ResearchHub

Case Report

Successful non-surgical management of chronic hip pain in the context of Otto's disease by targeted retraining of the internal torque chain and psoas major

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ABSTRACT

Background: Total hip arthroplasty (THA) is highly effective for degenerative joint disease but poses challenges in younger patients due to higher complication and revision rates. This case highlights the importance of exploring non-surgical approaches that optimise the neuromuscular system thoroughly prior to surgery and reduces the risk of osteoarthritis progression. **Case Presentation:** A 35-year-old non-competitive weightlifter with chronic hip pain, diagnosed with Otto's disease and protrusio acetabuli, was scheduled for THA. However, following a personalised neuromuscular approach that primarily focused on psoas major retraining through targeted breathwork-integrated contractions and interoceptive awareness techniques, she experienced immediate and sustained reductions in pain and stiffness, leading to cancellation of the surgery. At 2.5 years follow-up, she remains symptomatically improved. **Conclusion:** This case emphasises the critical role of comprehensive neuromuscular assessment and targeted optimisation of weak and imbalanced muscle groups, in particular the psoas major, before resorting to surgical interventions, especially for younger adults with chronic hip pain. In light of the limitations of a case report, we encourage larger well-designed studies to validate these findings.

Keywords: Sports medicine, Otto's disease, Protrusio acetabuli, Torque chains

Key Messages:

1. **Non-surgical psoas retraining led to cancellation of hip replacement:** A 35-year-old woman with chronic hip pain due to Otto's disease and protrusio acetabuli experienced immediate and sustained relief after targeted neuromuscular retraining of the psoas major using breathwork-integrated techniques, ultimately avoiding total hip arthroplasty.
2. **Targeted neuromuscular assessment revealed reversible dysfunction:** Despite prior imaging and consultations, the patient's pain and dysfunction were rapidly

improved by addressing an overlooked weakness in the internal torque chain—specifically the psoas—highlighting the clinical value of functional movement assessments in patients with structural hip diagnoses.

3. **This case underscores limitations of conventional diagnostics and treatment pathways:**
   The case challenges the assumption that radiographic findings always indicate irreversible structural disease and supports integrating neuromuscular optimisation—particularly in young, active patients—before pursuing invasive interventions like THA.

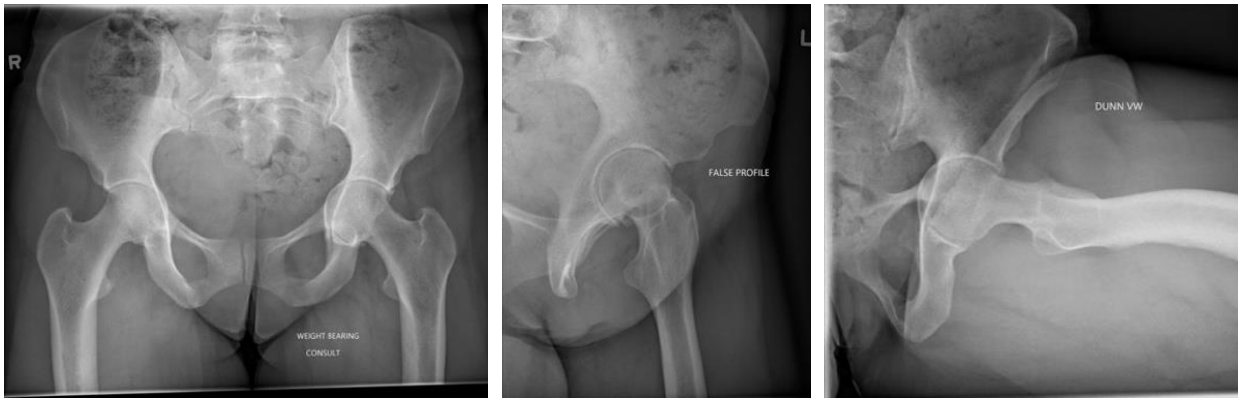
INTRODUCTION

Total hip arthroplasty (THA) is a well-established surgical procedure for end-stage degenerative joint disease (1), Otto's disease and protrusio acetabuli. However, younger patients present specific challenges, as surgical techniques have historically yielded disappointing results, raising questions regarding optimal management strategies (2–5). Functional expectations among younger patients tend to be higher, which can result in dissatisfaction even with technically successful surgeries. Moreover, younger patients tend to be more active, placing greater biomechanical stress on the prosthesis. This can accelerate wear (particularly with polyethylene liners in earlier generations) and increase the risk of complications such as dislocation, osteolysis, and early implant failure. Given the limited lifespan of prosthetic implants and the likelihood of future revision surgeries, comprehensive non-surgical approaches—including neuromuscular assessment and optimisation—should be thoroughly explored prior to THA, particularly in athletes. While broad nonsurgical recommendations may generally involve manual therapy, management of inflammation and pain, strengthening or providing mobility aids and, in specific populations, balance or gait training, more targeted approaches addressing specific neuromuscular imbalances may be highly beneficial. We present a case of a 35-year-old woman with years of chronic left hip pain and dysfunction, subsequently diagnosed with Otto's disease and protrusio acetabuli. She was scheduled for THA but cancelled the procedure after several hours of focused neuromuscular retraining of the internal torque chain (6)—specifically focused on the psoas major. It is our hope to highlight the importance of an individualised approach that involves comprehensive neuromuscular assessment of tension through the lens of torque chains, an approach that is not (yet) commonly applied.

CASE PRESENTATION

A 33-year-old Canadian woman (now 35) presented with chronic left hip pain and dysfunction persisting for approximately eight years. Previously fit and active, she engaged in weightlifting recreationally from age 22. One year into weightlifting, she experienced hip "clicking" that prompted an initial X-ray and the diagnosis of mild osteoarthritis in her left hip in 2014. Her symptoms significantly worsened during the first trimester of her first pregnancy in 2017. From 2018 to 2020, she experienced intermittent discomfort, particularly during exercises like sumo deadlifts and barbell squats (7). Despite no apparent progression of radiographic changes, her symptoms deteriorated further. This led to episodes of her hip "giving out" whilst walking, with

progressive loss of internal and external hip rotation. She struggled with daily tasks such as putting on socks and sitting normally. When seated, she observed a marked height discrepancy between her knees. In early 2022, physiotherapy treatment from a pelvic floor specialist was initiated, and cortisone injections were offered for pain relief. When the symptoms progressed to include back pain in April 2022, she consulted multiple healthcare providers. A chiropractor identified hip joint abnormalities on X-ray (Fig. 1), prompting referral to a sports medicine physician, who then referred her to an orthopaedic surgeon.



A **B** **C**

Figure 1. Representative hip X-ray series taken in 2022 (**A:** Weight bearing anteroposterior (AP), **B:** False profile, **C:** Dunn view). Femoral head crossing the ilioischial line on AP pelvic radiograph with joint space narrowing and early arthritic changes. Provided and published with consent from the case subject.

She was given a diagnosis of Otto's disease, and a total hip replacement was recommended. By this point, severe limitations were evident, including significant pain during basic movements, an antalgic gait, and difficulty sitting or lying comfortably. After consultations with four additional surgeons, her candidacy for THA was confirmed, and surgery was scheduled privately in Calgary due to lengthy public healthcare waiting times (12-14 months for consultation, plus 10-12 months for surgery). There was no pertinent past medical history. A precise list of non-surgical interventions tried by the case subject included: deep tissue massage, chiropractor sessions, physiotherapy, block injection and foam rolling. Prior to the onset of her pain and dysfunction, in addition to all the common bodybuilding, powerlifting movements and strength exercises for all body parts, the case subject used to engage in intense cardio as well (with a self-reported resting heart rate of 49-55 bpm at that time).

Intervention, outcome, and follow-up

Prior to surgery, the first and second authors (movement specialists, one also a medical doctor) became involved in this case. The second author identified significant functional weakness of her left psoas major at the initial assessment, which was made evident to the subject through rhythmic activation of the internal torque chain using an approach that combines breathwork with

movement (6). In short, the intervention involved applying gentle external pressure to the psoas major (at a point superior to the midpoint of the inguinal canal). The case subject was then guided to actively 'contract' or expand against this pressure. Specifically, she was taught to coordinate contraction of the psoas major with nasal inhalation, a technique designed to enhance interoceptive awareness and increase neural recruitment of this muscle. Remarkably, within the first 15 minutes of the intervention, building awareness of the left psoas major, she experienced reduced pain and increased functional capacity and progressed to running—an activity previously perceived as impossible due to pain and apparent stiffness—within the hour. Due to this dramatic initial improvement and subsequent training sessions, the case subject cancelled her scheduled THA within the week. Her ongoing regimen consisted of daily targeted psoas activation exercises for 10-15 minutes, integration of proper psoas engagement during functional movements, and progressive strengthening of the internal torque chain as pain decreased. Acutely there was almost immediate pain relief, with continued long-term improvement 30 months later. At 2.5 years follow-up, she continues to report ongoing functional improvements and reduced frequency and intensity of pain. She has successfully returned to recreational activities including squatting and deadlifting without significant daily limitations and has required no surgical intervention thus far. There is no longer any audible sound from the hip elicited by movement. Though the *rapidity* of the clinical response is particularly striking in this case, this improvement is consistent with many other cases shared between the first and second authors. It should be noted, however, that sustained results have required ongoing dedication to the approach to maintain and further improve functional outcomes.

DISCUSSION

This case underscores several key clinical principles: the primacy of comprehensive neuromuscular assessment prior to surgical intervention, the potential for targeted muscle retraining to resolve seemingly structural issues, and the importance of considering biomechanical factors in the context of anatomical variants. We feel that this is particularly important in athletes and younger patients who may be able to delay or avoid surgical intervention entirely, avoiding unnecessary harm. Even in the absence of arthritic changes, surgical hip dislocation and/or a valgus intertrochanteric osteotomy are indicated for skeletally mature patients with protrusio acetabuli; however, globally not all orthopaedic centres may possess the necessary experience to perform these procedures (8).

We hope to highlight that the initial presenting symptom in 2014 of hip "clicking" might best be considered a neuromuscular issue prior to moving forward with medical intervention such as imaging. Clinicians should consider functional neuromuscular assessment when patients present with joint sounds, especially in weight-training individuals. Simple tests for psoas strength, coordination, and activation patterns can reveal deficits that precede radiographic changes and may prevent progression to more debilitating symptoms. A single assessment is usually sufficient to ascertain whether neuromuscular repatterning will be beneficial based on acute reductions in

pain and dysfunction. Snapping hip syndrome (coxa saltans) is characterised as an audible or palpable snapping sensation during movement, commonly resulting from overuse, iliotibial band tightness, muscular tightness, shortened muscles or tendons, or inadequate muscle relaxation (9). This case may be a classic example of muscular imbalance not being addressed early enough and leading to more debilitating symptoms over time. In the context of a pelvic anatomical variant and the apparent diagnosis of Otto's disease, neuromuscular assessment and optimisation is potentially beneficial, even when surgery is indicated. Otto's disease is likely to be a normal anatomical variant of the pelvis, but it may predispose individuals to an increased risk of pain and dysfunction in light of altered biomechanics. This may also explain why that in this case, the response was rapid and dramatic in terms of reducing pain. Proper biomechanics are certainly likely to reduce the risk of wear and tear on joints secondary to the creation of improper tension, and may even alleviate inflammatory processes once the muscles start enabling better movement. It may be that the weakness in the psoas was subclinical and did precipitate arthritic changes.

In fact, altering neuromuscular balance in the context of anatomical variation may enable more even distribution of force through the joint leading to decreased likelihood of osteoarthritis progression (10,11). Our observations raise an intriguing question: Could the classical loss of joint space often attributed to osteoarthritis sometimes be a secondary consequence of neuromuscular dysfunction, specifically a short, weak psoas major? The altered joint mechanics from such dysfunction could potentially create uneven force distribution across the joint surface. In this subject, psoas dysfunction was central to the development of her symptoms, yet this was overlooked for more than seven years, emphasising the necessity of detailed clinical movement histories, especially in athletes. The focus for many conventional approaches is stretching and releasing a tight psoas muscle. A movement specialist approach focuses on the strength and mobility of the psoas major in the context of the rest of the torque chain, and teaches an individual how to isolate and strengthen it with the rest of the body. Despite consultations spanning several years with physiotherapists, chiropractors, sports physicians and orthopaedic surgeons, her underlying neuromuscular dysfunction was neither identified nor addressed appropriately at any point. Otto's disease diagnosis may have been a misleading factor, highlighting the importance of distinguishing anatomical variants from functional neuromuscular deficits.

The psoas major functions as a primary hip flexor and vital stabiliser of the lumbar spine and hip joint. Its dysfunction can significantly alter biomechanics, resulting in compensatory movements and chronic pain (12). In our patient, the asymmetric engagement patterns required by certain weight-training and powerlifting movements likely contributed to progressive left psoas dysfunction. This was evidenced by her differential pain responses to specific lifts—greater discomfort during sumo deadlifts and barbell squats compared to conventional deadlifts and belt squats—supporting a biomechanical rather than purely degenerative aetiology. Pregnancy-related pelvic biomechanical alterations may have also contributed in this case, further supporting the need to assess and optimise neuromuscular function in women after childbearing. Anecdotally we find that the obliques and psoas major are particularly important in these cases.

Lastly, it is important to note that pain processing is tied to the nervous system (13). Increasing heart-rate variability (HRV) and boosting parasympathetic tone is associated with improved health outcomes, and in particular healing (14). Allowing somebody in chronic pain to break this pain cycle is likely to change how they perceive the pain (15). This particular approach values the state of the nervous system in the context of muscular contractions and we have recently published a framework that links the psoas major and other muscles of the internal torque chain as a means to access parasympathetic activation (6).

LIMITATIONS

In addition to being a case report, the limitations of this study are that there are no objective measures of improvement. For example, electromyography (EMG) readings of the muscles involved would have provided depth in this case, to correlate with the clinical improvement. Quantitative measures of hip range of motion, strength testing values, and validated pain and function scales would also strengthen the findings. Further, no repeat imaging has been carried out to determine whether the clinical improvement reflects radiological change, which would be valuable to assess potential structural adaptations following neuromuscular retraining.

CONCLUSION

Though larger studies are needed to confirm results, this case demonstrates successful non-surgical management of chronic hip pain in a young woman initially scheduled for THA. The immediate and sustained improvements achieved through personalised neuromuscular optimisation, particularly psoas retraining, suggest the therapeutic potential of thorough movement assessment prior to considering irreversible surgical interventions. Future research should focus on developing standardised assessment protocols for identifying neuromuscular dysfunction in patients with hip pain and evaluating the long-term outcomes of targeted retraining approaches compared to conventional treatments. Although THA remains highly effective in specific contexts, careful consideration and comprehensive exploration of non-surgical approaches are essential, particularly for younger, athletic patients.

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AUTHOR CONTRIBUTIONS

Conceptualisation, E.C., R.A.; writing—original draft preparation, E.C., G.W.F.; writing—review and editing, R.A., F.B. All authors have read and agreed to the published version of the manuscript.

COMPETING INTERESTS

R.A. is founder of Moved Academy and Movement Ayahuasca, two companies which teach and apply the concepts introduced in this paper. E.C. is a practicing movement specialist as well as an instructor at Moved Academy and facilitator at Movement Ayahuasca. G.W.F. is a qualified Breath Teacher with The Breath-Body-Mind Foundation, New York. F.B. declares no conflicts of interest.