Massage Reduces Anxiety in Child and Adolescent Psychiatric Patients

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Abstract. A 30-minute back massage was given daily for a 5-day period to 52 hospitalized depressed and adjustment disorder children and adolescents. Compared with a control group who viewed relaxing videotapes, the massaged subjects were less depressed and anxious and had lower saliva cortisol levels after the massage. In addition, nurses rated the subjects as being less anxious and more cooperative on the last day of the study, and nighttime sleep increased over this period. Finally, urinary cortisol and norepinephrine levels decreased, but only for the depressed subjects. *J. Am. Acad. Child Adolesc. Psychiatry*, 1992, 31, 1:125–131. **Key Words:** massage, child/adolescent psychiatric patients.

Emotional disturbances like depression and adjustment disorder are typically accompanied by anxiety, muscle tension, increases in cortisol levels, and sleep disturbances. Anxiety as well as anxious behavior and physiology can be reduced by relaxation therapy (Richter, 1984). In one study, relaxation therapy was the most effective treatment (more effective than cognitive behavior therapy) for reducing anxiety in depressed adolescents (Reynolds and Coats, 1986). This effect persisted after the end of 10 15-minute sessions. In another study, adolescent psychiatric patients showed less acting-out behavior after relaxation therapy (Corder et al., 1986). Finally, in a study on adjustment disorder and depressed child and adolescent patients, both diagnostic groups appeared to benefit from relaxation therapy (Platania-Solazzo et al., 1991). Decreases were noted in both self-reported anxiety and in anxious behavior and fidgeting, and increases were observed in positive affect after a 1-hour session of relaxation therapy. Because relaxation therapy is typically composed of several components, including yoga, massage, progressive muscle relaxation, and visual imagery, it is not clear whether any of the individual components, such as massage, can by itself reduce anxiety in these patients.

The present study examined the independent effects of the massage component on the behaviors and physiology of children and adolescents who were hospitalized for depression or adjustment disorder. The massage component was selected because concern has been expressed about touch deprivation in hospitalized children. Depression and adjustment disorder diagnoses were targeted because of their prevalence among hospitalized child and adolescent psychiatric patients. The control group (composed of subjects having either diagnosis) simply viewed a relaxing videotape for the same time as the massage sessions. This group was included to control for the effects of additional care and attention as well as the effects of activity level changes.

Method

Sample

The sample was composed of 72 children and adolescents (40 boys, 32 girls). Subjects ranged in age from 7 to 18 years ($\bar{X} = 13$). Thirty-six subjects were diagnosed as having adjustment disorder problems (a category that also included conduct disorder and oppositional disorder, conditions that were labeled adjustment disorder for insurance purposes). The remaining 36 subjects were diagnosed as having depression or dysthymic disorder. These diagnoses were made after a 1-hour intake interview by a staff psychiatrist who employed *DSM-III-R* criteria. Certainly, the authors lost some information by lumping conduct disorder and oppositional defiant disorder under adjustment disorder and including depression and dysthymia under depressed. However, these conditions are often comorbid. In addition, the authors were more interested in assessing the massage effects on externalizing versus internalizing type disorders. The subjects came from lower socioeconomic backgrounds, and the ethnic distribution was approximately 40% Caucasian, 40% Latin, and 20% black. The subjects were hospitalized for a mean of 21 days ($R = 9$–64 days).

After group assignment by a random stratification procedure (stratified for sex, age, and medication), ANOVAs were conducted to make comparisons between the massage group of 26 adjustment disorder (14 boys), 26 depressed subjects (14 boys), and the control group ($N = 20$; 10 adjustment disorder and 10 depressed) on background factors. No significant differences were noted between the adjustment disorder patients and depressed patients or between the massage and video groups on sex distribution, age, intelligence quotient ($\bar{X} = 105.7$), number of previous admissions ($\bar{X} = 1.2$), duration of hospital stay ($\bar{X} = 24.6$ days), or medications (approximately 30% of each group were receiving medications; the groups were stratified on medications). Several children or adolescents were ineligible for the study because of complex combinations and timing of medications. Because of the increasingly popular notion of comorbidity (on

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internalizing and externalizing problems), antidepressants were the most commonly used medication on our adolescent units. Thirty percent of the adjustment disorder and 30% of the depressed groups were receiving antidepressants, and none of the children or adolescents had received that medication longer than a week at the time of their entry into the study. Thus, the medication hopefully did not differentially influence the behaviors or the biochemical levels (cortisol and catecholamines) of the groups. Medication was also entered as a covariate in data analyses, but it was never a significant covariate.

Procedures

Massage. The massage group subjects received 30 minutes of back massage per day for 5 days. This type of massage entails moderate pressure and smooth movements. The massage consisted of carefully timed stroking movements for 5-minute periods in each of three regions: up and down the neck, from the neck across the shoulders and back to the neck, and from the neck to the waist and back to the neck along the vertebral column. The 15-minute sequence was composed of 30 back and forth strokes per region at 10 seconds each. This same 15-minute sequence was repeated in its entirety for a total of a 30-minute massage. The massages were given at the same time of day (midafternoon) over the 5-day period, and they were administered by psychology students trained in the standard massage procedure. Male psychology students administered massage to male patients and female students to female patients. The subjects were told that it was hoped that the procedure (both massage and relaxing videotape) would help them relax. After the procedure, the subjects were asked if they liked the treatment and if it made them feel relaxed. The relaxing nature of the massage and video conditions was evident by the subjects' self-reports after the sessions. Although this is a subjective measure, the reduction in activity level in both conditions is also suggestive of the relaxing nature of the conditions. The psychology students were instructed not to talk during the massage (and video conditions) except to ask the subjects after the massage (and video conditions) if they liked the treatment and if it made them feel relaxed. The psychology students were asked not to talk for two reasons: 1) a massage without talking is generally considered more relaxing; and 2) during the piloting, massage often facilitated self-disclosure in the subjects. Because the psychology students were not the subjects' primary therapists, self-disclosure was not encouraged during these sessions. The nurses were "blind" to the condition (massage or video) of the patients (although certainly not to the diagnosis) because the patients were seen in a closed room for similar periods of time and were requested not to reveal their condition. "Keeping a secret from staff" was something that appealed to these youngsters, and by the nurses' report, they did not know the subjects' condition.

Videotape viewing control condition. The control group was seen at the same time of day for a videotape viewing session for the same period of time (30 minutes per day for 5 days). During this condition, the patient simply sat and watched a relaxing videotape (of pleasant sounds and visual images) with the student. The patient was asked to remain still and quiet for the 30-minute sessions. This control condition was employed to ensure that any changes noted in behavior or physiology during the massage sessions were not simply related to temporal or activity variation in these measures, to clinical improvement from other treatments, or from the physical presence and attention provided by the student. The same measurements as those used in the massage condition were employed in the control condition over the same time frame for the subsample of 20 subjects.

Assessments. Assessments followed the same schedule as that used by Platania-Solazzo et al. (1991) in their investigation on the effects of relaxation therapy. These included self-reports of anxiety and depression, behavioral observations, nurse ratings of the same behaviors that were included in the behavioral observation schedule, actometer readings of activity level, heart rate, saliva samples for cortisol, urine samples for cortisol and catecholamines (norepinephrine, epinephrine, and dopamine), and time-lapse videotaping of nighttime sleep sessions. On the first and last days of the treatment period baseline, postsession, and follow-up assessment measures were collected according to the following schedule: 1) 30 minutes before the massage and/or video session (baseline): the State Anxiety Scale for Children (Spielberger et al., 1970) and the Profile of Mood States (McNair et al., 1971); 2) immediately before the massage and/or video session (presession): saliva samples, activity level, pulse rate, and behavior observation ratings based on the previous 30 minutes of the subjects' baseline behavior; 3) immediately after the massage and/or video session (postsession): activity level, pulse rate, behavior ratings based on behavior noted during the session, and self-report measures; and 4) 30 minutes after the massage and/or video session (follow-up): saliva samples, activity level, pulse rate, and behavior ratings based on the previous 30 minutes of postsession behavior. These three different time periods are referred to in the tables as pre-, post-, and follow-up periods. Finally, on the first and last treatment days, nighttime sleep was videotaped using a time-lapse video camera, and subjects were asked to collect a 24-hour urine sample to be assayed for urine cortisol and catecholamines (norepinephrine, epinephrine, and dopamine). To ensure subject compliance, the children and adolescents were given a game or audiotape of their choice after the 5-day period.

The State Anxiety Inventory for Children (STAIC) (Spielberger et al., 1970). The STAIC is an adaptation of the State Anxiety Inventory specifically designed for the study of anxiety in school-age children and adolescents who are below average in reading level. The inventory consists of 20 items. The subject completes statements such as "I feel . . . very calm, calm or not calm." As expected, because state anxiety should be variable, test-retest reliability for the STAIC form is low regardless of the lapsed time intervals. The test, requiring approximately 5 minutes to complete, was administered individually before the massage and/or video sessions and 30 minutes after their completion.

The Profile of Mood States (POMS) (McNair et al., 1971). The POMS is a 5-point adjective rating scale asking the subject to describe how well an adjective describes his or

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her feelings for the past 2 weeks, including today. The questionnaire, which includes adjectives such as happy or gloomy consists of 65 items. This study used those 14 items that comprised the depression factor of the POMS. The answer choices are 0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, and 4 = extremely. The test-retest reliability ranges from 0.43 to 0.64 over a time period ranging from 4 to 12 weeks. The authors propose that the POMS is a sensitive measure for assessing mood changes of psychiatric patients after different forms of therapy. The profile of mood states was used because it is one of the shortest, simplest, easy-to-understand scales for assessing current depressed mood. Most of the more recent scales of this kind have been designed for adults and seemed to be too difficult and lengthy for these children and adolescents. This questionnaire, like the STAIC, was individually administered before the massage and/or video session and required approximately 5 minutes to complete. The POMS was also given 30 minutes after the sessions were completed. Both of these self-report measures were administered by a clinical psychology graduate student who was unaware of the diagnostic or treatment/ control control group of the patient.

Behavior observation ratings and activity level. Behavior observation ratings were completed three times based on behavior observed as follows: 1) during the 30 minutes before the sessions (pre); 2) during the sessions themselves (post); and 3) during the 30 minute period after the sessions were completed (follow-up). This 7-behavior rating scale was originally used to assess behavior after relaxation therapy classes (Platania-Solazzo et al., 1991). In that study, the rating scale reliably discriminated the behaviors of depressed and adjustment disorder children and adolescents before and after relaxation therapy classes. To complete this measure, the behavior of each subject is rated by an observer on a 3-point continuum on seven scales including state, affect, activity, anxiety, fidgeting, vocalization, and cooperation. The seven scales are then summed to yield a summary score (with anxiety and fidgeting scores reversed for the summary scores). Summary scores range from a low score of 7 to a high score of 21 (with a high score being positive). Observers were given descriptors and examples of each level of the seven scales. Interobserver agreement was assessed by two independent observers (psychology graduate students) recording simultaneously across the observation period for one-fourth of the subjects. Reliability was calculated using Cohen's Kappa, a chance-corrected statistic (mean $K = 0.83$, range = 0.69 to 0.94) (Cohen, 1968).

For a more objective measure of the subjects' activity level, an actometer was used. The actometer is a Timex® watch that has been adapted to cumulatively record movements in the horizontal and vertical plane. It is worn on the subject's wrist like a typical watch. Activity level was calculated by subtracting the reading taken from the monitor at the beginning from the reading taken at the end of each observation period (pre-, during, and post- the massage). The difference was then divided by the number of seconds that had elapsed and multiplied by 100 to yield a whole number.

Physiological and biochemical measures. Pulse rate was measured by taking the subject's radial pulse for 30 seconds before, after, and 30 minutes after the end of each session. Cortisol samples were collected at the same times. Because of the 20-minute lag in cortisol change, saliva samples always reflected responses to stimulation occurring 20 minutes before the sampling.

Saliva cortisol samples were obtained by having subjects place a cotton dental swab dipped in sugar-free lemonade crystals along their gumline for 30 seconds. The swab was then placed in a syringe and the plunger depressed to insert the saliva into a microcentrifuge tube. The saliva samples were frozen and subsequently assayed for cortisol levels at Duke University.

Twenty-four hour urine samples were collected by 76% of the subjects (approximately evenly distributed across groups) under the supervision of the nursing staff. This relatively high compliance rate was probably related to the authors giving the subjects an audio tape or game of their choice. An aliquot of each 24-hour sample was frozen and sent to Duke University for subsequent assays. Urinary levels of norepinephrine and epinephrine were analyzed by high-pressure liquid chromatography with electrochemical detection.

Nighttime sleep recordings. Nighttime sleep was videotaped on the first and last treatment days using a time-lapse video camera. The video camera was set up on a tripod in the subject's room to focus on the bed of the subject. The subject (under the supervision of the nursing staff) was responsible for turning the camera on at bedtime and turning it off the next morning. The videotapes were subsequently coded using a time-lapse video system enabling 8 hours of videotape to be coded in 2 hours. The tapes were coded for quiet sleep (no body movement), active sleep (body movement), awake and lying quietly, and awake and active. Only 32% of the tapes were unavailable for coding because of noncompliance and technical difficulties with the nighttime videotaping. Again, this high subject compliance rate probably was related to giving the subjects a tape or game of their choice.

Results

Mulitvariate (MANOVA) and univariate (ANOVA) repeated measures by group (massage/video) and by diagnosis (depressed/adjustment disorder) analyses of variance were conducted to determine the immediate and longer-term effects of the massage therapy. The repeated measures were Days 1 and 5 and the pre-, post-, and follow-up periods. MANOVAs were conducted first to control for Type I errors. One MANOVA was conducted on the behavioral data and one on the physiological data. Because these analyses yielded significant Wilk's lambda values, ANOVAs were then conducted to determine the specific effects. Because all of the significant ANOVA effects were time by condition or time by condition by diagnosis effects, post-hoc comparisons were made by Bonferroni t tests.

Tables 1 and 2 feature the mean values for the measures pre-, post-, and 30-minutes after (follow-up) the massage and video sessions on the first day (Day 1) and the last day (Day 5) of the massage treatment period. The average values

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TABLE 1. *Mean Values for Self-Report and Behavior Measures Pre-, Post-, and 30 Minutes after Massage on First Day (Day 1) and Last Day (Day 5) of Massage Treatment Period. (Video Group Means Appear Below Massage Group Means).*

Measures	First Day (Day 1)			Last Day (Day 5)		
	Pre-	Post-	30 Min Post-	Pre-	Post-	30 Min Post-
Self-report						
State Anxiety	34.7		27.3****	31.9**		27.6**
	33.8		31.9	31.8		29.3
POMS	20.4		16.4***	14.7**		14.7
	16.3		14.5	13.5		13.0
Behavior observation ratings						
State	2.4	1.5****	2.6	2.5	1.7****	2.6
	2.7	2.5	2.7	2.8	2.7	2.8
Affect	2.0	2.3***	2.3***	2.0	2.3**	2.2*
	2.2	2.1	2.2	2.3	2.4	2.5
Vocalizations	1.8	1.1***	1.8	1.8	1.2****	1.9
	1.8	1.6	1.9	1.8	1.8	1.8
Activity	1.7	1.2****	1.8	1.7	1.4****	1.8
	1.7	1.3***	1.7	2.0	1.5***	1.8
Anxiety	1.7	1.2	1.3***	1.4*	1.2*	1.2*
	1.5	1.6	1.4	1.6	1.5	1.6
Fidgeting	1.5	1.2**	1.2**	1.4	1.1*	1.2*
	1.3	1.3	1.3	1.3	1.3	1.3
Cooperation	2.8	2.9	2.8	2.8	2.8	2.8
	2.8	2.9	2.9	2.9	2.9	2.8
Nurses ratings						
State	2.8			2.9		
	2.9			2.9		
Affect	1.9			2.3*		
	1.9			2.0		
Vocalizations	2.1			2.2		
	2.4			2.4		
Activity	2.3			2.5		
	2.6			2.6		
Anxiety	2.1			1.8*		
	2.0			1.9		
Fidgeting	1.8			1.5*		
	1.6			1.6		
Cooperation	2.1			2.3*		
	2.2			2.3		

Note: Asterisks after post-means are pre-post session comparisons. Asterisks after pre-means last day (Day 5) are for comparisons between Day 1 and Day 5 baseline (pre-) means.
$* p = 0.05, ** p = 0.01, *** p = 0.005, **** p = 0.001.$

for the diagnostic groups are given here because there were no diagnostic group effects. The means are given in the text for the few diagnostic group by repeated measures interaction effects.

Immediate Effects of Massage

As can be seen in Table 1, the following immediate effects of massage were noted:

1. For the *self-report measures:* a significant decrease in STAIC scores was recorded between the pre- and follow-up measures on both days 1 and 5, and, for the *POMS* Scale, the score decreased from pre- to follow-up on Day 1 but not on Day 5.

2. Based on the *behavior observations,* the following changes occurred: the *state* ratings decreased during the massage, suggesting that the patients were less alert during the massage; the *affect* ratings increased and remained ele-

vated at follow-up, indicating that the patients were showing more positive affect after the massage; the *vocalization* ratings decreased during the massage and returned to baseline following the sessions; *activity* level decreased during both the massage and the video sessions and returned to baseline at the end of the sessions; and, *anxiety and fidgeting* ratings decreased during the massage and remained diminished at follow-up, suggesting that the patients were showing less anxiety and fidgeting behavior during and after the massage.

3. Like the behavior observation ratings on activity, the *actometer readings* on Day 1 decreased during the massage and video sessions and remained low, although on Day 5, the readings decreased but then returned to baseline.

4. Similarly, *pulse* decreased and remained decreased during the massage and video sessions on Day 1 and decreased but returned to baseline on Day 5.

5. *Saliva cortisol* levels decreased, but only during mas-

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TABLE 2. *Mean Values for Physiological and Sleep Measures Pre-, Post- and 30 Minutes after Massage on First Day (Day 1) and Last Day (Day 5) of Massage Treatment Period. (Video Group Means Appear below Massage Group Means).*

Measures	First Day (Day 1)			Last Day (Day 5)		
	Pre-	Post-	30 Min Post-	Pre-	Post-	30 Min Post-
Physiological measures						
Activity watch	5.0	1.5****	3.6*	3.4*	1.7**	3.6
	3.8	2.6**	3.1	3.8	2.4**	3.1
Pulse	88.0	79.0****	82.0***	87.0	82.0****	85.0
	86.0	80.0**	84.0	84.0	80.0	87.0
Saliva cortisol	1.8	1.4*	1.3**	2.2	1.4****	1.6****
	1.7	1.7	1.9	1.9	1.7	1.6
Urine cortisol	87.4			78.7**		
	82.7			86.1		
Norepinephrine	29.6			25.2		
	27.6			29.5		
Epinephrine	4.3			4.0		
	4.4			4.7		
Dopamine	265.0			261.0		
	271.8			286.7		
Sleep behaviors						
Time Asleep (%)	79.7			91.3**		
	82.1			84.5		
(States 1 & 2)						
Time Awake (%)	15.2			4.0*		
	15.6			17.9		
(States 3 & 4)						

Note: Asterisks after post-means are for pre-post session comparisons. Asterisks after pre-means last day (Day 5) are for comparisons between Day 1 and Day 5 baseline (pre-) means.
$* p = 0.05$, $** p = 0.01$, $*** p = 0.005$, $**** p = 0.001$.

sage, and remained diminished at the 30-minute follow-up period.

Longer Term Effects of Massage

Several repeated measures by group interaction effects were noted for the Day-1 and Day-5 values, suggesting changes for the massage group, although no changes occurred for the video group. The changes for the massage group were as follows (Table 1):

1. For the *self-report measures:* the STAIC score was lower at baseline on Day 5 than it was on Day 1, but only for the depressed group. The mean score for the depressed group decreased from 37 to 33 (p < 0.05), whereas a negligible change was noted in the adjustment disorder group (32 to 31) (Table 3). For the *POMS* scale, however, the scores of both of the diagnostic groups decreased, indicating a less depressed mood by Day 5.

2. Based on the *behavior observations:* both diagnostic groups that were massaged showed a decrease in *anxiety*-like behavior from Day 1 to Day 5; post-hoc comparisons after repeated measures by group interaction effects suggested that the depressed group versus the adjustment disorder group had lower *activity* levels (based on behavior observation and activity watch) and *fidgeting* behavior on Day 5.

3. Based on the *nurses' ratings of behavior* on the unit, positive changes were noted to occur over the 5-day period, including an increase in positive affect, a decrease in anxiety and fidgeting behavior, and an increase in cooperative behavior.

4. *Saliva cortisol* levels did not change over the 5-day period, although an interaction effect suggested that the depressed group had lower saliva cortisol levels than the adjustment disorder group on Day 5.

5. *Urine cortisol* significantly decreased over the 5-day period, but an interaction effect revealed that this decrease occurred only for the depressed group (for depressed group, Day 1 cortisol $\overline{X}$ = 99, Day 5 = 64, p < 0.005, and for the adjustment disorder group Day 1 cortisol $\overline{X}$ = 80, Day 5 = 85, NS). It should be noted that on Day 1, the cortisol level for the depressed group ($\overline{X}$ = 99) was significantly higher than the corresponding level for the adjustment disorder group ($\overline{X}$ = 80), suggesting that the depressed group started higher and significantly decreased, whereas the adjustment disorder group started lower and remained the same.

6. Similarly, urine norepinephrine decreased, but only for the depressed group (for the depressed group, Day 1 norepinephrine $\overline{X}$ = 39, Day 5 = 29, p < 0.05, and for the adjustment disorder group, Day 1 $\overline{X}$ = 27, Day 5 = 25, NS). Again, the depressed group started higher and significantly decreased, whereas the adjustment disorder group started lower and did not change.

7. Based on the time-lapse video of the *nighttime sleep* sessions, the percentage of time in bed that sleep occurred increased over the 5-day period, and the percentage of time that nighttime wakefulness occurred correspondingly decreased over the same period for the massage group.

Discussion

These data are consistent with studies on relaxation ther-

TABLE 3. *Mean Values for Measures on Which the Depressed and Adjustment Disorder Children and Adolescents of the Massage Group Differed.*

| | Means | | | |
| | Depressed | | Adjustment Disorder | |
	Day 1	Day 5	Day 1	Day 5
State anxiety	37	33*	32	31
Urine cortisol	99	64**	80	85
Urine norepinephrine	39	29*	27	25

$*p < 0.05$, $**p < 0.01$.

apy, suggesting decreases in anxiety and depression immediately after treatment sessions (Platania-Solazzo et al, 1991; Reynolds and Coats, 1986; Richter, 1984). After the massage sessions, patients' self-reported anxiety scores (STAIC) and depression scores (POMS) dropped significantly as they did in the Platania-Salazzo et al. study on relaxation therapy. Likewise, ratings on the Behavior Observation Scale also changed immediately after the massage sessions. The children and adolescents showed a general increase in positive affect and a decrease in anxiety and fidgeting behavior. In addition, although decreases were noted in activity level and heart rate during both the massage and video sessions, decreases in saliva cortisol levels only occurred during the massage sessions. This finding from the control video group suggests that the decrease noted in saliva cortisol levels during massage was probably unrelated to decreased activity level. The consistency of these results across diagnostic groups and the convergence of self-report, behavioral, and physiological measures in the direction of lesser anxiety highlights the immediate effectiveness of the massage treatment. Additional evidence for the specific effectiveness of massage is provided by the comparison with the video control group who merely showed diminished activity level and heart rate during the sessions.

The longer-term effects of the massage treatment across the 5-day period were probably of greater clinical importance. Although no long-term changes were noted in the video group, significant changes occurred in the massage group. Self-reported depression levels were lower by the end of the 5-day period for both diagnostic groups that were massaged, and lower state anxiety scores were noted in the depressed massage group. Even though the adjustment disorder group anxiety levels did not change according to self report, behavior observations and nurses' ratings of anxiety suggested that both groups were lower on anxiety. The nurses also rated fidgeting behavior as occurring less often, and they noted improved affect and cooperation by the last day of treatment. In addition, by the end of the 5-day period, the children and adolescents were spending more of their bedtime periods in sleep and less time awake. Finally, the depressed group showed some changes not evident in the adjustment disorder group, including decreases in urine cortisol and norepinephrine levels.

The consistency of this self-report and behavior observation data and the positive immediate and longer-term effects of the massage treatment support the use of this treatment for children and adolescents on psychiatric units. Although the immediate effects of the massage were anticipated, the authors had not expected the positive effects to persist across the treatment period. Of particular clinical importance were the nurses rating the children as being more cooperative and less depressed, anxious, and fidgeting. Thus, it would appear that the effects were not limited to the massage treatment period but generalized to behavior on the unit, as observed by the nurses.

The longer term effects were more pronounced for the depressed versus the adjustment disorder children and adolescents. Although anxious behavior, based on observer and nurse behavior ratings, decreased in the adjustment disorder children over the 5-day period, their self-reported anxiety levels started at lower levels than the depressed patients and remained the same over the massage period. Their cortisol and norepinephrine levels were similarly lower and did not change over the 5 day period. Although the massage appeared, then, to reduce behavioral anxiety in these children, they apparently were less affected by the massage treatments at a feeling and biochemical level. As in an initial level effect, it is not surprising that a high baseline level of physiological or biochemical activity might diminish with treatment, whereas low baseline levels would remain the same. It is also possible that while the adjustment disorder children showed immediate effects of the massage, they were unaffected by the treatment over the long-term and simply displayed the expected and desirable reduction in anxious behavior immediately after the sessions. Alternatively, depressed children may simply be more sensitive or responsive to physical stimulation of this kind.

Several limitations of these findings can be noted. Certainly, longer term follow-up data would be desirably collected on another sample for both replication and follow-up purposes. With respect to potential abuses of massage, some concerns were raised by clinicians on these psychiatric units. One was the concern that staff may be accused of sexual abuse for extensive touching of patients (during the massage). For this reason, the massage was limited to the head and back regions, and the patients were fully clothed. Because of the same concern, therapists who were the same sex as the patients gave the massage. A potentially more desirable arrangement is the use of grandmother or grandfather volunteer massage therapists to attenuate this problem as well as to reduce treatment costs. The use of same-sex therapists raised the potential concern about patients with homosexual tendencies or history of sex abuse. For this problem, the psychiatric staff advised that cues (verbal or nonverbal) be taken from the individual patient who might or might not experience massage as an aversive treatment.

Although the clinical staff in general supported the use of massage in these patients' treatment, particularly in light of their concern about the infrequency of touching received by these children during their hospitalization, they were also concerned about how their children would react to extensive touch, i.e., the massage. Many of the children did not recall ever having been touched by their parents, and none of the children had ever received a massage. In addition, the staff were concerned that massage would be popularized on the

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unit, leading to adolescent-to-adolescent massage and potential promiscuity. This problem did not occur, at least during the course of the study.

Finally, the staff was concerned about the facilitating effects of massage on self-disclosure of intimate material by the patients. Although pilot data suggested that massage could be effectively used for this reason by primary therapists, the massage therapists in this research were not primary therapists. Simply instructing the massage therapists to behave like "real masseurs," who do not talk, effectively discouraged self-disclosure. After resolving these problems anticipated by the staff, the only remaining problem expressed by the staff was that they, too, needed massage to reduce their stress.

On a different note, the parameters of the massage used were somewhat arbitrary. Midafternoon was selected because the adolescents tended to be more aroused at that time, probably because it marked the end of their school period. A period of 30 minutes was chosen because it is the typical duration for commercial massages in hotels and sports clubs. Variables such as these and the use of primary therapists and same sex therapists for massage treatment will require further investigation.

These data do not clarify whether the treatment effects noted in relaxation therapy studies (Platania-Solazzo et al., 1991; Reynolds and Coats, 1986; Richter, 1984) derived form massage per se, because massage has not yet been compared with other relaxation therapy components, such as progressive muscle relaxation, exercise, or yoga. Nonetheless, the data from the self-reports, behavioral observations, and cortisol levels converged to suggest reduced anxiety over the short term as well as decreases in anxiety over the long term for at least the depressed subjects. Moreover, the nursing staff's ratings concurred with the behavioral observation ratings, suggesting that massage may have positive effects on hospitalized child and adolescent psychiatric patients with either depression or adjustment disorder.

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