

Stress Urinary Incontinence & The Pelvis

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Introduction

The research in the last decade has led to a clearer understanding of how load is transferred through the low back and pelvic girdle. From this research it is evident that low back pain and stress urinary incontinence have components in common. Recently, a multi-center study in Holland investigated how common it was for people to experience a combination of low back pain and stress urinary incontinence together. In a study of 66 patients, 52% reported a combination of low back pain along with some form of pelvic floor dysfunction (voiding dysfunction, urinary incontinence, sexual dysfunction and/or constipation). Of these 52%, 82% stated that their symptoms began with either low back or pelvic girdle pain.

While attending the 4th World Congress on Low Back and Pelvic Girdle Pain, we heard a very interesting paper from an Australian research team which demonstrated via ultrasound imaging what happens to the bladder in back pain patients when they lift one leg off the table. They noted that the bladder tended to move when the leg was lifted and that this movement decreased when compression was applied to the pelvis by a therapist squeezing the pelvic bones together. Our question at the time was, "How much should the bladder move when you lift your leg?" This led to a search of the literature on stress urinary incontinence and several revelations followed regarding the parallel features of both low back/pelvic girdle pain and stress urinary incontinence. It is clear that the factors which are optimal for stability of the low back and pelvic girdle and those which must be present for closure of the urethra (continence) are the same.

Stability requirements for the low back and pelvic girdle

The ability to effectively transfer load through the low back and pelvis is dynamic and depends on:

1. optimal function of the bones, joints and ligaments
2. optimal function of the muscles and fascia
3. appropriate function of the brain and nervous system (which controls your muscle system and can be affected by many things including your emotional state)

There is a small amount of motion between the joints of the pelvic girdle, and this motion needs to be controlled in situations that put load through the low back and pelvis (sitting, standing, walking, running, etc.). Motion control is provided by the contraction of certain muscles at the right time and the right place, as well as by ligaments that are intact and the right length. We now know from research that certain muscles should contract to stabilize and prepare the bones and joints before other muscles contract to create the movement. Optimal function therefore requires proper coordination of your muscle system – with the right muscles turning on at the right time, with the right amount of force. This is not only about *strong* muscles – it is about your brain and nervous system being able to orchestrate proper patterns between the muscles to create beautiful movement.



Stress Urinary Incontinence & The Pelvis

Research has shown that, in health, when the central nervous system can predict the timing of the load (i.e. when you know you are going to sneeze, jump, cough, lift your leg), the stabilizing muscles anticipate the impending load and contract prior to the event occurring. The joints of the low back and pelvic girdle as well as the organs of the pelvis (bladder and uterus) are therefore stabilized and protected against any large increases in shear forces or pressure. Within the low back and pelvic girdle, these muscles include the:

1. transversus abdominis (deepest abdominal)
2. deep fibres of multifidus (deep back muscle)
3. pelvic floor muscles (muscles of your perineum)
4. respiratory diaphragm (breathing muscle)

These muscles must be functioning optimally for an individual to be free of low back pain and to be continent during activities which increase the intra-abdominal pressure (sneezing, running, coughing etc).

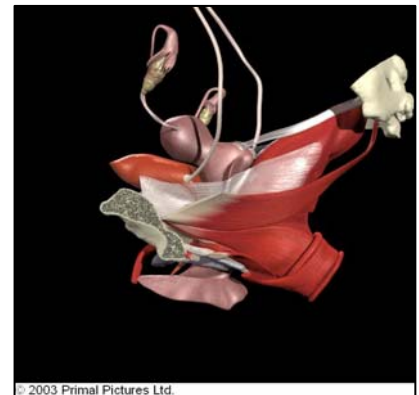
Stability requirements for the urethra

Urinary incontinence is defined as the involuntary leakage of urine. Stress urinary incontinence (leakage which occurs during physical exertion) is the most common type. How common is this? The prevalence of this condition varies according to age, study design and definition. Ashton-Miller et al (2001) stated that 8.5% - 38% of women experience stress urinary incontinence (SUI). Nygaard et al (1994) noted that this condition is not limited to women bearing children and that in a study of 144 nulliparous female athletes ages 18 to 21 years, 28% suffered from SUI. Bø & Borgen (2001) found that 41% of elite female athletes experience SUI. Fantl et al (1996) stated that incontinence affects four out of ten women, about one out of ten men, and about 17% of children below the age of fifteen.

Clearly, this is a significant problem, but is it a *different* problem than a loss of stability of the low back and pelvis? It is common to hear women complain of both low back and pelvic girdle pain as well as urinary incontinence and therapists commonly note that treating one component often impacts the other.

The structures which provide support for the urethra include:

- the fascia which is anchored to the inside of the pelvic bones
- the pelvic floor muscles
- the nervous system which controls the timing, endurance and strength of the muscle contraction



Stress Urinary Incontinence & The Pelvis

Redrawn from DeLancey (1994)

Together, the fascia and muscles form a hammock of support for the urethra and the health and function of these tissues is essential if the urethra is to be kept closed during loading. If this system gives way easily, it cannot provide a backstop against which the urethra can be compressed. A useful analogy is to imagine a garden hose (urethra), with water running through it (urine), lying on a trampoline bed (the pelvic floor). Stepping on the hose will block the flow of water if the bed is very stiff and provides an equal and opposite counterforce (functional pelvic floor). If however, the bed is very flexible (i.e. loss of muscle and fascial support), the downward pressure on the hose will cause the bed to stretch and allow the hose to indent the bed. The flow of water will continue uninterrupted (DeLancey 1994). These muscles have to contract at just the right time to increase tension in the muscles and fascia if urinary leakage is to be prevented.



Optimal function requires a coordinated co-contraction of all the muscles of the stabilizing system for the low back, pelvic girdle and urethra. Optimally, your deep multifidus and transversus abdominis will co-contract (turn on together) at different times during many functional activities and together, your transversus abdominis and deep multifidus create your center of support. It is also hypothesized that deep multifidus turns on when a gentle contraction of the pelvic floor is performed. In other words, when the pelvic floor muscles contract a response should occur in the transversus abdominis (deepest abdominal) (Sapsford et al 2001) and we also think in the deep multifidus (deepest back muscle). In dysfunction (either low back pain or urinary incontinence), this co-activation pattern is often absent or asymmetric. It has also been noted that it is wrong to assume that everyone will be able to contract the muscles of the pelvic floor through verbal commands alone (lift your vagina/testicles or squeeze the muscles around your urethra) (Bump et al 1991).

Stress urinary incontinence

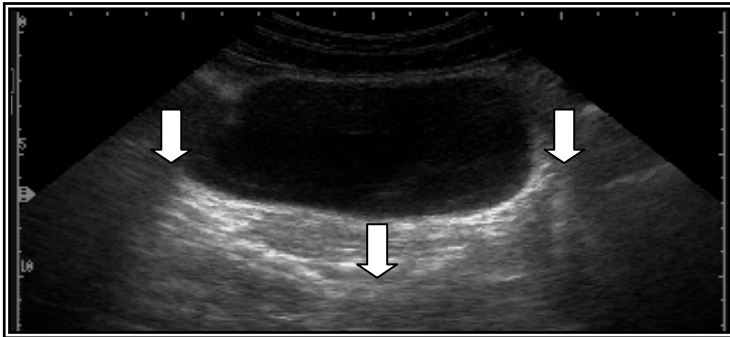
Stress urinary incontinence can result when there are problems with:

1. the anatomy of the pelvic floor (stretched fascia, unhealthy muscles – too long or too short)
2. the motor control of the pelvic floor (absent, delayed or asymmetric contraction)
3. strength and/or endurance of the pelvic floor muscles

These problems occur following a single major trauma (vaginal delivery of a baby or other sudden pelvic floor trauma) or repetitive minor trauma (using a bearing down maneuver to eliminate the rectum). When an individual uses an improper strategy to transfer load through their low back and pelvis, particularly one which excessively increases the intra-abdominal pressure, the bladder and pelvic organs can be repetitively pushed inferiorly. This can lead to urinary incontinence if the fascial

Stress Urinary Incontinence & The Pelvis

structures become stretched or if the pelvic floor muscles become lengthened or develop trigger points and are easily fatigued. When the bladder is observed with ultrasound imaging, it can be seen that these strategies cause the bladder to shift or move. Optimally, the bladder should move very little during low load functional tasks (eg. lifting your leg off the table) or load through your low back or pelvis.



Excessive motion of the bladder imaged via ultrasound during load transfer strategies which result in an excessive increase in the intra-abdominal pressure.

Since the pelvic floor muscles function as part of a team, we believe that orthopaedic manual therapists who focus on restoring function to the stabilizing muscle system of the low back and pelvic girdle and therapists who specialize in pelvic floor dysfunction are treating the same condition – failed load transfer through the lumbopelvic region, manifested either through a loss of stability of the low back and pelvis (causing low back pain), or loss of closure of the urethra (causing stress urinary incontinence). The research supports that we are merging to a common understanding of both function and dysfunction of the whole pelvis and not just its parts. Treatment of the impaired low back and pelvis must focus on a combined approach (Richardson et al 1999, Stuge et al 2004, Lee & Lee 2004) - one which considers the function of the joints, muscles and nervous system of all the structures contained within the region.

Treatment for failed load transfer through the pelvis

Treatment for the impaired low back and pelvis (including the pelvic organs) with or without stress urinary incontinence must be prescriptive since every individual has a unique clinical presentation. Rarely will only one dysfunction be present (one stiff joint or one poorly controlled joint); more commonly, multiple problems coexist such that the most effective treatment consists of a unique combination of techniques and exercises specific for each individual. At *Diane Lee & Associates*, we often use real time ultrasound imaging as a teaching tool (biofeedback) to confirm that a proper activation pattern is occurring.

The effective management of low back/pelvic girdle pain with or without stress urinary incontinence requires attention to the joints, the muscles, the nervous system and sometimes to the emotional state. Ultimately, the goal is to teach the individual a healthier way to live and move such that sustained compression and/or tensile forces on any one structure are avoided.

Stress Urinary Incontinence & The Pelvis

Treatment may include:

1. restoring joint mobility for the joints of the low back, pelvis or hip,
2. correcting the alignment within and between the lumbar spine, pelvis and thigh,
3. restoring optimal muscle function of the stabilizing muscle system. Sometimes a temporary external support (SI belt or lumbar brace) is used to augment the training.
4. retraining functional movements and changing poor postural and movement habits

A word about exercises

The *type* of exercise prescribed is of utmost importance. For back and pelvic pain as well as stress urinary incontinence, the evidence supports correcting deficits in *motor control* (timing of muscle activation = core training) rather than initially focusing on strength and power of individual muscles (core strengthening) (Hodges 2003, O'Sullivan et al 1997, Stuge et al 2004). Individuals who go mindlessly through a routine of exercises will have limited success in retraining motor patterns and may get worse with exercise if poor patterns and control are reinforced, resulting in irritation of joint structures and symptom exacerbation. The problem may not be *which* exercise was prescribed, but *how* the exercise was performed. The key to correcting dysfunctional patterns of muscle activation is teaching awareness of movement; this requires mindfulness on the part of both the therapist and the patient.

The goal of restoring motor control for the low back and pelvis is ultimately to create optimal movement patterns that ensure ideal transfer of loads through all the joints and organs. The result is stability with mobility, where there is stability without rigidity of posture, without episodes of collapse or organ prolapse, and with fluidity of movement.

Your therapist at *Diane Lee & Associates* will give you a very thorough examination of the joints and muscles of your low back and pelvis as well as an assessment using real time ultrasound imaging to see what strategy you are using to transfer loads through your pelvis. An individual treatment program will be developed that is specific to your needs. Hopefully, you will learn to support the organs of your pelvis and keep them for a lifetime avoiding what we believe is NOT inevitable with time – stress urinary incontinence.



Stress Urinary Incontinence & The Pelvis

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