



## A Case Study: Piriformis Syndrome in Transplant Athlete Special Considerations? Treat the Symptoms? Find the Cause?

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### Abstract

**Participant:** Male athlete early 30's presenting post-competition at World Transplant Games with reoccurring piriformis syndrome. Previously treated successfully, however reoccurs after intense periods of exercise and settles after 2 to 3 weeks. Generally good health with no previous injuries reported however kidney transplants two years ago following eight years of illness. Medication for high blood pressure and anti-rejection. Works full time as a sound engineer involving standing holding a boom for long hours.

**Main Outcome Measures:** Assessment using the selective functional movement top tier and breakout multi-segment rotation. During breakout remembered previous right ankle injury.

**Results:** Thoracic stability/motor control dysfunction and mobility dysfunction medial tibial rotation. Treatment with exercises to improve stability and motor control in thoracic rotation and mobilization to improve right medial tibial rotation.

**Discussion:** SFMA assessment stimulated remembering an ankle injury whilst playing semi-professional football prior to transplant. The thoracic stability and motor control could be related to the deconditioning during illness, the transplant surgery and his working stance. The mobility dysfunction of tibial rotation may relate to the previous ankle injury.

**Conclusion:** The SFMA is a useful tool to identify areas of dysfunction away from the symptoms which maybe sustaining the chronic problems.

**Keywords:** Piriformis syndrome; SFMA; Multi-sport event

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### Introduction

The World Transplant Games (WTG) is a biannual event bringing together life-saving Transplant Athlete (TxA) from 69 different countries to compete in their chosen sports (WTG 2019). Competitions are arranged within age groups with up to 5 different sporting events which can be entered. Scheduling of events is difficult and can be untimely with athletes frequently overloading themselves physically. Therapy provision was provided at this years' WTG for the athletes all events and at clinics (in 20 minute slots) in a similar to other international sporting events [1]. This is a case study of one athlete who presented in the clinic following completion of all his sporting events.

### Consultation at World Transplant Games

#### Presenting condition

Male athlete, early 30's presenting with a deep tightness in his right buttock which radiates down his right posterior thigh.

#### History of present condition

The athlete had previous similar episodes for last 2 years (only since his transplant). Has been seen by physiotherapist who diagnosed piriformis syndrome and gave him treatment. Treatment was soft tissue work with no home exercises.

#### Worse

Only after overload of sport (as in this situation) and usually settles down after 2 to 3 weeks. Easier: Reducing activity level.

## Medication

For high blood pressure and anti-rejection.

## Occupation

H works sound engineer which requires standing on his feet all day and holding a sound boom above his head most of the day.

## Transplant

Kidney transplant from his step-father 2 years ago.

## Sporting events at this years' games

**Football, badminton:** Singles, doubles, mixed doubles and table-tennis.

**Provisional hypothesis:** Piriformis syndrome (right side).

## Examination

Using Selective Functional Movement Assessment (SFMA).

## Observation and palpation

He was standing with slight anterior tilt and tender on palpation of right piriformis.

## Top tier SFMA

Minor Dysfunction no Pain (DN) however Multi-Segment Rotation (MSR) asymmetrical DN, Single Leg Stance (SLS): DN & Arms Down Deep Squat (ADDS): DN

## Breakout

MSR revealed left medial tibial rotation mobility dysfunction and Stability and/ Motor Control (SMCD) with thoracic rotation both sides.

Local investigation of tibial dysfunction noted joint mobility dysfunction of inferior tib/fib joint which was hypomobile in the anterior to posterior direction appearing to be soft tissue (ligament and capsule).

(At this point during further questioning he remembered a severe old right ankle injury which he had many years ago prior to transplant).

## Hypothesis

Dysfunction inferior tib/fib joint, SMCD thoracic spine.

## Treatment

Accessory mobilizations to inferior tib/fib joint grade III × 2 [2]. Exploration of pelvic control with movements and advice of postural awareness.

## Post-treatment assessment

Top tier easier to perform subjectively and objectively observed ADDS closer to the floor.

## Home exercise program

Pelvic tilting with breathing control morning and evening to progress to other positions when gained control. Maintain tibial rotation for 2/52 with active exercise in sitting twice per day 5 to 6 times. Explanation of poor stability possibly because of deconditioning whilst unwell combined with abdominal surgery for kidney transplant.

## Plan

Discharge to home therapist and progress postural control. Suggested could try Pilates to improve stability.

Treatments are only 20 min however following treatment informed consent was sought to present this as case-study.

## Additional Information Gained from Athlete Following Informed Consent to Write the Case Study

### History of transplant

Eight years ago, he started to experience headaches (especially after sport) alongside increased nocturia. He consulted his general practitioner however both he and the GP thought this might be a result of increased workload hours increased workload hours. Subsequently he attended a walk-in centre with the blood pressure at 210/150. He was immediately biopsied and diagnosed with IgA nephropathy. (It was considered the vast majority of his kidney function was destroyed by uncontrolled high blood pressure caused by IgA Nephropathy as opposed to the IgA scarring of the kidneys). IgA nephropathy could have been undiagnosed for many years, as only until very late in its progression and once real function has been serenely impaired are symptoms generally manifest. When his BP was controlled there was stable kidney function (around 30%: Creatinine 250 µmol/l, eGFR 29 ml/min/1.73 m<sup>2</sup>) for 5 years. On 5<sup>th</sup> year of his annual check-up the kidney function was so poor (creatinine: 676 µmol/l, eGFR <15 ml/min/1.73 m<sup>2</sup>). He was placed on the transplant list requiring peritoneal dialysis for 10 weeks before receiving a kidney from his stepfather 2 years ago.

### The effect on his body

He had felt perfectly normal until diagnosed with chronic kidney disease which necessitated taking blood pressure medication: Irbesartan 300 mg morning, Doxazosin 16 mg evening and Simvastatin 40 mg evening

#### He reported that:

“The medication completely wiped me out fitness wise overnight. I don't think my body ever quite recovered from having my blood pressure forced low’.

The result was that when he tried to exert himself to the same level before he started medication, he felt the blood pressure would not raise enough to sustain the activity. The peritoneal dialysis which he had during the night resulted in pain (drain pain) in the peritoneal space. There were also dietary considerations required to protect the kidneys which would reduce the need for a transplant as long as possible. His work was mainly unaffected but because of the physicality and long hours demanded by the occupation it was hard to differentiate between fatigue caused by the condition and the demands of the job (Table 1).

### Sporting activity prior to transplant

He had played football to a semi-professional standard, training twice a week also playing competitively twice a week. He had played squash, badminton and went skiing both socially and competitively playing Rugby Fives (<https://rugbyfives.com>) for England in his teens.

### Sporting activity post-transplant

He reports he now plays less football and much more racket sports as did not feel he could reach the level he played at before the transplant which made him feel ‘a bit deflated’ by this. Racket sports to him ‘were fresher’ and he felt he was improving, whereas in football he was declining.

**Table 1:** Post-transplant medication.

Mar-19	Cholecalciferol	20000 units monthly oral
Jan-19	Irbesartan	75 mg nocte oral
Apr-18	Adoport (Tacrolimus)	1.5 mg nocte oral
Apr-18	Adoport (Tacrolimus)	2 mg mane oral
Mar-18	Irbesartan	150 mg od oral
Aug-17	Prednisolone	5 mg od oral
Aug-17	Mycophenolate mofetil	750 mg bd oral
Jul-17	Aspirin	75 mg od oral
Jul-17	Omeprazole	20 mg od oral

## Discussion and Reflection

The diagnosis of piriformis syndrome was plausible as this is frequently concluded through exclusion of other causes in those presenting with low back buttock and leg pain [3]. Many other physical tests have been described; however, the sensitivity and specificity of these tests are not conclusive from studies to date [4]. Low back pain is not essential for this diagnosis with the client not presenting with a history or any current low back symptoms. There was external tenderness on palpation which is reported as being present in 92% of reported cases [5]. Aetiology of the syndrome is reported to be through gluteal trauma which the athlete would have no doubt experienced at some point through his football career [4]. Physiotherapy, which he had already received, is considered key for treatment, with a 51.2% cure rate, however there is reported a lack of high-quality studies for these non-invasive approaches [5].

The present assessment of the athlete utilized the SFMA approach [6] to assess the wider picture and to investigate the cause of the problem rather than treat the symptoms alone as these were reported to settle spontaneously [7]. The SFMA is based on the theory of regional interdependence whereby body regions are considered “musculoskeletally linked” [8]. The SFMA top tier, consists of ten functional movements assessing fundamental movement patterns from which algorithms of impairment-based movement assessments or ‘breakouts’ are used to determine to causal movement dysfunctions in regions of the system that may be contributing to or causing abnormal patterns. The top tier assessment exposed asymmetry of pelvic rotation with the breakout revealing thoracic SMCD and tibial rotation dysfunction. The tibial rotation could possibly relate to the previous severe ankle injury which the athlete remembered when the area was being assessed. Ankle injuries are common, frequently reoccur and maybe long-term problematic. Although this athlete reported no problems with the ankle and the level at which he was playing football suggests he had good rehabilitation, the acute treatment at that time was unlikely to be based wider objectively identified mechanical and sensor motor impairments [9] therefore an associated stiffness of this area may have resulted which would also impact upon the deep squat.

The effect of IgA nephropathy, high blood pressure and the subsequent drugs to slow the decline of kidney function would have resulted in deconditioning of the athlete [10] alongside suggested dietary modifications of low sodium diet before dialysis and subsequently low potassium low phosphate whilst on dialysis which has effects on diet quality [11]. Chronic Kidney Disease (CKD) is a high-risk factor for sarcopenia which can result in reduced activities of daily living and low quality of life [12] and with the kidney failure

in this situation, resulted in peritoneal dialysis. This is not without complications, being an invasive procedure through the abdominal cavity [13]. The ultimate kidney failure threatened his life and necessitated a kidney transplant which is another more invasive procedure resulting in inflammation which challenges the already compromised autoimmune system [14]. A kidney transplant is generally accepted as the optimal treatment for kidney failure with improved quality of life, independent from dialysis and increased life expectancy. It should also be considered that the domino effects of IgA and the associated traumatic events would undoubtedly also have a psychological effect for which various coping strategies have been suggested by those undergoing similar experiences [15]. On returning to ‘a normal life’ the post-transplant realization of a second opportunity at life may also put pressure on athletes to achieve, not only for themselves but their donor as well [16]. This athlete had a living donor which has better results in terms of graft function and patient survival, however feelings of guilt towards the donor, perceived responsibility to do well and anxiety may have occurred [16].

The minor biomechanical changes from the tibial rotation may not have impacted significantly on the athletic performance however the peritoneal dialysis, abdominal surgery on that side and general deconditioning may have predisposed to an asymmetry. The working static posture of this client similarly adds asymmetry with the addition of the one-sided loaded of the racquet sports. The asymmetry may be functional adaptation; however, this will have also contributed to the piriformis overload through sporting activity [17]. Overall the information gleaned from the initial assessment would not have changed the treatment approach although the additional information would have enhanced cultural competence of the therapist to maximize the management of this transplant athlete [18]. Understanding the emotional trauma and physical deconditioning from his life-changing experience, his castration of his sporting activities and efforts to return to previous levels [19] may enable a deeper understanding of their motivation and rationale for competing [20].

Athletes in competition situations seek therapy that provides instant relief enabling them to continue to compete which is the primary source of this competition therapy service [21] however at present in the transplant population it is unknown how many athletes return with the same or similar problems and become a new contact in the therapy statistics. Long term, athletes must be supported out of competition to continue and support their return to sport and/injury management. Although following surgery exercises are frequently given to restore muscle control there were none given to this athlete however this would have been a minor consideration alongside the other life-changing experience?

## Limitations

This is only a single case study with limited time for assessment in this sporting arena however this is the reality of working at competitive events both at national and international games is [21]. As with all case studies this cannot be applied to all transplant athletes however may provide some insights as to management of this vulnerable population [22].

Recommendations and future work: following organ transplantation pilates and yoga could be early suggestions for post-op exercise to improve baseline core control. Additionally,

before returning to sport a screening for fundamental movement (for example the Fundamental Movement Screen) would identify vulnerable areas for injury [23]. Possibly preventing the onset of chronic overload conditions. Future developments to improve therapy services provided to transplant athletes should consider tracking the injury/problem to provide a clearer indication to the effectiveness of long-term therapy injury management.

## Statement of Ethics

In accordance with institutional ethics procedures and guidelines, ethical approval was granted for this original piece of research.

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