

## THE GROOVI-SI-BELT

### INFORMATION FOR THE PRACTITIONER

For patients requiring lumbo-pelvic support for pain and/or instability.

Provides excellent support after abdominal surgery, or for post-operative support after lumbar spine surgery.

It is extremely effective in relieving low back pain during and after pregnancy.

The belt helps to support the pelvis while proper muscle function is being re-established through core stabilization training



The **Groovi-SI-belt** consists of a light fabric which is wrapped around the pelvic girdle and secured with Velcro. The innovative strong elastic power compression straps which provide the force closure are then simply attached to the belt specifying the location of compression. Other SIJ belts use four straps of two different lengths to provide the compression. The **Groovi-SI-belt** is innovative in that compression is provided by two power straps, each with a central Velcro attachment, so that the power strap is then stretched from the central point in two different directions. This improves ease of application greatly, without sacrificing any of the compression benefits.

External support of the pelvic girdle (taping or using the **Groovi-SI-belt**) is used only as an adjunct to the **restoration of force closure**. Mens et al (2006) were able to show using Doppler imaging that the stiffness of the sacro-iliac joint (SIJ) increases when a belt is applied to the pelvis of patients with pregnancy related pelvic-girdle pain. They found that optimal positioning to significantly reduce sacroiliac laxity is just below the ASIS's. The advantage of the **Groovi-SI-belt** is that compression can be adjusted (increased or decreased) according to each patient's specific pelvic dysfunction (bilateral anterior, bilateral posterior, unilateral anterior and/or unilateral posterior).

USE THE ACTIVE STRAIGHT LEG RAISE (ASLR) TEST TO SELECT WHICH PATIENTS WILL BENEFIT FROM THE GROOVI-SI-BELT AND THE DIRECTION OF THE COMPRESSION.

This is a **validated test** for measuring effective load transfer between the trunk & lower limbs (Mens et al, 2001).

Patients with SIJ or lumbo-pelvic pain can have poor MOTOR CONTROL strategies & changes in respiratory function when performing low load tasks (eg ASLR).

These changes are a compensatory strategy to enhance force closure of the pelvis – where stability has been compromised by injury.

e.g.: Bracing or breath-holding to increase IAP.

Over activation of Rectus Abdominus & chest wall muscles

Irregular/ increased respiratory rate & minute volume

Descent of pelvic floor

Decreased diaphragmatic motion

## HOW TO PERFORM THE ACTIVE STRAIGHT LEG RAISE TEST

The active straight leg raise test (ASLR) is used to determine exactly where and how much compression is needed. **It has been shown that if you apply manual compression** it can reduce the effort to lift the 'heavy' leg (Mens et al, 1999).

From supine, ask the patient to alternately actively lift each leg approximately 20cm off the plinth.

Observe for the following substitution strategies:

- Abdominal wall bulging
- Trunk rotation
- Breath holding
- Rib flaring (over-activation of internal oblique)
- Drawing in of the rib-cage (overactivation of external oblique)
- Extension of the thoracic spine (over-activation of the erector spinae)
- Overactivation of the contralateral hamstring to perform the lift.

Also – observe & note if the test movement provokes any lumbo-pelvic pain.



Ask the patient which leg feels heavier to lift.

The physio applies a sustained passive compression and the ASLR is repeated.

Lee (2004) proposes that by varying the location of the compression across the pelvis, information can be gained regarding which of the local stabilisers are deficient (this has not been validated).



Apply compression manually to approximate the anterior superior iliac spines (ASIS). This replicates force closure anteriorly as if increasing activity of Transversus Abdominis.

Then apply compression posteriorly to approximate the posterior superior iliac spines (PSIS). This replicates force closure posteriorly as if increasing

activity of Multifidus.

The test is considered positive if the patient reports a MARKED improvement in the amount of effort required to perform the ASLR.

### **A Positive test= REDUCED FORCE CLOSURE:**

MARKED improved ability to lift the leg due to the addition of force closure - - patient says it feels 'MUCH' better

Prognosis good when force closure improves ASLR.

These patients will benefit from the use of the **Groovi-SI-belt to increase FC**

### **A Negative test: = EXCESSIVE FORCE CLOSURE**

Compression increases pain & makes the ASLR more difficult for the patient.

This implies **excessive** activation of the local system. Overload due to overtraining of stabilisers (eg excessive Pilates)

Seen in anxious 'A'-types with high levels of stress, that seldom rest.

These patients will **NOT** benefit from the use of the **Groovi-SI-belt**.

You may find patients with reduced force closure anteriorly (pubococcygeus & TrA) & excessive FC posteriorly (ischiococcygeus & piriformis).

If bilateral anterior compression of the pelvis (approximate the ASIS's) allows the patient to lift the leg with less effort (it feels MUCH easier for the patient to lift her leg), then anchor the two straps on either lateral side (midpoint between the ASIS & the PSIS) and pull each strap strongly anteriorly towards the midline (pubic symphysis). One band is applied at a time.



If bilateral posterior compression of the pelvis (approximate the PSIS's) allows the patient to lift the leg with less effort, then two straps are applied by anchoring each band laterally and pulling them to the posterior midline. One band is applied at a time.



Compression can also be applied to one side anteriorly and simultaneously to the opposite side posteriorly. If this is the most effective, then one band is applied and pulled anteriorly and one band pulled posteriorly. Once the bands are applied, the ASLR is repeated. The patient should notice a **marked** difference in the ability to transfer load through the pelvic girdle through a reduction in the effort required to lift the leg when either supine or in standing.

The same principles and tests are applied if tape is used instead of the **Groovi-SI-belt**.

Initially, the pelvis should be taped or supported by the belt whenever the patient is vertical (i.e. standing, sitting or during any activity of daily living).

The patient also uses the belt whilst performing his stabilising (core) exercises. These may be exercises given by the therapist, or more progressive Pilates- type rehab. As force closure returns, the patient should wean off the belt by reducing the amount of compression (loosen the tension in the compression straps) and finally removing the belt altogether for short periods of time (begin with ½ hour). Ultimately, they should be able to eliminate the need for any external support.

### The active straight leg raise (ASLR) test- EVIDENCE

THE ASLR test is recognised as a valid & reliable tool to assist in the assessment of load transference through the pelvis and the functional integrity of the force closure mechanism (Mens et al, 2001; O'Sullivan et al, 2002a). It was recently found that the ASLR test demonstrates disturbed load transfer across the sacroiliac joints in patients with pregnancy related low back and pelvic girdle pain (de Groot et al, 2008).

Irregular respiratory patterns, decreased diaphragmatic excursion (altered motor control) and descent of the pelvis have been reported in patients with pelvic girdle and sacro-iliac pain (O'Sullivan et al, 2002). Also, a significantly increased activity and shorter endurance time of the pelvic floor muscles have been found in lumbopelvic pain patients than in healthy subjects (Pool-Goudzwaard et al., 2005).

For the practicing clinician, the ASLR test can be used to establish a diagnosis of failed load transfer through the pelvic girdle (instability) and subsequently as an outcome measure to assess progress to management.

### Understanding Form & Force Closure & Its Importance In Patients With Pelvic Girdle Pain (PGP)

It has been postulated that PGP is related to insufficient stability of the lumbopelvic region. According to a model of SIJ function, stability is obtained by a combination of form and force closure (Snijders et al., 1995; Vleeming et al., 1997).

**Form closure** is determined by the friction coefficient, integrity of the ligaments and the shape of the articular surfaces.

**Force closure** is described as the muscle forces acting dynamically across the lumbopelvic region and the integrity of facial structures.

It is thought that SIJ shear may be prevented by both form and force closure.

Impairment of form and force closure may be associated with pain disorders of the lumbopelvic region (Mens et al, 1999; Vleeming et al., 1992).

The muscles of the abdominal canister; Transversus Abdominis (TrA), Internal oblique (IO), Diaphragm, and the pelvic floor muscles (PFM) work together to produce and control intra-abdominal pressure, and thereby increase stiffness of the lumbar spine (Hodges et al., 2003a, 2005) and thus indirectly contribute to lumbopelvic stability. With activity, these muscles should contract to assist in force closure and minimise intersegmental translation. The articular compression and the resultant resistance to translation should occur prior to the onset of any movement. The timing of specific muscle contraction is critical for the effective transfer of loads through the pelvic girdle (Hodges 2003). In addition, muscular strength and endurance is required (Hodges 2003, McGill 2002) for all functional tasks. In both the assessment and treatment of patients with pelvic girdle pain, both motor control (sequencing and timing of muscle activation) and muscle capacity (strength and endurance) need to be addressed.

### Treatment of Pelvic Girdle Pain

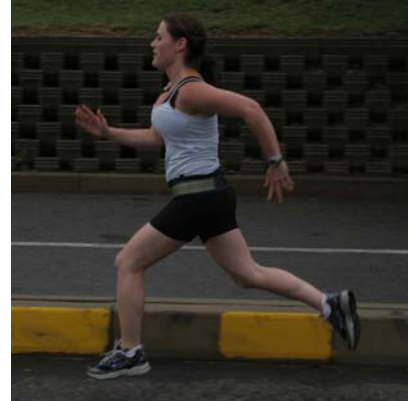
Stuge et al (2004), in a randomised controlled trial (RCT) significantly showed the efficacy of a treatment of specific stabilisation exercises (local motor system rehab) with sling exercises (global system rehab) to be effective in the treatment of post-partum women with PGP. They showed significant improvements in pain intensity and disability and had an improved quality of life.



Further RCT's are required, but the evidence is mounting to support the use of an SIJ belt to improve force closure, reduce instability and improve load transfer in those patients who test

positive for the ASLR test. The belt is to be used in CONJUNCTION with a progressive rehabilitation program which addresses the retraining of the local system to improve timing, motor control, co-contraction, control intra-abdominal pressure and resist segmental translation. Rehabilitation is then progressed to retrain the global 'sling' muscle groups that assist in lumbo-pelvic stability anteriorly, posteriorly, longitudinally and laterally. Rehabilitation should be in functional positions (sit, stand, gait) and progressed to incorporate the patients specific sporting and recreational demands.

As the patient improves, use of the **Groovi-SI-Belt** is reduced, until it is used as a precautionary measure during recreational or sporting activities such as hiking or golf.



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