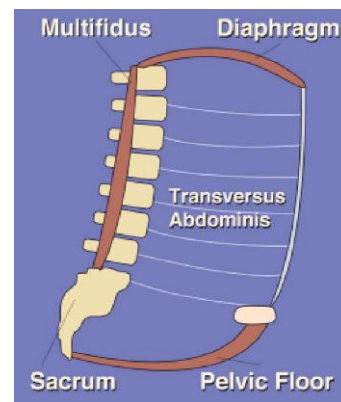
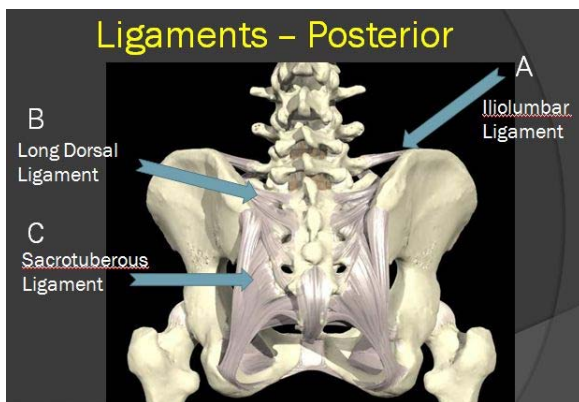


Sacroiliac Instability and Prolotherapy

The sacroiliac (SI) joint plays an important role in load transfer between spine and the lower extremities. Patients usually experience significant symptoms when the SI joint is no longer able to sustain and transfer the load. (Lee 2001b & Vleeming 2003). The pelvic stability is best described through the integrated model of function based on various anatomic and biomechanical studies. (Vleeming et al 1990a, b., 1995b, 1996, Snijders et al 1993a) The integrated model includes four components (Lee D 2004):

1. Form closure (structure)
2. Force closure (forces produced by myofascial action)
3. Motor control (specific timing of muscle action/inaction during loading) and one that is psychological
4. Emotions

Form closure contributes to the SI stability through the joint surfaces and various regional ligaments such as the iliolumbar, interosseous, long dorsal, sacrotuberous, ventral sacroiliac, and sacrospinous ligaments. The sacrotuberous ligament contributes to the longitudinal stability while horizontal stability is associated with predominantly the long dorsal and interosseous ligaments.



Force closure provides stability through activation of local core muscles and global muscles in the trunk. The local system consists of muscles of pelvic floor, transverse abdominis, diaphragm, and deep fibres of multifidus. The global muscles provide stability through three sling systems. (Vleeming et al 1995a, Lee D 2004)

- 1) Posterior oblique sling (latissimus dorsi, gluteus maximus & thoracodorsal fascia)
- 2) Anterior oblique sling (external oblique, contralateral internal oblique & hip adductors)
- 3) Longitudinal sling (biceps femoris, sacrotuberous ligament and the erector spinae)

Furthermore motor control (the timing of specific muscle action and inaction) ensures proper coordination of the local and global system to generate stability without rigidity of posture and without episode of collapse. (Lee 2004)

Emotional states of an individual can affect the neuromusculoskeletal system through consequence of psychological stress and subsequent hormonal release. (Lee & Vleeming 2003) For example a negative emotion associate with past experience can lead to increased muscle hypertonicity and detrimental motor patterning thus causing excessive compression of the SI joint.

Instability of pelvis occurs when there is insufficient articular compression due to either one or a combination of:

- 1) stretched out ligaments as a result of general hypermobility or trauma
- 2) weakness and poor coordination of local and global muscles.

The patients usually have complaints with daily activities that involve unilateral loading on one side of the pelvis. This can include high impact movement such as jumping or running. Typically, patients will have trouble with activities such as stair-climbing, turning in bed, and transferring in/out of a car. Frequently, the unstable SI joint will become subluxed, consequentially altering the biomechanical chain above and below the pelvis. This can result in widespread pain in various parts of the body due to mechanical misalignment and compensatory muscle hypertonicity, which can contribute to or mimic the symptoms of FMS. A detailed articular and myofascial manual therapy assessment can identify these dysfunction and help in the true diagnosis of FMS.

Mild dysfunction in the form closure system can be compensated by a strong force closure system. However when the force closure system is inadequate in stabilizing an unstable sacroiliac joint (due to stretched out ligaments), prolotherapy is indicated. This procedure involves injection of various proliferants into tendon and ligament to stimulate fibroblast proliferation. Such process will increase the strength of connective tissues in addition to decrease pain. (Reeves 1994)

In vitro studies have shown that injection of chemical irritants encourages collagen proliferation. (Dorman 1997) In 1937, Dr. Earl Gadney achieved successful results of sclerosis in hypermobile SI joints with injection of sclerosing agent. (1994) However, it was George Hackett who perfected this technique by injecting various SI joints with saline and glucose solution. (Hackett 1958) Significant improvement was found post prolotherapy in 543 patients who suffered from chronic low back pain. Various proliferants have been utilized over the years. These proliferants promote healing by one of three ways: (Ko 2008)

- By osmotic rupture of local cells, e.g. dextrose (12.5-25%)
- By local cellular irritation e.g. a mixture of phenol, glycerine and glucose (P2G)
- By chemotactic attraction of inflammatory mediators, e.g. sodium morrhuate (cod liver oil extract)

Recently **Platelet-Rich Plasma (PRP)** injection has also been used in this application with excellent results. Through special harvest technology, platelets and alpha Granules (Growth Factors TGF-B, bFGF, PDGFA-b, EGF, VEGF, CTGF, Cytokines) are extracted from the blood and injected back into the injured tissue. (Mishra 2009) The healing benefit of PRP is based on its effect on multiple tissues: muscles, tendon, ligament, cartilage, angiogenesis, and local stem cell activation.

Clinically, it takes 4-6 sessions of monthly injection with sodium morrhuate to achieve a satisfactory stability of the SI joint. However, much faster healing time was observed with PRP and most patients achieve the equivalent recovery time with 1-2 injections on a monthly or bimonthly basis. Prolotherapy provides strength back to the ligaments to restore form closure of the SI joint. Following the injections specific core stabilization exercises are carried out by patients to restore and maximize the force closure system. This will allow patients to achieve full recovery permanently instead of just masking the symptoms.

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Further Resources: www.dianelee.ca www.drkoprp.com

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