you perform and the program you design (the art of glute training). You know what you are doing works, not because you've tested it on yourself or because it worked for someone else, but because you understand the science.

CHAPTER

5

Anatomy of the Glutes

I'm going to assume that most of you reading this book are more interested in growing bigger, stronger glutes than learning about anatomy. This is not a bad thing. In fact, filling out my jeans in the hopes of looking more athletic and

attractive is what put me on the path to becoming the Glute Guy. So I realize that learning the anatomy of the glutes might not be your chief objective. But here's the deal: whether or not you're interested in anatomy, it is crucial to understand—at least on a basic level—for several important reasons.

For starters, everyone can benefit from knowing how the body works. After all, I make a lot of recommendations and propose a ton of ideas that will help you grow and strengthen your glutes, but those recommendations aren't valid unless I discuss the muscles you're working so hard to develop. When you understand what the glutes look like, where they are located (I'm referring to the three gluteal muscles, which I will get to shortly), what structures they attach to, and why they are shaped the way they are, you will gain a whole new appreciation for their role and function, as well as for the glute training techniques and programs I offer later in the book. Equally important, understanding the anatomy will help you realize how magnificent and versatile your glutes are and why prioritizing them in training is so important.

Second, the anatomy of the glutes explains a lot about the aesthetic differences between individuals and highlights what you can and can't change. For example, if you're wondering why you can't get a wider butt no matter how hard you train, or why you have pronounced hip divots or hip dips (inward curves on the sides of your hips), knowing about anatomy will provide a clear and concrete answer. Put simply, anatomy partly explains your glute aesthetics and appearance.

Third, in order to appreciate the important role the glutes play in our

daily lives—from posture and injury prevention to performance and overall health—you need to understand what is going on underneath the skin. As you work your way through this chapter, you will learn how hip anatomy determines how you move, and what adjustments you need to make based on your anthropometry (limb and torso proportions) to achieve your desired results, whether you're training your glutes for aesthetics, performance, or general health.

In addition to guiding your movement mechanics, understanding the anatomy of your glutes will help you relate what you are feeling when you perform an exercise. As I discuss in Chapter 8, picturing in your mind the muscle you are working during an exercise (referred to as the mind-muscle connection—see here) has been shown to enhance muscle growth. And understanding your gluteal anatomy will help you communicate where you are feeling an exercise—whether it is in your upper glutes, lower glutes, or somewhere else—which will allow you to make the necessary adjustments. In short, a basic knowledge of anatomy will help you refine your technique and choose exercises that are in line with your aesthetic and performance goals.

And if you happen to be a trainer, it's even more important to have a working knowledge of anatomy, especially if you intend on teaching my Glute Lab system. You have a duty to educate your clients. They will have questions, and it's up to you to provide answers backed by evidence-based science. For instance, clients might want to know why a particular exercise feels better than others, why their glutes are shaped the way they are, and why they need to perform certain exercises based on their anatomy and training goals. If you don't understand where the muscles are located and what they are designed to do, you won't have good answers. Not only will you fail to satisfy their curiosity, but you might lose their confidence, which is a primary driver for getting results. However, if you can explain the nuances of skeletal and muscle anatomy and how those determine the shape and function of their glutes, you can resolve their concerns, attach meaning to the programs you're putting them through, and keep them focused on the most important elements of training, which are having fun and staying consistent.

HIP AND PELVIS SKELETAL ANATOMY

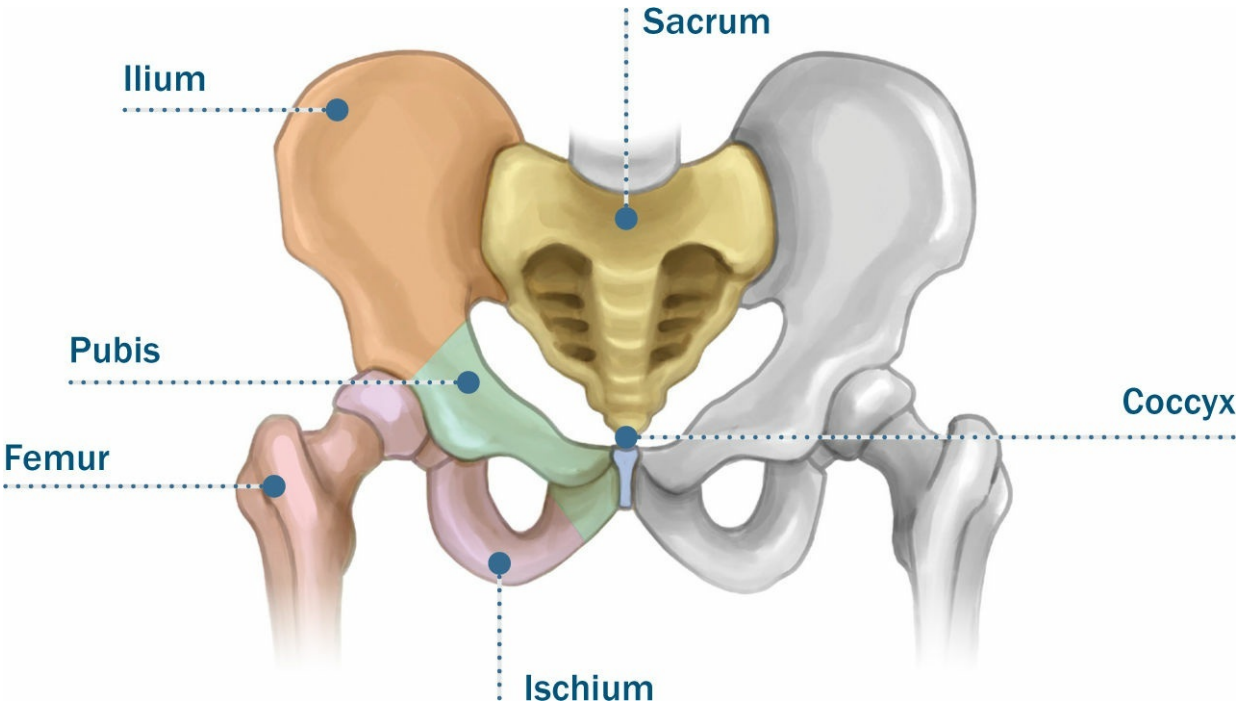
The appearance and function of a muscle can be partly figured out by looking at its anatomy—what the muscle looks like and what it attaches to. Although your gluteal muscles give your hips shape, the skeletal anatomy of your pelvis and hips determines that shape. What's more, your hip and pelvis anatomy is an important variable for determining which exercises you should prioritize and how, based on your anatomy, you should approach those exercises. I discuss all of this in more detail in the pages to come, and I reference anatomy as it pertains to exercise mechanics and program design throughout this book.

So, before you glaze over the illustrations, understand that hip and pelvic skeletal anatomy is crucial not only for determining the appearance of your glutes, but also for determining the best exercises for your unique anatomical shape. But before I delve into these particulars in this chapter, you need to know what the main bones of the hip and pelvis are.

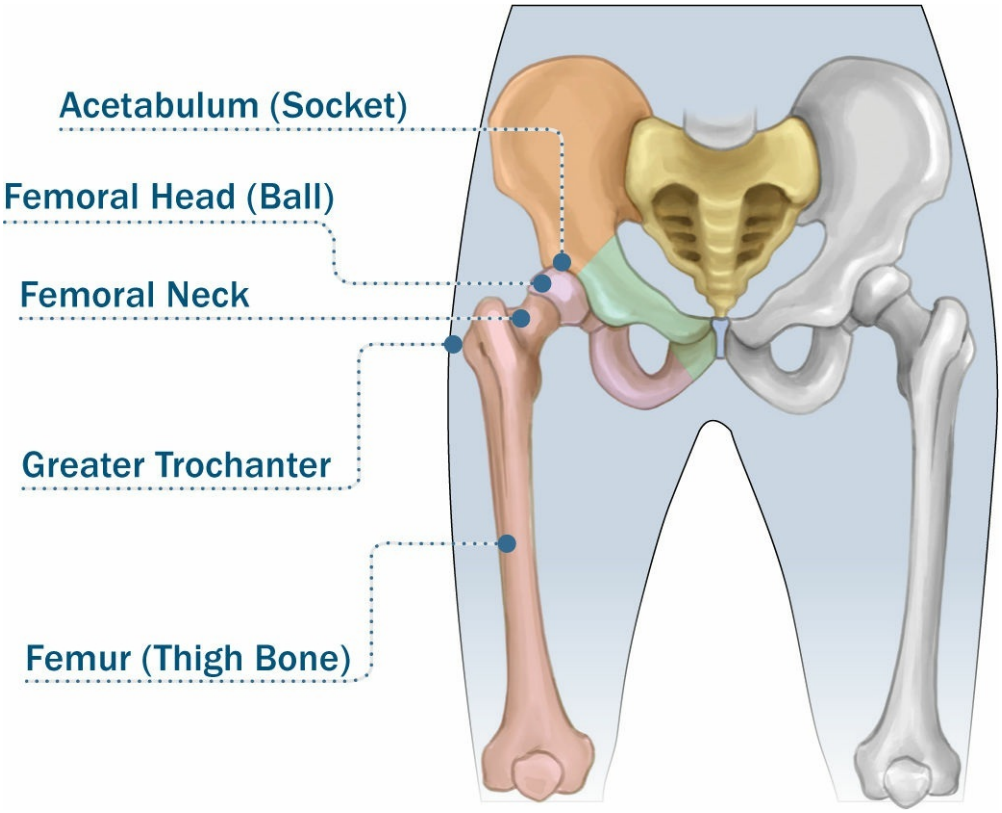
Don't feel like you need to memorize the name and location of each bone.

This is just a primer to familiarize you with basic skeletal hip and pelvis anatomy. As you progress through this chapter, I will reference these bones and help you connect the dots between skeletal and anatomical differences (sizes and shapes) and how those differences create unique aesthetic characteristics and movement patterns.

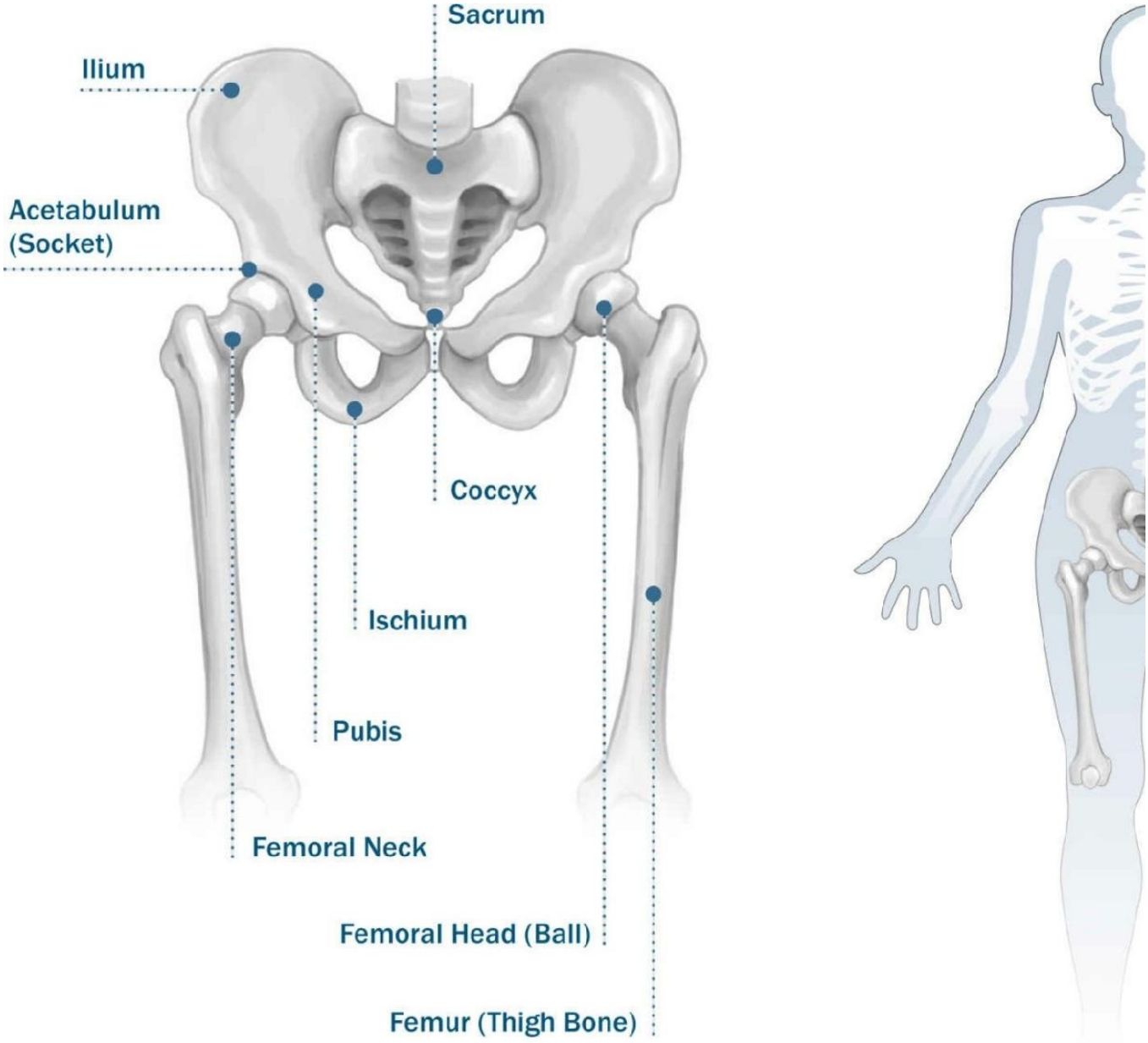
Let's begin by looking at the anatomy of the pelvic region. As you can see, your pelvis and hips are made up of five main bones: the ilium, pubis, ischium, sacrum, and coccyx.



On the side of the pelvis are the acetabulum (hip socket) and the femur, which encompass the femoral head (ball), femoral neck, greater trochanter, and thigh bone.



Here’s how these bony structures fit together to make up your hip and pelvis anatomy.



SCIENCE SPEAK: DIFFERENCES BETWEEN MALE

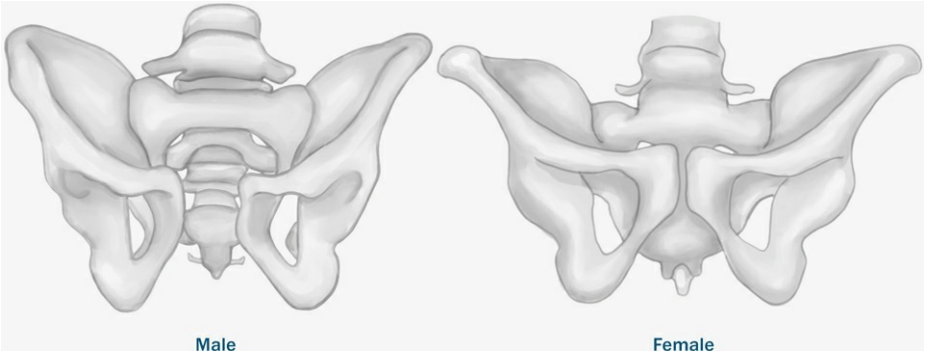
AND FEMALE HIP ANATOMY

Whether I’m working with a man or a woman, I base the

training strategy around their goals and select exercises based on their unique anatomy. Because everyone has different anatomical shapes, mobility, and injury histories, I treat every person as a unique case.

However, there are some general differences between male and female hip anatomy that are worth noting and that, in some circumstances, help explain certain aesthetic and

movement characteristics. For example, the male pelvis is generally taller and narrower than the female pelvis, and the



acetabulum is oriented more laterally in males than in

females, which is more forward-facing. 1, 2 This means men tend to have relatively narrower and longer glutes compared to females, who tend to have wider and shorter glutes.

Interestingly, relative overall glute size is nearly identical between men and women; male glutes are proportionately

larger, though.3

What's more, females on average have significantly greater acetabular depth and smaller femoral head diameters

compared to males, 1, 4 which might make the hip joint more or less stable in certain positions and movements. We can't say for certain what these positions and movements are because it depends on so many variables. All we can do is make

assumptions based on the average characteristics.

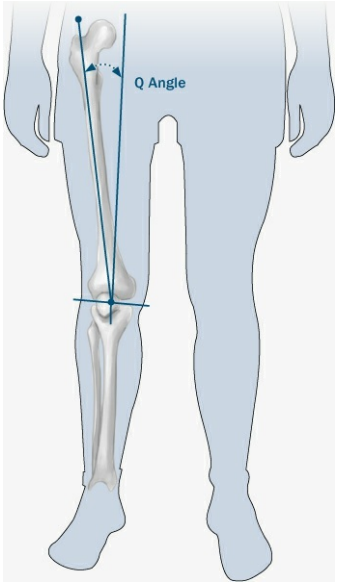
For instance, women tend to have relatively wider hips than males. For this reason, it is commonly thought that women have larger Q angles (line representing the resultant line of force of the quadriceps made by connecting a point near the ASIS to the midpoint of the patella) compared to males; however, this is not the case.5 Nevertheless, women tend to possess more hip range of motion, allowing them to move through more range of motion during various glute exercises than males.6, 7 Women also tend to portray greater knee valgus (inward movement of the knee) than men during

various landing and squatting movements (eighth study) due to anatomical and neuromuscular factors.8 Wider hips can make it appear that women are caving in more than men

during various single-leg squatting movements, but sometimes this is just an illusion, and the knee isn't actually caving inward.

Women also tend to have greater standing sacral slope and lumbar lordosis angles (there is a 7- to 13-degree difference between females and males according to various studies). 9, 10

This explains why female glutes often appear to protrude more than male glutes and suggests that women have more range of motion in the lumbar spine. I've experienced this in my own practice. In fact, most of the women I train are more prone to hyperextension through the lumbar spine when squatting and deadlifting than men, and this might be due to a greater lumbar range of motion. For example, when I use the "chest up" cue, which reminds lifters not to round their backs when they squat or deadlift, some women tend to anterior pelvic tilt and overarch their backs, putting unnecessary increased stress on the lumbar spine. So the "chest up" cue is great for most men, but not for some women.



Although these examples are common, they're not universal.

Some guys I train can squat to rock bottom, whereas some women I train can't get to parallel without butt winking (posterior pelvic tilting in the bottom of the squat). Some women I train have narrow pelvises, and some men I train have wide ones. Some women I work with never struggle with knee valgus or lumbar hyperextension, whereas some men I work with do. The point is, these averages don't take into account individual variability, which ultimately determines how

each person looks and moves. So you can use these averages to help explain certain aesthetic and movement differences, but you also need to take into account the individual's injury history, mobility, experience level, and goals, as well as their skeletal anatomy.

Now that you're familiar with basic skeletal hip and pelvis anatomy, let's see how the different sizes and shapes of these bones create certain gluteal shapes. Then we'll look at how those differences create unique movement patterns.

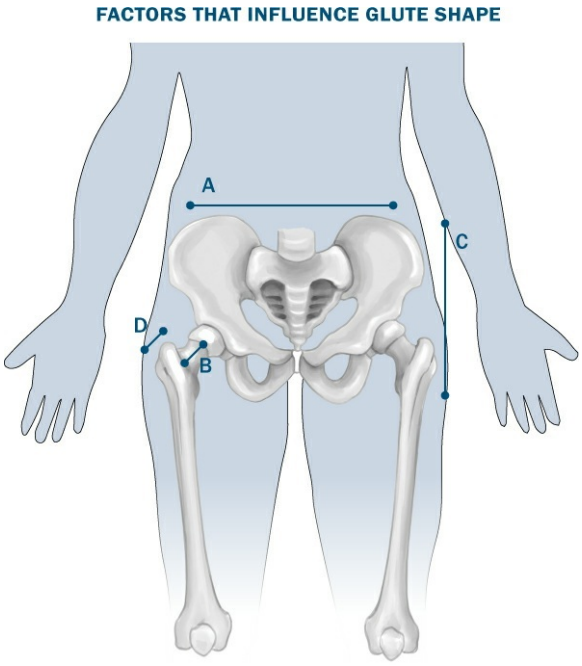
HOW SKELETAL ANATOMY INFLUENCES GLUTEAL

APPEARANCE

As you probably know, you cannot change your skeletal anatomy. It's completely dependent on your genetics. You can manipulate the appearance of your glutes by adding muscle and losing fat, but you can't modify your skeletal anatomy. For this reason—and I can't stress this enough—I implore you not to get hung up on the things you cannot change. Instead, focus on the things you can control, like your body composition (proportion of fat to muscle), muscle development, and exercise selection and, equally important, your diet, mindset, and lifestyle (sleep and stress management). Genetics matter, it's true, but other variables influence how you look, feel, and perform, and those are the ones you should focus on.

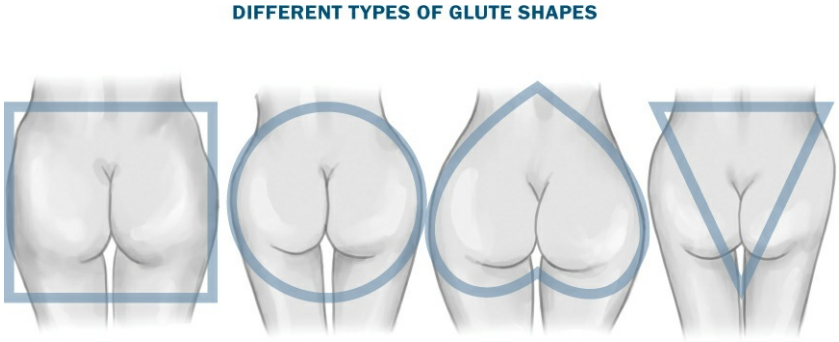
Later in the book, you will learn how to maximize muscle growth and alter the appearance of your glutes by targeting certain regions (upper and lower) with specific exercises. But for now, I want to focus on the different anatomical shapes and how these anatomical differences partially determine the shape of your glutes.

For instance, the size and width of the ilium (A), the length and angle of the femoral neck (B), the vertical distance between the ilium and greater trochanter (C), and the size of the greater trochanter (D) partially determine the shape of your hips, waist, and glutes when viewed from the front and



back.

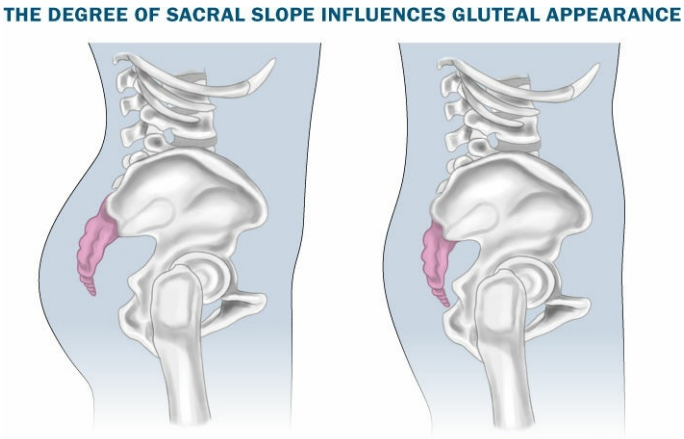
If you have wide ilium bones, long femoral necks, and pronounced greater trochanters, you might have a square or round butt. If you have medium or narrow ilium bones, long femoral necks, and pronounced greater trochanters, you might have a heart- or pear-shaped butt. And if you have wide ilium



bones, short femoral necks, and small greater trochanters, you might have a V-shaped butt.

And there's more: some people have outward curves, giving the bubble butt look, while others have inward indentations along the insides of their hipbones, which are often referred to as hip dips or hip divots. Just as hip and femur size partially determines gluteal shapes, it also partially determines how pronounced the inward depressions are. If you're lean and have wide hips (ilium bones), long femoral necks, and big greater trochanters, you might have more pronounced hip dips than someone who has narrow hips, small greater trochanters, and more body fat. What's more, the vertical distance between the ilium and hip socket also matters. If that distance is short, you may not have any hip dips, but if that distance is long, you may have more pronounced hip dips.

Other aspects of the skeleton that affect the appearance and shape of your glutes are the angle of the sacrum and the distance between the sacrum and femurs. Picture someone standing in front of you so that you're viewing them from the side. If the individual has a more horizontal sacrum and a greater horizontal distance from the sacrum to the femurs, their glutes will look rounder and larger. If the individual has a more vertical sacrum and a smaller horizontal distance from the sacrum to the femurs, their glutes will appear flatter and smaller. This is true regardless of the amount of gluteal muscle mass the person has. Some ethnicities are known for having more aesthetically pleasing glutes than others, and the angle of the sacrum plays a large role in this appearance.



These two pelvises are the same except that the one on the left has a larger sacral slope, which creates a greater gluteal prominence.

Of course, all of the examples I have offered are gross generalizations; there are a lot more variables that determine these shapes, such as body composition and muscle size. My intention here is merely to highlight how the size and structure of the hip bones influence the shape and appearance of the glutes. In other words, they are far from concrete. Just because you identify with a certain shape doesn't mean your anatomy matches that shape.

I've trained women who have wide hips, long femoral necks, and pronounced greater trochanters who have no hip divots. My point is this: anatomy matters, but it's not everything. I can't emphasize this enough: you can alter your appearance by increasing the size of your glutes (adding muscle) or by adjusting your percentage of body fat (losing or gaining weight). And you will learn how to do exactly that in the following chapters.

Having covered the role that skeletal anatomy plays in appearance, let's look at how it affects movement.

HOW SKELETAL ANATOMY INFLUENCES

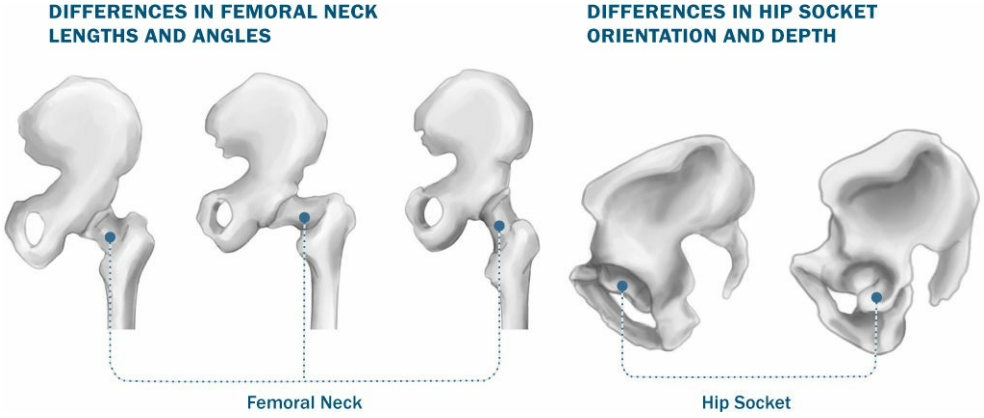
MOVEMENT PATTERNS

Just as there is no all-encompassing approach to nutrition and program design, there is no universal way to perform a movement. The shape, orientation, and depth of the hip socket; the length of the femur; and the angle of the femoral head and neck, for example, vary from person to person and therefore influence the setup, execution, and exercises people should perform.

For instance, if someone has shallow hip sockets and long femoral necks, they might have access to more hip range of motion—say, squatting to full depth (hips below knee crease)—because their femurs are unobstructed by their hip sockets (acetabulum). If they have deep hip sockets and short femoral necks, on the other hand, they might not be able to squat as deep or lift their knees as high because their femur collides with the ridge of their acetabulum. And these are just two examples, which factor in only a couple of variables.

As I describe in Part 5, your stance, your technique, and the variation you choose to perform should be based on your experience, body type, and anatomy. And this is where the art of training and coaching comes into play.

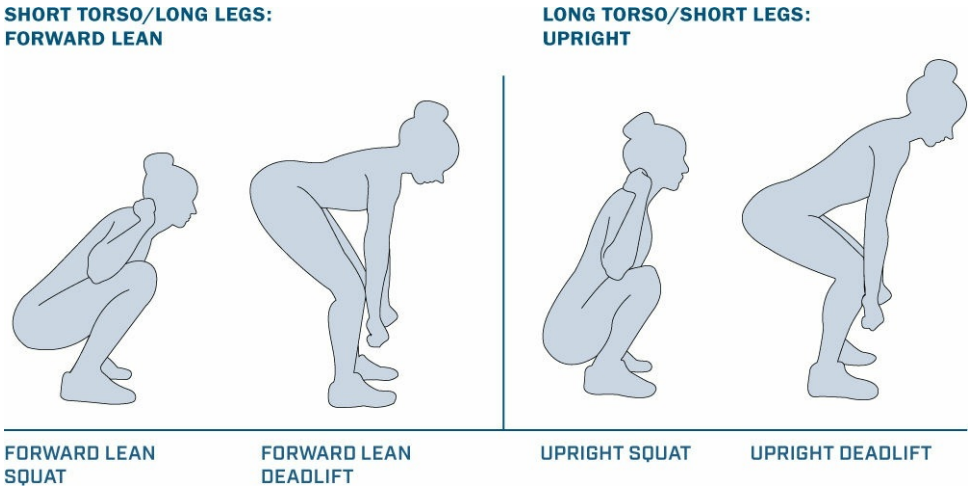
It takes some tinkering and experimenting to figure out which setup, execution, and exercise variation is best for you. But understanding anatomy will shed light on how you should move and may steer you in the right direction.



For example, perhaps squatting deep from a narrow stance hurts your hips, while squatting to parallel from a wide stance is just fine. Some trainers will tell you that you need to squat deep to get the best results and that your poor mobility is the limiting factor when in fact it is your bony anatomy.

Rather than spend time performing stretches that won't actually improve your mobility due to anatomy, you can focus on performing the variations that cater to your unique build.

Another example of how anatomy affects movement is femur and torso proportions (anthropometry). Take the deadlift and squat, for example. To maintain balance and perform the movement correctly, you must keep the barbell centered over the middle of your feet. Someone with a longer torso and short legs will necessarily have a more upright squat and deadlift, while someone with a shorter torso and longer legs will need to lean their torso forward.



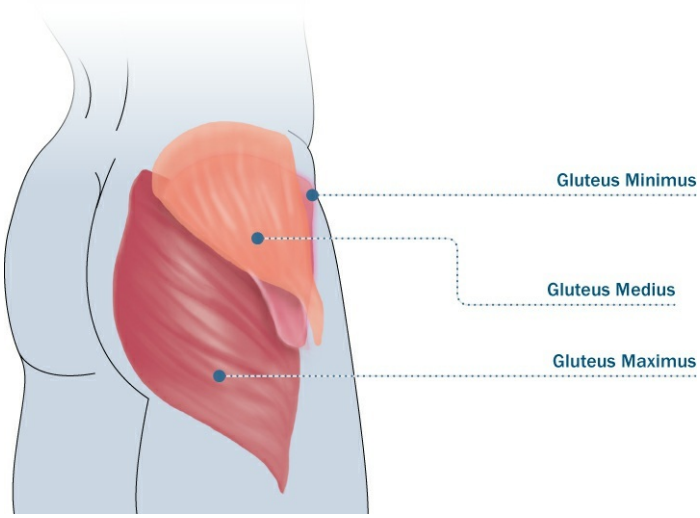
But this is not always the case. There are always exceptions and anomalies.

There are people who have short torsos and long femurs who squat upright, which might be due to the orientation, shape, and depth of their hip sockets and the length, size, and angle of their femoral necks, along with other factors such as ankle dorsiflexion mobility and technique.

The point is, no two individuals move exactly the same, and they shouldn't. There is a wide range of skeletal shapes and sizes that affect how we move. So, if you ever hear a coach telling everyone to squat or perform a movement the same way, you should immediately question that coach's motives and experience.

It's also important to point out that these examples are simple generalizations. Like I said, there are exceptions to every rule, and I'm leaving out a lot of variables, such as mobility and motor control (coordination), which also highly influence how you move and the exercise variations you should perform. I'll dive deeper into these variables and look at all of this in more detail in Parts 3 and 4.

The key takeaway here is that skeletal anatomy varies from person to person, and these variations dictate not just how you look, but also your range of motion and movement mechanics.

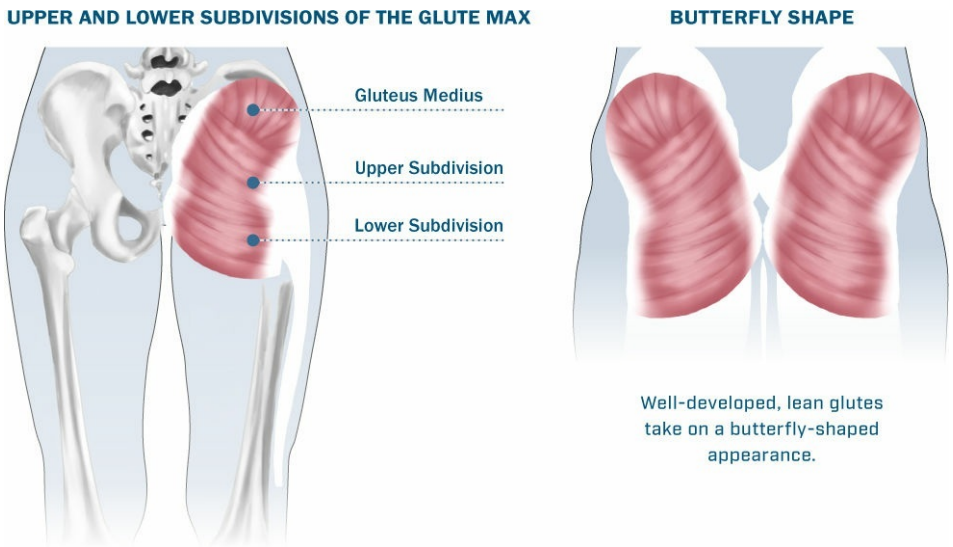


GLUTEAL MUSCLE ANATOMY

Now that you have a basic understanding of skeletal anatomy, let's take a look at the gluteal muscles. As you know, the three muscles in each buttock—the gluteus maximus, gluteus medius, and gluteus minimus—are collectively referred to as the glutes.

GLUTEUS MAXIMUS

The gluteus maximus (or glute max) is the largest of the three gluteal muscles and gives your hips and butt shape. It is typically broken into two subdivisions—the upper and lower glute max. As you can see, the gluteus maximus builds the most superficial layer (the top layer closest to the skin), covering a portion of the gluteus medius (and the gluteus medius covers the gluteus minimus).



It’s worth repeating that when I say “glutes,” I’m referring mainly to the gluteus maximus because it makes up two-thirds of the glutes and is twice the size of the gluteus medius and gluteus minimus combined. When it comes to aesthetics as well as function and performance, it’s easier to think of all three muscles as one. (This will make more sense after you read Chapter 6.) With regard to exercise selection and glute sculpting—that is, targeting a specific region of the glutes with an exercise—I’ll simply refer to the upper and lower subdivision of the gluteus maximus. For example, if you want to target your upper glutes to build what is commonly referred to as a shelf, it’s best to perform hip abduction exercises. If you want to target your lower glutes, you might prioritize more squats and deadlifts. And if you want to target the upper and lower subdivisions simultaneously, performing hip thrusts and glute bridges will give you the best results.

Due to the anatomy and structure of the glute max, we don’t think in terms of inner versus outer subdivisions because it’s impossible to target the muscle in that way. When you look at the glute max, for example, you will notice that the muscle fibers are oriented diagonally and tend to run the entire length from the origins to the insertions. This helps explain the shape

of the muscle and why it’s difficult to target the inner versus outer regions.

As I will make clear in the forthcoming chapters, I recommend performing a variety of exercises to ensure maximal development. But what is important to understand here is that you can target the upper, lower, and both the upper and lower with specific exercises.

SCIENCE SPEAK: MUSCLE SIZE

Untrained humans range from around 200 to 1,000 cm3 in

gluteus maximus volume, a five-fold difference—and that’s without training! With training, research shows that there are large discrepancies in the ways individuals respond

physiologically. Much of this has to do with the way people’s satellite cells behave. Satellite cells are muscle stem cells that surround the muscles’ cells and lend their nuclei when it senses the muscles need it, which are the three primary mechanisms of hypertrophy. Think of satellite cells as a backup system signaling that the muscle needs to grow.

Furthermore, skeletal anatomy and body fat levels profoundly impact the look of the glutes, both of which are highly influenced by genetics.

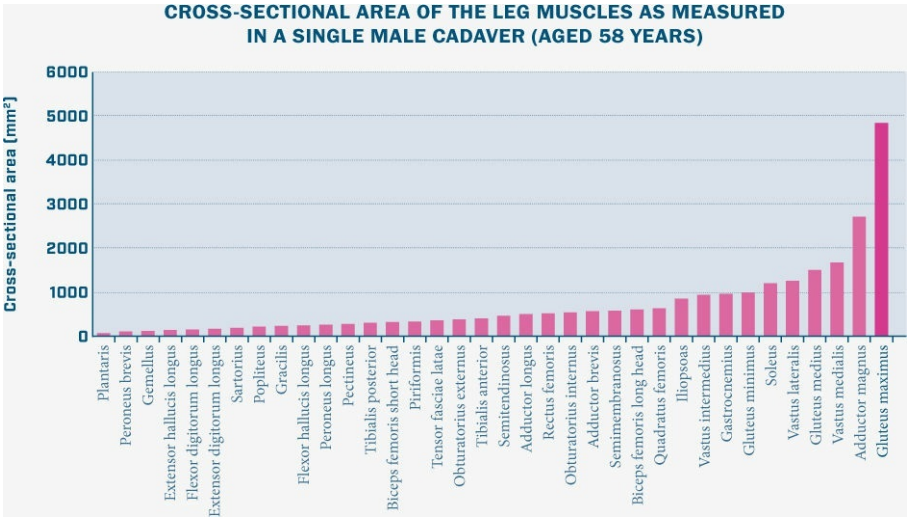
There are several ways to measure the size of a muscle, including anatomical cross-sectional area (CSA), muscle thickness, volume, and even weight. By any measure, the glutes are the largest muscle in the body.

The charts below show that the glutes are the heaviest[11] and largest[12] muscles in the lower body. Indeed, the gluteus maximus is certainly the largest muscle in the body when measured by anatomical CSA, with values in cadavers

reaching 48.4 cm2 [13] and many values recorded in living subjects using magnetic resonance imaging (MRI) or

computed tomography (CT) scans reaching as high as 58.3

cm2. [14, 15, 16, 17], [18], [19], [20]



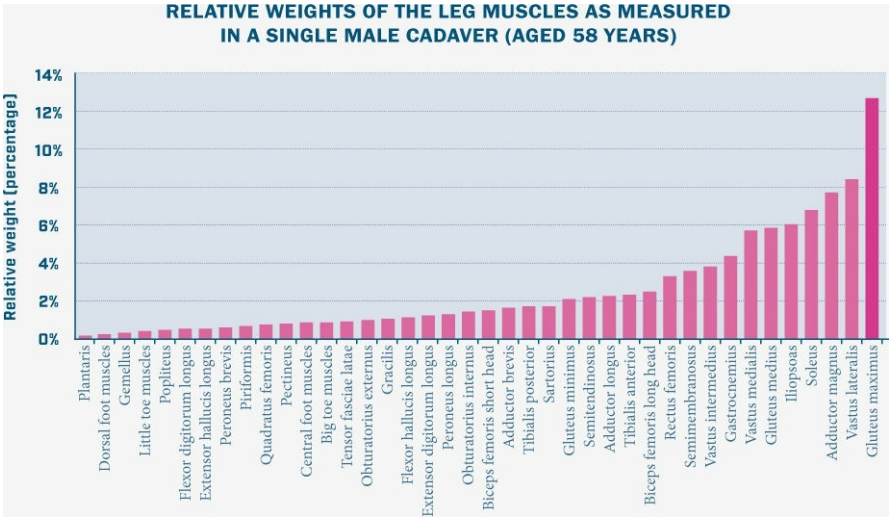
When comparing gluteus maximus muscle volume between

males and females, it’s interesting to note that the relative measures are similar (as a proportion of total hip muscle volume), but the absolute measures are very different, with the whole muscle being 27 percent larger in males than in

females. [21]

Across different sports, female athletes show different levels of gluteal development. [22] Those taking part in high-impact sports (volleyball players and high-jumpers), odd impact sports (soccer and squash players), and high-force sports

(powerlifters) all tend to show much larger glute size than those taking part in repetitive impact sports (endurance runners) and repetitive non-impact sports (swimmers). Overall, those pursing odd impact sports had the greatest glute size, which may suggest that variety of loading types is one key to successful gluteus maximus development.



Gluteus Maximus Origin and Insertions

The function of a muscle can be partly figured out by looking at the attachment points, which are called the origins and insertions. The origins and insertions are where the muscle and its associated tendons attach to the bones of the skeleton. The origin is closer to the center of the body, while the insertion is more distant from the center of the body. When the muscle contracts, it pulls the origin and the insertion points closer together.

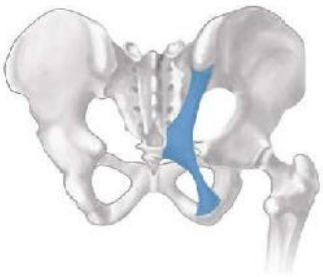
As the image on here illustrates, the gluteus maximus runs diagonally downward from the rear of the pelvis to meet the femur and the iliotibial band (ITB). This diagonal direction of the muscle fibers—as you will learn more about in the next chapter—has important implications for exactly how the glutes function.

Interestingly, only around 20 percent of the gluteal fibers attach to bone; the remaining 80 percent attach to fascia (connective tissue). The gluteus maximus connects to the coccyx, sacrum, pelvis, femur, iliotibial band, pelvic floor muscles, thoracolumbar fascia, erector spinae, gluteus medius, and sacrotuberous ligament.

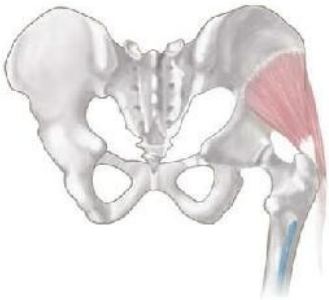
SACRUM

ILIUM

THORACOLUMBAR FASCIA

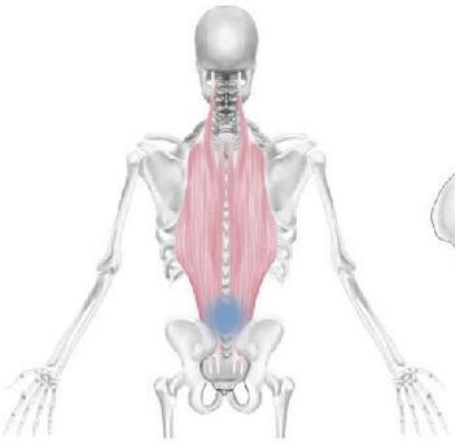


SACROTUBERUS LIGAMENT



GLUTEAL TUBEROSITY

ILIOTIBIAL TRACT



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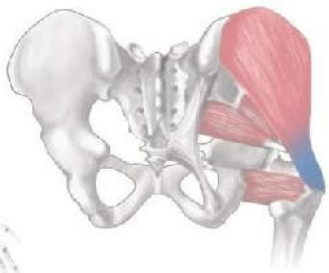
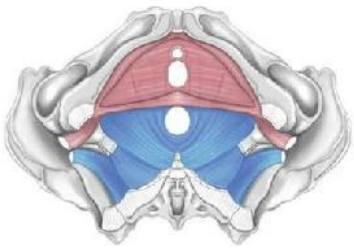
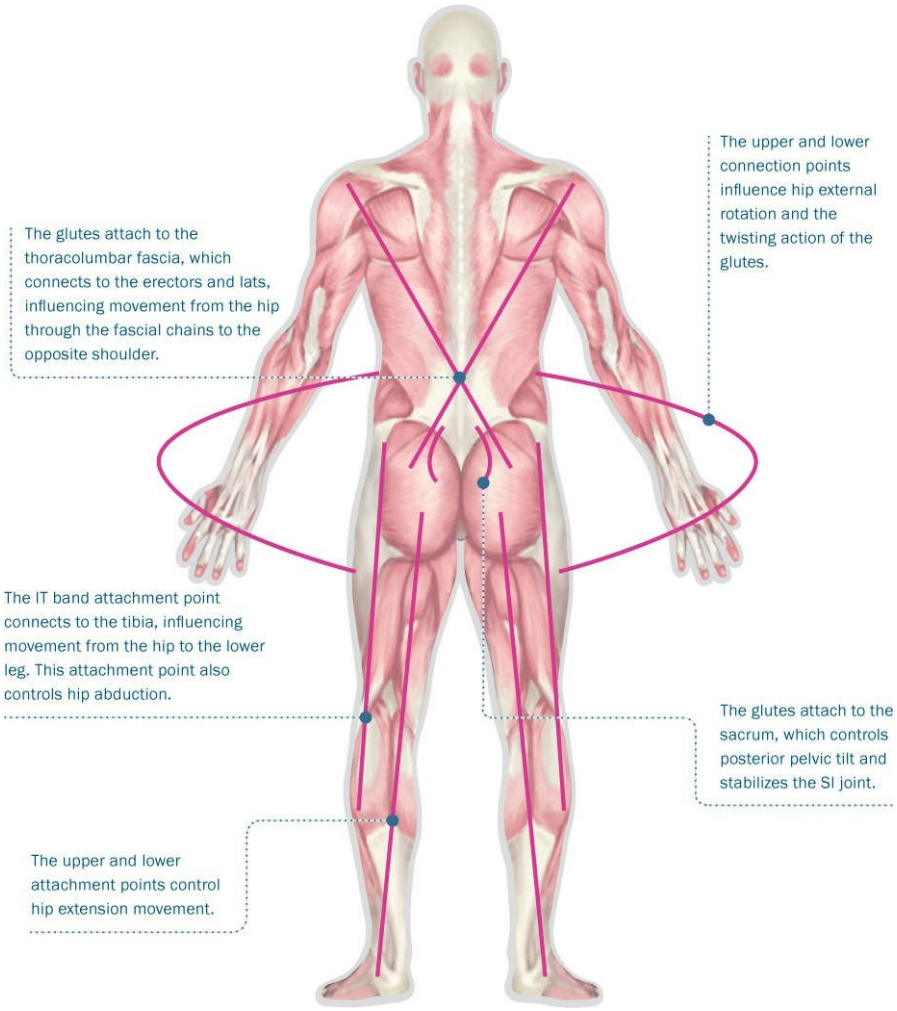


GLUTEUS MEDIUS



PELVIC FLOOR

From this list, it becomes apparent that the gluteus maximus is one of the most important muscles in the human body due to its vast attachments. For example, it connects to the humerus (the long bone in the upper arm) via the latissimus dorsi (lat) muscle through the thoracolumbar fascia, and it connects to the tibia (shin bone) via the iliotibial band, thereby influencing movement and transferring force throughout the entire body. What's more, these attachment points allow for hip extension, hip abduction, and hip external rotation, all of which are expressed in the movements of daily life.



Again, you will learn more about the function of the glutes in the next chapter—more specifically, the role of hip extension, hip abduction, and hip external rotation. For now, it's important to understand that these attachment points allow for a wide range of movements, from daily actions like squatting, bending over, standing upright, and walking to explosive movements like

sprinting, jumping, and rotating.

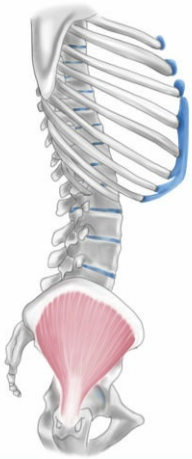
GLUTEUS MEDIUS

The gluteus medius (or glute med) and gluteus minimus (or glute min) are commonly referred to as the small gluteal muscles and often are lumped into the same category when describing anatomy and function. The gluteus medius is located near or slightly above the hip joint, forms the middle layer of the glutes, and completely covers the gluteus minimus muscle. The glute med provides some shape to the upper butt region, but it's hard to isolate the muscle with specific exercises because it shares responsibilities with the upper subdivision of the glute max as well as the glute min.

Nonetheless, you'll hear a lot of trainers say, "You should do lateral band training to target your gluteus medius." The problem with this statement is that it's nearly impossible to know which subdivisions of which gluteal muscles you're working during a movement, especially when the hips move away from neutral in terms of flexion (bending your hips or lifting your leg), abduction (moving your leg away from your body), and rotation. In all likelihood, you're working all of them to a certain degree.

There are three subdivisions of the gluteus medius: the anterior, middle, and posterior regions. Each plays slightly different roles during functional movement. When you perform lateral band walks, you're working the gluteus medius, but you're also targeting the upper subdivision of the gluteus maximus and the gluteus minimus. Again, this is why I refer to the gluteal muscles collectively as the glutes and often distinguish only the upper and lower regions of the glute max.

LATERAL BAND WALK

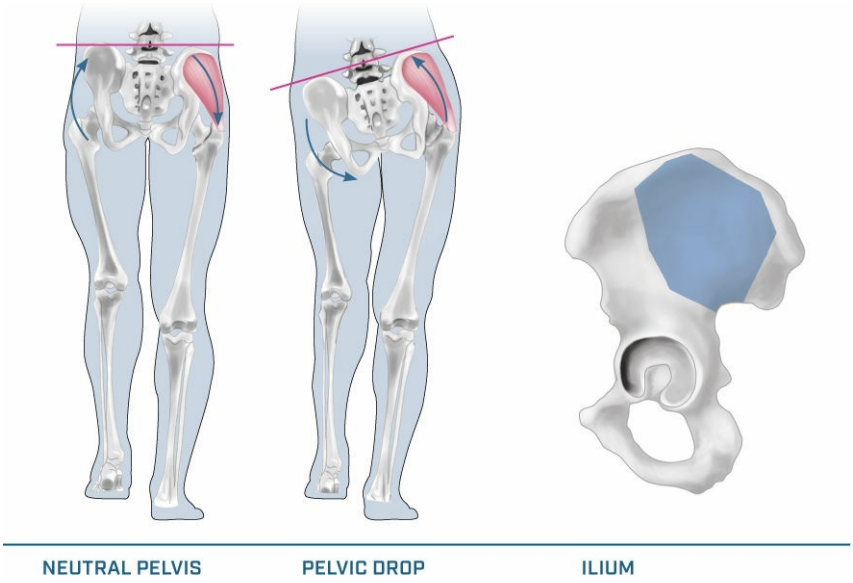


GLUTEUS MEDIUS

Gluteus Medius Origin and Insertion

The glute med originates on the ilium and inserts (with the gluteus minimus) at the greater trochanter of the femur. This connection serves as a primary stabilizer for your

hip when you're balancing on one leg or walking and running. If your gluteus medius is deconditioned or weak, then your pelvis won't be as stable, and you will have more knee valgus—more specifically, one side of your pelvis will drop, and your knee will cave inward. Physical therapists home in on this muscle because when the pelvis drops to one side or another, it can create knee, hip, and lower back issues.



GLUTEUS MINIMUS

The gluteus minimus, the smallest of the gluteal muscles, is located under the gluteus medius. As I just mentioned, the glute min often is lumped into the same category as the gluteus medius because it shares the same origin and insertion points and performs similar movements. However, they are different muscles with slightly different functions. As is the case with the gluteus medius, there are three subdivisions of the gluteus minimus—the anterior, middle, and posterior regions—and each plays a unique role during functional movement. As you can see, the gluteus minimus originates on the ilium below the gluteus medius and inserts at the greater trochanter of the femur. Like the gluteus medius, this connection provides stability for your hips.

MUSCLE ARCHITECTURE

Just as your skeletal anatomy influences your appearance, form, and exercise selection, your unique muscle architecture or the physical organization of your muscles can play a huge role.

It should come as no surprise that we all have unique muscle architecture.

Unlike your skeletal anatomy, you can change your muscle architecture through training, but those changes may or may not be visually noticeable.

For example, increasing fascicle length or pennation angle (the length of the muscle itself) won't make your glutes look much different, but it will improve how the muscle functions, because when you increase the fascicle length, you essentially have a longer muscle, which translates to more rapid force production (more on this in the sidebar below), and when you increase the pennation angle, you have greater force production capabilities.

I think it goes without saying, though I'm going to say it anyway, that there is much more to your gluteal anatomy than what is covered in this chapter. My intention is to include only the essential information pertaining to glute anatomy and appearance.

In subsequent chapters, I tie in more anatomy, such as muscle fiber

composition, the roles of the glutes, the mechanisms for increasing muscle size, and why performing a variety of exercises is essential to maximizing glute gains.

SCIENCE SPEAK: MUSCLE ARCHITECTURE

Muscle architecture refers to the way in which the muscle fibers are arranged within the overall muscle. 23 It is made up of three main factors: the length of the muscle fascicles (groups of muscle fibers), the fascicle angle (also called the pennation angle), and the cross-sectional area (CSA) relative to the direction of the muscle fascicles (called the physiological CSA).

Most muscles in the body are either long and thin, with long muscle fascicles (bundle of skeletal muscle fibers), low fascicle angles, and small physiological CSA; or short and fat, with short muscle fascicles, high fascicle angles, and large physiological CSA. Long and thin muscles are well suited for producing low levels of force at high speeds through large ranges of motion (ROM). Short and fat muscles are better suited for exerting high levels of force at low speed through small ranges of motion.

The gluteus maximus has unusual muscle architecture,

displaying aspects of both broad types of muscle. It has a large fascicle angle, a large physiological CSA, and long muscle fascicles. So it seems to function both to produce high levels of force at low speed through small ranges of motion, as well as to produce lower levels of force at high speeds through large ranges of motion. 24, 25, 26, 27

Scientists analyze various aspects of muscles that determine their size, shape, and characteristics. These unique

architectural characteristics help explain why some people are well suited for a particular sport or activity. For example, muscles with longer fibers shorten faster and lend themselves well to explosive actions such as sprinting or jumping, whereas muscles with high levels of physiological CSA produce high levels of force, which lends itself well to high-force actions such as strongman or powerlifting. Again, this points to a variety of loading types as one key to successful glute development.

CHAPTER

6

Function of the Glutes

The glutes are a true Swiss Army knife of a muscle equipped to handle a wide range of actions—from daily movements like walking, standing up from a chair, picking

something up off the ground, and carrying groceries to sporting motions like running, cutting, lifting, jumping, throwing, and striking. And whether you're balancing on one foot, lifting heavy, moving explosively, or carrying out an endurance effort, your glutes are well suited to handle every task.

When you examine the anatomy of the glutes—the attachment points and the fact that they link the upper and lower body together—you can start connecting the dots between the muscle structure and the wide range of movements the glutes control. Just as understanding the anatomy of your glutes helps explain their appearance and can inform your exercise selection and program design, knowing the roles of your glutes—that is, the movements they produce—can help you develop a training strategy that caters to your goals.

But what exactly do the glutes do? We know that they control a wide range of actions, but how do we know these things, and what specific motions are we talking about?

This chapter contains the answers to those questions. But before I get into the specific joint actions, which refers to the motions of the joint, I want to clarify a commonly misunderstood idea.

You might be thinking that each gluteal muscle has a specific role when it comes to moving your body, and you're most certainly right, but we don't know exactly what those roles are. For example, you will hear people say that the gluteus maximus is responsible for hip extension (standing up from a squat) and the gluteus medius and minimus are responsible for hip abduction (moving your leg laterally away from your body) and some hip external

rotation (rotating your thigh outward). While this might be partly true, we don't know the exact role of each muscle from every joint angle. I'm the Glute Guy, and I don't even know.

There are a couple of reasons for this. For one, there are subdivisions for each muscle. The gluteus maximus, as you learned in the previous chapter, can be broken into two subdivisions: upper and lower. You can also subdivide or characterize them as surface and deep muscle fibers, which have different functions. With the gluteus medius and minimus, you have three subdivisions

—the anterior, middle, and posterior—which, again, do different things, meaning that the anterior fibers are performing different actions than the posterior fibers.

Two, the gluteal muscles perform different actions depending on your hip and foot position. For example, from an upright standing position, your gluteus medius is responsible for moving your leg outward, but when you squat (flex your hips), the role of the muscle changes. Instead of producing outward movement (driving your knees out), it creates inward movement (pulling your knees in). Stated differently, your gluteus medius controls external rotation when your hips are in extension and internal rotation when your hips are in flexion. It's hard to determine the exact role of each muscle because the role changes depending on the movement, range of motion, and joint angle.

I can confidently say that from an upright anatomical position, the gluteus maximus is responsible for hip abduction, hip external rotation, and hip extension and the gluteus medius and gluteus minimus are responsible for hip abduction. But we're rarely in an upright standing (anatomical) position when we're in motion. For this reason, I don't program exercises to target each specific gluteal muscle, but rather select exercises that target either the upper or lower subdivision of the glute max.

*

JOINT ACTIONS

Although we have more to learn about the exact function of each gluteal muscle, we can confidently say that the glutes perform three primary joint actions: hip extension, hip external rotation, and hip abduction.

Even though most of the movements we perform involve a combination of these joint actions, understanding the role your glutes play in facilitating these actions will improve your comprehension of how your glutes function and why it's so important to train them using the methods and techniques provided in this book. Let's start with one of the most important joint actions of the human body: hip extension.

In many of the fundamental hip joint actions (including hip extension and hip external rotation),1, 2 the glutes are the prime movers, meaning that they are responsible for creating

movement. This shows that the gluteus maximus muscle is not merely a conveniently placed synergist (helps with movement), but rather an essential player.

HIP EXTENSION

KICKBACK QUADRUPED HIP EXTENSION

Hip extension is when you extend or open your hip joint, as in hip thrusting, standing out of a squat, or raising your torso from a deadlift.

You can also extend your hip by moving your leg behind your body, such as in a kickback or quadruped hip extension.

As you can see from the examples, you can perform hip extension movements while standing, while horizontal with your body facing downward (prone or quadruped position), or while horizontal with your

HIP EXTENSION

body facing upward (supine position).

Maximum glute activation occurs at end-range hip extension. This implies that exercises that emphasize end-range hip extension in our programs, specifically hip thrusts and glute bridges, should always be included. (But depending on your position and the movement you're performing, your glutes will activate and develop to varying degrees. For example, when you perform a cable kickback or quadruped hip extension, you get a short but high spike in glute activation. When you squat, peak glute activation is reached when the glutes lengthen and stretch, which works the muscle differently compared to hip thrusts and other glute-dominant exercises. I'll talk more about glute activation and how each movement pattern influences glute strength and growth in the coming chapters. For now, you just need to understand that position, vector (line of resistance), and movement patterns influence the degree of glute activation even though they all involve the hip extension joint action.

There's one more thing worth noting about hip extension: it is the same as tilting your pelvis backward, known as posterior pelvic tilt. This may seem confusing because hip extension and posterior pelvic tilt appear different

POSTERIOR PELVIC TILT

NEUTRAL SPINAL POSITION POSTERIOR PELVIC TILT

when you look at the physical motion of the hips. But when you look at what's happening inside the hip joints, it's the same motion in that the femurs move rearward, or away from the fronts of the hip sockets.

In short, your glutes also control posterior pelvic tilting, and you can use this knowledge to achieve higher levels of glute activation. In other words, the majority of people feel their glutes more when they posterior pelvic tilt while hip thrusting.

SCIENCE SPEAK: HIP EXTENSION AND

POSTERIOR PELVIC TILT

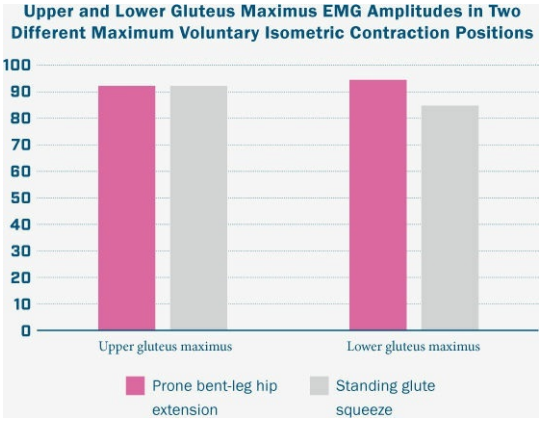
We know that the glutes are a primary hip extensor from gross anatomy, muscle moment arms, and EMG. Gross anatomy is

only broadly reliable as a way of assessing muscle function, as it is hard to identify the exact positions of the muscle in different joint positions when looking at a cadaver. Muscle moment arms (perpendicular distance between the line of force and axis of rotation) are a better way of determining muscle function, but only EMG can tell us how involved a muscle is in a joint action involving multiple muscles and supportive tension from passive structures.

Nevertheless, the origins of the gluteus maximus fibers on the rear of the spine and pelvis and its insertions on the femur[3]

show us that this muscle is well placed to perform hip

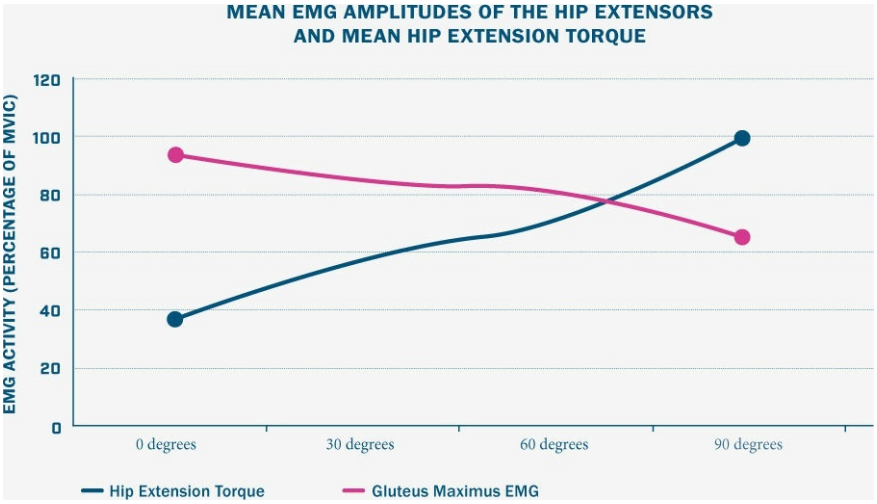
extension. Also, looking at the muscle moment arm lengths tells us that the glutes are effective hip extensors, just like the hamstrings and adductor magnus. 4, 5, 6



Finally, EMG confirms what we can deduce from basic

anatomy and from calculating muscle moment arm lengths, as maximum activation of the gluteus maximus can be achieved during isometric hip extension contractions. Hip flexion angle, though, is likely the biggest factor, with very high activation of the upper and lower regions of the glutes occurring in a position of full hip extension, irrespective of whether prone isometric hip extension or simple squeezing of the muscle in a standing position is performed.7

This may be why some research has found that the glutes are more active during a bodyweight quadruped hip extension (which has a peak contraction in full hip extension) than during a loaded barbell squat (which has a peak contraction in hip flexion). 8 Alternatively, this may be because combining hip and knee extension seems to emphasize the knee muscles more and the hip muscles less.9



This important finding about gluteal activation in hip extension movements was made nearly 50 years ago. It was discovered that gluteus maximus activation was substantially higher in full hip extension (the anatomical position) compared to in greater degrees of hip flexion, when exerting force to produce hip extension. 10 This was confirmed 30 years later in a more detailed experiment in which a number of joint angles were tested.11

These findings show us that the glutes are more active in producing hip extension when contracted (at short lengths) than when stretched (at long lengths). This can also be observed when producing forceful hip extension in positions of greater hip abduction,12, 13 posterior pelvic tilt, 14 and hip external rotation.15

This study showed that gluteus maximus activation actually increased from 64 percent of maximum voluntary isometric contraction (MVIC) levels at 90 degrees of hip flexion to 94

percent of MVIC levels when measured in full hip extension.

It also showed that the hips are stronger in extension when in a flexed position compared to neutral.

From a training perspective, we can use this information wisely during many different exercises. Performing glute bridges and hip thrusts with a wider stance, or while resisting an elastic resistance band placed around the knees, can enhance gluteal activation.

Finally, we know that making it harder for the hamstrings to produce force by flexing the knees and contracting them below their optimal length also increases gluteus maximus

activation.16 This is called creating “active insufficiency” of the hamstrings.

Again, we can use this information to help us predict which exercises are likely to be best for the glutes. Exercises that involve straight legs are almost certainly going to have more hamstring and slightly less glute involvement than exercises performed with bent legs. In other words, bent-leg hip

extension movements like the hip thrust and glute bridge variations involve more glutes because hamstring activation is decreased. (You will learn more about this in Chapter 10.) So, even though back extensions are a great exercise for the glutes,17 they do not involve quite as much glute activation as hip extension exercises with the knee flexed, which is such an effective position that it is used for the MVIC position during EMG testing. 18

POSTERIOR PELVIC TILT

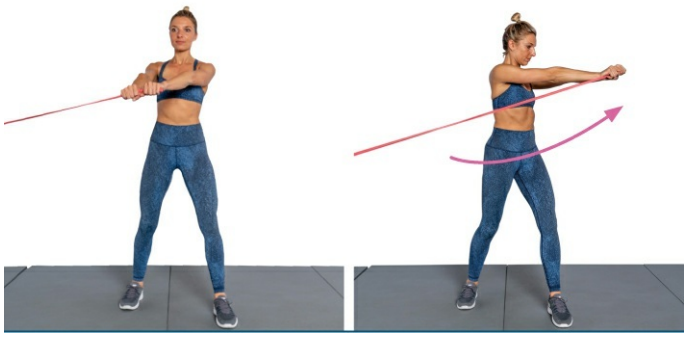
We know that the glutes can produce posterior pelvic tilt from gross anatomy and EMG. Gross anatomy is only broadly reliable as a way of assessing muscle function, as it is difficult to identify the exact positions of the muscle when in different joint positions from a cadaver. Even so, the clear origins of the gluteus maximus fibers on the rear of the spine and pelvis, and its insertions on the femur138 show us that this muscle can easily posteriorly rotate the pelvis. Indeed, this should also be obvious because of the role that the glutes play as a key element of the pair of force couples that cross the pelvis, connecting the trunk and legs.139

EMG studies have confirmed what these basic anatomical investigations suggest. Performing posterior pelvic tilt when doing a hip extension action in a quadruped position increases gluteus maximus activation above the same hip extension action in anterior pelvic tilt.140 Similarly, simply standing on a vibrating platform in posterior pelvic tilt leads to greater gluteus maximus activation than standing on the same platform in the same position but in either neutral or anterior pelvic tilt.141

HIP EXTERNAL ROTATION

Hip external rotation occurs when you turn your knee outward or rotate your thigh away from your midline. Hip external rotation also creates hip and full-body rotation. For example, if you rotate your hips with your feet planted as you would when performing a hip external rotation exercise or when throwing a punch or swinging a baseball bat, your glutes work in concert with other muscles to produce that motion.

BAND HIP EXTERNAL ROTATION



STANDING GLUTE SQUEEZE

Hip external rotation helps stabilize your pelvis, knees, and ankles during a myriad of movements, especially double- and single-leg squat patterns and glute bridge and hip thrust patterns. To feel how your glutes control external rotation, simply stand in an upright position with your feet oriented straight and then squeeze your glutes. You'll notice that your pelvis rotates and spins your legs outward, causing you to feel outward pressure in your planted feet.

But external rotation often happens in conjunction with abduction. I'll use squatting to illustrate how this works. The three most common faults when

HYPEREXTENSION FAULT KNEE VALGUS FAULT BUTT WINK FAULT

NEUTRAL BACK KNEES OUT NEUTRAL PELVIS

squatting, which I cover in more detail in the Squat section beginning on

here, are excessively hyperextending your back in the top position, allowing your knees to collapse inward (knee valgus), and excessively posterior pelvic tilting in the bottom position (butt wink).

By rotating your thighs outward (hip external rotation) and pushing your knees out (hip abduction), you stabilize the joints of your lower body, thereby preventing knee caving and even reducing posterior pelvic tilt.

Some coaches cue athletes to screw their feet into the ground to create external rotation stability, but I don't think this is necessary. It might help you activate your glutes, so if it works for you, then by all means do it. But in my experience, simply turning the legs outward as soon as the descent begins and pushing the knees out when they are bent does the trick.

SCIENCE SPEAK: HIP EXTERNAL ROTATION

We know that the glutes are the most important hip external rotator19 from gross anatomy, muscle moment arms, and EMG. Since the insertion point of the gluteus maximus is on the lateral surface of the greater trochanter of the femur, 20, 21

as the fibers of the muscle shorten, they naturally rotate the femur laterally in the hip socket. Indeed, this role as an external rotator may be as important as the role in performing hip extension. Based on logical assumptions about the

anatomical line of pull of the gluteus maximus muscle, the authors of the study calculated that 71 percent of the

maximum muscle force could be employed to perform external rotation.

Furthermore, careful assessment of muscle moment arm

lengths reveals that the hip external rotation arm length of the gluteus maximus is substantial and is probably only shorter than that of the posterior fibers of the gluteus medius (which is quite a small region with little ability to produce force) and of the deep external rotators (also small and weak muscles). 22, 23

Finally, EMG confirms these findings, as several common hip external rotation exercises produce levels of muscle activation that are moderate or high, albeit not in excess of MVIC

levels. 24 I have tested the band hip external rotation exercise and found that it generates extremely high levels of gluteus maximus EMG activity in the rear glute, indicating that the glute max is well suited for rotating the hip outward.

HIP ABDUCTION

Hip abduction occurs when you move your leg laterally away from your body,

FIRE HYDRANT

LATERAL BAND WALK

as in a fire hydrant or lateral band walk.

The majority of hip abduction exercises predominantly target the upper glute region. But your position determines the degree of upper to lower glute activation. For example, lateral band walks and standing cable hip abduction, which are considered “frontal plane” hip abduction exercises and are performed with a neutral hip position, highly activate your upper glutes, whereas seated hip abduction and fire hydrant exercises, which also involve hip external rotation and are considered “transverse plane” hip abduction exercises because they are performed with a flexed hip position, activate both the upper and lower glute regions.

Abduction—as I just covered—also helps stabilize your back, hips, knees,

TRIPLE-BANDED BARBELL HIP THRUST

and ankles in a myriad of movements. The most common examples are preventing pelvic lateral drop when walking (during gait) and driving your knees out when you squat or sumo deadlift. In addition to increasing glute activation, you’re creating tension in the system, which prevents potentially harmful positions. Again, I cover these faults and corrections in more detail in the Squat section.

VARIETY IS ESSENTIAL

Your glutes are unique in that you can challenge the muscle in all three joint actions simultaneously. For example, when you perform a knee-banded barbell hip thrust, you’re performing a combination of hip extension, hip external rotation, and hip abduction. This not only maximizes glute activation but also targets the upper and lower gluteal subdivisions.

While the upper and lower glutes highly activate in most movements that involve hip extension, hip external rotation, and hip abduction, only the upper glutes activate during certain movements and positions, and the lower glutes activate much more than the upper glutes during certain movements and positions. This is due to the incredible number of attachment points on

the skeleton, unique muscle architecture, and multiple subregions within the muscle. When you consider these facts, it becomes clear that optimal glute training requires a great deal of exercise and training variety.

In Chapter 10 and Part 5, you will learn how to choose exercises based on the area and muscle you want to target. The point I want to hammer here—

and a point that I reiterate throughout the book—is that performing a variety of movements is crucial for fully developing the glutes. The next chapter looks at the role of genetics as it pertains to glute development, and then I’ll home in on specific strategies for building bigger, leaner, stronger glutes.

CHAPTER

7

The Role of Genetics

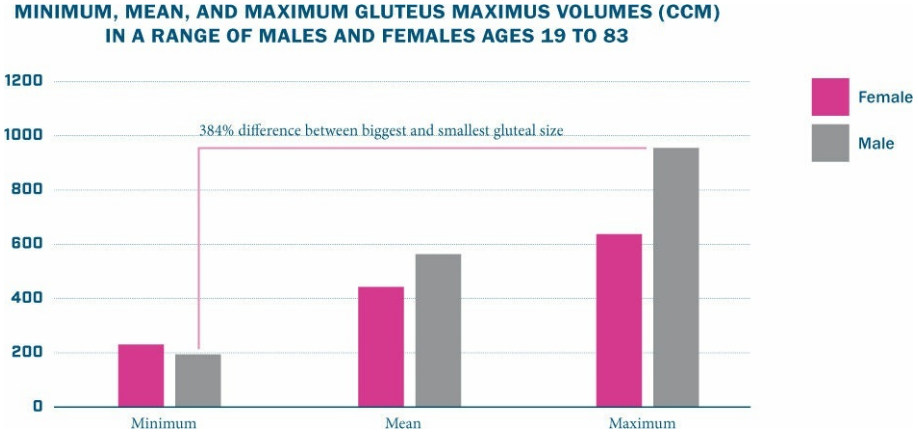
One of my greatest joys in life is helping people achieve their strength and physique goals. Nothing makes me happier than receiving testimonials showcasing the incredible physique changes credited to glute training, or helping a client lose weight and watching their confidence soar as they hit new personal records in the gym. Not only is it a testament to sound training strategies, but it also shows that hard work and consistency pay off.

In the following chapters, you will learn evidence-based principles for growing muscle and improving strength so that you can achieve similar results to my clients and the hardworking people following my training system. Of course, your rate of progress—like everything in fitness—depends on many factors (most of which are covered in this book). And the one factor that is rarely discussed is genetics.

There’s no getting around it: genetics is one of the most important variables when it comes to improving strength and building muscle. We’ve already seen how your skeletal anatomy affects how your glutes look as well as how you move. It turns out that how you respond to resistance training is also partially determined by what your parents passed on to you. I wish I could lie and tell you that genetics don’t matter, but the reality is, the way your glutes look before and after glute training will depend largely on your individual genetics.

GENETIC DIFFERENCES

You’ve heard it before, and certainly it’s true: everyone is different, and genetics help explain those differences. As I’ve said, glutes come in all shapes



and sizes. Some people are naturally stronger and more muscular than others.

Consider the following outliers, for example. World record–setting powerlifter Andy Bolton squatted 500 pounds and deadlifted 600 pounds the first time he tried those exercises. Professional bodybuilder and six-time Mr.

Olympia Dorian Yates bench-pressed 315 pounds on his first attempt as a teen. Arnold Schwarzenegger looked more muscular after a single year of lifting than most people do after ten.

The same certainly holds true for the glutes. One study found that in a sample of the general population, muscle volume varied from 198 to 958 ccm in men and from 238 to 638 ccm in women! So one man had glutes that were 384 percent larger than another man's glutes.

In addition to large differences in baseline levels of strength and size, there are big differences in how people respond to training. One study assessed how 585 untrained subjects responded to 12 weeks of strength training. The exact same program resulted in a shockingly wide range of responses. Those who responded the worst actually lost 2 percent of their muscle size and didn't gain any strength. In contrast, those who responded the best increased their muscle size by 59 percent and their strength by 250 percent. Another trial found that 26 percent of subjects failed to achieve any increase in muscle size after 16 weeks of strength training.

Although these findings highlight the unquestionable role of genetics and

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the differences among individuals, it's important to realize that the training programs used in the research studies didn't allow for individual variation.

Everyone used the same program, with the same sets, reps, frequency, and exercises. They didn't involve any experimentation, tweaking, or autoregulatory training (adjusting your training based on how you feel, also referred to as biofeedback). So, before you label yourself as someone who has poor glute-building genetics, consider the fact that the program you are following might not be well suited to your individual needs.

For instance, a lot of people follow a coach's program because they want to look like the coach does. Social media has turned women with nice butts into glute trainers overnight because they know people will buy their programs in hopes of building a similar physique by working out the same way. While it may work for a select few, it's not a comprehensive strategy.

And the last thing I want is for you to follow a program and then give up on training because you're not getting the results you were promised.

What's more, it is nearly impossible to determine whether someone has the genetics for building muscle and strength without a ton of time and experimentation. Of course, there are outliers, like the aforementioned examples who make any normal person look like a weakling their first day in the gym, and some people can practically glance at a barbell and put on muscle. But most of us respond well; you just need to find the programs and exercises that cater to your goals and unique physical traits.

CONTINUED EDUCATION: INDIVIDUAL DIFFERENCES

Research reports averages, which is not exactly accurate because many of us don't fall into the average category. In short, we all react differently to various training stimuli, and there are huge individual differences from one person to the next, which you can learn more about in this article:

bretcontreras.com/individual-differences-important-

consideration-fitness-results-science-doesnt-tell/

Although we haven't identified all of the muscle-building genes, we do know that some people have the genetics for building muscle all over their bodies, some have the genetics for building muscle in specific areas, and some have genetics that don't allow them to do either. I have great chest-building genetics, but I can't grow my quads to save my life. You can have great genetics for one muscle and poor genetics for another.

It's also important to acknowledge the genetics of how you look without training and the genetics of how you look after training. For example, just because someone starts with no glutes doesn't mean that they don't have the genetics to develop strong, shapely glutes. You might be a skinny twig without training, but once you start lifting weights, you will put on muscle and look jacked. The point is that your starting point is not reflective of your end point. You can't just train for three months and say, "I don't have the genetics to put on muscle." Sure, your rate of progress is partially determined by your genetics, but smart training, patience, and consistency will always produce results over a long enough period.

And there's more: some individuals respond very well to strength training, some barely respond, and some don't respond at all. It took me years of hard training and experimentation to figure out how to grow my glutes. If you're someone who, like me, has poor glute-building genetics, don't get discouraged. It's not all doom and gloom. You might not have the biggest glutes, but if you respond well to resistance training, you will build glutes fast.

Conversely, you might have small glutes and have a hard time building muscle, but you'll be lean and strong as hell.

YOU CAN'T CONTROL YOUR GENETICS, BUT YOU

CAN CONTROL YOUR MINDSET

Although you can't control your genetics, a lot of variables dictate your ability to improve strength and build muscle that are within your control. Regardless of where you fall on the muscle-building genetic spectrum, it's important to

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focus your attention on the variables you can regulate, such as sleep, eating habits, exercise selection, and training frequency. Some people respond best to variety, some to certain exercises, some to volume, some to effort, and some to frequency. You have to discover the best stimulus for your body, and that takes not only constant experimentation but also rationally considering your genetics and how that might affect your training strategies.

I wish I could provide a specific training protocol based on your unique genetic profile, but we're not there yet. There will come a day when you can get a genetic test that will tell you exactly what you should eat, how long you should sleep, and how you should train based on your genetic makeup. If you knew, for example, that you respond better to one of the three muscle-growing mechanisms covered in the next chapter, then you could more accurately determine the best exercises to perform. But we're still pretty far from that. Until we know more, it will remain more of an art than an exact science.

The fact is, everyone has genetics that they have to work around. Some people carry excess fat all over, while others are lean but have stubborn areas of fat (think stomach and hips). Some people have a hard time building muscle but are strong, while others can build muscle but have weak body parts. And then some of us have a combination of issues.

My list of genetic curses is a mile long, but I've managed to train my way to some decent glutes. Are they the biggest and strongest glutes? No. In fact, most people who see me would say, "That's the Glute Guy? He has mediocre glutes!" But if you looked at my starting point, you would see a big difference, and you might be impressed. Granted, it took me many years of hard work, but I've come a long way. And you can, too.

CONTINUED EDUCATION: BODYBUILDING GENETICS

Some people experience far greater results than others.

Although training and diet have a huge impact on people's

ability to put on muscle, the rate at which they progress is largely determined by their genetics, which I cover in more detail in this

article: www.t-nation.com/training/truth-about-bodybuilding-

genetics

In fact, I've yet to see a lifter who trains intelligently—meaning that they train consistently and experiment to find what works best for them—fail to see results. Of course, the rate and extent of the overall growth are highly influenced by genetics, but sound training methods will always produce good results. That is, you will probably lose fat, gain some muscular shape and density, and improve your strength. Even if you don't notice results right out of the gate, you can and will see results as long as you adopt the right mindset and remain consistent.

Remember, you can choose to train smart and work hard. You can choose to grow your knowledge to maximize your training results. You can choose to experiment to find out what works best for you. You can choose to sleep, eat, and live better. Embrace your genetics and fall in love with the training process. And praise your efforts and reward yourself for training consistently.

We all have strengths and weaknesses. The key to sustained progress and overall happiness is to be proud of your strengths and work tirelessly to round out your weaknesses.

With this understanding in mind, you will have a better idea of how you need to approach the training strategies, exercise selection, and program design variables covered later in the book. Equally important, you will be able to create goals that will improve your self-image, confidence, and resolve toward training. People don't say knowledge is power for nothing. Use the knowledge you're gaining in this book not only to empower your training, but also to improve how you think about yourself.

SCIENCE SPEAK: MECHANISMS OF GENETIC

IMPACT ON HYPERTROPHY

The results you see in the gym are highly dependent on the extent to which the satellite cells—muscle stem cells that play a role in muscle hypertrophy—surrounding your muscle fibers can fuse their nuclei into your muscle fibers. Put simply, the satellite cells produce more genetic material that signals the muscle cells to grow.

We know this because one study found that the difference between excellent responders and average/nonresponders in strength training boiled down mostly to differences in the degree of satellite cell activation.[1] Excellent responders have more satellite cells surrounding their muscle fibers as well as a greater ability to expand their satellite cell pool during periods of training, meaning it's easier for them to put on muscle.

In that study, excellent responders averaged 21 satellite cells per 100 fibers at baseline, which rose to 30 satellite cells per 100 fibers by the end of the program. This was accompanied by a 54 percent increase in mean fiber area. The

nonresponders averaged just 10 satellite cells per 100 fibers at baseline. This level did not change post-training, and they didn't experience any muscle growth. In addition to changes in satellite cells, the key hypertrophy-signaling molecules'

mechanogrowth factor (MGF), myogenin, and IGF-IEa were all upregulated to a much greater extent in responders than in nonresponders.[2]

Some people just win the genetic lottery, and the prize money is not insignificant. Some reviewers have suggested that genetic factors are responsible for 50 to 80 percent of the individual variability in muscle size[3] based on an analysis of twin studies.[4, 5, 6] That is not to say we have a perfect map of which genes are responsible for a person being an excellent responder to strength training. Rather, because methods for identifying the genes responsible for hypertrophic

responsiveness are relatively new, research is still quite limited.[7] And while some researchers have already found a

small number of different genetic traits and single nucleotide polymorphisms (SNPs) that may be related to a superior

increase in muscle mass, the extent to which these can explain the inter-individual variability in responsiveness to training is small. [8]

While some folks hit the genetic jackpot, others get the genetic shaft. Genetically speaking, anything that negatively impacts the ability of the muscle fibers to increase the number of myonuclei in response to any type of mechanical loading (lifting weights) reduces the potential for increasing muscle size and strength. This ranges from the number of signaling molecules that are produced to the sensitivity of the muscle fibers to those signals to satellite cell availability to satellite cell pool expansion to miRNA regulation.

LAST WORD ON GENETICS

As I said, it is rare for anyone who trains consistently and intelligently and experiments to find out what works for them to not look much better after a couple of months of training.

From a standing start, everyone loses fat and gains some muscular shape. So never use your genetics as a crutch not to train. Be patient and stay the course. Some of my most

incredible transformations took place over the course of several years. If you need inspiration, check out the

transformation photos on here and here or on my Instagram (@bretcontreras1).

CHAPTER

8

How Muscle Grows

When I first started bodybuilding, my goal was simple: to build bigger, stronger glutes. It took me a couple of years to realize that I needed to train my glutes in a unique way, but like most beginners, I had no idea what I was doing. Although I was listening to the advice given to me by more experienced bodybuilders, following training programs in bodybuilder magazines, and copying other people in the gym who looked jacked, my form was horrendous, and my programming was

lackluster because I omitted any exercise that felt off or was difficult to learn.

Now, you would think that I never would have gained any strength or size.

After all, my training was far from systematic. But the truth is, I got results.

This is the biggest advantage of being a beginner: the vast majority of people will gain strength and size very quickly, as long as they're consistently training hard. The good times last only so long, though. Over a long enough period, your body adapts to the training, after which point you will struggle to meet your physique and strength goals. What's more, there's an inherent risk of getting hurt when you lift with improper form or train too hard, too fast.

This is exactly what happened to me. I was getting bigger and stronger, but I was picking up bad habits. Instead of mapping out a direct path to my goals, I trained hard and then waited to correct issues until something went wrong or my progress stalled, which makes no sense. It's like waiting to get lost before checking the GPS. If you want to get to your destination faster, you need to know where you are going and pick a clear path to get there. If your goal is to develop bigger, stronger glutes, certain knowledge will help you avoid mistakes that beginners (and advanced practitioners) commonly make.

Most of us know this intuitively. The more knowledge and experience we gain, the faster we reach our goals. Yet I see so many people making the same

mistakes that I made when first starting out. It's not until their progress stalls or something goes wrong that they start looking for a map and seeking higher forms of knowledge.

My hope is that this book will serve as that map. Take it from me: training smart (that is, using science to guide your programs and workouts) is more important than training hard, though both are critical. By studying the principles and ideas outlined in this chapter, you can avoid a lot of the mistakes that I made and the majority of lifters make when they begin training. In other words, understanding how your muscles grow and the variables that contribute to muscle growth is essential if you want to reach your physique goals, and it will prevent you from getting derailed in your pursuit of muscular development.

HOW YOUR GLUTES INCREASE IN SIZE: THREE

MECHANISMS OF HYPERTROPHY

The science of growing muscle is a complex and emerging field of research.

When it comes to how muscles increase in size, we refer to it as hypertrophy (pronounced "hy-PER-tro-fee"), which is muscle growth or the enlargement of muscle fibers

(muscle cells). Another way to think of hypertrophy is as the opposite of atrophy, which is losing muscle, or the degeneration of muscle cells.

Based on what we currently know, three mechanisms are thought to cause muscle growth: mechanical tension, metabolic stress, and muscle damage.

While many experts contest muscle damage and metabolic stress, everyone agrees that mechanical tension is paramount for hypertrophy and is the most important factor by a long shot. The good news is, scientists are working to unravel the precise signals and sensors involved in muscle growth, which will allow us to focus on the exact mechanisms at play. But right now, we really don't know much about what causes muscle growth from a physiological perspective, so we take a shotgun approach—that is, we form training strategies that target all three mechanisms.

MECHANICAL TENSION

When you're lifting heavy weights, it sometimes feels like the muscle is about to rip off the bone due to the insane level of contraction and tension in the muscle. This is mechanical tension.

To better understand how this works, I need to briefly describe what I mean by tension. There are two ways to place tension on a muscle: 1. The first is passive tension, in which you place tension on a muscle by stretching it passively. Think of bending over and performing a hamstring stretch. Your hamstrings get very taut and you feel tension mounting, even though the muscle isn't activated.

2. The second is active tension, in which you place tension on a muscle by flexing or contracting it. Think about flexing your biceps as hard as you can to show off your guns. This is an example of active tension.

When you lift weights through a full range of motion, however, the muscles are placed under a combination of passive and active tension. In other words, they lengthen (eccentric phase) and shorten (concentric phase) while being activated through a full range of motion. And by "full range of motion," I'm referring to the full movement potential of your joint.

For example, say you're performing a heavy barbell back squat. Lowering your hips below your knee crease is considered a full range of motion because you're expressing a fairly complete degree of the movement potential of your hips, knees, and ankles—meaning you're fully opening (extension) and closing (flexion) the joints. And because you're performing a heavy barbell back squat, you have to contract your muscles sufficiently to raise and lower the weight, which creates a lot of tension in your muscles.

To maximize muscle growth by using the mechanical tension pathway, you must:

• Choose exercises that include both eccentric and concentric phases (see the Muscle actions sidebar on here and here for more on eccentric and concentric muscle actions)

• Move through a decent range of motion

• Create maximal activation and contraction in the muscle by lifting a lot of weight, lifting a moderate weight as many times as possible until you fail, or conscientiously contracting the muscle as hard as you can

Time under high tension is another important factor to consider. Your muscles need ample, regular signaling to grow larger, and they need enough stimulating reps to be enticed to grow. A stimulating rep is carried out slowly enough to achieve maximum tension by way of crossbridge formation at the sarcomere level. Put simply, ample time is required for the muscles to generate maximum tension. If the contraction is too fast, you won't achieve high enough levels of tension to stimulate growth at the molecular level. Even with full motor unit recruitment (motor units are groups of muscle cells that coordinate contractions of a single muscle), you can display lower levels of tension because of the rapid detachment of crossbridges that occur during activities such as jumping and sprinting. Only reps that are heavy enough—

say, above 85 to 90 percent of your one-rep max (1RM)—or reps done with lighter weight but placed at the end of a set and performed to muscle failure will meet these two criteria. In fact, a 1RM and the last rep of a set to failure (say, rep 10 of a 10RM) are carried out at the same speed.

In truth, all reps build muscle, but their muscle-building potential exists on a continuum with heavy reps and reps close to failure packing by far the most muscle-building potential. If you perform only one full-range squat with light weight, you will not stress the muscle enough to adapt and increase in size. But if you focus on the three criteria above and regularly perform ample volume to expose your muscles to enough stimulating reps, you will put enough tension on the muscles to stimulate growth.

It's also worth mentioning that lifting heavy doesn't automatically confer high levels of mechanical tension on the muscles. For example, it's possible to move a large amount of weight without generating high levels of muscle tension using leverage, the contribution of other muscles, and more. For this reason, you need to carefully select exercises that target the muscle you're trying to grow—say, hip thrusts for your glutes—and strive to maximize muscle contraction by focusing intently on the area you're trying to develop.

This is known as the mind-muscle connection, and I cover it in more detail

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later in this chapter.

Exercise Strategies for Creating Mechanical Tension

There are many ways to create mechanical tension. The most straightforward strategy is to lift heavy weight using the principles of progressive overload and the mind-muscle connection with low to medium reps (1 to 12 reps) and long rest periods between sets to allow for maximal recovery. You can also

utilize advanced training methods such as the following, which I cover in Part

3:

• Mind-muscle connection (here)

• Progressive overload (here)

• Cluster/rest-pause reps (here)

• Heavy partial reps

• Enhanced eccentrics (here)

• Pause reps (here)

• Forced reps

Here are three exercise examples of achieving high levels of mechanical tension:

Warm up thoroughly and perform heavy squats for 4 sets

of 3 reps with 85 percent of your 1RM.

Perform pause half-squats for 3 sets of 5 reps with a 3-second pause at the bottom of each rep with 60 percent

of your 1RM.

Say you're performing barbell hip thrusts with 275

pounds. This is your 6-rep max. Perform rest-pause hip

thrusts and do a set of 6 reps to failure. Then rest for 10

seconds and perform 2 more reps. Then rest for 10 more

seconds and perform 1 more rep, then rest for 10 more

seconds and perform a final rep. By the end of the set, you will have gotten 10 reps with your 6-rep max.

MUSCLE ACTIONS (TYPES OF CONTRACTION)

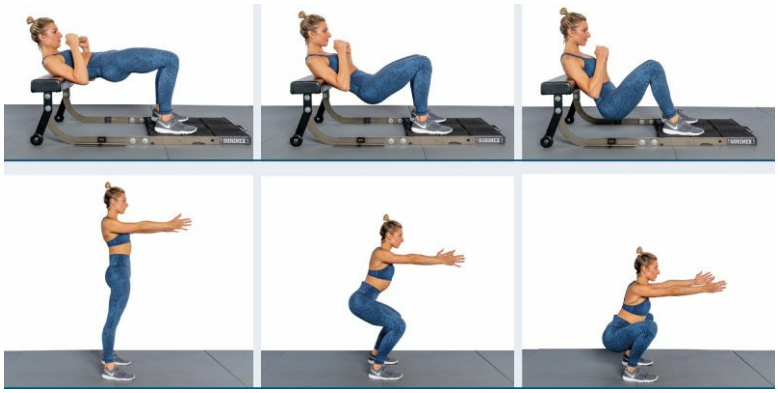
Muscle action refers to the movement of a muscle relative to the joint. For the purposes of this book, I define three main muscle actions (there are more if you want to get geeky): isometric, eccentric, and concentric.

Isometric muscle actions occur when the joint remains at the same angle. It is commonly thought that the muscle stays the same length, but this is not true. When you contract the muscle (generate force) without changing the joint angle, the muscle shortens while the tendon lengthens. For example, say you're performing a hip thrust and I tell you to hold the top position while contracting your glutes as hard as you can. This is considered an isometric contraction because the glutes

contract but the joint angle at the hips stays constant.

ISOMETRIC: HOLD THE BOTTOM OF A SQUAT OR TOP OF A

HIP THRUST



Eccentric muscle actions occur when muscles lengthen under tension. This type of action causes the most muscle damage because when a muscle contracts, it tries to shorten (pull itself together) while being stretched at the same time.

ECCENTRIC: LOWERING FROM A HIP THRUST OR SQUAT

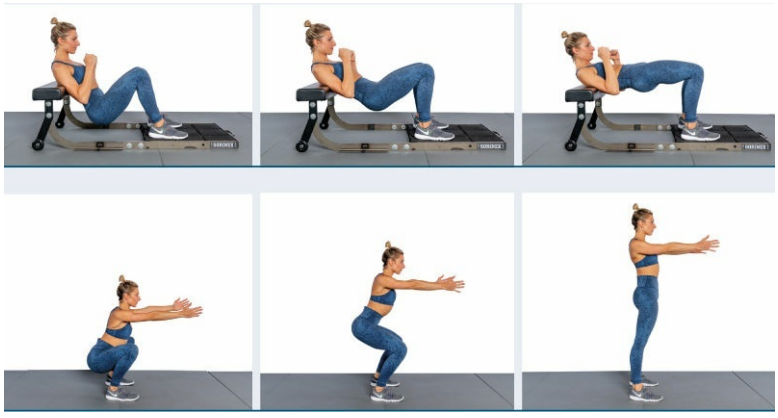
Concentric muscle actions involve the shortening of a muscle.

In this case, the muscle contraction exceeds the force

overcoming it in the other direction. For example, when you rise out of a squat or elevate your hips during a barbell hip thrust, you're creating enough muscle tension to turn your hips and knees into extension and overcome the downward force of gravity.

CONCENTRIC: EXTENDING YOUR HIPS DURING A HIP THRUST

OR STANDING UP FROM A SQUAT



METABOLIC STRESS

Think about the feeling you get when you know you're really targeting a muscle—the burning sensation you elicit and the pump (muscle swelling) you achieve. These two mechanisms fall under the umbrella of metabolic stress.

Metabolic stress is brought about by several factors, including:

• The occlusion (blockage) of veins by persistent muscle contractions, which prevents blood from escaping the muscle

• The hypoxia, or lack of oxygen supply, in the muscles due to the trapping of blood

• The buildup of metabolic by-products such as lactate and the increased hormonal surge

• The cell swelling or "pump" of the muscles, which is also due to blood pooling

These factors are thought to aid in building muscle and to be synergistic with tension and progressive overload (doing more over time). They also help explain why Kaatsu training—lifting lighter weight with higher reps while

restricting blood flow—is highly effective at inducing hypertrophy despite the lower levels of muscle tension compared to traditional resistance training.

The fatigue also drives up muscle activation, which places greater tension on the individual muscle fibers.

To clarify, the pump—also known as cell swelling—involves blood getting trapped in the muscle, causing the cells to swell. For example, when you lift weights, your arteries pump blood to the muscle, but the muscle contractions obstruct the veins, trapping and pooling the blood in the muscle.

Most of the women I train love training for the pump because they like the way it feels and how it makes their glutes look. Some of my clients get up to a 2-inch glute pump, which means that their glute girth increases by 2 full inches following a workout. Training for the pump is also good for muscle development through the mechanical tension pathway, but in a unique manner. It puts tension on the cell structure, and then your body ramps up protein synthesis, which in turn develops a bigger muscle.

The burn is also associated with metabolic stress. You feel the burn when metabolic by-products like lactate, inorganic phosphate, and hydrogen ions accumulate in the blood, causing a localized burn in the muscle. In theory, this increases muscle growth through a variety of factors; most notably, it ramps up muscle activation and increases muscle contractions. As you perform more reps and start feeling the burn, you recruit more motor units, which increases tension in the muscle. But the metabolites themselves are thought to lead to growth, which is demonstrated by the fact that people see more muscle growth if they train in hypoxic chambers. (Imagine a gym that has a lower-than-normal oxygen level, which would cause the body to generate more metabolic by-products during training.)

When describing the glute pump and burn, I usually present it as the

“burn/pump” because they are linked. But they are different, and you can have more of one than the other. For example, if I wanted the biggest glute burn, I might perform 1 set of high-rep frog pumps to failure—say, 100 reps.

But if I wanted the biggest pump, I would perform multiple sets of lower reps, like 4 sets of 50 reps. Put simply, it’s hard to get a good pump with a single set. For most people, it takes multiple sets to get good swelling in the muscle.

Scientists debate whether the pump and burn is good for hypertrophy, but I believe that it is. When you get a pump, fluid accumulates inside the cells,

and there is a corresponding outward pressure or tension on the cell membranes (sarcolemmas). The cells perceive it to be a threat to the ultrastructure (structure within the cell) and respond by growing thicker, which in turn grows muscle. But this is purely theoretical, and it’s difficult to prove or disprove because we don’t have the technology to measure it. We have research showing that cell swelling can cause hypertrophy in different tissues, like liver tissue and mammary tissue. But does it work with the muscles? Is it enough? Is the swelling intracellular and not extracellular? Is the pressure sufficient? We don’t know these things yet.

I believe that training for the pump and burn is good for muscle growth for the above-mentioned reasons, but that growth could also be due to a mechanism other than the pump and burn. It could just be that the fatigue associated with high reps and shorter rest periods drives up motor unit recruitment and slows muscle contraction speed, which allows for maximum tension in the glutes. Until we know more, I can’t say for certain that training for the pump and burn is good for hypertrophy, but I currently believe it is, which is why I recommend it in my programming.

Exercise Strategies for Creating Metabolic Stress

There are many ways to create metabolic stress. The most straightforward strategy is to perform fast, high-repetition (20 or more) sets with short rest periods in between. You can also utilize several advanced training methods, which I cover in Part 3. Here are the best methods for creating metabolic stress:

• High reps at fast speeds

• Short rest periods

• Mind-muscle connection (here)

• Using bands and chains

• Kaatsu, or blood flow restriction (BFR) training

• Constant tension (isometric hold) (here)

• Partial reps

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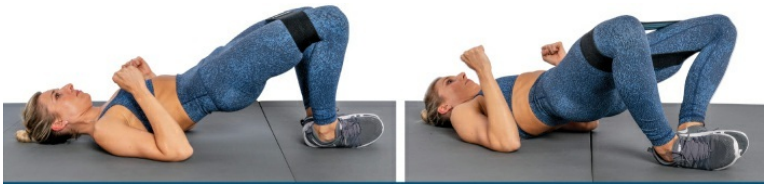

• Pyramids (here)

• Torque doubling (here)

• Dropsets (here)

• Supersets (here)

• Burnouts (here)

Here are three exercise examples of achieving high levels of metabolic stress:

Place a band around your knees and perform frog pumps

for 4 sets of 50 reps.

Place a band around your knees and perform 30 seated

hip abductions while leaning back, then do 30 more reps with an upright torso, then do 30 more reps while leaning far forward.

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Perform a hip thrust dropset by loading a barbell with one 45-pound plate and three 25-pound plates on each side.

This equates to 285 pounds. Perform 8 reps with this

load, then immediately have a spotter strip off one 25-

pound plate on each side. Without resting, perform 6

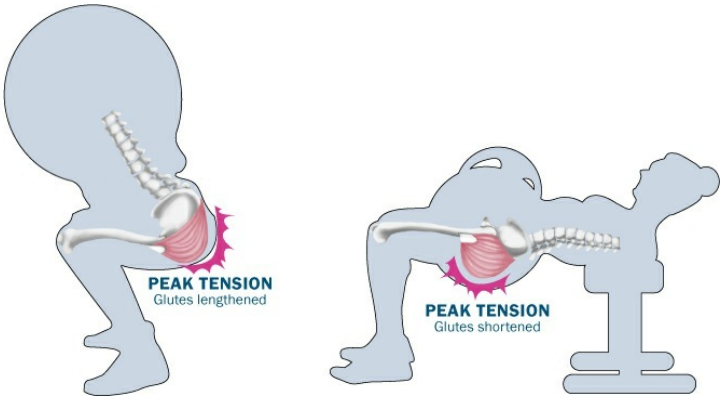
more reps with 235 pounds. Immediately after finishing

that set, have your spotter take another 25-pound plate off each side. Again, without resting, perform 6 reps with 185 pounds. To complete the final set, have your spotter take off the remaining 25-pound plates and perform 10

reps with 135 pounds. In the end, you will have performed 30 total reps with loads ranging from 135 to 285 pounds in a relatively short time, creating a lot of metabolic stress.

MUSCLE DAMAGE

Approximately two days after a strenuous bout of exercise, your muscle soreness is likely to reach its peak. This soreness is somewhat indicative of muscle damage. Muscle damage is created by doing something unfamiliar, performing an exercise that stretches a muscle to long lengths, or accentuating the eccentric component of an exercise—slowly stretching a contracting muscle—which induces high amounts of strain. For example, lunges stretch the glutes while under tension, which is why people tend to get sore glutes from the lunge and squat movement patterns. Conversely, exercises that target the glutes at shorter muscle lengths (in a contracted position) not only build bigger glutes but don't leave you as sore.



The traditional thinking is that lifting weights tears muscles down and resting builds them back up, but, like a callus, the body supercompensates and builds the muscles back stronger. Muscle damage consists of microtears, lesions, and associated inflammation and exists at the sarcomeric, membrane, T-tubule, and fascial levels. It could be that muscle damage in and of itself doesn't build muscle, but the tension produced in the muscles through a full range of motion during a workout and the tension experienced inside the muscle cells in the days that follow due to cell swelling are responsible for the

growth.

Whatever the case, most experts agree that damage is highly overrated and is the least important of the three proposed mechanisms. Yet the vast majority of people worship muscle soreness because they erroneously believe that they need to be sore to stimulate muscle growth. Not only is this thinking wrong, but it can easily do more harm than good. Imagine training really hard on Monday and then being too sore to train on Wednesday. Now you can't handle as much volume, and pain inhibits muscle activation, both of which are vital for growing muscle.

It is, however, important to factor in training frequency. If you're training only once a week, then you should train hard and not be too worried about soreness. But if you want to maximize your results, you need to train two or

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three times a week. Though there is little evidence in the literature to support this claim, I believe that training the glutes three days a week is ideal for most people. I've had the pleasure of working with half of the women with the best glute development on the planet, and they prioritize the glutes in their training and tend to work their glutes three to five times per week. (More on this in Chapter 12.) If you're training three days a week, you have to be careful not to overdo it. You want a little bit of soreness, but not so much that it interferes with your training frequency.

I also want to point out that I have clients who never get sore, and many of them see amazing glute development.

Exercise Strategies for Creating Muscle Damage

There are many ways to create muscle damage. When it comes to the glutes, the most straightforward strategy is to perform lunges and squats, which stretch the glutes. As a rule, any exercise that emphasizes the eccentric phase

—that is, it stretches the muscle while under tension—is likely to create significant muscle soreness. You can also utilize several advanced training methods, which I cover in more detail in Part 3. Here are the best activities for creating muscle damage:

• Exercises that stretch the muscles, like squats and lunges

• Exercise variety, including new, unfamiliar movements

• Free weight (barbell, dumbbell, and kettlebell) exercises

• Enhanced eccentrics (here)

• Accentuated eccentrics (here)

• Forced rep negatives

• Cheat reps with good negatives

• Loaded stretching

Here are three exercise examples of creating muscle damage: Perform a 10-rep set of dumbbell deficit reverse lunges

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while standing on a 6-inch step.

Perform a movement you haven't done in a while. For

example, say it's been three months since you performed dumbbell between bench squats. Choose that exercise

and perform 4 sets of 12 reps.

Perform enhanced-eccentric barbell hip thrusts. Have a

training partner stand over you and push down on the

barbell as hard as they can while you resist the load

eccentrically during the lowering phase. Then they let up as you raise the load concentrically. Repeat this process for 10 reps. To clarify, your partner is placing an additional 100 pounds of resistance (it doesn't have to be 100

pounds, just additional weight based on what the person can handle) during the lowering phase of the movement

so that there's a different load for the concentric and eccentric phases.

INTERRELATIONSHIP OF MECHANISMS

Mechanical tension, metabolic stress, and muscle damage are interrelated, and they signal hypertrophic responses through multiple, redundant pathways. For example, let's say you're performing knee-banded goblet squats. In this scenario, you're stretching your glutes while under tension, which creates muscle damage; you're carrying additional weight and pushing outward against the band, which creates mechanical tension; and, as you continue to perform reps, the prolonged muscle contractions create metabolic stress.

As you can see, the three mechanisms overlap. Although you can emphasize a specific mechanism with exercise selection, tempo, load, and effort, it's impossible to completely isolate one mechanism. At least this is the current thinking. We will home in on the individual signaling pathways over time as we learn more, but for now, we must cover our bases and target all three mechanisms by performing a variety of exercises, loads, and rep ranges at varying levels of effort. I call this the shotgun approach.

PICKING THE RIGHT EXERCISE FOR EACH

MECHANISM

As you've learned, some exercises are better than others at eliciting a pump or burn, some exercises are better than others at creating tension in a muscle or a particular subdivision of a muscle, and some exercises are better than others at damaging muscle fibers. Let's bring all of this together with a quick recap.

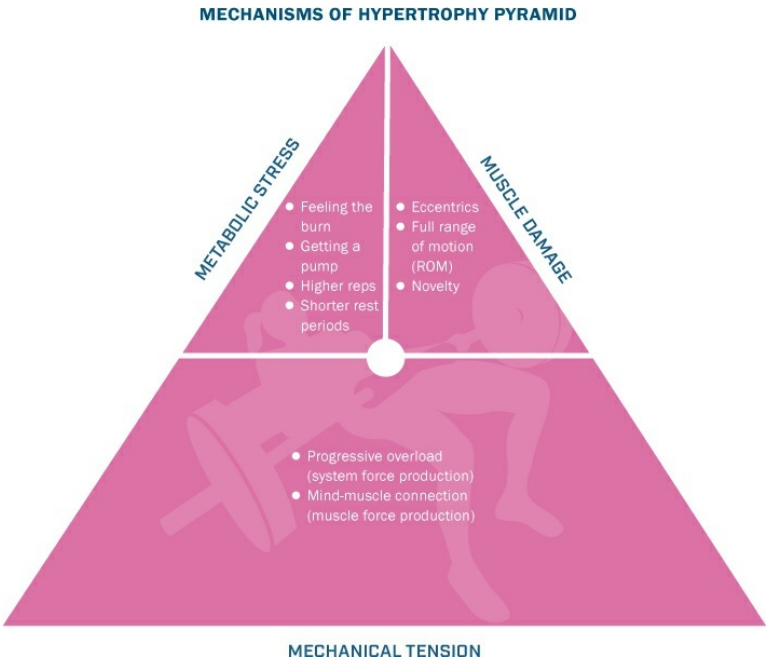
Large compound movements like squats, deadlifts, glute bridges, and hip thrusts can be done with high loads, which maximizes mechanical tension in the involved muscle groups. Using relatively high loads with lower reps and longer rest periods (to aid in strength recovery) can help increase mechanical tension in these exercises. Because mechanical tension seems to be the biggest driver of muscle growth and lifting heavy requires the most focus and energy, I recommend prioritizing compound movements and performing them first in your workout.

Exercises that either place constant tension on a muscle or place the greatest tension on the target muscle at short muscle lengths (in a contracted position) are best for stimulating metabolic stress. For the glutes, this is hard to do without using a glute bridge or hip thrust variation. Using medium to high reps with short rest periods and multiple sets, glute bridges and hip thrusts can produce a serious burn and a skin-splitting pump that is ideal for enhancing the metabolic stress response. Taking this a step further, you can use bands or chains to make the loading more constant throughout each rep.

I recommend performing these variations at the end of your workout in the form of burnouts (see here).

Movements that involve the greatest loading at long muscle lengths (in a stretched position) are best suited for creating muscle damage. Lunges, squats, Bulgarian split squats, Romanian deadlifts (RDLs), deficit deadlifts, and good mornings are good examples of exercises that cause damage to the glute muscles.

Pure eccentric, enhanced eccentric, or eccentric-accentuated reps can be used to increase muscle damage, but there's a fine line between optimal and excessive. Again, muscle damage is overrated and can easily do more harm than good if it interferes with strength gains and training frequency. Feeling a bit sore the next day is fine, but barely being able to sit down is overkill. For this reason, I recommend doing only one or two exercises that stress muscle damage in the course of a week, typically in the middle of a workout.



In summary, the bulk of your muscle gains will come from placing increasing amounts of tension on your muscles. You achieve this by progressively overloading your training session (more on this in Chapter 9).

Put simply, you need to do more over time—more weight, more reps, more sets, and so on—and focus on the most important aspects of muscle building, which revolve around creating mechanical tension.

But getting stronger doesn't always mean that the targeted muscle is receiving a greater tension stimulus. You could fail to create mechanical tension by altering your technique, using momentum, skimping on range of motion, and/or relying too much on other muscles to do the job. This is why you must utilize the mind-muscle connection in conjunction with progressive overload. One strategy without the other is inferior. You must mentally focus

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on the muscle you're training to grow in order to see hypertrophic results.

CONTINUED EDUCATION: MIND-MUSCLE

CONNECTION

A number of studies have shown greater activation when you think about contracting the muscle you're trying to target, which is outlined in an article that I wrote with my good friend and colleague Brad Schoenfeld titled "Attentional Focus for Maximizing Muscle Development: The Mind-Muscle

Connection." You can find it at bretcontreras.com/wp-

content/uploads/Attentional-Focus-for-Maximizing-Muscle-

Development-The-Mind-Muscle-Connection.pdf.

MIND-MUSCLE CONNECTION

For ages, bodybuilders have used the mind-muscle connection to bring attentional focus to the working muscle. Attentional focus is what you think about while performing a movement or exercise.

I'll use an example to help you understand how it works. Say you're doing barbell hip thrusts. As you perform the movement, you put all of your mental focus into squeezing and activating your glutes. As you lower the weight, you're tuned into the tension building in the muscle. As you elevate your hips to reach full hip extension, you're directing all of your attention into contracting the muscle to achieve maximum activation. This is the mind-muscle connection at work. It is also referred to as internal attentional focus.

The research is clear: you get more activation when you're thinking about the working muscle. By bringing consciousness to the area you're targeting, you're directing more neural drive to the muscle, which increases tension and

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activation. I've done a ton of EMG experiments on myself, and I can tell you that this works.

In addition to increasing activation, it increases metabolic stress. If you neglect the mind-muscle connection, meaning you're not thinking about activating your glutes when you perform exercises that involve the glutes, you work your glutes less, and other synergistic muscles, like your quads and hamstrings, compensate so that you can carry out the task (lift the weight).

When you're going for hypertrophy, you want to direct your attention inward toward the muscle, which, again, is the mind-muscle connection. But if your goal is to improve strength and performance, then you want to focus on something outside your body that is motivating (referred to as external attentional focus), not the muscle being worked. In other words, focusing on your glutes will improve your ability to grow bigger glutes. If you want to train your glutes so that you can jump farther or higher or lift more weight, then you don't want to focus on the muscle. Instead, you want to direct your attention externally, focusing on your environment and letting your body figure out which muscles to use at the right moment.

For example, say you're going for a one-rep max on a heavy back squat. In this situation, you don't want to focus on the muscles powering the movement, but rather on lifting the weight. So you might think about something that motivates you to get the weight up—like you're going to squat the bar through the roof. By focusing on the task and the environment, you rely on your body to sort out which muscles to recruit in order to carry out the task the most efficiently. In the research, this is known as internal versus external attentional focus.

I am not saying that you're not using your glutes or the working muscles.

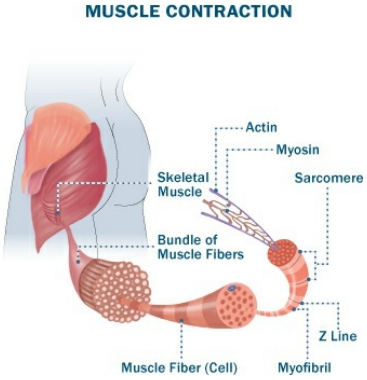
Whether you're squatting, hip thrusting, or deadlifting, you're still using good form and staying safe. But you're not trying to fire your glutes maximally the way you would if you were focusing on the mind-muscle connection for hypertrophic gains.

LONGITUDINAL EVIDENCE AT LAST!

Brad Schoenfeld and I recently got an experimental study accepted that shows evidence of the mind-muscle connection being superior for muscle growth. This is the first paper to examine this phenomenon. We knew that thinking about the muscle increased muscle activation, but now we know that it leads to more growth.

The next chapter covers progressive overload, which simply means doing more over time. Although progressive overload is important for muscle growth (if all you do is lift the same amounts of weight over and over again, you will have a hard time gaining muscle), it's also specific for developing strength. When employing the mind-muscle connection, on the other hand, you're trying to visualize and think about the working muscle and make sure your glutes are the primary mover.

Because both lifting heavier weight and focusing your attention on the muscle being worked are important for hypertrophy, you need to find a balance between the two methods. In Chinese philosophy, yin and yang describes how two seemingly opposite or contrary forces in the natural world may actually be complementary, interconnected, and interdependent and may give rise to each other as they interrelate. When training for maximum muscle growth, you need to get stronger over time with certain movements.



However, sometimes you shouldn't concern yourself with quantity (progressive overload) and instead should focus on quality (the mind-muscle connection). Both are necessary to develop maximum muscle hypertrophy; one without the other would yield inferior results. I typically perform the first one or two exercises of the day with the goal of lifting heavy and then do the rest of my workout with a focus on the feel, not the weight.

Before I delve into progressive overload, there is one more important factor to consider when it comes to muscle growth, and that is muscle composition.

MUSCLE COMPOSITION

All of the muscles in your body are made up of muscle fibers, which are elongated cells that form the muscles, as shown in the illustration below.

These muscle cells are designed to control movement by producing and absorbing force.

We commonly refer to two muscle fiber types: slow twitch (type I) and fast twitch (type II). You've probably heard that people have either

predominantly slow twitch or predominantly fast twitch muscle fibers. Slow twitch muscle fibers are better suited for endurance efforts, like running marathons, whereas fast twitch muscle fibers are better suited for speed and power actions, such as sprinting and lifting. As the theory goes, a marathon runner has mainly slow twitch muscle fibers, and a sprinter has mostly fast twitch muscle fibers.

When you look at EMG research, it's common sense to think that the glutes are a fast twitch muscle group because they are not heavily recruited when you do things like stand up from a chair, climb stairs, walk at a normal pace, or perform activities of daily living that involve the glutes. But when you sprint, jump, or pick up something heavy, glute activation increases dramatically.

In this sense, the glutes are like sleeping giants that are called upon when you perform explosive and heavy movements. For this reason, everyone assumed that the glutes were comprised of predominantly fast twitch muscle fibers. However, two studies looked at the fiber type composition of the glutes. The first study showed that the glutes were 68 percent slow twitch and 32 percent fast twitch. The second study found that the glutes were 52 percent slow twitch and 48 percent fast twitch. To make matters more complicated, there is research indicating that the upper glute fibers have a little more slow twitch type composition than the lower glute fibers, which makes sense because the upper subdivision has more influence on the pelvis, controlling posture and other stabilization actions.

Whether the glutes are fast twitch or slow twitch, the question is, should we train them in a unique way?

This question has long been debated in the world of strength and conditioning. The idea is that you should train your muscles by following an exercise plan that is specific to your distinct muscle fiber type.

There are companies out there that will provide a vague reading of your muscle fibers. Your results might tell you that you have predominantly fast twitch or slow twitch fibers. Although this finding gives you some insight, it shouldn't influence how you train your glutes, because the only way to know whether your glutes are fast twitch or slow twitch is to perform a biopsy—that is, to stick a needle into the muscle, surgically remove a sample, and test the actual muscle fiber. In other words, it's hard to say whether your glutes are

fast or slow twitch. And even if you did check them, the finding might not matter.

Here's the theory: if you're mostly fast twitch, you should perform explosive movements with fewer reps and heavier weight, and if you're predominantly slow twitch, you should perform more reps with lighter loads.

My colleague Brad Schoenfeld and I are testing this theory with a training study (starting in 2019), so we'll know more in time.

While this approach might be helpful for people who are training for sport, it doesn't change anything when it comes to building the glutes, because we know that both high and low reps will result in muscle growth.

What's more, if you train hard, you can't choose which fibers to activate during training. You will end up recruiting all of your muscle fibers.

Proportions of muscle fiber types vary from person to person and from muscle to muscle, and motor units (groups of muscle fibers recruited by the nervous system to coordinate muscle contractions) are composed of a mixture of fibers. Furthermore, there is new evidence suggesting that you can alter your fiber type composition over time through vigorous training. So, as long as you train the muscle close to momentary failure—whether you hip thrust for high reps, for a one-rep max, or anywhere in between—you will activate all of the muscle's motor units and recruit both types of muscle fibers.

Remember, your glutes are incredibly unique and versatile in that they can operate effectively through long and short ranges of motion at both slow and fast speeds and resist fatigue during both long- and short-duration exercise—

more evidence supporting the importance of exercise and training variety.

In conclusion, a genetic test that tells you your muscle fiber composition (fast or slow twitch) is fine, but it should not guide your training protocol when it comes to developing your glutes. For the best results, just follow the guidelines laid out in the final section of this chapter.

SCIENCE SPEAK: MUSCLE FIBERS

Muscle fibers can be classified into types by using a variety of methods, although the underlying principle across all methods

is how fast the fibers can shorten. Fast twitch (also called type II or MHCII) muscle fibers contract much faster than slow twitch (also called type I or MHCI) muscle fibers. 1 Some researchers believe that training with lower loads and higher reps targets slow twitch muscle fibers while training with higher loads and lower reps targets fast twitch muscle fibers2

on the basis of a small number of studies showing trends in this direction. 3, 4

Only two studies have measured the muscle fiber type of the glutes, and unfortunately they came to different conclusions.

One study found a 52 percent proportion of slow twitch muscle fibers in young male subjects. 5 The other reported a 68

percent proportion of slow twitch muscle fibers in elderly patients with hip osteoarthritis.6 The higher proportion of slow twitch muscle fibers might have been due to the age of the subjects, although we can't know for certain. Either way, the glutes are not fast twitch; they are probably split evenly between slow and fast twitch fibers. Variety is key in glute training!

STRATEGIES FOR MAXIMIZING MUSCLE GROWTH

This chapter has covered a lot of ground, from the three mechanisms of hypertrophy to the mind-muscle connection and muscle fiber types. Consider the following a brief recap of the most important points of this chapter, as well as the key variables for maximizing muscle growth.

PERFORM EXERCISES CLOSE TO MUSCLE FAILURE TO

INCREASE MUSCLE SIZE

Most of us want bigger muscles. To achieve that, we need to get stronger—

much stronger. Gaining strength by lifting heavy weight places increased tension on the muscles over time, forcing them to adapt by growing larger.

Heavier weights equal greater tension, which equals bigger muscles. Got it?

Great!

However, heavier weight alone will not build the biggest muscles.

Powerlifters lift more weight than bodybuilders, thereby placing greater tension on their musculature. Yet, despite this added tension, bodybuilders are generally more muscular. If tension were the be-all-end-all, powerlifters would have bigger muscles than bodybuilders. We can't say that it's the drugs, because natural bodybuilders are still bigger than natural powerlifters, and when powerlifters want to build muscle, they borrow methodology from bodybuilders by employing higher-rep assistance lifts with shorter rest times between sets instead of performing low-rep, heavy sets. Furthermore, bodybuilder workouts are more efficient because bodybuilders can handle more volume without getting as beat up. For example, powerlifters might max deadlift (lift heavy with longer rest periods) and then perform only 3 or 4

more sets in their workouts. In contrast, a bodybuilder would deadlift with less weight and shorter rest times and still be able to add in accessory exercises, such as hip thrusts or back extensions, because lifting to failure with less weight and shorter rest times is less taxing on the body.

What gives, then? There are two explanations. The first is that powerlifting techniques maximize the amount of weight you can handle, so you end up using more muscle overall and generating more ground reaction force. Bodybuilding techniques maximize the tension you put on the muscle, so you end up generating more muscle force mainly in the targeted muscle.

Moreover, with lighter loads, the prevailing thought is that lighter loads end up placing sufficient tension on each fiber throughout the set due to Henneman's size principle. That is, as a muscle fatigues, the lower-threshold motor units can no longer carry out the task, so the higher-threshold motor units are called upon to pick up the slack and get the job done.

Although peak EMG activity never gets as high during sets with lighter weight as it does during sets with heavier weight, the sets take longer to carry out, and during this period, each muscle fiber ends up being recruited for a sufficient time to match the hypertrophy stimulus. This is evident from training studies comparing light versus heavy weight on muscle growth.

There are more than 20 published papers on the topic, and the overwhelming consensus is equal growth between the two. In fact, an interesting study

shows that muscle growth can be achieved simply by contracting the muscle with no resistance. The participants in one group squeezed their biceps with no load, and the other group did dumbbell biceps curls. The two groups saw similar hypertrophy. It could very well be that lighter loads cause slightly greater growth in slow twitch fibers while heavier loads cause slightly greater growth in fast twitch fibers, but total growth ends up being equal.

So, even though lifting heavy does build muscle and strength, you don't need to lift heavy to maximize glute growth. As long as you're carrying out the movement close to muscle failure using a load that's above 40 percent of your one-rep max (1RM) and moving through a full range of motion, you can get similar hypertrophy gains. Stated differently, you can achieve similar hypertrophy through a wide range of loads (even bodyweight training provides load in the form of your body weight as resistance against gravity) as long as you perform the exercise one or two reps shy of failure—that is, if you did another one or two reps, you wouldn't be able to perform the movement again without cheating the range of motion or compromising your form.

DO STIMULATING (EFFECTIVE, HYPERTROPHIC) REPS

The last 5 reps of a set to failure provide the majority of the muscle-building stimulus. If you do a heavy 1RM, even though it's brutal, it provides only one stimulating rep. If you do a set of 3 reps to failure, all three stimulate hypertrophy. The same goes for 5 reps. But once you exceed 5 reps, the number of stimulating reps doesn't increase. So let's say you perform a set of 20 reps to failure. Only the last five contribute meaningfully to muscle growth. What if you leave a rep or two in the tank and avoid training to failure? Then you subtract that from the 5 stimulating reps. Let's say you do a set of 10 reps with 2 reps in reserve (2 reps shy of muscle failure). This would amount to 3 stimulating reps. This example is grossly oversimplified, as each rep contributes a little to the muscle-building puzzle, but the reps closest to failure pack the biggest punch. And this is assuming your form and range of motion are stellar on every rep, because sloppy reps aren't as effective as pristine reps for building muscle.

In summary, you can essentially pick the rep scheme that you prefer as long as you follow the above protocol and perform a sufficient number of

stimulating reps. Research needs to determine the optimal number of stimulating reps per week, and it likely varies from one person to the next.

But you can see how 5 sets of 5 reps to failure would provide 25 stimulating reps, 8 sets of 1 rep would provide only 8 stimulating reps, and 3 sets of 15

reps would provide 15 stimulating reps.

Let’s say you hate training to failure on certain exercises, like lunges or deadlifts. If you performed 8 sets of 8 reps to 3 reps shy of failure, this would amount to 16 stimulating reps. A pyramid involving 10/8/6/15 reps would amass 20 stimulating reps. Knowing this system helps you plan ideal training sessions.

We need more research to teach us how this system applies to certain exercises, such as high-rep bodyweight frog pumps. Say you do 4 sets of 50

reps and none of the sets is to failure. This system would indicate that it wouldn’t stimulate any muscle growth, but this doesn’t seem to be the case based on my anecdotal experience as a lifter and trainer. Models like these help us make sense of our methods and keep us on track, but they rarely withstand scientific scrutiny.

UTILIZE A SHOTGUN APPROACH AND EMPHASIZE VARIETY

One exercise can’t be everything. As you have learned, you need to perform a variety of exercises with different loads and tempos and through varying ranges of motion to ensure that you target all three hypertrophy mechanisms and hit all of your muscle fibers. This is why I utilize a shotgun approach when it comes to exercise selection and program design, which you will learn more about on here.

HIGH ACTIVATION IS RELATED TO HYPERTROPHY, BUT YOU

ALSO NEED SLOW CONTRACTION SPEEDS THROUGH A LARGE

RANGE OF MOTION

Activation, as measured by EMG, is related to hypertrophy, but it is not perfectly linear, meaning that activation is not completely equal to muscle growth. You must consider other factors, such as the speed of the muscle contraction. For example, say you land from a jump. Your quad activation is

through the roof, but you get only a brief spike.

To create adequate tension on the muscle fibers, you need a sustained contraction. More specifically, the contraction or activation needs to be slow enough to generate optimal tension throughout the muscle. It takes time for all of the possible cross-bridges to form—cross-bridges are the structures responsible for muscle tension to create the pulling forces on bones—which creates movement. This can be achieved either by lifting heavy or by lifting a light load to failure.

What’s more, there is evidence that you need to create tension through a large range of motion to maximize hypertrophy in order to get the best of both worlds in terms of stretch and activation-related growth. Not all studies demonstrate this, however, so it likely depends on the muscle/muscle group and exercise in question. Isometrics don’t seem to be as well suited for building muscle as dynamic exercises that move the muscles through their full ranges of motion.

So, while it’s true that greater activation is better for hypertrophy, you need to create tension (activation) through a large range of motion with proper load, tempo, and effort to maximize muscle growth.

SQUEEZING YOUR GLUTES IS GOOD FOR HYPERTROPHY

When you’re performing glute-dominant and certain hamstring-dominant movements, like the hip thrust, glute bridge, kickback, quadruped hip extension, and back extension, squeezing your glutes at the top of the movement is good for hypertrophy. Glute activation is very high with these exercises, which is why I recommend a one-second glute squeeze at end-range hip extension.

However, you have to be careful when squeezing your glutes at the top of a squat or deadlift. Most people squeeze their glutes naturally at the top of these movements to lock out their hips. But you have to avoid exaggerating the glute squeeze to the point where it compromises your form. For example, say you stand tall to finish a squat but squeeze your glutes so hard that you posterior pelvic tilt. In such a situation, your lumbar spine pulls into flexion and pushes your hips forward. If you have a heavy bar on your back, you’re asking for trouble. You can’t grow your glutes while injured, so exercise

caution and prioritize form.

TRAINING FOR THE PUMP WILL MAKE YOUR BUTT LOOK BIG

AND PROBABLY GROW MUSCLE

As I stated earlier, I believe that training for the pump is good for muscle growth, although we don’t have concrete science to back it up yet. One thing is for sure: you will love the way your butt looks following a good pump workout, and there’s a strong chance that it will help build bigger glutes as well.

HIP EXTENSION IS THE BEST JOINT ACTION FOR GROWING

THE GLUTES

If all you ever did was hip extension exercises like glute bridge and hip thrust variations, you could probably achieve 90 percent of your maximum results.

Remember, maximum glute activation occurs at end-range hip extension, which is the shortest position for the glutes. It is for this reason (among others) that the glute bridge and hip thrust are considered great glute-building exercises. You can test this idea by sitting down or bending forward and then squeezing your glutes as hard as you can, which is similar to

squatting and deadlifting. Although you can contract your glutes in this flexed position, you can’t achieve peak tension; it feels like you’re leaving room on the table in terms of maximizing glute density through contraction.

But if you stand upright with your hips in full extension, you can squeeze your glutes maximally, which is similar to glute bridging and hip thrusting.

THINKING ABOUT THE WORKING MUSCLE INCREASES

HYPERTROPHY

A ton of research shows that thinking about the working muscle—that is, using the mind-muscle connection—increases activation, and one study shows that it leads to greater hypertrophy. So there is no refuting this fact.

Whether you’re warming up using activation drills or you’re trying to build muscle in a certain area, putting conscious effort into thinking about

contracting that muscle will yield the best results.

PRIORITIZE RESISTANCE TRAINING AND AVOID SPRINTING

AND PLYOMETRICS FOR GLUTE DEVELOPMENT

Although the glutes are highly involved in sprinting and jumping, I don't recommend plyometrics or sprinting as a strategy for building bigger glutes for two reasons. First, plyometrics and sprinting are risky in that they make you more susceptible to muscle strains and tears. Second, plyometrics and sprinting don't build muscle nearly as well as resistance training. Almost all of the best glutes in the world are built through resistance training because resistance training maximizes tension on the muscles—something that cannot be said of plyometrics or sprinting. Resistance training is also safer to perform and more predictable. Allow me to elaborate.

It is true that sport training builds some glute muscle (but doesn't maximize it) and improves neural output. When I work with athletes who have played ground sports (think soccer and football) but have never lifted weights, they see results much sooner than people who don't have athletic backgrounds. This is largely due to the fact that athletes have developed proficiency in utilizing their glutes explosively from every angle. In contrast, beginners who haven't played a lot of sports haven't yet developed the motor

patterns and mind-muscle connection because they haven't been using their glutes in training.

But say I'm working with a beginner who has never played sports or done anything athletic, or even a former athlete whose goals have switched to aesthetics and maximizing glute development. In these situations, I don't recommend sprinting, jumping, or explosive training due to the risk of injury. Strength training is a better way to build muscle due to the slower contractions.

If you're an athlete and you're training for performance and function, on the other hand, then explosive and plyometric training is necessary, not because you're trying to build muscle but because you're trying to get better at your sport (think speed, power, agility, and coordination). You might be wondering, "Then why does [fill in the blank] athlete have such nice glutes?"

It's true that numerous athletes have incredible glute development. However, this is likely due more to their strength training than to their sport training.

Before weight training was popular, athletes' glutes weren't nearly as developed.

CHAPTER

9

How to Gain Strength

One of my favorite experiences as a personal trainer is seeing the look on a client's face when they hit a new personal record on the hip thrust, squat, or deadlift. It's a joyful moment for everyone because it validates all of the training and hard work.

The client is stronger than they were before, which is a clear measure of progress.

I encourage most of my clients to create strength-specific goals because it gives them something to come back to month after month. They get addicted to hitting new PRs. As a result, they work harder in the gym, and their training adherence improves. As they get stronger and more consistent, they start to notice more physique changes, which also encourages them to keep training.

Chapter 11 addresses specific strength goals that I expect all of my clients to achieve after training with me for six months. For now, I want to focus on the best strategy for improving strength. Although there is some overlap between training for strength and training for hypertrophy, it's not perfectly linear, as you might expect. In other words, you can gain size but not increase your strength and vice versa.

This is not to say that increasing muscle size won't increase strength or that improving strength won't facilitate muscle growth. Whether you're training for strength or training for hypertrophy, you will probably see gains in both departments if you're training properly.

But—and this is key—training for strength is not the same as training for hypertrophy. There is a specificity component that you have to consider. For example, as you will recall from the previous chapter, when you're training for hypertrophy, you don't need to lift heavy as long as you're carrying out the movement close to muscle failure. When you're training for strength, however, you need to lift heavy and utilize the progressive overload

methodology.

PROGRESSIVE OVERLOAD

Progressive overload simply means doing more over time. This can mean more weight over time, more reps over time, or more sets over time, but if your goal is to gain strength, then more weight over time is your best bet.

There are many other ways to progressively overload the body. For example, you can perform larger ranges of motion, use a smoother tempo, add a pause, or add an explosive element.

In a nutshell, the best way to develop strength—and, to a lesser degree, muscle size—is to do more over time to increase your work capacity and improve your form.

Although progressive overload is pretty straightforward, simply telling someone to add 10 more pounds or do two more reps with the same weight each week is not sustainable. There is a huge gap in fitness ability from one person to the next. If you're just starting your strength journey, you will see huge gains in the first few months of training, but as you start plateauing or reaching peak performance, the protocol gets a lot more complex. For this reason, it's nearly impossible to offer a blanket prescription. So, rather than try to give you an exact protocol, I've outlined 10 rules or guidelines to help you maximize your results using progressive overload.

1. PROGRESSIVE OVERLOAD STARTS WITH WHATEVER YOU

CAN DO WITH PERFECT TECHNICAL FORM.

Let's say you're new to a particular exercise. You've seen all sorts of YouTube videos of strong lifters hoisting hundreds of pounds. You think you're a strong cat, so you load up the plates and find that the exercise just doesn't feel right. It feels awkward and unnatural, you don't feel the right muscles working, and it even seems jarring on your joints and potentially injurious.

This exercise is definitely not right for you, right? Wrong! The exercise probably is right for you; you just need to approach it in a different way.

Do not concern yourself with what others use for loading (weight). When

you begin an exercise, start out light and gradually work your way up. I'll provide two examples: the starting point for the weakest non-elderly and non-injured beginner I've trained, and the starting point for the strongest beginner I've trained. Chances are you'll fall somewhere in between these two individuals.

The weakest beginner I ever trained (a middle-aged woman who had been completely sedentary for around 15 years) had to start out with bodyweight high box squats on an adjustable step-up platform so that she was descending only about 8 inches before sitting on the box. This client also performed glute bridges, step-ups from a 4-inch step, and hip hinge drills—all with just body weight.

But she was squatting, hip thrusting, step-upping, and deadlifting.

Granted, she was performing the most remedial variations of those exercises, but this was what was right for her at the time. Within six months, she was doing full-range goblet squats, barbell hip thrusts, Bulgarian split squats, and deadlifts from the floor with 95 pounds.

Conversely, the strongest beginner I ever trained—a high school wrestler

—was able to use 185 pounds for full squats, 225 pounds for deadlifts and hip thrusts, and 155 pounds for bench presses and could do Bulgarian split squats, single-leg hip thrusts, and chin-ups with great form. Though he was an athlete, surprisingly he had never lifted weights before. Sports had strengthened his legs and upper body so that he was able to start out at a much more advanced level than most beginners. Even my (at the time) 13-year-old niece, a very good volleyball player, squatted 95 pounds, trap bar deadlifted 135 pounds, and single-leg hip thrusted (all with excellent form) in her very first weight training session.

But these people are not you. You'll find that due to your unique body type, you have an advantage with some exercises and a huge disadvantage with others. Long femurs? You probably won't set any squat records, but your weighted back extension strength is going to kick some serious butt. Long arms? You can kiss bench press records goodbye, but you will be a deadlifting rock star.

Figure out where you belong on the regression-progression continuum (basically a list of variations of an exercise from the easiest to the most challenging) and start getting stronger. This means staying conservative, not

progressing too quickly, and letting your technique guide your progress. If your form starts to break down as you go up in weight, that's an indication that you're not strong enough to lift that much weight yet. In such a situation, you need to take a step back and build your body up to handle heavier loads.

Another mistake people make is following percentage-based programs—

meaning they're lifting a certain percentage of their one-rep max—using a one-rep max from years ago. They're screwing themselves from the start because they're basing it on a one-rep max that they did when they were much stronger (and younger). If you are following a percentage-based program, it's important to retest your one-rep max and use that number as your starting point.

2. PROGRESSIVE OVERLOAD FOR BEGINNERS INVOLVES A

FEW TENETS.

Progressive overload methodology is different for beginners than for more advanced lifters. It's also different for men than women and for those carrying a lot of muscle versus those not carrying much muscle. For example, I can't tell a woman who is new to strength training to add 10 pounds to the bar for squats and deadlifts each week. First, chances are some work has to be done just to get her to squat and deadlift properly before focusing on load.

Some clients should start out with partial-range lifts, such as bodyweight box squats and rack pulls (deadlifting from an elevated platform), and simply work on progressive distance training, whereby the range of motion is increased slightly each week. If you keep squatting your own body weight (or rack pulling 65 pounds) for 3 sets of 10 reps, but each week you descend an inch deeper, that's progressive overload. Eventually you'll be using a full range of motion, and then you can concern yourself with adding weight.

With exercises that have you move a significant portion of your body, such as squats, hip thrusts, back extensions, and lunges, you must master your own body weight before adding load. As a general guideline, I like my clients to be able to perform 3 sets of 20 full-range-of-motion reps with bodyweight exercises before adding load.

What's more, many lifts require very small jumps in load over time, and attempts in these exercises usually involve jumps in repetitions instead of

load. This applies to lifts that utilize smaller loads, such as cable kickbacks and cable standing hip abductions, as well as challenging bodyweight movements, such as skater squats, single-leg Romanian deadlifts, single-leg hip thrusts, and prisoner single-leg back extensions.

This is especially important for women and smaller men when it is not possible to access smaller plates (for example, 1.25 or 2.5 pounds) or make smaller jumps in dumbbell or kettlebell loads (say, 17.5 pounds). Think about it: going from 50-pound dumbbells to 55-pound dumbbells is a 10 percent jump in weight. However, going from 10-pound dumbbells to 15-pound dumbbells is a 50 percent jump in weight. You cannot expect to make a 50

percent jump in load and execute the same number of repetitions as the week before, but you can expect to get another rep or two with the same load.

Let's say that one week you perform ankle weight quadruped kickbacks with 10 pounds for 15 reps. The next week, rather than up the load to 15

pounds, try performing 20 reps with the 10-pound weights. When you can do 3 sets of 20 reps, increase the weight to 15 pounds.

3. PROGRESSIVE OVERLOAD CAN BE ACHIEVED IN A VARIETY

OF WAYS— 12 THAT I CAN THINK OF.

There are many ways to do more over time. I've already mentioned progressing in range of motion, repetitions, and load. In the beginning, you want to progress in range of motion and form. Yes, if you do the same workout you did the week before but with better form, you've made progress.

You did more for your neuromuscular system in terms of motor patterning (developing coordination) and even muscle force because using better form involves relying more on the targeted muscles.

After you've established and ingrained proper form and full range of motion, it's time to worry about progressing in repetitions and load. But these aren't the only ways to progress. Here are all of the practical ways that I can think of:

• Lifting the same load for the same number of reps for increased distance (range of motion)

• Lifting the same load for the same number of reps with better form,

more control, and less effort (efficiency)

• Lifting the same load for more reps (volume)

• Doing the same number of reps with heavier weight (load)

• Lifting the same load for the same number of sets and reps with less rest time between sets (density)

• Lifting the same load with more speed and acceleration (effort)

• Doing more work in the same amount of time (density)

• Doing the same work in less time (density)

• Doing more sets with the same load and number of reps (volume)

• Lifting the same workout more often throughout the week (frequency)

• Doing the same workout and maintaining strength while losing body mass (relative volume)

• Lifting the same load for the same number of reps and then extending the set past technical failure with forced reps, negatives, dropsets, static holds, rest pauses, partial reps, or a superset (effort) Just remember, improvements in form and range of motion come first, and increases in reps and load come second.

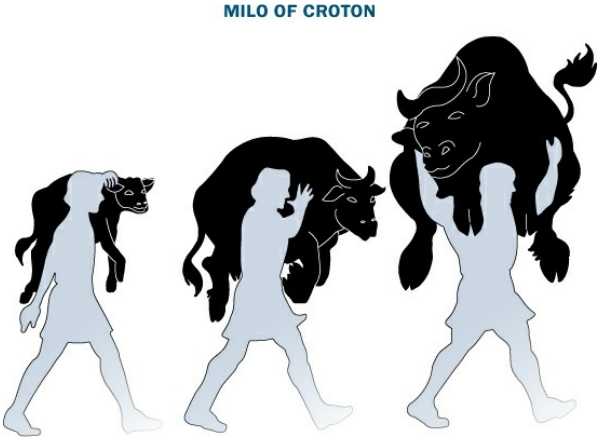
4. PROGRESSIVE OVERLOAD WILL NEVER BE LINEAR.

Many strength coaches love to tell the story of Milo of Croton to illuminate the merits of progressive overload. Legend has it that Milo used to pick up a baby calf every day and carry it around on his shoulders. As the calf grew, Milo got stronger. Eventually, Milo was hoisting a full-sized bull and busting out sets of yoke walks like it was nothing. Pretty cool story, right?

Unfortunately, this story is a crock of bull (pun intended). First of all, a half-ton bull would be way too awkward to carry due to the lopsided nature and

sheer size of the animal. But this is irrelevant.

No gains from weight training, be it in mobility, hypertrophy, strength, power, endurance, or fat loss, will ever occur in a linear fashion. The body



doesn't work that way. Adaptations happen in waves. Sometimes you'll make big jumps in a single week in a particular quality, while other times you'll stall for three months in another quality. Over the long haul, everything goes up, but it's a windy road. There are physiological reasons for this phenomenon, which are highlighted throughout the book.

However, let's pretend for a minute that you could make linear progress for an entire year on a particular lift. A 10-pound jump per week equates to 520 pounds in a year. Even a 5-pound jump per week equates to 260 pounds in a year. Moreover, a one-rep jump per week equates to 52 reps in a year, while a one-rep jump per month equates to 12 reps in a year. You won't gain 260 or 520 pounds in a year on any single lift. You won't gain 12 or 52 reps on most lifts, either. It's just not going to happen. In some sessions, you'll be surprisingly strong and make big gains; in some sessions, you'll simply tie your previous efforts; and in some sessions, you'll actually be weaker and go backward. But every six months, you'll likely be stronger and fitter.

The charts below depict a woman's progress in body fat percentage and

lean body mass over a one-year period. Her transformation was the most dramatic I've seen to date, but notice the nonlinear adaptations. Also notice the drop in muscle, despite doing everything right. This woman gained a ton of strength on squats, deadlifts, hip thrusts, bench presses, military presses, rows, and chin-ups; she never missed a training session; and she ate perfectly for an entire year; yet she lost around 11 pounds of muscle during her yearlong pursuit of getting into contest shape of below 10 percent body fat.

Nevertheless, she won her first figure competition and quickly became a popular figure competitor.

5. PROGRESSIVE OVERLOAD WILL NEVER BE AS FUN AS IT IS

DURING YOUR FIRST THREE MONTHS OF LIFTING.

If you're a beginner, sit back and enjoy the ride! Your rate of strength gain during your first three months of proper weight training will be higher than at any other time in your life. Each week, you will slaughter personal records.

Getting 15 reps of an exercise that you got only 10 reps of the previous week is not uncommon. This is mostly due to rapid gains in intermuscular coordination. Just don't get spoiled; your rate of gain will slow dramatically, and pretty soon you'll be just like the rest of us—fighting like hell for those gains.

6. PROGRESSIVE OVERLOAD FOR VETERAN LIFTERS

REQUIRES SERIOUS STRATEGY AND SPECIALIZATION.

As a beginner, you can do pretty much anything and gain strength as long as you're consistent. After a couple of years of solid training, however, you have to be clever about your programming in order to continue to reach new levels of strength. You'll need to rotate your lifts, plan your program designs intelligently, fluctuate your training stress, specialize in whatever you're striving to improve most, and tinker with methodologies.

For example, one month you might have a deadlift focus, the next month a squat focus, and the next month a single-leg focus. However, you will be performing squat, deadlift, and hip thrust variations each month. By prioritizing one movement pattern, you will progress mostly with that lift.

This is not to say you're neglecting the other movements, as maintaining strength is very easy. If you're following a squat specialization program, for instance, you might program that in the beginning of each of your workouts and then perform your glute-specific exercises afterward. Then the next month, maybe you follow a hip thrust specialization program, and then the month after that, you follow a deadlift specialization program. But you'll always include a variation of each exercise in your training. This is a great way to increase strength with specific lifts and progress your strength. Remember, building is hard; maintaining is easy.

Eventually, it becomes difficult to pack more pounds onto a particular lift or even gain another rep. In such a situation, you might need to give your body a chance to recover. When I program—whether it's for myself, for my Booty by Bret program, or for one of my clients—I typically have three hard weeks of training and then one deload week. Here's an example:

• Week 1 = 60 to 70 percent of overall effort

• Week 2 = 70 to 80 percent of overall effort

• Week 3 = 80 to 90 percent of overall effort

• Week 4 = 90 to 100 percent of overall effort

Then the cycle repeats. You can do three-week cycles or even six- to eight-week cycles, but I like four weeks because it fits within a calendar month.

7. PROGRESSIVE OVERLOAD IS MUCH HARDER WHEN

YOU'RE LOSING WEIGHT.

Unless you're a beginner, increasing your strength while simultaneously dropping significant weight is challenging. In fact, simply maintaining your strength while losing weight is a form of progressive overload, as you'd be increasing your relative strength (strength divided by body weight) and therefore doing more over time.

Weight loss affects some lifts more than others. Squats and hip thrusts tend to take a dive, whereas deadlifts sometimes stay put and single-leg exercises may improve. You will see a huge jump in your strength and endurance on bodyweight exercises when you lose weight, so enjoy the boosts in reps on push-ups, chin-ups, dips, inverted rows, and Nordics.

8. PROGRESSIVE OVERLOAD SOMETIMES HAS A MIND OF ITS

OWN.

Quite often, you'll do everything right, but you won't get stronger. The plan just doesn't work. You'll be lifting hard, adhering to an intelligent plan, eating well, and sleeping right, yet you still won't set any PRs. Other times, you'll do everything wrong and somehow gain strength. Your training can be derailed and your diet and sleep can go down the gutter, but you'll go to the gym and set a PR. This makes absolutely no sense and flies in the face of sports science.

Nevertheless, this is how the body works sometimes. Physiology is tricky and multifactorial. Don't get cocky and think that you've stumbled upon some secret system that involves excessive partying, eating mostly junk food, and training sporadically. Engaging in these behaviors for too long will backfire on you, so stay on track to the best of your abilities.

9. PROGRESSIVE OVERLOAD SHOULD NEVER BE PRIORITIZED

OVER PROPER FORM.

At any point, if you really want to set a PR, you can be lax on your form and likely set a record. For example, you could round your back excessively during deadlifts, let your knees cave during squats, skimp on squat depth or hip thrust lockout range of motion, or let your hips shoot up during lunges.

However, this is a slippery slope that's best avoided. Progressive overload works only when you challenge your muscles to do more over time, and your muscles will not be forced to do more if your form gets sloppy. Moreover, you won't set any personal records if you're injured or constantly in pain.

10. PROGRESSIVE OVERLOAD REQUIRES STANDARDIZED

TECHNIQUE.

The only way you will ever know whether you have gained strength is to perform the lifts the exact same way each time. In other words, true strength gains require proper depth, tempo, and execution. Many lifters lie to themselves and pretend that they've gotten stronger, but their ranges of motion diminish or their form goes out the window. These lifters didn't get stronger; they got sloppier. Federations in the sports of powerlifting, Olympic weightlifting, and strongman have created rules for their various exercises. It may be worth your while to learn these rules so that you always perform the lifts properly in training and when testing your max. Assuming you can perform the lifts properly, always squat to parallel or deeper, always lock out your hip thrusts and barbell glute bridges, and in general, always control the weight through a full range of motion.

My hope is that these 10 guidelines will help keep you on track and maximize your strength.

I have one more piece of advice to share with you. Even the most seasoned lifters often have to take a step back in order to take two steps forward.

Sometimes we get caught up in chasing continuous PRs to the point of altering form, relying on the wrong muscles, skimping on range of motion, or training through pain.

Once a year, I recommend retesting your strength levels in your pursuit of progressive overload. Throw everything you've done out the window and start over using the best possible form through a full range of motion. This is your new baseline. Now work on adhering to that form while doing more over time. In the long run, your body will thank you for engaging in this simple yet effective practice.

MITIGATING RISK

Lifting heavy is dangerous if you don't exercise good form or follow a well-designed training program. For example, if you deadlift with an excessively rounded back, you might get injured. But if you keep your spine in the neutral zone—back flat with maybe a little bit of upper back rounding—then you're usually fine. The same is true for program design: If you try to deadlift heavy three times a week, you're setting yourself up for disaster. It's simply too much for your body to recover from. But if you're following a good program that takes into consideration recovery and you're deadlifting only once a week, you'll probably be fine.

It's like this: lifting heavy is inherently more dangerous than lifting lighter weights because you're putting more stress on your joints and you have less room for error. However, this shouldn't prevent you from lifting heavy or pursuing strength goals.

If you and your coach know what you're doing, you can mitigate a lot of the danger. Put simply, lifting heavy is safe as long as you listen to your body, follow an intelligent program, and prioritize good mechanics.

CHAPTER

10

Exercise Categorization

When I start working with a client, I typically begin the conversation by asking about the client's training goals. The goals always vary, but more often than not, clients are seeking physique changes, trying to correct a gluteal imbalance or injury, or working toward a specific strength or performance goal.

Although their reasons for training are different, the underlying principles that I use to design their programs are the same, in that I select exercises tailored specifically to their experience, anatomy, and goals. Exercise selection, in other words, is crucial to ensure that my clients get the results they are looking for. If a client wants to develop the upper glutes, then I need to program exercises that primarily develop that area. If a client has one glute that is markedly larger than the other, then I need to select exercises that will help correct the imbalance.

Like a master carpenter, a good trainer has specific techniques and tools for every situation and circumstance. In most situations, trainers use the primary tools, like a barbell hip thrust or back squat, but in certain circumstances, they use a specialty tool, such as a single-leg foot-elevated banded glute bridge. And herein lies the point: to achieve training goals, you need to know how to select the right exercise for the job. And you can't select the right exercise for the job if you don't have a system for categorizing techniques. How else do you pick from the hundreds of exercises and variations? When you have a classification system for organizing and choosing techniques, you know why a specific exercise works and—equally important—when and how to apply it.

As you will learn, there are several ways to categorize glute training exercises, including planes of motion, force vectors, knee action, dominant muscle group, movement pattern, limb number, load position, and type of

resistance (equipment). In this chapter, I cover only planes of motion, force vectors, and knee action because, when combined into one system, these classification methods create the most comprehensive and accurate categories.

In Part 5, I describe how to organize exercises based on the dominant muscle being worked, movement pattern, limb number, equipment, and load position (where on the body the equipment is placed). These methods are a great way to organize exercises into broad categories, and I use the same system in this book to make the exercises easier to navigate. But—and this is the crucial difference—it's not the most accurate way to categorize individual techniques.

To determine why certain exercises are well suited for specific goals and why certain exercises work the glutes better than others, you need to look at the position of your body relative to the load or weight you are moving. This is exactly what you will learn in this chapter. For instance, you will learn why squatting with a barbell on your back, which is a vertical load in a standing position, works your lower glutes and why hip thrusting with a barbell on your hips, which is a horizontal load in a supine position, works both your upper and lower glutes.

I believe this information is essential for anyone interested in learning how to fully develop their glutes. However, I realize that exercise categorization —especially planes of motion and force vector speak—is likely to make your head spin. So let me do you a favor and boil everything down to this: to get the most out of your glute training program, you need to target your glutes from a variety of angles in a variety of positions.

In this chapter, I describe those angles and positions in detail. This knowledge will help refine your approach to exercise selection and program design, which I cover in Part 4. If you're not interested in learning about the exercise categorization systems, or you just want a simple way to choose exercises based on how they work your glutes, you can refer to the Glute Exercise Categories chart on here and here, which outlines all of the forthcoming information in one easy-to-understand infographic.

SCIENCE SPEAK: EXERCISE CATEGORIZATION

Exercise categorization is usually done for the purpose of figuring out which exercises transfer best to specific sports.

Transfer of training is the extent to which an adaptation to a strength training exercise, such as maximal back squat

strength, leads to an adaptation in a sporting task, such as vertical jump height. Done properly, an estimate of training transfer is achieved for a group of athletes by collecting data and then using the transfer effect coefficient (TEC) ratio. The TEC ratio takes the ratio of the gain in the sporting task performance after training (as an effect size: ESST) and the simultaneous gain in the exercise 1RM after training (also as an effect size: ESEX). 1 So TEC ratio = ESST / ESEX.

Less rigorously, training transfer can be predicted based on the similarity between the exercises and the sporting tasks. This is akin to the concept of "dynamic correspondence," which is

"how closely the means of special strength preparation

corresponds to the functioning of the neuromuscular system in a given sport." 2

The extent to which dynamic correspondence of exercises is important depends greatly on the training status of the individual. For beginners, just about any exercise or activity will improve performance, as all of the muscles quickly gain in strength from being exposed to a novel stimulus. However, as the individual becomes more advanced, the need for greater specificity increases. In elite athletes, training has to be very specific to the task in which the athlete is trying to improve.

Exercises can display dynamic correspondence with sporting tasks across a broad range of domains. Specificity can

encompass contraction types (concentric, isometric, or

eccentric muscle actions), contraction speeds (explosive or controlled), loading (heavy, moderate, or light), force vectors

(axial, anteroposterior, or combined), joint angles where peak contraction occurs, range of motion, time available for force development, stability requirements, posture, number of limbs acting, and many other factors.3

The trouble is, we don't know for sure which of these factors is most important when assessing each case!

Traditionally, when aiming to achieve better dynamic

correspondence between exercises in the gym and sports

performance, strength coaches focused on posture and

stability requirements. There was a rush to the squat rack and away from the leg press, as the standing position and the need to stabilize the barbell were thought to more closely resemble the challenges of sport. Later, there was a move to single-leg movements, as running involves pushing off on one leg at a time, and many cutting and leaping movements also start from one leg or from a split stance. One factor that has taken a long time to come to the fore is the force vector, which is the direction of the force with respect to the body. And yet, this appears to be a mode of specificity that you do not want to ignore.

EXERCISE CLASSIFICATIONS

To reiterate, there are several methods of categorizing exercises. In this section, I focus on planes of motion, force vectors, and knee action. By themselves, these classifications are incomplete, but when you combine them into one system, you can effectively select exercises based on the movement and muscle you want to work—whether it is your upper glutes, lower glutes, both upper and lower glutes, quads, or hamstrings.

For instance, it's difficult to explain what a particular exercise is good for by looking only at where the movement occurs (plane of motion). To narrow down your options, you also need to know where the load is placed on your

body relative to your position (force vector). And in order to know which muscle the exercise targets, you need to look at the motion of your knees (knee action) during the exercise.

To begin, I'll introduce and explain each classification method, and then I'll tie it all together and clarify how these methods are used to categorize glute training exercises.

PLANES OF MOTION

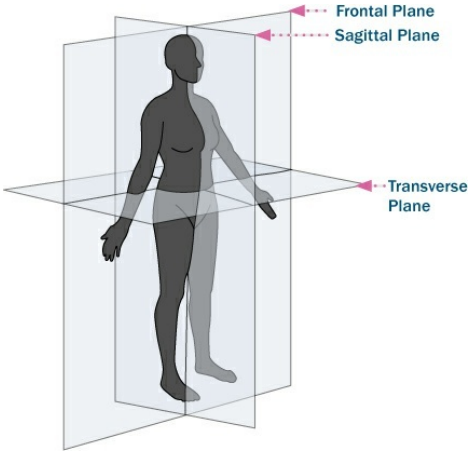
The first step in understanding how to categorize exercises is to get acquainted with planes of motion.

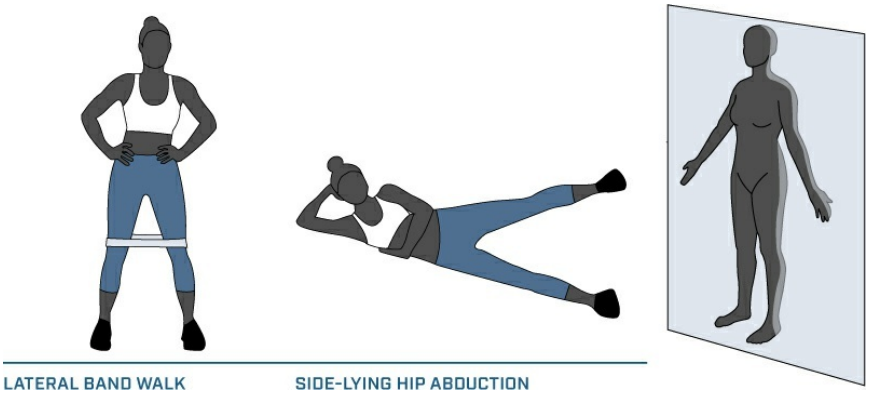
Plane of motion refers to the particular plane—front and back, left and right, top and bottom—in which movement occurs. To put it another way, when you lift weights, the motion usually occurs across defined planes of motion. This method of classification became popular with strength coaches because it helped describe movements in sport. Coaches would look at where the motion occurs (plane of motion) and then try to mimic that movement in a controlled environment to improve performance in a specific area or action.

For example, if a movement occurred across the frontal plane of motion (side to side), then the coach might implement side-to-side or lateral movements in the gym.

In sports, movement involves a blend of planes, which is why so many coaches incorporate "multiplanar" exercises into their regimens. For the purposes of this book, I use planes-of-motion terms to label exercises and isolate certain movement patterns, such as frontal plane hip abduction and transverse plane hip abduction. To fully develop the different regions of the glutes, you must perform exercises from both categories. (More on this shortly.)

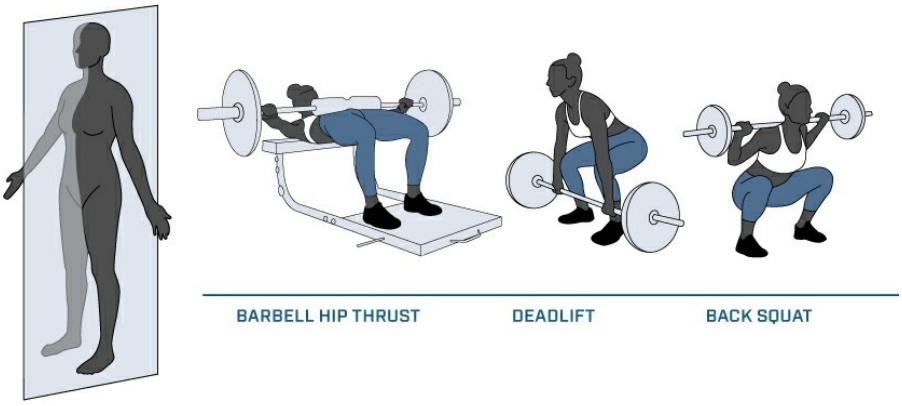
When it comes to human movement, there are three planes of motion: frontal, sagittal, and transverse.



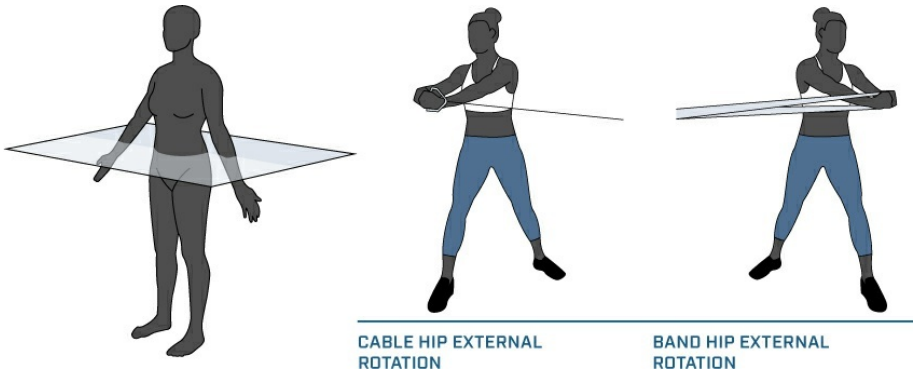


LATERAL BAND WALK SIDE-LYING HIP ABDUCTION

Frontal Plane divides the body into front and back halves. Examples include side-to-side or lateral movements and abduction exercises such as upright lateral band walks and side-lying hip abduction. Frontal plane exercises primarily target the upper glutes.



BARBELL HIP THRUST DEADLIFT BACK SQUAT



CABLE HIP EXTERNAL ROTATION BAND HIP EXTERNAL ROTATION

Sagittal Plane divides the body into left and right halves. Examples include hip thrusting, squatting, deadlifting, and any exercise that is done with little to no side-to-side or rotational movement. Exercises in this category can be done with higher loads and typically comprise the main lifts.

Transverse Plane divides the body into top and bottom halves. Examples include rotational exercises such as band or cable hip external rotation.

Transverse plane exercises target both the upper and lower glutes.

Although categorizing movements using planes of motion tells us where the movement occurs, it doesn't paint a complete picture. In order to

categorize glute exercises accurately, we must look not only at where the movement occurs, but also at the force vector, which is the line of resistance relative to the body.