Atopic Dermatitis Symptoms Decreased in Children Following Massage Therapy

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Abstract: Young children with atopic dermatitis were treated with standard topical care and massaged by their parents for 20 minutes daily for a 1 month period. A control group received standard topical care only. The children’s affect and activity level significantly improved, and their parent’s anxiety decreased immediately after the massage therapy sessions. Over the 1 month period, parents of massaged children reported lower anxiety levels in their children, and the children improved significantly on all clinical measures including redness, scaling, lichenification, excoriation, and pruritus. The control group only improved significantly on the scaling measure. These data suggest that massage therapy may be a cost-effective adjunct treatment for atopic dermatitis, since there is a one-time expense of $30 for the child to receive the massage and the parent to learn the technique.

In a pediatric dermatology clinic study, Schachner et al. (1) reported that atopic dermatitis (AD) was the leading diagnosis for 456 of 1578 children, exceeding the second most frequently diagnosed disorder, impetigo, by 292 patients. The frequency of AD is still increasing (2). One recent study indicates that some form of atopy (AD, hayfever, and asthma) occurs in 22.5% of the general population (3).

The severity of atopic dermatitis has been correlated with depression (4), stress, and anxiety (5–7), which possibly cause negative effects on the immune system via stress increased cortisol levels and cortisol altered immune function (8). The skin has been described as a “shock organ” for emotional stress, which manifests itself in the form of skin diseases (9).

Various stresses may lead to increased histamine release and vasodilation with redness and itchiness in atopic children (6,10). This often acute phenomenon may be associated with allergic or irritant contact dermatitis, bacterial and viral infections, self-induced excoriations, or a putative response to dietary or respiratory allergen contact.

However, some symptoms in atopic patients have also been associated with vasoconstriction (e.g., white dermatographism and central facial pallor). It is suggested that in chronic stressful situations, patients may develop peripheral vasoconstriction mediated by the central nervous system (11). This is thought to be a possible explanation for the white dermatographism phenomenon seen in some patients with AD.

Atopic dermatitis can be a source of great embarrassment and insecurity, particularly for a child who feels
“different” from other children. Feelings of estrangement can heighten the stress and anxiety, which in turn affect the course of the disease. Because there is evidence suggesting that eczema outbreaks and their severity are influenced by psychological stress, some have used stress reduction as a course of treatment (12).

Although pharmacotherapies are often effective with atopic dermatitis, stress reduction therapies can be a helpful adjunct. The AD may improve and thus the need for medication may decrease (and the cost of treatment decline) following stress reduction therapies. For example, relaxation therapy may reduce the severity of eczema and the irritation associated with the disorder because relaxation exercises interfere with the scratch and itch cycle that worsens AD (12). Progressive muscle relaxation training (13) and biofeedback (14) have reduced scratching habits in adults and have reduced stress, anxiety, and stress hormones (cortisol) in child psychiatric patients (15).

Massage therapy might improve children’s AD inasmuch as massage therapy also decreases stress, anxiety, and stress hormones (cortisol and norepinephrine) in children (16). Massage therapy might be more effective than relaxation therapy for atopic dermatitis patients because (1) it requires less compliance from the children; (2) it may increase peripheral blood supply in those atopics in whom vasoconstriction may be a putative contributing factor; (3) it has been shown to increase vagal activity in other massage therapy studies (17). Increased vagal activity (increased parasympathetic activation) would reduce the peripheral vasoconstriction associated with sympathetic activity (11); (4) it might decrease itching as it has been noted to do in postburn patients (18); (5) receiving touch therapy might reduce the AD child’s awkwardness about being touched; and (6) massage therapy may also help improve compliance with the use of prescribed emollients since the parents use such emollients as part of the daily 20 minute massage. Patients with AD itch, particularly in response to stress. Massage therapy, by providing touch and relaxation, might reduce stress, leading to decreased itching and scratching and improvement of the dermatitis. The mandated use of emollients certainly may be of considerable benefit.

Although relaxation therapy is usually considered more cost effective, massage therapy was considered cost effective in this study because it could easily be administered by the parents. The parents would also benefit by performing a socially acceptable form of touching their children and would feel a sense of actively participating in the treatment process. Finally, the parents could perform the massage therapy while applying medica-

ions, emollients, and creams and thus facilitate the standard medical care (19).

METHODS

Participants

Twenty children (seven girls) with atopic dermatitis (2 to 8 years old, mean 3.8 years) who received standard atopic therapy were recruited from the dermatology department. Clinical assessments were made by a pediatric dermatologist and a pediatric dermatology fellow who were blind to the child’s group assignment. The study design called for half the group to receive standard care and the other half to receive standard care plus a 20 minute massage daily. Power analysis based on moderate effect in our previous studies at a level of .05 and power of .80 suggested that 20 subjects would be adequate (20). The children were primarily of lower-middle socioeconomic status (range 2–4, mean 3.2 on the Hollingshead Index). Twenty-eight percent were Black, 61% Hispanic, and 11% White. The children were given the diagnosis of AD an average of 2 months previously and had experienced the current flare for an average of 12 months. As judged by the mother, the child’s skin condition had impacted on appearance hardly at all in 11% of patients, somewhat in 67% of patients, and considerably in 22% of patients. Eighty-four percent of the children had at least one other allergy, 68% had at least two additional allergies, and one child had as many as nine other allergies. Sixty-four percent of the children had at least one other family member who had similar problems. The children were randomly assigned to a standard care control group or a massage group (that continued to receive standard care) based on a stratification of moderate to severe condition, age, and gender. The children were seen twice, on day 1 and 1 month later.

Procedures

Standard Care

The children continued to receive treatment from a dermatologist consisting mainly of emollients and topical corticosteroids. These included (1) topical 1% hydrocortisone ointment to the face and groin and 0.1% triamcinolone ointment to the trunk twice daily or as needed; (2) Aquaphor twice daily; (3) age-appropriate doses of diphenhydramine every 6 hours or as needed; and (4) oral antibiotics for superficial infection with Staphylococcus aureus with cefaclor as needed. Patients who appeared superinfected had their skin and nares cultured. The parents were instructed to keep a log of the medications used.
**Massage Therapy**

The massage therapy group patients were given daily 20 minute massages by their parents. During the first session the therapist gave the parents a 20 minute massage to acquaint the parents with the techniques and how the massage feels. Then the therapist demonstrated the massage techniques on the child. Finally, the parents were given a videotape and a written description of the massage to take home and review. The massage consisted of two standardized phases. During the first phase, the child was placed in a supine position and the standard medication was used as an emollient (instead of oil) to ensure smooth, stroking movements. The parent stroked five regions of the child’s body in the following sequence: 1. Face: (a) strokes along both sides of the face, (b) flats of fingers across the forehead, (c) circular strokes over the temples and the hinge of the jaw, and (d) flat finger strokes over the nose, cheeks, jaw and chin. 2. Chest: (a) strokes on both sides of the chest with the flats of the fingers, going from midline outward, (b) cross strokes on the sides of the chest going over the shoulders, and (c) strokes on the sides of the chest toward the shoulder. 3. Stomach: (a) hand over hand strokes in a paddlewheel fashion, avoiding the ribs and the tip of the ribs cage, and (b) circular motion with fingers in a clockwise direction starting at the appendix. 4. Legs: (a) strokes from hip to foot, (b) gentle squeezes and twists in a wringing motion from hip to foot, (c) massage of the foot and toes, (d) stretch of the Achilles tendon, and (e) gentle strokes of the legs upward toward the heart. 5. Arms: (a) strokes from the shoulder to the hand, and (b) the same procedure as for the legs. Any severely affected AD areas of the body that were sensitive were avoided.

**Pre- and Posttherapy Session Assessments**

Before and after the massage session, or control period, on the first and last days of the study, the parents rated their own anxiety levels. In addition, on the first and last days of the study, parents completed scales on how they were coping with their children’s disease, and their feelings about their children. Parents also rated their children’s response to being touched, anxiety, soothability, and stability levels. Independent observers, blind to the conditions of the study, rated the child’s behavior before and after the first and last day’s massage and/or control period, and an age appropriate measure of mood was given to the child.

This pre-post test (i.e., before versus after the massage or control period) repeated measures design has been used and reported in other massage therapy studies (16,18). This design allows for assessments of both immediate massage effects (e.g., pre-post) and longer term effects (e.g., first versus last day’s assessments). The assessments were administered as follows.

**Parent Measure**

The State Anxiety Inventory (STAI) (21) is a 20 item scale that measures parents’ current anxiety levels by their responses to statements such as “Right now I feel calm,” “Right now I feel anxious,” and “Right now I am relaxed,” ranging from “Not at all” to “Very much.” The STAI has adequate concurrent validity (22) and internal consistency ($r = 0.83$) (21), and the STAI scores increase in response to situational stress and decline under relaxing conditions (21).

**Child Measures**

**Happy Face Scale.** Before and after the first and last sessions the children were asked to point to a face that depicted how they were feeling at the moment. The four faces ranged from unhappy (1), to neutral (2), to contented (3), to happy (4).

**Behavior Observation Scale (15).** Behavior was coded for the 30 minutes prior to the session and for the 30 minutes after the session by research associates blind to the hypotheses of the study and the child’s group membership. The behaviors were coded at 30 second time sample units on a three-point continuum including affect, activity, and anxiety. Reliability was calculated on 30% of the sessions using Cohen’s kappa, a chance-corrected statistic (23).

**First Day–Last Day Assessments**

**Parent Assessments of the Child**

The Tactile Defensiveness Scale (24) measures the child’s typical response to touch. Characteristic yes or no items include, “Does your child stiffen his/her body when picked up?,” “Does your child dislike being held, cuddled, and hugged?,” and “Does your child enjoy playing with other children?” This scale has adequate validity and discriminates between groups of children with and without tactile sensitivity (24).

**Coping Index**

On this scale (24 items) parents rate their child’s anxiety, soothability, and stability and their own coping on Likert scales ranging from a “0 = Not at all” characteristic to “4 = All of the time.” The psychometric properties of this scale have been consistent across varying ethnic and socioeconomic groups (25).

**How I Feel About My Child**

This 17 item scale taps the parents’ feelings about taking care of the child and the child’s well-being on a 5-point Likert scale.
Dermatologic Assessment

First Day Assessment. The diagnosis of atopic dermatitis was established using the Hanifin–Lobitz criteria. The BSA of involvement was calculated using the rule of nines. A bodygram delineating the extent of involvement was completed. A focal area representative of the severity of involvement was chosen and marked on the bodygram. Historical data including the duration of the current flare and concomitant medications were recorded.

First Day–Last Day Comparison. The clinical status of the AD was defined both globally and focally on a scale of 0 to 3 for the parameters of redness, lichenification, scaling, excoration, and pruritus. These assessments were made by the dermatologist (L.S.) and the dermatology fellow (A.D.) who were blind to the child’s group assignment.

RESULTS

To ensure that the stratification yielded comparable groups, the demographic data were subjected to a non-parametric analysis. No group differences were noted on the demographic data.

Pre- and Postsession Comparisons: Children’s Behavior and Parents’ Anxiety

Because more than one dependent criterion variable was being evaluated (i.e., skin assessments, parental reports, and behavioral observations), a repeated measures multivariate analysis of variance (MANOVA) was used to evaluate mean differences on the dependent variables. The repeated measures were pre- and postmassage or control session and first and last day sessions. The MANOVA on parental anxiety and children’s behaviors revealed differences for the massage and control groups’ scores from pre- to posttreatment session (massage or control session) on the first and last days of the study. Post hoc comparisons revealed the following effects favoring the massage group (see Table 1): (1) the parents’ reported anxiety levels decreased after the first massage session and by the last day of treatment, and (2) the massaged children’s mood (affect) and activity levels improved and their anxiety decreased, but only on the last day.

First Day–Last Day Comparisons: Parent Assessments

A repeated measures MANOVA with first day–last day data as the repeated measure yielded a group by first day–last day interaction effect. Post hoc comparisons revealed the following (see Table 2): (1) the parents’ assessment of their child’s anxiety and stability improved on the coping index; and (2) the parents’ feelings about their child improved.

First Day–Last Day Comparisons: Children’s Skin Assessments

A repeated measures MANOVA with first day–last day data as the repeated measure yielded a group by first day–last day interaction effect. Post hoc comparisons revealed the following (see Table 3): (1) for the focal area assessment, all measures (redness, lichenification, scaling, excoration, and pruritus) were numerically and statistically significantly improved by the last day of treatment. Scaling was the only measure in which both the standard treatment group and the massage group showed statistically significant improvement over the 1 month period; and (2) for the global area assessment, scaling and excoriation statistically improved for the massage group and only scaling statistically improved for the control group.

DISCUSSION

The massaged children’s clinical condition, particularly for focal area assessments, improved following 1 month

| TABLE 1. Means for Pre-Post Session Child and Parent Measures on the First and Last Days of the Study |
|--------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                                     | Massage                     |                           | Control                   |                           |
|                                     | First Day Pre/Post | Last Day Pre/Post | First Day Pre/Post | Last Day Pre/Post |
| Parent Measures                    |                          |                           |                          |                           |
| Anxiety (STAI)*                    | 41.5/33.3*                | 35.3*/35.9               | 38.9/35.6                | 38.8/38.5                |
| Child measures                     |                           |                           |                          |                           |
| Happy faces                        | 3.8/3.9                   | 4.0/4.0                  | 3.4/3.7                  | 2.7/3.0                  |
| Affect                              | 2.9/2.6                   | 2.6/3.0*                 | 2.8/2.8                  | 2.7/2.7                  |
| Activity                            | 1.9/2.1                   | 1.3/1.7*                 | 1.8/1.5                  | 2.0/2.0                  |
| Anxiety                             | 2.4/2.7                   | 2.3/3.0*                 | 2.3/2.3                  | 2.2/2.0                  |

* A lower score is optimal only for the STAI measure; * indicates statistically different means for pre/post measures. An * denoted on a pre measure indicates significantly different means for first day pre versus last day pre value; *p = .05.
TABLE 2. Means for First Day–Last Day Parent Assessments for the Massage and Control Groups

<table>
<thead>
<tr>
<th>Parent Assessments</th>
<th>Massage Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Day</td>
<td>Last Day</td>
</tr>
<tr>
<td>Tactile defensiveness*</td>
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<td>3.5</td>
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<tr>
<td>Coping index</td>
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<td></td>
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<tr>
<td>Child’s anxiety</td>
<td>4.9</td>
<td>6.8**</td>
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<tr>
<td>Child’s soothability</td>
<td>7.6</td>
<td>7.7</td>
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<tr>
<td>Child’s stability</td>
<td>6.3</td>
<td>7.6*</td>
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<tr>
<td>Parent’s coping</td>
<td>42.6</td>
<td>43.2</td>
</tr>
<tr>
<td>Feeling about child</td>
<td>69.2</td>
<td>73.6*</td>
</tr>
</tbody>
</table>

* A lower score is optimal only for the tactile defensiveness scale. * denotes that the first and last day means for the group (e.g., massage group) are statistically different; ** p = .05; *** p = .01.

TABLE 3. Means for First Day–Last Day Children’s Skin Assessments for the Massage and Control Group

<table>
<thead>
<tr>
<th></th>
<th>Massage Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Day</td>
<td>Last Day</td>
</tr>
<tr>
<td>Focal area*</td>
<td></td>
<td></td>
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<tr>
<td>Redness</td>
<td>2.1</td>
<td>1.4**</td>
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<tr>
<td>Lichenification</td>
<td>1.8</td>
<td>0.9**</td>
</tr>
<tr>
<td>Scaling</td>
<td>1.3</td>
<td>0.6*</td>
</tr>
<tr>
<td>Excoriation</td>
<td>1.7</td>
<td>0.6**</td>
</tr>
<tr>
<td>Pruritus</td>
<td>1.9</td>
<td>1.5*</td>
</tr>
<tr>
<td>Global area*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redness</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Lichenification</td>
<td>1.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Scaling</td>
<td>1.5</td>
<td>0.6*</td>
</tr>
<tr>
<td>Excoriation</td>
<td>1.6</td>
<td>1.0*</td>
</tr>
<tr>
<td>Pruritus</td>
<td>1.9</td>
<td>1.5</td>
</tr>
</tbody>
</table>

* Lower score is optimal for all measures, * denotes that first versus last day’s means are statistically different; ** p = .05, *** p = .01, **** p = .001.

of parents giving the children daily massages before bedtime. This statistical improvement occurred in the focal areas for all measures (redness, lichenification, scaling, excoriation, and pruritus), in contrast to the control group which only significantly improved on the scaling measure. The massaged group also showed statistical improvement on the global area assessments, but only for the scaling and excoriation (and the control group only for the scaling) measures. These dermatologic assessments document significant improvement in the children’s clinical condition following a massage therapy regimen.

The observed improvements in the children’s conditions may have been mediated by massage decreasing anxiety levels in the parents and children. The children’s behavior was less anxious and their affect and activity levels improved. In addition, the parents perceived their children’s anxiety levels as having decreased. The parents also reported that their own anxiety levels decreased and their feelings about their children improved.

Direction of causality cannot, of course, be determined in this study. And although it cannot be ruled out, it is unlikely that the findings were the result of a “placebo effect” inasmuch as the clinical data, the independent behavioral observations of the children, and the parents’ observations of their children converging to suggest that massage therapy was beneficial in relieving symptoms of atop dermatitis.

Although this study did not assess the long-term effects of the massage intervention, it is hypothesized that the observed improvement in the children’s condition would stabilize or continue to improve if the parents continued to administer the massage protocol. Further research is required to explore residual or longer term effects of massage therapy. Overall the results of this study suggest that parents benefit from giving their children massage and children who receive massage therapy show an improvement in their AD condition. It is a very cost-effective adjunct therapy since the massage and instruction are given by the therapist one time, at a cost of $30. This small pilot study will lead us to examine larger numbers of patients with AD and perhaps other chronic inflammatory skin disorders.

REFERENCES