Effect of Massage Therapy on Stress Levels and QoL in Brain Tumor Patients

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SHORT COMMUNICATION

Effect of massage therapy on stress levels and quality of life in brain tumor patients—observations from a pilot study

Stephen Thomas Keir
Study Background

...Why Massage Therapy?

Stress and intervention preferences of patients with brain tumors
Stress and Intervention Preferences

• Anecdotal Origins… *brain tumor patients are stressed*
• Public Health Background – Validate Problem
• 63% of cross-sectional sample “stressed”
• 86% wanted more information
• 78% believed in techniques to reduce stress
• 56% could participate twice weekly

...Massage Therapy – 57%
Extent of Problem?

Psycho-Oncology
Psycho-Oncology 17: 621–625 (2008)
Published online 31 October 2007 in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/pon.1271

Brief Report

Screening for distress in patients with brain cancer using the NCCN’s rapid screening measure

Stephen T. Keir*, Roberta D. Calhoun-Eagan, Jonas J. Swartz, Oussama A. Saleh and Henry S. Friedman
The Tug McGraw Research Center, The Preston Robert Tisch Brain Tumor Center at Duke, Durham, NC, USA

Distress persists in long-term brain tumor survivors with glioblastoma multiforme

Stephen T. Keir - Margaret M. Farland - Eric S. Lipp -
Henry S. Friedman

Support Care Cancer (2007) 15:1423–1428
DOI 10.1007/s00520-007-0292-1

Stress and long-term survivors of brain cancer

Stephen T. Keir - Jonas J. Swartz - Henry S. Friedman
Reports of Distress for Brain Tumor Patients

- Cross-sectional Study of 75 BT Patients
- NCCN Distress Thermometer (DT): 0-10
  5 categories: practical, family, emotional, spiritual, and physical

### The Distress Thermometer

First please circle the number (0-10) that best describes how much distress you have been experiencing in the past week including today.

<table>
<thead>
<tr>
<th>Extreme Distress</th>
<th>No Distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
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<tr>
<td>7</td>
<td>3</td>
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<td>6</td>
<td>4</td>
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<td>5</td>
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<td>4</td>
<td>6</td>
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<td>3</td>
<td>7</td>
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<td>2</td>
<td>8</td>
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<tr>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td>10</td>
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</tbody>
</table>

Second, please indicate if any of the following has been a problem for you in the past week including today. Be sure to check YES or NO for each.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Practical Problems</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Child Care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Housing</td>
</tr>
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<td></td>
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<td>Insurance/financial</td>
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<tr>
<td></td>
<td></td>
<td>Transportation</td>
</tr>
<tr>
<td></td>
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<td>Work/school</td>
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<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Family Problems</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Dealing with children</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dealing with partner</td>
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<td></td>
<td></td>
<td>Dealing with close</td>
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<td></td>
<td></td>
<td>Friend/relative</td>
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</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Emotional Problems</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fears</td>
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<td></td>
<td></td>
<td>Nervousness</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Worry</td>
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<td></td>
<td></td>
<td>Loss of interest in usual activities</td>
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<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Spiritual/religious concerns</th>
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<table>
<thead>
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<th>YES</th>
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<th>Physical Problems</th>
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<tr>
<td></td>
<td></td>
<td>Appearance</td>
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<td>Bathing/dressing</td>
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<tr>
<td></td>
<td></td>
<td>Breathing</td>
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<tr>
<td></td>
<td></td>
<td>Changes in urination</td>
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<td></td>
<td></td>
<td>Constipation</td>
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<td></td>
<td></td>
<td>Diarrhoea</td>
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<td></td>
<td></td>
<td>Eating</td>
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<td></td>
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<td>Fatigue</td>
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<td>Feeling Swollen</td>
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<td>Fevers</td>
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<td>Getting around</td>
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<td>Indigestion</td>
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<td></td>
<td>Memory/concentration</td>
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<td></td>
<td></td>
<td>Mouth sores</td>
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<td></td>
<td></td>
<td>Nausea</td>
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<tr>
<td></td>
<td></td>
<td>Nose dry/congested</td>
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<tr>
<td></td>
<td></td>
<td>Pain</td>
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<td></td>
<td></td>
<td>Sexual</td>
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<tr>
<td></td>
<td></td>
<td>Skin dry/itchy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sleep</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tingling in hands/feet</td>
</tr>
</tbody>
</table>

Other problems
Reports of Distress for Brain Tumor Patients

52% considered “Distressed”

- Emotional problems/issues ($r=0.444, P \leq 0.001$)
- Total number of concerns ($r=0.368, P \leq 0.001$)
- Physical problems/issues ($r=0.231, P \leq 0.05$)
### Distress in other Cancer Populations

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>No. of Patients</th>
<th>Cancer Site</th>
<th>Cut-off Score</th>
<th>% Distressed</th>
<th>% Brain Tumor Patient Distressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roth et al.</td>
<td>1998</td>
<td>121</td>
<td>Advanced Prostate</td>
<td>&gt; 5</td>
<td>29</td>
<td>44</td>
</tr>
<tr>
<td>Hoffman et al.</td>
<td>2004</td>
<td>68</td>
<td>Mixed Outpatient</td>
<td>&gt; 4</td>
<td>53</td>
<td>52</td>
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<tr>
<td>Jacobsen et al.</td>
<td>2005</td>
<td>380</td>
<td>Mixed Outpatient</td>
<td>&gt; 4</td>
<td>43</td>
<td>52</td>
</tr>
<tr>
<td>Ransom et al.</td>
<td>2006</td>
<td>491</td>
<td>Pre-Bone Marrow Transplant</td>
<td>&gt; 4</td>
<td>42</td>
<td>52</td>
</tr>
<tr>
<td>Average of Studies</td>
<td>1000 +</td>
<td></td>
<td></td>
<td></td>
<td>42</td>
<td>50</td>
</tr>
</tbody>
</table>

Keir et al. Screening for Distress in Patients with Brain Cancer using NCCN’s Rapid Screening Tool. Psycho-Oncology (2008)

20% more likely to meet the NCCN Distress criteria
Distress Persists Throughout Survivorship

- **Survivorship:** LTS > 18, Newly Diagnosed <18months
- **83 BT Patients**
- **Overall:** 54% distressed (DT)
- **Total Distressed:** LTS 59% vs 49%
- **BT < 18 months:** physical sources of distress
- **LTS distress correlated to:** physical sources and the addition of total number of concerns and emotional sources

20% Increase in distress
Distress Trajectory and Survivorship


Distress persists in long-term brain tumor survivors with glioblastoma multiforme

Stephen T. Keir · Margaret M. Farland · Eric S. Lipp · Henry S. Friedman
**Perceived Stress Scale**

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

Name__________________________________________ Date__________

Age ________ Gender (Circle): M F Other________________________

0 = Never  1 = Almost Never  2 = Sometimes  3 = Fairly Often  4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly? ........................................ 0 1 2 3 4

2. In the last month, how often have you felt that you were unable to control the important things in your life? ........................................ 0 1 2 3 4

3. In the last month, how often have you felt nervous and "stressed"? ........................................ 0 1 2 3 4

4. In the last month, how often have you felt confident about your ability to handle your personal problems? ........................................ 0 1 2 3 4

5. In the last month, how often have you felt that things were going your way? ........................................ 0 1 2 3 4

6. In the last month, how often have you found that you could not cope with all the things that you had to do? ........................................ 0 1 2 3 4

7. In the last month, how often have you been able to control irritations in your life? ........................................ 0 1 2 3 4

8. In the last month, how often have you felt that you were on top of things? ........................................ 0 1 2 3 4

9. In the last month, how often have you been angered because of things that were outside of your control? ........................................ 0 1 2 3 4

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? ........................................ 0 1 2 3 4
Stress and Long-term Survivors

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Range</th>
<th>&quot;Stressed&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 18 months</td>
<td>15.2</td>
<td>14.0</td>
<td>1 to 28</td>
<td>57%</td>
</tr>
<tr>
<td>≥ 18 months</td>
<td>13.7</td>
<td>14.5</td>
<td>2 to 29</td>
<td>54%</td>
</tr>
<tr>
<td>average</td>
<td>14.4</td>
<td>14.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 18 months</td>
<td>16.1</td>
<td>16.5</td>
<td>6 to 27</td>
<td>67%</td>
</tr>
<tr>
<td>≥ 18 months</td>
<td>17.6</td>
<td>16.5</td>
<td>10 to 27</td>
<td>69%</td>
</tr>
<tr>
<td>average</td>
<td>17.0</td>
<td>16.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


- Unlike over cancer populations...stress
- LTS report fewer concerns...still stressed
- Family, emotional, and trend to practical concerns

No Statistical Difference between groups

Female BT patients report more stress
• Large Number of BT Report Being Distressed
• More Distressed than Cancer Counterparts

• LTS Report Higher Levels of Distress
• Needs of LTS Different

• LTS just as Stressed
• Unlike other Cancer Populations: Stress
• Fewer Concerns – Family, Emotional, & Practical
Background

• Elevated levels of stress and distress

• Want information, belief in stress/distress management, and ability to participate

• Massage therapy – reduce stress/distress and improve QoL

A Pilot Study is born!!!!
The National Cancer Institute defines massage as a treatment in which the soft tissues of the body are kneaded, rubbed, tapped, and stroked. It also involves the application of specific physical manipulations applied in a systematic way, with varying intensity, direction, rate and rhythm.\textsuperscript{6}
Massage Therapy

• Improve symptom control \(^7\)
• Reduce psychological distress and improve QoL \(^8\)
• Reduces stress, depression, anxiety, pain, chemotherapy-related nausea and fatigue \(^9\)–\(^11\)
• Increase immune function \(^11\)
• Promotes relaxation and improves sleep patterns \(^12\)
• Ease breathing, facilitate weight gain, and increase alertness \(^13\)–\(^15\)
• Safely incorporated into conventional care for cancer patients \(^16\)

...little is known about the psychological benefits of massage therapy for patients with brain tumors
Materials and Methods

• Prospective, single-arm intervention
• Subjects – Adult, Newly diagnosed, Karnofsky, English, Distance, Stressed
• Setting - Duke Center for Living
• Design and procedure – 45 minute massage session, Twice weekly for 4 weeks
• Massage – “classic” Swedish massage
Swedish Massage

Swedish massage uses five styles of long, flowing strokes to massage. The five basic strokes are effleurage (sliding or gliding), petrissage (kneading), tapotement (rhythmic tapping), friction (cross fiber) and vibration/shaking.¹⁷

SWEDISH MASSAGE? French fries, Chinese checkers, Canadian bacon…

Peter Ling – father of Swedish massage? Royal Gymnastic Institute
Georg Mezger – French terms to movements
Swedish Massage

**Effleurage:** A Swedish massage usually begins with effleurage, which is a smooth gliding stroke that covers long distances on the body. It may involve movements from the neck to the bottom of the spine, or motions from the shoulder area to the fingers. Therapists direct the strokes toward the heart to assist in blood and lymphatic circulation. This stroke relaxes soft tissue, such as muscles, ligaments and connective tissue.

**Petrissage:** Petrissage is often the second type of movement in a massage session. This technique consists of gently elevating muscles from the bony structures they lie above. It usually employs kneading and compressing movements of rolling and squeezing, to foster circulation in the deeper veins and lymphatic vessels. The advantage of improved circulation is that it provides nutrients and oxygen to assist with cell growth and repair. It also facilitates the release of toxins from muscles and nerve tissue.
Swedish Massage

**Friction:** Friction is the deepest of all the stroke techniques. It involves applying deep circular or transverse movements to soft tissue, so that deeper layers of tissue rub against more superficial layers. Therapists administer this motion close to joints and bony prominences. The advantage of friction is that it increases joint flexibility through breaking down knots in bound muscle fibers. It improves circulation as well.

**Tapotement:** Tapotement involves rapid percussive strokes where the hands strike the muscles. This technique has different benefits, depending on the length of time the masseuse performs it. When therapists administer it for less than 10 seconds, it has a stimulating effect, but when they apply it up to 60 seconds, it promotes relaxation. If the masseuse uses tapotement longer than 60 seconds, it can provide relief from muscle spasms.

**Vibration:** Vibration involves fast shaking of the back or limbs, which the therapist only administers a few seconds at a time. It stimulates circulation and helps the muscles contract. Those who suffer from low-back pain can benefit from this technique. The movement is especially beneficial in working on the nerves. It is stimulating when the masseuse performs it for a short period, and relaxing when they administer it for a longer period.
Assessment

- Stress: Perceived Stress Scale (PSS-10)
  Measures perception of stress
  Unpredictable, uncontrollable, and overloaded

- Quality of Life: Functional Assessment of Cancer Therapy – Brain (FACT-Br)
  Wellbeing: Physical, social/family, emotional, functional, and BT specific

Statistical Analysis: SPSS
PSS-10 and FACT-Br - z scores
P values: 0.05 and 0.08
Results

Enrollment:

Pre-Screen: Adult, diagnosis, language, Karnofsky score, and location

28 Patients approached
~ Decline due to transportation problems (1)
~ Stress & geographic location validated
~ 26 out of 27 Patients met study criteria
~ 26 patients enrolled

Withdrawal from study due to Shingles (1)
Results

Stress:

26/27 consecutive patients – 96% stressed
Mean PSS Score 24 (17 – 34)

Effect of Massage on Mean PSS Scores

BT report 85% more stress
Results

Stress:
26/27 consecutive patients – 96% stressed
Mean PSS Score 24 (17 – 34)

Week 3 (M=12.3, P≤0.010)
Week 4 (M=10, P≤0.063)
Effect of Massage on Mean PSS Scores

Average PSS Score

Stress Threshold

Week 3

Week 4

Week 5

Baseline

Week 1

Week 2

Week 3

Week 4

Week 5

2012 AMERICAN BRAIN TUMOR ASSOCIATION PATIENT AND FAMILY CONFERENCE
Results

Quality of Life:

<table>
<thead>
<tr>
<th>Mean Quality of Life Scores</th>
<th>Baseline</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Δ</td>
<td>P value</td>
<td>Δ</td>
<td>P value</td>
<td>Δ</td>
<td>P value</td>
</tr>
<tr>
<td>Physical Well-being</td>
<td>10.2</td>
<td>3.6</td>
<td>NS</td>
<td>3.8</td>
<td>0.079</td>
<td>3.2</td>
</tr>
<tr>
<td>Social/Family Well-being</td>
<td>17.3</td>
<td>0.3</td>
<td>NS</td>
<td>0.8</td>
<td>NS</td>
<td>2.7</td>
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<tr>
<td>Emotional Well-being</td>
<td>10.3</td>
<td>1</td>
<td>NS</td>
<td>2.1</td>
<td>NS</td>
<td>3.1</td>
</tr>
<tr>
<td>Functional Well-being</td>
<td>14.1</td>
<td>1.5</td>
<td>NS</td>
<td>0.8</td>
<td>NS</td>
<td>0.1</td>
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<tr>
<td>Fatigue</td>
<td>23</td>
<td>4.1</td>
<td>NS</td>
<td>4.4</td>
<td>NS</td>
<td>4.5</td>
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<tr>
<td>Additional BT Concerns</td>
<td>42</td>
<td>0.2</td>
<td>NS</td>
<td>0.3</td>
<td>NS</td>
<td>4.3</td>
</tr>
</tbody>
</table>

* "NS" indicates Not Significant Improvement

Week 2:
- Physical Well-being (3.8) t

Week 3:
- Emotional Well-being (3.1)
- Additional BT Concerns (4.3)

Week 4:
- Physical Well-being (3.9) t
- Social/Family Well-being (4.3)
- Emotional Well-being (3.5)
- Additional BT Concerns (5.4)

Week 5:
- Physical Well-being (3.4) t
- Emotional Well-being (3.1)
What does this study tell us?

1. Pilot Study
2. Feasibility, acceptability and patient safety
3. Stress is widespread for patients with BT
4. Impact of massage on stress and QoL
5. Unexpected outcomes - caregivers
   16% returned to MT
Challenges and Limitations

1. Research Design vs Buzzkill Effect
2. Massage technique
3. Number of therapists
4. Recruitment

Recommendations

1. Control: Cross-over or other CAM therapy
2. Longer therapy protocol that tracks outcomes
3. Objective assessment of physiological and biological markers
Final Recommendation....

Massage therapy is a safe way to reduce stress and improve one's quality of life...get one!

Questions
References


References


The Karnofsky score runs from 100 to 0, where 100 is "perfect" health and 0 is death. Although practitioners occasionally assign performance scores in between standard intervals of 10, there is no substantiated rationale for this and prognostication is not improved. This scoring system is named after Dr David A. Karnofsky, who described the scale with Dr Joseph H. Burchenal in 1949.

100% – normal, no complaints, no signs of disease
90% – capable of normal activity, few symptoms or signs of disease
80% – normal activity with some difficulty, some symptoms or signs
70% – caring for self, not capable of normal activity or work
60% – requiring some help, can take care of most personal requirements
50% – requires help often, requires frequent medical care
40% – disabled, requires special care and help
30% – severely disabled, hospital admission indicated but no risk of death
20% – very ill, urgently requiring admission, requires supportive measures or treatment
10% – moribund, rapidly progressive fatal disease processes
0% – death.