

# *Announcing!*

## **Linear Spine<sup>®</sup> Machines**

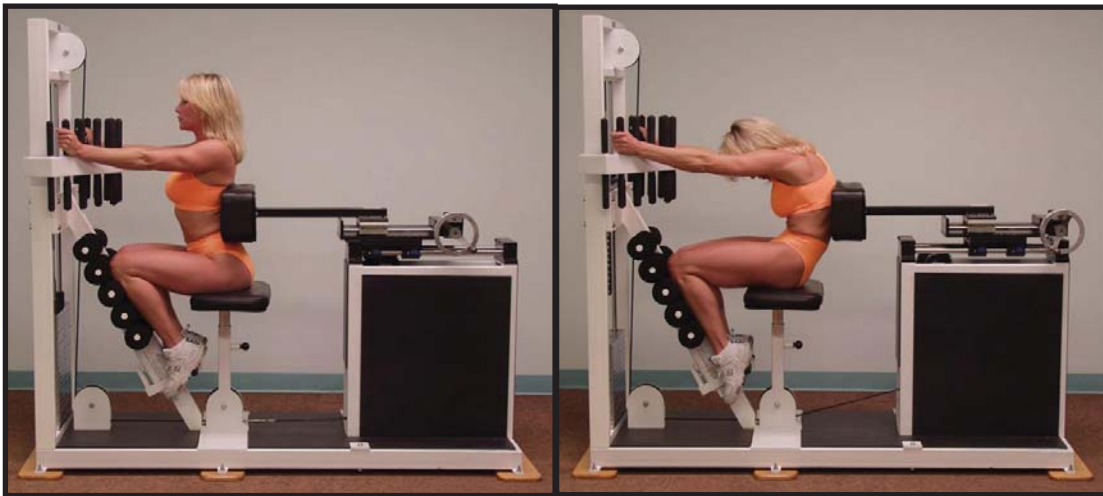
### *The Second Generation*

As many serious SuperSlow<sup>®</sup> practitioners and instructors are already acquainted, both the Linear Spine Flexion (LSF) and the Linear Spine Extension (LSE) machines are some of the most unique and valuable trunk machines ever designed and produced by Ken Hutchins. Originally sold by SuperSlow Systems, LLC, they are no longer available.

An exercise equipment design historian ranked the Linear Spine machines as the most original idea in exercise equipment since the designs of Jonas Gustav Vilhelm Zander (1835-1920)... adding that even Arthur Jones' Nautilus<sup>®</sup> Pullover was not quite as original, since it was based on a composite of several pre-existing exercises.

In the past several years, Ken has made several breakthroughs while supervising thousands of bouts with the Linear Spine machines.

#### **The Linear Spine Stretch**



**Graphic #1: Left:** The bottomout (spine-extended, trunk flexor muscles stretched) position of the Linear Spine Flexion exercise. Note that this position is a *true stretch* (passive stretch) as compare to the *pseudo stretch* (active stretch) observed in the exercises of Graphic #3. This true stretch beneficially and safely decompresses the inter-vertebral discs of the lower middle spine *a la* Robbin McKensie. A pseudo-stretch only somewhat decompresses the discs, because of its active muscular limitation. **Right:** The top-out (spine flexed, flexor muscles contracted). This position is often incorrectly described as a “stretch.” No...it is a contraction, the opposite of a stretch. Note: the LSF exercise is also known for relieving the most debilitating menstrual cramps within 3-5 repetitions.

For many subjects suffering back pain, much of the benefit of the Linear Spine Flexion (Graphic #1) can be derived from the true stretch obtained from merely sitting in the machine at stretch position for a minute. In other words, these subjects entirely avoid performing the dynamic excursion in the machine. With the assistance of an informed instructor, they go through the setup procedure to determine their appropriate positioning and safe stretch limitation (during only the introductory session), then proceed in the introductory sessions and all subsequent session to only sit in that predetermined stretch position for one full minute, then exit the machine.

In 2017, I estimated to a chiropractor (who owns an LSF) that if I placed a random sample of back-pain sufferers—with no foreknowledge of their specific diagnosis—in the LSF at their stretch position for only a minute—involving no dynamic positive or negative contractions—roughly 60% of the group will experience dramatic pain reduction or complete relief. He asserted that my estimate was conservative.

Of course, there are many different back debilities, a few for which the LSF is not appropriate.

To provide this stretch, the new Linear Spine Stretch (LSS) is possible at less than a third the price of the original dynamic version, with less than half the weight, and with a reduction of roughly 25% of the floor area. Also, it provides much more control and safety. After all, once the setup is complete for a particular individual, all instruction is reduced to entry, loading, unloading, and exit of the machine.

There is no weight selection. There is no lifting or lowering of a weight. It requires no instruction to change flexion of the head and neck throughout a movement to maintain neutral position of these structures. It requires no instruction to contract the abdominals and buttocks as is necessary and desirable in the LSF. Much of this verbiage and detail is eliminated.

With this truly personal version, the Linear Spine Stretch requires only a preliminary setup for an individual. Since we are only stretching, SuperSlow protocol instruction is not needed. TSC protocol instruction is not needed. Then—unless another person uses the LSS—it can be left more-or-less permanently set for that individual. Many individuals can use the LSS without personal supervision, although supervision will be required and available by phone to anyone who needs such in their home and office when first learning the setup and protocol.

The Linear Spine Stretch is now simplified to the extent that some of Ken's clients who suffer from back conditions buy the LSS for their home or office. In this way they have some of the convenience that Ken has for himself in his studio with his LSF—when his back is symptomatic he can merely stretch and decompress his middle and lower spine at regular intervals throughout the day to prevent lockup and to promote healing.

By the way, the Linear Spine Stretch should now weigh about 200 pounds—hopefully less—as its dynamic predecessor weighed almost 900. At 200, the LSS remains very stable, but easily moved around on floors with sliders. This makes it easy to tuck it into tight spaces when temporarily stored between bouts.

## **The *Linear Spine Static* (LS TSC) Machine**

This is, perhaps, Ken's most unique machine ever. To get the basic idea for this device, first note the original Linear Spine Extension (LSE) pictured in Graphic #2. Note, first, that the real value in its approach is to posteriorly draw the shoulder girdle toward the pelvic girdle as the belly is distended anteriorly.

Second, note the TSC (TimedStaticContraction<sup>SM</sup>) exercise illustrated in Ken's book, *Music and Dance—Critical Factors of Practice and Conditioning*. (See Graphic #3.)

There are many advantages of this simple exercise, and it is an exercise that extremely few back patients cannot perform. For nearly four years in Texas, Ken found himself forced to make do without his redesigns of the vintage Nautilus Lower Back machine as well as his design of the RenEx Trunk Extension machine. He was stunned by how effective this exercise could be.

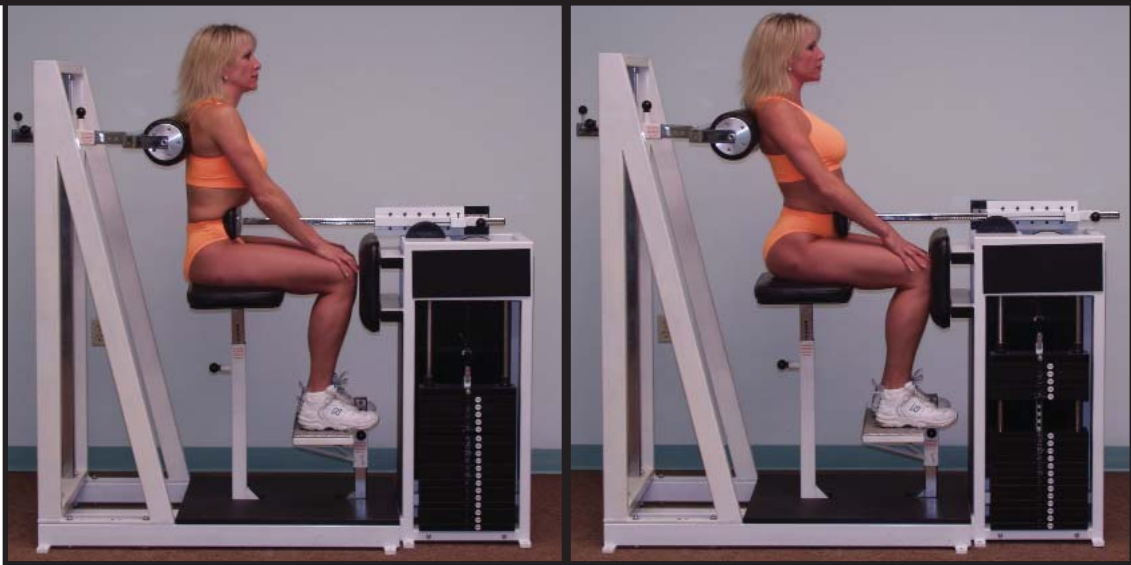
In addition, this static trunk extension exercise can be greatly improved with the proper design of a machine to accommodate the subject's debility, if any, as well as to provide optional computer-aided feedback for resistance progression and recording.

All we can tell you about the new Linear Spine Static for now is that:

- Other than adjustable settings, it has no moving parts. It is a static-only exercise device.
- It weighs less than 200 pounds, will ship on a standard shipping pallet, and requires a working floor area of only 10 square feet.
- It is very effective for loading the spine extensors without feedback, although load-cell and computer-aided feedback are optional at point of purchase or applied afterwards with or independent of our involvement.
- Several different trunk exercises are possible with the LSS.

### **Status of Availability**

Due to my illness in late 2019-2020, I have stopped manufacturing. This piece is for information purposes only and not to construed as a solicitation for money.



**Graphic #2: Left:** The bottom-out (spine-flexed, trunk extensor muscles stretched) position of the Linear Spine Extension (LSE) exercise. **Right:** The top-out (spine extended, trunk flexor muscles pseudo-stretched). This position is often incorrectly described as a “stretch.” No...It is a contraction, the opposite of a stretch.

**Note:** This is the only machine that provides a dynamic exercise that neurologically cancels the contraction of the hamstrings and buttocks during trunk extension. Both the MedX® Medical Lumbar as well as its exercise-only sibling were designed to filter the actions/force of these muscle groups from their respective movement arms (force-receiving arms). This enabled the Medical Lumbar to be a reasonably accurate (and unnecessarily dangerous) strength testing tool. But if meaningful isolation of the trunk extensors (both the intrinsic as well as the extrinsic trunk extensors) during back rehabilitation is the goal, the LSE greatly surpasses the MedX.

Although a great leap forward and sorely needed by some back patients, the LSE is not nearly as generally useful as the internal-resistance exercises for the trunk extension musculatures illustrated in Graphics #3.

Also note: full-range performance of the MedX Lumbar is believed to destabilize the vertebrae of spondylolithesis patients. This can be easily avoided by pinning off the movement arm to delimit range of motion.

Also note: the MedX Lumbar severely restricts the range of motion most critical for a beneficial pseudo- or true-stretch. These criticisms notwithstanding, the MedX Lumbar seems to have benefited many people with their back complaints. The new Linear Spine Static; however, isolates the target musculature better, more safely, more simply, and less expensively regarding equipment cost, set-up, space required, etc.



**Graphic #3.**  
**Internal-Resistance Static Trunk Extension (five approaches)**

The general protocol for all five of these approaches is in the *TSC Protocol* sidebar.

At the left (the first picture), the subject is lying supine on the floor. With her legs and buttocks disinvolved, and her neck and arms and shoulders relaxed, she distends her belly upwards as she tries to approximate her scapulas and buttocks. This approach should be used only if a suitable straight chair or seated bench with a seat back is unavailable. Getting down-onto and up-off the floor is problematic and is to be avoided in all exercises whenever possible.

In the second picture (subject facing left), the subject is belted in an appropriate chair-bench. If her feet were placed solidly on the floor and wide with knees wide of the seat corners (providing maximum lateral stability), she would still need the belt moderately cinched to offset any slight tendency for her buttocks to slide forward. A wider seat here would be an improvement for those who can isolate better with the feet suspended off the floor. Some marginalized subjects must have their feet on the floor to avoid back pain. This is often true of those with rods and other appliances. For stability, the subject must remain against the back pad throughout the bout. (Unknown to almost all personal trainers and physical therapists, this is a hard-fast rule in almost all exercises!)

The third picture (subject facing right and somewhat away from the camera) shows the heels off the floor when the feet are placed forward. The heels must bear as much pressure as the balls of the feet (by placing the feet more forward) so that the ankles remain tension-free. Of course, the legs and buttocks must remain relaxed. A belt is placed around the torso at shoulder height to provide resistance against the counter-resistance (reactionary force) of the anterior abdomen.

The fourth picture shows the same approach as the third, except that the feet are placed behind the subject as though she is attempting to place the top of her shoes on the floor. This placement neurologically cancels out the buttocks and hamstrings musculatures and puts the pelvis into a forward tilt that ensures ideal lordosis of the spine, especially the lumbar. And this lordosis helps the subject to properly engage and isolate the torso extensors. Again, the resistance-belt is applied.

Although the resistance-belt approach lends to obtaining a readout on the RenEx iMulti Machine, we have ditched the resistance-belt in favor of the internal-resistance approach noted in the picture at far right. This approach eliminates the force against the anterior abdomen, as this was problematic with many subjects who have issues such as hiatal hernia and GERD. It also eliminates a tendency in some subjects to extend at the hips rather than exclusively within the torso.

In the Stage #3 of the TSC Protocol the subject, if all is well, simultaneously strives to touch her belly to the far wall and her fingertips to the floor. Note that the idea pelvic tilting with feet placed backwards often irritates the hips.

**Therefore**, a bench with a wider seat is required for subjects who are best with their feet off the floor and place anteriorly. **Therefore**, a bench with a saddle seat is required for subjects who are best with their feet on the floor and behind them. **Therefore**, a bench with an adequately adjustable seat height is required for subjects to rest their feet solidly on the floor, whether posteriorly or anteriorly. **Therefore**, the seat must have a seat belt. **Therefore**, the seat must have a seat back for stability.

The challenge for Ken has been to design a device that provides all of these requirements for a static exercise that utilizes the internal resistance of the subject's torso...?! Not only has Ken achieved design of a machine meeting the requirements of this exercise, but he has found a way to provide it with feedback if so desired!

# TSC Protocol

Traditionally, *static exercise* has been termed *isometric exercise*. Specifically, the involved prefix, *iso*, means *same*, thus literally yielding *same measure* from the total word. This is misleading, because it inaccurately implies that the involved muscle contracts yet maintains its length...hence no muscle shortening occurs during the exercise. Although movement is slight and the contraction is short, it nevertheless does shorten, i.e., contract. This is one of several reasons why we prefer the use of *static* rather than *isometric*.

*Static* is also preferable merely because it is easier to pronounce, write, and to understand. Part of this is due to its having fewer syllables. For lay people, *isometric* is unnecessarily arcane as with its siblings *isotonic*, and *isokinetic*. Both of these siblings, like *isometric*, convey and imply inaccurate concepts. With *isotonic* (*same tonus*)—since no one has ever measured or is able to measure the tonus of a muscle we have no place where the word (not a true technical term) can be useful. And with *isokinetic* (*same speed*)—implying that muscle contraction speed is held constant throughout a joint's range of motion—only a device *might* impose a constant angular flexion or extension speed upon a joint, hence the corresponding linear contraction of the muscle would have to be ever-changing along that joint's constant speed of angular motion. All of these *iso* words are perfect only if the goal is to instill confusion and obfuscation into the mind of the reader or listener.

Also, *isometric(s)* has a bad reputation for injuries and minimal benefit. And this is almost completely expected from the manner in which they are commonly instructed and performed—with a maximum effort and with a bout duration of only 5-15 seconds. This is inadequate bout time to meaningfully inroad the muscle's resting strength to obtain a growth stimulus and exposes the muscle to a force magnitude very close to its structural integrity limit. Also, explosive application of this maximum effort is commonly promoted and performed. Also, *isometrics* are often promoted and performed in a mechanically-very-strong and, therefore, dangerous position of the body part being exercised. Of course, there are devotees of so-called *statics* who espouse many of the same poorly conceived *isometrics*. Hence, some of the bad practices of *isometrics* are flowing into the newer term, *statics*.

For several reasons—two being safety and inroad stimulus effectiveness—statics are performed at a sub-maximum commencement load. The load can be applied with feed-back devices or subjectively (without feed back) with a staged effort termed *TimedStaticContraction<sup>SM</sup>* or TSC. With feedback (visual or auditory), TSC is applied for the first several bouts to estimate load before applying this as a target load (via feedback) for subsequent bouts. Without feedback availability, TSC is applied to all future bouts ad infinitum. TSC is particularly useful as it does not require expensive feedback equipment and can be performed almost anywhere on almost any equipment for various exercises.

The preferred scheme for TSC exercise performance is as follows, placing the subject's body part (if an appendage) of interest roughly in its midrange position (The timing is usually applied to three levels of effort. TSC can be proportioned in many ways, but the most common standard involves a three-stage sequence wherein each stage is a 30-second duration and graduated by stage.):

Stage #1—Moderate Effort.

Stage #2—Almost as Hard as You Dare.

Stage #3—As Hard as You Dare.

Usually, with the first stage involving a moderate effort, the subject exerts against an immovable object with about 50% of his maximum effort. Of course, this moderate or 50% effort is a subjective level of effort. One hint at some perhaps-useful imagery is to contract at least hard enough to admit to oneself that I would not want to continue this interminably. After 30 seconds, the subject immediately, but non-abruptly, commences the second stage.

With the second stage we say, "Almost as hard as you dare," because we never want to command anyone to push "as hard as possible" or even "almost as hard as possible." Therefore, "dare" is placed into the verbiage to put some personal responsibility on the subject to not cross any threatening thresholds of discomfort.

Usually, the subjective quantification for the second stage is a 75% effort. A hint for this level is to push much harder than the first level, but leaving some definite awareness that it is not truly 100%. After 30 seconds, the subject immediately, but non-abruptly, commences the third stage.

The third and last stage is, "As hard as you dare." This level may truly be a 100% effort, but only if the subject deems it acceptably safe.

The objective in an exercise is to momentarily inroad—fatigue—the muscle's strength to cross a stimulus threshold to signal the body to enhance, improve, strengthen any way that it can.