Clinical Case Report Competition

Vancouver Career College - Burnaby
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Third Place Winner

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Massage therapy and essential tremor: to abate the symptoms
Notice:

The writing samples and Archimedes Spirals from the first to last treatments are attached in three separate files due to a large size capacity. If there is any difficulty accessing the figures, please contact me at priyadevisharma@gmail.com and I will personally send out the separate files.

Thank you for your time,

-Priya Sharma
Acknowledgments

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ABSTRACT

Hypothesis: Massage if done on a set schedule and with the same techniques repeatedly can be an alternative and non-invasive way of treating patients with ET.

Null hypothesis: The stage of these tremors is much too severe and therefore massage will not have much of an impact on decreasing the tremors associated with ET.

Case Study is a 68 year old retired male patient who used to be a high school English teacher and retired in 2008. He was diagnosed with ET in his mid 30’s though he started feeling these symptoms when he was 10 years old.

This study consisted of six consecutive 55 minute massage treatments given twice a week for 3 weeks. The techniques used were general soft relaxation based techniques mainly to combat stress and promote relaxation. Assessment techniques used were Archimedes spirals, writing samples, and finger-nose tests.

Some progress was established with the patient’s penmanship and the final assessment which along with reassessment did show positive results.

Massage can be most helpful in mild cases of essential tremor whereas in severe cases, the results are not as significant.

Key words

Essential tremor, Massage, Swedish Techniques, Swedish Massage, Case Study
Introduction

Essential Tremors (ET) are a neurological disorder affecting both the central nervous system (CNS) and the peripheral nervous system (PNS) resulting in rigidity while trying to accomplish fine motor movements, and rhythmical shaking in certain parts of the body. Stress is said to increase these symptoms and therefore would massage have a positive impact on ET?

Hypothesis: Massage if done on a set schedule and done with the same techniques repeatedly can be an alternative and non-invasive way of treating patients with ET. Null hypothesis: The stage of these tremors is much too severe and therefore massage will not have much of an impact on decreasing the tremors associated with ET.

Definition and Pathophysiology

Essential tremors are the most common type of tremors that are not related to Parkinson’s disease and they are usually present when trying to complete acts of daily living (ADLs). The tremors in ET are different from the tremors that accompany Parkinson’s disease due to the fact that they are only present when trying to accomplish a certain task whereas the tremors associated with Parkinson’s are mostly present at rest and when the arms are at ones side. Though the cause of ET is unknown, some differences that scientists have found between the brains of patients with ET and the brains of people without ET include degeneration of the cerebellum and brain stem Lewy bodies¹.

Lewy bodies are abnormal accumulations of proteins that develop inside nerve cells found in the brainstem. The reasons for these degenerations are unknown but are thought to have a genetic link factor involved².
ET is known to mainly affect the arms and rarely affects the legs and voice, though it is possible. Degeneration of neurons in the brainstem leads to symptoms of tremors during fine motor movements.

**Signs and Symptoms**

Signs and symptoms of ET are tremors that worsen during periods of emotional stress and with purposeful movements such as writing and walking. Tremors can be present unilaterally or bilaterally and decrease with rest. Possible symptoms could include loss of balance and proprioception. In Parkinson’s disease, the tremors do not cease with rest, therefore the pattern of the tremors can be used as a differential diagnosis. ET could affect the neck, voice and legs but is most commonly known for affecting the arms and hands. As the patient with ET gets older, their tremors also become much more noticeable and are more likely to interfere with their ADL’s. Refer to **Table 1** for a list of signs and symptoms experienced and unique to patients with ET.

Mortality rates have been thought to be the same between patients with ET and the general population. In a recent study done on patients 65+ years of age, the mortality rate seems to have increased. Disability from essential tremor is common. Of individuals with essential tremor, 85% report significant changes in the way they live and their social skills, and 15% report being seriously disabled by the condition. Decreased quality of life results from loss of function and from embarrassment. In a study of hereditary essential tremor, 60% of affected individuals did not seek employment; 25% changed jobs or took early retirement; 65% did not
dine out; 30% did not attend parties, shop alone, partake of a favorite hobby or sport, or use public transportation; and 20% stopped driving.

Table 1 Signs and Symptoms

| • Uncontrollable shaking (often for a brief period) |
| • Shaky voice |
| • Nodding head uncontrollably |
| • Tremors that appear to worsen in stressful times |
| • Tremors that worsen with purposeful movements (ADLs) |
| • Tremors that lessen/seize with rest |
| • In rare cases, balance and proprioception problems. |

(Mayo Clinic Staff, 2013)

Methods

Patient Profile

The patient is a 68 year old retired male who used to be a high school English teacher and retired in 2008. He was diagnosed with ET in his mid-30’s though he started feeling these symptoms when he was 10 years old. His father, brother, and sister also have this condition but his symptoms are more severe, and his children do not have it. A few years back, these tremors were just embarrassing for him but now they affect his ADLs and therefore he makes a good surgical candidate. His surgery is planned to be during the spring time. This patient also has hypertension and type two diabetes. He has had his appendix and gallbladder both removed in the past. This patient stays active, and he rides a stationary bike for 70 minutes daily and does relaxing activities such as crossword puzzles and reading on a daily basis. He gets approximately eight hours of sleep every night, and to him stress is an aggravator. This patient does not smoke.
but does consume wine on a daily basis which he has stated does help with his tremors at times, though we are uncertain whether this is because he is feeling very relaxed while doing this activity or if alcohol does have a beneficial effect towards tremors. His last massage treatment before this case study began was back in December 2013. A previous treatment he sought for ET was medications around 10-15 years prior to this study and had to stop since they were not effective and they were interfering with his medications that he’s currently taking for his heart and cholesterol. A list of the medications the patient was taking during the case study will be listed and described in Table 2.

<table>
<thead>
<tr>
<th>Medications for The heart</th>
<th>Ramipril 5mg (2x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metoprolol 50mg (2x/day)</td>
</tr>
<tr>
<td></td>
<td>Amlodipine Besylate 5mg (1x/2 days)</td>
</tr>
<tr>
<td></td>
<td>Aspirin 81mg (1x/day)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications for Cholesterol</th>
<th>Simvastatin 20mg (1x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spironolactone 25mg (1x/day)</td>
</tr>
</tbody>
</table>

| Other                      | Vitamin D 1000IU (1x/day) |

Table 2 Patient’s Medications

Baseline

January 6th 2014, the first treatment began. His symptoms are felt in his hands when activities that involve both hands are done. ET are more prevalent in his left non-dominant hand compared to his right hand. Sometimes these tremors also affect his legs when he is lying down and his jaw, though these are not as common and were not noted in the initial assessment or treatment. Prior to this treatment, there was a thorough assessment done which involved active range of motion (AROM), passive range of motion (PROM), and resisted range of motion (RROM) of both wrists. For AROM, there was shaking of the full arm for both arms...
but the tremors were worse in the patients left arm. Though there was shaking, the patient was able to achieve full range of motion (ROM). For PROM, the patient had no abnormalities and the tremors had decreased. Lastly, RROM, the patient was able to resist my full force (therefore achieving a 5/5) but there was a significant amount of shaking present in all directions tested. This day, the patient’s posture was also noted. He was present with head forward posture, and a higher right shoulder (hypertoned compared to patient’s left shoulder), this could be due to the fact that the patient is right handed. The tremors were noted right away as the patient walked into the treatment room. His gait was also noted, his arms were behind him as he was walking ahead. Special tests done this day were finger to nose with eyes open and closed, Archimedes spirals, and writing samples. These special tests will be discussed more in depth in the assessment and reassessment portion of this paper. For the pre-treatment symptoms picture for this day, the patient said that the tremors were worse on his left side in his arm. Before the first treatment was initiated, the patient did say that stress does aggravate the tremors but he believes that massage won’t reduce the tremors but only maintain it.

**Management Plan**

The techniques I used were light fascial and mostly Swedish techniques. The massage treatments done were full body so the time frame for each treatment had to be concise. I started to massage the patient in the prone position. In this position, the patient’s back and posterior legs were worked on. Before massaging a certain area however, I did start each treatment with rhythmical rocking for a minute of the whole body. After a minute of rocking, I began working on the patient’s full back. The back was worked on for 10 minutes and the
techniques used were: cross-hand release, shearing, open-c’s, wringing, and long strokes. Next, the posterior legs were worked on. The legs were worked on from the hamstrings down to the patient’s feet for a time of 20 minutes (10 minutes for each leg). The techniques used on the posterior legs were: shearing, open-c’s, long strokes, and wringing. After these were massaged, I would dim the lights, making it easier on the patient’s eyes and then get him to turn supine. In this position, the anterior legs were worked on first for 10 minutes (5 minutes each leg). The techniques used on the anterior legs were: open-c’s, wringing, and long strokes. Next, the arms and hands were worked on for 4 minutes (2 minutes each arm). General Swedish techniques were once again used including: shearing and long strokes. The treatment ended after a 10 minute neck and head massage which included: shearing and long strokes around the neck and then a general head massage. The total length of the treatments were 55 minutes and this was consistent every treatment. I decided to stick with light techniques in order to achieve the goal I had set which was to decrease SNS firing. The patient felt very relaxed after each treatment showing that the goal was met. The time spent at each region will be discussed in the treatment portion of this paper. For home-care, the patient was given trunk rotational exercises and he was also instructed to take 20 minutes out every day for just relaxation purposes. In the 20 minutes, the patient could do any activity that relaxed him, this included crossword puzzles and reading. For the trunk rotational exercises, these were broken up to 3 parts.

Part one: The head rotates in one direction while the legs (with the knees flexed) rotate in the opposite direct. The patient was informed to do this exercise 2 times every day for a minute each time (resulting in 2 minutes every day). The patient was also told to take deep breaths and hold each stretch for around 10 seconds each side (a set of 3). Part one was to be
done twice every day starting from Monday January 6\textsuperscript{th} 2014 until Monday January 20\textsuperscript{th} 2014. Refer to \textbf{Home-care A image} provided below.

Part two: The patient was to continue with part one separately as instructed in the previous visit. Part two also included 90 degrees of shoulder abduction and 90 degrees of elbow flexion. One shoulder internally rotates while the other externally rotates. These were to be performed alternately in a slow rhythmical manner. The legs were not to be involved in this exercise. Again, this exercise was given to do twice a day and to be held for one minute each time starting from Monday January 13\textsuperscript{th} 2014 to January 20\textsuperscript{th} 2014. Refer to \textbf{Home-care B image} provided below.

Part three: Combination of part one and two. This was to be done twice a day, every day starting Monday January 20\textsuperscript{th} 2014 to Friday January 24\textsuperscript{th} 2014. The exercise was to be done for a minute each time leading to two minutes every day in total. The patient was also instructed to take deep breaths while completing this exercise. Refer to \textbf{Home-care C image} provided below.
Treatments

Appointments one and six were both for 2 hours allowing for an initial and final full assessment, and appointments two to five were an hour long. The treatment goals for each visit were to decrease sympathetic nervous system firing therefore decreasing the tremors. All treatments were consistent with techniques done.

Assessment and Reassessment

Assessment techniques used were writing samples both dominant and non-dominant hands, Archimedes spirals done with both hands, and finger to nose assessment with both arms. The assessments and reassessments started on Monday, January 6th 2014. These assessment techniques were done both pre and post-treatment. The finger to nose assessment was done every other treatment where the writing samples and Archimedes spirals were done every treatment. Finger to nose was hard to really get a visual on, therefore only an observational input could be added. First the patient did this assessment with his right hand with his eyes open 5 times and then 5 times with his eyes closed. Both times the patient was able to place his finger on his nose with no real problem and not missing his nose at any time.
The patient repeated the same assessment technique with his left hand and with this side; the patient’s movements were a bit more rigid the closer the patient’s finger got to his nose, the tremors would increase. The last assessment technique used was a sample of writing with both his dominant and non-dominant hands pre and post-treatment. The patient had to write “This is a sample of my best writing” and he was able to complete this with his right and left hand pre-treatment but post-treatment, the patient could only complete it with his right hand.

Friday January 10th 2014 was the second day of treatment and therefore the second day of assessments and reassessments. This day the assessment techniques used were the Archimedes spirals and writing samples of the patient both pre and post-treatment.

The third appointment was on Monday January 13th 2014. This day, the assessment techniques used were the Archimedes spirals, finger to nose and samples of the patient’s writing. For finger to nose pre and post-treatment, both left and right hand, patient had less visible tremors (though tremors were still observable). The patient seemed to have more control over his movements for the finger to nose test.

Friday January 17th 2014 was the fourth appointment and the assessment techniques used were the Archimedes spirals and writing samples.

Appointment five was on Monday January 20th 2014. The assessment and reassessment techniques used were Archimedes spirals and the writing samples.

Friday January 24th 2014 was the last appointment for this case study. The assessment this day was similar to the assessment done on January 6th 2014. The assessment and
reassessment techniques used were AROM, PROM, RROM of both wrists, Archimedes spirals, writing samples and finger to nose. Just like the patient’s initial visit, the ranges of motions of the wrist was full though there were still signs of tremors, still more so in the left wrist. Active, passive and resisted, there was no notable change from the initial visit. Though the motions of the wrist had not changed, the finger to nose test with eyes open and then closed seemed to improve by means of less tremors visible during the movements. The improvements seen were slight and seemed to be a bit more controlled, though not in a significant manner.

Results

Though the patient did not note any difference in his ADLs, there were small improvements that did occur. The patients writing improved from his initial visit. Along with the patient’s writing, the patient’s Archimedes spirals also showed significant improvement. Though the treatments did not decrease his tremors enough to sharpen his ADL’s, the treatments did hold some value and in fact did increase his penmanship. For a side by side comparison of the patient’s writing samples post-treatment 1 and 6, refer to Figures 1-2. For the comparison of the patient’s Archimedes spirals post-treatment 1 and 6, refer to Figures 3-6.
Discussion

During this study, there were a few factors that may have affected the research done and the overall result. One factor that could’ve affected the study was a flaw in the Archimedes spirals drawn. Archimedes spirals are to test for tremors and are to be done the same way in terms of the amount of circles in each spiral. For this study, originally the plan was to use 4 circles since it fit well on paper but due to miscommunication, the spirals began having more circles as the treatments progressed. This could’ve skewed with the results since this specific assessment technique was for the most part inconsistent. Another flaw was the time spent treating each limb. Though from the beginning, nothing in the treatment changed, the fact that more time was spent on the legs than on the arms could’ve impacted the treatment plan in a negative manner. The arms only had 4 minutes (2 minutes ea.) overall in the 55 minute treatment whereas the legs had a total of 30 minutes (10 minutes posterior leg and 5 minutes
anterior leg each leg). The fact that the client had severe tremors in his upper extremities and only had tremors in his legs a few times, the arms should’ve had more time spent on them. Though the tremors result from complications within the brain and spinal cord, working on the upper extremities could’ve had a more positive result compared to the treatment that was done. This could’ve been avoided by keeping track of the time spent on each limb, which was lacking in the first treatment and the treatments following due to the fact that I had a desire to keep each treatment consistent. Another factor that may have slightly altered the results was the fact that I had not filled out the Visual Analog Scale (VAS) for any of the treatments done. I realized this after and I feel as if it may have weakened the qualitative portion of this research. One more factor that could’ve affected the research was the amount of treatments and the frequency of each treatment. Originally, I had planned to have this study run once a week for a period of nine weeks. Unfortunately this wouldn’t be possible due to the school schedule and breaks in between. There were only three weeks before the break which would be a factor that would affect the results if I had opted for that choice. Due to these circumstances, the treatment was twice a week, Mondays and Fridays for three consecutive weeks leading to a total of 6 treatments rather than nine. I believe the results would’ve been much clearer if there were nine consecutive treatments since there’d more time to observe the affects of the treatment and to tell whether the results were from the treatment itself or if there was something else that was skewing with the final result. Most of these factors could’ve been avoided and since life is mostly based on trial and error, these factors will be avoided in any future studies that will be done.
Conclusion

In the initial treatment, the patient had a hard time with writing post treatment and his spirals showed a significant presence of tremors. However, in the last treatment, the patient’s writing improved and the spirals became much smoother. With observed results like these, massage was beneficial and helped decrease the patient’s tremors while performing fine motor movements such as writing, but overall the patient did not feel any major difference while conducting his ADLs. From the patient’s stand point, the treatment did very little and wasn’t as helpful towards his tremors; this is something to make note of. Though his writing and spirals showed a reduction in the tremors present, the reduction of his tremors wasn’t large enough to also benefit his ADLs. In conclusion, though there was some improvement, the improvement wasn’t significant enough and therefore massage is not as beneficial in the later more severe stage of ET as it is in the mild stage.
References

1 Mayo Clinic Staff (2003). Diseases and Conditions: Essential Tremor
   http://www.mayoclinic.org/diseases-conditions/essential-tremor/basics/definition/con-20034509

2 Jellinger KA (2007). "More frequent Lewy bodies but less frequent Alzheimer-type lesions in
   multiple system atrophy as compared to age-matched control brains"


Archimedes Spirals Right Hand Pre and Post-Treatment 1

(First=Pre-Treatment, Second=Post-Treatment)

Archimedes Spirals Left Hand Pre and Post-Treatment 1

(First=Pre-Treatment, Second=Post-Treatment)

Writing Samples Pre and Post-Treatment 1 (Top=Right hand, Bottom=Left hand)

(First=Pre-Treatment, Second=Post-Treatment)
Archimedes Spirals Right Hand Pre and Post-Treatment 2

(First=Pre-Treatment, Second=Post-Treatment)

Archimedes Spirals Left Hand Pre and Post-Treatment 2

(First=Pre-Treatment, Second=Post-Treatment)

Writing Samples Pre and Post-Treatment 2 (Top=Right hand, Bottom=Left hand)

(First=Pre-Treatment, Second=Post-Treatment)
Archimedes Spirals Right Hand Pre and Post-Treatment 3

(First=Pre-Treatment, Second=Post-Treatment)

Archimedes Spirals Left Hand Pre and Post Treatment 3

(First=Pre-Treatment, Second=Post-Treatment)

Writing Samples Pre and Post-Treatment 3 (Top=Right hand, Bottom=Left hand)

(First=Pre-Treatment, Second=Post-Treatment)
Archimedes Spirals Right Hand Pre and Post-Treatment 4

(First=Pre-Treatment, Second=Post-Treatment)

Archimedes Spirals Left Hand Pre and Post-Treatment 4

(First=Pre-Treatment, Second=Post-Treatment)

Writing Samples Pre and Post-Treatment 4 (Top=Right hand, Bottom=Left hand)

First=Pre-Treatment, Second=Post-Treatment
Archimedes Spirals Right Hand Pre and Post-Treatment 5

(First=Pre-Treatment, Second=Post-Treatment)

Archimedes Spirals Left Hand Pre and Post-Treatment 5

(First=Pre-Treatment, Second=Post-Treatment)

Writing Sample Pre and Post-Treatment 5 (Top=Right hand, Bottom=Left hand)

(First=Pre-Treatment, Second=Post-Treatment)
Archimedes Spirals Right Hand Pre and Post-Treatment 6

(First=Pre-Treatment, Second=Post-Treatment)

Archimedes Spirals Left Hand Pre and Post-Treatment 6

(First=Pre-Treatment, Second=Post-Treatment)

Writing Samples Pre and Post-Treatment 6 (Top=Right hand, Bottom=Left hand)

(First=Pre-Treatment, Second=Post-Treatment)