

# **Becoming a Supple Leopard**

**The Ultimate Guide  
to Resolving Pain,  
Preventing Injury,  
and Optimizing  
Athletic Performance**

**Kelly Starrett**  
with Glen Cordoza



**Victory Belt Publishing Inc.  
Las Vegas**

First Published in 2013 by Victory Belt Publishing Inc.

Copyright © 2013 Kelly Starrett and Glen Cordoza  
All rights reserved

No part of this publication may be reproduced or distributed in any form or by any means, electronic or mechanical, or stored in a database or retrieval system, without prior written permission from the publisher.

ISBN 13: 978-1-936608-58-4

This book is for educational purposes. The publisher and authors of this instructional book are not responsible in any manner whatsoever for any adverse effects arising directly or indirectly as a result of the information provided in this book. If not practiced safely and with caution, working out can be dangerous to you and to others. It is important to consult with a professional fitness instructor before beginning training. It is also very important to consult with a physician prior to training due to the intense and strenuous nature of the techniques in this book.

Printed in The USA

RRD 02-13

# TABLE OF CONTENTS

<b>ACKNOWLEDGMENTS</b> .....	7
<b>INTRODUCTION</b> .....	10
A New Human-Performance Epoch .....	11
How to Use This Book.....	15
<b>CHAPTER 1 THE MOVEMENT AND MOBILITY SYSTEM</b> .....	16
It's About Performance.....	18
The Gym Is Your Lab .....	20
You Are an Amazing, Adaptable, Healing Machine .....	22
You Cannot Make Basic Adaptation Errors.....	25
<b>CHAPTER 2 MIDLINE STABILIZATION AND ORGANIZATION</b> .....	26
Three Reasons for Bracing Your Spine.....	28
The Bracing Sequence .....	29
The Two-Hand Rule.....	31
Braced-Neutral Standing Position.....	34
Braced-Neutral Sitting Position.....	36
Abdominal Tension .....	38
Breathing Mechanics .....	39
<b>CHAPTER 3 ONE-JOINT RULE</b> .....	43
Braced Spinal Extension and Flexion.....	46
Global Spinal Extension and Flexion.....	47
<b>CHAPTER 4 LAWS OF TORQUE</b> .....	49
The Two Laws of Torque.....	53
Torque Tests.....	55
Shoulder-Stability Torque Tests.....	55
Hip-Stability Torque Tests .....	59

<b>CHAPTER 5 MOVEMENT HIERARCHY</b> .....	70
Skill Progressions and Movement Complexity .....	71
Category 1 Movements .....	73
Category 2 Movements .....	74
Category 3 Movements .....	75
Upright-Torso Demands .....	76

<b>CATEGORY 1 MOVEMENTS</b> .....	80
-----------------------------------	----

Air Squat .....	82
Box Squat .....	94
Back Squat .....	96
Front Squat .....	106
Overhead Squat .....	111
Deadlift .....	116
Pushup .....	124
Ring Pushup .....	129
Bench Press .....	130
Floor Press .....	135
Dip .....	136
Ring Dip .....	139
Strict-Press .....	140
Handstand Pushup .....	146
Pull-Up .....	149
Chin-Up .....	153

<b>CATEGORY 2 MOVEMENTS</b> .....	154
-----------------------------------	-----

Wall Ball .....	156
Push-Press .....	158
Jumping and Landing .....	161
Kettlebell Swing .....	162
One-Arm Swing .....	166
Rowing .....	168
Kipping Pull-Up .....	171
Snatch Balance Progression .....	172

<b>CATEGORY 3 MOVEMENTS</b> .....	176
Burpee.....	178
Turkish Getup.....	180
Clean.....	183
Power Clean.....	186
Hang Clean.....	187
Push-Jerk.....	190
Snatch.....	195
Muscle-Up.....	198
<b>CHAPTER 6 THE TUNNEL</b> .....	201
Identifying the Problem.....	202
<b>CHAPTER 7 THE SYSTEMS</b> .....	204
A Movement-Based Approach.....	205
The Mobility Systems.....	207
<i>Joint Mechanics</i> .....	208
<i>Sliding Surface</i> .....	211
<i>Muscle Dynamics</i> .....	212
Mobilization Methods.....	213
<i>Pressure Wave</i> .....	213
<i>Contract and Relax</i> .....	214
<i>Banded Flossing</i> .....	215
<i>Smash and Floss</i> .....	216
<i>Paper Clipping (Oscillation)</i> .....	216
<i>Voodoo Flossing (Compression)</i> .....	217
<i>Flexion Gapping</i> .....	221
Upstream/Downstream Approach.....	222
Programming for Mobility.....	222
Rules of Mobility.....	223
Mobility Tools.....	226
<b>AREA 1: THORACIC SPINE (UPPER BACK, NECK, SCAPULA)</b> .....	230
<b>AREA 2: POSTERIOR SHOULDER (LAT, POSTERIOR DELTOID)</b> .....	248

<b>AREA 3: ANTERIOR SHOULDER (PEC, ANTERIOR DELTOID)</b> .....	262
<b>AREA 4: DOWNSTREAM ARM (TRICEPS, ELBOWS, FOREARM, WRIST)</b> .....	274
<b>AREA 5: TRUNK (PSOAS, LOW BACK, OBLIQUE)</b> .....	286
<b>AREA 6: POSTERIOR HIGH CHAIN (GLUTES, HIP CAPSULE)</b> .....	298
<b>AREA 7: ANTERIOR HIGH CHAIN (HIP FLEXOR, QUADRICEPS)</b> .....	322
<b>AREA 8: MEDIAL CHAIN (ADDUCTOR)</b> .....	338
<b>AREA 9: POSTERIOR CHAIN (HAMSTRING)</b> .....	346
<b>AREA 10: KNEE</b> .....	358
<b>AREA 11: MEDIAL/ANTERIOR SHIN</b> .....	366
<b>AREA 12: CALF</b> .....	374
<b>AREA 13: ANKLE/PLANTAR SURFACE</b> .....	386
<b>GLOSSARY</b> .....	398
<b>ABOUT THE AUTHORS</b> .....	400

# INTRODUCTION

Often these days, I find myself crammed into an airplane seat on my way across the country to work with athletes, coaches, professional sports teams, CrossFit gyms, corporations, and elite military forces. Inevitably I end up making small talk with the poor soul imprisoned next to me. Soon enough I get the question: “What do you do for work?”

Dozens of answers run through my head.

“I make the best athletes in the world better.”

“I work with the government to improve our military’s force protection and force resiliency.”

“I work with athletes and coaches to help them understand and resolve common and preventable losses of torque, force, wattage, and output.”

“I’m trying to change the world’s movement-based economy from subsistence tension-hunting to sustainable, high-yield torque farming.”

“I’m fomenting revolution. I’m trying to empower people to live more integrated, pain-free, self-actualized lives.”

No, I don’t mention anything about farming torque or self-actualization, which I’ll spend plenty of time on in the pages to come. I keep it simple. “I’m a teacher,” I say.

Typically eyes glaze over, and the conversation sputters to a halt. But once in a while, my seatmate is curious enough to ask the obvious follow-up—“What do you teach?”—unaware of the depths of my obsession with human movement and performance, but he soon finds out.

What I teach—and what you will learn in this book—is a multi-function, extraordinarily effective movement and mobility system. Learn, practice, and apply it and you will understand how to move correctly in all situations. And I mean *all*. It will serve you at rest *and* when you are executing a demanding physical feat, say, in the midst of an Olympic competition, or in a strenuous combat or rescue operation.

This is a strength-and-conditioning system that is also diagnostic in nature: it can help you—or your coach—detect movement and positioning errors even as it improves your performance and brings you to the top of your game. My system gives you the tools to dissolve the physical restrictions that prevent you from fully actualizing your potential. With enough practice, you can develop yourself to the point at which your full physical capabilities will be available to you *instantaneously*. You will develop the motor-control and range-of-motion to do *anything* at any time.

You could ultimately become the human equivalent of a *supple leopard*, always poised and ready for action.

You might ask, “What does it mean to become a *supple leopard*?” It’s a good question, one that warrants an explanation.

I’ve long been fascinated with this idea of a leopard: powerful, fast, adaptable, stealthy... badass.

When I was fourteen I watched *Gallipoli*, a World War I movie about two Australian sprinters going off to war, with my dad. There’s a memorable scene in the beginning of the movie in which Archy, a rising track star, is being trained by his uncle Jack. The pep talk goes something like this:

**Jack:** What are your legs?

**Archy:** Springs. Steel Springs.

**Jack:** What are they going to do?

**Archy:** Hurl me down the track.

**Jack:** How fast can you run?

**Archy:** As fast as a leopard.

**Jack:** How fast are you going to run?

**Archy:** As fast as a leopard!

**Jack:** Then let’s see you do it!

For whatever reason, the “fast as a leopard” mantra stuck with me. But it wasn’t until a Navy SEAL buddy of mine said to me, “You know, Kelly, a leopard never stretches” that this notion of becoming a supple leopard drifted into my consciousness.

Of course a leopard doesn’t stretch. A leopard has full physical capacity available at all times. It can attack and defend with full power at any moment. Unlike humans, it doesn’t need to prep for movement. It doesn’t need to activate its glutes; it doesn’t have to foam-roll; it doesn’t have to raise its core temperature—it’s just ready.

Obviously, we do not share the same physical playing field with leopards. We have to warm-up for strenuous activities and practice and ingrain good movement patterning. But that doesn’t mean we all can’t be working toward the goal of having full physical capabilities available to us instantaneously, or having the motor-control and range-of-motion to perform any physical feat at any time. Leopards don’t have to work at being supple; they naturally are. But people are brutally tight and missing key ranges of motion that prevent them from moving as supplely and powerfully as a leopard.

Metaphorically speaking, if you want to become a supple leopard, you need to understand how to move correctly in all situations. You also need the tools to deal with stiff and adaptively short tissues that restrict range-of-motion. This is the basis of my Movement and Mobility System.

## A New Human-Performance Epoch

Is what I teach radically new? Yes, and then again, no.

I see myself as one of the latest in a long line of teachers concerned with organizing and optimizing movement to maximize physical performance—consistently and without injury.

Certainly, human beings have explored this for eons. In fact, I’ve seen a thousand-year-old image on a coin that shows a man sitting in full lotus—a

posture that creates more stability for the spinal system. More recently, some three hundred and fifty years ago, a famous Japanese swordsman, Miyamoto Musashi, wrote about the importance of keeping your belly firm and your knees and feet in a good position: “Make your combat stance your everyday stance.” Strange yet perfect advice from Musashi’s famous text, *The Book of Five Rings*.

What’s exciting about being alive today is that we’re in the midst of a human-performance epoch. Physical mastery is not limited to the few. As I see it, we are experiencing a quantum leap in the quality, reproducibility, and ubiquity of absolute human physical potential. In fact, if we imagine the peak expression of human potential to be some kind of golden ratio, then the current generation of coaches, athletes, and thinkers have made the equivalent of a Fibonacci jump to light speed.

It’s crazy. I mean, even my mother is gluten-free and casually brags about her latest deadlift personal record.

What’s going on? What’s so different about the time in which we live?

What’s different is that we’ve seen a convergence of factors create a new golden age in human physical performance. Four key factors are responsible.

First, the advent of the Internet and modern media has enabled a global sharing of ideas. Isolated pockets of embodied knowledge are more easily transferred and shared. Ten years ago, finding an Olympic-lifting coach required bloodhound-like determination or luck. Most likely both. Now the clean and snatch—the two core Olympic-lifting movements—are widespread practices.

Second, for the first time in the modern training era, there is an unparalleled cross-discipline exchange among training practices and theories of human movement. For example, our gym, San Francisco CrossFit, is an interdisciplinary melting pot: physiotherapists hang out with elite powerlifters, Olympic-lifting medalists talk to champion gymnasts, and ballet dancers train with elite endurance coaches. This phenomenon is the strength-and-conditioning equivalent of the



great systems theorist Buckminster Fuller's concept of mutual accommodation: that correctly organized, functionally sound systems are never in opposition. They mutually support one another.

We all have the same basic design and body structure. People's shoulders all work the same way: the principles that govern a stable shoulder position while vaulting in gymnastics are the same in the bench press; how you organize your shoulders to sit in lotus posture while meditating is the same way you organize them when working at your computer. It's just that the same set of problems have been solved from radically different angles and approaches. Until now.

Third, we appear to be living in a time in which there is a growing interest in the body. While this topic probably merits its own book, there can be no doubt that the accessibility of online and mobile tools that make it possible to measure our behavior, along with our lifestyle, nutrition, and exercise habits, has shifted the responsibility for keeping our bodies in the best shape possible back where it belongs—on the individual.

Elite and recreational athletes alike can track

and measure nearly any aspect of their performance and biology with little effort and cost. Want to know how that afternoon coffee affects your sleep quality? No problem. Want to fractionate your cholesterol and find out if you are eating too much bacon? No problem (although I'm pretty sure that it's impossible to eat too much bacon). Whether people are tracking their own blood chemistry or daily step totals, or trying to get to the root of their own knee pain, there has been an enormous shift in consciousness, leading to a greater sense of self-control. Eating, sleeping, and moving correctly are not gimmicks or fads. The dam is burst and the personal biological revolution is here.

It's a brave new world. We don't have to wait decades or weather multiple knee surgeries and heart attacks to find out that we're running poorly, eating poorly, sleeping poorly, and training poorly. Peter Drucker—world-renowned management consultant, educator, and author—was right, "What gets measured, gets managed."

The fourth factor contributing to this golden age is the evolution of strength-and-condition-

ing. People have been lifting heavy weights, moving quickly, and working very hard to real effect for some time. The difference now is that a good strength-and-conditioning program *has all of the elements of human movement covered*. That is, an intelligently structured strength-and-conditioning program gives the athlete full range-of-motion in his joints, limbs, and tissues; the motor-control to express those ranges with movements; and the ability to do so under actual physical load, metabolic demand, cardio-respiratory demand, speed, and stress. Couple this complete physical paradigm (the CrossFit model holds that people should look and train like Olympic-lifting-sprinter-gymnasts, for example) with the number of people now using a common language of movements and movement paradigms, and you have the largest scale model experiment in human movement in the history of the world.

To help put this in perspective, in the seven years our gym, San Francisco CrossFit, has been open, we estimate that we've facilitated nearly seventy thousand athlete training sessions. The sheer volume of pattern recognition this is capable of generating is staggering and could take a clinician or a coach a lifetime to accumulate. Now multiply this by the thousands of locations, across hundreds of sports platforms, and suddenly a simple strength-and-conditioning system also becomes the world's most potent diagnostic tool with unmatched test and retest capabilities. This accumulated wisdom is what has given rise to my system. The gym is suddenly the laboratory.

We are able to eliminate correlates for human movement and performance and replace them with actual human movement. You don't have to demonstrate an active straight-leg raise (a common physical-therapist tool for assessing hamstring range-of-motion); you just need to demonstrate that you can pick something up off the ground while keeping your spine organized and flat (deadlift). This is how you bring it down to the bare essentials.

Realize what a huge shift in thinking this is.

Our previous model of strength-and-conditioning was predicated on the fact that if you were just stronger and fitter, you'd be a better ath-

lete and better at your chosen sport. Clearly, that's not true. In fact, anterior cruciate ligament (ACL) injury rates in children continue to increase. Running injury rates are estimated to be as high as 70 percent in some studies. And therein lies the problem.

In the past, it has been difficult to understand the nuances of poor technique and biomechanics as expressed by athletes. Anecdotally, basketball is the most dangerous sport a middle-aged man can play. Why do middle-aged guys so readily tear their Achilles playing pickup B-ball? Because it's hard to see the underlying poor movement patterns while they're playing. They're changing shapes, transitioning from one position to another at high speeds.

To prevent these injuries, we need a tool to make the invisible visible. We need to bring athletes into the lab (i.e., gym) to assess their movement patterns before the catastrophe occurs—ACL tear, herniated disk, torn rotator cuff. In addition, we need a model that allows us to identify the problem, be it motor-control or biomechanical in origin. That's what my Movement and Mobility System does.

By consistently and systematically exposing athletes to the rigors of full-range movements and optimal human motor-control, we're able to quickly identify force leaks, torque dumps, bad technique, motor inefficiency, poorly integrated movement patterns; holes in strength, speed, and metabolic conditioning; and restrictions in mobility. Best of all, the tool we use to detect and prevent injury is the same tool needed to improve an athlete's performance. The middle-age "tore my heel cord" syndrome is a lot less likely to happen if that athlete is regularly exposing his ankle to full ranges of motion in movements like pistols or overhead squats (see page 111).

But there is even more to it than that. This complete and modern strength-and-conditioning system has not only become the most complete way to systematically test and retest athletic performance, and to diagnose movement inefficiencies and dysfunction—it has also created a formal, universal language of human movement. In short, if you understand the principles that govern

full-range strength-and-conditioning exercises and can apply them in this low-risk environment (gym), you understand and can apply them to the activities and positions of life, sports, dance, combat, and play.

Take the squat for example. Squatting isn't just a movement performed in the gym; it's how human beings lower their center of gravity. To perform a full-range—hips below knee crease—squat with loads overhead, in the front of the torso, on the back, or on one leg pretty much covers the range of squatting activities a human can ever be expected to perform. If you understand the principles of this formal movement training language, then you are better prepared to express a more informal or applicable form of human movement everywhere else. You can start to connect the dots between the safe, stable positions practiced in the gym to the movements performed outside the gym. For example, if you understand how to organize your spine and stabilize your hips and shoulders in a good position when performing a deadlift or clean, you have a ubiquitous model for picking something off the ground. If you understand how to create a braced-neutral trunk and generate torque off of a bar when performing a pull-up, you will not have a problem applying the same principles when climbing a tree.

This is the rub: If you only ever climb trees, it may be impossible to know if you are working in the safest and most efficient positions—a stable shoulder and stable trunk—unless you also do formal pull-ups. In other words, it's a lot harder to identify whether someone is moving in a safe, stable position when climbing a tree than when performing a pull-up in the gym, even though both activities abide by the same fundamental movement principles. So in addition to being a lab in which to identify, diagnose, and treat poor movement practices, the gym is a safe and controlled environment in which we can teach and layer these ubiquitous concepts with accelerated learning capabilities and reduced potential for injury.

Moreover, the idea of creating a common movement language based on formal strength-and-conditioning principles is why there can be suddenly so much inter-disciplinary movement-

based discussion and collaboration. We are able to move beyond “people should train in gymnastics” to “people should train in gymnastics because the handstand position easily teaches and exposes shoulder stability and organization and has the same finish position and shoulder demands as the jerk.” The commonality and universality of “formal” human movement is easily understood by coach and athlete alike, and it is easy to track and test changes in positional quality by measuring the very thing we are chasing in the gym anyway—performance. This is why we track work output, wattage, poundage, reps, and time in the first place.

Brilliant people have spent their entire lives developing systems that help us understand how and why humans move the way they move and have the ailments they do. Do these systems work? Of course they do. They work to varying degrees and with varying application. Should we discard them? No, of course not. But there is a significant disconnect between our older models of human movement and our current understanding about how best to maximize human physical potential.

I'll use a real-life example to help illustrate my point. Recently I was on a working vacation to Australia with my wife and two daughters. We booked a few days at a beautiful spa along Australia's west coast. My wife, Juliet, noticed that there was a free yoga class the following morning at 8 a.m. and thought it would be amusing for me to attend. I showed up ten minutes before the hour as I was instructed but found that I was the last person to arrive. The instructor sighed in resignation when she saw 225-pound me walk into her yoga class “late.” (There were already fifteen or so very “I do yoga”-looking women there; I was the only man.)

In a fake-pleasant voice, she asked me if I'd ever done yoga. I said I had, which was true: I'd done a lot of yoga when I was much younger. Not five minutes into the session she started making very complimentary comments about the abilities of the “bloke” in the back row. “Great job back there!” “Wow!” And the more effusive and surprised the instructor became, the more I became the hated target of all the skinny women in class struggling

with the postures.

At the end of class, the instructor rushed right up to me and apologized for not recognizing that I was obviously an advanced practitioner. (I mean clearly I'm a beginner, but I was loads better than everyone else, and I do lift weights and perform gymnastics.) When she asked me where I practiced, I laughed a little and said that I didn't. In my

nicest voice I said that I actually hadn't done yoga in over ten years. She was a little taken aback, in that I clearly understood how to perform the movements in her class, but didn't actually practice, and so she had to ask, "What do you do?"

**I said I was a teacher.**

## HOW TO USE THIS BOOK

To help you navigate the pages of this book, it's important that you understand the basic construct and function of my Movement and Mobility System.

There are three movement principles: midline stabilization and organization (spinal mechanics), one-joint rule, and laws of torque. Think of the movement principles as the master blueprint for creating safe and stable positions for all human movements. You will learn about these in chapters 2, 3, and 4. If you practice them in the order presented, you will know how to stabilize your spine in a braced, well-organized position; how to maintain good posture during loaded, dynamic movements; and how to create stability in your joints to generate maximize force, power, and speed. Then you will have the necessary foundation to properly execute the strength-and-conditioning exercises in chapter 5.

Realize that you can immediately apply the movement principles to the actions of sports and life. Once you understand position as a skill and the underpinnings of stability, you can start to bring consciousness to your position in all situations, whether you're trapped behind a desk at work, picking up your child, carrying groceries, or playing volleyball. But mastering the movement principles takes practice. And you need to be able to identify restrictions in range-of-motion and motor-control dysfunction so that you can isolate and solve your unique problems. That's why the movement principles are practiced in a safe, controlled environment (the gym) using fundamental (transferable) strength-and-conditioning move-

ments.

In chapter 5, "Movement Hierarchy," you will learn how to properly execute functional full-range strength-and-conditioning movements—squatting, pulling, and pressing iterations—as well as how to identify and correct common movement errors. Once you understand and can apply the movement principles to functional movements, you will have no problem using those skills to correct errors and optimize movement efficiency for all of your movements.

The key is to prioritize position and movement first. Most of you will probably want to skip right to the mobilization techniques later in the book. And if you have a tight muscle or a painful joint that needs to be dealt with, by all means go there. (See chapter 7, "The Systems.") But know that you will never get to the bottom of your pain and dysfunction if you don't correct the movement or position that is causing the problem. It's like treating a symptom without addressing the disease. The problem will still be there.

**Note:** The evolution of the Movement and Mobility System continues to progress at an exponential rate. New ways of improving performance and torturing athletes are being developed everyday in the San Francisco CrossFit laboratory. For all the latest and most up-to-date mobilizations go to [MobilityWOD.com](http://MobilityWOD.com).

# DEADLIFT

Bend over to pick up a toolbox and you're deadlifting. The deadlift is both common and crucial to the world of work: A fireman hoisting someone onto a stretcher, a soldier in the field bending over to grab an ammo box, or a construction worker picking up an electric saw.

Each time you bend over to pick something up off the ground, you're essentially executing a deadlift. Yet few people understand how to do it correctly. The fact that so many people round their back when they bend over to pick something up may explain why millions suffer from lower back pain.

People who understand how to deadlift with good form—meaning they know how to brace, create torque, and never sacrifice form for range-of-motion—typically have fewer back problems. They have a model for picking something up that is universally applicable: If you know how to set up for a deadlift, you know how to pick something heavy off the ground without compromising your back.

To protect your back and maximize force production, you need to bring consciousness to this fundamental movement pattern so that you can reproduce a good position in all situations. You need to optimize and ingrain the deadlift setup so you have the same movement outcome every single time. Whether you're tired, or stressed out, or both, you have a blueprint that will allow you to produce maximum power with minimum risk.

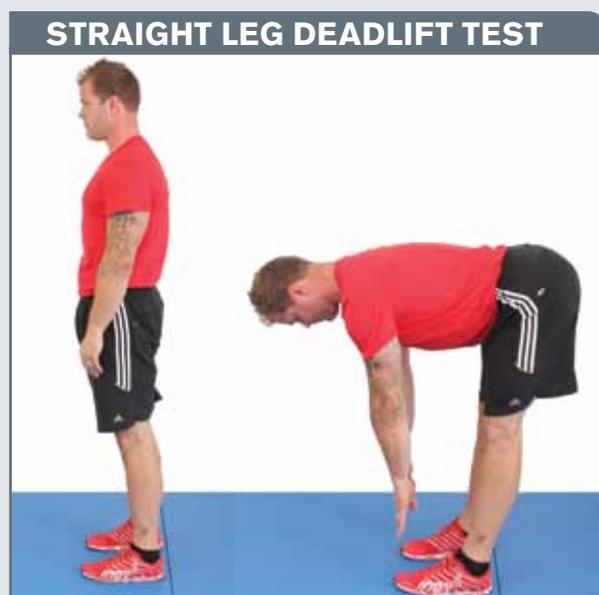
The deadlift shares the same load-order sequence and universal laws as the squat: brace, create torque, load your hips and hamstrings, keep your shins vertical, and distribute your weight in the center of your feet. (For an overview of these principles, review the air squat on page 82.) This makes the deadlift a very easy movement to learn and significantly shortens your learning curve. And as with all category 1 movements, the deadlift serves as a diagnostic tool for assessing range-of-motion restrictions and motor-control errors. (You can really see spinal errors and posterior chain restriction with this movement). But before you start down that path, you need to learn how to optimize the setup.

## Deadlift Range-of-Motion Test

To get a read on your mobility in regard to good deadlifting technique, it's important to assess your posterior change range-of-motion—specifically in your hips, hamstrings, and back.

One of the best ways to do this is to hinge forward at your hips with your back flat and legs straight. If you can touch the barbell without rounding your back or internally rotating your shoulders (essentially a straight leg deadlift setup with your body forked at a 90-degree angle), you have full range-of-motion and are good to go. If you come up short, you may need to use the top-down setup option 2—see page 121.

Here's another way to assess posterior range-of-motion: To start, sit on the ground with your legs out in front of you. With your belly tight, you should be able to sit tall with your back and legs straight. If you bend your knees,



round your back, or break from the upright seated position, it's a dead giveaway that your posterior chain range-of-motion is wanting or there's a motor-control issue.

This is not to be confused with the classic sit and reach test, where in gym class you sat with your feet flush against a box, clenched your teeth, and reached your hands as far past your toes as possible. Once you acknowledge the laws of bracing, this test becomes comical because it reveals exactly nothing about functional range-of-motion or motor-control. It does, however, tell you how good you are at rounding the back into a horrible, broken position.

Compared to the long sit position test, the straight leg deadlift is the preferred measuring tool. You don't do a lot of movements from a seated position unless you're a kayaker or rower. So adding a weight-bearing element—the torso—makes it more realistic.



## Top-Down Deadlift Setup

The top-down setup is the easiest and most effective model for lifting something off the ground. By organizing your spine in the top position, you minimize load on your spine and optimize trunk stability prior to forming your grip on the bar, dumbbells, stone, or other heavy object. Again, it's the same bracing sequence as the air squat. One of the mistakes that people make is to bend over, establish their grip, and then try to organize their spine and put their hips in a good position. If you set up for the deadlift by rounding forward, you have to recapture a flat back from the bottom position, which is difficult. This is no different than trying to brace your spine in the bottom of the squat. While you can get your back flat, you will most likely end up in a compromised position because you can't create tension in the upper back or stabilize the spine.

To correctly execute the deadlift, you have to take all the slack out of the system by creating as much tension in your body as possible prior to lifting the weight off the ground. You need to actively seek tension. If you lose tension in the setup, specifically in the hips and hamstrings, you have to adjust with your knees to reload the area. Bottom line: The more tension you can create, the more force you can apply to the movement.

Let's use a simple example to help illustrate this principle. Imagine a car that is stuck in a ditch. To pull it out, you hitch a rope from the ditched car to another car. If there is slack in the rope and the tow car hits the gas, it's either going to rip off a bumper or break the rope. To prevent that from happening, the car in front must eliminate the slack and create tension on the rope, *then* pull. It's the same thing with the deadlift: create tension by loading the hips and hamstrings and pulling on the barbell (see caption 7). You almost want the bar to float before initiating the lift. If you have a 135-pounds on the bar, you should be thinking about putting a 130-pounds of tension into the bar. If you're lifting 400-pounds, you need to preload at least 200-pounds into the system to avoid breaking the metaphorical rope or tearing apart the metaphorical bumper—as in your lower back.

## Top-Down Setup

1



To establish a deadlift stance, walk your shins up to the bar and position your feet directly underneath your hips. The bar should bisect the center of your feet. If you glance at the photos, you'll notice that my feet are pointed straight and positioned underneath my hips, slightly narrower than my squat stance. This is a close iteration of my jumping stance or running stance.



2



Go through the same load-order sequence as the air squat: squeeze your butt to set your pelvis into a neutral position, screw your feet into the ground, raise your arms, pull your shoulders back while externally rotating your arms, and take a breath in.



3



After setting your shoulders into a stable position, pull your ribcage down over your pelvis and get your belly tight.

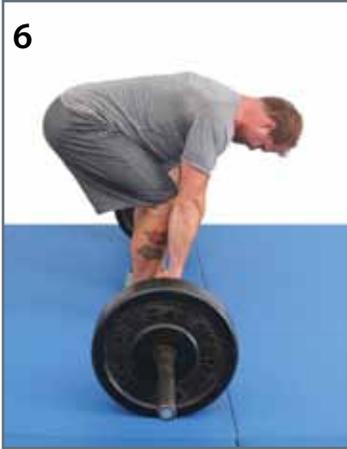


4



Keeping your back flat, reach your hamstrings back and hinge forward at the hips until you can touch the barbell, or until you reach end-range. Note: If can't reach the bar without compromising spinal position due to a lack of hip and hamstring mobility, use the top-down setup option 2.





Grip the bar one hand at a time, forming your grip just to the outside of your shin with your palm facing your body. This allows you to form a hook grip on the bar—see hook grip, page 120—while maintaining tension in the hips, hamstrings, and upper back. For most people, a thumbs distance from your leg is good start. The key is that you have enough room to press your knees out. So before you start your lift, get into position, shove your knees out as far as possible, and make sure that your arms are not in the way.

### Reload Hips and Hamstrings:

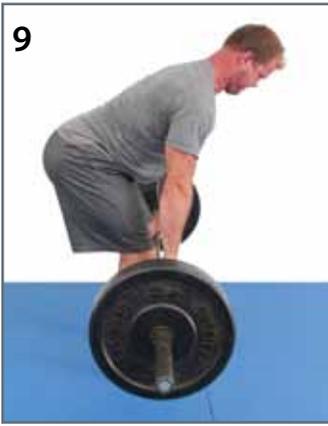
Form a hook grip with your other hand in the exact same fashion. Note: I prefer the double over-hand grip (pronated grip) as illustrated in the photos. This allows me to maximize torque and tension in my upper back. While the mix grip is certainly a viable option, it does not allow you to create torque and stabilize your shoulders to the same degree—see mix grip, page 122.

As you form your grip, you'll probably notice that there is not as much tension in the system—meaning your back is not as tight and your hips and hamstrings are not loaded to the same degree. To reclaim tension, screw your hands into the bar as if you were trying to break or bend the bar. As you do this, raise your hips and pull your knees back, creating as much tension in your hips, hamstrings, and back as possible. Again, there should be no change in spinal position.

After reloading your hips, hamstrings, and back, lower your butt slightly while pulling on the barbell, keeping your shins as vertical as possible. To help with this step, imagine pulling yourself into position. It's also important to notice that the bar is positioned underneath my scapula. If your shoulders are too far over the bar it's usually an indication that your shins are not vertical. You will lose some capacity to generate force.



9

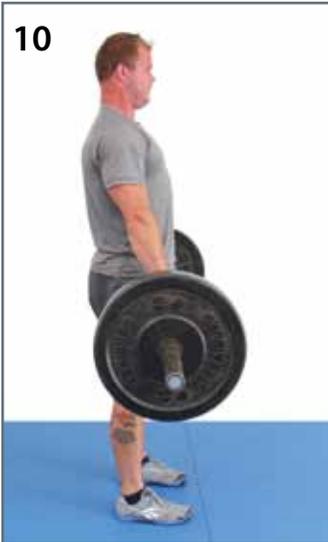


## Lift

Still screwing your feet into the ground and your hands into the barbell, lift the weight straight off the ground. As you start the pull, the position of your spine should remain unchanged.



10

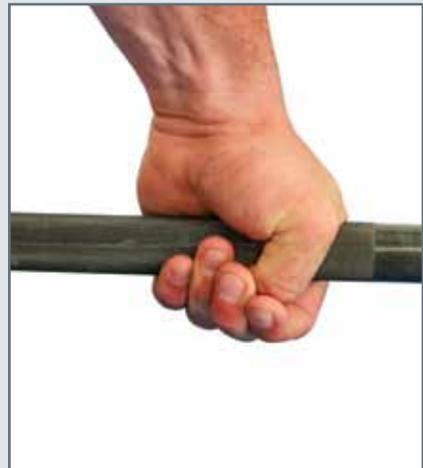
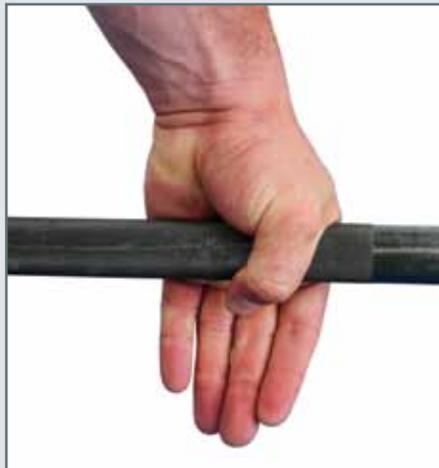


Keeping the barbell as close to your body as possible, stand up with the bar, squeezing your glutes as you extend your hips in the top position. Don't lean back or try to shrug your shoulders. To lower the bar to the ground, simply reverse the order of the movement: keep your back flat, head neutral, load your hips and hamstrings, and maintain as much tension in the system as possible. Or you can just drop the bar from the top position.



## Hook Grip

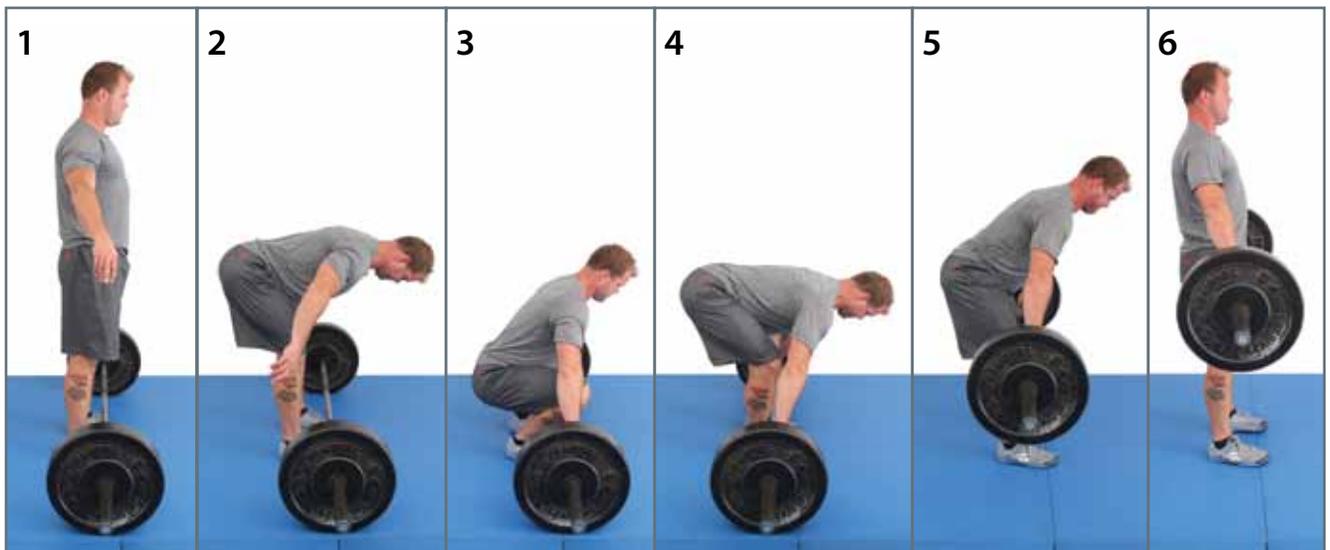
The hook grip is a technique commonly taught to Olympic lifters. As you can see from the photos, instead of clasping your thumb over your fingers, which is a conventional grip, you wrap your thumb around the bar, and then wrap your fingers around your thumb. This lock prevents the bar from rolling out of your hand and puts your wrist in a good position for creating external rotation torque. The reason I like teaching this for the deadlift is because it allows you to handle larger loads and it transfers to other lifts like the clean and snatch.



## Option 2: Knees Forward Setup

Some people can't quite reach the barbell while keeping their hips loaded and shins vertical using the top-down setup. This is due to tight hamstrings and hips. If that's a problem, use this variation. It's carried out in the same fashion as the previous setup, in that you stabilize your trunk in the top position and hinge forward from your hips while keeping your shins vertical. But the moment you run out of range in your posterior chain—meaning you can't hinge forward or push your hips back any farther without compromising your spinal position—bring your knees forward. This will allow you to adjust for position while still keeping your back flat and your hips and hamstrings loaded. After you establish your grip on the bar, pull your shins back to vertical to reclaim tension. It's the same model: brace, load your hips and hamstrings, and use your knees to adjust for position.

In some cases, people's ankles (missing dorsiflexion/knee forward range), hamstrings, and hips are so tight they can't set up from the ground without rounding their back position, even when using this setup. In such a situation, scale the setup by setting the bar to a higher position, using blocks, bumper weights, or a rack.



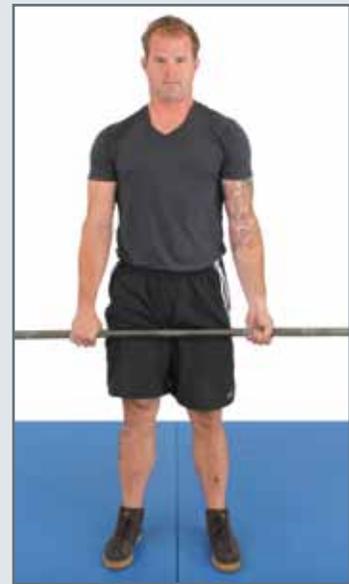
1. Establish your squat stance and stabilize your trunk—see caption 1 in the previous technique.
2. Hinge forward from your hips and drive your hamstrings back.
3. The moment you run out of hamstring and hip range-of-motion, bring your knees forward and establish your deadlift grip. The key is to keep your heels in contact with the ground and your spine rigid.
4. Reload your hips and hamstrings by pulling your knees and hamstrings back. Try to get your shins as vertical as possible.
5. Pull the weight off the ground by extending your hips and knees. Again, there should be no change in spinal position.
6. Keeping the barbell as close to your body as possible, stand up with the bar, squeezing your glutes as you extend your hips in the top position.

## Mix Grip

As I mentioned, I generally prefer the double overhand grip because it allows you to maximize external rotation force and builds grip strength. It also transfers to other pull-based exercises (pull-up, clean, snatch, etc.). The mix grip—or what is commonly referred to as the flip grip—doesn't allow for ideal shoulder positioning. As you can see from the photos, my left palm is facing forward and my right palm is facing back. The problem here is I'll never be able to create the same amount of external rotation torque with my left hand as my right, leaving my left arm vulnerable to injury.

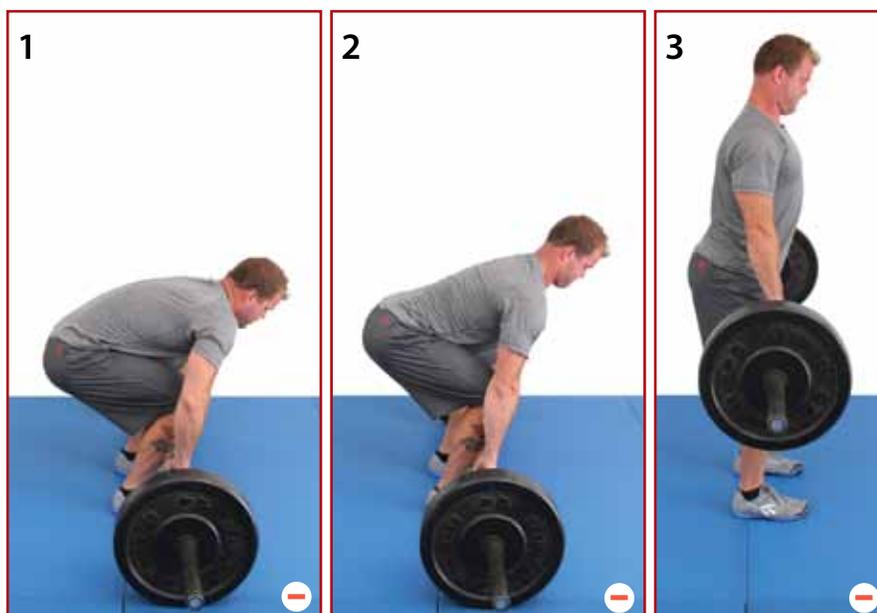
Not only that, it is a dead end grip, meaning that it only applies to the deadlift and doesn't transfer to other movements.

For some people, the mix grip is a more comfortable position and allows them to lift more weight, so it does have a place in your arsenal of techniques. But does that mean it should be used all the time? Not exactly. Here's what I generally recommend: Use the overhand hook grip until your grip starts to fail, which for most people is around 90 percent of a one rep max. Then, implement the flip grip.



## Bottom-Up Setup Fault

A lot of people will set up for the deadlift by rounding forward, establishing their grip on the bar, and then trying to set their spine and hips in a good position. Don't get me wrong, I've seen people pick up enormous loads setting up in this manner, but they almost always round forward into a compromised position. Here's why: When you hinge forward from your hips without stabilizing your spine, you rely on the anterior musculature of your pelvis to pull your back into a flat position, shortening the front of your hips. You can pull your back into a neutral position, but you can't lock in or stabilize the position. If you're deadlifting heavy, you will usually round forward. If the weight is light you might be able to maintain a flat back, but because your hips are in a shortened state, standing up into a neutral position is difficult. You will usually overextend to get your torso upright. To put it another way, the bottom-up setup loads your back instead of your hips and hamstrings. So if your lower back hurts after you deadlift, there's a strong chance you're committing this fault.



### Motor-Control Fix:

- ▶ Address the top-down setup (both options).

## Tension-Hunting Fault

Setting up from the bottom position predisposes people to a rounded back. However, this fault is not limited to the setup. Even if you set up from the top position, if you fail to take all the slack out of the system, you will always default into a bad position. This is what I call tension-hunting. If your hips, hamstrings, and back are not tight, your body will take up the slack, which is expressed with a rounded back. The key to avoiding this fault is to maximize tension in your body by pulling on the bar. Remember, the deadlift is a slow movement. In other words, you never go from 0 to 60; rather you go from 40 to 60.

**Note:** Failure to preload the bar will express itself with a definitive click, which is the barbell hitting the bumper weight. Again, the weight should feel like it's floating before you actually lift it from the ground.

### Motor-Control Fix:

- ▶ After setting your grip, be sure to pull your knees back and raise your hips to load your posterior chain before initiating the pull.
- ▶ Create sufficient external rotation torque in your shoulders by screwing your hands into the bar.



## Powerlifters Rounding Their Back

A lot of powerlifters will pull with a rounded upper back—while keeping the lower back flat—because it shortens the distance they have to pull the weight to the lockout position of the hips. This is where people get confused. The upper back is in fixed flexion, meaning that they round forward and then create tension and torque in that position.

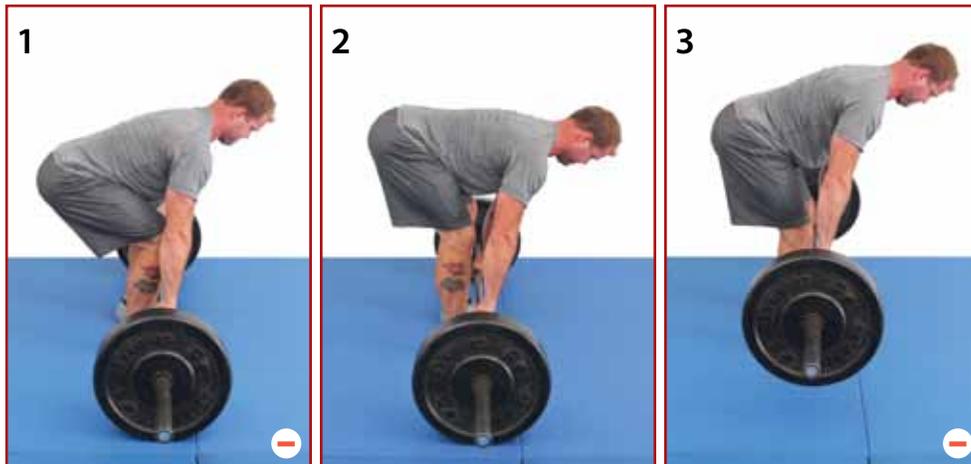
What people have to remember is that rounding the upper back is a conscious decision that professional powerlifters make. And they understand the consequences. A classic case is Donny Thompson, a professional powerlifter and world record holder. He was practicing deficit deadlifts with a rounded back and suffered a disc injury. His reaction was: “I knew better. I was pulling with a rounded back and it got me.” At no point will a professional powerlifter ever round their lower back when performing a deadlift. It would be like a bomb going off. However, to get a slight edge, sometimes they will sacrifice the safety of their position if it means being able to lift more weight.

With that said, a beginner or fitness lifter should *never* round their upper back as a means of lifting more weight. Why? Because it increases susceptibility to injury, ingrains a dysfunctional movement pattern into your daily life, and does not translate to other athletic movements like dynamic pulling and jumping.

I like Jesse Burdick’s general rule for pulling heavy with a rounded upper back. When you can deadlift 600 pounds, then you can start to entertain thoughts of rounding your thoracic spine. In fact, many of the best Olympic lifting coaches in the world, like Mike Burgener and Glenn Pendlay, won’t let their athletes pull heavy deadlift singles for the reason that they don’t want to ingrain a pulling pattern with an upper body (upper back and shoulder position) that won’t translate to Olympic style weightlifting.

## Tension Fault

A properly executed deadlift is expressed with a single movement, meaning that everything goes up at the same time (hips and knees extend simultaneously). If an athlete starts to lift the weight off the floor and his hips come up first and then the torso follows, it's an indication that he didn't take up all the slack in the system. They are tension-hunting. Although he can still maintain a flat back, which is great, he compromises his ability to generate maximum force.



### Motor-Control Fix:

- ▶ Before lifting the weight off the ground, raise your butt and bring your knees back. This will load tension into your posterior chain. With your hip and hamstrings fully engaged, lower your hips and shove your knees out, pulling on the bar as you lower into position.

---

# PUSHUP

Imagine if you will: An adrenaline freak bombing down a trail of jagged rock on a full-suspension mountain bike. Or a climber scaling a vertical shelf of blue ice at 18,000 feet. Or a powerlifter bench pressing a record load surrounded by screaming powerlifting maniacs. Or a 335-pound NFL offensive tackle with a 4.8 40 speed pulling, ripping, pushing, and dismantling a blitzing linebacker.

Have one or all of those images in mind. Now what do you think will happen if that athlete doesn't understand how to organize his shoulders into a good position? This is what happens: His shoulders internally rotate and his elbows flare out, sacrificing his ability to create force and opening the door to injury.

Most upper body movements conducive to sport and life are performed at midrange out in front of your body: feeding, grabbing, carrying, pushing, and pulling. To operate effectively within this domain, you need a model that teaches you how to create a stable shoulder position.

Enter the pushup.

As with the air squat, the pushup is where you can start to layer the principles of bracing and torque. The pushup also serves as a diagnostic tool for assessing motor-control and range-of-motion. But instead of illuminating what's happening at the hips, the pushup tells you what's going on at the shoulder, elbow, and wrist. You go through the same checklist: Does an athlete understand how to brace his spine in a neutral position? Or create external rotational torque by screwing his hands into the ground (set the shoulder in a good position)? Does he have the range-of-motion and motor-control to keep his hands straight and elbows close to his body as he performs the movement? Without having to use any equipment, you can see how well an athlete understands the fundamental principles of bracing and torque, as well as identify restrictions in his mobility.

In addition, the pushup serves as a launchpad to more complex pressing motions—the bench press, dip, and overhead press—and more complex motor patterns as well. If you understand these basic concepts and can apply them to the pushup, you are less likely to default into bad positions when you're training with more

complicated movements.

No wonder so many athletes suffer from torn rotator cuffs and dislocated shoulder injuries, and why people experience anterior shoulder pain every time they press. They don't understand the principles that govern good positions as it relates to the shoulder, elbow, and wrist. The pushup teaches and ingrains those fundamental movement patterns and gives coaches and athletes a template for solving problems at the shoulder, elbow, and wrist.

Coaches, athletes, and physical therapists will often relate shoulder issues to a weak rotator cuff or weak shoulders. Although this is a contributing factor, it's not necessarily the root cause. It's about position: If you don't have a model for creating a stable position, generating spontaneous torque and force is difficult. Once you understand how to correctly perform a pushup, it doesn't matter where your hands are, what you are grabbing, pushing, or pulling. Nor does the orientation of your arms matter. You can still create a stable and mechanically powerful position.

**Note:** The pushup shares a lot of the same principles as the squat and deadlift, but instead of loading your hips and hamstrings, keeping your shins vertical, and distributing your weight over the center of your feet, you load your pecs and triceps, keep your forearms vertical, and distribute your weight over the center of your hands (in front of your wrist). The concept of stance is also transferable. As with your squat and deadlift stance, you should find a comfortable position that transfers to other pressing motions. Positioning your hands shoulder-width apart is a good start. The goal is to establish a position that allows you to perform the movement with good technique. Once you're proficient, start switching up the width of your hands from time to time to create a new stimulus.



## Setup

To correctly set up for the pushup, kneel down and situate your hands at about shoulder-width with your fingers pointing straight ahead. Once accomplished, sprawl your legs back, position your feet together, and squeeze your glutes. Note: Positioning your legs together maximizes glute activation and tension in your trunk. If you glance over at the photo, you'll notice that I start with my hands out in front of my body. By keeping your weight slightly back, you take load off of your shoulders, making it easier to screw your hands into the floor and create an external rotation torsion force.



## Top Position

Still actively screwing your hands into the floor, lever forward, positioning your shoulders over your hands. To help maximize torque, think about getting the pits of your elbows forward.



## Midrange Phase

Keeping your weight centered over the center of your hands (just in front of your wrists) and your forearm vertical (elbow inline with your wrists), start lowering into the bottom position. This is the equivalent of keeping your shins vertical in the squat in that it maximizes force production and protects your elbows. Remember, you load your triceps and pecs for the same reason you load your hamstrings and glutes in the squat. The pecs help stabilize your shoulder in a good position so that your triceps can do their job, which is to extend the elbow.



## Bottom Position

Lower into the bottom position. Keep your butt squeezed, belly tight, and forearms as vertical as possible.



## Midrange Phase

As you press out of the bottom position, there should be no change in your spinal or shoulder position. Your back should be flat and your shoulders retracted (pulled back).



## Top Position

Still screwing your hands into the ground, extend your arms and reestablish the top position.

---

## Elbows Out Fault

The majority of people can set up for the pushup in a good position, meaning that they can create torque and get their back flat. But just like the squat, the moment they start lowering into the bottom position, errors become easy to spot. For example, a lot of athletes will flare their elbows out and compensate with a shoulder forward position as they lower their chest to the ground. When I see this happen—whether it's in the first few inches or in the bottom position—the first thing that comes to mind is missing internal and/or external rotation at the shoulder. While a poor setup and weak triceps can contribute to this fault, it's almost always a shoulder range-of-motion issue.

As you can see from the photos, once my elbows fly out to the side, my shoulders get loaded into a bad

position. This is why people experience wrist, elbow, and anterior shoulder pain. Whether they are bench pressing a heavy load, stabilizing a weight overhead like with the overhead squat, or performing body-weight movements like pushups or dips, they have no choice but to adopt an elbow-out, shoulder-forward position to execute the movement. It's no surprise that people feel hot, burning pain in the front of their shoulders when they press. They are missing 100 percent of their internal rotation range-of-motion.

**Motor-Control Fix:**

- ▶ Address the setup in the top position: squeeze your butt, screw your hands into the ground (elbow pits forward), and keep your forearms vertical as you descend and rise out of the bottom position.

**Mobilization Target Areas:**

- ▶ Anterior Shoulder/Lat
- ▶ Posterior Shoulder/Chest
- ▶ Downstream Arm (Elbow/Wrist)



**Open Hand Fault**

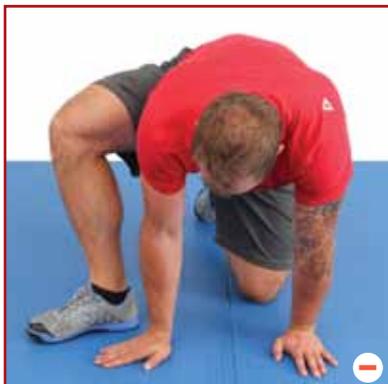


As I explained in the torque chapter and in the squat techniques, if an athlete is missing ankle or hip range-of-motion, he will generally turn his feet out to increase his range-of-motion. The same thing happens in the pushup. If an athlete is missing rotation at his shoulder (internal or external rotation) or flexion at his wrist, he will usually compensate into an open-hand forward shoulder position. As with the open-foot, this causes a landslide of mechanical problems

up and down the chain, and is what opens the door for a lot of the injuries and pain people experience when they press.

**Motor-Control Fix:**

- ▶ Focus on the position of the pushup. Position your hands straight—between 12- and 1-o'clock (right) and 12- and 11-o'clock (left).
- ▶ Screw your hands into the ground, creating an external rotation torsion force, and try to get the pits of your elbows forward.



**Mobilization Target Areas:**

- ▶ Anterior Shoulder/Lat
- ▶ Posterior Shoulder/Chest
- ▶ Downstream Arm (Elbow/Wrist)

## Elbow Back Fault

If you've read the introduction to the air squat, you already know that driving your knees forward early in range typically stems from not creating sufficient external rotation torque: You failed to screw your feet into the ground and shove your knees out so your knees track forward to compensate. The pushup exists in a parallel universe. Failure to screw your hands into the ground results in loading your elbows. What happens? Your back positions breaks, power leaks away, and your elbows hurt.



a parallel universe. Failure to screw your hands into the ground results in loading your elbows. What happens? Your back positions breaks, power leaks away, and your elbows hurt.

As a quick recap, loading your chest and triceps is the equivalent of loading your glutes and hamstrings in the squat. Your chest helps keep your shoulders in a good isometric position (just as your glutes keep your hips in a good isometric position). Your triceps are responsible for extending your elbows (just as your hamstrings extend your knees and hips). To accomplish this, screw your hands into the ground and keep your elbows inline with your wrists.

### Motor-Control Fix:

- ▶ Pull your shoulders back and create and maintain torque by screwing your hands into the ground, positioning your elbow pits forward.
- ▶ Think about keeping your forearms as vertical as possible as you initiate the movement.

## Scaling the Pushup

If you are not strong enough to correctly perform a full-range pushup, you can do one of two things: Place your hands on a higher surface (chair, box, or wall) and/or make the movement easier using Mark Bell's slingshot. Note: If you don't have access to a slingshot (you should), you can loop a Rogue monster band around your elbows. Both methods lower the demand, making the movement easier, while still allowing you to idealize a neutral spinal position. What's particularly great about the slingshot, however, is it prevents your elbows from flaring out to the side and supports your weight in the bottom position. So in addition to removing some of the load, it encourages good mechanics. This is the equivalent of doing a pull-up with a Rogue monster band hooked around your feet. You can mimic the movement without compromising form.

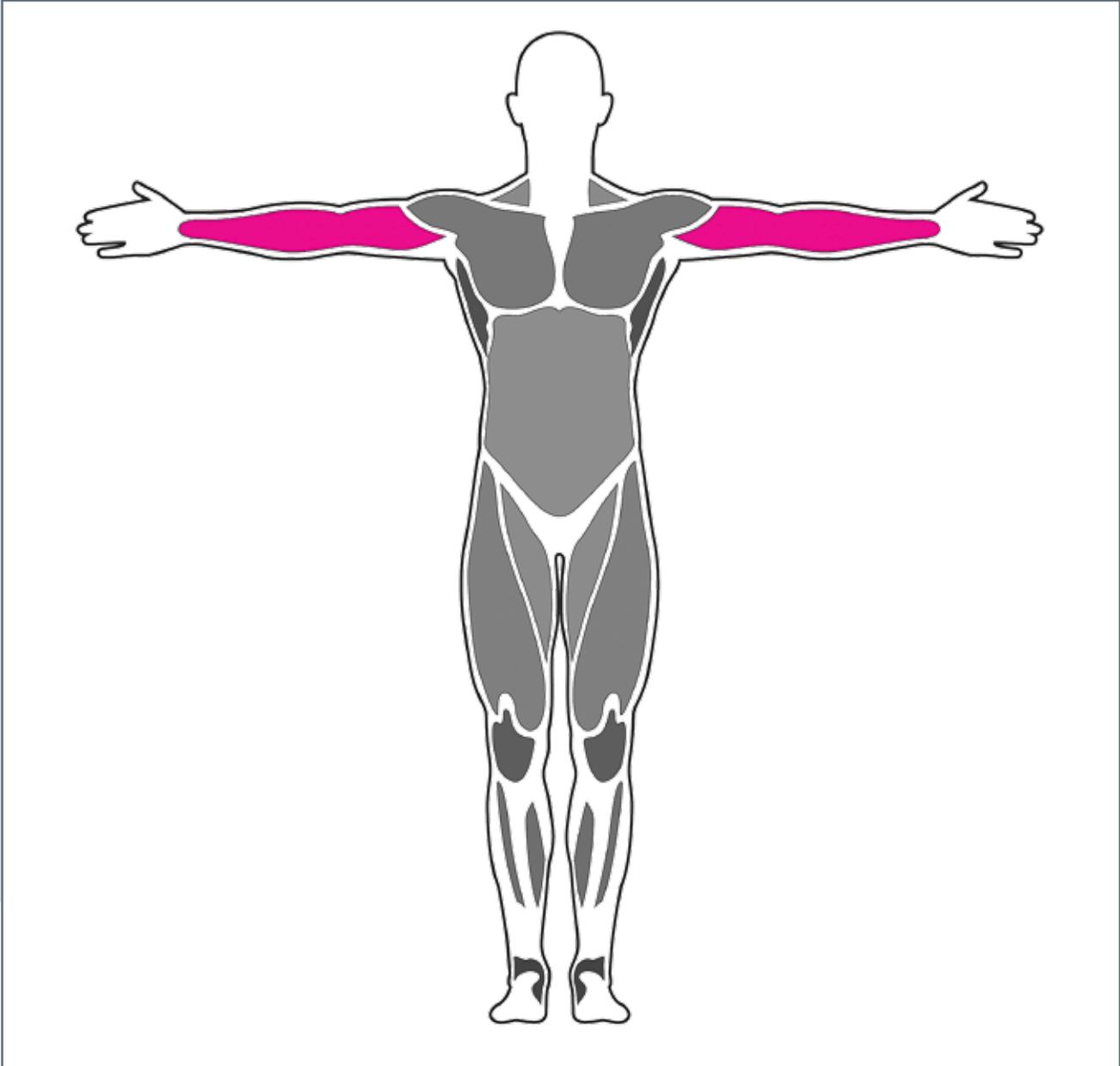
**Important:** A lot of coaches and athletes will mistakenly scale the pushup by dropping their knees to the ground. While this reduces the load and makes the pushup easier, it compromises your ability to squeeze your butt and create tension in your trunk. Doing a pushup from your knees encourages bad mechanics. In order to create a rigid flat back, you need to set your pelvis in a neutral position by keeping your butt squeezed: If you perform a pushup from your knees, accomplishing this task is impossible.



order to create a rigid flat back, you need to set your pelvis in a neutral position by keeping your butt squeezed: If you perform a pushup from your knees, accomplishing this task is impossible.

# AREA 4

## DOWNSTREAM ARM (TRICEPS, ELBOWS, FOREARM, WRIST)

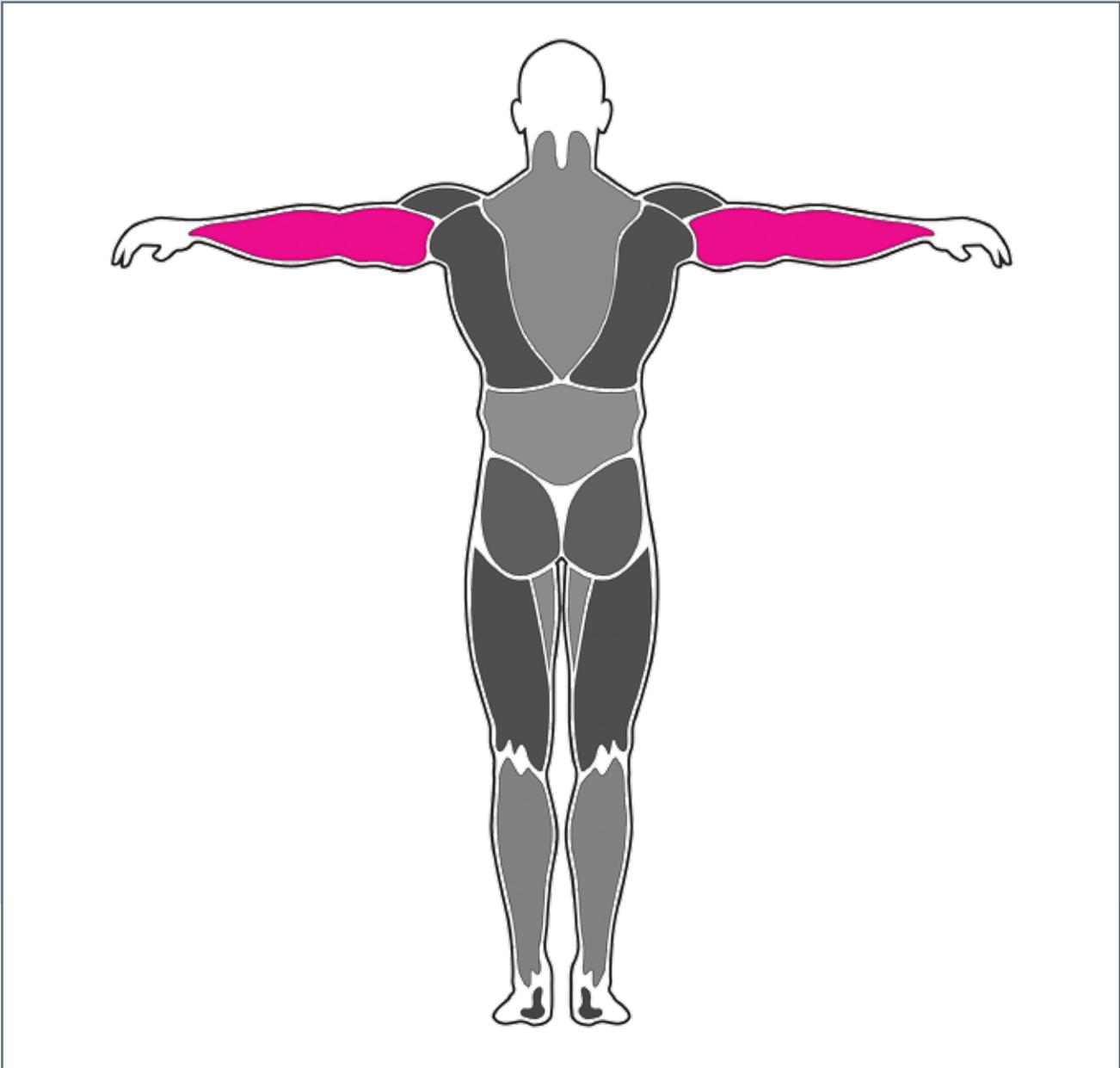


### Mobilization Target Areas:

- ▶ Triceps, elbow, forearm, and wrist

### Most Commonly Used Tools:

- ▶ Voodoo Band
- ▶ Barbell
- ▶ Single Lacrosse Ball
- ▶ Rogue Monster Band
- ▶ Roller



**Test and Retest Examples:**

- ▶ Overhead Press
- ▶ Hanging from the Bar
- ▶ Front Rack Position
- ▶ Back Squat Setup
- ▶ Pushup/Bench

## Triceps Extension Smash

Your triceps are wicked strong and account for two thirds of the mass of your arm. Consider a powerlifter like Mark Bell who can bench press over 800 pounds. Most of that is triceps. If you are someone who lifts weights or does CrossFit, you can probably remember a time when your triceps were so sore that you couldn't extend your arm. It just hurt to move. I'd be willing to bet that rather than address the stiffness, you waited for the soreness to go away or continued to work out with stiff muscles. Sound familiar? Of course it does. You are an athlete and that's what athletes do. But that doesn't make it right. When your triceps get tight and nothing is done, they get adaptively short, causing you to lose extension in your arm.

If you don't have the full length of your triceps, creating external rotation torque and locking out your elbow is difficult. Elbows tend to chicken flap out into a compromised position. The same thing happens with your legs in the squat when you have stiff quads. You end up missing external rotation and dumping torque by collapsing your knees inward. Restore suppleness to your quads and you can solve this problem.

These big tissues, whether it's the triceps or quads, dictate your capacity to generate stability in your primary engines. The triceps affect your shoulders and the quads affect your hips. If these regions get stiff, it's going to reflect in your movement mechanics and eventually express itself in the form of pain. That means you have to address the ugliness by smashing away the stiffness so that you can reclaim stable positions. And the triceps extension smash is one of the best ways to accomplish that.

### Improves:

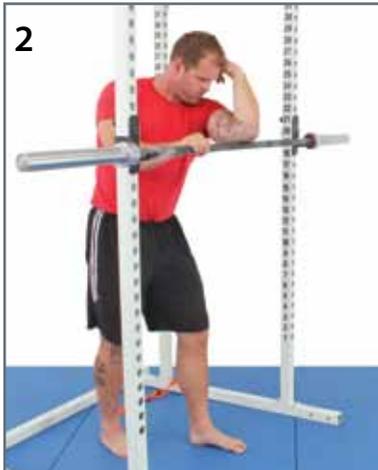
- ▶ Elbow Extension
- ▶ Front Rack Position
- ▶ Midrange Pressing Mechanics
- ▶ Overhead Position
- ▶ Elbow Pain

### Method:

- ▶ Contract / Relax
- ▶ Pressure Wave
- ▶ Smash and Floss



Position the head of your triceps (right above the elbow joint) on the barbell with your arm in extension. Apply downward pressure with your arm to tack down the underlying tissue.



Having tacked down a stiff area of tissue at the base of your left elbow, pull your left hand to the left side of your head.

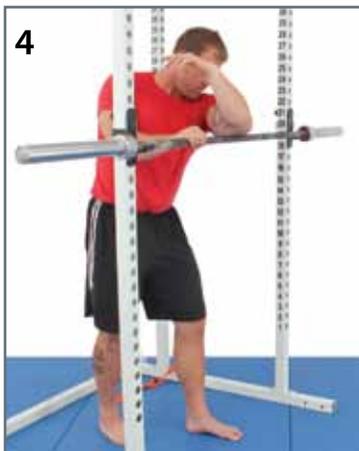




3



Staying on the stiff tissue, straighten your arm. The idea here is to find a tight spot and push and pull past that spot by bending and straightening your arm.



4



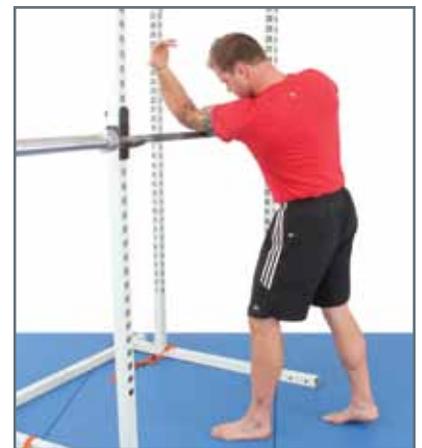
To get full excursion of the tissue, bend your left arm to the opposite side of your body.



5



Keeping your arm bent, continue to smash the tissue by moving your arm toward your left side. The idea here is to pressure wave back and forth, smashing the tissues laterally.



### TRICEPS SMASH—ALTERNATE OPTIONS



If you don't have a rack, don't panic. You can do this on the ground using a barbell, lacrosse ball, rolling pin, wine bottle, or whatever you have at your disposal. Find something to smash your triceps on and get some work done.

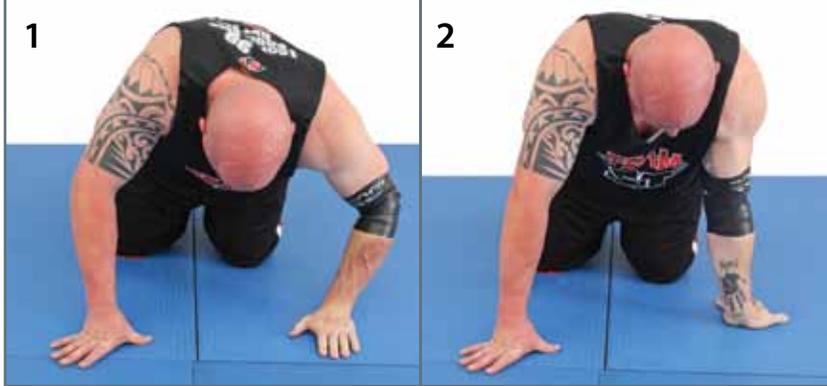
## Voodoo Elbow Mobilization

Wrapping a voodoo band above and below your elbow and then spending a few minutes moving through a full range-of-motion is one of the fastest and most effective ways to address elbow pain and restore suppleness to your triceps. If your elbow aches, or you're missing key corners in your mobility—elbow extension or flexion—this should be one of your first stops. In fact, if I have an athlete that is suffering from epicondylitis (tennis elbow), this is the first thing I have them do. Seriously, nothing I've seen, experienced, or have been taught solves "hot elbow" problems as quickly and effectively as the voodoo elbow mobilization. To learn more about proper wrapping technique, revisit the introduction to this chapter.



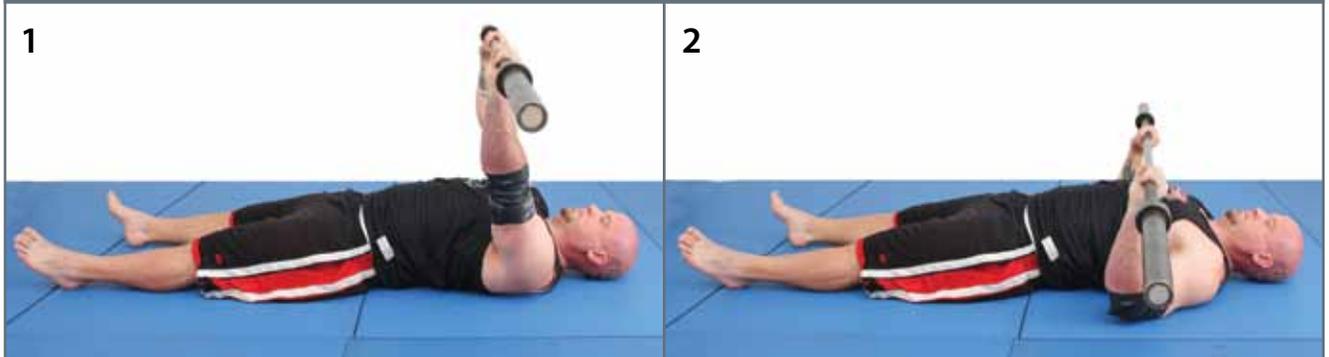
*After I finish wrapping an athlete's elbow, the first thing I'll do is rotate his elbow toward the ground, position his palm flush against my chest, and then pull his arm into full extension. As I do this, I'll externally rotate his arm to capture all the corners of the joint. The role of the Superfriend is to force the elbow into as much range-of-motion as possible while making sure your partner doesn't pass out. As with most of the highly effective mobilization techniques, voodoo flossing your elbow is not a pleasurable experience. This is why having a Superfriend manipulate your arm into key ranges is ideal, because he or she is not limited by your pain. However, like all Superfriend mobilizations, you probably need to pick and respect the use of a safe word.*

### FORCED FLEXION AND EXTENSION



*Placing your palm on the ground is a great way to encourage flexion and extension movement through the elbow. The idea is to explore different positions and accumulate 15 to 20 arm bends.*

### MOBILIZE THE MOVEMENT YOU'RE TRYING TO CHANGE



*One of the best aspects of voodoo flossing is that you can mobilize in the position you're trying to change. For example, if you're benching, pressing, or doing a workout with a lot of pushups, wrap your elbow and perform the movement you are about to perform.*

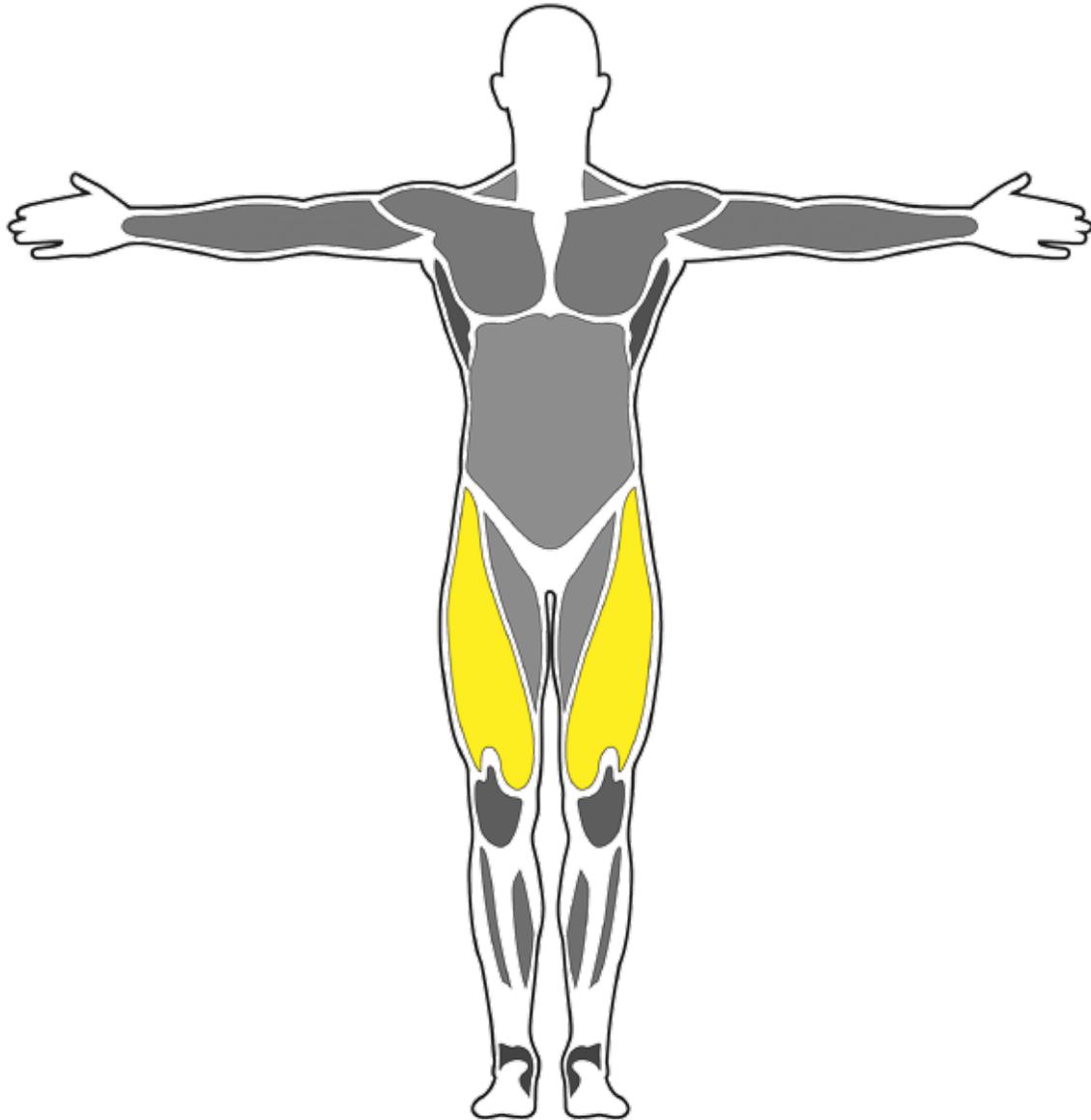
### HANG FROM A BAR



*Anchoring your hand to a bar and twisting your body is a great way to tie in the rotational components of your elbow. The key is to spend some time in both hand positions: supinated (chin-up grip) and pronated (pull-up grip).*

# AREA 7

## ANTERIOR HIGH CHAIN (HIP FLEXOR, QUADRICEPS)



## **Mobilization Target Areas:**

- ▶ Anterior hip (hip flexors) and quadriceps.

## **Most Commonly Used Tools:**

- ▶ Single Lacrosse Ball
- ▶ Rogue Monster Band
- ▶ Roller

## **Test and Retest Examples:**

- ▶ Squat/Pulling Position
- ▶ Top Position

## Quad Smash

This is one of my favorite global mobilization pieces because it has broad range application and applies to everyone. CrossFitters, elite level Olympic weight lifters, tactical athletes, and desk bound workaholics all need tools in their mobility arsenal that address global stiffness in large muscle groups like the quads, hamstrings, and glutes. They are under constant tension, put under tremendously large loads, and get adaptively short from sitting. Yet very little is done to restore suppleness to the stiff tissue. In this sequence, I demonstrate a potent way to smash your quads and restore normal function to this large bundle of hardworking muscle. However, before you delve into the technique, it's important to revisit some general rules.

**Rule #1:** Go against the grain of the tissue. Whenever you're dealing with global smashing elements, focus on slow, qualitative, back-and-forth smashing. As with the T-spine smash, rolling up and down the length of the muscle fiber with zero intention or purpose is a waste of time. You might as well just do some classic static 70s stretching and calisthenics, because you're not going to change anything. To produce significant change, create large pressures across the tissue, applying the big three mobilization techniques: contract and relax, smash and floss, and pressure wave.

**Rule # 2:** Stay on the tissue until you make change. The key is to clear a section until it normalizes (meaning it's not painful) before you move up or down the length of the muscle. When I treat athletes in my practice, I will smash one leg for no less than 10 minutes before I switch to the other leg. The point is you need to commit at least 20 minutes (10 minutes per leg) to unglue the tissue. If you can't clear the entire leg in 10 minutes, switch to equal out the other side, remember where you left off, and attack the rest of the leg later.

**Rule #3:** Use a mobility tool that will make change. To penetrate into deeper layers of the tissue, you have to apply large blunt pressures. If you've never smashed your quad before, starting out with a foam roller is not a bad idea. However, if you're a monster athlete, a foam roller will impact you about as deeply as a bag of marshmallows. If you fall into this category, use a pipe, barbell, or have a Superfriend stand on your quad. Be warned, smashing your quads is very painful. You will catch a lot of people hiding in the deep crevices of the pain cave. It may take twenty rolls back and forth before you can take the full pressure of your weight (or friend's weight) before it stops hurting. So pony up and get some work done.

### IMPROVES:

- ▶ Hip Function
- ▶ Knee, Hip, Low Back Pain
- ▶ Intra Muscular Stiffness
- ▶ External and Internal Rotation

### METHODS:

- ▶ Pressure Wave (Side-to-Side)
- ▶ Smash and Floss
- ▶ Contract and Relax



To set up, lay over the foam roller, positioning the roller directly under your left leg. Notice that I'm on my side. To keep my weight distributed over my leg, I plant my left foot down while supporting the weight of my upper body with my arms.



With your weight distributed over your left leg, create a pressure wave across the grain of your tissue by slowly rolling toward your right.



As you roll onto your stomach, plant your right foot on the opposite side of your leg. From here, you can contract and relax and oscillate on and off of tight spots.



Floss around tacked down tissue by pulling your heel toward your butt. The idea is to stay on the tight area, using the smash and floss and the contract and relax techniques until you no longer feel pain. Once you clear the area, progress up your quad to clear another chunk of your muscle.

## Barbell Quad Smash

Next to having a buddy stand on your thigh, the barbell quad smash is probably the second most effective way to tap into the deep tissue stiffness of the quad. As I said, you need large blunt forces to effect change; that is easily done using a barbell. However, going against the grain of the muscle fiber is difficult using this technique. To restore sliding surfaces to the underlying tissue, be sure to go very slow, clearing one small area at a time. Think about pressure waving back-and-forth over stiff muscle bundles until something changes or until you stop making change. You can also try rolling your leg from side-to-side to get the full smashing effect or as a way to tap into different corners.

**Note:** The barbell quad smash is particularly effective for clearing upper quad stiffness near the hip.



1. Position the sleeve of the barbell over your upper quad. To create pressure, lean forward with a flat back and push the barbell into the meat of your thigh.
2. Slowly roll the barbell down the length of your muscle, maintaining as much downward pressure as possible. Remember to focus on small chunks and go as slow as possible. The goal is to create a large pressure wave through the tissue. If you encounter a really stiff spot, you can roll your leg from side-to-side as well as use the contract and relax technique.
3. Pull the barbell back up your thigh, internally rotate your leg, and prepare to attack a new line. For optimal results, only create pressure through the barbell going down the length of your leg.

---

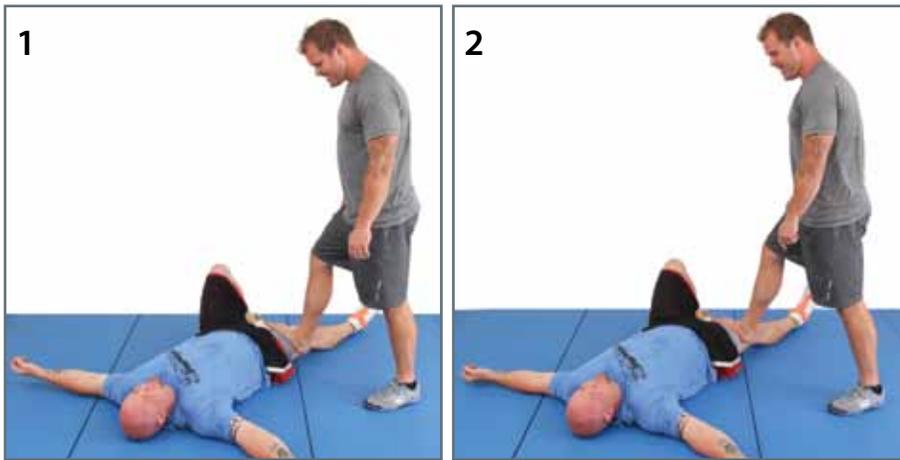
## Superfriend Quad Smash

The Superfriend quad smash is the most efficient way to effect global stiffness change in your quads. While using a barbell, Rumble Roller, or PVC pipe on yourself is certainly a good idea, the simple fact is you will never create the same amount of torturous pressure that someone else will. No one is that sick.

To perform this mobilization, have your training partner step on your quad with the arch of their foot and create large downward smashing pressures back-and-forth across your muscle. If it's you who is doing the smashing, avoid using pinpoint, lacrosse-ball-like pressures by driving your heel or ball of the foot into the meat. Uncool at the least. The goal is to create a shear force across the muscle so that you can restore sliding surfaces to the underlying tissue, as well as make it a little bit more tolerable for the guy getting smashed.

If you're on the bottom end of the smash, fight the urge to overextend. Raising your hips is not going to reduce the pain. Also, don't tap out in submission. It's not a grappling match. However, you probably need to pick out and agree on a "safe" word that will get your training partner to ease up when the pain gets to be too much.

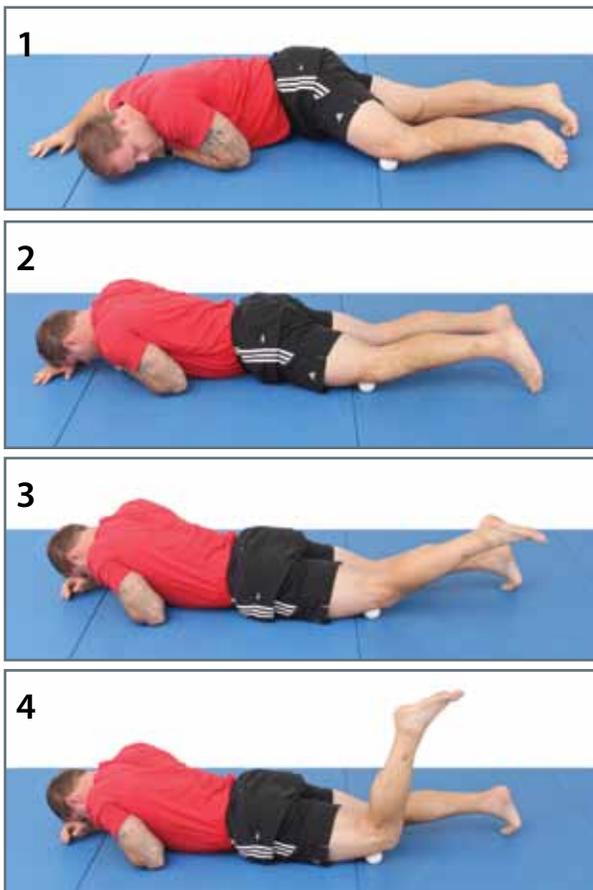
**Note:** This is a great mobilization to drop into a large group of athletes. In fact, the Chinese weightlifting team has been reported to put on large smashing parties before and after training.



1. As you'll see in the photo, I position the arch of my foot on Jesse's quad. Notice that Jesse posts up on his left leg. This helps him keep a flat back and reduces some of the extension forces (overextending his back) as I mash into his leg.
2. I shift my weight forward and create a large shear force across the top of Jesse's quad.

## Suprapatella Smash and Floss

If you're doing a lot of jumping with shins that aren't vertical—rather your knees are tracking forward when your hips are in flexion—or you're performing some sketchy squats where your knees cave in, not only will you experience knee pain, but you're burning through duty cycles at an insanely accelerated rate. Don't wait until your knee explodes to do something about it. First, feed some slack to the kneecap system so that you can reclaim good knee positions and reduce pain. Second, revisit the load-order sequence and fix your faulty mechanics. To address the former, snuggle a lacrosse ball into the area just above your kneecap (the suprapatella pouch), then apply some pressure and smash and floss until something changes. To address the latter, flip back to the chapters devoted to movement mechanics. By opening up the area right above your kneecap, you can effectively alleviate joint pain, as well as resolve a lot of the knee dysfunction that occurs in deeper ranges of flexion.



### IMPROVES:

- ▶ Knee Pain
- ▶ Knee Mechanics/Function

### METHODS:

- ▶ Smash and Floss
- ▶ Pressure Wave
- ▶ Contract and Relax

1. Position a lacrosse ball on the inside of your leg, just above your kneecap.
2. Create a pressure wave across your patellar pouch by internally rotating your knee.
3. Continue to smash across your suprapatellar pouch and quad tendon until you reach the lateral part of your knee.
4. If you encounter a hot spot, floss around the stiff tissue by curling your heel toward your butt.

## Voodoo Knee Mobilization

Guess what? Your kneecap does not stretch. The ligaments and tendons that make up the knee structure are a fixed length. The best way to improve knee mechanics (knees out-ness) and reach deeper ranges of flexion is to feed slack to the knee structure by opening up the suprapatellar pouch. In that area, you have the common quad insertion, which shares a large, common tendon sheath entering into your knee. When this area gets matted-down and stiff, it pulls on your knee structure, causing pain and faulty mechanics.

Although the lacrosse suprapatellar smash and floss works, you're limited to a tiny spot and can't get the entire target area. That is why I prefer the voodoo band variation as the first step in dealing with upstream and downstream stiffness. It tears open that big common tendon sheath and clears up the entire area in a very short amount of time.



I've wrapped Jesse's knee with a voodoo band. Notice that I've wrapped below and above the knee using two separate voodoo bands. Note: You can also wrap the entire knee using one band. To learn how to properly voodoo wrap, revisit the chapter introduction (page 219).



With his knee wrapped, Jesse looks to floss some of the stiffness away by squatting and biasing some knee-out positions. It's important to perform a number of squats, hang out in the bottom position, and force your knee into end-range flexion positions.

Jesse continues to force his knee into flexion by kneeling on the ground and sitting his butt to his heels.

## Banded Hip Extension

Opening up the front of your hips while kneeling on the ground is not a new idea (photo 1A). People have been doing this for thousands of years. But there's just one problem: The classic kneeling hip opener does not account for the joint capsule, leaving a huge piece of tissue restriction on the table. What's the solution? Simple: Hook your leg through a band, pull it up to your butt crease, and create a forward distraction. With a large tension force pulling your femur to the front of your hip socket, you idealize your joint position, which not only ties in your anterior hip capsule (y-ligament or iliofemoral ligament), but also makes it easier to mobilize all the musculature at the front of your hip structure.

As you will soon see, there are three ways to bias your anterior hip into extension: banded hip extension, banded hip extension lunge, and the infamous couch stretch. In this sequence, I start with the most basic of these elements, the banded hip extension. To correctly perform this mobilization, create tension in the band and then slowly shift your body forward while keeping your back flat. A lot of athletes mistakenly arch the back and hyperextend their back as they open their hip. To avoid this fault, shift your weight over your grounded knee while keeping your posture straight and your butt squeezed.

**Note:** To capture some of the stiffness in your high anterior hip, put your left arm over your head (if your left knee is on the ground), lean back, and then come back to center. The key is to oscillate back and forth, in and out of end-range. As with the classic hip extension, you *must* keep your butt squeezed to support your lumbar spine. This is just another option that you can infuse into this mobilization. It is a nice way to tear open that high front hip region, which tends to get very nasty.



### IMPROVES:

- ▶ Hip Extension
- ▶ Top Position (Squat, Deadlift)
- ▶ Normal Posture
- ▶ Low Back and Hip Pain
- ▶ Knee Pain

### METHODS:

- ▶ Contract and Relax
- ▶ Paper Clipping (Oscillation)



1. Hook your left leg through the band and step back to create tension—keeping your rear foot internally rotated. To avoid breaking into an overextended position, squeeze your left glute and keep your belly tight.
2. With the band distracting your femur into the front of your hip socket, slowly shift your weight forward over your grounded knee. Notice that I move my entire body rather than thrust my hips forward.
3. For optimal results, hook your foot around a weight so that you can bias internal rotation of your hip, which is the stable position for your hip.

## Banded Hip Single-Leg Squat

Mobilizing is a way to deal with muscle stiffness. It restores normal ranges of motion to tacked-down tissues. It is not a warm-up to exercise. However, there are some mobilization techniques that are appropriate prior to training and competition. The banded hip extension lunge is a perfect example. As you can see from the photos, the setup looks a lot like a split-jerk, making it a perfect piece to tie into some Olympic lifting, or anything else that requires you to open up your hips into full extension.

### IMPROVES:

- ▶ Hip Extension
- ▶ Top Position (Squat, Deadlift)
- ▶ Normal Posture
- ▶ Low Back and Hip Pain
- ▶ Knee Pain

### METHODS:

- ▶ Contract and Relax
- ▶ Paper Clipping (Oscillation)



Hook a band around your left leg, pull it up to your butt crease, and step back to create a forward distraction on your left hip. To avoid breaking into an overextending position, squeeze your left glute to protect your low back, and brace your trunk.



Keeping your left glute squeezed and your belly tight, drop your left knee to the ground. Notice that my lead shin does not go past vertical and my torso is upright.



Driving off your lead leg, extend both of your knees and stand up.

## Couch Mobilization

The couch mobilization is one of my favorite hip openers and is probably the most famous technique in the movement and mobility arsenal. Athletes have a real love-hate relationship with the couch mobilization because it is both effective and horribly painful at the same time. In fact, it's frack-en gnarly. When I first developed this mobilization, I had to do it on the couch in front of the T.V. because 1) it's an easy way to get your leg into full flexion and open your hips, and 2) the T.V. takes your mind off the pain and keeps you from blacking out.

It's important to realize that although the couch mobilization is unique to the Movement and Mobility System, it's not a new idea. People have been doing variations of this for a long time. You'd recognize this as the classic standing quad stretch that you did in elementary school (photo 1), or the traditional yogi pose (photo 2), which requires you to grab your foot and pull it to your butt while kneeling on the ground. The problem with these iterations, aside from being difficult to maintain a stable position, is they do not take you to end-range. To effect change, you need to be able to mobilize in a good position and hit end-range knee flexion and hip extension, which is what the couch mobilization allows you to accomplish.

Whether you're trapped at the airport, hanging out watching a movie, at work in front of your desk, or getting ready to work out, the couch mobilization is a highly effective way to reclaim range-of-motion and reduce muscular stiffness in the front of the hips and quads.

**Note:** The positions illustrated in the photos are basic physiologic ranges of motion, meaning everyone should be able to get into position 1 and position 2 without pain or restriction. While this is ideal, it's just not possible for the majority of people. So this turns into a really quick diagnostic for athletes and coaches. If you can't get your leg into the pre-start position or pull your back to the wall, you know something is seriously wrong: your quads and the front of your hips are freakishly tight.

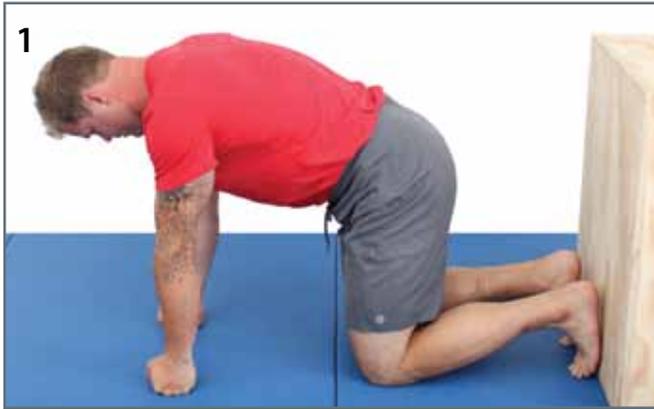
### IMPROVES:

- ▶ Hip Extension
- ▶ Top Position (Squat, Deadlift)
- ▶ Normal Posture
- ▶ Low Back and Hip Pain
- ▶ Knee Pain

### METHODS:

- ▶ Contract and Relax
- ▶ Paper Clipping (Oscillation)







1. Back your feet up to the side of a box.
2. Slide your left leg back, driving your knee into the corner and positioning your right shin and foot flush with the side of the box.
3. Squeezing your butt to stabilize your lower back, post up on your right foot, keeping your lead shin vertical. Note: If you're unable to post-up on your opposite leg because you're too stiff, position a small box in front of you for extra stability.
4. Still squeezing your left glute, drive your hips toward the ground. With your lower leg in full flexion (heel to butt), pull the tissue slack to end-range (quad/anterior hip structure), making it extremely difficult and painful to open up the hips. As long as you don't feel hot, burning nerve pain, you're OK.
5. After hanging out in the previous position for a minute or two, lift your torso into the upright position. If you find it difficult to support the weight of your upper body from the upright position, position a chair, box, or bench in front of you for extra stability.

## Common Faults

One of the biggest issues people have with the coach mob is they can't get into the correct positions because they are too tight. For example, it's not uncommon to see athletes slide their knee out to the side, pull it away from the corner, or overextend as a way to circumvent their mobility restriction. If you find that getting into position 1 or 2 is difficult, keep your opposite knee on the ground and stabilize your weight on a box. For the best results, put your



knee in full flexion so that you can tie in the quads and open up the business at the front of your hips. And remember: If your butt goes off tension a dear friend will probably die, so don't do it.

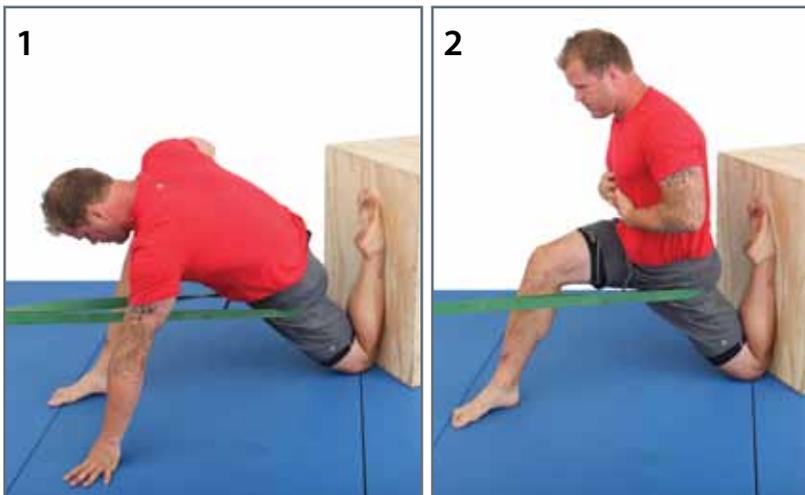
## Super Couch Variation

The super couch is the DEFCON 5 version of the couch mobilization. By adding a band and creating a forward distraction you increase the brutality and effectiveness of this mobilization by a factor of 10. Remember: Anytime you can make a mobilization feel worse, it's probably better. Despite increasing your chances of blacking out, the band opens up your hip capsule and tears into the anterior structures of your quad and hip like nothing else. The results are truly amazing.

Disclaimer: If you don't have full-range in your quads and hips, you should probably stick with the couch mobilization because adding a band is like dropping a nuclear bomb on your quads and hips. This is the favorite mobilization technique of Laura Phelps—world champion, world record holder, and one of the greatest strength athletes of our generation—so we commonly refer to the super couch as the Laura Phelps.

**Note:** Wrapping a band around your hip and then positioning your leg against the wall is tricky. Unless you have a \$10,000 dollar mobility setup, or you have a large enough box that you can position next to a pole, you have to get a Superfriend to pull on the other end of the band, which is not ideal. Enter the Coach Roop variation.

Coach Roop—San Francisco CrossFit super coach—identified this problem and came up with a solution. In Coach Roop's iteration, you wrap your leg up in a band, pinning your foot to your butt, so that you can implement the super couch anywhere. All you need is two bands and a pole. It's genius.



1. To set up for the super couch, hook your left leg through a band and create a distraction by pulling your left leg back. To prevent the band from pulling you forward, post up on your right foot and then force your knee into the corner of the box. With your shin flush and foot flush with the box, squeeze your left glute with all your might and drive your left hip toward the ground.
2. Keeping your butt squeezed and your trunk braced, very carefully lift your torso into the upright position.