Answering the Critics: The Back Squat

A look at the man who popularized the squat, and commentary on the latest controversy surrounding this lift

BY **KIM GOSS, MS**

Ever since BFS was founded in 1976, we have been promoting the back squat as a core exercise for athletes – but it hasn't been easy. On occasion the medical community has discouraged its use, thinking it was harmful to the knees and could stunt a young athlete's growth, myths that were eventually proven false by credible scientific research. But now the squat has come under fire again.

At the 2011 Annual Meeting of the North American Spine Society a study was presented that suggests that the squat may be associated with fractures to a relatively weak bony structure in the spine. The organization issued a press release about the presentation under the headline "New Spine Research Urges Teens to Skip Squat Lifts in Weight Training." From there the news media caught on, publishing articles about the study with such titles as "Danger Zone: Study Warns That Squat Lifts Are Tough on Spine."

Before getting into the details of this study, let's take a look at how one of the strongest men of all time, Paul Anderson, contributed to the squat becoming such a popular exercise.

The King of Squats

Paul Anderson was born in 1932 in Toccoa, Georgia. Julius Johnson, Anderson's brother-in-law, said that the first time Anderson attempted the squat he did three reps with 315 pounds. After just one year of training while still a teenager, Anderson weighed 275 pounds at 5-feet-9-1/2 inches in height and had 33-inch thighs and 19-inch calves. When he turned 20, Anderson squatted 660 pounds, exceeding the world record by 30-1/2 pounds. And on July 25, 1953, lifting barefoot, Anderson squatted 762-1/2 pounds at an exhibition in Norfolk, Virginia. By the spring of 1954 he was squatting 820, deadlifting 700 and doing quarter squats with 1,800 pounds.

As powerlifting was not an organized sport at the time, Anderson competed in Olympic lifting. In December 1954 he broke the American record in the standing Olympic press with a lift of 364 pounds, and the following year in June he won the Senior Nationals, where he pressed 390, snatched 320 and clean and jerked 436-1/2 pounds. Impressive – but what made world headlines was Anderson's performance at an exhibition in Russia later that year where he became the first man to press 400 pounds with a lift of 402.5. After the event the Russians nicknamed Anderson "Mr. America."

The following year, at a bodyweight of 340 pounds, Anderson won the Senior Nationals with lifts of 400/335/440, and then became the Olympic champion. No American super heavyweight has won Olympic gold since. After the Olympics, Anderson turned professional to help raise money for the Paul Anderson Youth Home, a home for boys that he

opened in 1961 in Vidalia, Georgia. In training he eventually did a 485 press, a 375 snatch and a 485 clean and jerk; as well as a 1,000-pound deadlift with special hooks attached to his wrists. As for squatting, he did 1,200 pounds and 10 reps with 900. His measurements included a 25-inch neck, 36-inch thighs, 22-1/2-inch arms, 58-inch chest and 20-inch calves.

The Truth About Squats and Spines

The study that is causing so much controversy is "The Effects of Two Different Types of Squat Exercise on Radiography of the Lumbar Spine." The authors are John McClellan, MD, Nebraska Spine Center, Omaha, NE; Nick Aberle, MD, University of Nebraska Medical Center, Omaha, NE; Kay Ryschon, MSN, Nebraska Spine Center, Omaha, NE; and Travis Manners, PT, CSCS, Athletes' Training Center Physical Therapy, Omaha, NE.

It is difficult to form opinions about this study because at the time of this writing, only the abstract is available. From this abstract I know that the researchers used radiographic imaging to examine the alignment of the lumbar spine and pelvis during the squat. Twenty subjects were involved. The researchers concluded that the biomechanics associated with the squat may increase the risk of a young athlete fracturing the bony structures between the facet joints of the spine, a condition called a pars interarticularis fracture.

The bottom line is that this study is simply an opinion piece, because, among other deficiencies, there was no before-and-after methodology – in other words, no cause and effect. Further, the authors apparently didn't consider that with proper training, the body can adapt to the stresses they associate with the squat. Here is what Ernie Rimer, a strength coach for the US Ski Team and US Snowboarding Team, has to say about this topic:

"In my short career I've worked with numerous athletes in 20 different sports and a far greater number of disciplines within those sports. I have used both back and front squats as a staple in all of these athletes' physical development and injury prevention. I

Photo: Paul Anderson Youth Home

Paul Anderson helped popularize the squat with his unparalleled accomplishments in this exercise.

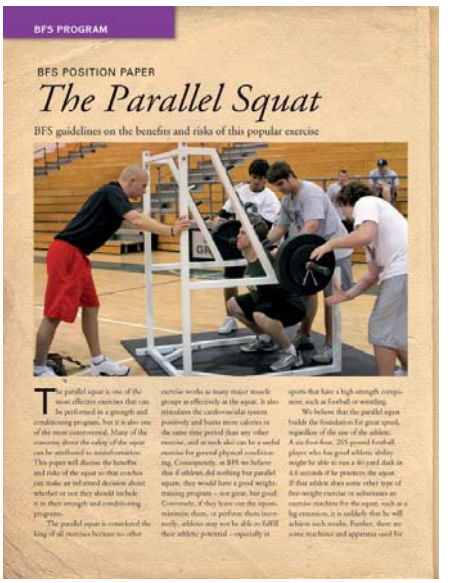
2011 USA Weightlifting National Super Heavyweight Weightlifting Champion Pat Mendes has performed a full squat with 800 pounds.

have never had a single athlete experience a stress fracture to the spine for any reason.

"I can only speak from my own experience as a coach, but I always preach quality before quantity, and appropriate loading and progression. This may be the reason that I have not observed the described injury in any of my athletes. Further, if this injury was prevalent in the weightroom, then I am certain I would know about it from athletic trainers and physical therapists. They have a close relationship with strength coaches. While strength coaches remain focused on the science and literature geared toward effective and efficient training programs, sports medicine focuses their energy on training methods that can prevent injury.

"In my experience, sports medicine has not expressed huge concern about back and front squats. We do debate over the different techniques that can reduce back and knee stress, but both sports medicine and strength and conditioning experts agree that properly performed squats can enhance performance and reduce injury in the field of play."

As discussed in the BFS position paper on the squat, even when full studies are made available, the methods must be closely examined. Our paper reviews the results of a 1961 study on the squat by Karl K. Klein. Klein concluded from his research that squats could increase the risk of knee injury by decreasing knee stability. It turns out that the study had flaws, and future studies showed that those who practiced squats had more stable knee joints than control groups and as such were less susceptible to knee injuries.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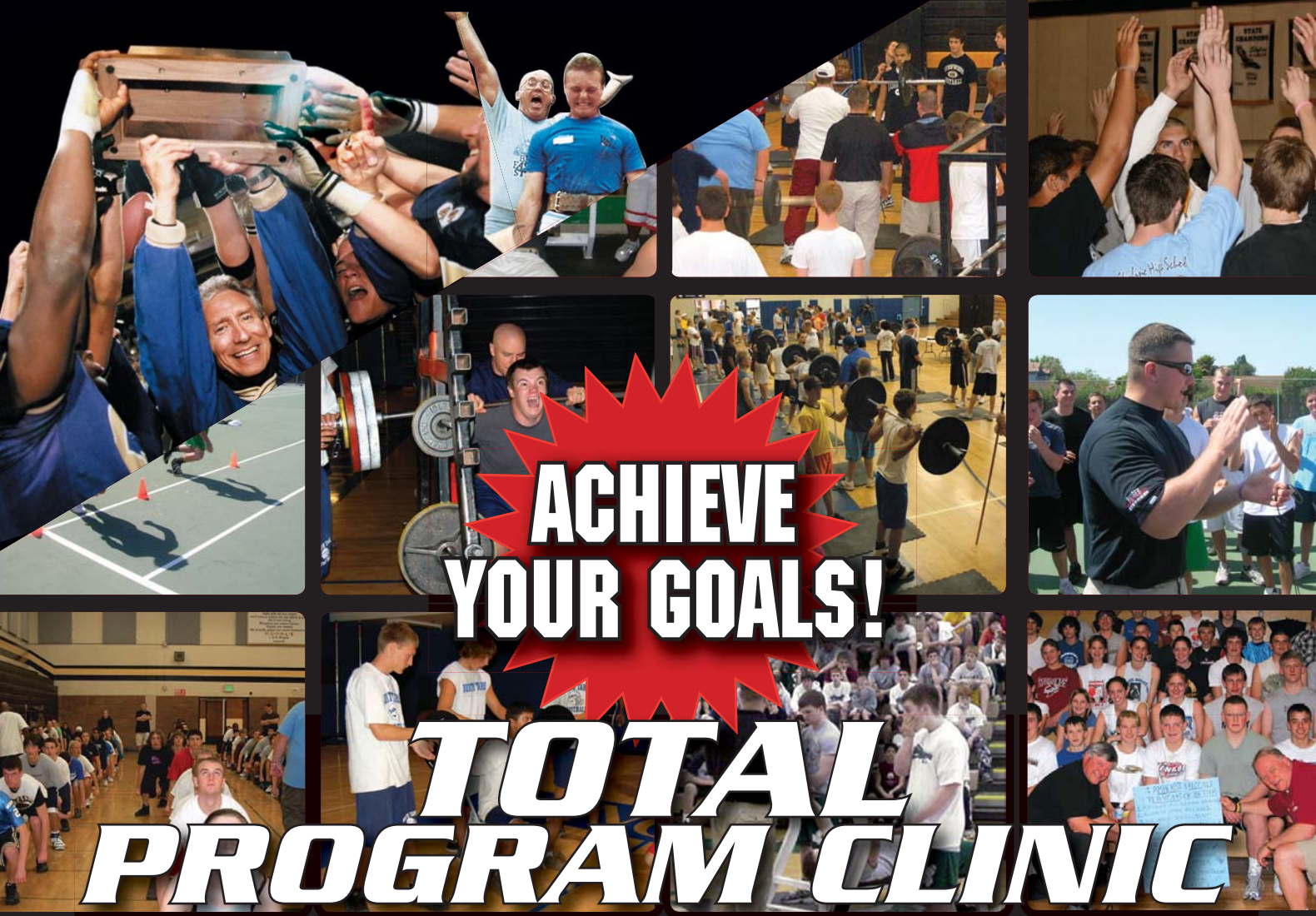
The Parallel Squat

BFS guidelines on the benefits and risks of this popular exercise

For more information about the benefits and risks of the squat, you can download a free copy of our position paper on the squat through the BFS website.

As for the issue of squats damaging the growth (epiphysial) plates of the knees in young athletes, thereby stunting growth, there is no clinical evidence or scientific research to support this belief. In fact, the American Academy of Pediatrics published a position paper in which the authors said "appropriate strength-training programs have no apparent adverse effect on linear growth, growth plates, or the cardiovascular system…." and that bone density could be improved with weight training.

Perhaps the squat will always have its critics, but the preponderance of research shows that when properly performed, it can be a safe lift for young athletes. Paul Anderson got the iron game hooked on the squat, and his inspirational lifting will hopefully encourage more young athletes to train hard and lift heavy to fulfill their physical potential. BFS



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