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## Introduction

The purpose of this manuscript is for it to serve as a general weight lifting field guide for both strength coaches and personal trainers that are new to the field. In the lift Rx series, beginning with this manual, I will cover the four core lifts that are the fundamental base of every strength and conditioning program on the planet. If your programming does not include these lifts, outside of legitimate physical restrictions, then your programming is not worth the paper you write it on. I will outline the processes involved in each lift, common movement faults, common causes for those faults, and spot or cue corrections for those faults. I will touch briefly on the role mobility can play in certain movement faults as well as list some strengthening exercises for the muscle imbalances at the root of specific movement faults. The exercises and mobility will serve more as general guidance pointing you in the direction of more in-depth information for such specialties. Overall, none of the topics are covered in great

anatomical or biomechanical detail because the scope of this manuscript is to merely serve as a platform for you to develop as a strength coach or personal trainer starting out in the field of health and human performance.

### **Everything's a Process**

Everything on this planet is a process. Ordering food at a restaurant, traveling out of town for vacation, even getting yourself out of bed and to your coffee maker first thing in the morning is a process. Every process has a beginning and an end but these terms we place on it are arbitrary. With fitness the beginning always starts with the question "what are you training for?" You can't start your journey unless you have a defined direction to start moving in, so the answer to this question gives you both a direction and a destination.

With that said we can't properly coach, or train someone, without knowing our clients answer to this question. There are numerous different paths that lead to the same destination, some are more efficient and cost effective than others. If I wanted to get off of my couch in Indianapolis Indiana and go to Atlanta Georgia to visit family, I have a lot of different ways to get there. I could be there in a few hours if I fly, or a few months if I start walking. This brings up the idea of efficiency within a process. One of these options is much more efficient and time conserving than the other and would naturally be my travel mode of choice.

Efficiency in terms of weight lifting really starts with the programming. Since programing is outside of the scope and purpose of this manual I will keep my discussion of it brief. 99% of the time the coach is also the programmer for their clients. So make sure their programming is in line with their goals and efficiently gears them towards said goals. After all, you don't want them walking across the country to their destination when flying there is a viable option.

Assuming you already have efficient programming in place for your clients, I'm going to turn my attention to the direction of *the process* as it pertains to each set and individual rep your client will complete. In this manual I outline the most efficient processes for the back squat in order to achieve maximum efficiency when approaching the bar, un-racking the bar, performing repetitions, and returning the bar to the rack. The importance of these processes cannot be overstated. Approaching and attempting every rep the same way every time, when done right, helps eliminate error, variance between sets, and thinking during the lift. Football coaches say all the time that thinking on the football field makes you slow, which is true. For strength coaches we tell our clients thinking makes them slow... and weak. The processes outlined will help eliminate any thoughts, fears, or anxiety that a client may have going into an attempt, which subsequently will help increase their performance of that lift (T. Liu-Ambrose, Moritz, Schonk).

## **The Environment**

As coaches we are responsible for the physical environment our clients train in as well as the mental environment we help shape within our clients. The physical environment constitutes the equipment our clients will use and the surrounding atmosphere our client train in. If you are a coach that works in a gym that consists of rows upon rows of treadmills and isolation machines then you are not really a coach, you're a machine babysitter. Furthermore, if you fall into this category you probably think deadlifts, squats, bench press, and overhead press are all bad for you which means you're uneducated in the field of strength and conditioning and thus nobody cares what you think anyway. As coaches we should choose training locations that have a diverse array of equipment. Our clients' needs are all different so having a variety of equipment allows us to program efficiently to meet their needs. If your gym does not have variety in equipment, help them acquire some or find a new gym to train your clients. They will thank you either way for it in the long run.

As important as the physical training setting and equipment is, the mental environment we shape within our clients is more important than any piece of equipment and is something they will take with them when they leave your training session. From this respect we are life coaches, which is something we should take just as serious as the physical condition of our clients. We instill confidence by teaching and unlocking the true physical potential a person has. There is confidence that comes with unlocking this potential that will spill over into other areas of their lives. Their confidence is gained through your knowledge of exercise science, ability to coach movements, and ability to properly motivate a client. Without these three attributes your client will never reach their potential or goal, which is what they pay you for. It won't take long for a client to realize any deficiencies you have as a coach, which will lead to distrust. Trust is the foundation that the relationship between coach and client is built upon and is thus something to be taken seriously. So spread your knowledge, program specifically and efficiently for your client, coach them on every detail of every movement, find out how to sufficiently motivate your client so they can reach their goals, and never stop your personal quest for knowledge in the field you work in. All of this will lay the foundation for your coaching relationships and lead to the mental environment we strive for within our clients that will impact them long after they leave the gym or are finished working with you.

### **Coaching the Client**

Coaching a client has two basic elements that must be considered and addressed. Just like the environment, we are responsible for coaching the client both physically and mentally. To coach a client physically you must be able to effectively communicate what you want the client to do in their language. Most coaches call these cues or phrases that are short and specific that aim to induce a physical response by bringing awareness to a fault in the movement you're trying to coach. It is important to have a variety of coaching cues for every movement fault since every individual communicates

differently. If the cue you are using is not eliciting the desired response then the client is probably not understanding what you want them to do, so having multiple ways to say the same thing gives you a greater chance of getting the desired response from the client. Sometimes we have to drop the square peg we're trying to fit into the round hole and grab the round peg that obviously fits better.

Our intent as coaches when we teach these movements is to develop proper motor patterns for the movement. The first step is getting the client to perform the movement with very little to no weight. For some clients this is a great challenge, others will pick it up very quickly. Once we get the technique right, the key to ensuring continued correct technique is repetition and reinforcement. Having them do the movement over and over and over again teaches their body that this is the way we move for this exercise. It is important to not just tell them 'good job' or 'that was good', but to be specific about what they are doing really good with each 'clean' or 'good' repetition, this reinforces the positive aspect of the movement. We have to coach not only the bad movement patterns but the good as well. This will ensure continued success with the specific portion of the movement they performed so it does not become a fault down the road.

Once we have coached the client to perform the movement correctly we have to start altering different aspects of the lift. By increasing the weight, decreasing the rest intervals, or increasing repetition schemes we are implementing different types of intensities to the lift. After a movement is learned, these stresses bring out the good, the bad, and the ugly. There will be aspects of the lift that they perform really well under these stresses. As for the bad and ugly, here we learn when the weight gets heavy, or the client gets tired, what biomechanical patterns they default to in order to complete the movement. These can be caused by anything from muscle imbalances, poor previous motor patterns that you had to coach out of them that have reared their ugly head, or specific muscle weakness that lead to biomechanical break downs. Observation of these faults guides our programming specifically for

that individual client to help improve that specific lift, or portion of the lift. It is important to note here, that allowing a client to perform 'dirty' or 'broken' repetitions under load only reinforces to the client that the poor movement pattern is acceptable when it gets heavy or hard. Obviously this is not what we want so don't let them do it. When their form breaks stop them. You worked so hard to teach them to do it the right way, don't give them the opportunity to throw all of that away. The way a client learns to move under these different stresses will be the movement pattern that really sticks with them.

It is important to touch on the subject of coaching around physical limitations. You will have clients that come to you with all kinds of 'bad' body parts. If they make a claim about an injury, make them give you a physician's note for it outlining what they are able to do and what they are not allowed to do. If they don't have a physician's note then you cannot, with a clear conscious, work those body parts until they have been professionally evaluated. We are in the business of helping people, not hurting them. This doesn't mean there aren't things you can do in the meantime, get creative and give your client a great workout in other ways, but stay away from 'injured' body parts until they are cleared for physical activity, unless you have great insurance and love lawsuits.

As I mentioned earlier in this segment, there is a mental aspect to coaching the client that is an extension of the mental component discussed in the 'Environment' section but falls more under coaching. It is imperative to teach the client what I like to call 'fighting the good fight.' These means that the client learns how to perform a lift correctly without ever breaking form. They must learn to either complete the repetition correctly or fail. You would think, intuitively, that this would be considered physical coaching. More often than not the break in form stems from a break in the mind first, either from doubt or physical fatigue that manifests itself into mental fatigue. Coach them to be mentally tough, aware of their own body in motion, and that any deviation from the biomechanical norm you have established is unacceptable. This doesn't mean when it gets hard you quit and fail, it means

teaching them to mentally give the bar hell through their body the right way and when giving it hell isn't enough, then they have permission to fail.

The last aspect of mental coaching comes from building the confidence of your client through your programming. Don't ask your client to do things you know good and well they can't do. This includes exercise selection and weights used. There is a fine line between challenging your client where exercise completion promotes the confidence discussed in the 'environment' section, and failing your client by asking them to do too much, which can potentially decrease their self-efficacy. There is sufficient scientific literature proving a link between physical performance and self-efficacy (Moritz, Schonk). Therefore, destroying your clients' confidence by asking them to do things they are not capable or ready for is only dragging down their performance for subsequent training sessions. Push your clients, and when appropriate push them to their limits, never push them too far beyond those limits.

### **The Back Squat**

The back squat is a process that requires attention to detail in order to perform it correctly. There is a lot of information in this section so I suggest teaching it in the blocks that I have broken it down into. This process starts with approaching the bar, into the setup, to unracking the weight, to the back squat itself, and ends with the rerack. The common movement faults, their causes, and their correction cues will be addressed here. I will also provide a brief overview of exercise selection for correcting muscle imbalances associated with certain movement faults as well as mobility issues related to these movement faults. This overview is merely to make you aware of the roles that these two things play in movement faults, because of that I don't spend much time on them and merely point you in the direction of more in-depth knowledge since these topics are outside the scope of this manuscript and constitute whole subfields of lifting themselves. When writing the layout for each section you will see I

write as though I am speaking to you as the client and not a coach, I do this because it is easier to write and explain in this manner than telling you how to tell another person how to do something.

### **Approaching the Bar**

Approaching the bar is more of a mental prep than a physical action. Yes, you will physically approach the bar, but it's the mindset you have when you do that matters most at this point. This mental prep begins with thinking about the process you're about to undergo, beginning with the setup. You want your mind thinking about anything other than the weight on the bar. The purpose of attempting a repetition is to complete it. This objective is the same no matter if it's 50% your 1 repetition maximum (RM) or 99% of your 1 RM on the bar, you intend to complete the rep, so why treat any given repetition different than any another? This is why we approach the bar with a clear mind focused on the process we're about to undertake, not the weight. After all, if your programming is any good it won't ask you to do something you're physically unable to do.

### **The Setup**

The next step is the setup. The setup starts with placing the barbell hooks on the rack to a height roughly 2-4 inches below your shoulder height.





Subsequently this places the barbell in these hooks somewhere around 2 -4 inches below the top of your shoulder, which is optimal for the un-rack and re-rack. Next up we get our hand placement.



Hand placement is determined by your personal shoulder flexibility. Ideally you want your hands as close to your shoulders as possible because this not only helps create the shelf the bar will sit on, basically your trapezius muscles (traps), but provides the greatest muscle tension in the upper back by supplying the most torque through the shoulders, which also takes out any normal laxity you may have in the joint. The closer your hands are to your shoulders the more natural torque this position creates. The farther away they are the less natural torque you can create, this makes it more difficult to achieve stiff and stable musculature to support the weight on your back. The thumb of your hand should be wrapped around the bar. This will allow you to try and 'bend the bar' with your hands, this further increases torque in the shoulder and subsequently creates greater stiffness of the musculature in the upper back to support the weight. You want your hand placement even on each side of the bar to help keep you centered as you get under it. Since I know how important shoulder flexibility is to my squat I like to spend 4-5 minutes doing shoulder specific mobility exercises to help prepare my shoulders for the torque and load they're going to have to hold. A good mobility book to pick up for such exercises is

“Becoming a Supple Leopard” by Dr. Kelly Starrett. It’s a good resource filled with great information, so go get it, read it, and apply it, your shoulders (and rest of your body) will thank you.

Due to shoulder mobility issues you may not be able to get your hands very close to your shoulders and that’s fine. Space your hands out to a point that is as close to your shoulders as your personal mobility permits. You may want to spend some time during the next part, getting under the bar, playing with hand placement to find a position that’s best for you.

The next step is getting under the bar. After your hands are placed evenly on both sides we pull ourselves under the bar to place it on our back. Take a moment to look out of your peripheral to make sure you are centered on the bar. Any bar that is worth using has rough and smooth portions on it which are evenly distributed on the bar. Use these as visual markers out of your peripheral to help judge how centered you are. If you’re not even, get even, before you attempt the next step, or bad things happen.



It is important to point out now that there are two dominant types of back squatting: Low bar, and high bar. The definition of each are self-explanatory; low bar sits low your shoulders and back while high bar sits high on your shoulders and traps. The way I’ve outlined teaching this movement will correct technique for both so don’t put too much thought into this beyond knowing there are two types and whatever bar placement you feel is best for you falls into one of these two categories. Finding the right bar placement for you is what I call finding your sweet spot. I only have three no-no’s when it comes to

finding your sweet spot. First, the bar should never, yes I said never, be placed on your neck. Your cervical vertebrae are not built to have bars with lots of weight sitting on them. This is a good way to strain a muscle, bulge a disc, or find yourself in a wheel chair. All of which can be avoided. Second, the bar should never sit on the spine of your scapula. This is the prominent boney projection off of your shoulder blade. Sitting a loaded bar on this causes unnecessary discomfort and pain which will affect your ability to lift heavy weight, so don't do it. Third, and lastly, do not place the bar so low on your back that it sits under the natural shelf your hand placement and musculature creates. This places the shoulder in an unnatural and dangerous position by producing unnecessary strain on the wrists and shoulders. It's bad, it hurts, don't do it.



### **Un-rack**

You would think that this part would be self-explanatory, but it is important to discuss since there is significant injury risk involved. At this point your hands are in a place creating stiff musculature in the upper back via torque around the shoulder, your head and neck are in a neutral position, you're position evenly under the bar, and the bar is set on your sweet spot. Next we want to set our feet. Bring both of your feet forward towards the bar until the bar itself is sitting over your mid-foot. This creates a very vertical torso. Next we set our foot width which should be just underneath your shoulders with a tow angle of zero (toes pointed straight ahead). This vertical torso and stable base is the safest to un-

rack from. If you're feet are too far back away from the bar (more horizontal trunk angle) then when you attempt to un-rack the weight it will turn into an upper back extension. This comes with an increased risk of injury.

#### Good Setup vs Bad Setup (Horizontal Trunk)



With most racks there is little room on either side of the barbell between the rack and the notches of the barbell that the weights are slid up and pinned against. This is a problem if you get your feet too wide and you have a toe angle above zero because when you step back, your step will involve excessive side to side sway and increase the chance of hitting the rack with the notches of the barbell or the weights themselves. With a narrower base and zero toe angle, the step out of the rack has less side to side movement decreasing the risk of hitting the weights during the unrack.

The problem with hitting the rack with a loaded barbell on your back is that the sway from the bar will result in torque and shear stress being placed throughout your spine. This is a recipe for disaster. Not only is the risk of injury extremely high when this happens but the severity of the injury is high as well. Your spine is not built to torque with heavy loads on top of it, and surely isn't made to handle any

shear stress that results from a loaded barbell. This is why we set up and un-rack the way we do, to prevent injuries that could put you in a wheelchair.

The next part of un-racking the weight is called the brace and lift. This is where you create whole body tension, especially in your upper back, core, and gluteal muscles (glutes), to prepare your body to receive the weight. The best way to create this is to take a big deep breath and hold it, then squeeze your glutes, stomach muscles, and act like your rotating your hands in toward your body. All of this will create tension from where the bar sits on your back, all the way through the floor. Immediately after this whole body brace, drive vertically through your heels to lift the weight straight up out of the barbell hooks. **AT NO TIME FROM THE BRACE UNTIL YOU COMPLETELY REREACK THE WEIGHT ARE YOU TO LOSE ANY OF THE TENSION YOU CREATE IN THE-UNRACK, NOR ARE YOU TO TURN YOUR HEAD AND DEVIATE IN ANY WAY FROM AN ANATOMICALLY NEUTRAL HEAD POSITON.** This is so important that I had to put it in all capitals.

This last step in this part of the process is physically taking a step(s) back out of the rack. This step(s) should have no side to side movement. You also only want to take the necessary amount of steps to clear the barbell hooks. For some people this is one step, others it's two. You don't want to waste any unnecessary energy or movement, especially when the weight gets heavy, so only take the number of steps required to clear the barbell hooks.

## Just Far Enough (Easy Way) vs To Far Back (Hard Way)



## The Squat

Before we even attempt to squat the weight you can exhale the breath you held from the unrack and take a few relief breaths while you get yourself into a good position to help ensure proper mechanics of the squat. Firstly, this involves foot placement and toe angle. For most people their heels should be placed either under their shoulders or slightly outside of their shoulders. Play around with this and find what best and most comfortable you.



Your feet should be even, parallel, and an exact mirror image of each other. If one foot is wider than the other, one is set further back than other, or one toe is pointing east while the other is pointing north, then when you go to squat your mechanics will suffer and your form will ultimately fail.

Once you have your feet set we need to address the toe angle. For most people the optimal angle for squatting is 30 degrees moving as far out as 45 degrees based on body type and limb length. Play around with this and find what best fits you.



The importance of foot placement and toe angle cannot be overstated enough. As you will see in later sections where I address specific movement faults, these two things are at the root of several movement errors. Having a wide base ensures that the hips have a place sit and sink into when as you descend into the squat. While toe angle allows for greater external rotation and abduction of the femur which prevents valgus knee (knees caving in), helps ensure maximal gluteal muscle activation throughout the movement, creates muscle tension via torque in the hips, knees, and ankles which decreases laxity in those joints by creating 'stiffness', and keeps the femur out of the way of the boney anterior portion of your pelvis which can cause tissue impingement and posterior pelvic tilt. These concepts will show up later and how failure to pay attention to these negatively affects the biomechanics of the squat in the form of movement faults.

Before you begin the descent it is imperative you keep your shoulders, upper back, and core extremely tight, all while maintaining a neutral head and neck. I keep repeating this because it is that important. This stiffness is assisted by the breath hold. Just before you begin the descent take a big deep breath. This will help increase pressure in your thoracic cavity as well as your abdominal cavity via your diaphragm. This pressure will help support all areas of your spine and help add to the stiffness you've already created with the musculature around the shoulders and your core. Without this stiffness you greatly increase your chances of becoming part of the statistic that accounts for back injuries in the back squat. Being part of any injury statistic is not a good idea, nor is it any fun.

Now we get to squatting the weight. The squat is a hip thrust. Your hips dictate the muscle activation of the legs and the position of the trunk, because of this the first thing that moves is the hips. Start by unlocking your hips. From the standing position you're in at this point, more than likely your hips are locked out in an extended position. You unlock this by starting to push your hips back as if you're going to sit on the toilet. Continue pushing your hips back until they won't go back anymore. There is a difference between pushing your hips back and simply leaning your trunk over and your hips not going anywhere. Play around with this until you understand the difference to ensure proper mechanics moving forward from this point. At the point when you have driven your hips back as far as they will go, without you leaning over at the waist, the weight should be completely on your heels and mid-foot and you should have a trunk angle of about 35 degrees. To give you a frame of reference for this, zero degrees is considered standing straight up.



## Unlocking and Driving the Hips Back vs Leaning Over at the Waist

Unlocking the hips and driving them back involves a knee bend where leaning over does not.



From the position of hips being driven back as far as possible, which creates that trunk angle of about 35 degrees, we begin to drop our hips vertically down into 'the hole' between our legs. This motion should be initiated by the external rotation and abduction of the femur we mentioned earlier. To make this concept easier to understand, imagine you're trying to screw your feet into the ground. Depending on your body type and limb length this will either start to track your knees just outside of, or in line with your toes, both of which are acceptable as long as the weight is in your heels. As you drop your hips into the hole having the external rotation and abduction of your femur really activates, and sustains activation, of the glutes and hamstrings which will be your best friend when it's time to come out of the hole. You will continue on this track downward until your hip crease breaches the horizontal plane created by the top of your knee.



The debate for ‘how low is low enough’, is something I’ll leave to the internet ‘troll’ experts who want to argue and dismiss peoples accomplishments in the squat while sipping their Mountain Dew and eating their Hostess Honeycakes. As a coach or trainer you know what your clients’ goals are and you may determine their squat depth based on these goals. Anyone that tells you it has to done only one way as the concrete standard for everyone training for anything, is close minded and can’t see past their own nose. For this manual and the purposes of standardizing the movement for it, is the only reason why I’ve said that sufficient depth is reached when your hip crease breaks the horizontal plane of the top of your knee.



Coming out of the hole is a totally different animal. The easy part is getting down, the real struggle beings with coming up. The first thing that should rise out of the hole is your chest. If your hips rise first you're not driving through your hips, or thrusting your hips, you're simply shifting them vertically and creating a more horizontal trunk angle. This more horizontal trunk angle creates more stress on your back and really turns the movement into a modified good morning and not a squat. You want to drive the weight with your hips not extend your back to stand up. Driving through your hips transfers the force generated by your glutes, hamstrings, and smaller hip extensors/lateral rotators against the ground and up the kinetic chain to the bar. The drive against the ground is always through the mid-foot or heel, never through the balls or toes of your feet. This is why you want the chest to rise first; it keeps the 'weight' in your hips which helps with driving through them while keeping you set on your mid-foot or heels. This is the safest while most efficient way to move the most weight possible.



No Bueno, hips should not rise first.



If you're having trouble with this concept try thinking 'chest first' as you initiate the hip thrust out of the hole. If that cue doesn't work then physically 'initiate' your elbows. I say this not because I expect you be able to move your elbows, which you shouldn't be able to do since they are tight and creating torque around the shoulder to support the weight on your back, but because sometimes trying to move a body part that is already stationary can have a desired effect somewhere else in the kinetic chain. Trying to drive your stationary elbows straight up, like you're trying to press the weight off of your back, helps set your torso on a more vertical path out of the hole. This helps initiate and substantiate the hip thrust through the ascent. So at that moment when you're in the hole and begin to initiate the hip thrust out, simultaneously 'initiate' your elbows. Remember, the hip thrust is the most important part of maximizing the force generated against the ground through your kinetic chain. If your hips are broken, the chain is broken, and what good is a broken chain?

There comes a point during the hip thrust that two important things should happen while you finish the movement. First is the exhale. You've been holding your breath since you started your descent

for the purposes of increasing pressure to help stabilize your spine. There comes a point when you're  $\frac{1}{2}$  to  $\frac{3}{4}$  the way up that the benefit of this is not as great as the benefit of the exhaling. The squat itself is an anaerobic exercise, meaning you're not using oxygen to perform the work. That feeling of needing to breathe is your body accumulating  $\text{CO}_2$  from the work being performed that needs to be exhaled. This is largely because  $\text{CO}_2$  is a greater signal in your body to breathe than a lack of oxygen (McArdle). If you are performing multiple reps you need to establish this type of breathing rhythm so the  $\text{CO}_2$  does not accumulate to a point that it affects your performance quicker than it should. Once you hit the  $\frac{1}{2}$  to  $\frac{3}{4}$  mark of the ascent you should begin to slowly exhale throughout the rest of the lift. A good signal to begin this brings us to the second important thing that has to happen in order to finish the lift, the quad transfer.

The hip thrust is initiated by the tension in the glutes and hamstrings. This is the reason we sit back and set a trunk angle of roughly 35 degrees during the descent, to load the glutes, hamstrings, and hips, for the thrust out of the hole. There comes a point in the hip drive where some of the tension we loaded the hips, hamstrings, and glutes with, gets transferred to quads to help finish the lift. You will know when this happens because the drive starts to get a lot easier due to an increased mechanical leverage under the bar. This is also because for most people their quads are stronger than their posterior chain, not a good thing by the way. This does not mean you stop squeezing your glutes or engaging your hamstrings, it just means you're getting more force from your 'stronger' quads, due to your position under the bar, to assist in finishing the squat. When you feel this transition, use it to signal the exhale since the transfer tends to happen in conjunction with the optimal time to exhale. These two cues should be tied together as triggers for each other. All of these things we have discussed in combination with completely extending your hips and knees signals a completed repetition.

## Re-rack

The last part of the squat process is often the most dangerous, the rerack. At the top of the squat after the repetition is completed, take another quick breath or two while maintaining your stiffness and begin to take the necessary amount of steps, however big or small, until you get to the point that the bar is pressed firmly against vertical components of the barbell hooks. It is important to keep your speed into the rack relatively slow. I have seen people go into the hooks with so much speed that the barbell bounces off the vertical portion of the hooks and they miss the rerack completely. As you imagine what this looks like you should also imagine what comes after this event, paramedics. This is why we walk the bar slowly into the vertical portions of the barbell hooks.



Once you are pressed firmly against the vertical portion of the barbell hooks your foot placement will either be staggered or completely underneath you, either of which is acceptable for the re-rack. The important thing here is your torso; you want a vertical torso with one or both feet directly under the rack so you don't end up flexing your spine to drop the barbell into the hooks. From this position you simply reverse the motion of the un-rack, with the exception that you may or may not have

a staggered foot stance, and vertically drop the barbell into the hooks. The drop, just like bringing the bar into the vertical portions of the hooks, should not be a very fast descent either. I have seen people drop the bar too fast into the hooks and the bar bounces out causing them to miss the rerack completely. Again, as you imagine what this looks like, you should think about the paramedics that are soon to follow. Once the barbell is safe into the hooks the process of the squat is complete.

### **How to Fail**

Squatting with heavy weight on your back is lots of fun when you can complete the repetition. This movement can go from fun to dangerous really quick if you can't complete it. This is where it is important to know and understand how to properly and safely fail at the back squat. People generally get stuck and fail at two points, in the hole and half way up. In the first scenario you've descended into the hole and cannot move out of it. The second scenario you've visited the hole, decided you didn't want to be there, and ran out of gas shortly after you left it. The processes for failing I'm going to discuss covers both scenarios.

Failing from the hole is the much easier than failing half way up. From the hole you want to thrust your hips forward (horizontally) while simultaneously extending your back. The objective here is to get as much separation from yourself and the bar as possible, so this movement cannot be slow. Failure to perform this quickly results in not a lot of separation between you and the bar which potentially leads to the bar either 'rolling' down your back or hitting your lower back and tailbone as it drops. Both of these hurt and can cause a trip to the emergency room, so be explosive in your horizontal hip thrust and back extension. You will find yourself on your knees and the barbell far from your back if you perform it correctly.

Failing from half way up is a little different. Instead of trying to throw your hips forward horizontally and extend your back from this position, drop back down into the hole and do it from here,

just as you would do if you had to fall from the hole to begin with. The main reason for this is because it is much easier to throw your hips forward and extend from this position than it is from half way up. Most people when they try this from a position out of the hole they do not get much horizontal hip thrust or back extension and the bar either rolls down their back or hits their lower back and tailbone on the way down. Practicing these techniques and mastering them before you attempt maximal loads is a good idea and will save you in copays from hospital visits.

### **Movement Faults for the Squat**

#### **The Butt Wink**

Let's start by defining what exactly the butt wink is. The butt wink is where your pelvis posteriorly rotates, or tilts, under your torso at any point during the squat.



As you can see this creates a deviation from the natural neutral lumbosacral position. This unnatural convex curve that is created places the majority of the weight stress directly on that convex curve and subsequently the intervertebral disks, supporting connective tissues, erector muscles, and the lumbosacral joint itself.



The erector muscles along your vertebrae are design to extend the spine, allow the spine to move into flexion under a load, and laterally flex with our own, or light weight forces. They are not designed to flex and extend under heavy loads. Your intervertebral disks are designed as cushions between your vertebrae. In conjunction with the other vertebrae they evenly absorb the load placed on the spine when they are held in their neutral position by the erectors (Neumann). Any deviation from this neutral positional relationship results in an uneven load on these disks. It helps to think of these disks as Jello filled balloons. If you place an even, balanced, weight force on top of this balloon, as opposed to a weight force on just one side or off center, you'll find that you are able to place more force evenly in the middle than to just one side. Thus it takes a lighter load to break the balloon when it is off center, which leads to Jello busting out on one side, which leads to a mess to clean up and a doctors appointment to make.

For the lumbosacral joint, this is the junction between your spine and your pelvis. The pelvis is where the force transfer happens, which makes this joint very important. We have to have a neutral, natural, relationship between these two components for maximal force transfer. The other reason is any deviation from this natural relationship in the joint can result in more spilled Jello for you to clean up.

The butt wink is by far the hardest movement fault to correct. This is because the source of the fault could lie in so many different areas. It could be anywhere within the squat process itself, could be a flexibility and mobility issue, an underdeveloped musculature, a muscle imbalance, a motor recruitment issue, or any combination of these. We are starting with this since it is the most complicated movement fault to correct and addressing it will bring to light many of the concepts and cues we will use for several other movement faults in later sections.

In evaluating causes of the butt wink it's best to start from the floor up, with the feet. If your feet are uneven in any direction, laterally or horizontally, this can affect your stance and alter the

descent, causing the butt wink. Another issue with your feet could be if your feet are not wide enough to leave room for your hips to drop, which causes this posterior pelvic tilt (aka butt wink). This is because the femur can only move into so much of a flexed position before the tissues associated with the anterior portion start to come into contact with the boney structures of the anterior pelvis. This tissue impingement is both of the connective tissues and active musculature itself. So take the time to play around with your foot placement and see if this helps or fixes the problem.

Staying with the feet, check your toe angle next. If you don't have a large enough toe angle several things generally happen. First, you will not be able to get as much external rotation and abduction from your femur as needed to get it away from the boney structures of the anterior pelvis which leads to the issue as stated above. Second, you will tend to get a valgus knee which makes the glutes and hamstrings (hammys) harder to engage with this poor toe angle. Active glutes and hammys help keep the pelvis in an anatomically neutral position, so losing this muscle activation can sacrifice the position of the pelvis, not to mention decrease your force production since two of the primary movers of the squat are not operating efficiently. The other problem with the valgus knee is it sets the femur back on track to come into contact with the anterior portion of the pelvis. Lastly, attempting to externally rotate with too little of a toe angle will force your feet to 'spread the floor', meaning you're not fully engaging your small lateral rotators because you're strictly trying to abduct the femur and not rotate it. So if your toe angle is narrow, play around with it, and as you do remember you're trying to screw your feet into the ground, not spread the floor. This gives you that external rotation and abduction that maximizes glute, hammy, and lateral rotator activation.

Moving up the kinetic chain we come to what I call an overextension fault. This is where you overextend your back from its anatomically neutral position which leads to anterior pelvic tilt. Remember, those erector spinae muscles between your vertebrae are not meant to overly flex or overly

extend. This overextension creates a position of instability. On the flip side, how hard can you contract and stabilize your core when you're overextended in your back? The answer, not nearly as well as you can with a neutral spine. By overextending you're losing stiffness in the trunk because you cannot brace your core as much as you are capable of if you were in a neutral spine position. This fault is can cause intervertebral disk and connective tissue injuries on the medial and anterior side of the spinal column, which leads to more spilled Jello.



Take a moment and check your neutral hip and back position by standing erect and contracting your core, glutes, and hammys, all at the same time. Reach back and feel this curve that's created, this is your anatomically neutral position (Starrett). It's important to physically feel it so you can get a picture in your head of what it looks like, as well as what this really feels like. We're all little snowflakes so there will be some variance from person to person. A lot of people think they have to see the wall or ceiling when they squat because for so long strength coaches have been telling people 'chest up' as a cue. The first thing someone does mid-squat when you tell them 'chest up' is overextend their back to bring their chest up, which does nothing but break the kinetic chain in their back, sacrifice the stiffness in their core, and places them at an increased risk of injury, all to appease a strength coach who should know

better than give that cue in the first place. It's ok to see the floor while you're squatting, that probably means you have a trunk angle of 30 degrees and a neutral neck which is what we want. Keep a neutral spine position throughout the movement and if you feel yourself trying to overextend, have your trainer or coach tell you, or think to yourself, 'hips though' or 'hip thrust' as you're completing the movement to take the focus off of your overextending tendencies and put it back on your hips where it belongs.

Overextension faults can also be caused by weak or underdeveloped glutes and hammys. When the weight starts to get heavy our bodies try to find strength in other places when it perceives that extra strength is needed, this is called tension hunting (Starrett). In an effort to find strength when you're not getting it from your glutes and hammys like you're supposed to, you overextend in attempt to transfer some of the weight to your stronger quads to help finish the movement. It is important to keep the weight where it belongs, in your hips, and if you can't get the force needed to complete the reps from here than the weight is too heavy and needs to be reduced.

Staying with your trunk, there is another pair of trunk faults that can create, or help create, the butt wink; having too horizontal or too vertical a trunk angle. What I mean by trunk angle is the angle your flat back makes in relation to the horizontal surface you're standing on. If your trunk angle is vertically excessive, this places most of the stress from the weight on your quads, which can turn your glutes and hamstrings off. With these muscles less active on and around the pelvis, it is more likely to move into an posterior tilt and create the butt wink. The main culprit of this is not driving your hips far enough back before you start your descent into the hole, this is what sets your back angle for the descent. Once you have driven your hips back as far as you can, without just leaning over at the waist, then start your descent. This should help set the optimal back angle or roughly 30 degrees for the movement.

## Too Vertical



The flip side of the vertical trunk fault is too horizontal of a trunk angle. By going well beyond the 30-35 degree suggestion you transfer the majority of the weight from your hips, glutes, and hammys, directly onto your lower back. Causes for this can be when you were driving your hips back you began to lean at the waist thinking it was driving your hips back, when in reality all you're doing is bending at your waist. This sets your horizontal back angle before you even begin the descent. The other cause is when you execute the movement perfectly into the hole and instead of thrusting your hips and trying to get your chest to rise first, your hips pop straight up vertically, which puts your butt straight up in the air, and creates the horizontal back angle. Since this position relieves some of the tension in your glutes, hips, and hammys, it creates a less active lower posterior chain which can cause the butt wink. This is also called the good morning squat. One way to avoid this issue is to think 'chest first' or 'traps to bar' out of the hole. Another way to avoid this issue is to initiate your elbows coming out of the hole as if you were going to press the weight off of your back. The musculature of your upper back and shoulders created by the torque of your hand placement, as well as your hands trying to bend the bar, will not allow for actual movement of your elbows, which is good. The attempt won't move your elbows

but the attempt will act up and down the kinetic chain and assist in initiating the hip thrust, which will help keep your lower posterior chain active and stiff around the pelvis holding it in place.

#### Too Horizontal



Joint Mobility in healthy individuals is directly correlated to the tissues surrounding any given joint and those tissues natural compliance. While joint mobility is outside the scope of this manual it is important to make a note of it here since it can play a role in the butt wink. Stiff tissues that are not very compliant can alter the mechanical operations of the joint(s) they cross. So if you're having trouble achieving some of the positions mentioned it would be in your best interest to invest in some books or manuals that outline specific mobility exercises to address your specific issue.

There are certain individuals that have a butt wink with very light loads which tends to go away under progressively heavier weights. I've seen this issue in strong clients as well as weak untrained clients. The common denominator between all of them is that they all are very flexible. It seems that these individuals have a relative threshold of load that is needed for them to fully engage or activate their posterior chain. Under relatively light loads the butt wink is not a concern for them from an injury standpoint, but can be as the weights get relatively heavier. So if you have a client that is very flexible and you've pulled out all the stops trying to fix their butt wink at lighter loads, try increasing the load, they may fall into this category. Start with small jumps in their weights up and observe any changes. If

you see, with increasing loads, the butt wink is diminishing than your client may be one of these individuals who needs that heavier load to activate their posterior chain. At which point you can breathe a sigh of relief and squat on.

For many of the faults listed one of the common problems between them is muscle activation of the posterior chain, primarily the glutes and hamstrings. For some people this muscle activation is an acute issue that varies from session to session, which is somewhat normal. There are times that your nervous system needs to be primed in order to optimize motor recruitment and coordination for a given movement. No matter how good your warm up is sometimes your body is not putting all pieces together to function properly under heavier loads. When this becomes an issue, either after your workout has started, or you notice it during your warm up sets, you need to be able to fall back on a few accessory lifts to tell your nervous system to wake up and squat some heavy weights. I prefer movements that mimic the movement being performed and performing them explosively. For squats, this would be vertical jumps, broad jumps, squat jumps, kettle bell swings, body weight bridges, and weighted bridges. When doing explosive jumps stay away from things that diminish or eliminate the eccentric landing since there is significant evidence that suggests this portion of the movement assists in maximal strength production when done 3-5 minutes before a squat set (Bullock). An example of an exercise that limits the eccentric component would be any variation of box jump. These are not meant to be standalone exercises but just something to put a foot up your nervous systems rear end to get it firing the way we want it to. I stick to repetitions of 2-3 and wait 60-120 seconds before I go into my next working squat set.

For other people the problem of muscle activation is an imbalance or weakness in their posterior chain. For these individuals we need to bring these lagging muscles up to speed with the rest of the body. The best way to do this is with unilateral leg exercises that naturally emphasize the glutes

and hamstrings and perform them with your personal full range of motion. We never want to sacrifice form for range of motion. There are also some bilateral exercises that can be used if manipulated to focus posterior recruitment and strengthening more than quad development. The problem with most bilateral exercises is that with a wide base of stability most people with an underdeveloped posterior chain default to using their lower back for the movement rather than their backside leg muscles. With a clients stability being challenged by unilateral work most people cannot default to their lower back since they don't have a bilateral base of support, which is required to sufficiently activate the lower back for any type of pulling or hinging motion. Some examples of unilateral leg exercises are weighted step-ups, weighted lunges, single leg Romanian deadlifts, banded squats, monster walks, and Bulgarian split squats. Some examples of bilateral exercises that emphasize the posterior chain would be low box squats, parallel box squats, and good mornings. Proper execution and specifics of these movements are outside the scope of this manual, I have provided these examples as a starting point for you as a trainer or coach. For a broad database of exercises to start with get a copy of Bill Pearls Keys to the Universe, this book will help expand your uni and bilateral exercise base for posterior development exercises.

### **Valgus Knee**

Valgus knee is just a fancy name for when your knees collapse inward.





This can be caused by poor external rotation and abduction of the femur, poor foot placement, excessive or insufficient toe angle, or underdeveloped glutes and hamstrings (seeing the common theme yet?). The problem with this movement fault is it lessens the activation of the glutes and hammys, bleeds force through the knee joint which increases the force needed to complete the movement, creates a shear force on the meniscus of knee, and increases the tension force on the medial collateral ligament (MCL) of the knee (Neumann). Obviously having your posterior chain less active in a movement where the posterior chain is a primary mover leads to decreased performance via decreased force production. Add to that the fact that some of the force generated is being lost through the knee joint because of a lateral joint angle that shouldn't be there and we can see how much this compromised position can hurt our performance. From a physical standpoint, the shear stress placed on the meniscus can wear uneven grooves or cause micro-tears to it. Both of these are no Bueno. The increased tension force on the MCL can stretch it out leading to too much laxity in the tissue causing knee instability, increased inflammation in the tissue, small tears to it's attachment on the meniscus, or micro-tears to the MCL itself that lead to increased tissue degradation over time, all of this is also no Bueno (Neumann).

Just like the butt wink we'll start from the ground up for the valgus knee with your feet. If your feet are uneven in any direction it can cause an uneven load and force distribution that your body detects and tries to compensate for by moving into a valgus knee position. With a load uneven to one side it would make sense that our bodies would attempt to provide lateral stabilization with the limb under the lesser load, the valgus knee, so the other limb with the greater load can have a greater position of stability to complete the movement. Take the time to examine your foot placement, play around with it, and see if this fixes your valgus knee.

After foot placement examine the toe angle used in the squat. For most people, if the toe angle is too narrow compared to your foot width your knee will naturally want to move into a valgus knee position. The main reason for this is the biomechanical relationship between the knee, hip joint, and foot width. From this position if the knee is between the foot and the hips with insufficient toe angle then any flexion or extension in the knee will want to track into a valgus position. So play around with your toe angle in conjunction with your foot width and see if this fixes your funky valgus knee.

Even when we have reached an optimal toe angle, our knees cannot completely track with our toes without some external rotation and abduction of the femur mentioned earlier. So if your toe angle is ideal, between roughly 30-45 degrees, and you're still getting that funky knee, try creating more external rotation and abduction of the femur by screwing your feet into the ground. Not only will this help prevent the valgus knee but will also help in recruitment and activation of the glutes, hamstrings, and smaller rotator muscles.

#### Valgus Knee, No External Rotation, Good Toe Angle and External Rotation



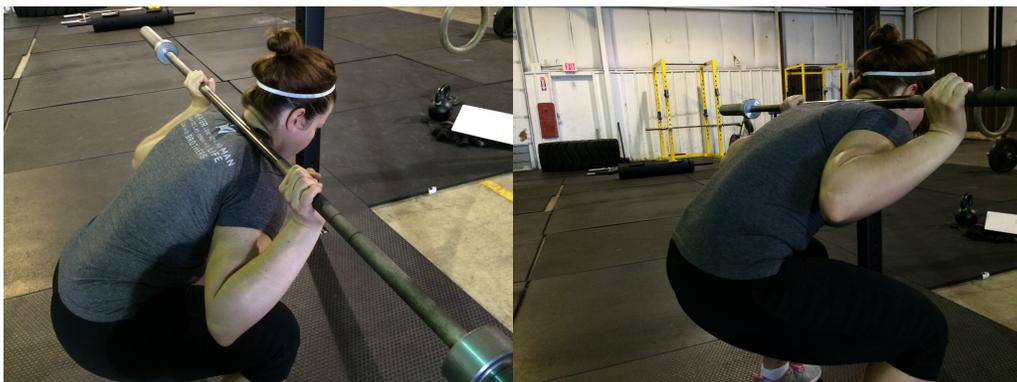
Another reason for the funky knee is an underdeveloped posterior chain. This can prevent the external rotation and abduction of the femur or proper extension of the hips. This is because the load placed on these muscles is greater than the muscles ability to generate sufficient force to move the load. For some people the valgus knee does not become an issue until the loads become close to their

maximal relative strength. So if you find this happening when the weight starts to get heavy your undeveloped posterior chain could be the problem. The same unilateral exercises good for underdeveloped glutes and hammys for the butt wink can also be applied here. Again, for knowledge sake, find other materials to expand your knowledge base for exercises to bring up these very important lagging muscles that are keeping you from better form and heavier weights.

The last subset of possible problems that create the valgus knee is strictly a mobility issue. If you have addressed all other aspects, and are still having the funky valgus knee, then the tissues of your hips, legs, and lower back could be preventing the range of motion necessary to create and maintain femoral external rotation and abduction. Since mobility is not my focus for the four big lifts, again I must defer to other manuals that specialize in mobility. I hope you have gotten the hint by now and recognized mobility as a common reoccurring problem with this lift, and you will see it in the other lifts as well. It is my goal, if I haven't already, to get it through your head by the end of this manuscript to go out and invest in a book specializing in joint and tissue mobility, your body will thank me for the suggestion.

### **Upper/Lower Back Collapse**

When I refer to the back collapsing I am talking about either the upper back hunching over or the lower back rounding and tucking the pelvis underneath it, or a combination of both.



The primary cause for the upper back collapse is simply a weak upper back. If this is the only movement fault you have then you know your core strength is sufficient for stabilization and your posterior chain is strong enough to squat the weight, which isn't a bad place to be. Sometimes this is an issue because you are not creating enough torque around the shoulder with your hands on the bar to create the stiff musculature needed to support the weight, but more often than not this is a simple issue of insufficient upper back strength. On the plus side, this is not a technical error so you're doing everything else right. You should not squat more weight than your upper back can handle with regards to this fault and it should in no other way hinder your squatting. Simply have your coach or trainer program upper back strengthening exercises to bring this lagging issue to par with the rest of your body so you can squat more weight. A good place to start is with kroc rows, barbell rows, regular and weighted chin ups, regular and weighted pull ups, bench dumbbell rows, face pulls, banded pull aparts, or any kind of a higher back angle horizontal or vertical pulling motion.

Almost the exact same thing can be said for the lower back collapse as well. This is usually an issue of lower back strength. If this is the only movement fault you're having, then you know your technique is good. The lower back stabilizes the core and is the transmission to your engine in the hips for force transmission. If your transmission is broken you're not able to go anywhere. You're losing that link between where the force is applied on your back and where force is being generated in your hips to oppose that force and move the weight. Just as with the upper back collapse don't squat any weight that will cause your lower back to collapse. In the mean time have your trainer program some specific lower back strengthening exercises to bring this weak back up to speed. I'd recommend starting with some regular and banded back extensions, good mornings, romanian or stiff legged deadlifts, atlas stone pick ups, reverse hypers, and heavy yoke walks.

The last cause of the back collapse is the ugly mobility monster, which has shown its ugly face yet again. The role that mobility can play in upper back collapse comes from shoulders that are protracted and depressed into a slightly hunched position. Common causes for this include years of poor posture, sitting a desk for work, or an imbalance between your anterior and posterior musculature. The imbalance usually means that your muscles in the front (the glory muscles) have been worked while the posterior muscles (the muscles that actually make you strong) have been neglected in comparison. This imbalance manifests itself as 'tightness' in those stronger anterior muscles pulling the weaker and subsequently 'looser' muscles forward. Simply follow the same recommendation for strength movements in the upper back collapse paragraph and remember to always try and pull twice as much as you push to keep those posterior muscles strong enough to support any movements performed in the frontal plane.

As for the years of poor posture and/or sitting at desk, part of this can be clumped into a weak upper back. From that point, again, simply follow the strength movements suggested in the upper back collapse paragraph. You may also want to research lower trap and middle trap therapeutic exercises since these muscles can also be the culprit of poor posture. In terms of mobility, you should search for texts that describe mobilizing your scapulae since most of the time that in conjunction with some strength training will eliminate the hunchback syndrome.

### **The Good Morning Squat**

The good morning squat is when you're trunk gets so horizontal that it's almost parallel to the ground, making it look a lot like a good morning and not a squat. Causes for this can range from getting to horizontal during the hip unlocking phase of the descent, raising your hips out of the hole instead of thrusting your hips, or improper use of the elbows in the descent or the ascent. The problem with the good morning is that it places the majority of the weight on your lower back and not in your hips. Since

the hips are the primary movers for the squat, having the force generated by the legs and hips transferred through the lower back will limit the amount of weight you can squat. The purpose of squatting is to squat more weight. So unless you want to have a weak squat, which leads to nobody in the gym wanting to be your friend, don't good morning the squat.

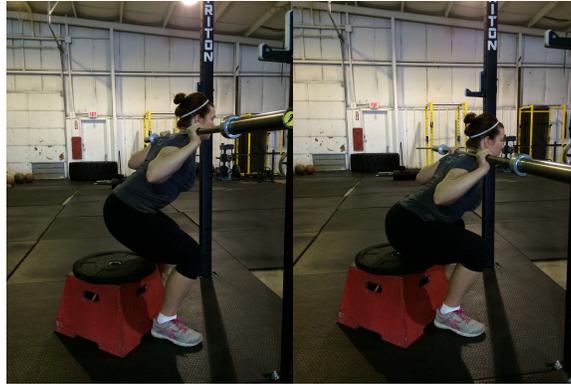
The first cause of the good morning squat is the hip unlocking phase of the descent. As you'll recall, the first movement of the squat itself is unlocking your hips. You want to unlock your hips and drive them back as if you're going to sit on the toilet, when you reach the point when your hips cannot be driven back anymore, you drop your hips vertically into the hole. This cause of the good morning is a misunderstanding of driving your hips back. You may be having trouble distinguishing between driving your hips back and simply leaning your torso forward which can feel like driving your hips back.



If this is your problem get your trainer or coach to use verbal cues during driving your hips back. Have them tell you 'back' repeatedly as you drive your hips back and then tell you 'drop' when it's time for you to drop vertically into the hole.

If your problem is leaning over from the start and not pushing your hips back, get your trainer to put a box underneath you and then have you 'reach' your hips back to make contact with the box. The box height should be adjusted for your ideal height of where your hips are driven back their furthest

without leaning over. This should be done repeatedly to develop and reinforce what it feels like and the motor pattern itself.



If you are still having trouble understanding this concept, the last thing you can try is to have your trainer or coach put their hands on you and use a combination of active and passive movement to demonstrate the proper execution with you on your body. This is a little more physically invasive and can potentially make you a little uncomfortable if you don't know your trainer or coach very well, this is why I've listed it as the last thing to try to fix this movement pattern.



Another cause of the good morning squat is raising your hips, or hip height, first out of the hole. This action alone immediately creates a more horizontal trunk and makes the movement a good morning squat. You have to remember this is a hip thrust above all else. Several cues for yourself, or your coach/trainer, are 'hips through' or 'hips first.' A physical cue that can be used is your coach or

trainer placing their hand above your hips once you're in the hole, if your hips rise first then your butt will touch their hand. This is a good physical cue to help teach you if you are having trouble understanding the concept and difference between raising your hips and thrusting your hips.

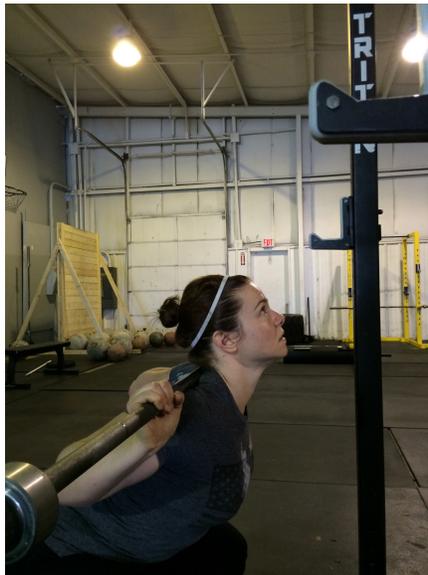
The last culprit of the good morning squat is improper use of the elbows. You have to remember that your torso will follow the track your elbows set it on. What this means is that if your elbows are too far behind the bar in either the ascent or descent your torso will want to fall forward and create a more horizontal trunk angle. The opposite effect is if your elbows become too far forward of the bar than your trunk angle is too horizontal and usually an overextended back fault follows to compensate. If you have examined all the other possible causes of your good morning squat pay close attention to what your elbows are doing. More than likely they are bad guys robbing you of good squat form. This problem is most prevalent when the weight is relatively heavy and you are struggling to finish, or grind out, the desired repetitions. So remember when you're coming out of the hole you want to try and press, although not physically possible, the weight off your back. This keeps your elbows where they are supposed to be and helps keep the optimal trunk angle throughout the ascent. A good personal cue or verbal cue from a coach or trainer for this is 'elbows' or 'press.'





## Overextended Neck

An overextended neck is exactly what it sounds like. For most people they have heard the ridiculous and ignorant cue of 'chest up' for so long they think if they bring their head up, causing an overextended neck fault, that this will bring their chest up too. As we have seen, the problem with chest up is not only that it causes an overextended back fault but subsequently causes an overextended neck fault. Another reason for the overextended neck is when you are tension hunting. Remember tension hunting is when your body is struggling to complete a repetition and unconsciously searches for strength or tension by attempting to move into other various positions while squatting (Starrett). Not only is tension hunting physically dangerous because it causes you to compromise your form, but it doesn't work, so tell your body not to do it.



The last cause of the overextended neck is we unconsciously think it will help get our hips through, or thrust our hips. The real danger with this fault is the possibility of injury. Injuries can range from muscle and connective tissue strains to bulging or slipping disks. The weight should be resting on your trapezius (traps) muscles. These originate on the scapula and insert on the thoracic vertebrae,

cervical vertebrae, and base of the skull. You have braced and created stiffness in the traps to hold this heavy weight, when you overextend your neck you are mechanically creating, or inserting, slack into the traps making them work harder to maintain the stiffness required to sufficiently support the weight. This can strain the traps or any of the smaller muscles in the cervical vertebrae area. This forced overextension can also cause the articulations of the vertebrae to unevenly distribute the force created and slip or bulge a disk. As you can imagine all of these things listed are very unpleasant, no Bueno, and can keep you from training, which defeats the purpose of training to begin with.

In terms of correcting this fault there's not a whole lot that needs to be done to fix it. You have to remember to keep a neutral head just like you keep a neutral spine. Sometimes this means you're looking at the floor and that's ok. You don't have to see the wall or ceiling to perform this movement, after all the wall and ceiling can't help you lift the weight or teach you to thrust your hips. If you have heard this 'chest up' or 'head up' cue for a long time this may feel awkward to you. If you struggle with this concept take a lacrosse or tennis ball and place it under your chin while you squat, this will force you to maintain a neutral head to keep the ball in place. Continue to do this until a neutral head feels natural and you can correctly perform the squat with this position. As for tension hunting, always focus on your technique and fight the urge to deviate from it. If the urge is great enough that it causes you to break, then drop the weight and continue squatting with correct form.



### **The Deep Sea Diver**

The last movement fault of the squat is what I like to call ‘the deep sea diver.’ This is when you go to take a big deep breath, before you initiate the squat, and hold it throughout the entire squat. You could argue that this is not a movement fault at all but a breathing fault, and you would be right. I’ve included it here because of how your body will move after you wake up from passing out with weight on your back, your body movement is severely altered. Some people hold their breath for every rep, some for multiple reps until their body screams at them to release the high amounts of accumulating CO<sub>2</sub> in their lungs. The two main causes of this are thinking too much about the squat process and not having developed the motor pattern to maintain a consistent breathing pattern. The main repercussion of this is the before mentioned passing out with weight on your back. I think we both know how that ends, in a trip to the emergency room. For reps of 1-2 breath holding is not necessarily a bad thing, but when the repetitions get a little higher, not having a consistent breathing pattern could lead you to walk and move like Quasimodo after you pass out with weight on your back.

If you are working with a strength coach or trainer a good cue during your ascent for the squat is 'breathe.' If you are one of those people that are missing that part of the process on your mental checklist as you are squatting that verbal reminder at the right time is good to help prompt you. If you are working out alone, use the physical feel of the transition from glutes and hammys to quads during the ascent as a physical reminder to exhale. Outside of these two tricks, there's no magic pill or cue to fix this prompt. Remember, breathing is essential to life and an important part of the process of the squat, so put it on your mental checklist of to-dos and make it like a Nike commercial, just do it.

### **Conclusion**

The squat is a technical and complex movement that requires attention to detail in every aspect of the lift. The purpose of this manual is to serve as a field guide for strength coaches and personal trainers new to the field on how to properly instruct clients in the squat. I've covered the basics of the process, common movement faults, and given some direction for issues stemming from muscle imbalances and mobility. Whatever you take from the information, apply it to your clients, and help create a more awesome world full of people who squat. This is a known fact, people who squat are more awesome than people that don't so it's our personal responsibility to ensure everyone we come into contact with can squat safely, effectively, and efficiently.

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