Steve Kinslow photo

A new look at: SQUATTING

BY KIM GOSS

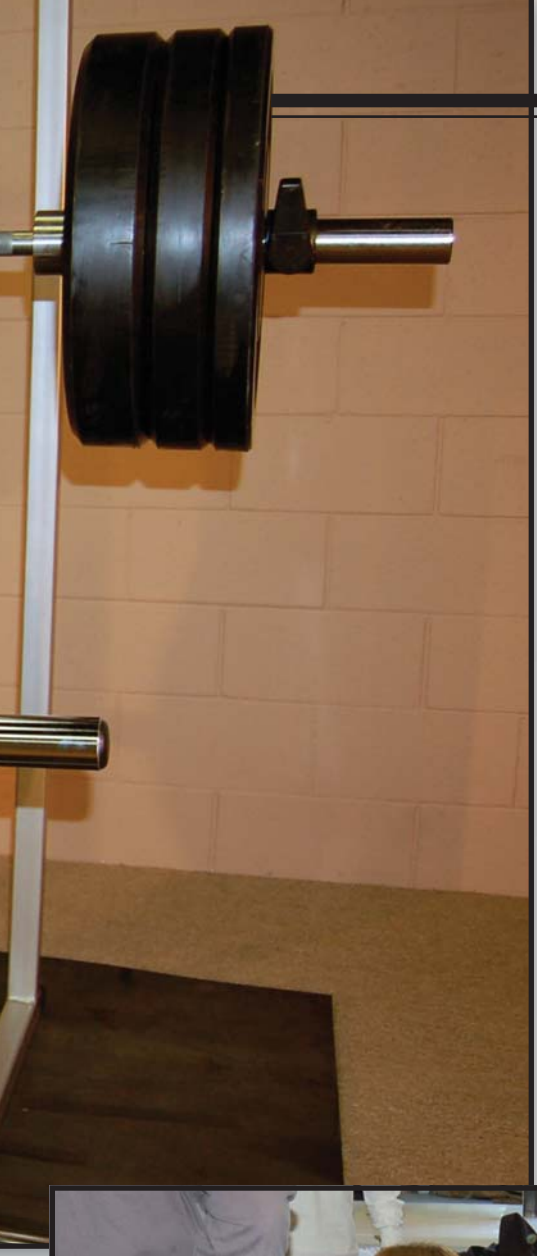
Part I A look inside the next level of technique training for the squat

A few years ago a study conducted by the Department of Psychology at Cornell University concluded that one of the major problems with incompetent workers is that they don't know they are incompetent! This is also a major problem in the field of strength coaching: Once coaches achieve a certain level of success, they often become reluctant to look at additional ways to improve their program. For this reason – and perhaps to avoid admitting they may not be as expert as they claim – you don't often see many of the top presenters in this profession attending the lectures of others in the same field. They just stop learning, if you will.

Socrates said: "The only true wisdom is in knowing you know nothing"; and the longer I am involved in this profession, the more I realize how true this statement is. One of the best examples of why we coaches need to follow this advice and stay open to new ideas is Dr. Guy Voyer.

A sound warm-up is essential to squatting with big weights. Shown is Maegan Snodgrass, a gymnast at Utah State and an American record holder in Olympic-style weightlifting. Maegan competes in the 139-pound bodyweight division and has back squatted 310 pounds and front squatted 253 pounds.

If you haven't read the article on Voyer that appeared in our January/February 2007 issue, please go to the archive section on the BFS website and read it. This man is a pioneer in the field of sports medicine, having developed many amazing advances in healing injuries, such as a manual therapy to reduce swelling in the joints and a type of stretching that enables you to increase the segmental space between two adjoining vertebrae and…well, let's just say Voyer is on a different level. One thing that really sets him apart is his understanding of anatomy and in applying this knowledge to training.



"Anatomy is anatomy," is a favorite saying of Voyer, and in the context of weight training it means that an adequate understanding of anatomy will determine how you should perform specific exercises. If the bones of the ankle are meant to orient in a specific manner and you perform an exercise that aligns them differently, then you might be creating adverse stress on them that could eventually result in an injury. Such an approach, which is seldom applied by strength coaches (or at least is not extensively considered), is why I jumped at the chance to attend Dr. Guy Voyer's seminar on squatting last November in New York City.

The Squat Seminar

Held in the prestigious Lift Gym and attended by many of the best personal trainers and strength coaches in the country, Voyer's three-day seminar was divided into four areas: anatomy and biomechanics; squatting technique, with considerations on how to modify technique for those with knee injuries; back pain and hip pain; and training protocols.

Having been a Division I strength coach who has also trained many elite Olympic lifters, and having passed – and even contributed material to – many personal training certifications, I felt pretty comfortable going into this seminar. That is, until Voyer began to speak, starting off the presentation with "The squat is a movement of total flexion-extension of the lower extremities." That caught my attention, because I'd never heard the squat described in such a way. I wondered if I was out of my league. Voyer continued with an impressive talk on identifying the variables that can affect the results acquired from performing the squat, such as the following:

Shown last year at his squat seminar in New York, Dr. Guy Voyer is a pioneer in sports medicine who believes that anatomy should determine appropriate exercise technique.

- **neck posture**
- **tension of the pharyngobasilar fascia**
- **position of the bar on the shoulders**
- **position of the hands**
- **degree of force of the grip**
- **degree of flexion of the trunk**
- **coordination of the thoracic diaphragm**
- **pelvic posture**
- **amplitude of flexion of the ankle, knee and hip joints**
- **position of the knees**

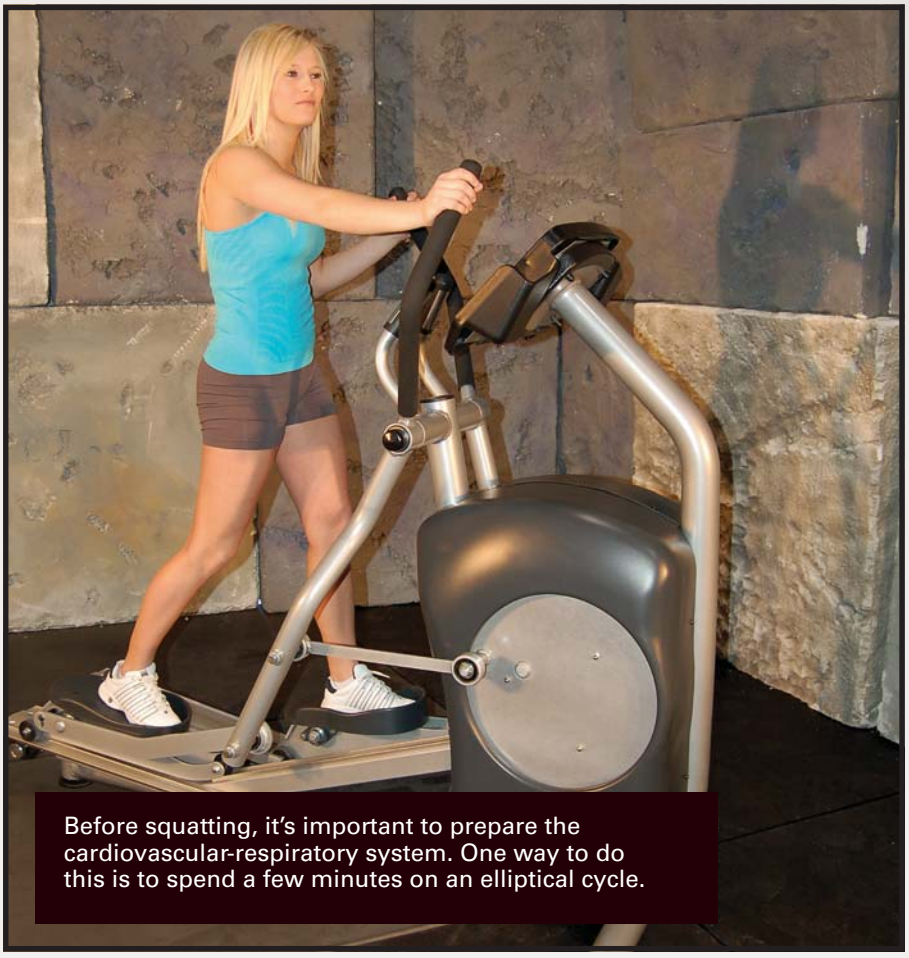
And so on…

The reason Voyer went into detail is that he has realized that whereas the squat can be an excellent method of rehabilitation and sports preparation, performed incorrectly it can result in chronic physical problems. In this regard, Voyer showed a way to modify the pelvic tilt during the squat so that those with specific back injuries could perform the exercise without pain.

Although such information may not be of much interest to a high school football coach working with healthy young men, a personal trainer who is working with a client with a condition such as spondylolisthesis (a type of instability of the vertebrae of the spine) is going to have to carefully consider how to alter the technique accordingly – or, for that matter, if the athlete should even attempt to perform the exercise.

Future issues of *BFS* will look at some of the ideas that Voyer presented at the seminar about modifying squat technique for specific medical conditions.

Now I'd like to introduce you to Voyer's method of warming up for the squat.



Before squatting, it's important to prepare the cardiovascular-respiratory system. One way to do this is to spend a few minutes on an elliptical cycle.

The Squat Warm-up

"The squat, like any physical exercise, must be prepared for by heating," says Voyer. Specifically, what Voyer means is that you should not simply start squatting during a workout but prepare the body for the activity with a thorough warm-up to accomplish three goals: Cardio-Respiratory Heating, Articular Awakening, and Muscular Demands.

Cardio-Respiratory Heating

Before carrying out what he calls "The Perfect Squat Workout," Voyer says it is necessary to begin by preparing the cardiovascular-respiratory system. Voyer says this warm-up will "increase the power of the systolic ejection and circulatory speed to facilitate the metabolic exchanges by increasing the body temperature"– in other words, bringing this system up to the level it will be required to perform at during the workout.

To accomplish this, Voyer suggests the athlete can perform three minutes of in-place walking (without taking the balls of the feet off the ground) with a light bar (less than 10 percent of bodyweight) on the shoulders. This light warm-up accomplishes several goals: getting the hips and knees ready to flex, preventing compression of the intervertebral disks and protecting the knees from too much impact. Voyer says that stationary bicycles or elliptical cycles can be used instead for a five-minute warm-up that becomes progressively harder but stops short of excessive fatigue.

Articular Awakening

Before squatting heavy, Voyer explains, it is necessary to activate, or "wake up," the proprioceptors, which he describes as the "small computers" located in the muscular tendons, the ligaments and the articular capsules. The proprioceptors will activate the communication reflex between the muscle pairs (antagonist and agonist) and between the articulations above and below; in effect, these exercises improve coordination of the muscles and protect against accidents that frequently occur to someone who is poorly prepared or performs a squat poorly.

An example of such an exercise is demonstrated by Maegan. Using a bar that weighs 10 percent (beginner) to 25 percent (highly trained athlete) of the trainee's bodyweight, this exercise is one that is designed to warm up the major ligaments of the knee, so it can be used as a part of many physical therapy rehabilitation programs for the knee. It is performed by bending the knees slightly and making small circles, clockwise and counterclockwise for 10 to 20 repetitions each way.

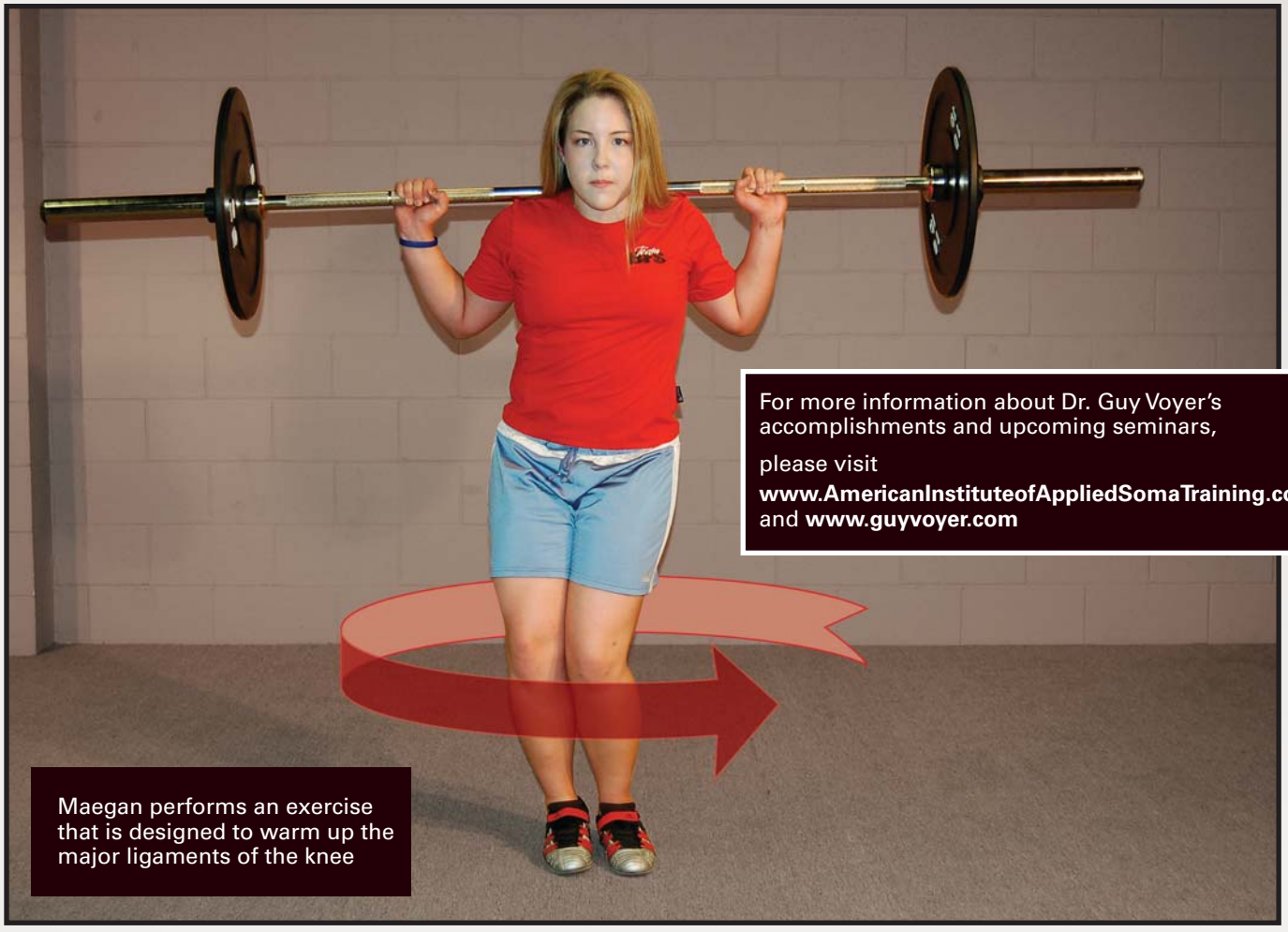
Muscular Demands

Another goal in the warm-up is to increase blood flow to specific muscles directly involved in the squat, but in a different manner than used in the primary exercise and without causing excessive fatigue. The quadriceps is the principal muscle solicited in all squat movements and must be properly warmed up yet remain unfatigued by the warm-up.

A proper warm-up must mobilize the five or six liters of blood in the body to augment the oxygen needed for the repetition of several sets of squats. When the quadriceps contracts fully, it creates a vacuum that forces multiple arteries to open and prepare for increased blood flow into the quadriceps. Therefore, the goal of the warm-up is to fully contract the quadriceps without doing too much work.

Voyer's subjects perform about 20 squats without significant resistance, staying on their toes. They follow with10-15 repetitions that are performed in 15-20 degrees of knee flexion while keeping both feet flat (both heels solidly on the ground and the toes extended). Keep your arms in front or rest a light bar on the upper trapezius to maintain balance.

Part II of this series will describe an entire squat warm-up, complete with exercises, sets, reps and suggested weights to use. In the meantime, it's my hope that exposure to the level of knowledge offered by experts such as Dr. Guy Voyer will encourage more coaches to take a closer look at how they teach weight training and to incorporate some effective new ideas. BFS



Maegan performs an exercise that is designed to warm up the major ligaments of the knee

For more information about Dr. Guy Voyer's accomplishments and upcoming seminars, please visit **www.AmericanInstituteofAppliedSomaTraining.com** and **www.guyvoyer.com**

A New Look at *Squatting* PART II

BY **KIM GOSS**

Melanie Roach is a mother-of-three who placed 12th at the 2007 World Weightlifting Championships with a 6-for-6 performance that included a 174-pound snatch and a 242-pound clean and jerk. In training Melanie has done a front squat of 292 pounds and a back squat of 352 pounds.

Photo by Bruce Klemens

The ultimate warm-up for lifting max weights safely in the squat

STOP READING THIS if you are a recreational lifter with no particular goals. If all you want is to get in a few sets of light squats once or twice a week, then this article may not be for you. Or if you are a high school coach who has to pack a lot of kids into a weightroom and get them in and out quickly, this article may not be for you either. But for anyone who wants to experience the best, and safest, method for preparing to perform the squat, read on.

At BFS, the way we recommend warming up for a workout is to perform the Dot Drill and then perform several sets of lifts with lighter weights before working on smashing your personal records. In the high school environment, this is the most practical way to warm up, and it has proven effective in thousands of schools in hundreds of thousands of workouts for over 30 years. It gets solid, reliable results every time. If "reliable" sounds a little lukewarm for your purposes, you might be ready for the granddaddy of all warm-ups: Dr. Guy Voyer's Squat Warm-up.

As discussed in Part I of this series, Dr. Voyer believes that you should not simply start squatting during a workout. It is critical to prepare the body for the exercise with a warm-up that fulfills three goals: cardio-respiratory heating, articular awakening and muscular demands. (Refer to Part I for the theory of these three variables.) Part II will describe, step-by-step, the actual warm-up program.

The Ultimate Squat Warm-up

Dr. Voyer's Squat Warm-up consists of 13 exercises. Consider them steps that will get you ready for maximum performance. The first exercise is the primary cardiorespiratory warm-up, but it can be preceded by a short warm-up on a stationary bike or elliptical cycle. Its primary purpose is simply to increase your breathing rate for a few minutes and to elevate your body temperature.

Exercises 2-12 are technically referred to as the osteoarticular warm-up, which means each is designed to warm up a specific joint.

Unlike most warm-ups, these exercises require the use of a light barbell with a resistance of 10 percent of an individual's bodyweight for beginners and up to 25 percent bodyweight for advanced. You should not use a belt on any of these exercises, as it could affect your ability to properly perform some of these movements. The squat is a strenuous exercise, and the use of resistance in this warm-up more adequately prepares the joints for such stress. [As a reminder, "proprioceptors" are simply sensory receptors that provide body awareness and are excited by such stimuli as changes in limb position.]

The final exercise is the actual squat, and this is considered the muscular solicitation phase of the warm-up. From here the athlete is ready to begin the regular squat workout.

It is extremely important to perform the exercises in this exact order and not to skip an exercise, as each exercise "builds" upon the previous one. If you have recently recovered from an injury, then you might perform a few extra reps for the exercise that works a specific joint. For example, if you have had previous injuries to an ACL or MCL, you could perform 5-10 extra reps on exercises 4 and 5.

Dr. Guy Voyer's squat warm-up emphasizes safety through proper preparation of all aspects of the squat, so it is ideal for elite athletes who want to take all the necessary precautions to avoid injury in the weightroom. It is also ideal for older athletes, especially those with a history of injuries. It's simply a great warm-up for everybody!

And for those of you who think this warm-up seems easy, it can be quite a challenge, especially when you progress to the level where you can use 25 percent of your bodyweight on the barbell. But the bottom line is that after you've gone through all 13 exercises in Dr. Guy Voyer's Squat Warm-up, you'll be ready to make some powerful progress with your squat!

(For more information about Dr. Guy Voyer's accomplishments and upcoming seminars, please visit www.AmericanInstituteofAppliedSomaTraining.com and www.guyvoyer.com.)

1. STATIONARY MARCH

The stationary march is a simple, low-impact exercise to stimulate the cardiorespiratory system by raising body temperature and respiration. It is performed by simply walking in place, lifting the heels but without lifting the foot off the floor. It should be performed at a slow-to-medium cadence for 1-3 minutes.

2. ANKLE INVERSION/ EVERSION

These two movements are used to wake up, or stimulate, the proprioceptors of the ankle in inversion and eversion. Rotate to the outside edge of the ankles for 20 reps, then rotate to the inside edge of the ankles for 20 reps. The motion is relatively small (with the edges of the foot just clearing the floor), as you do not want to risk turning your ankles and causing injury.

3. SINGLE-LEG BALANCE

This exercise is designed to wake up the proprioceptors of the ankle in flexion and extension. Simply lift the heel as high off the floor as possible without lifting the toes off the floor, and then return the heel to flat. Then lift the toes off the ground as high as possible without lifting the heel off the ground. Alternate between feet. Perform 20 reps for each side.

4. KNEE CIRCLES

Here is a specific exercise to stimulate the proprioceptors of the knee, thereby preparing the knee ligaments for squatting. With the feet together, bend your knees 15-20 degrees, making 20 small circles clockwise and then counterclockwise.

5. FIGURE 8

This works the same knee proprioceptors and ligaments as in exercise 4, but in a slightly different manner. With your feet and knees together, start by bending your knees 15-20 degrees and then perform a figure 8 pattern as you vertically descend and then ascend to the start position. Perform 15 reps by starting the figure 8 pattern in a clockwise direction, and then perform 15 reps by starting in a counterclockwise direction.

6. HIP FLEXION AND EXTENSION

This exercise works the proprioceptors of the hip in flexion and extension. Lift one leg (to parallel if possible), bending at the knee, and then lower the leg to the ground. Perform for 15 reps and then repeat for the other leg. There is no rotation of the lower leg, except for whatever happens biomechanically.

7. EXTERNAL AND INTERNAL HIP ROTATION

As with exercise 6, this exercise also works the proprioceptors of the hip, but this time with external and internal rotation. Lift one leg (to parallel if possible), bending at the knee, and then rotate the lower leg outward and then inward. Perform 15 reps and then repeat for the other leg.

8. LEG CROSSOVERS

This exercise works the prioproioceptors of the hip using abduction and adduction of the leg. Bend the supporting leg slightly, and then swing the other leg laterally in front and then behind. Perform 15 reps for each leg. Be careful not to swing your leg too far away from your body, as it can be difficult to maintain your balance at first.

9. SPINE TRANSLATION

This is designed to wake up the proprioceptors of the spine in what is known as lateral translation. Keeping the legs straight, pelvis tucked under, and without lifting the heels off the floor, move the spine laterally (to the right and then left). Beginners may slightly (1/4 inch or less) lift each hip independently while concentrating on moving the spine laterally in relation to the pelvis, which should remain stationary. Care should be taken to perform this exercise with a focus on lateral movement of the spine in a very small (less than an inch for beginners) range of motion. Perform 15 reps each direction.

10. SIDE BEND

The side bend is another exercise designed to wake up the proprioceptors of the spine in side bending. Keeping the legs straight, bend sideways as far as comfortable. For balance, you will have to shift your hips slightly in the opposite direction. Perform 15 reps each direction.

11. GOOD MORNING

This is designed to wake up the proprioceptors of the spine in extension and flexion. Bend forward from the hip until your back is almost parallel to the floor, and then return to the start by reversing the motion – do not allow excessive rounding of your lower back. Perform 15 reps. Regarding the head position, beginners should perform it with their head in a neutral position and through a short range of motion to prevent rounding the lower back; advanced trainees with good body awareness (and no history of back pain) can perform the exercise with the head looking down at the finish.

12. ELBOW TO KNEE

This step is designed to wake up the proprioceptors of the spine with simultaneous flexion and rotation. Dr. Voyer refers to this activity as "positive torsion." Bend forward and twist so that the right elbow touches the left knee (or gets close); then repeat for the other side for 15 reps each direction.

13. MUSCULAR SOLICITATION

For a muscular warm-up for all the muscles specifically used in the squat, simply perform a full squat for 15 reps.

To read Part I of this article, which appeared in our Sep/Oct 07 issue, go to the magazine archive section of our website: **biggerfasterstronger.com**.

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