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Physical Therapy Management of a Patient with Diffuse Pigmented Villonodular Synovitis: A Case Report

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PHYSICAL THERAPY MANAGEMENT OF A PATIENT WITH DIFFUSE PIGMENTED VILLONODULAR SYNOVITIS: A CASE REPORT

by

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ABSTRACT

BACKGROUND AND PURPOSE: Pigmented villonodular synovitis (PVNS) is a rare, benign disease of the synovial tissue resulting in overgrowth and swelling of joints or tendon sheaths. Currently there is no conservative management of this condition as PVNS continues to grow without radiation and/or surgery. There is limited research on conservative symptom management prior to surgery or on post-operative physical therapy management. The purpose of this case report is to describe the outpatient physical therapy treatment of a patient who underwent surgery to remove a recurrence of diffuse PVNS 20 years after initial PVNS treatment of surgery and radiotherapy.

CASE DESCRIPTION: The patient was a 48 year-old Caucasian female referred to physical therapy with recurrent diffuse PVNS in her left knee. Twenty years prior to this episode, the patient was diagnosed with diffuse PVNS in her left knee and underwent a massive knee debridement, including a synovectomy and menisectomy followed by radiotherapy. The recurrence of symptoms resulted in difficulty performing transfers, ambulation, and performing work-related duties as a special education teacher. For this episode, the patient had a synovectomy, chondroplasty, and spur excision to remove the PVNS and the damage that it caused to the knee joint followed by physical therapy.

INTERVENTION: The patient was seen two times per week for 14 weeks for a total of 26 visits to address strength and range of motion deficits and gait abnormalities. These interventions included functional strengthening, stretching, and joint mobilizations.

OUTCOMES: At discharge the patient's left knee flexion increased by 45% and knee extension increased by 70%. Knee range of motion increased to functional range for sitting and squatting to perform household cleaning and work duties. Knee extension was lacking 3 degrees; however gait abnormalities were only evident with fatigue. Strength improvement was noted with a change from inability to perform functional transfers without significant pain to 5/5 ratings of manual muscle testing throughout bilateral lower extremities without pain.

DISCUSSION: Patients post-PVNS surgery may benefit from physical therapy interventions that address gait abnormalities, mobility, range of motion, and strength to improve functional status with transfers, ambulation, and stairs.

Acknowledgements

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I would also like to thank my advisor Debra Sellheim for all of her assistance and support in this research project.

RESEARCH ADVISOR FINAL APPROVAL FORM

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

PHYSICAL THERAPY MANAGEMENT OF A PATIENT WITH DIFFUSE PIGMENTED VILLONODULAR SYNOVITIS: A CASE REPORT

Submitted by
Christa Schutte

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

Primary Advisor Debra Sellheim, PT, PhD Date 2/16/15

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Chapter I: Introduction

Pigmented villonodularsynovitis (PVNS) is a rare, benign disease of the synovial tissue resulting in overgrowth and swelling of affected joints or tendon sheaths.[1] The prevalence of PVNS is estimated to be 1.8 per million people.[2] Myers and Masi[2] performed the current largest study on epidemiology of PVNS with 166 patients. The knee was found to be the most commonly affected joint followed by the hip and ankle. Patients are generally between the ages of 20 and 50 years old at the time of diagnosis.[3] Common symptoms include: swelling, pain, aching, and stiffness in the joint(s).

PVNS was first described by Chassaignac in 1852.[4] Jaffe et al[5] documented the common histological appearance of PVNS as a prolific disease of the synovial membranes, bursae, and tendon sheaths that is characterized by lipid-laden macrophages, poly-nucleated giant cells, and deposits of hemosiderin in fibrous stroma. The differentiation between diffuse and localized forms of PVNS was described in 1976 by Granowitz et al.[6] The localized form is contained in a small portion of a joint while the diffuse form can affect an entire joint, from the synovial membrane to the adjacent bone and soft tissue. Also differing between the two types is the recurrence rate, with the localized form rarely recurrent and the diffuse form having a high rate of recurrence.

Diffuse PVNS commonly occurs at a single joint. Rarely, it may occur bilaterally or in several joints.[3] The cause of diffuse PVNS has been linked to trauma, recurrent haemarthrosis, and homogeneous inflammatory arthropathies but these links have not been well supported in the literature.[3] Evidence supports that there may be a neoplastic cause due to the presence of chromosomal abnormalities, capacity for autonomous

growth, the invasion of bone, and malignant transformation. Diagnosis is confirmed with magnetic resonance imaging (MRI) that shows all or some of the following as the disease progresses: synovial swelling without calcification, effusion, a normal or altered joint space, juxta-articular and/or subchondral erosions, and cysts. MRI allows the orthopedic surgeon to determine the extent of the lesion, erosion, and invasion of the PVNS prior to surgical intervention. The goal of surgery is to completely remove the PVNS growth through a synovectomy with minimal soft-tissue disruption to maintain normal joint anatomy as much as possible. Depending on the damage and patient co-morbidities, the procedure is either open or arthroscopic. Radiotherapy is infrequently done with benign tumors due to the effects of radiation on soft tissue and bones as well as the risk of secondary cancer, however radiotherapy may be done postoperatively to decrease the risk of recurrence of PVNS. This is done via external beam radiation therapy or intra-articular injection of yttrium-90.[7] There are few publications on radiotherapy for the treatment of diffuse PVNS due to the small number of cases, however most of the patients undergoing radiotherapy combined with surgical intervention do not have recurrence. Currently there is no conservative management of this condition as the PVNS continues to grow without radiation and/or surgery. There is also limited research on conservative symptom management prior to surgery.[1,2,7]

The purpose of this case report is to describe the outpatient physical therapy treatment of a patient who underwent surgery to remove diffuse PVNS that recurred after being treated with a combination of surgery and radiotherapy twenty-years prior to the current episode. There is a paucity of literature on PVNS and its post-surgical

rehabilitation; therefore this case report adds valuable information to physical therapy practice about the rehabilitation of patients who have PVNS. This patient was a good case report candidate because she was motivated to participate, as evidenced by active participation in goal making and all aspects of physical therapy. The patient gave written informed consent to be the subject of this report (Appendix A).

Chapter II: Case Description

History

The patient was a 48 year-old Caucasian female who was referred to physical therapy with recurrent diffuse pigmented villonodular synovitis in her left knee. The patient lived with her husband in a two-story townhouse with one flight of stairs to ascend to the bedroom and no steps to enter the home. The patient walked her dog for exercise but did not participate in a formal exercise program. The patient worked as a special education teacher, which was physically demanding. At the time of evaluation, the patient had been on leave from work for three months.

Twenty years prior to this episode of care, the patient was diagnosed with diffuse PVNS in her left knee at a university hospital in the Midwest. Her symptoms included swelling and pain throughout the knee affecting her ability to perform daily activities. She underwent a massive debridement of her left knee, including a synovectomy and menisectomy, to remove the PVNS. Following surgery, the patient had radiation treatment to decrease the risk of recurrence of the disease.

The patient had recurrent symptoms of pain and swelling five years after the initial treatment, but was able to manage her symptoms conservatively with ice and rest until this episode of care. Over the past four years, the patient had noted increased swelling and pain with walking, stairs, transferring from sit to stand, and prolonged positioning. According to the patient's surgeon the findings from the patient's x-rays included: mild spurring of the lateral tibial plateau, mild loss of the lateral joint space, minimal effusion, and small patellar osteophytes (Figures 1-3). The MRI findings

included: small joint effusion, mild medial compartment osteophytes, macerated lateral meniscus consistent with post-operative changes after initial surgery, chondrosis of lateral and patellofemoral compartments, and dense soft tissue material extending throughout the joint.

Figure 1

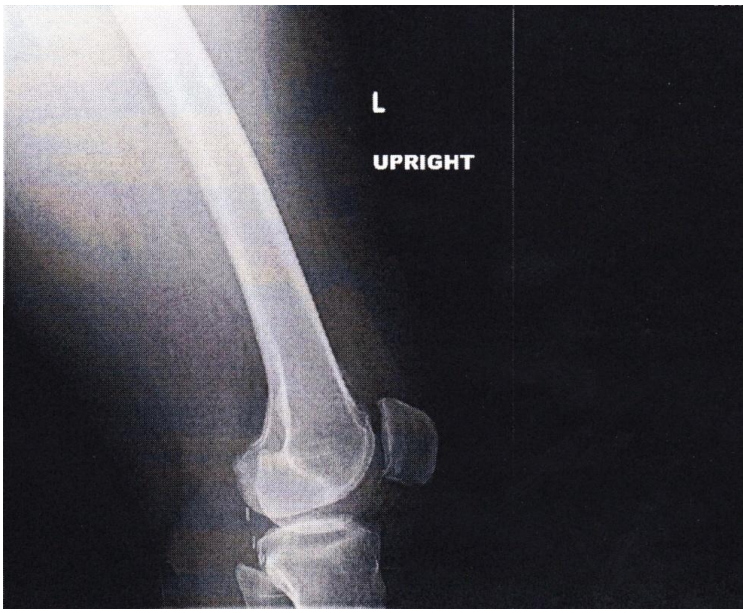
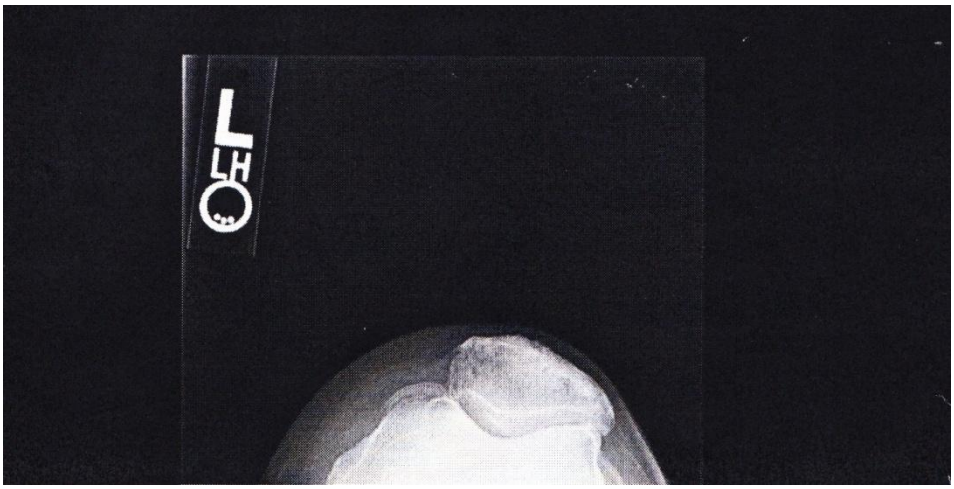


Figure 2

Figure 3



The patient underwent a left knee arthroscopy with synovectomy, chondroplasty, and spur excision to remove PVNS and the damage that it caused to the knee joint. The surgeon recommended that the patient receive a total knee arthroplasty if there was another recurrence of the disease. A total knee arthroplasty would non-selectively remove the affected portion of the knee so she would not need additional surgery to remove the PVNS. The patient did not have physical therapy while in the hospital, and started outpatient physical therapy four days after surgery. The patient came to the physical therapy evaluation session without an assistive device but was instructed to use a single end cane for pain management as part of her physical therapy intervention.

Other significant aspects of the patient's medical history that may have influenced her outcome include Bipolar II disorder and migraine headaches. The patient did not report any difficulties with either condition during her time in physical therapy. The patient's chart was reviewed to get a better understanding of her psychological state and Bipolar disease. According to the patient's psychologist, her mood and anxiety levels

had been stable for over one year. The patient was involved in a motor vehicle accident toward the end of therapy, resulting in right hip pain, but did not injure her left knee.

Examination

The patient presented to physical therapy four days after surgical removal of the PVNS. As outlined in the *Guide to Physical Therapist Practice*,[8] a review of body systems was performed. Table 1 outlines the significant findings of the integumentary, musculoskeletal, and neuromuscular systems. No abnormalities were found in the cardiopulmonary or cognitive systems.

The patient's pain was measured using the Numeric Pain Rating Scale (NPS). The NPS has been found to be a valid and reliable measure for chronic and acute pain.[9] A study by Salaffi et al[10] found the minimally clinical important difference in rating to be one point or a reduction of 15.0%. The patient's pain was 0/10 at rest and 4-5/10 with ambulation. The pain was aggravated by weight bearing and bending or straightening the knee through full range of motion. It was relieved by ice, elevation, and acetaminophen. The incisions from the first surgery healed well, but the scars remained observable. The current arthroscope holes were healing normally, with no signs of infection. Mild to moderate edema was noted as well as bruising on the anterior and medial knee. The patient had normal sensation other than the area around the incision where the sensation was decreased.

Range of motion was measured according to the protocol by Norkin and White.[11] Goniometry is a valid, reliable outcome measure for range of motion.[12, 13] Gogia et al[12] performed a study on the validity and reliability of knee goniometry measured by two

physical therapists and found that goniometry of the knee has high validity (r = .97-.98; ICC = .98-.99) and intertester reliability (r = .98; ICC = .99). According to a study by Boone et al,[13] the minimal detectable change is three to four degrees. The patient had full range of motion in her hips bilaterally and right knee flexion and extension. Left knee flexion was 80^{o} and painful and left knee extension was lacking 10^{o} and painful. Both end feels were empty due to the patient's increased level of pain with overpressure.

Strength testing was performed according to the methods described by Reese.[14] Manual muscle testing is a valid and reliable outcome measure, however dynamitic measurements are better able to detect differences in strength.[15] A study by Shahgholi et al[16] found that there were not significant differences between manual muscle testing and dynometric measurements for strength grades 4 and lower. For grades above 4, dynometric readers were found to be better indicators of strength. All hip musculature strength was 5/5 bilaterally. Right knee flexion and extension strength were 5/5. The patient was able to demonstrate an excellent quadriceps set on the right and a fair contraction on the left. Formal muscle testing was not performed on the left knee due to pain. Pain and weakness were noted with both left knee flexion and extension.

Per surgical protocol, the patient was able to weight bear as tolerated. The patient transferred from sit to stand with the use of her upper extremities due to her pain and decreased left knee flexion. As the patient could not obtain 90 degrees of knee flexion, she had difficulty shifting her weight to rise from the chair due to her knee joint alignment. The patient ambulated with an antalgic gait favoring the left lower extremity in a step-to pattern. She ambulated with a moderate limp on the left due to decreased left

knee extension range of motion. Due to the patient's level of pain with ambulation, she was only able to walk one block at the time of evaluation. The patient ascended and descended stairs with a step-to pattern. Each direction was equally painful.

Due to these impairments and functional limitations, the patient was unable to perform her work related duties as a special education teacher, perform household chores efficiently (vacuuming, sweeping, cooking, laundry, dishes, etc.), ambulate more than one block, or get a full night's rest. The patient's goals for physical therapy were to return to work and to perform household activities without pain or difficulty. Physical therapy goals included: ambulation without a limp or pain, functional knee range of motion to improve transfers and gait, and compliance with a home exercise program so that the patient could eventually be independent in her exercise program.

TABLE 1. Evaluation Measures

Pain	0/10 at rest; 4-5/10 with ambulation
Incision	● Past scope holes well healed; scarring noted ● Current scope holes normal; no signs of infection ● Mild to moderate swelling ● Bruising anterior and medial knee ● Positive tenderness ● Mild numbness
Range of Motion	Hip WNL bilaterally Knee Flexion: right 130^{o} left 80^{o} painful Extension: right 0^{o} left lacking 10^{o} painful
Strength	• Hip WNL bilaterally • Quad set contraction: right excellent left: fair • Pain and weakness with left knee flexion/extension: not formally tested due to pain
Sit to stand	Modified independent with use of upper extremities due to pain
Gait	● Antalgic favoring left lower extremity; step-to pattern ● 1 block ● Stairs ascend/descend stairs with 1 railing; step-to patterns
Sleep	Limited by 50% secondary to pain

Evaluation/Diagnosis

The patient presented to physical therapy four days status post left knee arthroscopy with synovectomy, chondroplasty, and spur excision to remove PVNS and the damage that it caused to the knee joint. The patient had difficulty with ambulation, transfers, stairs, work duties, and household duties secondary to pain, stiffness, decreased range of motion, and decreased strength consistent with surgery following the removal of PVNS.

Prognosis

The patient had an excellent prognosis with skilled physical therapy intervention to improve strength and range of motion to improve functional mobility. The patient was motivated to participate and had good spousal support. The patient remained positive about her progress and did not miss any sessions. Her prognosis was complicated by the risk of another PVNS recurrence. There is no study to date to predict the amount of physical therapy that a patient with PVNS may require. Since the patient had already had one recurrence of the disease, she was at greater risk for another recurrence if not all of the PVNS tissue was removed. As previously mentioned, the surgeon recommended a total knee arthroplasty if there should be a third recurrence to remove all tissue in the joint, limiting the risk of yet another surgery. Sharma and Cheng[17] found that 75% ± 13% of patients do not have recurrence at 2 years and 53 ± 18% at 5 years, indicating that the risk of recurrence increases as time since surgery increases.

The patient was seen two times per week for 14 weeks for a total of 26 visits. All sessions except the hour long evaluation session were 30 minutes in duration. According

to a study by O'Connor and Jackson,[18] the average patient who underwent a complex knee arthroscopy required 5.9 ± 3.1 physical therapy visits to meet minimal functional goals following surgery. This patient required more visits due to her past history of surgical removal of PVNS and the extent of the damage that the recurrent PVNS had caused to her knee joint.

Intervention

A physical therapy plan of care was developed in order to address the patient's functional difficulties with her activities of daily living and work-related duties. The plan of care included interventions addressing strength and range of motion in order to improve gait and transfer ability.

Strengthening was an important component of this patient's care to counteract the effects of decreased activity due to pain and stiffness before surgery, the impact of surgery on the body, and decreased activity while recovering from surgery. While strength measurements were unable to be obtained in the evaluation due to pain, pain and weakness were noted with left knee flexion and extension. Therefore, exercises were chosen that would increase quadriceps and hamstring strength (Table 2). Hamstring and quadriceps strength are needed for proper gait mechanics, transfers, and the patient's daily activities, including lifting students with disabilities at her job in a school setting. Parameters for strengthening were 2-3 sets of 10 repetitions with increasing resistance as the patient's strength and neuromuscular control improved. The patient performed quadriceps sets for early strengthening and to facilitate the restoration of communication between the muscle and the brain after surgery.

The patient had more difficulty regaining range of motion than strength, therefore a variety of manual stretching as well as functional movement through available range with end-range overpressure and/or holds for three thirty-second repetitions were included in the session to restore the patient's range of motion to improve functional mobility. When the incision was in the chronic phase, more aggressive manual therapy was performed, including: anterior and posterior joint mobilizations.

Table 2. Interventions

Category	Exercises
Strength	Supine quad sets Short arc quad Supine straight leg raise Bilateral heel raises To promote equal weight bearing: tandem stance, single leg stance Biking Resisted terminal knee extension (red to green Theraband) Hamstring curl weight machine (unilateral and bilateral) Leg press weight machine (unilateral and bilateral) Step ups (forward, backward, lateral)
Range of Motion	Heel slides Manual stretching: supine knee extension stretch progressing to prone; seated knee flexion stretch Standing gastrocnemius set Anterior/posterior knee joint mobilizations Scar tissue mobilization

The patient performed a home exercise program to continue progression outside of therapy (Table 3). The patient was instructed to perform her home program twice daily. Strengthening exercises were performed in 2 sets of 10-15 repetitions and stretches were performed with 4 repetitions of 30 second holds. Evidence of the patient's

compliance included her ability to perform the exercises with decreased cueing on proper form and technique as she gained experience.

Table 3. Home Exercise Program

- Supine quad sets
- Supine heel slides
- Supine straight leg raise
- Knee extension stretch: seated, prone, supine
- Standing gastrocnemius set
- Bilateral heel raises
- Tandem stance
- Resisted terminal knee extension
- Short arc quad

Chapter III: Outcomes

The patient demonstrated significant change over the course of her treatment as detailed in Table 4. The average reported pain with prolonged, strenuous activity was 2/10. When she felt fatigued, she used her single end cane to decrease the load on the left knee. The patient's pain progressively decreased in intensity and the workload that she was able to perform prior to onset of pain increased. The patient scored 5/5 in all manual muscle tests in her bilateral lower extremities at discharge, indicating improvements in strength. By discharge, the patient's left knee flexion had increased by 45% and knee extension had increased by 70%. Knee flexion increased to functional range for sitting and squatting to perform household cleaning and work duties. Although the patient's left knee extension had gained 7 degrees, she continued to lack 3 degrees, resulting in a slight limp. This limp worsened when fatigued, but the patient no longer demonstrated an antalgic gait pattern unless she performed a high amount of activity during the day. As her pain decreased and strength increased, the patient was able to improve her ambulation endurance from household distances to community distances while walking her dog.

At discharge, the patient continued to have decreased left knee range of motion. However, she had met her functional goals of improving her transfers and ambulation. The patient also met her goals of returning to work and performing household activities without pain or difficulty. She understood she may only see minimal further improvement due to this being her second episode of surgery. She demonstrated good understanding of her home exercise program and motivation to continue working on her strength and range of motion independently.

Table 4. Comparison of evaluation and discharge measures

Measure	Evaluation	Discharge
Pain	0/10 at rest; 4-5/10 with ambulation	0/10
Incision	● Scope hole appear normal; no infection ● Mild to moderate swelling ● Bruising anterior and medial knee ● Positive tenderness ● Mild numbness	Well healed scope incisions
Range of Motion	Hip WNL bilaterally Knee: *Flexion*: right→130^{o}; left→80^{o} and painful *Extension*: right→0^{o}; left→lacking 10^{o} painful	Knee: Left flexion→117^{o}; not painful Left extension→lacking 3^{0}; not painful
Strength	Quad set: right→excellent left→fair	Quad set: excellent bilaterally MMT: Bilateral lower extremities 5/5
Sit to Stand	Modified independent: use of upper extremities due to pain	Independent
Gait	● Antalgic favoring left lower extremity; step-to pattern ● 1 block ● 8 ascend/descend stairs with 1 rail; step-to pattern	● Slight antalgic gait favoring left lower extremity; step-through pattern; infrequent use of cane ● Community distances ● Ascend/descend stairs reciprocally
Sleep	Limited by 50%	Not limited

Chapter IV: Discussion

Patients who are diagnosed with PVNS experience pain in the affected joint, swelling, and impaired range of motion as the disease damages the joint.[1] PVNS has been shown to impact the synovium, bursae, connective tissue (ligaments, tendons, etc.), and bones from overgrowth of the lipid-laden macrophages, poly-nucleated giant cells, and deposits of hemosiderin in fibrous stroma.[5] These pathological changes disrupt the joint's integrity as well as its ability to function properly, resulting in pain, swelling, decreased strength, and decreased range of motion. The only successful management of this disease is surgical removal through a synovectomy and repair of damaged surrounding tissue.[14] While surgery is the gold standard approach to treatment, there is a high recurrence rate, as in the case of this patient. Surgery is traumatic to the patient, and in the short term increases their functional limitations and pain. If all of the diseased tissue is not removed, the growth will return and the patient will need to have additional surgery. With each surgery, the patient has an increased risk of mortality and infection.[14]

This case report contributes to the body of knowledge in physical therapy, as few studies have been completed to date on the rehabilitation of patients with PVNS. The patient described in this case report demonstrated marked improvement in range of motion and strength, resulting in improved functional mobility and the ability to perform activities of daily living. Prior to surgery and physical therapy intervention, the patient had difficulty performing activities of daily living, including cleaning and cooking, as well as her work related duties as a special education teacher due to pain, weakness, and decreased range of motion. While it is difficult to determine if the patient would have

improved without physical therapy intervention or with surgery alone without a randomized control trial, it is evident that the patient benefited from physical therapy intervention as her return to functional range of motion and strength was slow and would likely have not progressed independently. The patient was seen in the clinic for twenty-six visits before she reached a plateau and was determined able to continue working on her range of motion and strengthening exercises independently.

Other factors could have influenced this patient's outcomes. While the patient appeared to be open about discussing her mental state and psychology documentation with her physical therapist, she could have been withholding information to prevent bias toward her during treatment. As previously mentioned, it was noted that the psychologist reported that the patient had been stable in mood and anxiety for the past year. Psychological instability may have impacted the patient's outcome if she were depressed or unmotivated to complete her home exercise program or be an active participant in therapy sessions. Additionally, the patient was in a motor vehicle accident toward the end of physical therapy for her knee. Through history taking and evaluation of the patient after the car accident, it was determined that the knee was not involved.

Recommendations for future outpatient physical therapy programs for individuals with diffuse PVNS include a comprehensive program consisting of resistance strength training and range of motion interventions in order to improve mobility and function. Since there is little literature on the physical therapy management of PVNS, it is important that physical therapists communicate with physicians about the benefits that physical therapy may provide for these patients.

A limitation of this case report is that there are no known standardized tests for patients diagnosed with PVNS. The evaluation of this patient was completed prior to the author's management of the case and therefore a standardized measure other than range of motion and strength was not used at the evaluation. A qualitative outcome measure could have been included to better record the status of quality of life and function. Examples of outcome measures applicable to this case include: SF-36 and the Lower Extremity Functional Scale.

As a single case, the ability to generalize the findings of this case report to other patients with PVNS is limited. Randomized control trials on the benefits of physical therapy intervention to improve range of motion and strength of patients with PVNS are warranted. Such studies could benefit the profession of physical therapy by standardizing the treatment of these patients.

Chapter 5: Conclusion

PVNS disrupts joint integrity, resulting in pain, swelling, and decreased strength and range of motion, indicating that there may be a need for physical therapy intervention. As in the case of this patient, impaired joint integrity from the PVNS lesion, erosion, and invasion done to bone and connective tissue results in decreased strength and range of motion, affecting activities of daily living and function. Post-surgical physical therapy interventions should address gait abnormalities, mobility, range of motion, and strength. Physical therapy assists the patient in restoring range of motion and strength as much as possible.

Due to damaging bone and connective tissue effects, it may be difficult for a patient with PVNS to regain range of motion and strength; thus more physical therapy may be required than other arthroscopic knee surgeries. While it is difficult to determine if the patient would have improved without PT intervention without a randomized control trial, it is evident that the patient benefited from physical therapy due to her improved functional status. Her return to functional range of motion and strength was slow and would likely have not progressed well independently.

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Appendix A

Information and Consent Form

Introduction:
You are invited to be the subject of a case report assignment to be written by Christa Ahrens, Doctor of Physical Therapy graduate student from St. Catherine University, under the supervision of Debra Sellheim, PT, PhD, 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 assignment 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 assignment 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 assignment 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 assignment 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 of this case report assignment (if applicable; student will inform you);
2. whether what you say can be quoted directly in the case report assignment.

The case report assignment will be read by DPT faculty members. This case report assignment may be read by the physical therapist/s supervising the student at this facility. The case report assignment will be presented to other students and faculty at the St Catherine University Doctor of Physical Therapy Program. The case report assignment may also be 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 assignment.

Confidentiality:
Any information obtained in connection with this case report assignment that could identify you will be disclosed only with your permission. 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 assignment is voluntary. Your decision whether or not to participate will not affect your future relations with 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 assignment, at any time. You may also contact Debra Sellheim, DPT Program Faculty, if you have questions at any time (see contact information below). You may keep a copy of this consent form for your records.

Statement of Consent:
You are making a decision whether or not to participate in this case report assignment. 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 assignment, at any time.

I agree to participate in this case report assignment. Yes ___ No___

I agree to being quoted directly in this case report assignment. Yes____ No____

I agree to being photographed and having the photographs included in the public presentation and/or publication of this case report assignment. Yes ___ No___ NA___

_____

Signature of subject Date

_____

DPT student's signature Date

Faculty member supervising the student:

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