SECOND PLACE WINNER

Lan Liu

Will contact-relax stretch and swedish massage increase length of hamstring and improve quality of life in a patient with Parkinson’s disease?

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Conflict of Interest

The author of this case report declares no conflict of interest.

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A special gratitude goes to Myriame Lépine Lyons, Education and Support Services Coordinator of Parkinson Society British Columbia for generously providing me with very valuable information about Parkinson’s disease.
Abstract

**Background:** The patient in the study was a 58-year-old male with PD, whose activities of daily living were affected by rigid hamstrings.

**Objective:** To discuss the outcome of a patient with Parkinson’s disease (PD) treated with Swedish massage combined with Contract-Relax (CR) stretch, a Proprioceptive Neuromuscular Facilitation (PNF) technique.

**Methods:** The methods used for this study included 40-minute massage therapy sessions twice weekly for a total of five treatments. Each treatment followed the sequence of posterior to anterior leg, unaffected side to affected side, with a combination of Swedish massage techniques and CR stretch of 6-second submaximal contractions (for a total of three contractions) with 10-second relaxation periods in between. The assessment methods consisted of PDQ-39 questionnaire, observation, palpation, functional test, active range of motion (AROM) and special tests.

**Results:** The patient showed temporary increase in the length of affected hamstrings. The patient’s stress level noticeably impacted the outcome of the stretching procedure. There was little improvement in his AROM at hip and knee joints except for slight increase in internal and external rotations at the hip joint. The results of PDQ-39 questionnaire suggested an improvement in the dimensions of mobility and cognition yet a slight decrease in emotional...
well-being, social support and communication.

**Conclusion:** This case study demonstrates that CR stretch and Swedish massage are effective treatments for temporarily increasing length of hamstring, and partially improving quality of life in the patient with PD.

*Keywords:* Parkinson’s disease, Hamstrings, Swedish massage, Proprioceptive Neuromuscular Facilitation technique, Contract-Relax stretch
Introduction

Background

Parkinson’s disease (PD), typically affecting elderly patients, is a subcortical neurodegenerative disorder characterized by movement disorders and pathologic changes of the involuntary motor system nuclei in the substantia nigra of the midbrain. According to the World Health Organization, overall crude prevalence (including males and females across the entire age range) falls between 100 and 200 per 100,000 persons. The latest statistics from Parkinson Society of British Columbia showed that PD affected 1% of adults over the age of 65, and is slightly more common in men; there are approximately 100,000 people with PD in Canada. The annual healthcare cost for PD is ranked the third highest at $120,358,000, next to Epilepsy and Alzheimer’s.

Etiology

While the cause of PD is unknown, “this disease is characterized by a decreased number of dopaminergic neurons in the substantia nigra” of the midbrain. “Neurons that release dopamine, extending from the substantia nigra to the basal nuclei, help control subconscious muscle activities; loss of these neurons is associated with Parkinson’s disease.”
is related to various movement disorders due to the involvement of midbrain
which regulates and coordinates these movements. Unfortunately, in most
cases, PD is progressive and incurable \(^{(1)}\).

**Signs and Symptoms**

The symptoms of Parkinson’s disease begin unilaterally and eventually
become bilateral \(^{(6)}\). The four major motor symptoms of PD grouped under the
acronym TRAP \(^{(7)}\) include:

- **Tremor.** At rest often the first observed symptom in PD, also known as
  “pill-rolling”;
- **Rigidity.** Uniform, increased resistance throughout movement;
- **Akinesia (or bradykinesia).** Slowness in planning, initiating and
  sustaining movement;
- **Postural instability.** Developed toward the later stages of PD, when
  patients begin to lose postural reflexes and experience persistent
  instability while standing \(^{(7)}\).

There are also non-motor (neuropsychiatric) symptoms that nearly all
patients with PD would experience throughout the course of the disease
progression. These symptoms include, but are not limited to: depression,
dementia, sleep disorders, autonomic dysfunction encompassing
cardiovascular, gastrointestinal, urogenital and thermoregulatory disorders, as
well as psychotic symptoms such as hallucination and paranoia. They
“contribute to increasing disability and a negative impact on quality of life” (8).
Another study listed sensory disturbances as part of the clinical picture of PD,
where abnormalities in sensory processing, through a basal ganglia
involvement, were thought to be responsible for the sensory dysfunction (9).

**Disease Progression**

PD progresses slowly or rapidly with mild or severe symptoms (6). Hoehn-Yahr Scale of 1 to 5 was used by another study group to evaluate the disability of PD (6, 10).

**Current Treatments**

A research study pointed out that “drug treatment is the main way to control the symptoms of Parkinson’s”, and the common types of drugs currently being used to treat patients with Parkinson’s disease are Levodopa, Dopamine agonists, Apo-morphine, Glutamate antagonists, Anticholinergics, Catechol-O-methyltransferase (COMT) inhibitors and Monoamine oxidase-B (MAO-B) inhibitors (11). Levodopa, a natural precursor to dopamine, can enter the brain to replace the lost dopamine, and is “most effective in reducing tremor, rigidity and akinesia”; nevertheless, it’s most common side effects are “nausea and abdominal cramping”; long-term treatment with levodopa or the dopamine
agonists is “associated with two potential types of complications: hourly fluctuations in motor state and dyskinesia” \(^{(12)}\).

Deep brain stimulation (DBS), a surgical technique, is sometimes used to alleviate slowness of movement, stiffness and tremor of PD patients \(^{(11)}\). However, the adverse effects of surgery range from brain hemorrhage, infarct, seizures to even death; side-effects from the stimulation itself include “worsening dyskinesia, paresthesia, and subtle cognitive, mood, speech, phonation, and gait disturbances”; other complications consist of “lead breakage or other hardware failure, pulse-generator malfunction, and hardware infection” \(^{(13)}\).

In terms of non-drug therapies, “occupational therapy, physiotherapy, speech and language therapy can be of huge benefit to patients and have a positive impact on their quality of life” \(^{(11)}\). Earlier studies have affirmed that people with PD frequently use alternative therapy. For example, a study conducted by Johns Hopkins Medical School and Boston University School of Medicine found that 40% of the 201 studied patients had used “some form of alternative therapy in conjunction with traditional treatment. Over 70 percent of this group used more than one form of alternative therapy; mostly vitamins and herbs, massage and acupuncture” \(^{(12)}\).
**Massage Therapy Intervention**

The benefits of therapeutic massage, as summarized in a pilot study of massage in patients with PD, are reduced muscle rigidity, better movement coordination and improved balance in walking; in addition to enjoying the massage, “individuals showed improvement in self-confidence, well-being, walking and activities of daily living” (14). On the cellular level, “therapeutic massage balances the blood levels of serotonin, dopamine and endorphins, which in turn facilitates the production of natural killer cells in the immune system and regulates moods”; “at the same time, massage stimulates vagus nerve function, reduces cortisol levels, and regulates epinephrine and norepinephrine levels, which facilitates the action of growth hormone” (15). A pilot study utilizing a 30-minute massage therapy for five weeks on sixteen adults diagnosed with PD has been conducted (16). The results of this study suggested that “massage therapy may enhance some level of functioning in progressive or degenerative central nervous system disorders or conditions”.

Of additional interest were the positive findings of the study on PD patients which showed that “regular massages (twice a week) may increase the efficiency of the (body) system’s utilization of medication and may occasionally permit a reduction of the dosage” (17, 18).
**Proprioceptive Neuromuscular Facilitation Stretching Techniques**

As stretching techniques, PNF “integrate active muscle contractions into stretching maneuvers purportedly to inhibit or facilitate muscle activation and to increase the likelihood that the muscle to be lengthened remains as relaxed as possible as it is stretched”; PNF stretching is categorized into hold-relax or contract-relax (CR), agonist contraction and hold-relax with agonist contraction (19).

The PNF technique selected for this case study is CR, based on the theory that the activation of the Golgi Tendon Organs, the proprioceptors situated in the muscle tendons “during the isometric action associated with the contract-relax PNF techniques” decrease the excitability of the target muscle via the Ib-inhibitory interneuron and allow the muscle-tendon unit to undergo a greater elongation (20). CR had been recommended as a preferred technique for patients with PD (21, 22), which however was not supported by any follow-up study or experiment.

There was also a different opinion that PNF stretching techniques “cannot be used effectively for patients with paralysis or spasticity resulting from neuromuscular diseases or injury” (19), yet no further elaboration was provided.

Although there are abundant research and studies on the effect of PNF techniques in decreasing muscle hypertonicity and improving the functions of
extremities, few studies have reported the effect of PNF in patients with PD. The case study detailed below is an attempt to establish the positive effects of CR stretch and Swedish massage on a patient with PD.

**Hypothesis of the Case Study**

A combination of Swedish massage and Contract-Relax technique will stretch the hamstrings and enhance the quality of life in the Parkinson’s patient.

**Methods**

**Patient History**

The patient is a 58-year-old Caucasian male, diagnosed with PD about eight years ago. Initial signs and symptoms started with a decrease in his ability to write properly then to noticeable changes in his speech, muscle tightness and impairment with his balance. The patient complained that the pain and discomfort caused by the tight hamstrings in his right leg had affected his activities of daily living such as sitting, driving and walking; and painful muscle spasms consistently woke him up from sleep. The patient was on two medications for his PD: Levocarb and Azilect. The general health of the patient was otherwise good with no prior injuries. The patient was not doing any exercise, and was interested in trying out massage therapy, hoping it would help to relieve his muscle stiffness and discomfort (*see Appendix 1 for*...
history forms and treatment notes).

**Equipment**

The case study, including interview, assessment and massage therapy treatment, was conducted in the student clinic at the West Coast College of Massage Therapy. The air-conditioned room, set at 20°C, was equipped with a draped massage table and two chairs. Soft calming music was played in the background. Holy oil was applied as lubrication for each treatment. A goniometer was used to measure the active range of motion (AROM) of hip and knee joints, as well as the Straight Leg Raising (SLR) Test. A paper clip bent into a U-shape was utilized to assess the dermatomes and function of the peripheral nerves.

**Assessment**

Tools of assessment included PDQ-39 questionnaire (PDQ-39) for PD, observation, palpation, functional test, AROM, Two-Point Discrimination Test and special tests.

The 39-item PD questionnaire, the most extensively tested and used assessment tool for PD, covers eight dimensions: mobility, activities of daily living (ADL), emotional well-being, stigma, social support, cognition, communication and bodily discomfort. Items are scored from 0 to 4 based on
severity. A summary index is then calculated as the mean of the total sum score of the dimensions divided by the number of dimensions\(^{(23)}\).

Observation and palpation were performed prior to each treatment. For proper observation, the patient was advised to wear shorts. The observation commenced as the patient was taken into the treatment room. The patient presented a slow gait, leaning forward posture, slight knee flexion and reduced swinging of the arms. In standing, the patient showed moderate postures of head forward, kyphosis and rounded shoulders. The palpation revealed hypertoned muscles including hamstrings, quadriceps, adductor magnus, gastrocnemius and soleus, with the right side more severe than the left. Trigger points were palpable in bilateral gastrocnemius and soleus muscles. There was numbness in the anterolateral side of his right lower leg. The functional touch-toe test showed restriction from the tight hamstrings.

The assessment protocol for this study followed those of a previous study\(^{(24)}\) to bilaterally measure AROM of flexion, extension, abduction, adduction, internal rotation and external rotation at hip joint as well as flexion and extension at knee joint both before and after each treatment.

To avoid risk of harm due to potential sensory deficit caused by PD, Two-Point Discrimination Test\(^{(6)}\) was performed, prior to the first treatment, to the area where numbness was found during palpation, including the dermatomes.
of L4 and L5 nerve roots, in addition to the skin innervated by lateral sural cutaneous nerve and superficial fibular nerve. The nerve roots proved to be intact, but the said peripheral nerves were found impaired.

Three special tests performed before and after each treatment session were SLR Test for length of hamstrings (25), Hamstring Contracture (HC) Test (26) and Thomas Test for hip flexion contractures (26).

**Treatment**

The treatment plan for this case study consisted of 40-minute massage therapy session, twice a week for five treatments in total. The second treatment was postponed for 3 days by the patient due to food poisoning.

Each massage treatment followed the sequence of posterior to anterior leg, unaffected side to affected side, with a combination of Swedish massage techniques and CR stretching. The details are illustrated in Table 1 below.

**Table 1:** Treatment protocol showing patient position, area treated, duration and techniques used.

<table>
<thead>
<tr>
<th>Position</th>
<th>Treatment Area</th>
<th>Duration</th>
<th>Massage Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prone</td>
<td>Full body</td>
<td>3 minutes</td>
<td>Palmer compression and rocking</td>
</tr>
<tr>
<td></td>
<td>Left leg</td>
<td>5 minutes</td>
<td>Light stroking, wringing, picking up, muscle stripping and kneading</td>
</tr>
<tr>
<td></td>
<td>(posterior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Right leg</td>
<td>15 minutes</td>
<td>Light stroking, wringing, picking up, muscle stripping and kneading</td>
</tr>
<tr>
<td></td>
<td>(posterior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supine</td>
<td>Left leg</td>
<td>5 minutes</td>
<td>Light stroking, wringing, picking up, muscle stripping and kneading</td>
</tr>
<tr>
<td></td>
<td>(anterior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Right leg</td>
<td>10 minutes*</td>
<td>Light stroking, wringing, picking up, muscle stripping and kneading</td>
</tr>
<tr>
<td></td>
<td>(anterior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Right leg</td>
<td>2 minutes</td>
<td>CR stretch</td>
</tr>
</tbody>
</table>

*7 minutes before and 3 minutes after CR stretch
Swedish massage techniques such as palmar compression, rocking and light stroking were applied to promote relaxation. The muscles including hamstrings, quadriceps femoris, hip adductors, tensor fasciae latae, sartorius, gastrocnemius and soleus were treated with the techniques of wringing, picking up, muscle stripping and kneading, with the purpose of increasing local circulation, breaking down tissue adhesions and decreasing muscle hypertonicity. The pressure of the massage was modified to avoid stimulating sympathetic nervous system firing (6). Special attention was paid to the area of the patient's right lower leg with altered sensation, where lighter pressure was applied.

CR stretch was only performed on the right leg aiming at lengthening the affected hamstrings. The hamstrings are a group of muscles in the posterior thigh including the biceps femoris, semitendinosus and semimembranosus, all attaching proximally onto the ischial tuberosity and distally onto the medial side of posterior thigh (semitendinosus and semimembranosus) and the lateral side of posterior thigh (biceps femoris) (27). As a group, all three hamstrings flex the leg at the knee joint, and, except the short head of the biceps femoris, all extend the thigh and/or posteriorly tilt the pelvis at the hip joint; the hamstrings are more powerful at the hip joint than at the knee joint (27).

The CR stretch performed in this case study followed the protocol as
outlined in an earlier pilot study \(^{(28)}\). The patient laid supine with his left leg straight on the table and right leg at 90-degree hip flexion. The right lower leg was then passively extended to the point of initial resistance, where the patient performed a submaximal isometric contraction with the hamstring muscles for 6 seconds, followed by 10 seconds of relaxation. The right lower leg was then slowly extended further until the same level of resistance was felt. The patient performed two more 6-second submaximal contractions (for a total of three contractions) with 10-second relaxation periods in between. The findings of this study suggested that 20% and 60% voluntary isometric muscle contraction was just as effective as 100% isometric contraction during CR hamstring stretching \(^{(28)}\). For patient comfort, 20% submaximal isometric contraction was adopted for this case study.

**Results**

Results of SLR Test, as shown in Figure 1, demonstrated an overall slight increase in the length of hamstrings in right leg, and temporary increase was achieved by the end of each session, except for the last one when the patient was unable to relax due to stress from work. The left side hamstrings was also measured for comparison, which showed temporary increase in the first three sessions. Figure 2a shows SLR Test at the start of the study and Figure 2b at
the end.

Figure 1: SLR Test before and after treatments (1-5) for the left and right legs.

PDQ-39 was filled out before the first and after the fifth treatment (refer Appendix 2) to compare the changes in patient’s quality of life. Following the protocol outlined in a previous study (29), Parkinson's disease summary index (PDSI) a highly reliable and valid data, is calculated based on the mean of the total sum score of each dimension; lower scores reflect better quality of life. The results reveal an improvement in mobility and cognition, yet a decrease in emotional well-being, social support and communication; the dimensions of
ADL, stigma and bodily discomfort remain unchanged (Table 2). Overall, the PDSI reveals a slight decrease in patient’s quality of life.

Table 2: Summary of PDQ-39 Questionnaire

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Question No.</th>
<th>Before Treatment 1</th>
<th>After Treatment 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>^Scale Score</td>
<td>#Dimension Score</td>
</tr>
<tr>
<td>Mobility</td>
<td>1-10</td>
<td>7</td>
<td>17.50</td>
</tr>
<tr>
<td>ADL</td>
<td>11-16</td>
<td>3</td>
<td>12.50</td>
</tr>
<tr>
<td>Emotional well-being</td>
<td>17-22</td>
<td>2</td>
<td>8.33</td>
</tr>
<tr>
<td>Stigma</td>
<td>23-26</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Social support</td>
<td>27-29</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Cognition</td>
<td>30-33</td>
<td>3</td>
<td>18.75</td>
</tr>
<tr>
<td>Communication</td>
<td>34-36</td>
<td>1</td>
<td>8.33</td>
</tr>
<tr>
<td>Bodily discomfort</td>
<td>37-39</td>
<td>5</td>
<td>41.67</td>
</tr>
<tr>
<td>*PDSI</td>
<td></td>
<td>13.39</td>
<td></td>
</tr>
</tbody>
</table>

^ Scale Score = sum of scores in individual dimension; # Dimension Score = scale scores ÷ (number of questions in dimension × 4) ÷ 100; * PDSI = sum of dimension scores ÷ 8

The result of AROM of Hip Joint suggests, after five treatments, a slight increase in bilateral internal and external rotations at hip joint. However, hip flexion, extension, abduction and adduction as well as bilateral knee extension and left knee flexion are slightly decreased. The right knee flexion remains unchanged.

Thomas Test and HC Test were performed before and after each session, with all the results demonstrating positive. Figure 3a shows HC Test at the beginning of the study and Figure 3b at the end.
The functional touch-toe test performed before the first treatment and after the last both showed restriction from the tight hamstrings (see Figure 4a and 4b).

Discussion

The patient reported improvement in his mobility and cognition. SLR Test showed lengthening of hamstrings after each CR stretch, but the effect did not last long. When the patient was under stress, the muscles went into
spasm and became harder to relax, which rendered CR stretch ineffective. Despite CR stretch as a recommended technique for patients with PD \(^{(21, 22)}\), the outcome of this case study concurs with the findings of the earlier study \(^{(19)}\) that PNF stretching techniques cannot be facilitated effectively for patients with neuromuscular diseases or injury.

Considering the patient’s active hip extension was within normal range \((8^\circ-15^\circ)\), the hip flexor contracture would not be indicated. The possible explanation why Thomas Test was positive throughout all five treatments was the patient’s decreased ability to relax due to muscle rigidity, symptomatic of PD \(^{(7)}\).

Although Visual Analog Scale was not included as a measurement instrument, the patient reported that the pain caused by stiffness in his right hamstrings had decreased, especially after the first four treatments. Nevertheless, the pain returned once his stress level increased.

There were a few variables that might have impacted the validity and reliability of the results. Even though goniometer is a commonly used measurement instrument in clinical environments, it requires great degree of technical proficiency. Inexperience in using the goniometer may have affected the accuracy of data collection. Moreover, future studies regarding AROM at hip and knee joints would benefit from a more precise measuring device rather than the goniometer.

In conclusion, this case study demonstrated that CR stretch and Swedish
massage were effective treatments for temporarily increasing length of hamstrings. With reported overall relaxation and relief of stiffness following these treatments, the patient felt there was partial improvement in his quality of life, consequently, would continue with the massage therapy sessions.

Since PD is a progressive illness of the central nervous system, it would be more effective if the treatment is longer than 5 sessions, with incorporation of other techniques to reduce muscle spasm and tone, namely hydro application, diaphragmatic breathing, Rood’s inhibitory techniques, Golgi tendon organ release and trigger point release; and also if the treatment combines patient education, such as avoidance of prolonged stressful postures and self-care exercises.
References


the human body (3rd Ed.). Maryland Heights, Missouri: Elsevier Mosby.


Appendix 1: Treatment Notes
PATIENT INTAKE FORM

Give a brief detailed description of the problem you are currently experiencing:

How long have you had this condition? Yes. Is it getting worse or better?

Does it bother you (check appropriate box): work, rest, sleep, other: depression.

What seemed to be the initial cause: stress, injury, previous injury.

Are you currently satisfied with your:
- Physical health & fitness?
- Mental and emotional happiness?
- Diet?
- Ability to relax?

Do you exercise regularly?

How is most of your day spent? Standing, walking, Other:

When was your last physical exam? Yes.

Please describe your stress level:

Past Health History:
- Have you ever:
  - been hospitalized (surgeries etc.)
  - suffered from depression/anxiety?
  - had any broken bones?
  - had any strains or sprains?
  - used orthotics?
  - had pins, plates, screws, rods, prosthesis, breast implants?

Please list any medications you are currently taking and why: AIDOL-LORACAP & TAD-AZAMET.

Alcohol, tobacco, and recreational drug use: Don't drink, don't smoke.

Is there anything else your student therapist should know?

Consent and Release:
I acknowledge that the above information is accurate and true to the best of my knowledge. I fully understand that this is a teaching massage clinic and accordingly, a clinic instructor may be present during any aspect of my treatment. Our clinic makes every effort to ensure that your experience here is safe, effective and enjoyable.

The West Coast College of Massage Therapy Inc., its employees, servants and agents (the "college"), do not accept liability for any claim as to the method or manner of treatment given, or any complaints related to supposed conditions arising from therapy. In good and valuable consideration, the undersigned does hereby release and forever discharge the College, its successors and assigns, from any other legal obligations and compensation of whatsoever kind and howsoever arising from or out of any treatment which will be provided to the undersigned.

Please sign below to show that you fully understand and agree to the above disclaimer and stated conditions of receiving treatment at the West Coast College of Massage Therapy Clinic.

Signature: [Signature]
Date: [May 1, 2015]

Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPED).

Instructor signature: [Signature]
CONTRACT-RELAX STRETCH AND SWEDISH MASSAGE ON RIGID HAMSTRINGS

Patient History Form S

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Date: 9/14/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation:</td>
<td>Age: 55</td>
</tr>
<tr>
<td>Intern:</td>
<td>Class:</td>
</tr>
</tbody>
</table>

- Leg. hamst. HT, disturb sleep & drin.
- Restless dur. night, walking
- Calf feels solid at rest & tight, PD1/2 cramp occurs pt.ght
- Present balance affected after PD PD1
- Tai Chi, esp. Walking long PDR min.
- Seen: Feb. this yr (started from HT Hamst)
- N: 3/30 20: 6/16 6: 0/10 (unt. x 10)
- Help to relax
- NT1

- Neurologist & MT
- Prior inj. FL
- Meds: Levo touched Levaeph
- X: 1/4 hr. azilect
- Ex: 2: PHL, but take a rest. avoid caring for mobs.
- Stationary bike: 1 hr.
- Sleep: 11 pm ~ 2 am (bathroom) + 1 hr every wake up
- Not so rested by sleep & side
- Stress: medium from family & work
- Good general health & family disease
- PP dx: 7 - 8 yrs. ago

- Right: I write slowly. Slow progression. Can't form words, have to push to get words out. Can't say any more wrong.

Clinic Instructor: PB

Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPEDA).
Initial Scan Exam (ISE)

Palpation summary (4 T's & location)
- H.: from (2) needles hamstrings; calves (0)
- Calf tight; then (2) leg
- Fat hip; same leg (2 cm)

Functional tests

<table>
<thead>
<tr>
<th>Region</th>
<th>Functional Test</th>
<th>Findings (pain/ROM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip &amp; Knee</td>
<td>Squat &amp; Rise</td>
<td>Slow</td>
</tr>
<tr>
<td>LSp</td>
<td>Touch Toe</td>
<td>Unable to touch toe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90/90 hamst.</td>
</tr>
</tbody>
</table>

Regional Functional Tests:
- Hip: (pain & range)
- Knee: (pain & range)
- Ankle: (pain & range, heel/toe walk)
- Calf: (pain & range)
- Neck: (pain & range, touch toes)
CONTRACT-RELAX STRETCH AND SWEDISH MASSAGE ON RIGID HAMSTRINGS

Date: 11/4/15 visit # 2
S WAS 2 no
○ improving, ○ no change, ○ worsening
CR: ○ PD

Date: 11/11/15 visit # 3
S WAS 1/10
○ improving, ○ no change, ○ worsening
CR: ○ PP

Date: 12/4/14 visit # 4
S WAS 10
○ improving, ○ no change, ○ worsening
CR: ○ PP

SOAP Term 5

Patient Name: [Redacted]

Date: 9/11/15 visit # 2
S WAS 10
○ improving, ○ no change, ○ worsening
CR: ○ PP

Date: 9/4/15 visit # 3
S WAS 10
○ improving, ○ no change, ○ worsening
CR: ○ PP

Date: 9/4/15 visit # 4
S WAS 10
○ improving, ○ no change, ○ worsening
CR: ○ PP

SW (○) @ leg (R)
PW (○) leg (L)
On (○) leg for hamstring stretch

P:
PTR: __ days, ___ wks, ___ mth, ○ PRN
Home care (FD - frequency, intensity, duration):

Post Tx markers: ↑ ROM of [Redacted]
lumbar ext.

Student: [Redacted]  Instructor: [Redacted]

Same + x 2
9/4/15

Same + x 2
9/4/15
CONTRACT-RELAX STRETCH AND SWEDISH MASSAGE ON RIGID HAMSTRINGS

SOAP Term 5

Date: 7/18/15 Visit #4

S WAS 7/70
Improving, no change, a worsening
Cxx: Pff. F

O: Hamstring

T: While driving, waking, sitting, sleeping

Tx: Some rest

A

P: PIR 2 days, 6 wks, 1 month, 6 PRN
Home care (ID - frequency, intensity, duration)

Post Tx markers: HRM in straight leg raise (R)

Student: 
Instructor: SB

Date: 9/23/15 Visit #5

S WAS 7/70
Improving, no change, a worsening
Cxx: Strained from work. Every day is tight.

O:

T: Back (C)

O: Hamstrings

A

P: PIR 2 days, 6 wks, 1 month, 6 PRN
Home care (ID - frequency, intensity, duration)

Post Tx markers: HRM in straight leg raise (R)

Student: 
Instructor: SB

Date: 9/28/15 Visit #6

S WAS 7/30
Improving, no change, a worsening
Cxx: 

O:

T: Hamstrings by pulp

A

P: PIR 2 days, 6 wks, 1 month, 6 PRN
Home care (ID - frequency, intensity, duration)

Post Tx markers: 

Student: 
Instructor: SB
<table>
<thead>
<tr>
<th>Exercise</th>
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<tbody>
<tr>
<td>Squat</td>
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<tr>
<td>Lunge</td>
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<td>Jumping</td>
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<td>Lunging</td>
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<td>Box Jump</td>
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<td>Burpees</td>
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**Contraction**

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**Relaxation**

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**Special Techniques**

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<th>Treatment 2</th>
<th>Treatment 3</th>
<th>Treatment 4</th>
<th>Treatment 5</th>
<th>Treatment 6</th>
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Appendix 2: PDQ-39 Questionnaire

Please complete the following

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<td>17 Felt depressed?</td>
<td>✓</td>
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<td>18 Felt isolated and lonely?</td>
<td>✓</td>
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<td>19 Felt weak or tearful?</td>
<td>✓</td>
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|
---|---|---|---|---|
**Due to having Parkinson’s disease, how often during the last month have you...** | **Never** | **Occasionally** | **Sometimes** | **Often** | **Always** |
30. Unexpectedly fallen asleep during the day? & & & & &
31. Had problems with your concentration, e.g. when reading or watching TV? & & & & &
32. Felt your memory was bad? & & & & &
33. Had distressing dreams or hallucinations? & & & & &
34. Had difficulty with your speech? & & & & &
35. Felt unable to communicate with people properly? & & & & &
36. Felt ignored by people? & & & & &
37. Had painful muscle cramps or spasms? & & & & &
38. Had aches and pains in your joints or body? & & & & &
39. Felt unpleasantly hot or cold? & & & & &

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Thank you for completing the PDQ 39 questionnaire
PDQ-39 QUESTIONNAIRE

Please complete the following

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Page 4 of 12 Questionnaires for patient completion
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