PROVEN UNIQUE WARM-UP SYSTEM TO ATTAIN A HIGHER LEVEL OF ATHLETIC SKILL

Reno Speed School

"The most informative resource on warming up I've seen in 20 years as a coach."

Kelly Baggett
Performance Coach
www.higher-faster-sports.com

TRAVIS HANSEN, B.S. CPT

WARM-UP MANUAL

Reno Speed School Warm Up Manual

By: Travis Hansen

Editor: Brian Wade

Cover: Jen Cope

The information contained in this book is meant to supplement training for a sport. Like with any type of training, the training discussed within this book does pose some inherent risk. The author advises readers to take full responsibility for their safety and know their limits. Before practicing the exercises described in this book, be sure that your equipment is well maintained, and do not take risks far beyond your level of experience, aptitude, training, and comfort. As with any form of exercise, please consult your physician prior to commencing any strenuous activity.

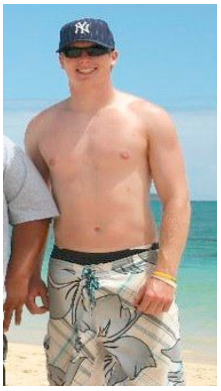
Reno Speed School Warm Up Manual

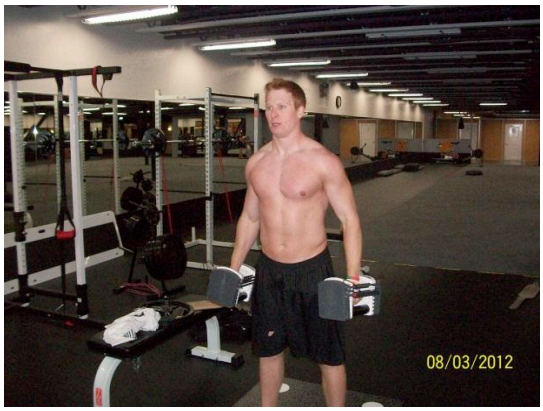
By Travis Hansen

RENO SPEED SCHOOL ATHLETIC PERFORMANCE TESTIMONIALS:

Please be aware that these testimonials were not achieved solely with this warm-up system, but it played a critical role.

Scott Underwood-MLB Prospect





BEFORE: 175 lbs. AFTER: 205 lbs.

*Improved Exit Throwing Velocity (outfield to home plate) from 85 MPH to 94 MPH.
*Bench press increased from 225 lbs. to 305 lbs.
*Squat increased from 300 lbs. to 400 lbs.
*40 yard dash has gone from 4.9 seconds to 4.6 seconds.
*60 yard dash has improved 7.0 seconds to 6.4 seconds.
*Vertical jump has gone from 30" to 36".
*Scott has bulked up 30 lbs. naturally while maintaining a low body fat percentage!

Erik Underwood- MLB Prospect

Erik has experienced tremendous gains on the program.
*Bench Press increased from 195 lbs. to 265 lbs.
*Deadlift increased from 225 lbs. to 435 lbs.
*Vertical jump increased from 27" to 32"
*40 yard dash improved from 5.2 to 4.6 seconds
*60 yard dash improved from 7.2 to 6.5 seconds
*Eric also amassed 25 lbs. of muscle.

Brent Koontz- Former Collegiate and Arena League Football Player

Brent improved his 40 yard dash time by almost a half second. When he first began training he recorded an unofficial 5.2 second run. At his tryout with the San Jose Sabercats of the AFL, Brent ran an unofficial 4.86 40 yard dash.

Zach Lessinger- High School Basketball Player

*Zach has increased his vertical jump by 10 inches in 12 weeks (18-28 inches) on the program.
*He got his first dunk and is now jamming with ease.

Taylor Elicequi- High School Skier

Up until last year, Taylor held the pound for pound squat record for all females. She parallel squatted 200 lbs. at a bodyweight of 125 lbs. This along with other skill improvements turned Taylor into a beast on the slope.

Jarrod Faust-Collegiate Football Player

When Jarrod first started training he had recently been released from outpatient therapy for his ACL reconstruction a year prior. Jarrod was uncoordinated, weak, and uncertain of how his body would respond. Fast forward a half a year and Jarrod reached a new PR in the 40 yard dash (4.9-4.6 seconds), and he is one of the all-around strongest trainees to ever practice in this program, and his knee feels fantastic.

Nate Nolan-High School Baseball Player

Nate has had remarkable gains over the past year of training on this system.

*He has gained 30 lbs. of muscle (165-195 lbs.) since he started.
*His pitching velocity has increased from 84 MPH to 87 MPH.
*His pop time at catcher has improved from 2.2 seconds to 1.8 seconds.
*His vertical jump has increased from 27" to 36".
*His 40 yard dash has gone from a 4.9 unofficial to a 4.5 unofficial.
He has been assessed on two occasions in the 60 yard dash at baseball showcases in Santa Clara, Ca. At his first showcase he ran a 7.3 seconds, and the second time he ran 6.8 seconds. Nate also recorded the farthest power based medicine ball throw out of all participants attending at the last showcase. He is only 17, he is all natural, resilient, and extremely focused on making it big. He received a full ride to St. Mary's College and is a high school Pre-Season All-American.

Jake Morris-High School Football Player

Jake has amassed over 40 lbs. while on this program. He has taken his 40 yard dash time from 5.2 to 4.7 seconds. His Shuttle Run from 4.5 to 4.0 seconds, and had the fastest shuttle on his high school team as a lineman! His vertical jump has increased from 19" to 26", and his squat has increased over 100% and his bench over 50%.

Josh Barrett-New England Patriots

"As an NFL athlete I've trained all over America and working with Travis, his hands on approach, challenged me as an athlete. His knowledge, passion and work ethic is amazing. I recommend Travis to anyone who aspires to reach their athletic goals."

Me @ 5'11"!

With the help of this program for the past 3 years I have been able to take my athletic performance to a whole new level.

*My standing vertical jump has improved from 30" to 37", and my running vertical jump has soared from 39" to 46".
*My fully electronic 40 yard dash has gone from 4.92 to 4.54 (Note: NFL combine uses partial electronic systems.)
*I'm 30 lbs. bigger (170 lbs. to 200 lbs.)
*Bench press has gone from 225 lbs. to 300 lbs.
*Deadlift 350 lbs. to 475 lbs.
*Squat 275 lbs. to 395 lbs.

As you can clearly see, these are *real* testimonies. None of this "I feel better," or "my trainer motivates me" or "my trainer is the best" non-sense. This is what a program is all about. The results you can generate and the science you provide, and we have definitely done that. I apologize to anyone whom I omitted above.

THE SCIENTIFIC REVOLUTION OF THE WARM-UP:

I'm sure many of you can vividly recall going through traditional calisthenics, or pre-sport stretching routines prescribed by previous coaches and physical education teachers. Do you remember the laps upon laps of light jogging, lots of slow static stretching, countless jumping jacks, and the other staples of the traditional warm-up? It was probably evident to many of you that what you were doing at the time was a hand-me-down from the previous generation of coaches, physical educators, teachers, and professors, passing on routines and techniques provided to them by their past authority figures. Maybe your coach or teacher even told you a story of their experiences with some specific routine that was especially dear to them. This "traditional warm-up" philosophy has obviously existed for decades, and I think very few have really questioned or even considered the possibility of re-evaluating and revising the way we perform a warm-up. Historically, just moving around and improvising movement with no rhyme or reason has been culturally accepted and sufficient for most in preparing an athlete for competition or ensuring a client is ready to workout. I must admit that I, too, was guilty of this for a long period of time. Moreover, I do not fault the coaches and past educators who used this preparation strategy. They were doing the best they could at the time with the resources they had at hand. Things have evolved tenfold in the last decade, and we have improved many of the ways we do things in training, and the warm-up is one of these things. In the last ten years the warm-up has started to become more evidence-based and studied in exercise science. Consequently, we have made big strides in this area and determined precisely how we should warm-up for increased productivity in training. The days of nonchalant, random, uncertain, slow and boring stretching, and excessive chit chat are officially over. Through exercise science you can come to appreciate that there is a best-practice approach to warming up and physically and mentally preparing the body to gain the most out of every workout. Before I go into further detail, I would first like to cover a standard set of guidelines to help define and serve as a basis for designing an effective and safe warm-up system. I will label these as the "5 Warm-Up Rules" derived from recent research.

Rule #1: Inhibit……Lengthen…….Activate……Integrate. (Courtesy of NASM—The National Academy of Sports Medicine)
Rule #2: Move slow to fast (i.e., Sit to Run)
Rule #3: Low Intensity to High Intensity (i.e., Bodyweight to BW + resistance types)
Rule #4: Simple to Complex (i.e., Stretch to Squat)
Rule #5: Stable to Unstable (i.e., Seated to Standing)

If you have competed in athletics or participated regularly in exercise for an appreciable length of time, then all of these rules may seem natural in the process of physical preparation except for number one. It is this unique chain of events seen in number one that is key to satisfying numbers 2 through 5. Keep in mind that rules #2-5 will all be mentioned and included during each phase that we discuss as part of rule #1. Also, rules #2-5 always run parallel or follow one another. Meaning that if we move from one stage to another in one of these rules, then we transition stages in the rest as well.

Approximately a decade ago I first caught wind of NASM's warm-up recommendations. To my understanding, they were practically unknown at the time, and it wasn't until I observed many other respected coaches and trainers across the country who had great success with diverse clientele implementing these new concepts into their own training systems, that I became intrigued by the idea of inserting it into my own practice. This simple model makes great sense and certainly delivers once you study and master it. It's a great opportunity to develop a number of important training functions in a very short period of time, and maintain those functions through repetition over the long haul. Truth be told, you will witness an array of different warm-up training models with different terminology, but the one thing they will have in common, if they are scientifically valid, is that they follow this sequence. I should also mention that this warm-up system is our general injury prevention/rehab program, which in the fitness industry is commonly referred to as *Corrective Exercise*. Corrective Exercise is a series of massage, stretching, strengthening, and movement drills that serve to help correct movement patterns as well as prevent injury or treat it in the process. Many injuries that could occur will be remedied for with this system. Now we will dive into the phases of the collective warm-up and discuss the associated benefits of each in detail.

PHASE #1-INHIBITION/FOAM ROLLING:

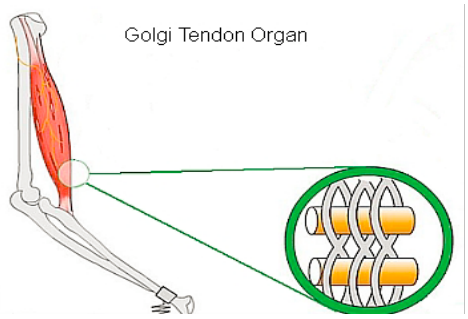
To comply with the recently proposed model (i.e., warm-up rules 2-5), this phase will always be slow, involving stable and simple motions, at a lower intensity. Before a workout, the body is not ready to engage in strenuous physical activity or reach its peak, and our sole focus should be on addressing more fundamental and often overlooked methods of the training process, which are integral to maximizing the more hyped and appealing techniques (speed, strength, power, etc.) to follow. In this segment of the workout, we will perform an activity referred to as *foam rolling*, also known as *self myofascial release*. Foam rolling is a "cheap massage." Massaging tissues helps decrease pain, reduce soreness, improve recovery time, increase metabolism, improve flexibility, and increase performance slightly. As a quick side note, foam rolling is a cost-effective derivative of manual massage. The reality is that many people can't afford a high-quality massage from a licensed therapist. The question then becomes, how do we simulate the act of massage, since we now know its many benefits, and still receive good results from the chosen alternative? The answer: The foam roll! The foam roll is generally a cylindrical piece of dense Styrofoam used to self-massage various tissues throughout the body. There are a number of other training implements that will work as a substitute for the foam roll. Examples include, but are not limited to: medicine balls, golf and tennis balls, PVC pipes, stick rollers, etc. Some items work better than others at different body locations, but I will keep it simple and suggest you invest in a foam roll. You can go to just about any local fitness or sporting goods shop and find one of these.

With this technique, you simply apply as much direct pressure to each target area of the body as you can. By doing so, you will relax and release problematic tissue knots

that form naturally. This results in a healthier and better functioning tissue. As a side note, *adhesion* or *trigger point* are other terms frequently used in place of *knot* and are more technically correct. I must warn you though that if you have never participated in this activity, it's uncomfortable and unpleasant in the beginning. I can assure you, however, that if you consistently roll out a few times per day, every day for a week, the discomfort and pain you experienced during your introduction to this technique will either disappear or substantially decrease to the point where it is quite tolerable. Maintenance of the improvement will be easy so long as you stay consistent with your soft tissue work before each workout. Below is a brief list of the five benefits associated with the self myofascial release technique.

#1-REDUCES PAIN AND SORENESS

When we exercise hard and train a muscle there is a complex set of events that occur inside the muscle that causes it to bundle up into a dense and painful knot or knots. When this occurs, local blood flow through the muscle is reduced and the tissue's metabolism suffers. Fortunately, if we use the foam roll and apply heavy pressure directly to the knot, then the knot releases, blood flow increases, and metabolism improves, and pain is eliminated. This cycle is due to the activation of a sensory receptor found in the tendon that attaches to the knotted muscle called a golgi tendon organ. When we apply pressure to the muscle, the Golgi turns on which in turn causes the muscle to relax and lengthen.



(Image courtesy of Wikipedia)
The golgi tendon organ is found at the muscle and tendon junction.

#2-ACCELERATES RECOVERY

As you can probably imagine, with greater local blood flow to the damaged tissue, the nutrients essential to the healing and recovery process are better delivered to that location and we heal quicker. Furthermore, harmful metabolic waste products, which can limit recovery, are removed. This allows us to train more frequently and at a higher intensity.

#3- INCREASES FLEXIBILITY AND MOBILITY

Tissue massage also does a great job ensuring that we have the capacity to operate our movements through a full range of motion. When a muscle develops a knot, its length is reduced and this reduction is proportional to the size of the knot. By rolling out the knot, tissue length improves, and we experience a simultaneous increase in soft tissue extensibility (flexibility) and mobility of our joints.

#4-INJURY PREVENTION

This next benefit introduces a very subtle, overlooked, and potentially dangerous scenario. We already now know that knots shorten muscle tissue. When one muscle shortens (agonist), the opposing muscle (antagonist) will equally lengthen, and a muscle imbalance emerges. When this occurs, the shortened agonist works extra, while its counterpart weakens. Eventually, we become predisposed to various overuse and underuse injuries. What's worse is that the rest of the body will have to compensate for the acquired imbalance since the body works as a single unit, and this same scenario repeats itself at every joint elsewhere in the body.

Thankfully, daily soft tissue massage is one of the primary means of preventing this vicious cycle from occurring or repeating itself; additional means include specific stretching and strengthening techniques, proper exercise selection, training volume/ intensity control and manipulation, solid nutrition, and good daily posture practice.

#5-INCREASES PERFORMANCE

Imbalance not only strongly predisposes us to various injuries throughout the body at any time, but it will also ultimately limit the quality and productivity of our movement. A short and knotted muscle loses its force production capabilities to some degree, since it cannot effectively stretch and store potential kinetic energy. Conversely, an excessively elongated muscle is just as weak. By incorporating foam rolling techniques and other pertinent training methods into our program, we can restore structural balance and improve performance across the board.

PHASE #2: LENGTHEN/ACTIVE FLEXIBILITY AND MOBILITY:

In this phase, we begin to transition our exercise from a low intensity to a medium intensity, and the drills become more complicated and less stable as we progress through the series. It's imperative that we capitalize on the gains made in the body during phase #1. What I mean here is that all of the areas we massaged previously are now ready to be stretched and maneuvered so that we can restore them back to their normal, healthy length and improve function. Furthermore, we increase the benefits listed in phase #1 and introduce one more that is often neglected, and sometimes even undermined, in most warm-ups. This benefit is enhancing our muscles stretch reflex, or stretch shortening cycle. The myotatic stretch reflex is a built-in protective mechanism of the body that quickly activates and contracts a muscle whenever it is stretched rapidly

and forcefully so that we do not run the risk of over-stretching and tearing the muscle. Fortunately, we can use and develop this unique feature of the muscle to our advantage so that we are stronger and more explosive with our movement tasks. Our stretching before training should *always* be active and explosive in nature, so that we can be more productive afterwards.

Traditionally, most people think that static stretching would follow foam rolling, or at least be taken up at some point in the warm-up cycle. This is a big mistake, and there are at least three scientific reasons why. First and foremost, static stretching has been shown in conclusive studies to reduce both the strength and power of our muscle contractions. "In contrast, passive static stretching has shown decreased force production, velocity, as well as power production suggesting a decline in performance."[1] Not a good thing by any stretch of the imagination, since these are the exact same qualities we are looking to develop maximally in our training.

(Photo courtesy of Wikipedia)
These guys are fast, but I bet they would be a whole lot faster if they cut this out before the game!

Furthermore, static stretching does not reduce injury risk in target muscles any better than dynamic stretching according to many reports[2]. Soccer athletes who performed dynamic-based stretches improved hip flexibility far more than those that used static stretches prior to competition. Also, keep in mind that faster, higher force stretching still stretches and prevents injury to the muscle just like in static stretching, and perhaps more so since there is more effort driving the joint and stretched muscles into motion. Moreover, the heat generated from the greater work produced with this type of stretching increases the elasticity of the muscle, promoting better stretching. Unfortunately, I'm constantly advising clients to lock it up or "tighten up" when moving. Contrary to popular belief, tendon and muscle stiffness are two primary characteristics of great athletes. Yes, you read that right! Athletes and people looking to perform better need to exhibit a moderate to high degree of muscular *tightness* to better transfer force to the object or limb they are moving. To help bring this into perspective, think of the blood vessel analogy for a moment: When we are stressed and need energy immediately, our blood vessels constrict so that they can increase the rate of blood flow to the target

[1] Wallmann H, Mercer J, McWhorter JW. Surface electromyographic assessment of the effect of static stretching of the gastrocnemius on vertical jump performance. *Journal of Strength and Conditioning Research* 2005; 19 (3): 684-688.

[2] Here is one *from The Journal of Strength and Conditioning Research*; http://journals.lww.com/nsca-jscr/Abstract/2011/06000/Acute_Effect_of_Static_and_Dynamic_Stretching_on.23.aspx

location. The vessels become rigid so that force can build against them, the blood stream increases its velocity, and our need for fast energy is soon satisfied. A muscle acts in much the same way as a blood vessel. If we are too flexible or loose with our movements, then we lose essential stiffness, force is lost, and we cannot move as efficiently. This isn't to say that we should not static stretch, because it is a significant factor for reducing and preventing injury and hastening general recovery from training. Static stretching is a fundamental piece to a complete training program. The problem arises, however, when we stretch and relax too much or stretch at the wrong times. Right before an intense workout is absolutely the wrong time. Another good example of this can be witnessed with a marionette (a puppet on a string). Marionettes are as flimsy as it gets. They flail erratically when we attempt to move them around. The ends of their "bones" attempt to penetrate through the tissues (muscles, ligaments, and fascia) supporting and preventing them from doing so. Their motions are very slow and drawn out, and wasted motion occurs at every joint. We desire none of these qualities in our training.

(Image courtesy of Jim Shore) VS.

(Photo courtesy of Keithen Valentine)

Who's the better athlete? The relaxed, overly flexible marionette, or the tight, intense, athlete? Keithen Valentine, shown here, has ran a 4.3 40-yard dash and formerly started at tailback for Kansas State!

Go Google images of the fastest Olympic sprinters, NFL athletes, etc. in action, and you'll notice that the majority are very intense and tight in most areas during the run. Some of my clients are nationally competitive in the 40-yard dash thanks to precise video software verification, and fully electronic timing systems. Not a single one of these athletes demonstrated a loose, less responsive, and unstable body structure. Quite the opposite. Bottom line is that I view everything we do, including stretching, as a precious opportunity to "turn on" and ramp up the activity of our neuromuscular system which drives performance. This notion is so underrated, and vital for making better athletes and enabling a more effective workout regardless of the training objective. Obvious exceptions to this relatively new warm-up approach would be special case populations, such as the morbidly obese, pregnant women, the elderly, and any other special population. In these cases, please consult your doctor, get clearance, or find a specialist that can cater to your physical needs in a prudent and safe manner. Everyone else gets the green light to go crazy! On a final note, so much focus in the industry has been placed on relaxation in training. The reality is that we are only required to relax at infrequent select times in training. Examples include: post-workout static stretching,

when we are attempting to restore proper breathing patterns, and, perhaps, after our foot toes off the ground in sprinting and running. The rest of the time, which is the majority, our concern should be on being as explosive, aggressive, and competitive as possible to help raise performance levels. To sum up, it does not matter if your goal is fat loss, building muscle, or taking your performance to another level, you'll definitely get there faster with quicker, high force, dynamic stretching techniques.

PHASE #3: ACTIVATE/MUSCLE ACTIVATION:

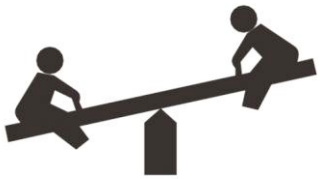
I remember sitting in a cadaver anatomy course years ago and our instructor made mention of Muscle Activation Training (MAT), which was pioneered by Greg Roskopf[3]. As far as I know, the NASM was the first fitness and training organization to promote MAT to the masses. With this method, we are basically "waking up" commonly weak muscle groups to ensure their participation in larger multi-joint movement patterns that will occur afterwards to raise performance and prevent injury. Also, muscles and tissues have just been stretched and now is an ideal time to strengthen and contract target areas. I remember hearing world-class performance coach Mark Verstegen, state that we should "isolate before we integrate" movement. It made good sense at the time, although, we can never exclusively train a muscle or truly isolate it, since other muscle groups must provide stability and support to joints during all motion. In his defense, however, the single joint exercises you will be performing in this phase are as close as it gets to true isolation work. Below is a short list of the essential benefits of MAT during your warm-up.

* Stretches dominant and overactive muscle groups
*Strengthens under-active and weak muscle groups
*Helps restore muscle balance and proper alignment to the body
* Assists in the reduction and prevention of various injuries types
* Educates or re-educates muscle groups on how to move (intramuscular coordination)

I will provide specific examples of each of the five benefits listed above. Muscle activation exercises, when prescribed properly, can stretch muscles that are overused and strengthen essential opposing muscle groups. If you analyze the hip region you will observe that the hip flexors (front of hip) are a commonly dominant and tight muscle group, while the gluteal group (back of hip) is inhibited and normally weak. This process of one muscle overpowering another and shutting it down, is technically referred to as reciprocal inhibition. This process is so common that it has been given a condition name: the lower crossed syndrome. It's not the only type of imbalance at the hip, but it is one of the more common ones. With this in mind, we always prescribe specific exercise variations for the weak gluteals to restore or increase strength while simultaneously stretching and slightly weakening the overactive hip flexor group. The beauty of this is that we kill two birds with one stone: our hip becomes more symmetrical and we effectively eliminate the pattern of dysfunction locally at the hip, and we also increase our chance of staying balanced and healthy above and below the

[3] http://www.muscleactivation.com/

hip as well. The body's function is interdependent, so if the hip is in balance there is no need for other joints to compensate and possibly shift out of balance.



(Photo courtesy of Wikipedia)
You can view our body as a dynamic see-saw. When one joint is out of balance, the joints above and below must change their position to maintain equilibrium.

Any of the other joints could have been used as an example of this movement principle, but it really does not matter which we consider so long as you understand that every joint and accompanying muscle group has both a direct and indirect effect on the posture and functional capacity of the body at any given time. In a direct sense, the muscle group affects the area in which it is located. For example, if part of the hip is not working right it obviously affects the hip, like in the case above. This is very well understood. What is not so obvious though, is that this same area of the hip indirectly affects other regions of the body as well. If the hip is not working well and develops an imbalance, then the upper body area has no choice but to compensate this weight shift and adjust itself as well, creating another imbalance in this process.

Continuing with the lower crossed syndrome, when the hip flexors become tight and overactive and the gluteals weak, there are several bad things that can happen not only at the hip, but other areas as well. Since the hip cannot fully extend or straighten, we are forced to straighten and extend elsewhere in order to move and accelerate. Our body naturally searches out and selects an alternate solution. Option B would be extending the knees and lower back to create motion. A very bad thing, since these areas are structurally designed primarily for stability and prevention of motion. Ultimately, if we want to prevent, or at the very least, reduce our risk of injury, there is no other option but to stay in structural balance from top to bottom. MAT is not the only or even the most effective way to achieve this objective (Maximal Strength Training is a superior method) but it is a proven and essential secondary measure that should be a part of anyone's fitness or performance training program.

PHASE #4: INTEGRATE/DYNAMIC MOVEMENT TRAINING:

Here is where we really start to elevate the intensity, speed, specificity, and complexity of our exercises! All of the fun stuff is just around the corner, so bear with me a little bit longer. At this stage in the warm-up, the body's internal activity is beginning to really take off as our body's proprioceptive system, or muscle sensory system, is heightened and we become much more productive and able. Below is a list of the essential associated benefits of this phase.

* General and specific movement preparation and correction training
* Increases high intensity energy production and metabolic rate
* Increases nervous system activation
* Increases respiratory rate and oxygen consumption
* Lubricates synovial movement joints
* Increases psychological readiness and focus
* Increases dynamic flexibility
*Reduces injury risk
*Increases core and body temperature
*Substantially increases systemic circulation

I view the final phases of this general warm-up system as a great time to really emphasize and address any movement deficiencies and inefficiencies a client may temporarily possess. Moreover, it's a great learning environment for the trainee since fatigue is low and this condition is prime for enhancing motor skill. Clients will complete a blend of specific and general movement patterns that will improve their movement skill in every direction. This approach also continues to build upon everything created in the previous phases. We've worked out all of the kinks, we are more flexible, and we are ready to move more at this point. Moreover, now is the time to create or retrieve movements in the specific motor centers of the brain. It's just like performing a few empty bar squat sets prior to heavy squatting, or hitting golf balls on the range before a round of 18. Our nervous system requires a brief session of practice with the target movement in order to ensure its proper application in training or competition.

As we execute the warm-up exercises our blood is racing to the target muscles and delivering large amounts of energy. Energy stores in the working muscles are also being broken down quickly and swallowed up. Joints are releasing essential fluids that reduce resistance which enables greater ease of motion, in much the same way oil lubricates the mechanical working pieces of a car. Psychologically, we are much more focused on the task at hand so that we can perform better. Our core and body temperature increases as a result of the energy being produced from the muscles and the transportation of blood through our vascular system. This reduces injury risk as the muscles and other tissues start to expand and become more pliable. Our lungs are working extremely hard to deliver more oxygen to the working muscles so that we can support the energy demand and recover. The generated heat, along with constant movement, starts to increase the rate with which our nerves fire our muscles and the contractions become stronger and more explosive. Last but not least, our reaction times, reflexes, and coordination in individual muscles and the synchronization between all muscle groups improves so that we can carry out the larger and more complex movement patterns with greater ease. The chain of events above clearly illustrates what is required before we train so that we can eventually function at the highest level possible. At this stage of the warm-up, we are nearly ready to perform at our peak. The last phase, which I introduce next, puts the stamp on maximum physical production to follow.

PHASE #5: PLYOMETRIC TRAINING:

At this stage in the warm-up, movements are going to be very fast, unstable, complex, and especially intense. *Intensity*, or level of effort, is a key element during the final stages of the warm-up and is a missing link in most people's training philosophy. Consequently, without an emphasis on high intensity, performance will decrease proportionally.

A plyometric by definition is a rapid eccentric (stretching) muscle action immediately followed by a rapid concentric (shortening) muscle action in attempt to move a body limb or object in an intended direction. Examples include hitting, throwing, kicking a ball, throwing a punch or kick, jumping, and sprinting to name a few. When we continuously accelerate our body in a specific direction, hit the ground, and reaccelerate rapidly like in running or jumping for example, our body develops and expresses its natural stretch reflex. This increases the activity of our nerves and muscles resulting in quicker and more forceful responses. This type of training is monumental for maximizing your speed and athletic potential. Proper and progressive plyometrics also seek to improve proper landing patterns and deceleration skill that are vital to long term lower body health and performance. In the words of world-class Strength and Conditioning Coach Mike Boyle, "People rarely get injured on the take-off." Lastly, this phase serves to "pre-exhaust" the body as way of metabolically signaling increases in energy production which fuel performance. If you're severely out of shape, then subsequent training after this warm-up approach will suffer to some extent for a while. Don't worry, though. Once you have grown accustomed to this phase and your body has made all of the necessary adaptations to accommodate this type of training then this will no longer be an issue, and you will perform better overall, if the rest of the program is being performed as it should be.

Before I continue, it is only right that I credit Joe Defranco[4] for the integral discovery of the plyometric training warm-up phase. He calls it a *frequency phase*, which is essentially the same thing, but I think most people are readily familiar with the term *plyometric*. NASM founded the concept of movement integration or performing larger and more specific movements just before a workout, but Defranco made it more specific to training and sports by making it extremely intense and power based. This phase is essentially a continuation of phase #4, but with a few significant distinctions. Below is a checklist of key features of this phase:

*Skyrockets nervous system activation and power output!
* Improves proper ground reaction/response of the foot and body
* Improves muscle's stretch-reflex or stretch shortening cycle
* Improves rate of force production and muscle recruitment velocity
* Improves general work capacity and conditioning
*Maximizes calorie expenditure/fat loss
*Helps build strength and size

[4] Defrancostraining.com

This notion of fast and extremely intense movement preceding our actual training has been researched, and the findings have been very positive. A study was conducted and reported in *The Journal of Sports Science and Medicine*[5] analyzing the impact of plyometrics on agility training. The subjects who performed plyometric training in this experiment improved their agility performance by up to 10%, whereas the control group demonstrated very little improvement. Another study was reported in *The European Journal of Scientific Research*[6]. In this study, subjects improved their leg muscle strength by up to 10% by performing various plyometric jump exercises before engaging in specific strength exercises for the lower body. The bottom line is that the plyometric exercises and drills performed in this phase promote extremely high levels of power output. In my own case study, my athletes would consistently run at least a tenth of a second faster in all acceleration, speed, and agility-quickness drills, gain 1 to 2 inches on jump tests, and lift 10-20 lbs. heavier in the squat, deadlift, or bench press when they warmed up this way. With this specific approach to the warm up, we not only get some much needed improvement in our overall work capacity and conditioning, but these training techniques will go a long way toward ensuring that we are truly ready to sprint, jump, cut, bench press, squat, and so forth at our absolute best and without injury!

WARM-UP SUMMARY:

Hopefully you learned a thing or two about how to effectively maximize your warm-up. Remember, you are how you train. If you want to be fast, you need to act fast and the warm-up is no exception. We should take the warm-up seriously, and not view it as a social time or time to dawdle. Warm-up philosophy has evolved quite a bit and you would be hard pressed to find a better scientific strategy for it at this point. The main issue surrounding this subject of proper warm-up is one of exposure, recognition, and understanding from the general public. Follow this system how it is written and you cannot help but make progress. It does not matter if you're interested in general fitness, trying to incinerate layers of body fat, gain size and strength, or take your athletic and sport performance to another level. This general warm-up system is a rare but valid one size fits all approach.

5 http://www.jssm.org/vol5/n3/12/v5n3-12pdf.pdf
6 http://www.eurojournals.com/ejsr_31_4_08.pdf

RENO SPEED SCHOOL WARM-UP SYSTEM:

PHASE #1: FOAM ROLLING (5 MIN.)

*Calves x 20 sec each
*Hamstrings x 20 sec each
*IT Band x 20 sec each
*Quadriceps/Hip flexors x 20 sec each
*Groin/Adductors x 20 sec each
*Glutes x 20 sech each
*Lats x 20 sec each

Note: Roll along muscle and find most tender location and hold that area.

PHASE #2: ACTIVE FLEXIBILITY-MOBILITY (1-2 MIN.)

*Calves x 5 each
*Walking heel to butt stretch x 5 each
*Walking knee to chest stretch x 5 each
*Leg cradle out x 5 each
*Stationary Spidermans x 5 each
*Heel to butt run x 10 yards
*High knee run x 10 yards
*Walking toe touch x 5 each

PHASE #3: MUSCLE ACTIVATION TECHNIQUES (1-2 MIN.)

*Plank Series x 10/10/10 Seconds (Front/Left Side/Right Side)
*Reverse Crunches x 10
*Supine Bridge x 5 each leg
*Lateral Band Walking x 5 each leg
*Build up sprint @ 40 yards (70% effort)

PHASE #4: DYNAMIC MOVEMENT TRAINING (1-2 MIN.)

*Forward skips x 10 yards
*Back skips x 10 yards
*Backpedal x 10 yards
*Backward Run x 10 yards
*Carioca x 2 x 10 yards
*Build up sprint @ 40 yards (80% effort)

PHASE #5: PLYOMETRICS (3-5 MIN.)

*Prisoner Squats x 5
*Prisoner Forward split squat x 5 each leg
* Prisoner Lateral squat x 5 each leg

Plyometrics (Jump Training):

Option #1
*Double Leg Variation=Forward Box Jump x 5 reps x 2-3 sets
*Single Leg Variation=Forward Box Jump x 5 reps per leg x 2-3 sets

Option #2
*Double Leg Variation=Broad Jumps x 5 reps x 2-3 sets
*Single Leg Variation=Bounding for height x 5 reps per leg x 2-3 sets

Option #3
*Double Leg Variation=Tuck Jumps x 5 reps x 2-3 sets
*Single Leg Variation=Lateral Bounding x 5 reps per leg x 2-3 sets

Ladder Drills:

Option #1
*Drill #1-Quick feet-forward x 2 half ladders
*Drill #2-Quick feet-side x 2 half ladders

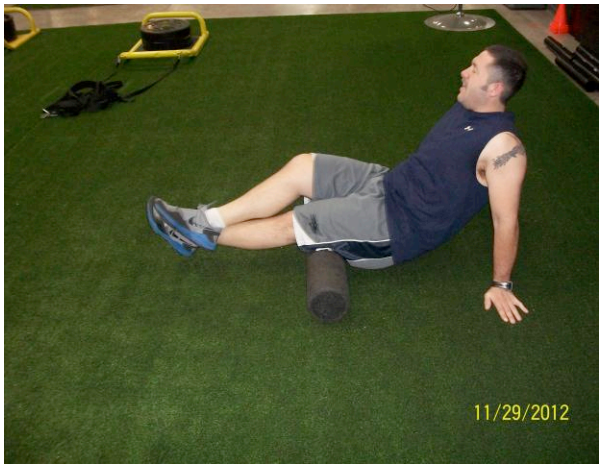
Option #2
*Drill #1-Hopscotch-Forward x 2 half ladders
*Drill#2-In/Out x2 half ladders

Option #3
*Drill#1-Cross in front x 2 half ladders
*Drill #2-Double Leg Slalom x 2 half ladders
*Build up sprint @ 40 yards (90% effort)

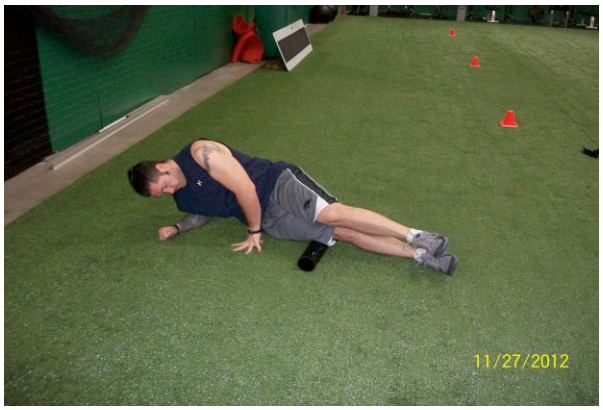
WARM-UP EXERCISES:

PHASE #1: SOFT TISSUE WORK-FOAM ROLLING (5 MIN.)

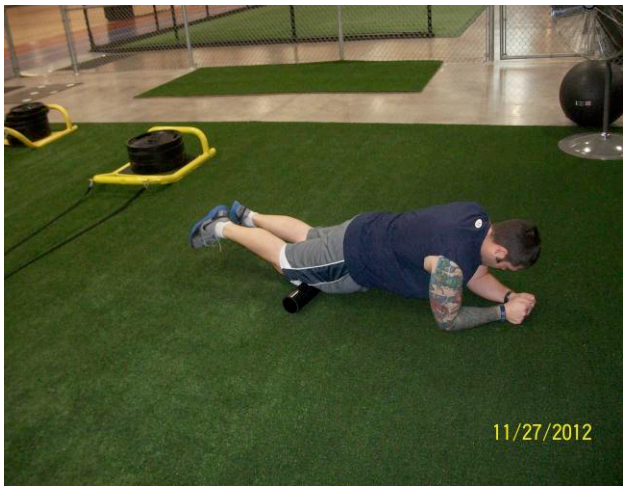
CALVES



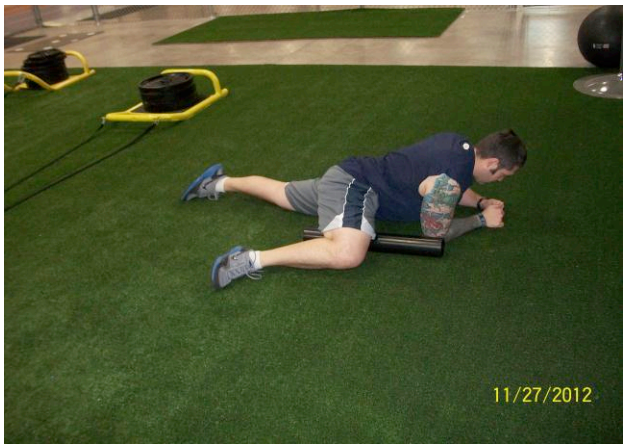
HAMSTRINGS



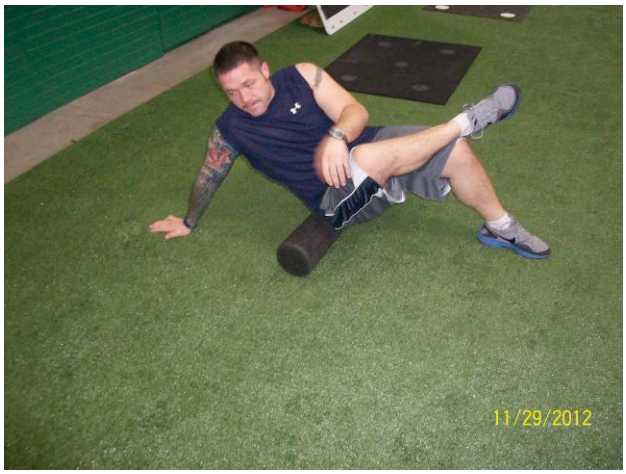
IT-BAND



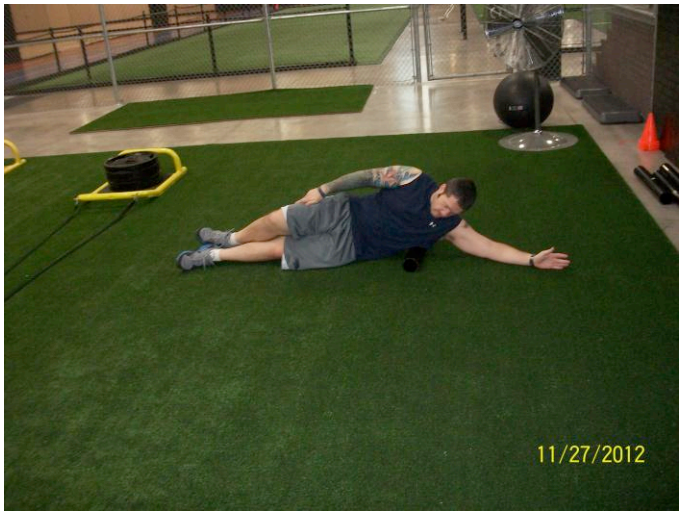
QUADRICEPS/HIP FLEXORS



GROIN/ADDUCTORS



GLUTES



LATS

PHASE #2: ACTIVE FLEXIBILITY-MOBILITY PHASE (1-2 MIN.)

CALVES

*PLACE STRETCH FOOT ON EDGE OF PLATFORM AND STRAIGHTEN KNEE
*PLACE NON-STRETCH FOOT ON TOP OF PLATFORM
*SQUEEZE GLUTE ON THE SAME SIDE AS STRETCH FOOT

WALKING HEEL TO BUTT STRETCH

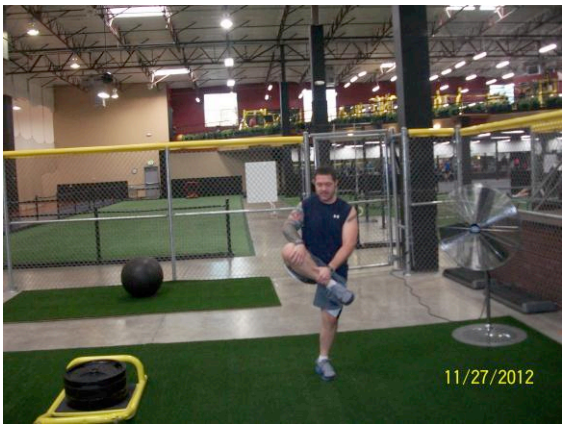
*KICK AND DRIVE FOOT BACK AS FAR AS POSSIBLE

*KEEP KNEES TOGETHER AND KNEE UNDER YOUR HIP

WALKING KNEE TO CHEST STRETCH

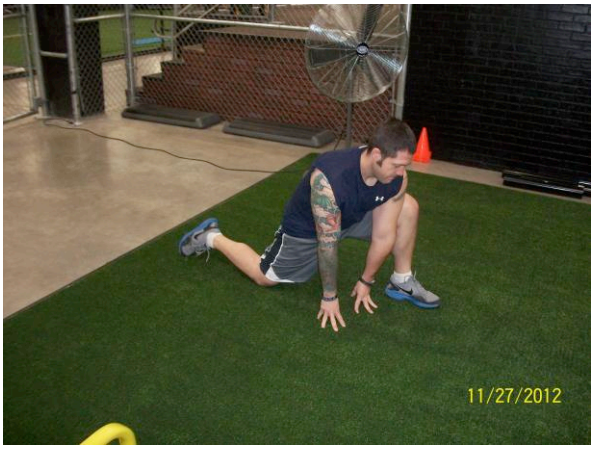
*HUG YOUR KNEE INTO YOUR CHEST
*KEEP BALANCE KNEE STRAIGHT AND BALANCE FOOT DOWN
*KEEP YOUR CHEST TALL

LEG CRADLE OUT



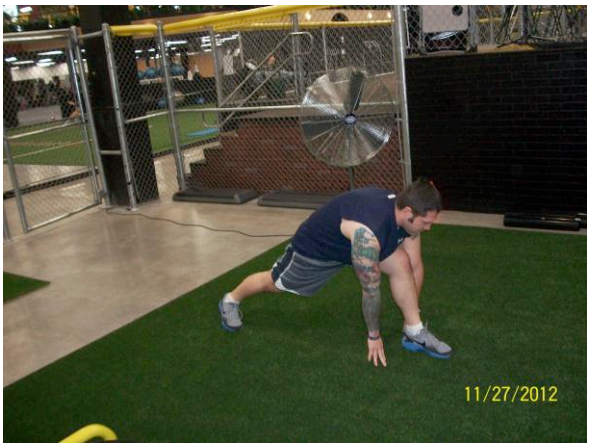
*KNEE OUT FOOT IN
*DRIVE KNEE TO CHEST
*KEEP BALANCE KNEE STRAIGHT AND BALANCE FOOT DOWN
*HIPS SQUARE

SPIDERMAN (PART #1)



*EXTRA LONG SPLIT STANCE
*DROP BACK KNEE DOWN AND HANDS INSIDE OF LEAD LEG
*CHEST OUT AND DRIVE HIPS FORWARD

SPIDERMAN (PART #2)



*PLACE HAND ON EACH SIDE OF LEAD LEG
*MAINTAIN HAND CONTACT WITH THE GROUND
*KEEP BACK STRAIGHT AND STRAIGHTEN BOTH KNEES

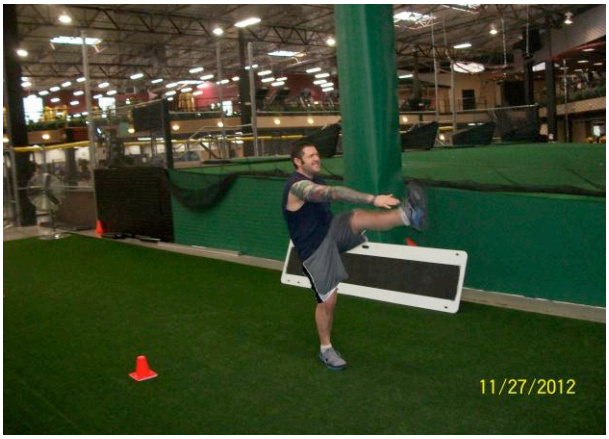
HEEL TO BUTT RUN

*ATTEMPT TO KICK HEEL TO BUTT
*PERFORM AS MANY KICKS AS POSSIBLE WITH GIVEN DISTANCE
*CHEST TALL
*KEEP KNEES TOGETHER AND KNEES UNDER YOUR HIP

HIGH KNEE RUN

*DRIVE KNEE TO CHEST
*KEEP BALANCE KNEE STRAIGHT AND STAY ON YOUR TOES
*STAND TALL
*DRIVE YOU ARMS AND LEGS AS FAST AS POSSIBLE

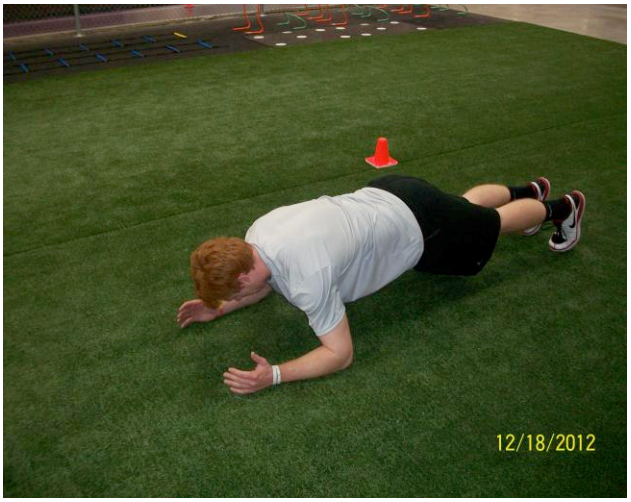
WALKING TOE TOUCH



*CHEST TALL
*SWING LEG AS HIGH AS POSSIBLE
*SPINE AND BOTH KNEES STRAIGHT

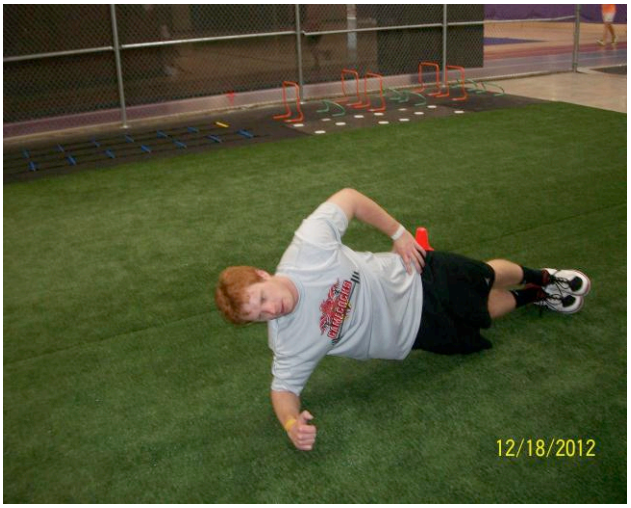
PHASE #3: MUSCLE ACTIVATION TECHNIQUES (1-2 MIN.)

PLANK SERIES (PART #1)



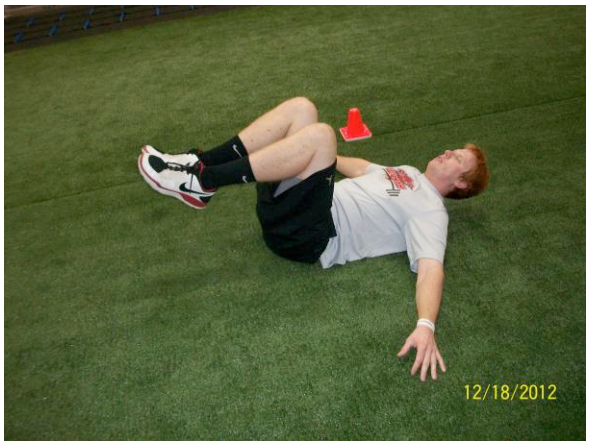
*WEIGHT SUPPORTED ON FOREARMS
*CHIN TUCKED, SPINE STRAIGHT, GLUTES
TIGHT, KNEES STRAIGHT
*STAY AS STILL AS POSSIBLE

PLANK SERIES (PART #2)



*STACK THE SHOULDERS ON TOP OF EACH OTHER
*FROM THE SIDE YOU SHOULD BE ABLE
TO DRAW A LINE THROUGH THE BODY
FROM HEAD TO HEEL
*DON'T MOVE AN INCH, STAY STILL

REVERSE CRUNCHES



*START WITH YOUR KNEES DIRECTLY ABOVE HIPS
*SWING YOUR LEGS BACK TOWARDS HEAD
*TRY TO DECELERATE YOUR LEGS AS THEY RETURN BACK TOWARDS FLOOR
*KEEP YOUR LOW BACK FROM ARCHING

SUPINE BRIDGE

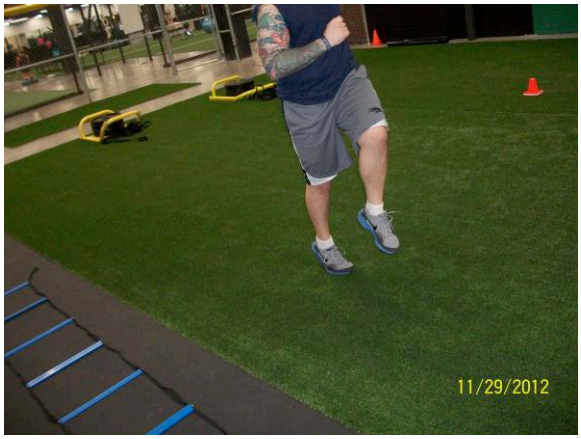
*START WITH GLUTES BARELY OFF THE FLOOR THEN DRIVE THEM TOWARDS THE CEILING
*SQUEEZE GLUTES AND DRAW-IN ABDOMEN AT THE TOP
*MAKE SURE FEET ARE SHOULDER WIDTH AND KEEP KNEES OVER HEELS

LATERAL BAND WALKING

*START WITH A SHOULDER WIDTH STANCE
*THEN STEP AND "REACH" WITH THE INSIDE LEG
"DRIVE" OFF THE GROUND WITH THE OUTSIDE LEG
*KEEP YOUR HIPS LEVEL AND WEIGHT MOVING IN THE INTENDED DIRECTION

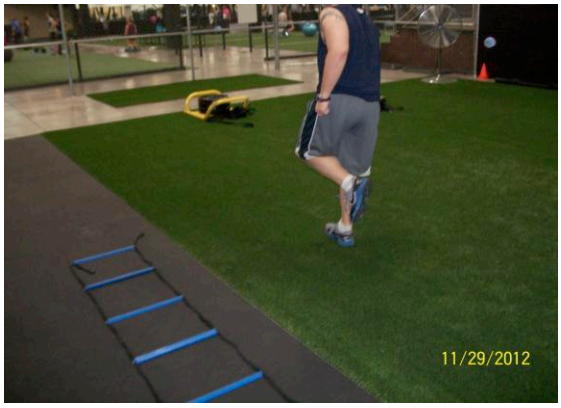
PHASE #4: DYNAMIC MOVEMENT TRAINING (1-2 MIN.)

FORWARD SKIPS



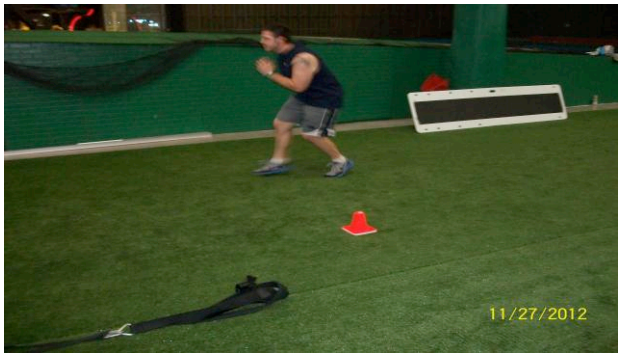
*LIFT ONE FOOT UP AND SLIDE THE OTHER ONE BACK
*REPEAT LEGS

BACK SKIPS



*LIFT ONE FOOT UP AND SLIDE THE OTHER ONE FORWARD
*REPEAT LEGS

BACKPEDAL



*STAY LOW
*HIPS BACK AND SHOULDERS FORWARD
*SHORT FREQUENT STEPS

BACKWARD RUN

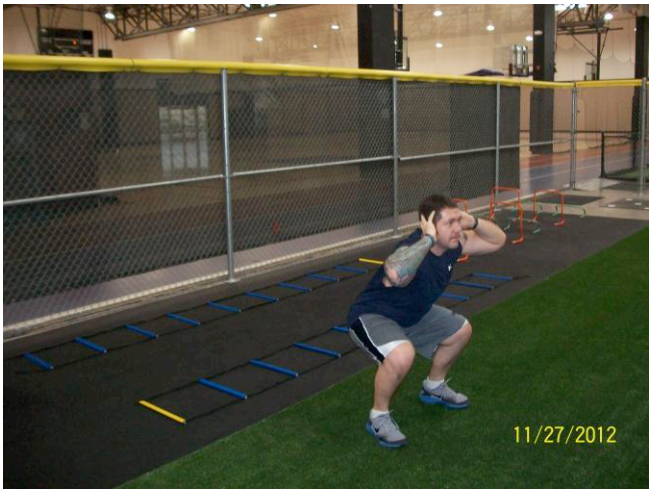
*STAY TALL
*HIPS BACK AND SHOULDERS FORWARD
*LONG STRIDES
*DRIVE OFF THE FRONT FOOT AND REACH
WITH THE BACK

CARIOCA

*OUTSIDE FOOT ALTERNATES OVER AND
THEN UNDER THE INSIDE FOOT
*ROTATE TORSO OPPOSITE OF HIPS
*EXECUTE AS MANY HIP AND TORSO TURNS AS YOU CAN IN THE TARGET DISTANCE

PHASE #5: FREQUENCY/EXPLOSIVE PHASE (3-5 MIN.)

PRISONER SQUATS



*PLACE HANDS BEHIND HEAD AND DRIVE ELBOWS BACK
*INITIATE SQUAT WITH HIPS GOING BACK
THEN BEND KNEES
*SQUAT UNTIL PARALLEL (THIGHS FLAT)
*TRUNK AT 45 DEGREES
*RETURN TO VERTICAL POSITION
*KEEP HIPS, KNEES, AND TOES FACING
FORWARD

PRISONER FORWARD SPLIT SQUAT

*STEP OUT INTO A 90/90 SPLIT STANCE
*MAJORITY OF WEIGHT IN THE FRONT
FOOT
*FRONT HEEL DOWN
*SQUAT TILL BACK KNEE IS JUST ABOVE
FLOOR
*SQUAT TO PARALLEL (THIGH FLAT)
*RETURN TO VERTICAL POSITION
*KEEP HIPS, KNEES, AND TOES FACING
FORWARD

PRISONER LATERAL SPLIT SQUAT

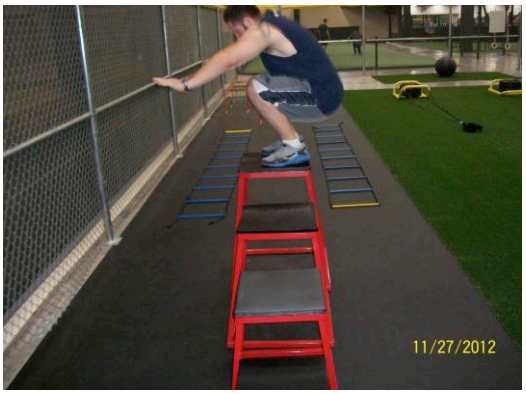
*ESTABLISH A WIDE SPLIT STANCE
*INITIATE WITH HIPS GOING BACK THEN
BEND KNEES
*KEEP YOUR WEIGHT CENTERED
*SQUAT TO PARALLEL (THIGH FLAT)
*RETURN TO VERTICAL POSITION
*KEEP HIPS, KNEES, AND TOES FACING
FORWARD

PLYOMETRICS (JUMP TRAINING):

FORWARD BOX JUMP (PART #1)

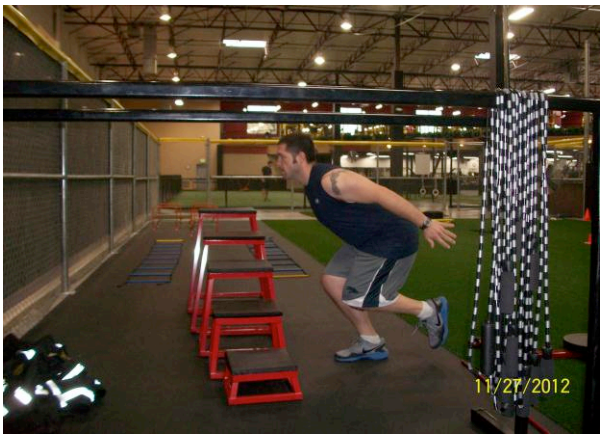
*DESCEND RAPIDLY INTO A SQUAT
*SHOULDERS OVER KNEES, KNEES OVER TOES
*DRIVE THE ARMS BACK AT THE SAME TIME YOU SQUAT
*MAKE SURE NOT TO PAUSE ONCE YOU REACH THE BOTTOM
*KEEP HIPS, KNEES AND TOES FACING FORWARD

FORWARD BOX JUMP (PART #2)



*DRIVE YOUR ARMS UP RAPIDLY
*JUMP AS HIGH AS POSSIBLE
*LAND ON BOX IN TAKEOFF POSITION
*HOLD POSITION FOR 1 SECOND
*KEEP HIPS, KNEES, AND TOESFACING FORWARD

FORWARD BOX JUMP-SINGLE LEG (PART #1)



*DESCEND RAPIDLY INTO A SQUAT
*SHOULDERS OVER KNEES, KNEES OVER TOES
*DRIVE THE ARMS BACK AT THE SAME TIME YOU SQUAT
*MAKE SURE NOT TO PAUSE ONCE YOU REACH THE BOTTOM
*KEEP HIPS, KNEES, AND TOES FACING FORWARD

FORWARD BOX JUMP-SINGLE LEG (PART #2)

*DRIVE YOUR ARMS UP RAPIDLY
*JUMP AS HIGH AS POSSIBLE
*LAND ON BOX IN TAKEOFF POSITION.
*HOLD POSITION FOR 1 SECOND

BROAD JUMP (PART #1)

*DESCEND RAPIDLY INTO A SQUAT
*SHOULDERS OVER KNEES, AND KNEES OVER TOES
*DRIVE THE ARMS BACK AT THE SAME TIME YOU SQUAT
*MAKE SURE NOT TO PAUSE ONCE YOU REACH THE BOTTOM
*KEEP HIPS, KNEES, AND TOES FACING FORWARD

BROAD JUMP (PART #2)

*DRIVE YOUR ARMS UP RAPIDLY
*JUMP AS FAR AS POSSIBLE
*EXTEND LEGS AND TRUNK BACK (IN AIR)
*FINISH BY REACHING ARMS AND LEGS FORWARD AS FAR AS YOU CAN
*LAND IN TAKE OFF POSITION
*REPEAT SEQUENCE AS FAST AS POSSIBLE TILL REPS ARE FINISHED
*KEEP HIPS, KNEES, AND TOES FACING FORWARD

BOUNDING FOR HEIGHT (PART #1)

*DESCEND RAPIDLY INTO A SQUAT
*SHOULDERS OVER KNEES, AND KNEES OVER TOES
*MAKE SURE NOT TO PAUSE ONCE YOU REACH THE BOTTOM
*KEEP HIPS, KNEES AND TOES FACING FORWARD

BOUNDING FOR HEIGHT (PART #2)

*PERFORM OPPOSITE ARM-LEG DRIVE
*JUMP AS HIGH AS POSSIBLE
*LAND ON TAKE OFF LEG
*KEEP THE KNEE STIFF AND STRONG ON LANDING
*ALTERNATE LEGS
*KEEP HIPS, KNEES AND TOES FACING FORWARD

TUCK JUMP (PART #1)

*DESCEND RAPIDLY INTO A SQUAT
*SHOULDERS OVER KNEES, AND KNEES OVER TOES
*DRIVE THE ARMS BACK AT THE SAME TIME YOU SQUAT
*MAKE SURE NOT TO PAUSE ONCE YOU REACH THE BOTTOM
*KEEP HIPS, KNEES, AND TOES FACING FORWARD

TUCK JUMP (PART #2)

*DRIVE YOUR ARMS UP RAPIDLY
*JUMP AS HIGH AS POSSIBLE
*TUCK" YOUR LEGS UNDER YOU OR DRIVE KNEES TO CHEST
*LAND IN TAKE OFF POSITION
*REPEAT SEQUENCE AS FAST AS POSSIBLE UNTIL REPS ARE FINISHED
*KEEP HIPS, KNEES, AND TOES FACING FORWARD

LATERAL BOUNDING (PART #1)

*DESCEND RAPIDLY INTO A SQUAT
*SHOULDERS OVER KNEES, AND KNEES OVER TOES
*MAKE SURE NOT TO PAUSE ONCE YOU REACH THE BOTTOM
*KEEP HIPS, KNEES, AND TOES FACING FORWARD

LATERAL BOUNDING (PART #2)

*PERFORM OPPOSITE ARM-LEG DRIVE
*JUMP AS HIGH AS POSSIBLE
*LAND ON NON-TAKE OFF LEG
*KEEP THE LANDING KNEE STIFF AND STRONG
*ALTERNATE LEGS
*KEEP HIPS, KNEES AND TOES FACING FORWARD

LADDER DRILLS:

QUICK FEET-FORWARD

*TOUCH EACH FOOT SEPARATELY INTO EVERY BOX AS FAST AS YOU CAN
*KEEP FEET LOW TO THE GROUND
*KEEP MASS FORWARD TO CREATE FASTER MOTION

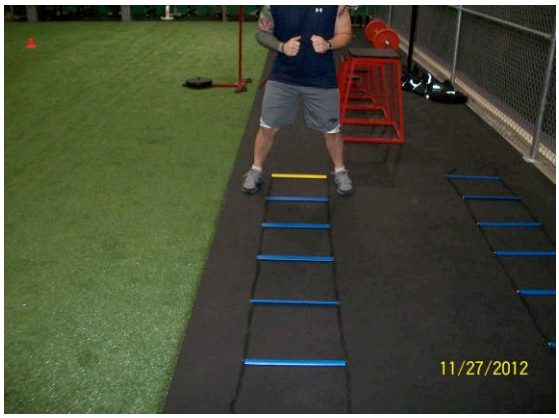
QUICK FEET-SIDE

*TOUCH EACH FOOT SEPARATELY INTO EVERY BOX AS FAST AS YOU CAN
*KEEP FEET LOW TO THE GROUND
*KEEP MASS IN THE INTENDED DIRECTION TO CREATE FASTER MOTION

HOPSCOTCH-FORWARD

*START WITH EACH FOOT ON EACH SIDE OF THE BOX
*THEN HOP INTO THE BOX ON ONE FOOT
*HOP BOTH FEET BACK OUT AGAIN
*HOP INTO THE NEXT BOX WTH THE OTHER FOOT
*HOP BOTH FEET BACK OUT AGAIN
*REPEAT

IN/OUT

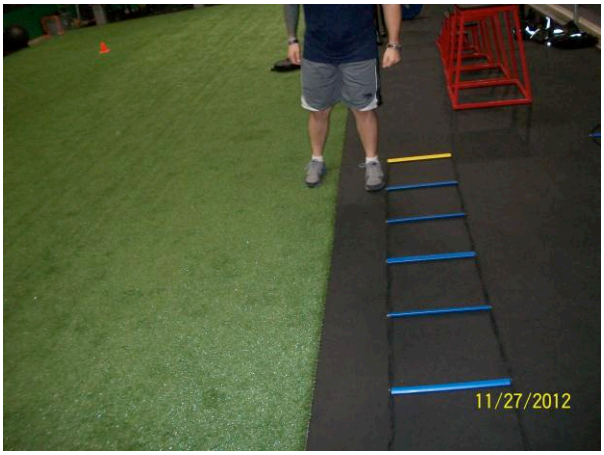


*BEGIN WITH FEET ON EACH SIDE OF THE BOX
*THEN HOP BOTH FEET INTO THE BOX
*REPEAT

CROSS IN FRONT

*BEGIN WITH BOTH FEET ON ONE SIDE OF THE BOX
*ROTATE OUTSIDE FOOT INTO THE BOX
*STEP BOTH FEET OUT ON OTHER SIDE
*REPEAT FROM THE OTHER SIDE

DOUBLE LEG SLALOM



*BEGIN WITH BOTH FEET ON ONE SIDE OF THE BOX
*HOP BOTH FEET INTO THE BOX AND THEN BACK OUT AGAIN ON OTHER SIDE
*REPEAT AT NEXT BOX