

Australian Track & Field Coaches Association

Level 3 Coaching Paper

The Injury potential of the Psoas muscle in Racewalking.

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Abstract

Most injuries that Racewalkers suffer are Overuse injuries. These are injuries that are caused by a muscle, tendon, ligament or bone being placed under undue repetitive stress. Many of these injuries result from problems associated with the pelvis and lower back. The injury I will be writing about is one of these overuse injuries which over time can cause pain in the groin, problems with power in the Hip Flexor and Quadricep, and an increased lordosis of the lower spine. The muscles affected here are called the **PSOAS** and **ILIOPSOAS**, during the article I will be referring to both muscles as the **PSOAS**. The Psoas is a hip flexor and may become stressed: meaning the muscle is failing to work properly; it may be in a contracted and cramped state, or it may not be able to move with power throughout its full range. The Psoas, when stressed overtime may cause excessive posterior pelvic tilt, that is, hyperextension in the lumbopelvic region which in turn may cause weakness or injury in the abdominal muscles, knee, ankle, quadricep and/or hamstring. As with most overuse injuries, the PSOAS requires regular treatment to the muscle and a need to learn how to stabilise the Pelvis, so the injury may be successfully managed, if not completely cured.

Psoas Muscle

The Psoas (and Iliopsoas) muscle has its origin at the anterior surface of the Transverse processes, the lateral border of the Vertebral bodies and corresponding intervertebral disc Thoracic vertebrae 12 through to Lumbar vertebrae 5. The insertion is the lesser trochanter of the Femur with the Iliacus. The action of the muscle is flexion in the hip region and gives minimal action in lateral rotation and abduction of the thigh. (1) The psoas and iliacus muscles join together and continue as the iliopsoas as shown in figure A. (2)

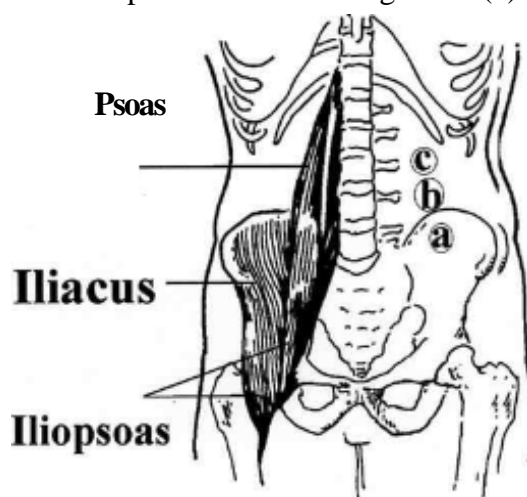


Figure A: Psoas muscle position (2)

Although the Psoas muscle origin is generally considered to be the lumbar spine, as mentioned above, in movement of the lumbar spine, the origin is reversed and is at the lesser trochanter of the femur and the insertion at the transverse processes and corresponding intervertebral disc T12 through to L5. (3) This reverse will cause a change of action, with an increased curve of the spine creating a lumbar lordosis. (i)

Psoas effect on Posture and the Lower Body.

For racewalkers, the body has a slight forward lean with the pelvis tilted at about 5°. This will give a normal curve of the lower back and allow the racewalker to walk with a fluent style, as in figure B. If a racewalker develops lordosis as in diagram C, he will develop style problems and may develop injuries.

If the abdominal muscles become stretched and weak, this may allow the anterior hip flexor to become contracted, which decreases extension of the hip and may cause an increased lordosis. (4)

As the abdominal muscles are weakened, the psoas will become the dominant muscle and may become stressed due to the extra work load. This stress will cause the Psoas to contract and spasm. Once in spasm the psoas will hold the lordosis. Then, even if the abdominal muscles are strengthened, the strength will not be enough to correct the lordosis. If the body has one psoas stressed, "there is a downwards and anterior pull of the pelvis in the ipsilateral side. This loads the hamstring and gluteus maximus, tightening the piriformis and loading the iliotibial bands, and causes excessive stress in the sacroiliac joint.



Figure B: Racewalker with no psoas problem



Figure C: Racewalker with a psoas problem.

The one stressed psoas will increase the scoliosis on the side of the shortening and rotate the vertebral bodies in the opposite direction." (5)

Bilateral stressed psoas "cause an increase in extension of the pelvis increasing lordosis, and slight flexion at the hip, which shifts the centre of gravity anteriorly. The abdominal muscles become stretched and weak, decreasing the effectiveness of the hamstrings and the gluteus maximus as flexors of the pelvis, and inhibit the gluteus maximus as an external rotator of the hip." "With abdominal muscles stretched and weakened, the anterior compartment of the thigh takes over the lifting of the leg, resulting in muscle hypertrophy. Muscular hypertrophy compromises muscle balance between the hamstring and quadriceps with increased instability of the effected joints, particularly the knee." (6)

Signs of Stressed Psoas

The racewalker who is suffering from psoas problems may not feel much or any pain, but usually feels his pelvic movement is restricted. The following signs may appear when the racewalker suffers from a stressed psoas:

- Restricted sacroiliac motion on the side of primary involvement (7)
- Lumbar scoliosis (7)
- Restricted flexion and extension at the hip joint (7)
- Tenderness at one or both psoas motor points (7)
- Tightness of the iliotibial band, often bilateral (7)
- Hyperlordosis, except in the few cases where the body is pitched forward and flexed at the hip (7)
- Weak abdominal muscles and tight hamstrings (7)
- Decreased external hip rotation (7)
- Tightened piriformis.
- Shifted centre of gravity, anteriorly.
- Lack of strength in holding the leg forward, or raising the leg.

Diagnosis

"It is possible to quickly diagnose a weakened psoas by testing it using Muscle Testing, a method which has been used by physicians and physical education professionals for many years to evaluate the function and effectiveness of the muscles." (8) The method used, is part of Kinesiology. It is also used by many Chiropractors. The method has been found to locate stressed muscles, which when checked against other symptoms, confirm the muscle is stressed.

Findings on Racewalkers diagnosed with Psoas problems

Gender	Age	Problem	Sign/Symptom	Diagnosis	Treatment	Result
Male	12-15y	Sore psoas both sides when racewalking	Pain in both psoas.	Stressed psoas on both sides of body.	Physiotherapist worked on area.	No improvement gave up racewalking.
Female	21-40y	Pain in hip flexor affecting the knee straightening when racewalking.	Pain in right psoas, lordosis of the back.	Right psoas stressed resulting in lordosis of back and tight right hamstring.	Massage of the psoas going from light to deep over a 2 week period. Stretching regularly, relaxing lower back muscles.	Pain disappeared, Lordosis was corrected and style improved.
Female	21-40y	Trouble with straightening knees when racewalking.	Lordosis of the back and pain in both psoas.	Both psoas were stressed, in contracted position and sore. Both hamstrings were tight.	Regular massage on psoas and hip muscles. Psoas stretching and lower back stretching.	Lordosis corrected. Pain lessened. Knee straightened.
Female	15-20y	Severe pain in hip flexors, when racewalking	Pain in both psoases.	Both psoas were stressed in contracted position.	Physiotherapist worked on lower back and partly on psoas.	No improvement. Pain returned, gave up racewalking.
Female	15-20y	Pain in abdomen after racewalking hard for 5 minutes.	A sudden lack of energy when racewalking. Increase in lordosis in back and loss of fluency in style.	Lack of oxygen, due to diaphragm incorrectly working, (diaphragm and psoas attach at T 12). Stressed psoas in contracted position.	Increased stretching program for whole body including psoas stretch, slump stretch. Self massage of psoas.	Pain disappeared within minutes. Fluency of style maintained. With the regular stretching the pain failed to return.
Male	21-40y	Loss of power in right hip flexor when racing in walking event, results in inability to lift right leg.	No power in psoas. Pain in psoas.	Both psoas were stressed and in severely contract position so the right psoas was unable to function.	Self massage and regular massage of the psoas. Stretching of psoas	With regular massage, power returned and athlete able to train normally again.
Female	15-20yr	Loss of power in hip flexors when racewalking, knees not straightening.	Lordosis in back, pain in both psoas and some stomach problems.	Both psoases were stressed, in contracted position and sore. Both hamstrings were tight.	Physiotherapist work on back. Self massage. Stretching of psoas. Medication for stomach.	Knees straightened. Pain lessened. Stomach problem gradually disappeared
Male	21-40yrs	During racewalking races, unable to lift leg. No strength in hip flexor or quadricep..	Lordosis in back. No power in psoas. Unable to lift upper leg higher than 10 below horizontal.	Both psoas were stressed and in severely contract position so the right psoas was unable to function.	Chiropractor using Kinesiology worked on psoas and muscles around hip. Self massage and regular massage of the psoas, stretching psoas and quadricep.	Power returned, lordosis corrected and returned to normal racing. However, as the psoas were severely affected, regular treatment was necessary..
Male	12-15yr	Lordosis of back effecting the straightening of the knees when racewalking.	Lordosis of the back and pain in both psoases.	Both psoases were stressed, in contracted position and sore. Both hamstrings were tight.	Self massage and regular massage of psoas. Stretching of psoas	Assisted in correction of psoas and improved style.

The method of Muscle Testing the Psoas.

Test by lying the patient face up with the leg raised up about 45 degrees, slightly to the side with the foot pointing out. Pressure is applied against the inside of the ankle to push the leg out and down, while stabilizing the opposite hip. (9)



Figure D: Muscle testing the Psoas

The muscle when tested will be either strong in the first part of the test, locking in place or it will give way completely and swing easily down to the ground. The patient if it begins to give way, may recruit strength from the adductors and attempt to rotate the pelvis, lifting the side opposite the test away from the table. (10) If the leg gives way, it means the psoas is in a stressed condition and the symptoms mentioned earlier should be checked.

Treatment

To treat the Psoas muscle when it is in this stressed position, there are a number of options available. These options will cure the problem if the Psoas is not suffering from acute overuse. If it is acute, the treatments will need to be used regularly. The muscle may then heal or it may just become manageable.

The options available are:

1. **Kinesiology.** This will depend on the type of Kinesiologist used. Some methods which have shown good promise are:

Neuro-lymphatic reflexes

Neuro-vascular reflexes

Meridian stimulation

Origin - Insertion massage

A method used by Chiropractors who use Kinesiology locate the tender spot in the belly of the psoas and work on it. The method is called Neuromuscular Spindle Cell and is described in David S. Walther's book: Applied Kinesiology. Volume 1.

2. **Massage.** Assess the condition using the modified Thomas Test. Lying on your back, palpate the muscle by feeling it between the pelvis and the navel, to detect resisted contraction and relaxation, during this, gently bring the knee towards the chest. To treat the psoas, massage the belly of the muscle, gradually working in deeper and working along the muscle. While massaging, contract the psoas by pulling the knee towards the chest. This will help to isolate the psoas muscle. Complete the treatment by PNF stretching of the psoas.

3. **Self massage.** The belly of the psoas muscle is located and pressed firmly by three fingers while the hip is flexed with the knee near chest and while applying pressure to the muscle, small movements of the leg are made to obtain maximum relief. After the pain in the psoas subsides, the leg is slowly straighten while still pressing on the belly of the psoas. Depending on the person, the area to press on the psoas may be located at three places along the psoas:

a. near the iliac crest,

- b. across from the navel,
- c. just under the rib cage.

The three positions are located on figure A, as a, b, and c.

4. **Stretching.** The best stretch is sometimes called the "runner's start" because the position you are in resembles that of a sprinter at the starting block. It mainly stretches the psoas muscle located just above the top of the thigh.

Runners Stretch

Crouch down on the floor with both hands and knees on the ground. Put one leg forward with your foot on the floor so that your front leg is bent at the knee at about a 90-degree angle. Now extend your rear leg in back of you so that it is almost completely straight (with just an ever so slight bend) and so that the weight of your rear leg is on the ball of your rear foot with the foot in a forced arch position. Now we are in the position to stretch, which is similar to a crouched, starting position.

Keeping your back straight and in line with your rear thigh, exhale and slowly try to bring your chest down to the floor (you shouldn't need to bend much further than the line your front knee is on). You should feel the stretch primarily in the upper thigh of your rear leg but you should also feel some stretch in your front hamstring as well. Hold this position for at least 15 seconds. If you wish to also stretch your rear quadriceps from this position, you can shift your weight back so that your rear leg makes a right angle with your knee pointing towards the floor (but don't let it touch the floor). Now, without bending your rear leg any further, try to force your rear knee straight down to the floor. Repeat the same stretch with your other leg in front.

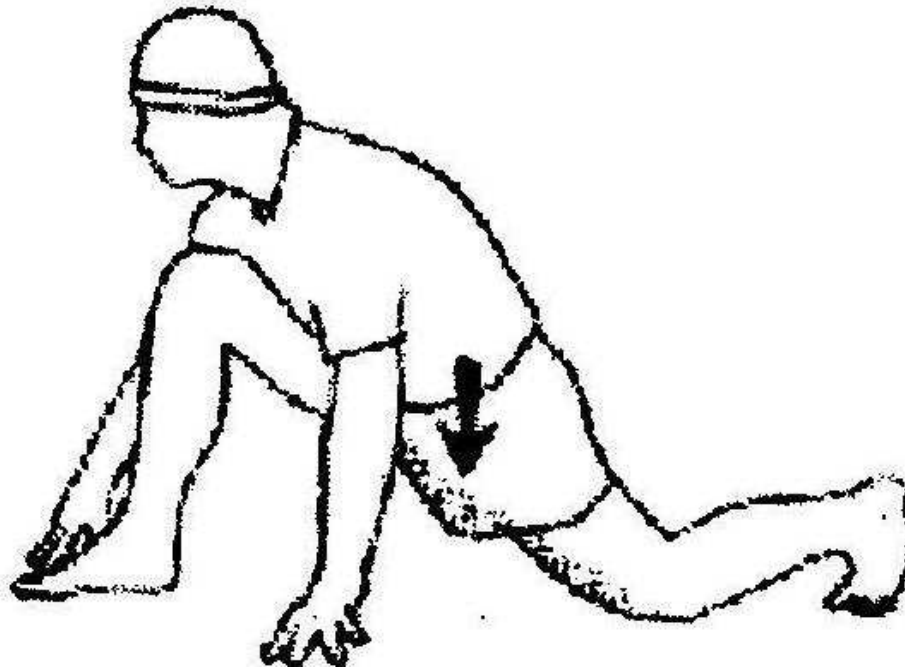


Figure E: Psoas Stretch. The Runners Position

5. **Physiotherapy.** The Physiotherapist will need to work on the psoas and if in spasm, release the spasm. It will then need to be stretched probably using the modified Thomas Test. The lower back and hip region may need treatment as well to relieve soreness and tightness created by the tight psoas.

Conclusion

Most racewalkers throughout their careers will suffer from pelvis and lower back injuries. The **Psoas** appears to be a muscle that, although may not cause the injury in the first place, may become stressed by the original injury affecting the posture, and in turn, causing many other problems, including lordosis, knee problems and hamstring problems. Many coaches in the past have suggested building up the abdominal muscles to avoid this problem. This is not a cure. When the **Psoas** muscle becomes stressed and the lordosis of the lower back appears, the **Psoas** overrides the abdominal muscles, affecting their ability to straighten the lordosis.

As it is an overuse injury, when a racewalker begins to show signs of **Psoas** trouble, he or she must ease down on the framing and receive treatment as soon as possible. Treatment may work immediately and the racewalker can continue the training session if the injury is minor. If the injury is major and is affecting other muscles and joints, the treatment may need to take in the **Psoas** muscle and other muscles of the Hip and Upper leg region, such as the Piriformis, Hamstring, Gluteus Maximus, and the iliotibial bands. The treatment may be needed over a period of days and so training needs to be scaled down for a few days. It does not need to be stopped all together.

Treatment is available in many forms: Massage, Self-massage and Stretching, and from various medical professional: Chiropractors, Physiotherapists and Masseurs. If the problem is only minor, with the correct treatment, it may be healed, however, if the condition is acute, then regular treatment for the rest of your competition life may be necessary.

REFERENCES

1. WALTHER, David S. *Applied Kinesiology. Volume 1.* Systems DC. Colorado. 1981. p302-304.
2. MARTIN, David E., and COE, Peter N. *Better Training for Distance Runners.* Human Kinetics Publishers Inc., Illinois. 1997. pi9
3. *Applied Kinesiology Volume 1.* p96
4. USSELL, Bill. 'A Study of Lumbopelvic Dysfunction/Psoas Insufficiency and Its Role as a Major Cause of Dance Injury.' *Chiropractic Sports Medicine.* February 1991. pp9-17
5. Study of Lumbopelvic Dysfunction/Psoas Insufficiency and Its Role as a Major Cause of Dance Injury.' p10
6. Study of Lumbopelvic Dysfunction/Psoas Insufficiency and Its Role as a Major Cause of Dance Injury.' p 11
7. Study of Lumbopelvic Dysfunction/Psoas Insufficiency and Its Role as a Major Cause of Dance Injury.' p15
8. THIE. John F., *Touch for Health.* T. H. Enterprises, California. 1994. p!2.
9. Touch for Health. p64.
10. Applied Kinesiology Volume 1. p304