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Boulanger: Massage Therapy for People with HIV
MASSAGE THERAPY FOR PEOPLE WITH HIV

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Massage therapists celebrated along with other complementary and alternative medicine (CAM) practitioners at the release of Eisenberg et al.'s follow-up of a national survey on the trends in the use of CAM in the United States from 1990-1997. Not only did the use of CAM increase from 33.8 percent to 42.1 percent, massage was one of the therapies that increased the most (Eisenberg et al., 1998). In addition, although 71.5 percent of the visits were not covered by any insurance, massage therapy was the second most popular CAM therapy used, accounting for 18.1 percent of the 628.8 million total visits (Eisenberg et al., 1998).

A survey commissioned by the American Massage Therapy Association in 2003 revealed that one in five adults received a massage within the previous year, representing a three-point increase from 2002 and a 13-point increase from 1997 (www.amtamassage.org). It appears that the trend for the use of massage therapy that Eisenberg identified may be continuing. Although the massage profession is gaining popularity, little is known about massage therapy and its potential impact on specific health conditions, such as human immunodeficiency virus (HIV).

There may be as many as 950,000 people in the United States infected with HIV, one-quarter of whom are naïve to their infection (Fleming et al., 2000). The characteristic effect of HIV infection is a decrease in the number of the immune system's infection fighters: CD4+ cells. Individuals may experience symptoms within a few months while others live symptom free for 10 or more years. Common symptoms of infection include swollen glands, lack of energy, weight loss, frequent fevers, persistent yeast infections, skin rashes and short-term memory loss. HIV develops into acquired immunodeficiency syndrome (AIDS) in its later stages as indicated by T-cell count (less than 200) and specific conditions that affect those with advanced HIV disease. The AIDS epidemic is spreading quickly among minorities and is a leading cause of death for African-American males aged 25-54 (www.niaid.nih.gov).

Drug therapy, although not without side effects, has significantly reduced the number of AIDS deaths in the United States. Because people with HIV are living longer, recent efforts have focused on managing symptoms to improve the quality of life of those infected (Power et al., 2002). Approximately 53-60 percent of people with HIV use some sort of CAM, including massage therapy (Hsiao et al., 2003; Mikhail et al., 2004).

In a nationwide survey of 1,675 HIV-positive men and women using CAM, the most common provider reported was a massage therapist (49 percent) and the most common CAM activities were aerobic exercise (63 percent), prayer (58 percent) and massage (53 percent) (Standish et al., 2001). When responding to an open-ended question regarding why they used CAM for HIV, subjects most often cited that CAM worked for them, they had positive experiences, CAM reduced their symptoms and because they had experienced negative side effects from conventional treatments.

Research on the effectiveness of various forms of CAM for people with HIV is grow-

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ing but not yet conclusive. Massage has been touted to ameliorate the effects of illness and improve quality of life, but little has been done to examine its impact on the lives of those with specific diseases. This paper will review all five prospective studies on massage therapy and HIV that have been published and indexed on Medline as of April 2005.

In these studies, counts of different types of immune cells are often used as outcome measures. As mentioned earlier, HIV primarily attacks CD4+ cells. Along with the CD4+/CD8+ ratio, CD4+ cell counts are used as a measure of disease progression. Natural killer (NK) cells may provide protection against common opportunistic diseases (e.g. tumors, viruses). Additionally, asymptomatic HIV+ individuals with low CD4+ counts seem to have enhanced NK cell functioning (Solomon, Ironson, & Balbin, 2000).

LITERATURE REVIEW

Changes in Behavior of Neonates Born to HIV+ Mothers

The objective of this randomized trial was to assess whether massage therapy could facilitate weight gain, cognitive and developmental performance and reduce stress behaviors in babies born to mothers with HIV infection (Scafidi & Field, 1996). The study included 28 neonates who were delivered vaginally, after an average 39 weeks gestation and considered medically stable. They were randomly assigned using a table of random numbers to receive either both massage therapy and standard medical care or only standard medical care in the same neonatal care unit. The treatment and control groups did not differ on any birth parameters. Their mothers had low education and low socioeconomic backgrounds, and were 67 percent African American and 33 percent Hispanic.

The mothers were tested for HIV using the ELIZA method; positive results were confirmed by the Western blot technique. Data on obstetric and postnatal complications were also collected. Lastly, an examiner blind to assignment assessed the infants before and after the study period using the Brazelton Neonatal Behavior Assessment Scale. The infants were massaged for three 15-minute intervals during three consecutive hours on weekdays for 10 days. The massage therapy sessions consisted of tactile and kinesthetic stimulation in the prone and supine position. The provider did not speak throughout the procedure.

In attempts to address drug use as a possible confounder, urine toxicology screens testing for seven substances were completed for the mothers. Only three substances were tested for in the infants due to inadequate volumes of urine. All urine toxicologies for the mothers and infants were negative.

MANOVA and individual ANOVAs suggested that compared to the control group, the infants who received massage therapy had greater improvements in habituation, motor, range of state, autonomic stability, excitability and stress behaviors as well as greater increases in weight (p-values ranging from <0.05 to <0.001). There were not significant differences in orientation, regulation of state, reflexes or depression.

The less optimal scores in the control group suggest an influence of HIV on newborn behaviors despite the fact that only 22-39 percent of exposed infants typically remain HIV positive. Although the mechanisms are unclear, massage therapy appeared to have a positive effect on these infants. The authors hypothesized that massage enhances vagal activity, possibly leading to improved weight gains and Brazelton scores.

They suggest future studies that examine vagal activity as well as immune changes and the duration of the massage therapy effects.

There are several strengths to this study. Infants were chosen consecutively for the study and randomly assigned to treatment. The massage therapy and control groups were equivalent at the beginning and there was no attrition for the duration of the study. The massage therapy protocol was described in sufficient detail to be implemented consistently and replicated in the future. Finally, those that examined the defined outcomes were blinded to the infants' treatment assignment.

This study, however, left some aspects of internal and external validity unable to be evaluated fully. Other than being HIV-exposed, no specification criteria were described. The setting in which the massage therapy was provided was not described. Repeated exposure to a less stressful environment compared to control infants might have made a difference. Second, the authors did not disclose whether the mothers and medical personnel were blinded to infant assignment. If the mothers or medical personnel knew which groups the infants were in, would they have treated the infants differently? For example, if the nurses felt sorry for the control infants and subsequently held them more often, this could possibly dilute any treatment effect.

Because infants were not randomly selected from the population of all infants exposed to HIV from their mothers, external validity is a concern. This could have been addressed by presenting the characteristics of HIV+ mothers and/or their infants and compare them to those included in this study. In addition, this study did not address the level of training that the provider of massage therapy possessed. If the provider was an experienced massage therapist, could similar effects be expected if the same massage technique was provided by the infants' parents or caregivers?

Immune Measures and Anxiety in Gay Men with and without HIV Infection

The goal of this study was to assess the effects of daily (Monday-Friday) massage therapy on the immune system of gay men with and without HIV infection (Ironson et al., 1996). Eligible subjects were gay men with no AIDS symptoms; Eliza testing was used to confirm HIV status. Most subjects were well educated and middle class; average age was 32. Only two subjects were taking antiretroviral medication.

This study included two different cohorts. The first cohort comprised seven HIV+ and nine HIV- gay men who all received 45 minutes of massage therapy. Three additional HIV+ and one HIV- subjects were recruited and completed the first session, but later dropped out. A within-subjects design was used for a second cohort composed of 13 HIV+ gay men. During the first month, half received massage therapy, the other half served as controls. During the next month, the other half received massage therapy with the first group as controls.

At the first session, subjects in the first cohort submitted their urine sample (to be tested for norepinephrine, epinephrine and cortisol), had blood drawn for NK cells, CD4+ and CD8+ counts/ratio, and other immune measures (HIV+ men only), completed a demographic questionnaire as well as the Profile of Mood States (POMS) and State Anxiety Inventory (STAI) and provided a sample of salivary cortisol. Second, subjects received their massage. Third, they rated their massage and provided another sam-

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ple of salivary cortisol. Finally, subjects completed the STAI and POMS again. Subjects in the second cohort did not complete the STAI or salivary measures (the relaxing effect of the massage therapy was already shown by the first cohort's significant reductions in anxiety as measured by the STAI and cortisol levels). Control subjects followed the same procedure except no massage was provided.

Following the first massage therapy session provided to the first cohort, there was a significant decrease in anxiety and cortisol values. The 29 subjects received an average of 20 massages in a month. After this month of massage, there were significant improvements in anxiety and relaxation scores. For the HIV+ men, there were no significant effects on CD4+ counts or CD4/CD8 ratios. There were significant increases in the number of NK cells following a month of massage, but significant decreases after the control period. Similarly, there were significant decreases in cortisol levels for the massage period and significant increases during the control period.

The authors attempted to remove confounding variables by excluding from the study men who abused alcohol or drugs, were heavy smokers or were on medications that may affect the immune system. These exclusions, and the higher socioeconomic status of the subjects, may limit the generalizability of the findings. Four men in the first cohort dropped out of the study; no explanation was provided. There were no significant order or carry over effects; however due to small sample sizes, these findings were admittedly inconclusive.

Although the design and analysis of this study was confusing and the sample sizes were small, it was the first attempt to demonstrate that massage therapy may impact the immune system of HIV+ individuals. It opened the door for future studies where improvements and more confident conclusions could potentially be made.

Immune Measures and Quality of Life of HIV+ Adults

The purpose of this randomized trial was to study the effects of massage therapy alone, massage with exercise or stress management, or standard treatment (control) on immune and quality of life measures on a sample of HIV-infected adults (Birk, McGrady, MacArthur, & Khuder, 2000). After completing health history and assessment forms, subjects had their blood tested for CD4+, CD8+ and NK cells. They were then randomly assigned to one of four groups: massage only, massage with twice-weekly aerobic exercise sessions, massage with weekly stress management or usual care. Massage therapy in all groups was provided once a week for 45 minutes for 12 weeks by a licensed male therapist. Health assessments and blood draws were completed after 12 weeks and a variety of statistical tests were applied.

Of the 42 subjects who were initially screened and consented to participate, 11 dropped out due to medical reasons (e.g., not feeling well enough to attend sessions). The drop-outs had significantly lower initial immune measures than those that completed the study. There were no significant main effects observed for the immune measures, even when all intervention groups were collapsed together and compared to the controls. Regarding quality of life measures, the group that received massage therapy combined with stress management had significant declines in health care utilization and increases in health perception. There were no significant differences in functional health status, men-

tal and emotional health or the symptom distress index.

This study had few strengths and many limitations. Subjects were randomly assigned to treatment conditions and monitored for crossover effects by completion of a log of weekly activities. However, there were several threats to internal validity. The massage therapy was described as whole-body relaxing-type using Swedish techniques. Whether the massage actually generated relaxation is unknown; there were no biologic or self-report measures of relaxation included in the study. Of the 42 subjects enrolled, 40 were men. Perhaps the men's relaxation was adversely affected by the gender of the therapist. The article cited two studies where men experienced positive outcomes when massage therapy was provided by a female therapist. In addition, it was not disclosed whether the massage therapist was blinded to the assignment of the subjects. If not blinded, the massage therapist could have treated the massage subjects differently than the ones he knew were going to receive some other additional therapy.

Primary author (yr)	Sample	Measures	Use of drug therapy	Interventions	Results
Scafidi (1996)	28 neonates born to HIV+ mothers	Brazelton Neonatal Behavior Assessment	none	MT 15min, 3 times in 3hrs X weekdaily X 10 days or usual care	Improved habituation, motor, range of state, autonomic stability, excitability, stress behaviors, & wt gain
Ironson (1996)	29 gay men with (20) and without (9) HIV infection	NK & CD4 & CD8 counts/ratio, cortisol, anxiety	2 men were on antiretroviral therapy (ART)	MT 45 min, week daily X 1 month or control period (within subjects)	Decreased anxiety, increased NK cell counts
Birk (2000)	42 adult HIV+ subjects (20 male)	NK & CD4 & CD8 counts/ratio, quality of life - 6 dimensions	Of the 31 who completed study, 18 on ART	MT 45min X 1X/wk X 12 wks, MT+ exercise, MT + stress mgmt, or usual care	MT + stress mgmt: decreased medical care utilization, increased health perception
Diego (2001)	24 HIV+ adolescents	NK & CD4 & CD8 counts/ratio, anxiety, depression	No difference between groups (# not given)	20min chair massage or prog. muscle relaxation 2X wk X 12 wks	Only MT: improved depression, NK, CD4 counts, and CD4/CD8 ratios MT & relaxation grp: decreased anxiety
Shor-Posner (2004)	24 HIV+ children (2-8 yrs)	CD4, CD8, CD3 cell counts	none	MT or friendly visit 20min X 2/wk X 12 wks	MT group improved more than controls on all measures

Possible treatment effects could have been masked by the high rate of attrition by unhealthy subjects and the small sample size. A final important issue was that the control subjects, by chance, were the healthiest subjects (had high CD4+/CD8+ ratios) at both

Immune Function, Depression, and Anxiety in HIV+ Adolescents

This randomized trial sought to assess changes in immune function, depression and anxiety in adolescents attending a clinic for HIV (Diego et al., 2001). Subjects were eligible if they were aged 13-19, HIV+ with CD4+ count greater than 200, and had no changes in their drug schedule during the past three months. Of the 24 adolescents recruited, 22 were female, most were from lower socioeconomic status, 92 percent were African American, 8 percent were Hispanic and the mean age was 17 years. These characteristics were similar in both groups and representative of the adolescents attending the clinic. In addition to a demographic questionnaire, subjects completed the Center for Epidemiological Studies-Depression scale and the State Anxiety Inventory before and after the intervention on the first and last days of the study.

Participants were randomly assigned to a 20-minute, structured chair massage provided by different professional massage therapists twice a week for 12 weeks. At the same frequency and duration, the control group participants were guided through progressive muscle relaxation by a research assistant or varied massage therapists. Initial and final interventions were scheduled within a week after and within a week before the participants' regularly scheduled blood draws for CD4+, CD8+, CD4/CD8 ratio and NK cells.

Both the massage therapy and relaxation groups reported significant decreases in anxiety before and after intervention on first and last days of the study; however, only the massage therapy group reported significantly less depression with a Group by Day interaction effect. NK cells, CD4+ counts and CD4/CD8 ratios improved significantly in the massage therapy group, but not in the control group. There were no significant differences in CD8+ counts.

Strengths of this study include randomization to intervention, no attrition (participants were paid \$10 for each session), structured massage therapy and relaxation protocols, an improved design from that of Ironson et al. (1996) and a description of biological plausibility. The results of this study appear generalizable to HIV+ adolescents who are of lower socioeconomic status and are depressed.

Immune Measures of HIV+ Children without Antiretroviral Medication

This short report discussed a randomized investigation into the effectiveness of massage therapy versus a friendly visit (control) in improving immune measures of HIV infected children living in the Dominican Republic and not taking antiretroviral medication (Shor-Posner, Miguez, Hernandez-Reif, Perez-Then, & Fletcher, 2004). Eligible children were aged two-eight, HIV+ and attended an infectious disease clinic in Santo Domingo. They were randomly assigned to receive either massage therapy provided by trained nurses or a friendly nurse visit, both twice a week for 12 weeks. Blood was tested for CD3, CD4+ and CD8 counts. Parents/caregivers received money (U.S. \$5) towards travel expenses to and from the clinic.

Preliminary data was presented on 24 children (15 girls and nine boys); most (76 percent) were under age six. All children were from lower socioeconomic status. At baseline, the groups were of similar age and CD4+ count, but the control group had signifi-

cantly higher CD3 and CD8 counts. At the end of 12 weeks, the massage group showed significant improvement versus controls on all immune measures. In fact, the mean cell counts of the control group all declined.

The strengths of this study include randomization to treatment group, structured protocols for each group and high visit compliance (86 percent). It is unclear, however, how representative the sample of children was to the broader population of HIV+ children in the Dominican Republic. Children whose parents declined study participation may be different in some way than children whose caregiver gave consent. In addition, no explanation was suggested for the poor outcomes of the control group.

SUMMARY

Table 1 provides a summary of the studies that were reviewed. Additional similarities and differences include potential confounds, forms of massage therapy and control groups that were used, sample sizes and researchers. Overall, the studies did not fare well at discussing alternative reasons for their findings. For example, other than anti-HIV drug medications, none of the studies mentioned if their subjects were on psychotropic medications or if they used any other forms of CAM during the study period. This potential confounding is less relevant to the neonates and children in the Dominican Republic and perhaps more relevant to the middle class gay men.

Varied duration and forms of massage therapy and control groups were used in each study. The first study defined massage therapy as infant stimulation, the second as 45 minutes of Swedish/Trager, Polarity, Acupressure and Craniosacral Therapy, the third as a 20-minute chair massage, the fourth as a 45-minute Swedish massage and the last as 20 minutes of moderate pressure stroking and kneading of muscles using a non-scented oil. In addition, the frequency of massage therapy differed in the studies: 10 days in the first study, four weeks in the second and 12 weeks for the remaining three. None of the studies had more than one massage group receiving varying levels of massage therapy; therefore, a dose response was not studied. Due to the variations in forms, frequency and duration among these studies, a potential dose response relationship cannot be evaluated. A final variation among the studies was the type of control group used: usual care, a within subjects control, progressive muscle relaxation and friendly visit.

One similarity of the all the studies was the small sizes used, ranging from 24-42. One possible reason for the nonsignificant findings is that there was not enough statistical power to capture any real differences. Another characteristic shared among the studies were the authors. The only study that did not share at least two authors was Birk, McGrady, MacArthur, & Khuder, (2000).

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CONCLUSION

These studies did not answer the question as to whether massage therapy improves the immune measures of HIV+ individuals. However, some of the results exhibited potential. In the Ironson et al. (1996) and Diego et al. (2001) studies, those who received massage therapy experienced significant increases in NK cells. This increase may lead to enhanced protection against opportunistic infections. In addition, Diego et al. (2001) and Shor-Posner, Miguez, Hernandez Reif, Perez-Then, & Fletcher (2004) found significant increases in CD4 cells, the primary cell that are attacked by HIV.

After reviewing these studies, I conclude that further inquiry into massage therapy's ability to positively affect the immune systems of those infected with HIV is warranted. In order to inform and justify the expense of a large randomized controlled trial, the methodology with the best potential outcome needs to be identified. Although people with HIV are using massage therapy without conclusive evidence of its effectiveness, research into what forms of massage therapy and dosage may be effective would be helpful in making recommendations to this population.

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