



the X-ISER™

**Research and Sprint
Training Information**



The X-iser® Machine... not your typical stepper!



Today's hectic lifestyles dictate the need for a time-efficient, yet effective, fitness solution. Whether the goal is weight loss, cardiovascular health, increasing athletic performance or just wanting to look and feel younger, The X-iser® Machine, along with its research-based, time-efficient programming, offers a total body workout in a compact space.

"To lose the fat and get your heart healthy, you need to exercise at least 30 minutes per day." I'm sure you have heard a statement similar to this from someone in the fitness industry or even your doctor. It has been a recipe for disaster, which you can see by simply looking around at the average person. Even for those that find the time for 30-minutes of exercise, they often see poor results, get discouraged and quickly go back to a lifestyle of inactivity. Well, there is good news! A much better way of exercising, which does not require a large investment of time, can provide quick results.

Imagine you are going to sprint up a long flight of stairs. In less than a minute you will find yourself out of breath, your heart racing and your muscles burning. This approach to working out is one of the best ways to burn fat, improve cardiovascular health and increase power. In fact, whenever compared to traditional time-consuming "cardio", the scientific research has always shown sprint training to be more efficient and effective. Most individuals, however, do not have the time or the desire to go and sprint as hard as they can up a flight of stairs. But The X-iser® Machine provides everyone the ability to sprint train in a non-impact fashion and its portability allows you to do it anywhere. With its unique design and adjustable speed setting, The X-iser® is also great for any age and fitness level because it responds to your effort and ability.

The X-iser® Machine was engineered to ensure correct hip and knee alignment, providing an optimal, impact-free workout. The "hands-free" design promotes the development of stabilizer muscles and correct posture, which, in turn, improves balance. It also provides a training method that few have ever experienced with any other physical activity, let alone a piece of exercise equipment. The nature of the hydraulics on the machine allows for a technique that produces a "static equilibrium", high-frequency stepping action. What actually happens is the body's center of mass stays level so that there is no vertical movement of the torso; imagine balancing a glass of water on your head while the legs are stepping as fast as you can (an elite athlete can produce 300 + steps in a minute).

What makes this unique is that in order to prevent the body's center of mass from moving up and down (as we normally see with all other stepping activities), both legs have to work equally, against each other, on both the up and down strokes of the stepping action. This "no recovery" protocol leads to tremendous improvements in muscular strength and endurance, while the rapid left to right stepping enhances neuromuscular development that translates to huge gains in performance. In addition, the cardiovascular demand of this intense exercise significantly challenges both the aerobic AND anaerobic metabolic systems, improving overall conditioning far more than traditional "cardio" prescriptions.

Numerous additional exercises are also possible because of the unit's size, portability, and uniquely connected hydraulic system. But while The X-iser® Machine and corresponding programs are extremely diverse and effective, the machine's unique ability to train the lower body in "static equilibrium" is what sets it apart from every other product (commercial or consumer) available in the marketplace today. Once you have experienced using The X-iser®, one quickly gains an appreciation of its effectiveness and the resulting benefits. Nothing can improve the varied parameters of strength, balance, coordination, speed, power and overall conditioning as efficiently and conveniently as The X-iser® Machine.

Sprint or jog?

Let us give you some information first...

Traditional Cardio

- Requires a lot of time, 20-60 minutes needed to burn calories for fat loss.
- Will not build muscular or bone strength, in fact can cause loss of both.
- Increases inflammation – may further complicate conditions associated with chronic inflammatory disease.
- Only improves one cardiovascular system (aerobic), both (anaerobic & aerobic) are needed for heart health.
- Over produces free radicals causing stress on the immune system.

Sprint Cardio

- Only requires 4-8 minutes to burn needed calories for effective fat loss.
- Helps increase muscle and bone strength as well as mass.
- Reduces inflammation - helps reduce chronic inflammatory conditions.
- It trains both aerobic and anaerobic systems at the same time. It can actually improve aerobic system better than traditional aerobic training.
- Increases fuel for the immune system.

Which body is better for health and performance?



Jogging The body "killer"	
Hormone Levels	
Glucagon	Low ▼
Cortisol	High ▲
HGH	Low ▼
Insulin	High ▲
Leptin	High ▲

Sprinting The body "creator"	
Hormone Levels	
Glucagon	High ▲
Cortisol	Low ▼
HGH	High ▲
Insulin	Low ▼
Leptin	Low ▼





Frequently Asked Questions about the X-iser and Interval Training

How can I lose weight exercising a just a few minutes a day?

This is a great question. Mainstream has not caught up to the latest research on fat burning and exercise. When scientist compared traditional cardio (30-60 minutes aerobic exercise) to sprint training (20-60 second sprints) they found sprint training can burn the same calories in 1/15th of the time. New studies also revealed that hormones play an important role in weight loss as well. Traditional cardio produces a lot of stress hormones (cortisol) that make your body store fat, while sprint training stimulates growth hormone, the elixir of youth, which helps build bones and muscle while burning fat. Another interesting note from the research is what happens to energy burning after exercise. When you do traditional cardio your body burns fat during exercise, but after the exercise you body will use carbohydrates to replace that fat in order to be ready for the next bout of exercise. This means you only burn fat during exercise. When you do sprint training you burn carbohydrates during exercise and fat afterwards. This means you become more of a fat burner throughout the day. To examine some of the research, please visit our website www.xiser.com or you can read the "Hormonal Weight Loss" article included in the packet.

I thought I had to do aerobic exercise for 30 minutes to an hour to have a healthy heart and lungs?

Another great question. Again, mainstream is not up to date on the research. Intensity, not duration, affects the body's adaptation to exercise. So it's not how long you do it, it is how hard you do it, quality over quantity. One study found as long as the intensity is sufficient you can double your cardiovascular condition in just 8 minutes a week of sprint training. Coming back to hormones again, stress hormones will cause the body to become more inflammatory leading to increased risk for chronic disease including heart disease. What scientists have found is sprint training produces an anti-inflammatory affect on the body. This means it can reduce the chance of heart disease much more than the long traditional cardio. They also found that it is even safe for post heart bypass patients to do sprint training. For more in depth look at this please read the "Exercise is Medicine" article in the packet. You can also visit our website.

Why does the X-iser seem to have a smaller step height (range of motion) compared to most other steppers and climbers?

The pedals on The X-iser Machine have a step height of eight inches, which equates to a varied range of motion at the knee joint depending upon height, body form and foot position on the machine. Although the range of motion has been biomechanically optimized, many individuals mistakenly compare the range of motion to other stepping-type machines that have a larger range of motion, assuming that a larger range of motion is better. Essentially, using a larger range of motion than The X-iser Machine is unnecessary and increases the risk of injury.

If I have bad knees can I use The X-iser Machine?

Bad knees come in a number of shapes and sizes, so it depends on the problem. First, The X-iser Machine is used around the world for knee rehabilitation, and is endorsed by orthopedic surgeons and physical therapists for this very purpose. In many cases the X-iser will fix bad knees. However, there will be occasions when The X-iser is not recommended. An example is a meniscal tear, which “locks” when trying to step – particularly when using the short burst form. In these cases, The X-iser Machine can be used in a backward or seated position, allowing for an improvement in functional strength of the knee while alleviating stress on the knee. In addition, the non-weight-bearing exercises done in the Core 4 Program on The X-iser Machine can be done regardless of knee issues. So, The X-iser Machine can provide a way to burn calories and strengthen muscles for those with bad knees struggling to find an effective mode of exercise.

I don't have very good balance; do you have a handrail or something to hold onto while stepping on The X-iser Machine?

One of the great benefits of the X-iser Machine is its ability to challenge balance and thus improve it. This is an extremely important component of health, given that falling down is the number one cause of death in the elderly. If you don't have much balance in the first place, then support is important in the early stages of using the machine. It is important to realize, however, that you do not need a handrail or support bars to use The X-iser Machine. Simply place the machine next to a wall or countertop, which will provide fingertip support. This is sufficient to provide support but still allow balance improvement. You will progress from constant touching of the support to intermittent touching to not needing support. This sequence can progress in a surprisingly short period of time – in some cases as little as a day or two.

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More Questions or concerns? Contact us at 1-800-756-9073 or at www.xiser.com

Hormonal Weight Loss:

Is there such a thing as the “Metabolic Effect?”

Jade Teta ND, CSCS and Keoni Teta ND, LAc, CSCS

It is time to bring the science of weight loss out of the dark ages and apply a new understanding of exercise’s impact on hormones and metabolism. The environment a person chooses dramatically affects the processing and use of energy he or she consumes. Intelligent exercise releases hormones in the body, and these chemical messengers translate movement into metabolic action. Hormonal signals are powerful determinants of which fuel our metabolic engine will use: sugar versus fat. Therefore, hormones manage much more than just caloric input and output. There is an optimal state of hormonal balance that enhances utilization of the body’s fat stores; we call this the metabolic effect. The intelligent manipulation of lifestyle choices like exercise is the chief means of accessing this highly beneficial state of function.

To begin this discussion, let’s take a look at how a strictly caloric model of metabolism holds up in examples of real people. It is useful to use athletes in this example since they are widely regarded as extremely functional and metabolically efficient. Among track athletes, both elite marathoners and sprinters are extremely lean. Any average person can quickly distinguish the difference between these two groups of athletes. One is muscular and lean while the other is more gaunt and wiry. Of these athletes, sprinters have less body fat and higher amounts of muscle mass, yet they burn far fewer calories when training for and engaging in their sport 1-2. Sprinters engage in very short bursts of all out effort lasting seconds while marathoners run for hours and consume large amounts of caloric energy. If the calorie model is the final word on fat loss, why is there a discrepancy? Shouldn’t marathoners be the leaner of the athletes?

To understand this glaring contradiction, the discussion must move to hormones and fuel metabolism. Hormones as described here simply refer to all signaling molecules in the body. In the case of weight loss, these chemical messengers are the ultimate predictors of the degree and type of energy used. The body is like an engine that can choose between two fuels. Fat is analogous to diesel fuel; it will get you far, but it won’t provide much performance. Sugar is like high-octane and delivers exceptional performance but horrible mileage. Hormonal messengers determine which fuel dominates. In reality, the body burns both fuels all the time, but lifestyle choices elicit hormones that determine the amount of each fuel burned. The body becomes efficient at burning what you feed it and it preferentially replenishes used energy by refilling its tanks with the alternative fuel. In other words, eat sugar at a meal and you will burn sugar after the meal, but burn sugar during exercise and you will burn fat after. With this understanding, eating and exercise programs can be designed to release the optimal hormonal situation for accelerated fat loss we call the metabolic effect.

EPOC: The metabolic effect of exercise

Exercise that modulates hormonal effects will burn more calories during activity and provide greater caloric benefit after exercise 25. This increased energy use after an intelligent workout is referred to as excess post-exercise oxygen consumption, or EPOC. This is a measure of how much oxygen the body consumes in the hours and days after a workout. An example of EPOC in the acute sense is climbing a steep flight of stairs. While walking up the stairs breathing is labored, but respiration becomes most difficult after reaching the top. The body does this to recover the “debt” of oxygen created during activity. The EPOC created by climbing a flight of steps is an example of the much larger metabolic effect created from intelligent movement. Intelligent exercise drives hormonal machinery towards burning large amounts of energy during exercise, and creates sustained fat-burning after. The amount of oxygen consumed is directly correlated to how much energy is burned, but the hormonal situation determines whether that energy is mostly fat or sugar.

Most people wrongly assume that low intensity exercise burns more fat than higher intensity exercise. This is true only from a relative perspective. Relatively speaking, the lower the exercise intensity, the higher proportion of fat you burn compared to sugar. However, exercise of higher intensity and beyond the aerobic training zone burns more absolute energy and fat. Suppose two people go out an exercise for thirty minutes. Person A does aerobic exercise at an intensity of 60% max heart rate, while person B does interval training by exercising at an intensity of 60% max heart rate and then frequently (every few minutes) spikes the intensity above 85% for a short period and then returns to the lower intensity. Let's say Person A burned 200 calories total, 60% of which was fat and 40% of which was sugar. Therefore, Person A burned 120 total units of fat and 80 units of sugar. Person B, who exercised at a higher intensity with intervals, burned 50% fat and 50% sugar, but burned 300 calories total. This means Person B burned 150 units of fat and 150 units of sugar. We can see by this example, that Person B burns more energy (300 calories) and more total fat (150 units compared to 120 units) than person A despite a lower percentage of total energy coming from fat. This shows higher intensity exercise far exceeds its low intensity counterpart during exercise in addition to hormonal and EPOC benefits that last long after.

The idea of hormonal influences on calorie burning is a novel concept to some, and is far more complex than simple one-dimensional models of hormonal metabolism. For example, we know that exercise of sufficient intensity elevates stress hormones like adrenaline, nor-adrenaline, and cortisol. As an innate physiological response to stress, these hormones are generated during a "fight or flight" response. Together they ensure the switch to high-octane sugar usage which historically supplied the energy to fight for our lives or run like hell. As we run faster and harder the body's supply of oxygen drops off. Since sugar is a fuel that can be burned in the absence of oxygen, highly intense activity depletes sugar stores. This increase in anaerobic metabolism generates lactic acid which is far more than a waste product, but also a buffering aid and likely signaling molecule (26-28). As lactic acid builds up to extreme levels, it is correlated with powerful metabolic stimulants like testosterone and human growth hormone (22-24). The total hormonal environment created acts synergistically to produce a leaner and more functional physiology.

The effect of these hormonal messengers persists after activity, and that coupled with empty energy reserves delivers signals that rebuild, regenerate, and recycle energy. Since sugar stores are depleted during intense exercise, fat is used after to repair the body and regenerate sugar reserves. In this way, the body becomes a fat burning machine through the hormonal metabolic effect and the ensuing EPOC. This finely orchestrated hormonal response creates the perfect scenario for fat burning and muscle building and ensures survival by generating a leaner, faster, and stronger body. It is useful to point out that humans in natural conditions did low intensity activity all day everyday. However, the last activity one should choose when confronted with stress and high blood sugar is low intensity exercise. This runs counter to inherited physiology and biochemical understanding. Our genes and metabolic processes are still tuned to a fight or flight reality. Intelligent hormonal exercise works along with this ancient machinery.

Interestingly, the scenario above describes the type of exercise sprinters use in their training. It is important to point out the rise in cortisol many people fear is only a problem when it is unopposed by growth hormone and testosterone (3-6). Hormones do not work in isolation, and like people they will behave differently depending on the social environment they find themselves in. When cortisol is "socializing" with testosterone and growth hormone, its muscle breakdown is blocked, fat storing at the belly is reversed, and the three synergistically enhance fat burning (3-6). Attempting to blunt the cortisol response to high intensity exercise is counterproductive for fat burning and not necessary in the context of growth hormones (7-10). Long duration and lower intensity cardiovascular exercise is more the problem because it causes cortisol to rise unopposed by the growth promoting hormones. This may explain why standard aerobic prescriptions are not as effective for optimal body composition and why marathon runners exhibit frail bodies devoid of muscle (14-17, 20). Duration of exercise and not the intensity is the most salient issue in

regards to cortisol (21).

Intelligent Exercise:

The description above dictates that intelligent exercise must be intense enough to elicit the hormonal metabolic effect described. There are many tools and techniques to generate this effect with exercise, but none of them include long duration or "aerobic zone" training. This new technology and understanding dictates that the real fat burning zone exists at higher intensities. Breaching 85% to 90% of maximum heart rate ensures adequate intensity and can easily be managed with short duration interval training. This level of exertion correlates well with the ability to speak during exercise (32). In addition, a weight training program that uses full body movements, short rest periods, and forces both mechanical and metabolic muscle failure will cause a ripple effect lasting long after exercise has ended (18-19).

So how long does this metabolic effect last? When the tools and techniques described are used appropriately the magnitude and duration of EPOC is substantial. Two resistance training studies that combined many of the elements described above showed a sixteen hour elevation for women and a forty-eight hour elevation for men (18-19). Studies on interval training show similar effects 11-13. This is admittedly hard to swallow when one considers exercisers spend countless hours doing aerobic workouts which are largely ineffective for weight loss (14-17).

Some Studies:

A 2001 study in the American College of Sports Medicine's flagship journal, *Medicine and Science in Sports and Exercise* illustrates the point nicely (31). This study compared two groups of women. One group exercised using standard zone aerobic training while the other group used anaerobic interval exercise. The anaerobic interval group exercised for 2 minutes at a highly intense 97% max heart rate. They then rested by doing three minutes of low intensity activity. The first, more aerobic group performed moderately intense activity at close to 70% of max heart rate. The researchers made sure that each group burned exactly 300 calories. Despite exercising longer and burning the same amount of calories, the aerobic group lost less body fat at the end of the study compared to the interval group. In addition, fitness in the interval group was substantially greater than in the aerobic group. This study demonstrates the effect of EPOC and shows that something other than just calories is driving metabolism.

A similar study published in the same journal in 1996 showed that an anaerobic trained interval group burned significantly more fat than their aerobically trained counterparts (30). Not only did the interval group burn more fat during exercise, but they exhibited increased fat burning effects that persisted for 24 hours after the exercise had stopped. These results clearly show that high intensity interval training burns more overall fat and calories during exercise, and demonstrate EPOC leads to a continued fat burn after exercise as well. Perhaps the most interesting thing about this study is that the interval group was able to accomplish all this with an exercise session that was a full 15 minutes shorter than the aerobic group. This shows that intelligent exercise moving away from the aerobic paradigm allows exercisers to have their cake and eat it too.

Perhaps the most telling study on the effects of high intensity exercise vs. aerobic training came in 1994 in the journal *Metabolism* 29. This study tracked two groups of people undergoing different modes of exercise. Group 1 did zone aerobic training for a period of 20 weeks, while Group 2 did 15 weeks of a high intensity interval program. The researchers wanted to see how each program would affect body fatness and metabolism. The results showed that the aerobic group burned 48% more calories than the interval group (120.4 MJ vs 57.9MJ) over the course of the study. However, despite the huge caloric disadvantage, the interval group enjoyed a 9 fold greater loss in subcutaneous fat (fat under the skin). Most remarkably, resting levels of 3-hydroxyacyl coenzyme A dehydrogenase (HADH), an enzymatic marker of fat burning, were significantly elevated in the interval group. The implications of this study are immense when you consider the interval group trained 5 weeks less than the aerobic group, had shorter workouts, and yet far exceeded

the aerobic group in fat burning at rest and during exercise. The measurement of fat burning enzymes in this study shows for the first time that this new exercise technology can “teach” the body to be a more efficient fat burning machine.

The current exercise environment for weight loss is still rooted in the low intensity, single mode and calorie burning paradigms. This approach is successful for some, yet fails the vast majority. New models for exercise are needed to combat the growing epidemic of obesity and chronic disease. Short duration, high intensity exercise offers a clear departure from current weight loss models. Those that desire real transformations, and are frustrated by cook book exercise prescriptions, need new and improved approaches for overcoming obesity. Training for the metabolic effect offers healthcare providers, trainers, and gym managers alike new and effective exercise techniques to combat obesity and ensure weight loss.

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the X-ISER™



ACL Rehabilitation Incorporating The X-iser® Machine and Sprint Interval Training

By Mark J. Smith, Ph.D.

Rehabilitation after anterior cruciate ligament (ACL) reconstruction has become more and more aggressive over the last two decades. The keys to any rehabilitation program are to reduce postoperative swelling, achieve full extension, maintain patella mobility, regain quadriceps control and minimize patellofemoral symptoms. Most orthopedic surgeons, therapists, and athletic trainers agree that closed chain exercises are beneficial in ACL rehabilitation. Closed chain exercises minimize patellofemoral stress, stabilize the tibiofemoral joint, and reduce anterior translation of the tibia on the femur.

High intensity exercise of short duration has numerous benefits to muscular development. These include stimulation of human growth hormone, an activator of muscle growth, and utilization of both type I and type II muscle fibers. Using a unique portable stepper (The X-iser® Machine, Southlake, TX), Merrick J. Wetzler, M.D. (South Jersey Orthopedic Associates, Voorhees, NJ) and Thomas E. Maxwell, MA, A.T.C. (Athletic Department, Rutgers-Camden University, Camden, NJ) conducted a pilot study incorporating Sprint Interval Training (SIT – intermittent 60-second high intensity exercise) into a standard aggressive ACL reconstruction rehabilitation protocol.

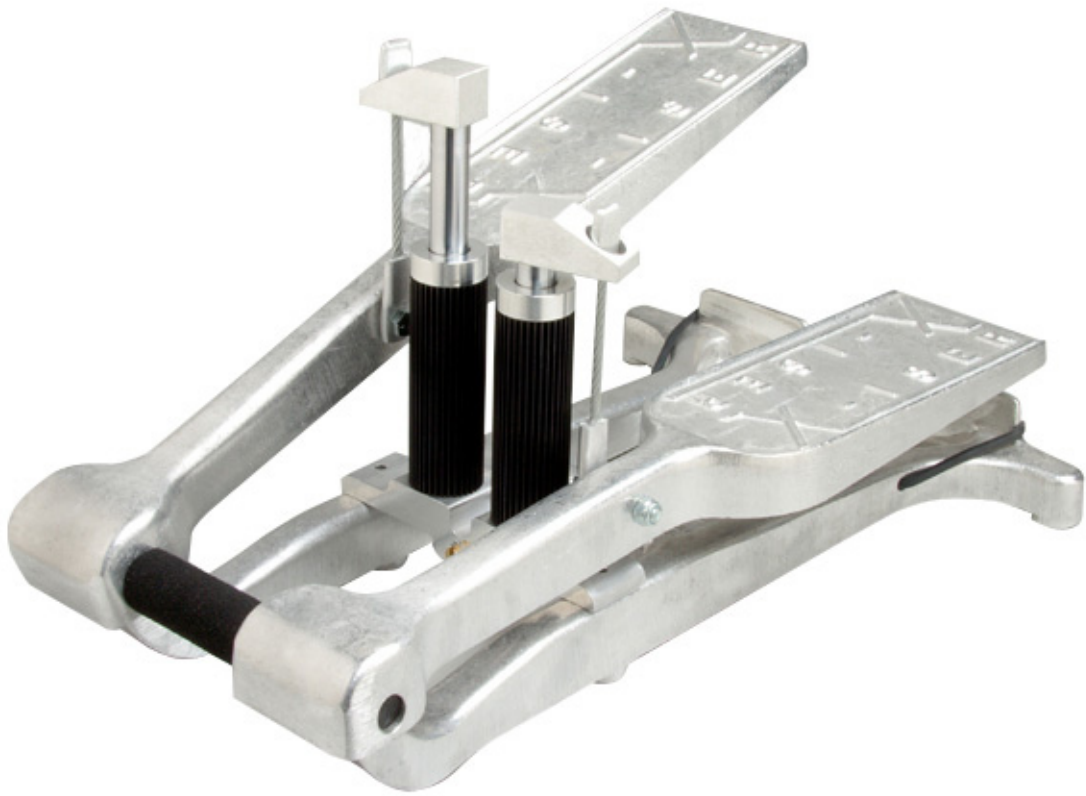
Weighing in at only 14 pounds, the unit permits closed kinetic chain exercise using a smooth non-rebound hydraulic system that minimizes impact and joint reactive forces thereby reducing stress across the patellofemoral joint. In addition, the adjustable resistance and independent responsiveness of each foot pedal allows less resistance for the operative limb during initial rehabilitation. Without handrails the machine also enhances neuromuscular coordination and proprioception required during functional activities. Further the portability of the machine enables increased rehabilitation via in-home therapy.

The preliminary study consisted of eight athletes, who underwent sub-acute ACL reconstruction (> six weeks post injury) using autologous bone-patella tendon-bone. There were five females and three males (average age - 19.3 years). All began rehabilitation within three days post-op. In addition to the standard protocol they began rehabilitation on the X-iser® Machine in a seated position as soon as 60 degrees of flexion was achieved. Once the subjects had quadriceps control and could do a straight leg raise they began using the X-iser® Machine in a specialized standing position (go to xiser.com and click "Demos" to view "Short Burst Stepping"). Initially subjects supported themselves using parallel bars, a table, or a walker. When the athletes were comfortable on the machine they utilized a doorway for balance and support, but only if necessary. The athletes began with four, 30-second intervals at a sub-maximal effort and progressed to 1-minute intervals at maximum effort.

Once independent with the machine, the subjects began home-based SIT that consisted of four, 1-minute intervals at maximum effort with at least 30-minutes rest between intervals. At four weeks an additional interval-training program was incorporated into their rehabilitation in the training room. The athletes maintained the home based SIT program on the other days.

All athletes achieved independent use of the machine by three weeks and had excellent compliance with the machine. At 12 weeks full range of motion was achieved & all girth measurements were within 2.5 cm of the uninvolved thigh. Isokinetic testing was within 20% of the uninvolved knee at 16 weeks. Subjective fitness level was excellent at 12 weeks and none of the athletes complained of patellofemoral pain at six, 12 or 24 weeks. A significant amount of the quadriceps hypertrophy and strength was attributed to the unique hydraulic system and specialized form. Together they obtain a simultaneous concentric and eccentric contraction of the opposing legs resulting in no half-cycle recoveries typically seen with other stepping activities. This study and numerous case studies have demonstrated cost effective benefits to ACL rehabilitation and overall cardiovascular fitness using the X-iser® Machine.

The size and portability of the unit, along with its unique hydraulic system, also make it an excellent tool for the rehabilitation of other orthopedic conditions such as the rehabilitation of the ankle, hip and shoulder. It can further be used for the rehabilitation of conditions that have compromised balance. The machine has been used by industry professionals for rehabilitation since its inception into the marketplace in the early 1990s.



the X-ISER™



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