

Commentary

Massage for pain relief in pediatric palliative care: Potential benefits and challenges

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Pain in pediatric palliative care populations

Pain is one of the most commonly reported symptoms of children in palliative care¹ (Wolfe et al., 2000; Goldman et al., 2006). Pain can increase the existing stress and fears of an individual with a life-limiting condition, and combine with other distressing symptoms (e.g. dyspnea, fatigue) to negatively affect quality of life (McMillan & Small, 2002; Kuttner, 2006). Wolfe et al. (2000) found that pain was the most commonly treated symptom experienced by children with cancer at end-of-life, but was successfully managed in less than 30% of children. Given the high prevalence of under-managed pain, improved pain management has been highlighted as a priority in palliative care (Grégoire & Frager, 2006; Steele et al., 2008; Friedrichsdorf, 2010). Massage therapy (MT) is the mechanical manipulation of the muscles and soft tissues of the body with a focus on physical structures and systems such as the circulatory and lymphatic systems (National Center for Complementary and Alternative Medicine, NCCAM, 2010). MT has been studied with a number of populations and linked to improvements in mood, pain, and anxiety (for reviews see: Moyer et al., 2004; Field et al., 2007). This commentary will introduce MT as a potentially useful intervention for pain in pediatric palliative care and encourage research on its efficacy for this population.

Congruent with pain management strategies in other populations and contexts, current interventions in pediatric palliative care include pharmacological and non-pharmacological

approaches (Kuttner, 2006). While the importance of holistic care has been emphasized, more research exists on pharmacological strategies (Grégoire & Frager, 2006; Kuttner, 2006). There is also much less research on pediatric compared to adult palliative care populations. Given the prevalence of ineffectively managed pain in pediatric palliative care, other developmentally appropriate strategies need to be investigated, and if found to be effective, put into practice.

In addition to traditional pharmacological approaches, there are numerous other pain management strategies, including psychological methods, physical therapy, and complementary and alternative medicine (CAM). CAM has become increasingly popular in the general population and for individuals with chronic or life-limiting illnesses (Post-White, 2006). Although CAM techniques are often thought of as a group, it is an umbrella term used to describe many different therapeutic approaches (Stone, 2002). Thus, it is important to examine each intervention to determine individual efficacy and mechanism of effect. CAM techniques for pain reduction in palliative care include massage, aromatherapy, hypnotherapy, reflexology, and music therapy (Molassiotis & Cubbin, 2004; Post-White, 2006). Studies of MT in adults in palliative care have demonstrated preliminary evidence in favor of its use for symptom control (including pain) and to improve quality of life, suggesting it may be a useful intervention for children in this context.

Massage therapy for pain relief

NCCAM classifies MT as a manipulative and body-based intervention. Massage can take many forms, of which General Swedish Manipulation including stroking (effleurage) and kneading (petrissage) is the most common (Hughes et al., 2008). Moderate pressure is required (Field et al., 2007). The target location for massage typically varies with client/patient needs and intervention goal but frequently includes the back, neck, hands, and feet. Carrier oils or lotions lightly scented with safe essential oils (e.g. lavender) can be used². Massage is distinct from other CAM practices that aim to affect health by adjusting purported energy fields of the body (e.g. Reiki, healing touch; NCCAM, 2011). Massage is one of the most commonly utilized CAM techniques for individuals with varying diagnoses, and has shown some promise in reducing pain (e.g. Moyer et al., 2004; Beider & Moyer, 2007; Kutner et al., 2008; Field, 2010; in contrast see Tsao, 2007).

Two theories have been most commonly proposed to explain why massage may be helpful in reducing pain. Consistent with the Gate Control Theory of pain, it has been suggested that massage inhibits pain signals from reaching the brain (i.e. “closes the gate”), thus reducing the experience of pain (Moyer et al., 2004; Field, 2010). Deep Sleep Theory postulates that massage inhibits substance P (a pain chemical) production by increasing the amount of time spent in deep sleep (Moyer et al., 2004; Field, 2010; Rich, 2010). MT has also been associated with increases in serotonin (Hernandez-Reif et al., 2004), a neurotransmitter which has been implicated in pain pathophysiology (Sommer, 2006). Massage may pose broader benefits for patients such as the reduction of stress and/or psychological symptoms, which in turn may lead to pain reduction and improvement in quality of life (Moyer et al., 2004; Ernst, 2009; Field, 2010). Supporting this contention, reductions in anxiety and depression (Moyer et al., 2004) as well as cortisol (a stress hormone) have been demonstrated (Field et al., 2005; in contrast see Moyer et al., 2004). A psychoneuroimmune framework has also been proposed to understand the effects of massage (Post-White, 2006). Unfortunately, research is

inconclusive regarding massage’s mechanism of action for pain relief and has not supported a direct relationship between massage and immune functioning (Field et al., 1997; Field, 1998; Moyer et al., 2004; Beider & Moyer, 2007).

There have been several general reviews on the efficacy of massage for a variety of concerns including pain (Moyer et al., 2004; Tsao & Zeltzer, 2005; Beider & Moyer, 2007; Tsao, 2007) which have included, but not focused on, patients in palliative care. These reviews have provided promising but also somewhat equivocal support for massage for pain relief. Some adult research suggests that multiple doses of massage are significantly more effective than control conditions at reducing pain (Kutner et al., 2008; Russell et al., 2008; Rich, 2010). Although results are somewhat inconsistent regarding pain reduction, adult patients in palliative care undergoing massage have demonstrated both significant immediate and short-term improvements in pain intensity (Moyer et al., 2004; Kutner et al., 2008). Pain reduction following MT has also been suggested in studies of children undergoing stem cell transplantation, and those diagnosed with cerebral palsy, sickle cell disease, cancer, a variety of chronic pain conditions (e.g. headaches, abdominal pain, fibromyalgia), and juvenile rheumatoid arthritis (Field et al., 1997; Suresh et al., 2008; Lemanek et al., 2009; Post-White et al., 2009; Phipps et al., 2010; Powell et al., 2010). Unfortunately, this latter evidence is inconclusive due to varying quality of designs and small sample sizes resulting in a lack of power to find significant differences (Beider & Moyer, 2007). Furthermore, in addition to differences in the intervention (e.g. single vs. multiple dose), choice of outcome measure (e.g. pain intensity, interference, qualitative vs. quantitative data) and outcome time points (e.g. immediate, delayed) may contribute to the conflicting results (e.g. Tsao, 2006; Phipps et al., 2010). There may also be a publication bias in this area with negative results of randomized control trials not being published (Ernst, 2009).

Researching massage for pain relief in pediatric palliative care

To date, no research has examined the effects of MT for children in palliative care and its current level of use in these services is unknown. However, there are a number of reasons to suppose that massage may provide pain relief, most notably, the reduction in pain in adult populations and promising results for children with chronic illnesses. Although we can begin by extrapolating from such studies, it is difficult to determine dosages or the specific pain-reducing effects of massage for children in palliative care. Specifically, complex developmental and contextual differences may affect these children's understanding, expectations, beliefs, and experience of pain (McGrath & Dade, 2004; Post-White, 2006), and therefore, the effects of massage.

Beyond the factors discussed above, the absence of research on massage in pediatric palliative care may be due to challenges related to the population and the intervention. Research involving individuals at end-of-life, especially children, requires increased sensitivity and is accompanied by a number of challenges such as limited sample sizes, high rates of patient withdrawal, concerns over burdening the families, and reluctance to use control groups (see Gorman et al., 2008). Multi-site trials have been suggested as a way to overcome limited sample sizes (see Kutner et al., 2010 for strategies) and the importance of including descriptive statistics to allow meta-analyses has been highlighted (Demmer, 2003; Beider & Moyer, 2007). Study replication has also been strongly encouraged (Beider & Moyer, 2007). Conducting trials on massage can be challenging (e.g. double blinding) but rigorous methodology is needed to establish efficacy (Miller et al., 2004). Furthermore, although massage therapists recognize the importance of research to their clinical practice, they may be reluctant to engage in research; this may be due to low confidence in their research skills resulting from limited emphasis on research within their training (Suter et al., 2007). Practitioner cooperatives, increased research training, and other forms of support may help encourage research within this profession (Suter et al., 2007).

Given the dearth of research, a step-by-step approach to future investigations incorporating multiple methodologies is recommended (e.g. single-case and cross-over designs). Qualitative data on stakeholder perceptions and data on the extent to which MT is currently being used in pediatric palliative care services are needed. Initial acceptability and feasibility studies are also required to inform larger scale clinical trials. Massage intervention research should assess whether it has any advantage over existing treatments in terms of efficacy, safety, patient preference, cost and availability (Stone, 2002). Research has yet to demonstrate whether massage performed by a massage therapist or a trained parent results in the greatest decreases in child pain. If effective, parent-delivered massage would enhance cost-effectiveness, an important consideration for families (Post-White, 2006) and palliative care programs (Knapp & Madden, 2010). Although massage is considered safe for most individuals, their physical condition must be considered (Corbin, 2005); issues including skin fragility, tumor sites, catheters, and open wounds may require treatment modification. The components of the intervention (e.g. duration, frequency, pressure, manipulation type) associated with the greatest pain reduction should be explored to determine the most appropriate massage intervention for pain management in pediatric palliative care.

Conclusion

Pain reduction in pediatric palliative care is, and needs to remain, a priority (Steele et al., 2008). MT has demonstrated some pain-relieving effects in children with chronic illnesses and adults in palliative care; however, no research has examined the effectiveness of massage for children in palliative care. Rather than a burden, participating in MT research may be a way for children and families to find meaning in illness and contribute to the health of future patients (Gorman et al., 2008). Methods of symptom control and coping can offer great value to the patients and families receiving palliative care, as they can provide a healing framework, decrease helplessness and maximize quality of life and strength at end-of-life (Kuttner, 2006). All of these factors call for research

assessing MT as a complementary strategy for pain relief in pediatric palliative care.

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Endnotes

- ¹ The Association for Children's Palliative Care (2008) indicates that: "Palliative care for children and young people with life-limiting conditions is an active and total approach to care, from the point of diagnosis or recognition, embracing physical, emotional, social and spiritual elements through death and beyond. It focuses on enhancement of quality of life for the child/young person and support for the family and includes the management of distressing symptoms, provision of short breaks, and care through death and bereavement."
- ² Aromatherapy is the therapeutic use of scent from essential oils (NCCAM, <http://nccam.nih.gov/health/aromatherapy>). Although aromatherapy is sometimes combined with MT, it is not the focus of this commentary.

References

- Association for Children's Palliative Care. Children's palliative care definitions, 2008.
http://act.org.uk/core/core_picker/download.asp?id=157
- Beider S, Moyer CA. Randomized controlled trials of pediatric massage: a review. *Evid Based Complement Alternat Med* 2007;4:23-34.
www.pubmed.gov/17342238
- Corbin L. Safety and efficacy of massage therapy for patients with cancer. *Cancer Control* 2005;12:158-164.
www.pubmed.gov/16062163
- Demmer C. Use of complementary therapies with terminally ill patients: the need for more research. *Illn Crisis Loss* 2003;11:281-291.
- Ernst E. Massage therapy for cancer palliation and supportive care: a systematic review of randomised clinical trials. *Support Care Cancer* 2009;17:333-337.
www.pubmed.gov/19148685
- Field TM. Massage therapy effects. *Am Psychol* 1998;53:1270-1281. www.pubmed.gov/9872050
- Field T. Touch for socioemotional and physical well-being: a review. *Dev Rev* 2010;30:367-383.
- Field T, Diego M, Hernandez-Reif M. Massage therapy research. *Dev Rev* 2007;27:75-89.
- Field T, Hernandez-Reif M, Diego M, Schanberg S, Kuhn C. Cortisol decreases and serotonin and dopamine increase following massage therapy. *Int J Neurosci* 2005;115:1397-1413. www.pubmed.gov/16162447
- Field T, Hernandez-Reif M, Seligman S, Krasnegor J, Sunshine W, Rivas-Chacon, R, et al. Juvenile rheumatoid arthritis: benefits from massage therapy. *J Pediatr Psychol* 1997;22:607-617.
www.pubmed.gov/9383925
- Friedrichsdorf SJ. Pain management in children with advanced cancer and during end-of-life care. *Pediatr Hematol Oncol* 2010;27:257-261.
www.pubmed.gov/20426516
- Goldman A, Hewitt M, Collins GS, Childs M, Hain R. Symptoms in children/young people with progressive malignant disease: United Kingdom Children's Cancer Group/Paediatric Oncology Nurses Forum survey. *Pediatrics* 2006;117:e1179-e1186.
www.pubmed.gov/16740818
- Gorman G, Forest J, Stapleton SJ, Hoenig NA, Marschke M, Durham J, et al. Massage for cancer pain: a study with university and hospice collaboration. *J Hosp Palliat Nurs* 2008;10:191-197.
www.pubmed.gov/19337585
- Grégoire MC, Frager G. Ensuring pain relief for children at the end of life. *Pain Res Manag* 2006;11:163-171.
www.pubmed.gov/16960633

- Hernandez-Reif M, Ironson G, Field T, Hurley J, Katz G, Diego M, et al. Breast cancer patients have improved immune and neuroendocrine functions following massage therapy. *J Psychosom Res* 2004;57:45-52. www.pubmed.gov/15256294
- Hughes D, Ladas E, Rooney D, Kelly K. Massage therapy as a supportive care intervention for children with cancer. *Oncol Nurs Forum* 2008;35:431-442. www.pubmed.gov/18467292
- Knapp C, Madden V. Conducting outcomes research in pediatric palliative care. *Am J Hosp Palliat Care* 2010;27:277-281. www.pubmed.gov/20228360
- Kutner JS, Smith MC, Corbin L, Hemphill L, Benton K, Mellis BK, et al. Massage therapy versus simple touch to improve pain and mood in patients with advanced cancer: a randomized trial. *Ann Intern Med* 2008;149:369-379. www.pubmed.gov/18794556
- Kutner J, Smith M, Mellis K, Felton S, Yamashita T, Corbin L. Methodological challenges in conducting a multi-site randomized clinical trial of massage therapy in hospice. *J Palliat Med* 2010;13:739-744. www.pubmed.gov/20597707
- Kuttner L. Pain – an integrative approach. In: Goldman A, Hain R, Liben S, editors. *Oxford textbook of palliative care for children*. New York: Oxford University Press, 2006. pp. 332-341. www.worldcat.org/oclc/61334486
- Lemanek KL, Ranalli M, Lukens C. A randomized controlled trial of massage therapy in children with sickle cell disease. *J Pediatr Psychol* 2009;34:1091-1096. www.pubmed.gov/19282374
- McGrath PA, Dade LA. Strategies to decrease pain and minimize disability. In: Price DD, Bushnell MC, editors. *Psychological methods of pain control: basic science and clinical perspectives*. Seattle, WA: IASP Press, 2004. pp. 73-98. www.worldcat.org/oclc/55008934
- McMillan SC, Small BJ. Symptom distress and quality of life in patients with cancer newly admitted to hospice home care. *Oncol Nurs Forum* 2002;29:1421-1428. www.pubmed.gov/12432413
- Miller FG, Emanuel EJ, Rosenstein DL, Straus SE. Ethical issues concerning research in complementary and alternative medicine. *JAMA* 2004;291:599-604. www.pubmed.gov/14762039
- Molassiotis A, Cubbin D. ‘Thinking outside the box’: complementary and alternative therapies use in paediatric oncology patients. *Eur J Oncol Nurs* 2004;8:50-60. www.pubmed.gov/15003744
- Moyer CA, Rounds J, Hannum JW. A meta-analysis of massage therapy research. *Psychol Bull* 2004;130:3-18. www.pubmed.gov/14717648
- National Center for Complementary and Alternative Medicine. *Massage therapy: an introduction*, 2010. <http://nccam.nih.gov/health/massage/massageintroduction.htm>
- National Center for Complementary and Alternative Medicine. *What is complementary and alternative medicine?* 2011. <http://nccam.nih.gov/health/whatiscam>
- Phipps S, Barrera M, Vannatta K, Xiong X, Doyle JJ, Alderfer MA. Complementary therapies for children undergoing stem cell transplantation: report of a multisite trial. *Cancer* 2010;116:3924-3933. www.pubmed.gov/20626016
- Post-White J. Complementary and alternative medicine in pediatric oncology. *J Pediatr Oncol Nurs* 2006;23:244-253. www.pubmed.gov/16902077
- Post-White J, Fitzgerald M, Savik K, Hooke MC, Hannahan AB, Sencer SF. Massage therapy for children with cancer. *J Pediatr Oncol Nurs* 2009;26:16-28. www.pubmed.gov/19074355
- Powell L, Cheshire A, Swaby L. Children’s experiences of their participation in a training and support programme involving massage. *Complement Ther Clin Pract* 2010;16:47-51. www.pubmed.gov/20129410
- Rich GJ. Massage therapy: significance and relevance to professional practice. *Prof Psychol Res Pract* 2010;41:325-332.
- Russell NC, Sumler SS, Beinhorn CM, Frenkel MA. Role of massage therapy in cancer care. *J Altern Complement Med* 2008;14:209-214. www.pubmed.gov/18315504
- Sommer C. Is serotonin hyperalgesic or analgesic? *Curr Pain Headache Rep* 2006;10:101-106. www.pubmed.gov/16539862
- Steele R, Bosma H, Johnston MF, Cadell S, Davies B, Siden H, et al. Research priorities in pediatric palliative care: a Delphi study. *J Palliat Care* 2008;24:229-239. www.pubmed.gov/19227014

Stone J. An ethical framework for complementary and alternative therapists. London: Routledge, 2002.

www.worldcat.org/oclc/48620332

Suresh S, Wang S, Porfyrus S, Kamasinski-Sol R, Steinhorn DM. Massage therapy in outpatient pediatric chronic pain patients: do they facilitate significant reductions in levels of distress, pain, tension, discomfort, and mood alterations? *Paediatr Anaesth* 2008;18:884-887. www.pubmed.gov/18768049

Suter E, Vanderheyden LC, Trojan LS, Verhoef MJ, Armitage GD. How important is research-based practice to chiropractors and massage therapists? *J Manipulative Physiol Ther* 2007;30:109-115.

www.pubmed.gov/17320731

Tsao JCI. CAM for pediatric pain: what is state-of-the-research? *Evid Based Complement Alternat Med* 2006;3:143-144. www.pubmed.gov/16550236

Tsao JCI. Effectiveness of massage therapy for chronic, non-malignant pain: a review. *Evid Based Complement Alternat Med* 2007;4:165-179.

www.pubmed.gov/17549233

Tsao JCI., Zeltzer LK. Complementary and alternative medicine approaches for pediatric pain: a review of the state-of-the-science. *Evid Based Complement Alternat Med* 2005; 2:149-159. www.pubmed.gov/15937555

Wolfe J, Grier HE, Klar N, Levin SB, Ellenbogen JM, Salem-Schatz S, et al. Symptoms and suffering at the end of life in children with cancer. *N Engl J Med* 2000;342:326-333. www.pubmed.gov/10655532