LOSE 80 POUNDS *instantly!*

No, it's not the latest miracle diet. But it is an exciting new way to rehabilitate and train athletes at less than full body weight.

BY MICHAEL MERK & TIMOTHY PLOSS

Throughout the country, athletic trainers and physical therapists are "lightening the load" in their rehabilitation and training programs by using a unique new device that lessens the athlete's body weight while exercising. Similar in concept to aquatic exercise, partial weight bearing workouts are being accomplished with the Zuni™ Incremental Weight bearing System, from SOMA, Inc., in Austin, Texas, and the Pneu-Weight™ Unweighting System from Quinton Fitness Equipment in Bothell, Washington.

From the ballpark to the gridiron, teams such as Chicago Cubs, Texas Rangers, Cleveland Indians, Green Bay Packers, Oakland Raiders, Seattle Supersonics, and Miami Dolphins as well as athletes such as Nolan Ryan, Dan Marino, Jose′ Guzman, and Kelly Gruber have rehabilitated injuries or improved speed or endurance on this new equipment. John Fierro, Head Athletic Trainer for the Chicago Cubs, says, "We use the Zuni for injured and non-injured players. It gets injured athletes into treatment much earlier, and it's great for fitness and cardiovascular conditioning."

Malcolm Macaulay, PT, a physical therapist at Isernhagen Clinics, Inc., in Duluth, Minn., and a user of Quinton's Pneu-Weight says, "I'm able to replace a lot of weight-stack activities with running and fast walking. We've never had a pool (at the clinic) so we simply weren't able to do the walking therapy before."

Rebecca Kern, PT, OCS, a clinical specialist with CareMark Physical Therapy in Austin, Texas, says, "The Zuni system has revolutionized the way we treat our patients. We use the Zuni on any lower extremity injury that prevents an individual from tolerating full body weight. Our patients that use the system range from the elite athlete to senior citizens."

FROM CONCEPT TO CREATION

According to Ty Lawrence, CEO of SOMA, Inc., and business partner of D.D. Kelsey, PT, OCS, who invented the Zuni, the creation was based on a very practical need to rehab back and lower extremity injuries. The concept was to reduce the effect of gravity by removing a portion of the athlete's body weight. By reducing gravitational forces, the athlete would be able to perform functional activities, such as running and walking, with little or no pain.

Kelsey first considered using a therapeutic pool. However, after investigating the cost, he realized that there must be a more practical and accurate way. So, after nearly three years of research and development, Kelsey invented and patented the special equipment necessary to accurately "Unload" his patients, and called it the Zuni Incremental Weight bearing System. After two additional years of clinical testing, the Zuni system was introduced in 1991.

So far, the concept is proving to be invaluable. Because the system reduces the load on the injured tissue, the athlete can often perform functional rehabilitation sooner without risking re-injury by overstressing tender joints and tissues. And, as the injury heals, more body weight can be added. This safe and gradual process means less pain and discomfort than with conventional treatment. Ultimately, partial weight bearing allows the athlete to exercise more functionally much sooner while utilizing normal gait patterns.

The system also allows for training specificity. For example, a runner's training during rehab should involve running, and with part of the load removed by the Zuni or the Pneu-Weight, it can. In addition, for cardiovascular training, the reduced body weight allows the injured athlete to train longer because he or she can exercise with little or no pain.

REHAB STORIES

Starting a rehabilitation program is much the same for both machines. After the physician has determined the specific functional exercise program in which the athlete will participate, the athlete is outfitted with a harness, hooked up to the overhead cable via a shoulder-width crossbar, and starts the intended exercise. The tension on the cable is increased ("Unloading™" on the Zuni, "Unweighting" on the Pneu-Weight) until symptoms (e.g., irregular gait, pain) of injury are gone. Cable tension is reduced until symptoms reappear, then settings are recorded and the process is repeated to verify this load tolerance.

Once familiar with this process, the athlete can come in for a therapy session and simply punch the appropriate amount of weight to be taken off on the Zuni's computer keypad, or, on the Pneu-Weight, dial in the pounds to be removed. As the athlete progresses, the therapist can gradually decrease the assistance from the machine until the athlete can support his or her full body weight.

Recovery times for injured athletes who have used partial weight bearing rehabilitation programs have been remarkable. "We recently worked with a soccer player training to bounce back from a sprained ankle," says Kelsey. "After six weeks of traditional rehabilitation, he was still unable to run effectively. This was due to the joint laxity caused by the sprained ligaments. With the Zuni it took us just two weeks to get him back on the field running."

Scott Crandall, PT, in Orem, Utah, recently also used the Zuni system to treat a severe ankle sprain. "The individual arrived at our clinic with a severely swollen ankle that prevented him from being able to bear his full body weight," he says. "Because the physician's report revealed it was not a Grade III ankle sprain, we were able to have the individual walk on the treadmill hooked up to the Zuni system, which unloaded a portion of the body weight. The individual was able to walk with very little pain; thus, the 'muscle-pump' action significantly reduced the swelling, which enhanced the healing process and allowed the individual to support his body weight with only a slight limp."

In a study of two professional basketball players by Kelsey and Ed Tyson, MD, which was reported in JOSPT (Volume 19, Number 4, April 1994, pp. 218-223), recovery was, again, faster than expected. Player A, who was recovering from a surgical screw fixation of the left fifth metatarsal that took place 20 days prior to beginning partial weight bearing therapy, was back on the court in two weeks. Player B, who had spent seven months recovering from surgical repair of the peroneal tendons of the right foot, was back playing in four weeks.

According to the article, Player A worked out every day, starting with the following exercises:

- Heel rises with 55 percent reduction of body weight. One set of 15 minutes.
- Jogging with 37 percent reduction of body weight. One set of 30 minutes.
- Unilateral squats with 34 percent reduction of body weight. Five sets of three minutes each.
- Retro jogging and side shuffle with 47 percent reduction of body weight. Five sets of two minutes each.

A second session was added on Mondays, Wednesdays, and Fridays consisting of:

- Alternating bench hops with 30 percent reduction of body weight. Three sets of two minutes each.
- Unilateral hop with 38 percent reduction of body weight. Six sets of 45 seconds each.
- Agility drill of rapid side-to-side shuffle movement with 25 percent reduction of body weight. Three sets of one minute each.
- Four-corner hops on the left lower extremity with 15 percent reduction of body weight. Two sets of 3.5 minutes each.

By the end of the first week, tolerable load had increased 50 percent in all activities. By the 10^{th} day, the athlete's gait was normal and the only exercise that required weight reduction was jumping. By day 12, all activities were performed at full body weight. He was discharged after day 14.

Player B's treatment included many of the same activities, performed at lower intensity due to the severity of his injury. He was discharged after 23 days.

FOR THE NON-INJURED

In addition to the specific treatment of injuries, partial weight bearing exercise can also be a great conditioning tool for extending the limits of what athletes are able to do while carrying their own body weight. According to Lawrence, "Garrett Giemont (Strength & Conditioning Coach for the Oakland Raiders) puts his linemen on a Zuni machine straddling a treadmill to build their endurance --- these guys can't go out and run at full body weight, because their knees and backs won't take it. He can have them run at seven or eight miles an hour for 20 minutes straight without any problems."

Another non-rehabilitative use of partial weight bearing is in overspeed training. Macaulay, who is also a part-time marathoner, says, "It's safer and more true to pure running form (than traditional overspeed methods). You're basically running for your life when you're being towed, and when you run down hills, you're hitting the brakes every step, which is not what you want to do when you want to run fast. With the Pneu-Weight and a treadmill, you can focus on form rather than just survival."

Lawrence adds, "In a study we're currently doing with soccer players, after six weeks of (partial weight bearing) training, preliminary results indicate a 15 percent increase in their sprint speed."

MANY MODELS TO CHOOSE FROM

Through the use of a cable, springs, and computer-controlled servos, the Zuni can reduce the effective weight of the user in one-pound increments, accurate to within two pounds. The Zuni remains the only weight-bearing device that achieves its goal in this method. SOMA's computerized models, the Zuni 2000 and 3000, cost $8,450 and $10,950, respectively, while its non-computerized Zuni 1000 costs $4,950. Double station machines are also available at a variety of prices.

The Pneu-Weight, which has been on the market only since August, uses a pneumatic cylinder for its weight compensation, and comes with multiple-sized vests. It extrapolates weight reduction based on the air pressure in the cylinder.

Quinton's least expensive unit, the Pneu-Lift, costs $3,690, and a single station Pneu-Weight, which has more features, including 25 percent greater range of motion and twice the lifting capacity of the Pneu-Lift, costs $6,300, with the necessary air compressor included. Stan Peterman, director of Quinton's Fitness Division, says that the $8,700 double-station Pneu-Weight accounts for about 90 percent of the units that they sell.

OUT OF THE WATER

Research has shown that closed chain, functional exercise leads to quicker and more functional recovery from back and lower extremity injuries. For many years, aquatic therapy was the best option for athletes who couldn't tolerate full body weight. With the Zuni and the Pneu-Weight, there is an option for those who don't have access to a pool, and it may even be an improvement to aquatic therapy. "Exercising in water does not simulate exercising on land because it provides resistance that does not exist on dry land," says Kelsey.

Brett Fischer, PT, formerly of the Chicago Cubs, agrees, "If we played baseball or football underwater that would be one thing, but we play them on dry land. Partial weight bearing allows us to be more functional on dry land. We can train players at high speeds and re-create what they're going to do in the game a lot better, while allowing athletes to move with proper biomechanics and gait patterns."

<u>NOTE:</u> Michael Merk, Med, CSCS, is Executive Director of the West Short YMCA and Director of Health & Fitness for the YMCA of Greater Cleveland. Timothy Ploss is the Assistant Editor at Training & Conditioning.