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Developmental Dysplasia of the Hip: A Case Study

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Developmental Dysplasia of the Hip; A Case Study

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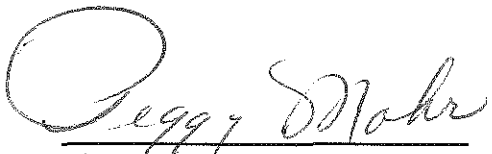
This Scholarly Project, submitted by Joseph D Taylor in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.



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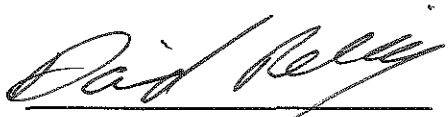

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ABSTRACT

PURPOSE: The primary purpose of this case study was to describe the implementation of a conservative treatment protocol for dysplasia of the hip in a young girl in an attempt to prevent surgical intervention. A secondary objective of reducing femoral acetabular impingement was subsequently undertaken in the course of the case study.

BACKGROUND: The patient was a 16 year old female with a diagnosis of bilateral developmental dysplasia of the hip (DDH), bilateral femoral acetabular impingement (FAI), anterior superior labral tear to left (L) hip, elevated antinuclear antibody (ANA) screening and a history of depression.

PLAN OF CARE INTERVENTIONS: An 8 week course of conservative treatment was pursued following a specific non-operative protocol provided by an orthopedic physician. The primary focus of the protocol was to decrease pain in intensity and duration and to normalize range of motion and strength.

RESULTS: The patient was seen for follow-up appointment after 8 weeks of physical therapy. Gains were made in strength and ROM. Pain had decreased in frequency, intensity, and duration. However, the patient was still unable to increase her activity level due to pain. At the conclusion of this case study, the patient was referred to an orthopedic specialist for consultation about performing surgical intervention.

CONCLUSIONS: While the protocol in use was successful in decreasing pain and increasing ROM and strength, measurement of quality of life for the patient

was not implemented. The lack of monitoring of the patient's QOL may have contributed to the necessity of surgical intervention. .

CHAPTER I

BACKGROUND AND PURPOSE

Developmental dysplasia of the Hip, or DDH, is a relatively rare congenital defect of the hip joint in humans, occurring on average in only 1-10 percent of live births.[1] In cases of DDH the acetabulum (or "socket" portion of the joint) is shallower than in typically developing children, allowing for easy dislocation and instability of the hip joint.[1] The incidence of DDH is greater in countries such as Finland, Canada, and Croatia while being vastly less in African countries.[1] There is a possible link between newborns raised in cold weather climates and the development of DDH and an increase in DDH incidence in children born during winter months versus those born in summer months.[2] Swaddling has been shown to be strongly associated with DDH[1] and breech presentation, positive family history, and female gender are considered predicting factors.[1] Prematurity, low birth weights, or multi-fetal pregnancies are have been identified as protective factors for DDH.[1]DDH has also been shown to be a major contributing factor in the development of osteoarthritis in the hip knee and ankle joints in younger aged children.[3]

DDH is commonly accompanied by femoral acetabular impingement (FAI).[3,4] In FAI, the malalignment of the hip joint causes a boney overgrowth of either the acetabulum or of the femoral head, which in turn causes an impingement of the hip labrum.[4] When accompanied by one another, DDH and FAI, can become a debilitating syndrome and restrict individuals' participation in

activities such as physical exercise, education tasks, occupational duties, and family, social and community events. Pain is often the limiting factor in most cases of DDH and FAI, leading to the lack of participation. As a result it is not uncommon to see a reduction in the quality of life in individuals with DDH and FAI, if the conditions occur separately or simultaneously.[4]

The patient in this case study was a 16-year-old female with a diagnosis of bilateral DDH and FAI. The patient had been limited in educational, vocational and familial involvement secondary to her diagnoses. The patient had requested the opinion of an orthopedic physician regarding possible surgical intervention options. However, the orthopedic surgeon suggested a course of conservative treatment via physical therapy in order to mitigate the patient's current symptoms and improve her quality of life. The primary purpose of this case study is to describe the implementation of a conservative treatment protocol for DDH for this patient in an attempt to reduce femoral acetabular impingement and prevent surgical intervention.

Conservative intervention included, but was not limited to; therapeutic exercise, passive range of motion (PROM), active assistive range of motion (AAROM), active range of motion (AROM), stretching, strengthening, manual therapy, soft tissue mobilization, joint mobilization, moist heat, cold packs, ultrasound, iontophoresis, phonophoresis, electrical stimulation, home exercise programing, neuromuscular education, posture training, body mechanics, therapeutic activities, and activity modification. With a course of conservative treatment in patients with DDH and FAI there may not be gains in strength and

range of motion (ROM), but there may be vast improvements in quality of life (QOL).[4,5,6] Current literature[4,5,6] strongly suggests that the success of the conservative treatment be based on QOL improvements rather than strength, ROM, and pain reduction.

CHAPTER II

CASE DESCRIPTION

The patient in this case report was a 16 year old English speaking female. The patient lived at home with her mother, stepfather, and half-brother. The patient was a full time student in the 10th grade and worked part-time at a convenience store (15-20 hours per week). The patient's mother reported a normal course of pregnancy and delivery without complications. The patient's medical record indicated she appeared well developed and well-nourished upon presentation to her primary care provider (PCP). The patient did not use any assistive devices at this time and lived at home with her family in a second floor apartment without an elevator. The patient was in good overall health, 5' 6" (1.6764 m) tall, and weighed 132 lbs. (59.87 kg) with a BMI of 20.99. A review of systems at the patient's PCP office revealed no obvious concerns. The patient reported that she was "not very" physically active, not involved with sports or other extracurricular activities other than working at the convenience store. The patient was previously diagnosed with depression and had been subsequently taking sertraline HCL (Zoloft) for this condition. The patient was not a smoker, or exposed to secondhand smoke, and did not report drinking alcohol. The patient had a familial history of arthritis on her maternal side (grandmother diagnosed in her 30's) and reported other family members had hip replacements in their 50's. The patient had no previous history of surgeries or other medical comorbidities. The patient presented to her PCP 3 months prior to reporting to physical therapy

with a primary complaint of bilateral hip pain. She reported having had this pain for 1 month prior to seeking the advice from her PCP. The pain began suddenly and did not have any clear mechanism of injury. Pain was present in both hips, but slightly worse in the R hip. Physical activity seemed to aggravate her symptoms. The patient did not report a change in gait at the time of initial visit; however, on follow-up visits she reported that she felt like she "waddles like a penguin." The patient also reported audible popping in both hips from "time to time." After this first visit with the PCP, an bilateral X-ray of the hips, complete blood count (CBC), erythrocyte sedimentation rate (ESR), Rh factor, and antinuclear antibodies (ANA) were ordered. The CBC document high levels of monocytes (15). The hips were not fractured or dislocated and the pelvic ring was intact. An ANA test was reported to be positive (low titer), possibly indicative of juvenile arthritis. The patient had a follow up appointment with her PCP 3 weeks later and was referred to a rheumatologist to address her hip pain. The patient never saw the rheumatologist and was again seen approximately 1 month later by her PCP. At this time, she reported that she felt like her hip pain was getting worse and sometimes she felt as if her hips were going to, "pop out of place." The patient's pain in her hips increased with activity and nothing (neither rest, ice, nor meds) seemed to relieve the pain. The patient's PCP decided to order an MRI and then referred the patient to orthopedist. The patient's MRI was shown to exhibit "tiny nonspecific bilateral joint effusions, without evidence of painful bone marrow edema or evidence of avascular necrosis. No evidence of trochanteric bursitis nor evidence of gluteal insertional tendonopathy. Mild

bilateral developmental hip dysplasia, without definite labral tear identified." The patient had a follow up with an orthopedic physician who, upon examination, reported severely limited hip internal rotation (IR) ROM and excessive hip external rotation (ER) ROM. The orthopedic physician concluded there was an anterior-superior labral tear in the L hip and possible labral involvement which was in contrast to the initial MRI interpretation. This physician also reported significant femoral retroversion in both hips and probable femoral acetabular impingement. A course of physical therapy was recommended and the patient was referred to physical therapy.

Examination, Evaluation and Diagnosis

Approximately 3.5 months after her visit with her PCP, the patient experienced an acute exacerbation of bilateral hip pain. The patient sought evaluation and treatment from a different physician and was referred to an outpatient PT clinic. The patient presented to PT with her mother on the day of initial evaluation. A comprehensive review of this patient's electronic medical was completed prior to the physical examination.

Observations. The patient sat on the observation table with slumped posture and a posteriorly rotated pelvis. During observation of her arrival to PT, no great deviations in gait other than slight ER bilaterally during toe off and initial swing phase of gait were noted.

Physical Examination. Range of motion (ROM) measurements were obtained of bilateral lower extremities and the results can be viewed in Table 1.

Table1

Range of Motion Measurements

Motion	ROM (measured in degrees)
L hip flexion	108^0
L hip abduction	60^0
L hip ER	80^0
L hip IR	7^0
R hip flexion	110^0
R hip abduction	63^0
R hip ER	90^0
R hip IR	15^0

Strength testing was completed via manual muscle test (MMT) to bilateral lower extremities as well and the results can be found in Table 2.

Table 2

Manual Muscle Testing

Motion	Left	Right
Flexion	3+/5	3+/5
Extension	2/5	2+/5
Abduction	3+/5	3+/5
Adduction	4/5	4/5
IR	2/5	2/5
ER	3/5	3/5

Upon palpation, the patient was tender to the touch over the anterior, lateral, and posterior aspects of her hips bilaterally, with her primary complaint presenting anteriorly. The patient was alert, oriented to person, place, time, and situation, and followed directions appropriately.

To more accurately determine the diagnosis and develop the plan of care, multiple special tests were performed. The results can be seen in table 3.

Table 3

Diagnostic Special Test Results

Test	Result
Faber's Test	+ bilaterally
Ober's Test	- bilaterally
Hip Scour Test	+ bilaterally

Faber's test was included to determine if hip pathology was present. Faber's test is a reliable, sensitive, and specific test for hip pathology (sensitivity=.89, specificity= .99).[7] Ober's test was included to examine if the patient had tight or pathological iliotibial band/tensor fasciae latae (sensitivity=.88 specificity=.83).[7] The hip scour test was included to test for hip labral involvement, hip arthritis or acetabular defects (sensitivity=.91 specificity=.75).[7]

Results. It was determined that this patient presented with strength and ROM limitations affecting the hips secondary to pain. Special tests indicated that the patient exhibited pathology located in the hip joints which could result from

arthritis, impingement, retro/anteversion, or labral tear. The patient demonstrated limitations in activities at school (pain when walking from one class to another and during gym class), work/occupation (pain with prolonged standing or carrying items), and recreation (pain with walking with friends, standing at a concert, participating in activities with friends). It was determined, to prevent further limitations, the patient should begin a course of conservative PT treatment focusing on strengthening the proximal hip musculature and working on proper gait mechanics.

According to the Guide to PT practice, the diagnosis was Practice pattern 4D; Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated with Connective Tissue Dysfunction. The medical diagnosis for this patient was "bilateral developmental dysplasia of the hip, bilateral femoral acetabular impingement, and possible labral tear/involvement." A PT "working" diagnosis was "Bilateral DDH, FAI and possible labral tear/involvement causing the patient pain, weakness and limited ROM leading to limitations in participation in school, work and leisure activities." In utilizing this working diagnosis, the medical disability was connected to the personal activity limitations. All medical professionals involved in the patient's care (patient, family, therapists, and physicians) played an active role in the treatment process.

Prognosis and Plan of Care

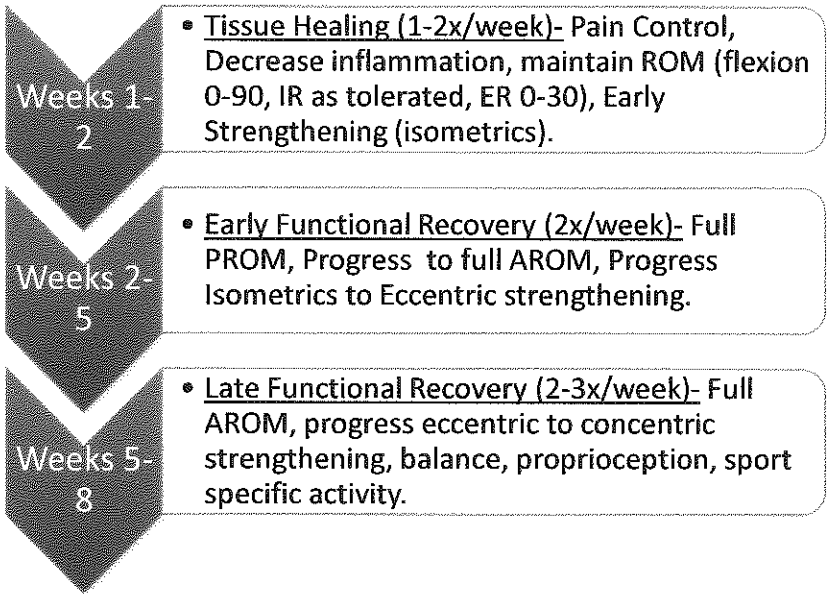
According to the Guide to PT Practice, the prognosis for this patient was as follows, "Over the course of 2 to 4 months, the patient will demonstrate optimal joint mobility, motor function, muscle performance and range of motion and the highest level of functioning in home, work (job/school/play), and community and leisure environments. During the episode of care the patient will achieve (1) anticipated goals and expected outcomes of the interventions that are described in the plan of care and (2) the global outcomes for patients who are classified in this pattern." The anticipated duration and frequency of PT was discussed with the patient and P.T twice a week for at approximately 6 weeks was planned.

The patient's long and short term goals were created in collaboration with the physical therapist, student physical therapist and the patient. The patient's functional activities and limitations were the primary focus of the following goals. Long term goals include: (1) Following PT interventions, the patient will report pain well managed at a level of 2/10 or less with all activities of daily living (ADLs) in order to participate fully in educational, occupational and recreational activities. (To be met in 6 weeks). (2) Following PT interventions, the patient will be independent with her LE strengthening and stretching program in order to increase strength and ROM in order to be able to perform all ADLs safely and independently (to be met in 6 weeks). Short-term goals were (1) Following PT

interventions the patient will be able to normalize bilateral hip ROM exhibited by flexion of 115°, abduction of 45°,and IR of 35°(to be met in 3 weeks). (2) Following PT interventions, the patient will be able to participate in isometric strengthening exercises to begin to build functional strength in LEs bilaterally and increase pain free independence in all ADLs (to be met in 3 weeks). (3) Following PT interventions, the patient will have a 50% reduction in pain bilaterally in the hips (4/10 or less) at all times (to be met in 3 weeks). At the time of examination, the patient was scheduled for a follow up appointment in 2 months with the orthopedic surgeon to determine if PT was progressing as intended, or if surgical intervention needed to be explored. It was determined that the patient be seen in the PT outpatient clinic twice a week until her follow up appointment with the surgeon. The intervention plan for these visits included, but was not limited to, therapeutic exercise, PROM, AAROM, AROM, stretching, strengthening, manual therapy, soft tissue mobilization, joint mobilization, moist heat, cold packs, ultrasound, iontophoresis, phonophoresis, electrical stimulation, home programing, neuromuscular education, posture training, body mechanics, and therapeutic activities. Also utilized throughout this patient's plan of care was a non-operative treatment protocol for FAI provided by the orthopedic surgeon. This protocol consisted of three phases: Phase 1: Tissue Healing, Phase 2: Early

Functional Recovery and Phase 3: Late Functional Recovery. The details of the protocol can be examined more closely in Figure 1.

Fig. 1. Non-Operative FAI Protocol



Intervention

Prior to implementation of any therapeutic interventions, written informed consent was obtained from the patient and legal guardian. The patient was continuously involved in the creation of the plan of care and agreed to any modifications to the plan of care. The SPT and PT involved in this case also obtained a written protocol from the orthopedic surgeon involved in this case prior to implementing any interventions. The use of specific protocols has been shown to be effective in the treatment of FAI in the current literature.[8,9] This protocol contained 3 phases to be performed over 6-8 weeks. Phase 1 was deemed "The Tissue Healing Phase" with goals of; pain control, decreased inflammation and swelling, maintenance of range of motion, and isometric strengthening. Phase 2, deemed the "Early Functional Recovery Stage" included: achieve full PROM, advance to AROM, and progress to strength gains. The third and final phase, "The Late Functional Recovery Stage" included: advanced strength gains, balance, and proprioception. The exact intervention techniques of the intervention program can be found in table 4. The interventions that were implemented for this patient took place over 11 visits spanning 2.5 months. The interventions were accompanied by a comprehensive home exercise program.

The purposes of the intervention techniques were multifaceted. In phase 1, the intervention plan was designed to decrease inflammation around the hip joint via the iontophoresis, maintain ROM via adductor stretching, and increase flexor/extensor/abductor strength. In order to decrease inflammation, iontophoresis was utilized in conjunction with ice, rest, and activity modification.

In conjunction with iontophoresis, dexamethasone (a prescription medication used to treat inflammation) was applied to a Hybresis patch (a method of iontophoresis application) and attached to an electrical charge which allowed the medication to diffuse across the patient's skin. Strengthening exercises were utilized to build strength around the hip joint and decrease current muscle imbalances which may have been a factor in the patient's pain and lack of activity. Strengthening began with isometrics in early phase 1, which was then progressed to eccentric training between the end of phase 1 and beginning of phase 2. Strengthening exercises were focused on the all four major hip muscle groups (flexors/extensors/abductors/adductors). In phase 2, iontophoresis was discontinued as the beneficial effects were no longer apparent. Strengthening was once again focused on increasing strength in the hip musculature (extensor/flexor/abductor/adductor groups) via eccentric training progressing to concentric training. Hip IR was increased with adductor and extensor strengthening. In phase 3, the patient was progressed to activities which challenged her proprioception and balance as well as concentric and dynamic strengthening.

The patient was provided with a home exercise program that was to be performed 1-2 times per day on the days she was not seen in the clinic. The home exercise program consisted of strengthening, stretching, and patient education. A copy of the home exercise program can be found in the Appendix A. Patient education was provided upon every treatment session and included items such as activity modification, posture, when to ice, when to rest, activities to

avoid, and when to progress exercises or activity. To measure the success of these interventions, a progress note was created on the 6th visit and again upon the 11th visit to compare current progress to goals. On these days prior to beginning any therapeutic exercise, the patient's strength, ROM and pain levels were assessed and compared to previous levels. Results were documented and everyone involved in the patient's care, including the orthopedic physician, was made aware of the progress.

Table 4

Intervention by session and target areas

Session	Daily Intervention	Target Areas
Session1	-Isometric hip flexion, abduction, adduction against pillow. -Posture education to prevent slouching in seated position. -Iontophoresis via Hybresis patch (using dexamethasone)	-hip flexor strength -hip ab/adductor strength -Normalize ROM -lumbar spine/pelvic alignment -inflammation around hip joint
Session 2	-Upright biking for active warm-up of the tissues. -Hook lying heel slides -Isometric abduction/adduction against pillow. -Glute sets -Straight leg press into plinth. -Clam shell (no band) -Hybresis patch	-Flexor extensor strength -Normalize ROM -ab/adduction strength -inflammation around hip joint

Session 3	-Upright biking for active warm-up of the tissues. -Isometric ad/abduction against "fitness circle". -Glute sets -Straight leg press into plinth. -Clam shell (no band) -Hybresis patch	-Flexor extensor strength -Normalize ROM -ab/adduction strength -inflammation around hip joint
Session 4	-Upright biking for active warm-up of the tissues. -Isometric ad/abduction against "fitness circle". -Glute sets -Straight leg press into plinth. -Straight leg raises -Clam shell (no band) -Hybresis patch	-Flexor extensor strength -Normalize ROM -ab/adduction strength -inflammation around hip joint
Session 5	-Upright biking for active warm-up of the tissues. -Isometric ad/abduction against "fitness circle". -Bridging -Standing hip abduction/adduction -Standing hip flexion/extension *Standing exercises performed with bilateral upper extremity support	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance
Session 6	-Upright biking for active warm-up of the tissues. -Isometric ad/abduction against "fitness circle". -Bridging -Standing hip abduction/adduction -Standing hip flexion/extension -Standing mini squats *Standing exercises performed with bilateral upper extremity support	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance -functional skills

Session 7	-Upright biking for active warm-up of the tissues. -Isometric ad/abduction against "fitness circle". -Bridging with fitness circle around outside of knees -Clamshell exercises with yellow band -Standing hip abduction/adduction -Standing hip flexion/extension -Standing mini squats *Standing exercises performed with bilateral upper extremity support	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance/proprioception -functional skills
Session 8	-Upright biking for active warm-up of the tissues. -Clamshell exercises with yellow band -Standing hip abduction/adduction with 2# ankle weight -Standing hip flexion/extension with 2# ankle weight -Standing mini squats -Side stepping in mini squat position *Standing exercises performed with bilateral upper extremity support	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance/proprioception -functional skills

Session 9	-Upright biking for active warm-up of the tissues. -Clamshell exercises with orange band -Standing hip abduction/adduction with 3# ankle weight -Standing hip flexion/extension with 3# ankle weight -Standing mini squats with yellow band around knees -Side stepping in mini squat position *Standing exercises performed with bilateral upper extremity support	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance/proprioception -functional skills
Session 10	-Upright biking for active warm-up of the tissues. -Clamshell exercises with orange band -Standing hip abduction/adduction with 3# ankle weight -Standing hip flexion/extension with 3# ankle weight -Standing mini squats with orange band around knees -Side stepping in mini squat position with orange band around knees -Squats to 90^0 with TRX band assistance *Standing exercises performed with bilateral upper extremity support	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance/proprioception -functional skills

Session 11	-Upright biking for active warm-up of the tissues. -Using the "Keiser" resistance machine closed chain hip abduction, adduction, flexion and extension were performed against resistance. -Semi squat side stepping -Balance on rocker board with eyes open and eyes closed. -Single leg balance.	-Flexor extensor strength -Normalize ROM -ab/adduction strength -low back/core strength -balance/proprioception -functional skills

Outcomes

Upon conclusion of these interventions, 2.5 months after this patient was referred to PT, the patient was again seen orthopedic physician for a follow up appointment. The patient had progressed in both the afore mentioned long-term goals (keeping pain at a level of 2/10 or less with ADLs and becoming independent in her home exercise program) as well as one short-term goal (increasing bilateral hip ROM). Although she had progressed in all three of these goals, she had yet to meet these goals at the end of her episode of care. The patient was able to meet one short-term goal (to be able to participate in isometric strengthening). As was discussed in the interventions section, the patient did not make any large gains in hip ROM. She was still severely lacking IR at both hips, and displayed excessive ER bilaterally. Flexion in both hips was still somewhat limited secondary to pain. The results of therapeutic interventions are outlined in table 5.

Table 5

Clinical Results of Therapeutic Interventions

Category	Initial Evaluation	Discharge (8 Weeks)
PAIN	Worse with activity, ranges from 5-7/10, "if she is awake pain in present"	Still exacerbated with activity, ranges from 2-7/10, less frequent, still cannot increase her activity
ROM	IR<10^0 Bilaterally ER >60^0Bilaterally Flexion painful above 100^0 Bilaterally	IR≈ 15^0 Bilaterally ER≈ 50^0 Bilaterally Flexion pain free to ≈ 110^0 Bilaterally
STRENGTH	3+ in all motions.	Adduction= 4+/5 Flexion/Extension/Abduction and ER increased to 4/5 bilaterally, IR 3+/5

At the conclusion of the episode of care, the patient was consistently reporting lower levels of pain when compared to the initial visit and reported that pain was less frequent and better controlled. Functionally, the patient reported less pain when climbing stairs at school, carrying items at work and prolonged standing at work or for leisure activities.

The patient was seen by her orthopedic surgeon for a follow-up visit upon completion of 8 weeks of physical therapy. The surgeon's findings of strength and ROM were consistent with what both the SPT and PT were able to obtain. The patient reported to the surgeon, "physical therapy definitely helped." She also explained to the surgeon that if she tried to increase her activity level at all, she experienced increased pain in both hips. The surgeon stated that he did not think that this was acceptable for a 16-year-old girl. His findings were that she had fairly substantial hip dysplasia, global retroversion, and a deficient lateral and posterior acetabulum wall. He did not think she was a candidate for arthroscopic intervention. The surgeon also stated that if the patient was not happy with her current condition, open surgical intervention would probably be the best course of action at that point. At that time the surgeon anticipated that patient would require a rotational osteotomy of the acetabulum and a simultaneous repair of the labrum.

CHAPTER III

DISCUSSION

Throughout the course of this case study, many clinical decisions had to be made in order to provide the patient with the best care possible. The world health organization (WHO) provided the international classification of function (ICF) (WHO-ICF) model, which can be utilized when making these clinical decisions. It was decided by the PT and SPT that it would be best practice to utilize this model in making decisions regarding this patient. The WHO-ICF model illustrate the interplay between the "health condition" relative to the body structure, activity, and participation realms, as well as the influence of internal and external factors on the outcome of patient care. A representation of WHO-ICF model applied to this patient is located in Appendix B.

This potential benefits of PT in the treatment of DDH and FAI are outlined in this case study. Conservative treatment for femoral acetabular impingement can be successful[5]. In order to determine the success of conservative treatment, goals were established. Successful conservative treatment required achieving all the PT goals. The decision regarding success or failure of PT was made by the surgeon in consultation with the patient regarding pain levels and function.

Outcomes. It was an intent of PT, to increase the patient's strength and normalize her hip ROM to provide proximal stability to the hip joint and subsequently increase function and decrease pain. These potential outcomes were supported in the current literature.[8,9] However, the patient in this case study was only able to achieve one short-term goal (being able to participate in

isometric exercises in order to begin building functional strength) and progress in a long-term goal (demonstrating pain well managed at a level of 2/10 or less with all ADLs) and another short-term goal (increase bilateral hip ROM to WNL as pain allows). Throughout the process of conservative treatment, the patient was able to partially normalize her hip ROM, bilaterally, and increase the majority of her hip strength.

Although the patient became stronger and obtained a more normalized hip ROM pattern, she was still unable to increase her activity level without resultant pain and fatigue. Consequently, her activity level remained unchanged and classified as sedentary. While the patient's hip pain did decrease in intensity, duration, and frequency, it remained the limiting factor in this patient's life.

During this episode of care, the patient's overall motivation to participate in and her confidence in the potential success of the rehabilitation process was in doubt. Both the patient and her mother, upon initial presentation to physical therapy, mentioned they believed surgical intervention was the only option for successful treatment at this point. This belief was demonstrated in poor compliance in the home exercise program and attendance during PT sessions. These were likely factors may have been influential regarding the outcomes of the conservative treatment.

Reflective Practice and Conclusions

No QOL measures were implemented, monitored, or documented for this patient. Current published literature[6,8,9,10] indicated that when dealing with DDH or FAI, most often, it is the improvement in QOL that determines successful treatment outcomes rather than strength and ROM gains. Consequently, it is the conclusion of this author that this particular case study was limited in its findings by not gathering this data. It is recommended that in the future, clinicians should utilize QOL measures when providing intervention for patients with these disorders to determine if interventions were successful or not.

If the patient had filled out a QOL measure, such as the International Hip Outcome Tool (iHOT-33)[12] during the initial evaluation, at mid-term, and upon discharge, the clinician could have determined if progress was being made, even if it was not tangible. Had a QOL measure had been implemented, at the initial evaluation, then goals could have been created based on the results of this questionnaire. Consequently, the plan of care created for the patient could have been designed to improve quality of life, an endpoint that is valued by the patient, rather than focus on improvements in ROM and strength. For example, if a QOL measure had been utilized, more time would have been spent in patient education on how to modify her work, home, and school environments in order to better serve her, rather than only attempting to strengthen weak muscles and improve ROM. However, it should be noted, though the literature[6,8,9,10] indicates that, while improvements in QOL should be held superior, strength training and

ROM exercises could help increase the patient's QOL. It is recommended that clinicians should not do away with strength training and ROM exercises, but rather, attempt to make them applicable to improvements in QOL.

Regarding the patient presenting with an undiagnosed, congenital disorder, there is evidence supporting the use of serial clinical examination of the hips by a trained clinician during the periodic health examination of all infants until they are walking independently.[13] Screening for hip dysplasia may prevent the need for late treatment, which is associated with long term hip deformity, gait disturbance and arthritis."[14] It is anticipated that, had this screening been performed, the potential for early identification and action may have prevented boney formational changes. At age 16, there would be little potential to change boney formation other than through surgical intervention.

While it is unknown if a delay was due to patient compliance or the health system, it was almost 4 months from the initial onset of hip pain before the patient reached the physical therapy clinic. By this time, the patient was very discouraged and in so much pain, that it limited the potential success of PT. Eventually this patient will most likely have to undergo surgical intervention, including a rotational osteotomy of the acetabulum and simultaneous repair of the labrum. This surgical procedure would include at least 6 to 8 weeks of non-weight bearing status and most likely make it difficult for the patient to participate in school, work, and leisure activities during this period. With the co-morbidity of depression, a major life event such as this could very well exacerbate her symptoms as well as cause her to fall behind in school.

It recommended that future practice should include a more available and reasonable way in which to screen all newborns for DDH. Early detection is of vital importance in the road to recovery. Also, all forms of conservative treatment should be exhausted prior to seeking surgical intervention to prevent falling behind in current lifestyle activities (school, work, leisure). Finally, the primary goal of conservative treatment for patients with DDH, FAI or a combination of both should have a primary focus on improving the patient's QOL over and above musculoskeletal improvements such as strength and ROM. However, it is also recommended that improvements in strength and ROM may be utilized as a means to reach this end; these parameters should never be used as the primary indicators of successful treatment.

APPENDICES

APPENDIX A

HEP2GO™ FREE HEP Builder

Home Exercise Program

Created by Joseph Taylor, SPT Jun 16th, 2015

View at "www.my-exercise-code.com" using code: C3H96K4

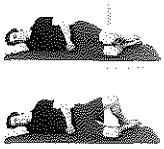
1

HIP INTERNAL ROTATION STRETCH - SEATED

Start by sitting on a chair with your legs spread apart and feet planted on the ground. Next, use your hand to draw your knee inward as shown.

Repeat 3 Times
Hold 10 Seconds
Complete 3 Sets
Perform 2 Time(s) a Day

2



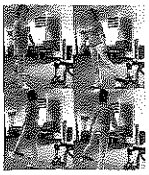
CLAM SHELLS

While lying on your side with your knees bent, draw up the top knee while keeping contact of your feet together.

Do not let your pelvis roll back during the lifting movement.

Repeat 10 Times
Hold 3 Seconds
Complete 2 Sets
Perform 2 Time(s) a Day

3



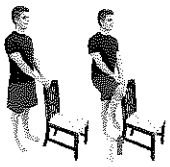
4 Way Hip #1

Stand on one foot with the resistance attached around the ankle of the other leg. The leg with resistance will move towards the weight and then away from it.

Stand facing four directions (front, right, back, left) so that the four main hip motions are worked.

Repeat 10 Times
Hold 3 Seconds
Complete 2 Sets
Perform 2 Time(s) a Day

4



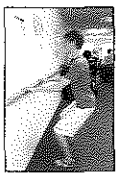
STANDING MARCHING - SIGNLE LEG

While standing, draw up your knee, set it down and then repeat on the same side.

Use your arms for support if needed for balance and safety.

Repeat 10 Times
Hold 3 Seconds
Complete 2 Sets
Perform 1 Time(s) a Day

5



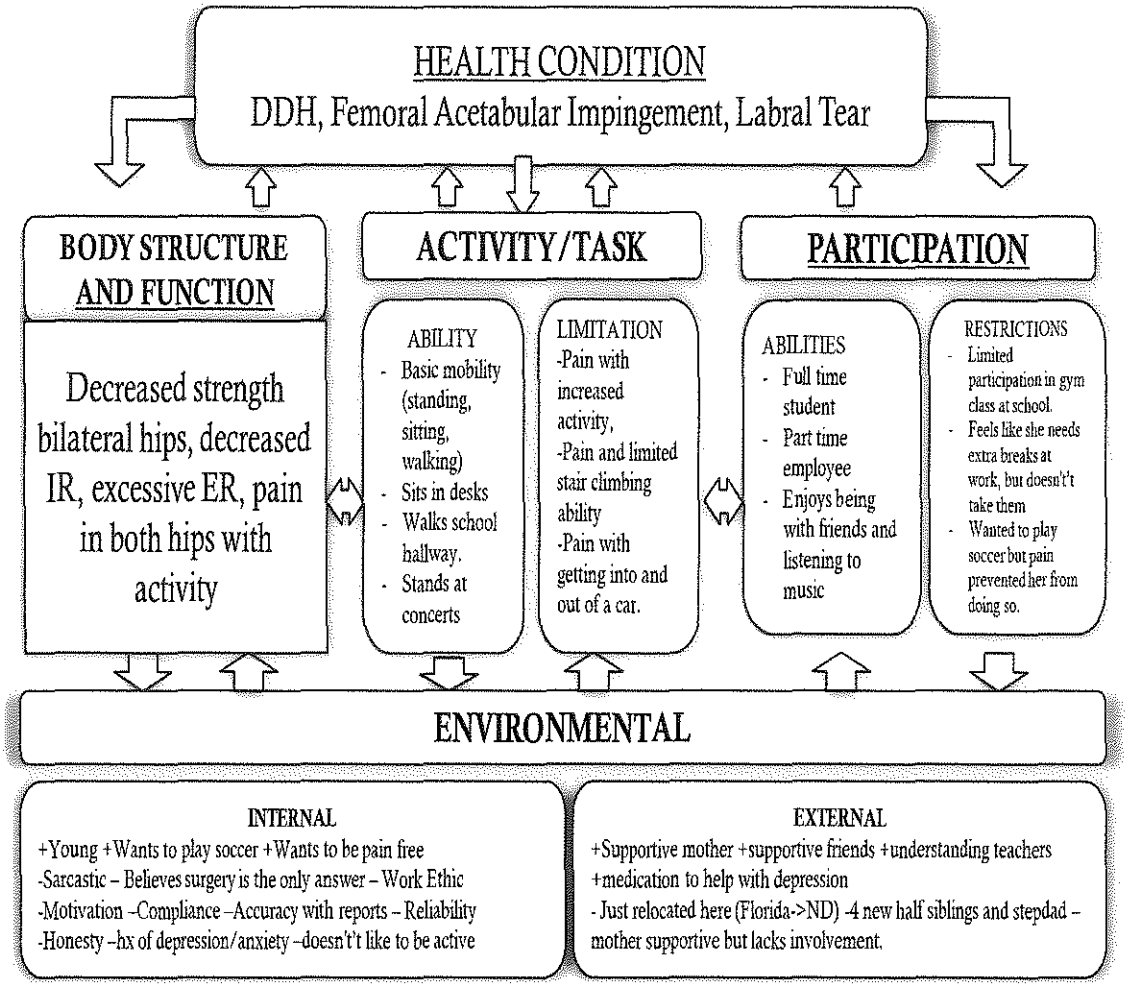
Mini squats

Stand at countertop and bend knees for a mini squat.

Repeat 10 Times
Hold 2 Seconds
Complete 2 Sets
Perform 2 Time(s) a Day

APPENDIX B

World Health Organization ICF Model



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