

How to be Back Strong and Beltless
Belts, are they as good as people say they are?
by Paul Chek

In Parts I and II of this article, I touched on the history of weight belt use, discussed the inner unit and our body's ability to stabilize itself using different mechanisms, and I demonstrated that the typical reasons people give for using a belt are invalid and may be predisposing a future injury. In this final installment of my article, I will help you wean yourself off the belt, *safely!*

Editor's note: You may find that Part 3 refers to figures or references that appeared in parts 1 or 2. If you want to take a look at either those figures or references, please see the "Previous Articles" section of the site.

How to be *Back Strong and Beltless!*

The worst thing someone could do is discontinue the use of a belt cold turkey! If you have been using a back belt or weight lifting belt for more than a month, chances are very good that your abdominal recruitment patterns have been altered. Your TVA and posterior IO are now likely sitting on the couch, relaxing, while allowing your rectus abdominis and external obliques to act as the primary stabilizers of the trunk in concert with the erector spinae muscles.

If you have been using a belt for several months or even years, particularly if you have had or currently experience any low back pain, chances are very good that you have *sensory-motor amnesia* of the deep abdominal wall. If you remove your belt and go back to your normal Herculean performances in the gym or start packing power tools around the construction site, *chances are very good you will be purchasing a new Mercedes for your doctor or orthopedic surgeon, real soon!*

When you take the belt off and begin working or lifting, your brain will sequence the muscles as though you were lifting with the belt. When your nervous system recruits the rectus abdominis and erector spinae at the greater intensity as learned when wearing the belt,(40,44) you are likely to have increased compression, torsion and/or sheer in one or more segments of your lumbar spine, but without the hoop tension provided by the belt.(42,43)

Additionally, a correlation of my clinical findings among athletes that wear belts and have experienced hamstring injury is supported by research. Lander et al. found that while using weight-belts, there was increased EMG activity of the vastus lateralis and biceps femoris.(55) This is logical when considering the intimate relationship that exists between the biceps femoris and the TVA via the thoracolumbar fascia system as an integral part of what is called the "deep longitudinal system" by Gracovetsky.(7 p. 243-251, 15 p.58) (Figure 14)

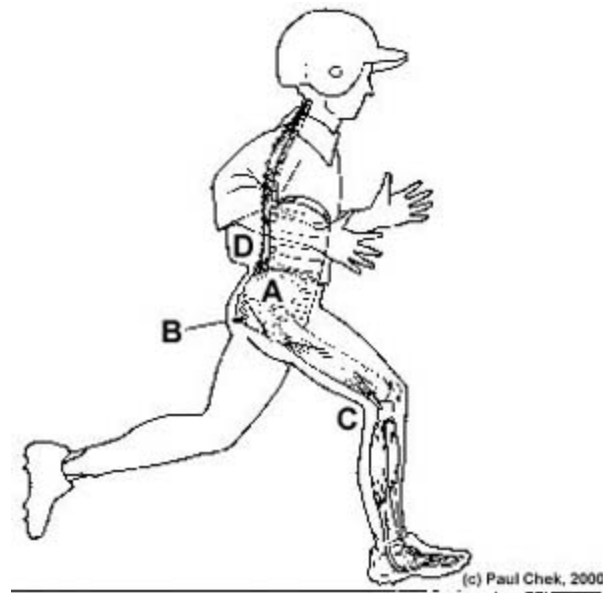


Figure 14. The Deep Longitudinal System

Adopted from Gracovetsky (7 p. 243-251, 8) and Lee (15 p.58) the Deep Longitudinal System illustrates the working relationship between the TVA as a stabilizer of the pelvis (A), the sacrotuberous ligament (B), the peroneus longus and biceps femoris (C) and the erector spinae musculature (D). In the late swing phase of gait, dorsiflexion of the foot in preparation for heel strike generates tension in the peroneus longus. Vleeming (7) indicates that approximately 18% of that force is transferred into the biceps femoris, which works to tension the sacrotuberous ligament, stabilizing the sacrum and ilium at heel strike. The erector spine musculature serve to dissipate kinetic energy through rotary action on the spinal column prior to reaching the cranium. This mechanism may explain the high correlation between biceps femoris injury in lifters using belts and sprinters with TVA dysfunction; theoretically, the biceps may be working to tension the thoracolumbar fascia system to compensate for inadequate action of the TVA.

If the belt user has developed the habit of responding to the exteroception provided by the belt by pushing the abdominal wall outward (which will inhibit the TVA), then it is very likely the brain may up-regulate the recruitment of the biceps femoris in an attempt to stabilize the thoracolumbar fascia.

This can be done by the biceps femoris because of its intimate relationship with the thoracolumbar fascia via the sacrotuberous ligament. Having treated numerous biceps femoris injuries in weight lifters and athletes performing in sports requiring explosive movement, I have witnessed a strong correlation between sensory-motor dysfunction of the deep abdominal wall, an inability to stabilize the lumbopelvic region, and biceps femoris injury.

Additionally, a study titled, "The effect of industrial back belts and breathing technique on trunk and pelvic coordination during a lifting task," found that "phase angles" (relationships) between the pelvis and lumbar spine during the initial phase of lifting tasks were altered among belt users.(56) The researchers concluded "the change in segmental kinematics was similar to that previously reported for patients with a history of low back pain".(56) What this means is that if you stop belt use cold turkey, *or even forget your belt one day*, not only will your motor sequencing be aberrant, but the relative timing of joint movements will also be faulty. This is a formula for disaster!

The Formula for Freedom from Belts

To begin, you must assess your TVA strength and function as described below in "Find the Weakness and Kill It!". Once you have achieved the ability to recruit your deep abdominal wall and you have restored normal lower abdominal coordination, it is then safe to begin weaning yourself off the belt.

After performing the test procedures described below and correcting any deficits, start by only wearing your belt with lifts of greater than 80% intensity (8 rep max or heavier). For some of you, this may mean only performing your warm-up sets without the belt. For those of you that don't normally lift at higher than 75% maximum intensity (12 reps), you may also want to begin by only performing your warm-up sets without the belt. The next step would be to take the belt off during your first working set, and so on. After two weeks of training, while continuing to use the abdominal retraining techniques described below, remove the belt for all exercises done at an additional 5% intensity, or two reps closer to your maximum. Continue this progression for 4-8 weeks. If your beltless performances match your previous lifts with a belt, you may safely drop the belt *forever*.

If you have any pain in the region of the back from T7-S3, it is very important not to try weaning yourself off the belt without professional guidance. Consult a qualified physical therapist that understands strength training or a C.H.E.K Practitioner near you (locate a C.H.E.K Practitioner by sending an e-mail to ginfo@chekinstitute.com).

Pain in any spinal segment between T7 and S3, or anywhere in the lumbopelvic region, can inhibit the transversus abdominis and pelvic floor musculature, leaving you susceptible to injury.

Find the Weakness and Kill It!

A chain is only as strong as its weakest link, and your body is no different. The first step toward developing a belt free body and toward reestablishing function of your own natural lumbar corset is to test it. Using a blood pressure cuff, you can test the TVA for proper function.(Figure 13) If your TVA function is normal, you should be able to reduce the pressure in the BP cuff by 10 mmHg without any movement of your spine, without flexing your hips, or pressing your shoulders into the floor. You can safely consider that for each 1 mmHg less than 10 mmHg you de-pressurize the cuff, you have a 10% loss of function. For example, if you could only reduce the BP cuff pressure 5 mmHg, you are probably about 50% deficient in TVA function.

Should you find your level of function is less than 100%, I strongly recommend you follow the exercise progressions described in Table I. For those of you needing to condition for improved neuromuscular isolation of the muscle as dictated by your test results, the test becomes the exercise. As indicated in Table I, you should progress until you can de-pressurize the cuff by 10 mmHg for 100 seconds without rest.

TABLE 1. TRANSVERSUS ABDOMINIS CONDITIONING

Week	Exercise	Rest	Intensity	Reps	Tempo	Sets
1	4 Point	<1:00		10	10/10	1-4
2	BP Cuff	<1:00	-10mmHg	10	10/10	2-4
3	BP Cuff	45 sec.	-10mmHg	10	10/5	2-4
4	BP Cuff	30 sec.	-10mmHg	2-4	=/>100s.	1

Some of you, particularly females, may have a hard time getting your TVA to fire. This is likely to be the case for anyone with a history of back pain, currently experiencing back pain, or who has given birth to one or more children. (23,57) To jump start the TVA, I use the "4 Point TVA Exercise" demonstrated in Figure 15 A-B.(23) The 4 Point TVA Exercise works very well because when you are on all four points, gravity is pulling your viscera downward into your abdominal wall and stretching the deep abdominal wall muscles.

The stretch excites the spindle cells of the muscle, increasing awareness of the deep abdominal wall in the sensory-motor cortex. This aids in recruiting the muscle when afflicted with sensory motor amnesia.

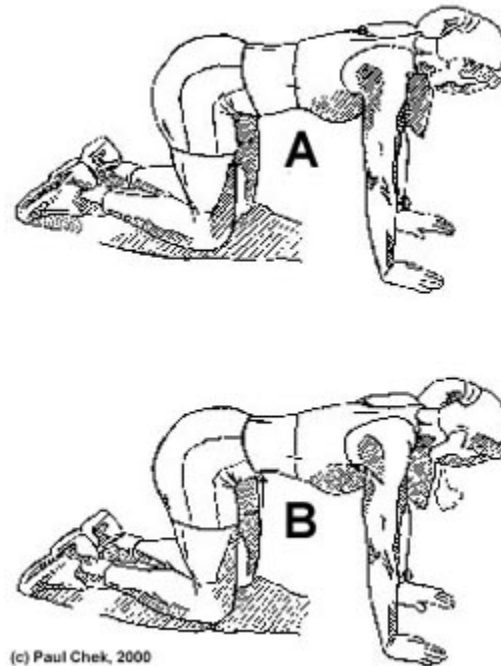


Figure 15. The 4 Point TVA Exercise

A) Positioned on your hands and knees with neutral spinal alignment, inhale deeply. Be sure to use a diaphragmatic breathing pattern. This means that as you inhale, your umbilicus should move away from your spine and your belly should relax and expand.

B) To exercise the TVA, as you exhale through pursed lips, draw the umbilicus toward the spine. Draw the umbilicus as close to your spine as possible, holding the TVA contraction for 10 seconds. If you need to breathe during the ten-second contraction, try to hold the umbilicus inward toward the spine while you do so. Always preface each contraction with a diaphragmatic breath, repeating the cycle as described here. Ten repetitions, holding each for 10 seconds would constitute one set. Work up to three sets with one minute rest between them.

Once you have performed the 4 Point TVA Exercise every day for a week, retest yourself with the BP cuff. While you are working on your deep abdominal wall, you can also be working on your lower abdominal strength and coordination.

Lower Abdominal Coordination Testing

Belt use has been shown to alter the natural recruitment patterns of the abdominal wall, favoring the rectus abdominis, (40) erector spinae(44) and potentially disrupting recruitment sequences in the legs. (39) It is therefore no surprise that belt users frequently present with aberrant coordination in the abdominal wall when assessed clinically.

It is very common for belt users to have reduced ability to control sacral base inclination, or *pelvic tilt*. This is another common challenge I must work through with back pain patients. Inability to control sacral base inclination can cause instability of the sacroiliac joints, particularly during forward bending activities.(58) Clinically, I have found inability to control sacral base inclination is also commonly related to such spinal pathology as spondylolistheses, spondylolysis, spinal instability and disc herniation.

To test yourself, lay on your back and place your hands under your spine (palms down). When your fingertips are just behind your umbilicus (L3), flex your hips to 90° and keep your knees fully relaxed. (see Figure 16) From this position, roll your pelvis posteriorly until you can feel the spinous process of your spine pressing on your fingers. Now, while holding the pressure on your fingers with your spine, begin lowering your feet to the floor, always keeping the knees fully bent. If you have normal lower abdominal coordination, you should be able to slowly lower your feet to the floor and bring your legs back to the point of 90° hip flexion without the pressure of your spinous processes at the L3 level ever coming off your fingers.(23)

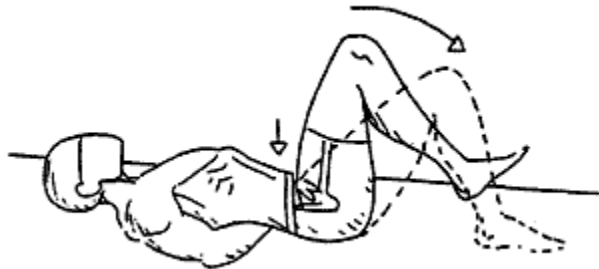


Figure 16. Lower Abdominal Coordination Testing

If you are unable to hold consistent pressure while lowering and raising the legs as described, it is very likely that you have facilitated hip flexors.(22,59) A very simple approach to correcting the problem is to stretch your hip flexors and repeat the test. If your test is now normal, it is an indication that you should stretch your hip flexors to reestablish normal recruitment pathways before doing any heavy lifting. If you stretch your hip flexors and you are still unable to pass the test, then it is likely you have developed a faulty motor engram (recruitment pattern). Restoration of normal motor control in the lower abdominal region is complex and beyond the scope of this article. Those interested in learning how to make this correction should study references 23 or 60.

The World's Greatest Weight Belt!

Once you have passed the lower abdominal coordination test and can decompress the BP cuff for 100 seconds or longer at 10 mmHg less than where the needle started, it is time to integrate your deep abdominal wall into your general movement schema and gym exercises.

It is well documented that coordinative patterns of the abdominal wall are *task specific*.(6,12,14,23) For

example, one may have normal abdominal wall function during a squat pattern, but not a push pattern. Additionally, loss of abdominal wall coordination is easier to *prevent* than to *restore*.(61) This should give those of you considering use of a weight belt adequate reason NOT TO!

I recommend trying what I call "the worlds greatest weight belt". It is simply a piece of kite string. Place the kite string around your waist at the belly button level. Exhale and draw your belly button in slightly, just enough to notice that it has moved toward your spine and that you now have more definition along the oblique line. With the string snug around your belly now, tie the string in a knot.

As you perform your exercises in the gym, you should always inhale and draw your umbilicus off the string prior to exerting any force. This teaches the brain to activate the TVA first. If you are lifting any significant load, you will cross the stabilization threshold,(23) at which time you will go from segmental to gross stabilization. This will be identified as visually observable activation of the external oblique and rectus abdominis.

When the load is heavy enough, you will notice that no matter how hard you try, you cannot keep the string loose around your torso. If you progressively reduce the weight, you will eventually cross back under the stabilization threshold, which will be identified by your ability to perform the lift and keep the string loose.

It is very important to perform enough low intensity lifting to train the brain to always recruit the deep abdominal wall before recruiting the outer unit, or outer muscles, which function as gross stabilizers.

To best condition your body, it is important to focus first on learning to activate the abdominal wall while performing what I call "Primal Patterns '". Primal Patterns' are the movement patterns most likely to have been necessary for our developmental survival as dictated by the selective pressures of nature. (62) The Primal Patterns ' are:

- Squatting
- Lunging
- Bending
- Pushing
- Pulling
- Twisting
- Gait (walk, run and sprint)

All these patterns, to be true Primal Patterns, must be performed from a standing position. If this is not possible, then you will need the help of an exercise or rehabilitation professional, preferably a C.H.E.K Intern, to assist you in learning how to correctly perform the sequencing and development of the movements.

For those interested in an educational resource that teaches integration of the deep abdominal wall while performing many functional exercises, I recommend "The Gym Instructor Series". (60) This program covers many pushing, pulling and abdominal exercises as well as showing how to restore normal coordination and strength to the inner and outer unit muscles of the abdominal wall and back.

Once you have implemented the training techniques described here, you will be free from training with the belt and have full confidence that your body now works correctly. If you have any orthopedic problems at all, it would be wise to consult a C.H.E.K Practitioner or a skilled rehabilitation professional that understands the science of corrective exercise to aid you in your quest to be "BACK STRONG

AND BELTLESS!"

Conclusion

In this article I discussed several legitimate considerations regarding chronic use of corsets, back belts, and weight lifting belts. Available research clearly demonstrates that belts are unable to stabilize the spine at a segmental level, therefore only stabilizing the torso. Gross stabilization, as provided by belts, may allow you to lift more weight than you could without the belt, indicating a stabilizer dysfunction within your body. The increased weight being lifted as afforded to the lifter by the belt will likely serve to traumatize the spine due to increased levels of compression, torsion and shear, increasing the potential for a serious injury.

Caution should be exercised by those using belts to increase "proprioception," as a belt is clearly a form of "exteroceptive stimuli". When the belt is removed, it is likely to have accomplished little in improving proprioception, leaving the lifter with an increased risk of injury secondary to belt usage. My clinical treatment of workers and athletes with spine injuries has shown that chronic use of weight lifting belts and back belts is highly correlated with sensory-motor amnesia of the deep abdominal. Finally, weaning yourself off a belt must be done carefully and in concert with evaluation and treatment of any stabilizer deficit found in the torso.

Paul Chek is founder of the C.H.E.K Institute in Encinitas, CA. He has served as a consultant to professional and college sports teams, equipment manufacturers and professional athletes worldwide. He is an internationally recognized lecturer and educator in the fields of orthopedic rehabilitation, corrective and performance exercise. For more information about Paul Chek, his internship program or to request a catalog of his books, videos and products (contains seven articles), please call: US 800-552-8789, International: 760-632-6360, Australia and New Zealand 0-800-552-8789, England 44-20-8874-6942 or visit his web site at www.chekinstitute.com.

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