Childrens' Distress During Burn Treatment Is Reduced by Massage Therapy

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Before dressing changes, 24 young children (mean age = 2.5 years) hospitalized for severe burns received standard dressing care or massage therapy in addition to standard dressing care. The massage therapy was conducted to body parts that were not burned. During the dressing change, the children who received massage therapy showed minimal distress behaviors and no increase in movement other than torso movement. In contrast, the children who did not receive massage therapy responded to the dressing change procedure with increased facial grimacing, torso movement, crying, leg movement and reaching out. Nurses also reported greater ease in completing the dressing change procedure for the children in the massage therapy group. These findings suggest that massage therapy attenuates young childrens' distress responses to aversive medical procedures and facilitates dressing changes. (J Burn Care Rehabil 2001;22:191–195)

In the United States approximately 83,000 children were hospitalized for burns during 1997.[1] Children less than 4 years old are at greater risk for burn-related deaths because their skin is thin and can be deeply burned at low temperatures.[1]

Debridement (skin brushing) and/or dressing change procedures for treating severe burns can be painful and stressful for young patients. Although pain management, such as the administration of opioid analgesics (eg, morphine, codeine, and meperidine) may decrease pain levels, opioids alone do not alleviate procedural anxiety.[2,3] Benzodiazepines and other anxiolytics have been used to reduce fear and anticipatory procedural anxiety; however, side effects of these medications can lead to respiratory dysfunction.[2]

The addition of complementary treatments to standard care may lead to greater pain management and may offer a safer approach for reducing pain and procedural anxiety for burn patients. For example, controlled studies have reported that hypnotherapy reduces burn-related pain for adults and children.[4–6] Distraction-relaxation therapy, such as watching scenic/music videos during debridement, has also been found effective in reducing pain and procedural anxiety for burn adult patients. However, patients also reported being bored with repeated distraction trials suggesting that the effects may be short-lived.[7]

In a controlled study, adult burn patients who received daily massage therapy reported reduced anxiety and pain and their cortisol (stress) hormone levels were also reduced.[8] In addition, those who received massage therapy reported improved mood and activity and reduced depression and hostility. Massage therapy has not been evaluated for reducing procedural anxiety or pain for burned children, although it has been shown to reduce pain, cortisol (stress) hormone levels, and anxiety in children with rheumatoid arthritis[9] and improve mood in children hospitalized for depression.[10] The present study examined whether massage therapy attenuated burned childrens' distress to dressing change.

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METHOD

Participants

Twenty-four children (mean age = 29.3 months) were enrolled in this study shortly after admission (mean days = 5.5) at a burn unit in a trauma center at a large university hospital. After provision of informed consent, parents completed a demographic questionnaire. The children (19 males and 5 females) were from lower to middle socioeconomic status families as indicated by the Hollingshead Index (mean = 4.0). The ethnic distribution was 54% Hispanics, 42% African-American, and 4% Caucasian. After a stratification procedure for age and severity of burn, the children were randomly assigned to a massage therapy (n = 12) or standard care control group (n = 12).

Procedures

Standard Medical Care. Approximately 30 minutes before debridement and/or dressing change, 23 of the 24 children were administered an oral, intravenous, or intramuscular analgesic (acetaminophen with codeine or morphine). No significant differences were found between the two groups in the type of medication they received.

Attention Control Group. To control for attention or placebo effects, the massage therapist spent 15 minutes with children assigned to the control group before dressing change. During the 15-minute period, the massage therapist sat next to the child's bed and talked with the child.

Massage Therapy. Children assigned to the massage therapy group received a 15-minute massage before the dressing change from a trained therapist. The following strokes with moderate pressure were applied to the areas of the child's body that were *not* burned:

Face

1. Small circles to entire scalp (as if shampooing hair);
2. using flats of fingers, long stroking to both sides of face;
3. starting at midline of forehead, stroking with flats of fingers outward toward temples;
4. small circular stroking over the temples and jaw area;
5. using flats of fingers, stroking over the nose, cheeks, jaw, and chin.

Legs

1. Three long gliding strokes from the feet to the hips;
2. squeezing and twisting in wringing motion from the feet to the; knees
3. gliding thumbs across the bottom of each foot followed by squeezing and tugging of each toe;
4. stretching the Achilles tendons by flexing and extending each foot.

Arms

1. Stroking from hands to shoulders and
2. same procedure as for legs.

Back and Shoulders

1. Long gliding downward stroking along the back from the neck to the hip;
2. hand over hand movements from the upper to the lower back;
3. starting at the top of the spine, alternating hand strokes across the back working down toward the tail bone (never pressing the spine) and reaching over to include sides;
4. rubbing and kneading shoulders;
5. small, circular rubbing along the base of the neck, and
6. long, gliding stroking from the base of the neck and down the length of the back to the tail bone.

Assessments

Behavior Observations. Immediately after the intervention, an observer unaware of the child's group assignment (massage vs control), recorded the child's behavior *before* and *during* the dressing change. The observer distinguished between the two phases as follows: 1) the *before* dressing change, or baseline, observation was the period immediately after the therapist completed the 15 minute massage or control period and up until the time the nurse approached the child to start the dressing procedure and 2) the *during* the dressing change observation started when the nurse began the procedure and ended when the procedure was completed.

The Children's Hospital of Eastern Ontario Pain Scale (CHEOPS)[11] was used to code the distress behaviors during the observations before and during the dressing change. Six behaviors were recorded as shown in Table 1.

Each category was rated every 2 minutes. Interrater reliability between 90 and 99.5% has been reported for the CHEOPS for 1 to 5 year olds after various surgical procedures.[11] Acceptable correlations (r = .91) between CHEOPS and nurses ratings have also been reported for pain.[11]

Table 1. The Children's Hospital of Eastern Ontario Pain Scale used to code distress behaviors

Cry	
No cry	1
Moaning	2
Crying	2
Screaming	3
Facial	
Smiling	0
Composed	1
Grimace	2
Verbal	
Positive	0
No talking	1
Other complaint	1
Pain complaint	2
Both complaints	2
Torso	
Neutral	1
Shifting	2
Tense	2
Shivering	2
Upright	2
Restrained	2
Touch	
No touching	1
Reaching	2
Touching	2
Grabbing	2
Restrained	2
Legs	
Neutral	1
Squirm/kick	2
Drawn up/tense	2
Standing	2
Restrained	2

Postsession Only Assessments

Nurses' Rating Scale. Nurses who performed the procedure were asked to complete a short questionnaire. Two questions involved the child's stress level at the beginning and end of the procedure, using a 0 (very relaxed) to 5 (very tense) scale. Two additional questions rated the patient's overall pain, using a 0 (low pain) to 5 (high pain) scale, and the difficulty of the procedure, using a 0 (easy) to 5 (difficult) scale. The nurses who conducted the dressing changes were blind to the childrens' group assignments.

Massage Rating Scale. The therapists completed this scale immediately after the massage. The therapists rated the childrens' and their own stress level at the beginning and end of the massage on a Likert scale ranging from 0 (very tense) to 5 (very relaxed). The therapists also rated on a scale of 0 (not well) to 5 (very well) how the massage therapy session went overall. The criterion for this item was based on the child's responsiveness to receiving massage therapy. For example, a score of 5 on this item reflected that the child was very receptive to being touched and cooperated during the massage session.

RESULTS

Demographics

Results of *t* tests and chi-square tests revealed no differences between groups on the demographic data (Table 2). In addition, the groups did not differ on cause and degree of burn or on the medications administered before dressing change (Table 3).

CHEOPS

Because the CHEOPS variables were measured along an ordinal scale (ranked according to pain severity),

Table 2. Demographic data

Variables	Massage Therapy	Control	χ^2	*t* Tests
Age in months	25 (15)	34 (16)		0.16
Days admitted before observation	5 (4)	6 (4)		0.49
Sex			0.62	
Male	10	9		
Female	2	3		
Socioeconomic status			0.62	
Middle	3	2		
Lower	9	10		
Ethnicity			0.48	
Caucasians	0	1		
Hispanics	6	7		
African-Americans	6			

Figures are number and (SD) unless otherwise specified.

Table 3. Burn characteristics and procedural medications

Variables	Group		χ^2
	Massage Therapy	Control	
Cause of burn			NS
Scalding liquid	10	8	
Flame	0	3	
Hot contact surface	2	1	
Percentage of body burn			NS
0–10%	9	8	
11–20%	3	3	
20–25%	0	1	
Burn degree			NS
Second degree only	10	7	
Second and third degree	2	5	
Medication before dressing change			NS
Acetominophen with codeine	4	5	
Morphine	7	7	
None	1	0	

NS, not significant.

the data were subjected to nonparametric tests. Wilcoxon matched-pair signed-ranks tests revealed that the massage therapy group showed only an increase in torso movements during the dressing changes, $W = 2.29$, $P < .05$. In contrast, the control group showed an increase in 1) facial grimacing, $W = 2.60$, $P < .01$; 2) torso movement, $W = 2.34$, $P < .01$; 3) crying, $W = 2.27$, $P < .05$; 4) leg movement, $W = 2.61$, $P < .01$; and 5) reaching out, $W = 1.84$, $P < .05$ during the dressing change (descriptive statistics are shown in Table 4).

Nurses' Rating Scales

The nurses reported less difficulty in completing the procedure for the children who received massage therapy before the dressing change, $Z = 2.13$, $P < .05$ (Table 5).

Massage Therapists' Rating Scale

The massage therapists reported that their stress levels were lower after massaging the children (mean = 2.9 before vs 4.1 after), $Z = 2.46$, $P < .01$ and that the children seemed to be more relaxed after the massage therapy (mean = 1.9 before vs 3.5 after), $Z = 2.43$, $P < .05$.

DISCUSSION

Before dressing changes 24 young children hospitalized for severe burns received standard dressing care or massage therapy in addition to standard dressing care. The massage therapy was conducted to body parts that were not burned. During the dressing change the children who received massage therapy showed minimal distress behaviors and no increase in movement other than torso movement. In contrast, the children who did not receive massage therapy responded to the dressing change procedure with increased facial grimacing, torso movement, crying, leg movement, and reaching out.

Unaware of the childrens' group assignment, the nurses also reported less difficulty conducting the procedure on the massaged children. Moreover, the massage therapists reported that both they and the children were more relaxed after the massages. These results and other data show that massage therapy benefits the therapist as well as the receiver of massage.[12] Future research might study the efficacy of teaching parents to massage their children before burn care procedures to reduce the anticipatory stress level of both parties.

One limitation of our study was the small sample size. Future studies need to be conducted with larger samples before the findings can be accepted with a

Table 4. Medians/means and (SD) of Children's Hospital of Eastern Ontario Pain Scale ratings (0–3) of distress behaviors observed before and during dressing change

Variables	Massage Therapy		Control	
	Before Dressing	During Dressing	Before Dressing	During Dressing
Crying	$1.5/1.4\ (.3)_a$	$1.8/1.7\ (.4)_a$	$1.3/1.4\ (.5)_a$	$1.9/2.0\ (.5)_b$
Facial	$1.3/1.3\ (.6)_a$	$1.6/1.5\ (.3)_a$	$1.4/1.4\ (.4)_a$	$1.8/1.6\ (.4)_b$
Verbal	$1.0/0.9\ (.3)_a$	$1.0/0.9\ (.3)_a$	$1.0/1.1\ (.3)_a$	$1.1/1.2\ (.3)_a$
Torso	$1.0/1.1\ (.2)_a$	$1.5/1.5\ (.3)_b$	$1.2/1.3\ (.4)_a$	$1.8/1.7\ (.2)_b$
Touch	$1.1/1.2\ (.3)_a$	$1.1/1.3\ (.4)_a$	$1.0/1.2\ (.3)_a$	$1.4/1.4\ (.3)_b$
Legs	$1.0/1.2\ (.3)_a$	$1.1/1.3\ (.4)_a$	$1.0/1.1\ (.2)_a$	$1.4/1.4\ (.3)_b$

Lower is optimal for all scores. Different subscripts denote significant differences at $P < .05$ level for adjacent means within group.

Table 5. Nursing ratings for the two groups

Ratings	Groups		
	Massage Therapy	Control	*P*
Child's stress level			
Beginning of the procedure	2.8 (1.5)	3.3 (1.3)	NS
End of the procedure	2.3 (1.6)	2.5 (0.7)	NS
Overall stress level	2.5 (1.4)	3.3 (0.4)	NS
Procedural difficulty during dressing change	1.5 (1.5)	2.6 (0.8)	0.02

NS, not significant.
Lower scores are optimal. Figures are mean and (SD) unless otherwise specified.

greater degree of confidence. Another future study might assess having the children serve as their own controls to provide a better measure of massage therapy outcome. Assessing stress hormone levels (salivary cortisol) and/or neuropeptide pain levels (substance P) during stressful medical procedures could provide additional measures of massage therapy effects as an adjunct to standard burn dressing care.

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