CASE REPORT

Massage therapy for essential tremor: Quieting the mind

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KEYWORDS
Neurologic disorders; Familial tremor; Massage; Hydrotherapy; SNS; Parasympathetic nervous system

Summary Background: Essential tremor (ET) is a neurological disorder causing rhythmical shaking of part of the body. The condition is known to have an inheritable tendency and can present in more than one family member, known as familial tremor. Treatment of the disorder is commonly by way of prescription medication. ET is progressive and in its mildest form can be sensed and/or observed when performing simple motor skills or activities of daily living (ADL). Objective: To examine the influence of massage therapy on the severity of ET using an activity-based rating scale pre- and post-treatment. Methods: The study period included five consecutive weekly sessions. The subject, a 63-year-old female, indicated her hands and head as the primary areas affected by ET. The treatment aim was to reduce sympathetic nervous system firing; therefore, the massage techniques implemented were relaxation-based. Methods included Swedish massage, hydrotherapy, myofascial release, diaphragmatic breathing, remedial exercise education and affirmative symptom management recommendations. Drawings of an Archimedes spiral for comparison pre- and post-treatment provided an objective, visual representation of tremor intensity affecting fine motor control. Goniometric measurements were taken to mark changes in cervical range of motion. Results: Tremor intensity decreased after each session; demonstrated by improved fine motor skills. The client also reported an increased functionality in cervical range, which was documented during the first and last visits. Conclusion: The results suggest that tremors, symptomatic to ET, can be eased through initiatives that encourage a parasympathetic response. Massage therapy has shown to be a valuable method of treatment for ET. Tremor severity can present in an irregular pattern due to subjective individual triggers; therefore, further controlled research is required to lessen the variability between subjects and to validate these findings.

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Introduction

ET is a disorder of the nervous system varying in severity from a mild irritant to a severe disablement. The condition is also referred to as familial tremor given the likelihood of genetic predisposition. Essentialtremor.org (2011) explained, "[T]he tremor seems to be inherited as an autosomal dominant trait...[giving] each child of a parent... a 50% chance of inheriting the gene" (para. 1).

The initial onset of ET is unremarkable but the progression is persistent. The pathogenesis of the tremor is multifaceted with a disconnect occurring within certain central and peripheral neurological pathways (Lees et al., 2009). This disruption, expressed through rhythmic shaking, is the primary symptom of ET. Different areas of the body can be affected, primarily the hands and head (Louis, 2010, p. 144). Secondary symptoms to the disorder include postural imbalance and increased muscle tone in affected and compensatory areas. Studies have shown that the continuity and increasing severity of these tremors make ADL a challenge. "Eighty-five percent of individuals with [ET] report significant changes in their livelihood and socializing... [and] fifteen percent report being seriously disabled" (Damian et al., 2009, p. 72). This condition is identified primarily in late adulthood and is not restricted by race or gender (Essentialtremor.org, 2011, paras. 3–4). Accurate diagnosis and proper treatment of this condition remains of great importance even though the individual may be aware of their predisposition.

Tremors are not all created equal. Unique subtleties differentiate ET from the closely comparable Parkinsons disorder. Ellias (1993) reported ET is non-responsive to dopamine agonists and does not include symptoms of bradykinesia or pin-rolling tremors of the fingers, characteristic of Parkinsons (p. 564). Further tremor classifications, based on unique behavioral criteria, include rest tremor, action tremor, postural tremor, kinetic tremor, intention tremor, task-specific kinetic tremor and isometric tremor (Bain, 2007, p. S369).

Stress and anxiety are disruptive, individualized reactions to an environmental stimulus. Tremors can be both disruptive and demanding. Damian et al. (2009) reviewed mechanisms that encourage calmness and reassurance, thereby removing stressors that may contribute to the intensification of ET tremors (p. 65). Cognitive awareness and perception of the condition may influence the patient’s emotional response. "[P]atients with ET are now known to also commonly experience non-motor manifestations including changes in personality, cognition, and mood" (Graff-Radford et al., 2010, p. 1040). As the tremors evolve, the functional limitations and related embarrassment can have a significant impact on ADL.

The conventional treatment of ET is by way of pharmaceuticals, including beta-blockers and anticonvulsants. Surgical interventions involve diluted botulism toxin injections and deep brain stimulation (DBS). DBS is the most effective, highly invasive treatment for ET with documented improvements in “tremor severity and ... ADLs” (Graff-Radford et al., 2010, pp. 1043–1044). O’Connor and Kini (2011) argued, “even with optimal medical or surgical intervention in tremor, patients will still require physical and occupational therapy interventions to promote full social participation” (p. 510).

Massage therapy in the treatment of ET is symptomatic, given the progressive nature of the condition. The intention of this modality was to guide the path of the autonomic nervous system and permit a restful state. Diego and Field (2009) indicated, "repeated massage therapy sessions consistently elicit increased PNS [parasympathetic nervous system] activity" (p. 637). Rattray and Ludwig (2005) also recognized the reflexive effects of massage on the neurological systems (p. 10). Consecutive applications of massage therapy will decrease tremor intensity in clients with ET by provoking an involuntary state of relaxation and through the treatment of hypertonic musculature over-stimulated by repetitive movement.

Methods

Profile of client

The subject, a 63-year-old female, cited the first sign of mild shaking 20 years prior to this case study. Medically diagnosed by a neurologist with familial tremor in 1993, the subject was genetically predisposed to the condition by way of her father. In addition, her older sibling was diagnosed approximately eight years prior. Tremor intensity was reported to have increased from slight and inconsistent to moderate, incessant and bothersome. The tremors were, and continue to be, exacerbated by emotional stress and/or anxiety. The subject, on diagnosis, was prescribed a beta-blocker; generic name propranolol. The current dosage administered is 40 mg b.i.d. The subject indicated her sibling had become unresponsive to propranolol upon reaching the maximum allowable dosage. Consequently, the subject’s desire to maintain or decrease her prescribed amount led her to seek out alternative forms of treatment.

The subject also documented five motor vehicle accidents from 1991 to 1998 resulting in successive incidence of whiplash. Using the Quebec Task Force classification system for whiplash, the subject recalled a grade one level of injury on each occasion with “a neck complaint of pain, stiffness or tenderness only” (Rattray and Ludwig, 2005, p. 385). This circumstance may also have contributed to the unsteadiness and guardedness she had referred to in the cervical region.

A postural analysis indicated an imbalance in the upper thorax. The right shoulder presented in medial rotation and depression when compared to the left shoulder. Forward head posture with a slightly exaggerated kyphosis was also documented. A full cervical scan was performed during the initial visit. Items of note were restricted active and passive cervical range of motion (ROM) and the presence of moderate shaking in the head and arms during passive ROM and isometric testing. The subject referenced her head and hands as the primary areas affected by ET whereby compromising her ability to perform controlled fine motor skills.
Treatment plan

The determined treatment strategy was designed to decrease sympathetic nervous system firing and included Swedish massage techniques, myofascial release and hydrotherapy heat applications. The rationale for this platform was based on managing the tremors, increasing relaxation and decreasing muscle tone. Consideration was given regarding the chronic impact ET has had on the subject's posture, ADLs and social interactions. Rattray and Ludwig (2005) suggested treatment for tremors in relation to Parkinsons disorder (pp. 711–718) and, given that an ET tremor is generated in a similar neurological manner, this information was deemed transferrable for the treatment of ET (Lees et al., 2009).

The study period included five consecutive weekly sessions, 60 min in duration. A thorough interview and assessment dictated the majority of time allocated for the initial visit. The client received a 20-min relaxation-based massage to arms, hands, shoulders, neck and head at the end of this session to introduce touch and build trust. Case-specific analysis and documentation transpired over the remaining four sessions. Duration of treatment was adjusted, allocating 5 min for follow-up assessment and charting and 55 min of massage.

A modified Washington Heights-Inwood Genetic Study of Essential Tremor (WHIGET) tremor rating scale (wTRS) was used to evaluate the subject's progress and log bilateral tremor intensity pre- and post-treatment (see Appendix A). "wTRS rates tremor on a subjective, qualitative 0–4 scale generally corresponding to (0) normal, (1) slightly abnormal, (2) mildly abnormal, (3) moderately abnormal, and (4) severely abnormal" (Heldman et al., 2011, p. 537). To execute this approach, the subject was asked to rate her tremor, on the right and left sides, prior to treatment. Immediately following, the subject was instructed to perform five bilateral tests of action. These tasks included "pouring [water], drinking [from a cup], using a spoon, finger-to-nose, and drawing [Archimedes] spirals" (Louis et al., 2001, p. 89). The spiral drawing results were not quantified on the rating scale; nevertheless, they served as a visual representation of the results. On completion, the numbers were added which provided scores for sustention tremor and action tremor. Higher scores indicate a more severe tremor.

Goniometry measurements were recorded for cervical flexion, extension, lateral flexion and rotation during the first and last visits. The intention was to determine whether the massage treatment for ET impacted cervical ROM.

In order to gather reliable, consistent feedback in the examination of massage therapy for ET, a pre-determined course of treatment was observed during each session. The context was relaxation-based with the aim to decrease the intensity of the tremors. Proper body positioning of the subject was addressed with appropriate pillow placement throughout treatment to reinforce postural balance. Propanolol, used by the subject in treatment of ET, indicates postural hypotension as a potential side effect; therefore, care was made to ensure the subject was able to safely get on and off the table (Wilbe, 2009, p. 430).

To begin the session the subject was instructed to lie prone wherein gentle, rhythmical rocking was applied to the entire length of the body. This technique was chosen to introduce touch and to promote a reflexive, soothing parasympathetic response (Fritz, 2009, p. 295). A hydrocollator pack was then applied over the rhomboids for a period of 10 min. Rattray and Ludwig (2005) revealed, "deep moist heat is used to increase relaxation and decrease muscle tone" (p. 711). During the application of hydrotherapy the posterior legs were massaged, starting at the gluteal muscles and working distally. Strokes, applied with palms, knuckles and forearms, included longitudinal stroking, kneading and wringing. Moderate pressure was used so as not to elicit pain or over-stimulate the tissue. Following removal of the hydrocollator pack, the next 20 min focused on treatment of the back, from the sacrum to the middle fibres of trapezius. Similar strokes and applications listed above were used in this region. With the subject transitioned into supine position, towels were added to support the neck and cover the eyes. The next 5 min were allocated for work on the anterior legs, including quadriceps, iliotibial band and the anterior and lateral compartments of the lower leg. In view of the hands and head having been the primary areas affected by ET, the last 20 min of treatment was evenly divided between the arms, hands, chest and neck. The session ended with deep diaphragmatic breathing and a myofascial release to the occipital condyles. This technique proved to be highly effective in decreasing the tremor-induced oscillations of the head.

The primary home-care goal was 10–20 min of non-interrupted relaxation each day. Damian et al. (2009) advocated the "[u]se of appropriate coping strategies [that] may substantially reduce stress, thereby preventing possible augmentation of tremor due to anxiety" (p. 66). The subject was given instruction on how to practice diaphragmatic breathing during self-imposed moments of calmness and meditation. This technique was intended to help manage ET in moments of anxiousness by encouraging relaxation (Rattray and Ludwig, 2005). The benefits of movement therapy in relation to joint health were also discussed given that the subject exercises regularly. Lastly, a trunk rotation exercise was demonstrated and recommended daily to improve cervical range of motion (see Appendix B).

Results

Scores on the WHIGET tremor rating scale, resulting from action tremor tasks, consistently decreased post treatment (see Fig. 1). Ratings dropped an average of 23 percent post treatment, with the most significant decrease, 30 percent, in week one.

Comparison drawings of an Archimedes spiral pre- and post-treatment were used to objectify tremor severity and present a visual relationship of how tremor affects fine motor skills (see Figs. 2 and 3). The spiral is to begin at a fixed point, from which the line travels in a circular manner maintaining equal distance between each successive rotation. The execution of the spiral was explained and
<table>
<thead>
<tr>
<th>Action</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
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<td>Finger to nose</td>
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<td>Post Tx</td>
<td>Pre Tx</td>
<td>Post Tx</td>
</tr>
<tr>
<td>Pouring water</td>
<td>Pre Tx</td>
<td>Post Tx</td>
<td>Pre Tx</td>
<td>Post Tx</td>
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<td>Post Tx</td>
<td>Pre Tx</td>
<td>Post Tx</td>
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<tr>
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<td>Pre Tx</td>
<td>Post Tx</td>
<td>Pre Tx</td>
<td>Post Tx</td>
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<td>Action Total</td>
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<tr>
<td>Using a spoon</td>
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<tr>
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<td>13.5</td>
<td>23.0</td>
<td>14.5</td>
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*Note.* Higher scores indicate a more severe tremor. The range for action tremor is 0-32.

**Figure 1** Bilateral tremor scoring by action.

**Figure 2** Archimedes spiral drawn with right hand.
demonstrated for the subject prior to completing this task. It is important to note, the subject is right-hand dominant.

The subject demonstrated an increase in cervical range of motion over the course of treatment. A goniometer was used to measure and confirm these results. The most significant improvements were made in right and left side flexion gaining 11 and 10 degrees of range, respectively. The subject described this progress in the context that it was "easier to shoulder check while driving." (Fig. 4).

Discussion

This case report has demonstrated massage therapy can be effective in reducing the severity of ET symptoms, as was set out in the treatment plan. Diaphragmatic breathing, rhythmical rocking and slow, intentional Swedish massage techniques were key contributors to this reflexive state. Rattray and Ludwig (2005) confirmed "a supportive touch throughout

![Figure 3](image3.png) Archimedes spiral drawn with left hand.

![Figure 4](image4.png) Goniometric comparison of cervical range.

Note: Drawing executed without leaning hand or arm on table.
Increasing muscle tone and treating compensatory muscles should also be addressed during massage; bearing in mind that over-stimulating the tissue with deep work could be counterproductive. Occipital condyle release and other soft tissue manipulations also helped the client reach a deeper level of relaxation. For further research initiatives, massage via direct contact should be isolated from the use of hydrotherapy or other treatment tools that may influence the results. Attentive palpation skills and the ability to make adjustments, as needed, will be an important tool in monitoring the client’s reaction to touch.

Due to the fact that cumulative stress may worsen tremors, alternative treatments that promote relaxation, such as a massage therapy, can be beneficial in the management of ET. This welcomed period of rest, however long, will give the body systems a moment of respite and may encourage a prolonged relaxed state following the therapeutic treatment. Client activity should be documented pre- and post-treatment to reveal potential triggers that both calm and excite the tremulous state. Data collection should include diet, activity level and hours of sleep.

Age, medicinal dosages and tremor severity will have an effect on treatment outcomes for different subjects. These variables, in addition to emotional triggers, can manifest a tremor of varying intensity in any given moment. “Continuous classification and rating throughout the day may aid clinicians and researchers in therapy development and symptom management optimization for patients with… ET” (Heldman et al., 2011, p. 541). Due to the fact that the rating scale required the use of tools in four of the demonstrated actions, similar tools must be examined and weighted to ensure consistency between subjects. Furthermore, tremor velocity is a subjective observable indicator of ET if it is not recorded empirically. The inclusion of an accelerometer in further studies would assist to qualify and validate these findings.

### Appendix A

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<tr>
<th>Modified Washington Heights Inwood Genetic Study of Essential Tremor Rating Scale (WHIGET).</th>
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<tr>
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<td><strong>Action total</strong></td>
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### Appendix B

#### Trunk rotation exercise

**Purpose:**

To maintain range of motion and flexibility

**Steps:**

1. Warm up (i.e. walking)
2. Position:
   a. Lying on the back (on a bed or the floor)
   b. Bend knees, keep feet together
   c. Hands rest on chest
3. Apply stretch to right side:
4. Rotate head to right (nose toward right shoulder)
5. Rotate knees to left (drop knees down to left side)
6. Rotate knees to right

**Timing:** Hold stretch for 30–60 s

**Repetition:** 3 stretches on each side with 60 s rest between Duration: 2 times per day

**Remember to:**

- Breathe deeply throughout the stretch
- Visualize the area you are stretching
- Stretch should not be painful

### References


