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## **Clinical Decision Making and Physical Therapy Management of Knee Pain Following Total Hip Arthroplasty: A Case Report**

Lisa Marais  
*St. Catherine University*

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**CLINICAL DECISION MAKING AND PHYSICAL THERAPY MANAGEMENT  
OF KNEE PAIN FOLLOWING TOTAL HIP ARTHROPLASTY:  
A CASE REPORT**

**by**

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**Doctor of Physical Therapy Program  
St. Catherine University**

**March 2, 2012**

**Research Advisor: Mary Weddle, PT, DSc**

## ABSTRACT

**BACKGROUND AND PURPOSE:** The diagnostic process for determining the source of lateral knee pain in active individuals is difficult. This process is made considerably more challenging in a patient with a complicated surgical history. The purpose of this case report is to illustrate the diagnostic process in the development of a plan of care for a patient whose lateral knee pain was suspected to be a result of ITBS and whose case was complicated by undergoing bilateral THA's and a meniscectomy prior to referral to outpatient physical therapy.

**CASE DESCRIPTION:** A 55 year old patient was referred by this orthopedic surgeon to an outpatient physical therapy clinic with complaints of left knee and left hip pain after MRI of the left knee revealed no significant pathology. The patient described increasingly bothersome hip pain that had never completely resolved after his THA, in addition to left lateral knee. Activity limitations included antalgic gait, difficulty with walking long distances and pain with stair climbing. The specific source of the knee pain was not apparent based on the physical therapy examination, so a treatment plan addressing the patient's general physical impairments was adopted.

**OUTCOMES:** Over the course of eleven treatment sessions the patient made gains in lower extremity strength and soft tissue mobility in the affected leg and met his functional goals. However, his pain did not resolve with treatment. Several clinical impressions regarding the cause of the patient's pain, with an increasing focus on impairments at the hip, were adopted during the episode of care and modifications to the plan of care were made accordingly. Over time, after considering the lack of success in reducing pain, a final clinical impression was formed that the cause of the patient's pain was consistent with greater trochanteric pain syndrome (GTPS). The patient was referred back to his orthopedic physician for a re-evaluation and was eventually treated with cortisone injection to the lateral hip, which completely resolved both his left knee and hip pain.

**DISCUSSION:** This case study describes how physical therapists' ability to use clinical decision making when considering alternative physical therapy clinical impressions can lead to a better outcome for patients who make therapeutic improvements but continue to experience pain.

The undersigned certify that they have read, and recommended approval of the research project entitled:

**CLINICAL DECISION MAKING AND PHYSICAL THERAPY MANAGEMENT  
OF KNEE PAIN FOLLOWING TOTAL HIP ARTHROPLASTY:  
A CASE REPORT**

Submitted by

Lisa Marais

In partial fulfillment of the requirements for the Doctor of Physical Therapy Program

Primary Advisor  Date: 4.25.12

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## CHAPTER I: INTRODUCTION

A presentation of non-specific knee pain is one of the most common complaints seen in outpatient physical therapy clinics.<sup>1,2</sup> Unfortunately, pinpointing the underlying cause of a patient's knee pain is not always a straightforward process. Knee pain, for example, can result from damage to soft tissue at the knee, ligamentous injury, meniscal injury, fracture or inflammation or it can result secondary to post surgical femoral component loosening tightness of the iliotibial band inflammation of the greater trochanteric bursa or soft tissue dysfunction.<sup>3,4,5,6</sup>

Sourcing the cause of **lateral** knee pain is recognized as a challenge for even experienced clinicians and requires the consideration of a large number of potential factors.<sup>1,7</sup> Table 1 lists a number of discrete diagnoses that have been identified as possible primary sources of lateral knee pain. Taking into account this wide range of underlying pathologies, a thorough differential diagnosis process in which clinicians must consider the patient's history combined with a thorough physical exam including the judicious use of special tests in order to form a physical therapy diagnosis is required to identify the source of a patient's impairment.

Several authors have suggested that in addition to intra-articular and extra-articular issues at the knee itself, pain felt at the knee may also be the result of dysfunction at the hip or ankle given the knee joint's location in the middle of the lower extremity kinetic chain.<sup>8,9</sup> This body of literature highlights a multi-factorial etiology underlying lateral knee pain whereby symptoms are caused by the relationship of factors such as hip-joint strength or abnormal biomechanics, most

commonly at the hip, that are then exacerbated by overuse. In their clinical commentary relating hip function to knee pathology, Reiman (2009, p.35) and colleagues identified relationships between hip influences and patellofemoral pain, injury to ligamentous structures of the knee, iliotibial band syndrome (ITBS) and knee osteoarthritis.<sup>8</sup>

Iliotibial band syndrome (ITBS) is one of the most common overuse syndromes that can contribute to lateral knee pain. In this condition, biomechanical factors or tightness in the IT band causes an overuse injury of the tendinous distal end of the IT band where it passes over the lateral femoral epicondyle.<sup>10</sup> Classic symptoms associated with ITBS include pain with walking or running at the lateral knee due to inflammation from the friction caused by the fibers rubbing over bony structures, palpation tenderness at the site, tightness of the IT band, weakness of hip abductors, and muscle imbalances between the quadriceps and hamstrings.<sup>10</sup> With time, if the situation is not rectified, scarring may occur at the bursa of the lateral knee.

In addition to primary pathologies at the knee joint itself such as those listed in Table 1 or pain resulting from proximal dysfunction at the hip, lateral knee pain may also be a secondary complication resulting from surgery on the knee or hip.<sup>2</sup> While research into pain following knee or hip surgery is very limited to date, several studies have found that middle-aged patients who had undergone meniscectomy surgery may present with notable knee pain, muscular deficits and functional limitations up to four years after their operations.<sup>11,12,13</sup> The postulated



causes for these impairments included persistent decreased quadriceps strength, damage to mechanoreceptors in menisci or ligaments due to surgical insult and neuromuscular deficits.<sup>13</sup>

Another group of researchers, Tokuhara and colleagues<sup>(2011, p.956)</sup>, investigated knee pain following total hip arthroplasty (THA) and reported that 7.3% of their sample presented with discomfort and/or pain in the lateral patellofemoral joint following total joint surgery.<sup>14</sup> In the THA group, knee pain was linked to increased lateral patellar tilt and leg length discrepancies.<sup>14</sup> Clearly, surgical intervention can further complicate the differential diagnostic process when determining the source of lateral knee pain.

Due to the multiple primary and secondary causes of lateral knee pain, experts in the field have noted that no consensus regarding patient management exists.<sup>1,2</sup> A review of current literature suggests that a physical therapy plan of care must take into account the specific signs and symptoms of each individual patient in order to address their particular health condition.<sup>2</sup> The purpose of this case report, therefore, is to illustrate the diagnostic process in the development of a plan of care for a patient whose lateral knee pain was suspected to be a result of ITBS and whose case was complicated by undergoing bilateral THA's and a meniscectomy prior to referral to outpatient physical therapy.

## CHAPTER II: CASE DESCRIPTION

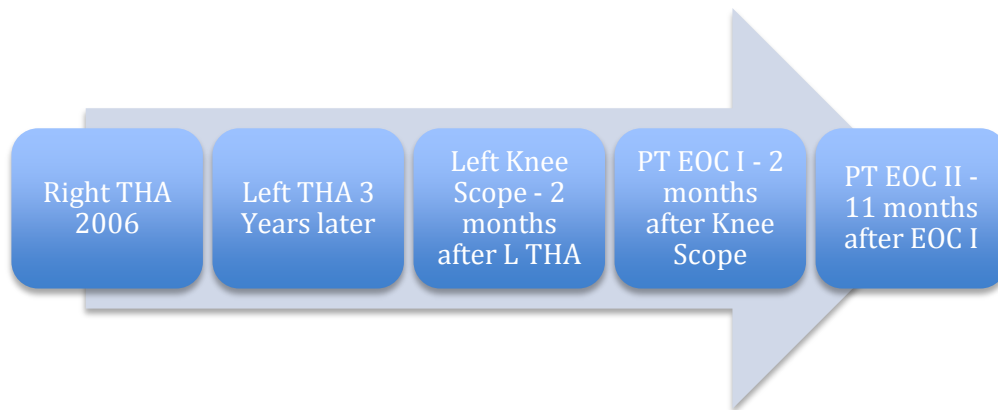
The subject of this case report was a 55-year-old male, presenting with left lateral knee and hip pain, referred to outpatient physical therapy by his orthopedic surgeon. The International Classification of Functioning, Disability and Health (ICF) Model will be used as a framework for providing relevant background information regarding his case. The ICF combines biological, personal and social perspectives in order to establish a bio-psycho-social view of a person's health status.<sup>15</sup>

One of the strengths of this model is that it illustrates the interaction between health conditions, body functions and structures, activity limitations, participation restriction, environmental factors and personal factors as shown in Figure 1. A proponent of the ICF model states, "the model portrays human function and decreases in functioning as the product of a dynamic interaction between various health conditions and contextual factors."<sup>15</sup> By identifying multiple factors, the model does an excellent job of representing complex cases due to its ability to represent multiple issues and provide a holistic picture of a patient for evaluation. An important implication of the interactive nature of the multiple factors defined by the model is that changes in one category will have effects on other categories; while the model places function at the center of health (in terms of activity limitations), it is clear that the restoration of function must include recognition of the influence of each of the other elements in the model.

## Health Conditions

The past medical history for this patient was well known to the treating physical therapist as he had previously sought physical therapy in the same clinic following a number of orthopedic surgeries. In the previous five years, he had had total hip arthroplasties (THA) in both hips as a result of osteoarthritis: right hip surgery first, followed by left hip surgery three years later. In addition, two weeks after the left THA, he sustained a partial left meniscus tear that required a knee arthroscopy to remove damaged tissue.

Two months after the knee arthroscopy, the patient had had a physical therapy episode of care (EOC-I) for dysfunction and pain in the left hip and thigh that were severe enough to require the use of a cane for ambulation. His plan of care at that time had included lower extremity strengthening and stretching, especially of the iliotibial band (ITB). He made gains in these areas and was able to discontinue use of the cane. Ultimately, he was discharged from physical therapy when his progress plateaued. His chart from EOC-I noted that his pain had been unresolved at discharge. A time line of his surgeries and physical therapy episodes of care (EOC) are outlined in Figure 1.



**Figure 1. Timeline of patient's previous surgeries and physical therapy.**

### **Impaired Body Structures and Functions**

**Patient History.** At the initial physical therapy visit for the patient's second physical therapy episode of care (EOC II), the patient reported symptoms in the left lateral knee and thigh/hip area. The patient stated that the left hip/thigh pain that had been present prior to physical therapy EOC I had continued since discharge, and though improved by the physical therapy treatment he received at that time, had never fully diminished. Three weeks prior to the start of EOC II, after walking down an incline, he experienced an on-set of pain in the left lateral knee area, a new site of discomfort for him. In addition, this exacerbated his on-going hip/thigh pain.

The patient indicated that prior to EOC II he tried chiropractic treatment but had not found relief from his symptoms. After several weeks of chiropractic care, he was examined by his orthopedic surgeon who ordered an MRI of the left knee as this was the area that was causing the greatest amount of pain. No MRI was ordered for the hip. The MRI of the left knee did not reveal any significant pathology at the knee,

fractures or soft tissue damage and no definitive medical diagnosis was indicated. According to the patient's report, the surgeon reviewed the imaging report and told the patient that he still needed to give the left leg time to recover; "I went to the doc and he said it could take another six months for the leg to get better and to go to PT."

The patient described his current pain as running up his left leg to his thigh and hip, occasionally reaching the left low back (lumbar) region. He rated his pain as 2/10 at best and 8/10 at worst; he reported that he always felt symptoms to some degree and that the pain could be sharp. The patient assessed pain using an analog scale of 0 (no pain) to 10 (worst pain imaginable). Numerical and verbal pain scales have been shown to be psychometrically sound for measuring pain.<sup>16</sup>

**Examination.** The patient was examined by the supervising physical therapist (PT) with observation by her student physical therapist. Based on her clinical experience, information provided by the patient in the interview, data gathered from the patient's intake forms, physician orders, MRI report and a review of the patient's prior physical therapy chart, the supervising PT hypothesized that the patient's knee pain and functional limitations were most likely not due to a specific impairment at the knee, such as a torn meniscus, but rather, were related to either impairments at the hip or pelvis or to decreased global lower extremity muscle strength and endurance that were causing abnormal pathomechanics that referred pain to the knee. She therefore organized her examination to assess the possible impact of these more global impairments and did not perform special testing of the knee or triad testing to assess radiculopathy (myotome, dermatome

and deep reflex testing) as these impairments did not fit the data collected via patient history or her initial impression.

Physical exam included assessment of posture, lumbar and lower extremity range of motion, soft tissue components of the knee, lower extremity strength, pelvic stability and gait. Observation and test procedures documented to be valid and reliable were used. Detailed results of the patient's physical exam are outlined in Table 2. In summary, the following impairments were noted: decreased lower extremity strength in the hip abductors, external rotators and extensors identified both through manual muscle tests and functional testing, sacroiliac (SI) joint dysfunction in the form of a right anterior innominate rotation and decreased range of motion of the trunk with side bending to the right that was accompanied by pain in the region of the lumbar spine.

Gait was also assessed. The patient walked without an assistive device but demonstrated an antalgic gait pattern. This was congruent with his report of pain in the left hip and knee during gait. The patient reported subjectively that he felt as though he was listing when he was walking, as though he were walking on a boat, but he was not observed to be leaning to the left during ambulation.

### **Activity Limitations**

At the initial visit, the patient was asked to identify activity limitations related to his knee and hip pain. In the subjective interview, he identified problems with painful gait, a decreased ability to tolerate walking longer distances, difficulties ascending/descending stairs and difficulties with transferring from lying to sitting.

This information matched the patient's responses to the Outpatient Physical Therapy Improvement in Movement Assessment Log (OPTIMAL) outcome measure that he had been asked to fill out as part of the intake process. This self-report measure, developed by the American Physical Therapy Association (APTA) is routinely given to all patients who are seen in this clinic and was used to track progress and set goals. The OPTIMAL has been demonstrated to be psychometrically sound.<sup>17</sup> This measure consists of questions that identify specific activities that are restricted for the patient, provides a way for the patient to indicate their perception of their ability to carry out everyday activities and asks them to select three activities that they would like to use as a basis for physical therapy goals.

### **Contextual Factors**

Environmental and personal categories of the ICF model pertain to those major contextual factors that impact an individual's health status. They help to provide a comprehensive picture of the patient and the barriers or supports that may play a role in improving function. Environmental factors for this patient included the familiarity of the treating PT with the patient and the fact that the orthopedic physician was not part of the PT clinic's health care system, which meant that electronic medical records and charts were not available to provide additional background information on the patient's past medical history or physician's impressions.

Personal factors added to the complexity of this case. This patient was only 55 years old, but had already undergone two joint replacements and a knee surgery and was now contending with new impairments. At the time of treatment he was unemployed; before having orthopedic issues he had worked as a computer cable installer but had had to give up that occupation after his THAs. He expressed a great deal of frustration with his current impairments. He felt that he should be able to do a normal day's activity of working around his house and ambulating in the community without the amount of discomfort he was experiencing. He had not had any significant problems after his first THA on the right side but felt that his left leg was getting worse rather than better.

As a married father of two teenage sons, he was highly motivated to participate in therapy so that he could continue to be an active member of his family. However, while his medical records indicated that he was a non-smoker with a healthy BMI, he did have a history of depression and was often frustrated when he did not perceive he was making progress. A final important consideration impacting the health status of this patient lay in the length of time he had been experiencing pain symptoms. Experts in the field of chronic pain generally define chronic pain as that lasting greater than six months in duration. The distinction between acute and chronic pain has important implications as chronic pain is thought to have a different etiology to that underlying acute pain, tends to encompass psychological as well as physical issues and requires a different treatment approach to manage.



## Participation Restrictions

The ICF model places an emphasis on identifying the patient's roles in society, the extent to which a person is able to fulfill them and how the other factors influence this amount of participation. A patient's desire to fulfill the roles that are important to them often provides a basis for functional goals for their rehabilitation. From information gathered at the initial visit, the patient's main social roles included being a family man who was a husband and father, a home owner who took pride in taking care of his home, and a person who could help support his family as an employed person. In addition, this patient was a boating enthusiast who found great satisfaction in taking his family and friends on day-long boat trips on a nearby river. Appendix 1 depicts a generic and a completed ICF grid for this patient listing the relevant information that depicted the state of his health at the time of EOCII.

## Clinical Impression I

***Diagnosis and Evaluation.*** In developing a physical therapy diagnosis for this patient, the clinical impression of the treating PT was that the patient's symptoms were consistent with ITBS. The clinical impression was based on her previous knowledge of the patient, physical exam findings, the finding that pain intensified with repetitive movement, the lack of pathology at the knee and the likelihood of altered biomechanics at the knee due to the surgical insult at the hip.. The PT Guide Practice Pattern for this patient was 4I: impaired joint mobility, motor function, muscle performance and range of motion associated with bony or soft tissue surgery.<sup>18</sup>

**Prognosis and Goals.** Based on the PT's experience with the patient and the PT diagnosis of ITBS, the prognosis for this patient was fair to good to meet his therapy goals. Based on the information gathered and in consultation with the patient, treatment goals were developed: 1) pain free transfers; 2) ability to walk distances of a mile or more; and 3) unrestricted ability to ascend/descend stairs. In addition, the patient set a goal to increase his tolerance and strength so that he could take his family out for an all day boat trip without an exacerbation of pain.

**Interventions.** In order to achieve these goals, a plan of care was developed that specified therapy visits twice a week for 30 minutes for a period of approximately six weeks. A variety of interventions were planned, including: muscle energy techniques to correct SI rotation on an as needed basis; lower extremity/core strengthening using progressive resistance exercises and functional activities; IT band stretching exercises and soft tissue mobilization using a foam roller; development of a home exercise program (HEP) for strengthening and stretching of the lower extremities. Table 3 details the specifics of interventions carried out at each visit.

### **CHAPTER III: OUTCOMES**

Following the initial examination and treatment, the next four visits and first two weeks of the HEP, the patient reported an improvement in symptoms. He was able to progress his exercises both in the clinic and at home. During this time period, he was administered a cortisone shot in the knee by the orthopedic physician which resolved the majority of his knee pain. Notable increases in strength and flexibility were identified, great adherence to the HEP was noted and the patient provided a subjective report of reduced pain with functional activities.

#### **Clinical Impression II**

At visit number 6, however, the patient responded in an unexpected way. He reported a major exacerbation of hip pain. The patient was unable to identify any precipitating event to account for the pain. Upon examination, palpation of the lateral left thigh and hip elicited pain and several nodules of soft tissue were discovered. In addition, decreased scar mobility around the THA incision site was noted.

These findings prompted a return to the clinical reasoning process and reflection on the course of treatment to this point. We hypothesized that the pain relief at the knee resulting from gains made in therapy and the cortisone shot might have made the patient newly aware of pain at the hip that had been overshadowed by more acute concerns. If the pain at the knee had in fact been a result of dysfunction up the kinematic chain, then it was not surprising that the hip pain had persisted.

Considering the strength, flexibility and functional gains the patient had recently made and the soft tissue finding of the lateral thigh and hip, the clinical impression was amended. Instead of focusing solely on ITBS as a cause of the lateral leg pain, we conjectured that a soft tissue myofascial restriction leading to altered biomechanics at the lateral knee might be the underlying source of the patient's impairments.

***Interventions II.*** Guided by this updated clinical impression, a new intervention was added to the plan of care and implemented at each subsequent visit during EOC II. Gua Sha, a form of tool assisted soft tissue mobilization was employed to help improve mobility of the soft tissue of the lateral hip and thigh. Gua sha is a traditional healing technique widely used by practitioners of traditional East Asian medicine that involves therapeutic stroking or surface frictioning of an area of lubricated skin with smooth edged tools. The tools' edges are pressed deeply enough during stroking into the skin to contact the fascial layer, but not so deep that they cause pain or discomfort, in order to raise therapeutic petechiae.<sup>19,20</sup>

One of the traditional indications for gua sha is for musculoskeletal conditions ranging from fibromyalgia to severe strain, spasm or injury.<sup>20</sup> Although the exact mechanism by which gua sha reduces pain is still unclear, initial research points to an increase of local microcirculation at the treatment site and a randomized control trial of the effectiveness of gua sha therapy on patients with chronic neck pain showed significant treatment effects for patients in the intervention group versus those in a control group <sup>19,20</sup> In addition to pain reduction

effects, gua sha has also shown benefits similar to that of other soft tissue mobilization therapies, such as Graston technique, which work by separating and breaking down irregular collagen formations found in scar tissue and by mobilizing and stretching connective tissue and muscle fibers.<sup>21</sup>

As treatment continued through visits 7 to 10, the patient reported a highly satisfactory response to the gua sha treatment and a feeling he described as “loosening” in the left lateral hip and thigh area. When re-examined to provide information for a clinic progress note, the patient had made improvements in all areas of body structure impairments. The patient reported functional gains as well; for example, at one visit he remarked that he had been able to stand on his left leg to don sweat pants, a task he had been unable to do for many months. The patient met his goals of pain free transfers and stairs. He progressed with his walking goal and met his goal of taking a family boat trip.

### **Final Clinical Impression**

Unfortunately, even with these improvements, at visit 11, the patient had another exacerbation of pain, in both the hip and the knee. This visit occurred after 7 weeks of therapy. This set back influenced a reconsideration of the clinical impression and an assessment of its efficacy as a guide for the patient’s plan of care. We reflected on the possibility that the knee and hip pain was not due to a multi-factorial issue involving several structures, such as ITBS or soft tissue restriction in the lateral thigh, but might be due to an issue located specifically at the hip.

Literature dealing with hip pain after THA identified a number of possible differential diagnoses that could be considered when identifying the cause of lateral hip pain. These factors include tumors, musculoskeletal conditions such as tendinopathies, muscle tears or structural abnormalities of the pelvis and nerve compression issues causing radiculopathies.<sup>22</sup> A review of the patient's history, his exam, evaluation and progress since beginning therapy led us to believe that these causes could be ruled out. Other possible causes of lateral hip pain included issues with the implant components or possible stress fractures. While it is outside the scope of physical therapist practice to diagnose such causes, we felt that the patient's orthopedic physician likely had considered them in his exam and evaluation prior to referral. In addition, pain related to stress fractures tends to be of acute onset and a causative trauma or noted increase in activity can be identified.<sup>23</sup> Our final clinical impression, after considering all of this information, was that the underlying condition that best fit this patient's presentation was greater trochanteric bursitis

Greater trochanteric bursitis by definition is considered to be an inflammation of the superficial trochanteric bursa, a condition that causes chronic lateral hip pain and tenderness to palpation over the region of the greater trochanter. Some researchers have indicated that, after osteoarthritis, trochanteric bursitis is the next most common cause of lateral hip pain.<sup>23</sup> It should be noted that the term trochanteric bursitis is currently falling out of favor as there is growing recognition that a true inflammatory process is unlikely to exist in a condition

persisting longer than an acute injury time frame. Pathology relating to the trochanteric bursa is increasingly being included as a component of greater trochanteric pain syndrome (GTPS), a regional pain syndrome referring to symptoms in the area of the greater trochanter.<sup>5</sup>

Etiology of GTPS is thought to be due to overuse, repetitive microtrauma or acute injury, all of which may cause altered biomechanics.<sup>4,23</sup> Research has indicated that following THA, GTPS may be distinguished from intra-articular or implant issues by the lateral location of pain that may be elicited by deep palpation specifically over the greater trochanter, a lack of groin pain and the absence of startup pain, that is pain that occurs upon starting to walk.<sup>22</sup> Immediate pain relief upon administration of a corticosteroid injection, which lasts for the predicted duration of the medication, confirms a diagnosis of GTBS, as there are few sensitive clinical tests to definitely rule in the condition.<sup>5,23</sup>

In many cases, GTPS are successfully treated with conservative measures. However, some patients do require corticosteroid injections, or in rare cases surgical intervention, to relieve symptoms.<sup>4,5</sup> Experts have also indicated that for long term management of GTPS, a consideration of the cause of compression in the region, overuse or overtraining errors, myofascial dysfunction in the lateral hip area, altered biomechanics and muscle imbalances are necessary.<sup>4,5</sup>

The patient was provided with education about GTPS and referral back to his orthopedic physician was recommended. The patient elected to discontinue physical therapy at this point and to discuss further treatment options with his

physician at his next appointment. In a follow up telephone conversation with the patient ten weeks after discontinuing physical therapy, the patient reported that he had been given a cortisone shot in the hip that resulted in complete pain relief in both the hip and knee. He noted that the effects had lasted for just over six weeks, but that some of his symptoms were starting to return as the benefits of the medication diminished. The patient did not return to physical therapy, although he reported that he continued to follow his HEP and that his physician had been pleased with gains in strength he attributed to physical therapy.



## CHAPTER IV: DISCUSSION

Case reports may serve many purposes as a research tool that can inform physical therapy practice.<sup>24</sup> While a case report may not establish causative relationships, it can provide another avenue to add to the collective body of knowledge that clinicians may draw upon. The merits of this case report lie in the glimpse it provides into the clinical reasoning process adopted by an experienced clinician in a situation where at first glance a patient presents with a relatively common outpatient complaint. In addition to presenting the physical therapy diagnostic process and management for a patient presenting with knee pain after total hip replacement surgery, this case report also highlights the importance of on-going reflection in the clinical decision making process.

### **Complicating Factors Related to Previous Surgeries**

In this patient's case, the differential diagnosis process and the resultant plan of care were complicated by previous orthopedic surgeries. Over the duration of only a few years, in addition to surgery on his knee, this patient had both hips replaced. Currently, there is a lack of research into the incidence of knee pain following total hip arthroplasty (THA), but the little that is available highlights the problems, such as those experienced by the subject of this case report, that a significant minority of patients have had post surgery.<sup>22,25</sup>

Total hip arthroplasties (THA) or total hip joint replacements are the most common orthopedic surgeries currently performed to mitigate hip pain resulting

from severe osteoarthritis.<sup>26</sup> Incidence of primary THA surgeries in the United States in 2005 was 208,600 and the number of surgeries is predicted to increase greatly over the next twenty years; current estimates are 572,000 primary total hip joint replacements per year by 2030, a growth rate of 174%<sup>27</sup> This growth is due to the aging of the American population and increased activity levels in middle aged and older adults.

In the vast majority of patients, a THA provides significant pain relief and allows them to return prior levels of function and activity.<sup>6,28,29</sup> For many patients, activity levels are actually increased to levels last achieved some years before surgery was required. However, a small number of THA patients do not achieve good pain relief after their joint replacement. The remaining pain level is severe enough to impact their return to function and eventually their health related quality of life. While the percentages currently are low - estimated by some researchers to be 10% of patients undergoing THA<sup>29</sup> - if the number of total procedures is on the rise, then it stands to reason that the number of those patients who do not have a good result will also rise. Physical therapists need to be ready to evaluate and treat these patients who come to therapy to deal with pain and secondary limitations after THA surgery.

The cause of a patient's pain after THA is not a simple matter to diagnose. A review of the literature suggests a number of reasons a patient may have poor clinical outcomes, including pain, after THA surgery.<sup>6,28,29</sup> Clinicians need to consider

that poor outcomes may be due to problems related to the repaired joint itself, consequences of the surgery or, in rare cases, to co-morbidities.

Experts in the field, such as Duffy and colleagues (2005, p 2567) propose clinicians consider a distinction between a number of intrinsic and extrinsic factors specific to the hip as outlined in Table 4.<sup>28</sup> In addition to the conditions listed in Table 2, other specialists indicate that the source of a patient's pain may also come from soft tissue dysfunction, leg length discrepancy and altered biomechanics that lead to overuse syndromes.<sup>25</sup> To make diagnosis more complicated, pain after THA may refer to the hip, the anterior thigh, the lateral thigh or the knee.<sup>3</sup> Health care professionals must rule out pathologies specific to these areas at the same time they consider that it is possibly the repaired hip that is the primary source of pain.<sup>3,4,5</sup> Fortunately, research has indicated very favorable reductions in pain and improvements in function when complications secondary to THA are correctly identified and treated; Iorio et al. (2006, p.235) noted that in one study of 24 patients with lateral hip pain all were successfully treated with nonoperative methods after factors relating to their THA's were taken into account.<sup>25</sup>

### **Role of Reflection in Clinical Decision Making**

As this case report illustrates, the importance of reflection in the clinical decision making process is crucial for patient overcomes. Examining the process of clinical decision-making is a crucial and necessary component of physical therapy practice. Without proper review of the results of interventions, a plan of care may

be continued that does not meaningfully improve a patient's impairments, leading to dissatisfaction with the results of therapy. Over the course of this patient's episode of care, several clinical impressions were formed and then replaced as the patient's subjective and objective responses to interventions were considered.

This patient arrived in clinic with no definite medical diagnosis. Although magnetic resonance imaging has been shown to be effective in diagnosing soft tissue issues in the hip region, including pathologies such as an inflamed bursa or a tendon tear that can underlie GTPS<sup>30</sup>, no diagnostic imaging of the hip had been carried out. Physical therapy examination uncovered several clinical findings that were consistent with ITBS, the first clinical impression, including pain at the lateral knee, tightness of the ITB and lack of structural pathology at the knee. However, continued re-assessment of symptoms – especially the finding of tenderness at the lateral thigh which continued after the patient's knee pain was reduced with a corticosteroid injection- and the progress made with conservative management eventually refocused attention to a potential diagnosis of GTPS.

From the physical therapy perspective, this patient made significant improvements during his time in therapy and responded well to all of the interventions that were carried out. However, from the patient's perspective, he did not make the progress that was most important to him - that of reducing his overall pain levels and increasing his ability to participate in his everyday roles.

Fortunately, this particular patient was able to articulate that issue clearly, which helped prompt the reflection process. Had clinical decision making not been

re-examined, it is possible that this patient would have again been discharged with an unsatisfactory outcome. Instead, by considering different clinical impressions, the PTs in this case were able to rule out several possible diagnoses with conservative management. They were then able to refer the patient back to his physician and a new avenue of treatment was opened for the patient.

### **Limitations**

Reflection is also the process that allows for the identification of limitations in practice and provides ideas for how performance may be improved to achieve improved patient outcomes. Inevitably, certain assumptions will be made when a patient is seen for a second or third time due to acquaintance and rapport. This familiarity may influence a therapist's perspective and clinical decision making.

***Patient-Therapist Familiarity.*** In the episode of care described in this case report, it is possible that had the patient not been acquainted with the physical therapist, who had previously treated the patient for tightness of the ITB and reduced hip strength, additional special tests and measures may have been included in the initial exam. For example, if an Ober test to assess iliotibial band tightness had been carried out and found to be negative, a different initial clinical impression may have been formulated. Similarly, positive results on the Thomas Test (to assess deficits in flexibility of the iliopsoas, rectus femoris and TFL/ITB) and the Noble Compression Test (to assess lateral knee pain at specific angles of knee flexion) have been proposed as useful clinical tests in the identification of ITBS, either separately or in conjunction with one another.<sup>1,10</sup>

In addition, familiarity may also have contributed to undue importance being placed on the patient's past impairments. It may have been useful in this case to consult with a colleague who had not worked with the patient previously, in order to gain a fresh perspective, before the formulation of the initial clinical impression. While this patient returned to clinic with several chronic impairments, his referral was for a new acute condition. Experts in the field of knee pain have noted that a management strategy for an individual patient must be based on specific signs and symptoms present and address both acute and chronic concerns.<sup>2</sup>

***Chronic Pain and Psychological Factors.*** Another limitation of the patient management described in this case report relates to consideration of chronic pain and psychological factors. It is possible that this patient would have had improved outcomes if he had been referred to practitioners with expertise in the management of chronic pain conditions. Given the length of time he had been experiencing hip, thigh and knee pain, the criteria for defining pain as chronic – usually as pain persisting for longer than three months - had been met.<sup>7</sup>

In addition, the patient's medical history included a diagnosis of depression and it seems plausible that in addition to the physical sequelae associated with chronic pain, attitudes and behaviors such as catastrophizing or fear/avoidance may have developed, impacting his symptoms, pain experience and expectations for health related quality of life after surgery. One study looking specifically at variable determining outcomes in total hip replacement surgeries noted a significant relationship between pre-operative anxiety/depression and pain relief and patient

satisfaction.<sup>31</sup> Given the rising incidence of total joint arthroplasties, researchers are beginning to look at determinants of pain and health-related quality of life after total hip and knee replacements. Early research has indicated that psychological factors such as post surgical expectations, depression, optimism and self-efficacy, have a significant influence on functional outcomes and patients' pain perceptions.<sup>26</sup> While treatment for psychological factors is beyond the scope of practice of physical therapists, referral to an appropriate practitioner may have resulted in improved outcomes for this patient.

## CHAPTER VI: CONCLUSION

This case report detailed the complexity of the process of pinpointing the underlying cause for one patient's knee pain following THA. Although the process was on-going and required the revision of several clinical impressions, in the end it provided valuable information for the patient through a systematic exclusion of possible diagnoses. It was reasonable to assume that the patient's initial physical therapy diagnosis was ITBS given the information available to the physical therapist at the time of initial evaluation and her clinical experience of a presentation of ITBS in other patients. Eventually, following continuous reflection on the patient's progress, a clinical impression consistent with GTPS was formed and the patient returned to his orthopedic physician to be successfully treated for greater trochanteric bursitis. The contribution of future research into the prevalence and causes of knee pain after THA will lead to a better diagnostic process and greatly enhance physical therapy management for this patient population.



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**TABLES:****Table 1. Potential Causes of Lateral Knee Pain, Adapted from Rosenthal<sup>(2009)</sup>**

<b>Underlying Cause</b>	<b>Possible diagnoses</b>
Injury/inflammation	Lateral meniscus tear Lateral collateral ligament sprain Proximal tibial/fibular joint sprain Distal femur bone stress injury Tendinopathies/strains Lateral compartment osteochondral injury/arthritis Surgical sequelae
Mechanical/Loading/ Anatomical	Patellofemoral syndrome Illiotalband syndrome Tibial torsion Discoid lateral meniscus Proximal tibial/fibular instability Patellar instability
Medical disorders	Malignant or benign tumors Popliteus syndrome
Referred pain	Lumbar radiculopathy Common fibular nerve injury Popliteal artery entrapment

**Table 2. Patient Impairments at Initial Examination**

Posture	Decreased lordosis, left iliac crest elevated
Palpation	No tenderness along joint line or IT Band
Strength	Bilateral hip ABD 5-/5, all others within normal limits
Functional Strength	6" step test demonstrated less control on left side with mild valgus; squat performed with anterior migration over knees
Sacro Illiac Screening	Left posterior/right anterior innominate rotation, positive forward bend on right SI
Range of Motion: Lumbar	Within normal limits, right sidebend painful on right, extension increased lower back pain
Range of Motion: Hip/knee	Right hip extension 5 degrees, all others within normal limits
Flexibility	Distal tightness present in IT Band

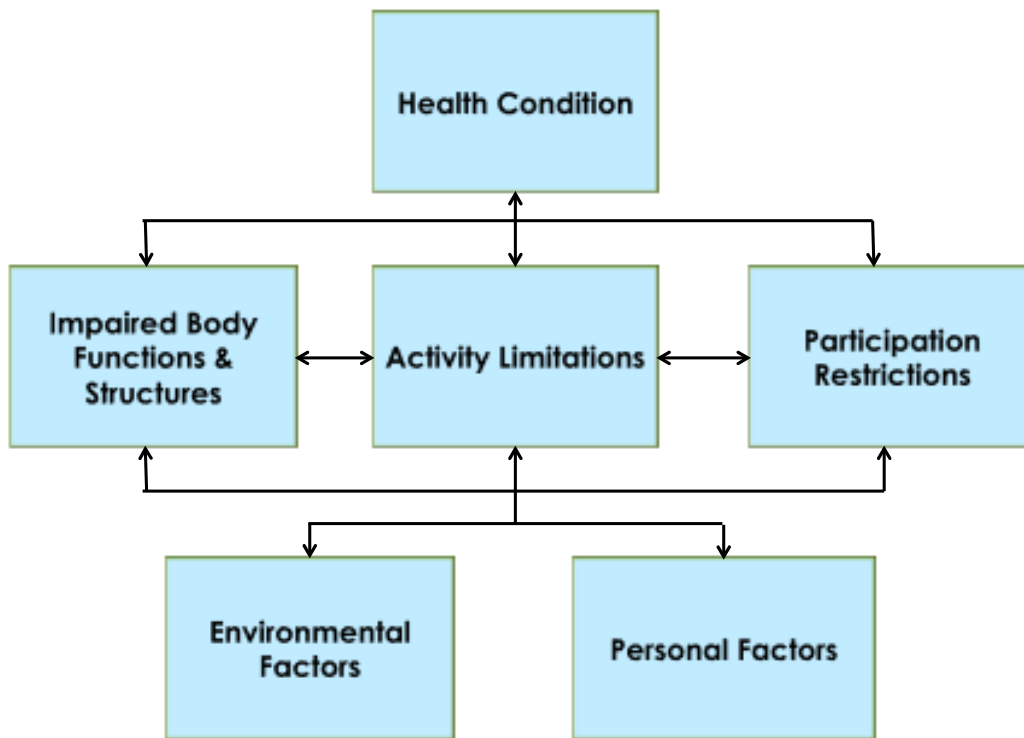
Table 3. Details of Patient Visits

	<b>Subjective</b>	<b>Objective</b>	<b>Assessment/Plan</b>
1	Report of pain in lateral knee and thigh; feeling of listing; difficulty w/gait, stairs & sitting to lying	<b>Manual therapy:</b> adjustment to SI joint for left posterior/right anterior innominate rotation <b>Therapeutic Exercise:</b> - side lying hip ABD exercise: no weight, 1 set of 13 - wall squat: 1 set of 13 w/cueing - step downs 6" box: 1x13 w/cueing - taught IT band stretch for home <b>Education:</b> - education re: use of foam roller on IT band to work soft tissue restriction - education regarding prognosis and possible	See patient 2x/week for next 4-6 weeks  Add to patient's HEP at next visit.
2	"feels a click in L knee, but no pain, able to walk outside over weekend, decreased pain"; patient purchased foam roller for HEP	<b>Therapeutic Exercise:</b> -treadmill warm up: 4 min @1.8 mph - exercises as visit one; progressed reps - reviewed HEP	Continue to see patient 2x/week; able to progress HEP
3	"still feeling click in L knee, but no pain, able to complete 2 mile walk with no flare up of symptoms"; patient to see MD next week	<b>Therapeutic Exercise:</b> -treadmill warm up: 5 min @ 2.0 mph - exercises as above and PROGRESSED - added single leg bridge, bilateral, 1x10	Continue 2x/week ; able to progress HEP
4	Patient saw Ortho MD & had cortisone shot to L knee and will return to MD in 6 wks; pain level 0/10; "able to walk several miles around lake over weekend"	<b>Therapeutic Exercise:</b> -treadmill warm up: 5 min @ 2.0 mph - exercises as above and PROGRESSED - added standing quad stretch 3 x 20 sec bilaterally, standing HS stretch 3.20 sec bilaterally, standing mini lunge 1 set of 15	Patient improving control and strength during resistance exercises; able to demonstrate stretches  Continue 2x/week
5	"feels knee pain has improved due to cortisone shot , feels stronger since starting PT, less pain, able to do HEP consistently "	<b>Therapeutic Exercise:</b> -treadmill warm up: 5 min @ 2.0 mph - exercises as above and PROGRESSED - added Single Leg Stance 30 sec bilaterally and threw 3# ball at rebounder during single leg stance on left, 2 sets of 12 <b>Education:</b> - reviewed stretches and gave handout	Continue 2x/week ; able to progress HEP
6	"no knee pain, but having hip pain now; back to having a feeling of listing when he walks (that had gone away for a while), thinks maybe flare up of symptoms due to increased activity, now is unable to lie on left side due to pain" Patient only able to attend one appointment this week.	<b>Manual therapy:</b> - adjustment to SI joint for left posterior/right anterior innominate rotation - manual posterior rocking of R ilium and anterior rocking of L ilium, - SI gapping on right, - MET for R inflare <b>Therapeutic Exercise:</b> - treadmill warm up: 5 min @ 2.0 mph - single leg bridge 1 set of 10 bilaterally - standing hip flx, abd, add, ext with blue theraband, one set of 10 each direction	Reassess pelvis at next visit.  Trial 'gua sha' tool assisted soft tissue manual therapy at next visit to help with skin, fascial mobility in lateral hip.  Continue 2x/week
7	"pain worse at this visit, 3-4/10 in left hip and 2-3/10 in left knee, feeling frustrated, patient unable to add theraband exercise this week, fighting a bad cold"	<b>Manual therapy:</b> - assessed pelvis, no MET needed - trialed gua sha therapy on left lateral thigh for 10 minutes <b>Therapeutic Exercise:</b> - treadmill warm up: 5 min @ 2.0 mph - sidelying hip ABD 3#, 1 set of 15 - reviewed HEP	Patient liked the feel of the gua sha therapy; would like to continue with that at next visit.  Reassess frequency of treatments at next visit

<p><b>8:</b> <b>30 days after start of EOC II</b></p>	<p>Pt reported less pain today 3/10, liked the gua sha treatment and thought it made his leg feel better, identified activities such as raking or snow shoveling as triggers for symptom flare up</p>	<p><b>Objective measures for 30 day progress note:</b>  - trunk side bend: pt able to reach lateral knee bilaterally with only slight discomfort  - lumbar extension: WNL and pain free  - squat: pain free, no anterior migration, no valgus noted  - 6" step test : improved control on L though still less than R, no valgus noted  <b>Manual therapy:</b>  - gua sha therapy on proximal lateral L HS and lateral quad for 15 minutes  <b>Therapeutic Exercise:</b>  - treadmill warm up: 5 min @ 2.0 mph  - sidelying hip ABD 3#, 1 set of 15  - reviewed HEP</p>	<p>Patient met goal of pain free stairs; progressing towards pain free ambulation for long distances.</p> <p>Continue HEP</p> <p>Decrease frequency to 1x/week</p>
<p><b>9</b></p>	<p>pt reported having a good week with increased ability to work on his boat and around the house with no increase in pain, able to stand on one leg to put shorts on which he has not been able to do for several months, feels that lateral thigh is "looser"</p>	<p><b>Manual therapy:</b>  - palpation of skin and muscle of lateral left leg shows increased mobility and 'smoothness'  - gua sha therapy on proximal lateral L HS and lateral quad for 15 minutes  <b>Therapeutic Exercise:</b>  - treadmill warm up: 5 min @ 2.0 mph  - 6" step down 1 set of 15 on L (review)  - wall squat with 8 sec hold 1 set of 5  - SL rebounder 4# ball 2 sets of 12  <b>Education:</b>  - reviewed HEP  - discussed ways to modify exercises to challenge muscles after discharge</p>	<p>Gua sha therapy seems to be making a positive difference to mobility of L leg; continue treatment.</p> <p>Continue HEP</p> <p>Continue 1x/week</p>
<p><b>10</b></p>	<p>pt was very pleased to report he was able to do an all day river trip on his boat in the past week, without a noticeable increase in symptoms, however noticed a few twinges in the lateral knee again, attributed that to increase in other (outdoor) activities that precluded doing HEP as regularly as usual</p>	<p><b>Manual therapy:</b>  - palpation of skin and muscle of lateral left leg shows additional improvement in mobility and 'smoothness'  - gua sha therapy on proximal lateral L HS and lateral quad for 15 minutes  <b>Therapeutic Exercise:</b>  - treadmill warm up: 5 min @ 2.0 mph  - 6" step down 1 set of 15 on L (review)  - wall squat with 8 sec hold 1 set of 5  - SL rebounder 4# ball 2 sets of 15</p>	<p>Concerning that knee pain is recurring only four weeks after cortisone shot and in spite of increased lower extremity strength and flexibility</p> <p>PTs to consider different diagnosis: perhaps trochanteric bursitis?</p> <p>Continue HEP</p> <p>Continue 1x/week</p>
<p><b>11</b></p>	<p>Pt was very frustrated at this visit, feels he "improved in strength and that gua sha is helping, but there is still pain in both the hip and the knee to a greater extent than what he was hoping", pain rating at 3-4/10 intermittently, feels that perhaps cortisone shot is wearing off, plans to see ortho MD in 2 ½ weeks</p>	<p><b>Manual therapy:</b>  - palpation of skin and muscle of lateral left leg shows additional improvement in mobility and 'smoothness'  - gua sha therapy on proximal lateral L HS and lateral quad for 18 minutes  <b>Therapeutic Exercise:</b>  - treadmill warm up: 5 min @ 2.0 mph  - 8" step down 1 set of 12  - "monster walks" with green theraband 4 sets of 8  - SL rebounder 4# ball 1 sets of 24  <b>Education:</b>  - shared research article on greater trochanteric bursitis so he could discuss with ortho MD  - showed patient how to do some self gua sha treatment at home  - Discussed how to incorporate HEP with other physical activities</p>	<p>Feel that conservative treatment has not been able to sufficiently address patient's pain symptoms that seem unrelated to strength and soft tissue mobility.</p> <p>Educated patient about possibility of greater trochanteric bursitis and how to discuss this with ortho MD.</p> <p>Continue with HEP although with decreased frequency if participating in outside activities</p> <p>Patient will try going two weeks between visits to assess if he is able to self manage symptoms and to trial variations in HEP</p>

**Table 4. Intrinsic and Extrinsic Causes of Pain Status Post THA<sup>28</sup>**

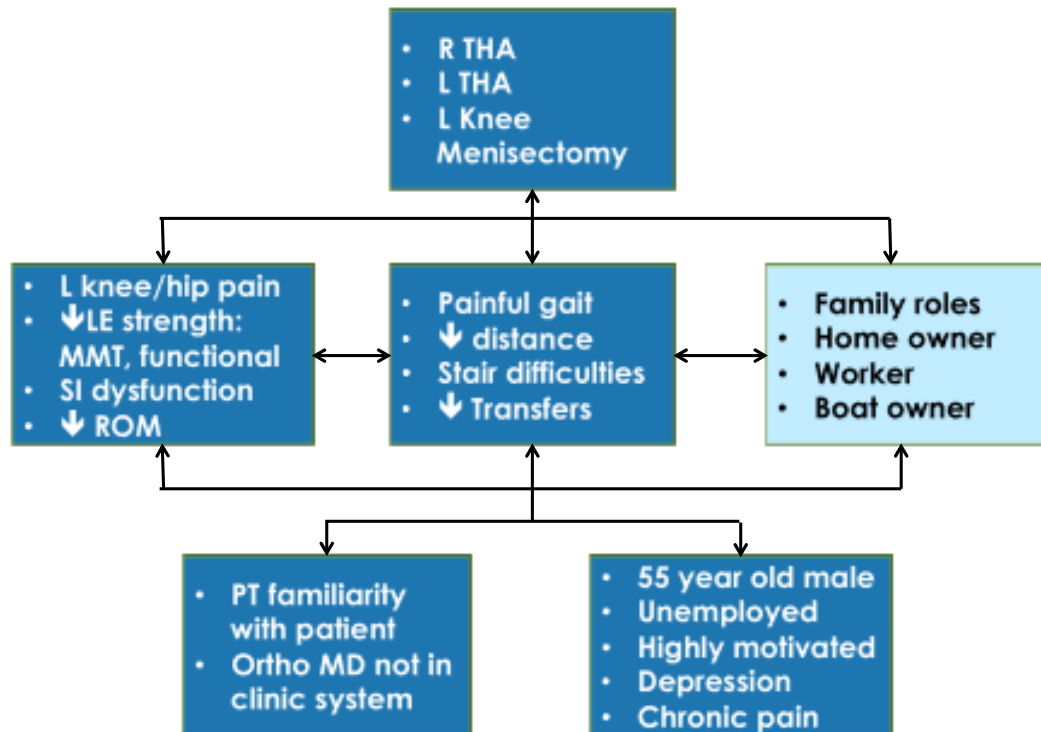
<b>Intrinsic Causes of Pain</b>	<b>Extrinsic Causes of Pain</b>
<ul style="list-style-type: none"> <li>• Infection: acute, delayed, late hematogenous</li> <li>• Aseptic loosening</li> <li>• Pain at stem tip (modulus mismatch)</li> <li>• Greater trochanter nonunion</li> <li>• Wear debris synovitis</li> <li>• Periprosthetic fracture</li> <li>• Trochanteric fixation bursitis</li> <li>• Osteolysis</li> <li>• Occult instability</li> </ul>	<ul style="list-style-type: none"> <li>• Lumbar spine disease: stenosis, disc herniation, spondylolysis, spondylolisthesis</li> <li>• Malignant tumor: primary, secondary</li> <li>• Peripheral vascular disease</li> <li>• Stress and insufficiency fracture</li> <li>• Nerve injury: sciatic, femoral, lateral cutaneous</li> <li>• Iliopsoas tendinitis</li> <li>• Hernia: femoral, inguinal, obturator</li> <li>• Complex regional pain syndrome</li> <li>• Other gastrointestinal, genitourinary or gynecological disease</li> </ul>

**APPENDIX A. International Classification of Functioning, Disability and Health**

Jette (2006)



## APPENDIX B. Completed ICF Grid for Case Report Patient



## APPENDIX C. Case Report Consent Form

### Case Report Information and Consent Form

#### Introduction:

You are invited to be the subject of a case report to be written by \_\_\_\_\_, Doctor of Physical Therapy graduate student/s from St Catherine University, under the supervision of Mary Weddle, PT, DSc, Doctor of Physical Therapy program faculty member, and \_\_\_\_\_, the student's clinical instructor/s. You were selected as a possible subject for this case report because your course of physical therapy care would be of interest to physical therapist students and physical therapists. Please read this form and ask questions before you agree to be the subject of this case report.

#### Background Information:

The purpose of this case report is to describe the physical therapy care you are receiving and how you respond to the care you are receiving at

\_\_\_\_\_  
(name and address of facility).

For example, the case report would describe the following:

1. why you are receiving physical therapy at this time;
2. the kinds of physical therapy treatment/s you are receiving at this time;
3. the effectiveness of the physical therapy treatment for you at this time.

This case report will help others better understand how physical therapy may help other people like you.

#### Procedures:

Your decision about participation will not affect your physical therapy care in any way. If you decide to participate, your physical therapy care will proceed just as it would if you were to decide not to participate. If you decide to participate, you may choose whether or not you will allow the following:

1. whether your photograph can be taken and used in public presentation and/or publication of this case report;
2. whether what you say can be quoted directly in the case report.

You may be given an opportunity to read or review parts, or all, of the case report prior to its completion, so that you can make suggestions to the student about the accuracy of the information described in the case report. You are not obligated to read/review the case report, however.

The case report will be read by the student's faculty supervisor, Mary Weddle. This case report may be read by the physical therapist/s supervising the student at this facility. The case report will be presented publicly by the student/s at St Catherine University Doctor of Physical Therapy Program Research Day. This case report would be available for students and faculty at the St Catherine University to read. The case report may also be published in a scientific journal and/or presented at a professional meeting locally or nationally.

**Risks and Benefits:**

There are no risks or benefits to you for participating in this case report.

**Confidentiality:**

Any information obtained in connection with this case report that could identify you will be disclosed only with your permission. Unless stated otherwise, your name, or names of your family members, will not be used in any way in the case report.

**Voluntary nature of this case report:**

Participation in this case report is voluntary. Your decision whether or not to participate will not affect your future relations with the St Catherine University, or with the facility at which you are receiving physical therapy. If you decide to participate, you are free to discontinue participation at any time without affecting these relationships.

**Contacts and questions:**

You are encouraged to ask the student or the physical therapist supervising the student any questions about this case report, at any time. You may also contact the student's faculty supervisor, Mary Weddle, if you have any questions, at any time.

You may keep a copy of this consent form for your records.

See next page for Statement of Consent

**Statement of Consent:**

You are making a decision whether or not to participate in this case report. Your signature indicates that you have read this information and your questions have been answered. Even after signing this form, please know that you may discontinue your participation in this case report, at any time.

I agree to participate in this case report. Yes \_\_\_\_ No \_\_\_\_

I agree to being quoted directly in this case report. Yes \_\_\_\_ No \_\_\_\_

I agree to being photographed and having the photographs included in the public presentation and/or publication of this case report. Yes \_\_\_\_ No \_\_\_\_

If the student wishes to have me read or review the case report prior to its completion, the student may contact me, after my course of physical therapy is complete. If I check no, that means I do not want the student to contact me at any time, after my course of physical therapy is complete.

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Signature of subject

\_\_\_\_\_  
Date

\_\_\_\_\_  
Student's signature

\_\_\_\_\_  
Date

Faculty member supervising the student:

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