

SHORT REPORTS

Massage Treatment in HIV-1 Infected Dominican Children:  
A Preliminary Report on the Efficacy of Massage Therapy to  
Preserve the Immune System in Children Without  
Antiretroviral Medication

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ABSTRACT

**Objectives:** More than 1.4 million children are living with HIV and global access to antiretrovirals is not yet readily available. Massage therapy, which has been shown to improve immune function in HIV+ adults and adolescents, may provide an important complementary treatment to boost immune status in young children living with HIV disease, especially those without access to antiretroviral medications. No studies have been conducted, however, that specifically target massage therapy to enhance immune function in HIV+ children.

**Design:** Clinical trial with eligible, consented HIV+ children randomized to receive either massage therapy or a friendly visit (controls).

**Settings/Location:** CENISMI/Robert Reid Cabral Hospital, Santo Domingo, Dominican Republic.

**Subjects:** HIV+ children ages 2–8 years.

**Intervention:** Massage therapy sessions (20 minutes, twice weekly, for 12 weeks), conducted by trained nurses, following a structured protocol of moderate pressure stroking and kneading of muscles, using a non-scented oil. The friendly visit control group, (reading, talking, playing quiet games), met with the nurse twice weekly for 12 weeks.

**Outcome Measures:** At the initial evaluation, and following the 12-week intervention, blood was drawn to determine absolute helper (CD4/T4) and suppressor (CD8/T8) counts.

**Results:** Children in the control arm had a greater relative risk of CD4 count decline (>20%) than massage-treated children (RR = 5.7,  $p = 0.03$ ). Lymphocyte loss was also more extensive in the controls ( $p < 0.02$ ), and more of the control group than the massage group lost >50 CD8 lymphocytes ( $p = 0.03$ ).

**Conclusions:** The efficacy of massage therapy in maintaining immunocompetence may offer a viable alternative to the thousands of children worldwide without antiretroviral access.

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## INTRODUCTION

In developing countries, where antiretroviral medications are not yet readily available to slow disease progression, massage therapy may have the potential to provide an important, safe, and sustainable form of immuno-stimulation. Daily massage therapy has been shown to enhance natural killer cytotoxic capacity in HIV+ adults (Ironson et al., 1996) and improve markers of disease progression (CD4 cell count, CD4/CD8 ratio) in adolescents who received massage treatment twice weekly for 12 weeks (Diego et al., 2001). Less frequent (once weekly) massage, however, has not been associated with immune improvement in HIV infected persons (Birk et al., 2000). The present study investigated the effectiveness of massage therapy in enhancing immune status in HIV-1 infected children living in the Dominican Republic, who are particularly vulnerable to rapid disease progression due to the limited access to antiretroviral therapies, prevalence of malnutrition, and increased risk of opportunistic infection.

## MATERIALS AND METHODS

Following review and approval of the investigation from CENISMI/Robert Reid Cabral Hospital in the Dominican Republic and the Institutional Review Board Human Subjects committee of the University of Miami School of Medicine, the trial was initiated in June 2003. Children age 2–8 years, with confirmed HIV infection, attending an infectious disease clinic in the Robert Reid Cabral Children's Hospital in Santo Domingo, and whose parent or caregiver signed a consent form, were included.

The intervention design involved randomization of eligible, consented HIV+ children ( $n = 54$ ) to receive either: massage therapy (20 minutes, twice weekly, for 12 weeks),

or a friendly visit. The massage sessions were conducted by trained nurses and followed a structured protocol of moderate pressure stroking and kneading of muscles, using a non-scented oil. Children in the friendly visit control group met with the nurse/therapist for a 20-minute session (reading, talking, quiet games), twice weekly for 12 weeks. The children's parents or caregivers received a small monetary compensation (US \$5) for travel to and from the clinic.

At the initial evaluation, and following the 12-week intervention, blood was drawn in the morning (to account for diurnal variations in CD4 counts) and shipped to the University of Miami Laboratory of Immunology within 24 hours to determine lymphocyte profiles. Lymphocyte assessments included absolute helper (CD4/T4) and suppressor (CD8/T8) counts.

Statistical evaluations were performed using SAS (SAS Institute, Cary, NC) and included comparisons between means and proportions using one-sided Student's *t*-test and Fisher's exact tests, with alpha level at 0.05.

## RESULTS

To date, data are available on 24 consented children (15 girls and 9 boys) ages 2 to 8 years (mean  $4.9 \pm 1.5$  years). Most of the children (76%) are under 6 years of age. Fifty-two percent of the study children reside with their HIV+ mother and all are from lower socioeconomic status. Adherence to scheduled visit appointments has been outstanding (86%), with the mean time between visits 3.5 days.

Children randomized to receive massage therapy ( $n = 10$ ) were of similar ages ( $5.1 \pm 1.6$  years) as the children in the friendly visit control arm ( $n = 14$ , mean age  $4.7 \pm 1.4$  years). The mean CD4 cell count of the study group was  $850 \pm 453$  cells/mm<sup>3</sup>. Most of the children had >500 CD4 cell counts (80% massage, 72% control); >1000 CD4 cell

TABLE 1. IMMUNE PARAMETERS AT BASELINE AND POSTINTERVENTION

Variable	Massage ( $n = 10$ )	Control ( $n = 14$ )	p-value <sup>a</sup>
Baseline CD4 (Mean $\pm$ SD)	802 $\pm$ 423	885 $\pm$ 535	
Final CD4	852 $\pm$ 438	696 $\pm$ 453	
Change <sup>b</sup>	+50 $\pm$ 163	-189 $\pm$ 331	0.03
Baseline CD8 (Mean $\pm$ SD)	1440 $\pm$ 566	2722 $\pm$ 1712	0.03
Final CD8	1820 $\pm$ 984	2546 $\pm$ 1509	
Change <sup>b</sup>	+380 $\pm$ 593	-176 $\pm$ 646	0.04
Baseline CD3 (Mean $\pm$ SD)	2437 $\pm$ 711	4003 $\pm$ 2133	0.02
Final CD3	2921 $\pm$ 1364	3655 $\pm$ 1852	
Change <sup>b</sup>	+484 $\pm$ 901	-348 $\pm$ 938	0.04

<sup>a</sup>Comparisons between children randomized to the massage and control arms.

<sup>b</sup>Change calculated as postintervention measurement minus baseline measurement (+represents increase and - represents decrease). SD, standard deviation.

counts were noted in 43% of the control and 20% of the massage group. No evidence of immunological suppression (Stage 1) was observed in 43% of the control and 40% of the massage group; Stage 2 (moderate suppression) was noted in 36% of the control and 60% of the massage group, and Stage 3 (severe suppression) was seen in 21% of the controls.

Immune parameters at baseline and postintervention are indicated in Table 1. Despite differences in CDC stage distribution, the mean CD4 cell count at baseline was similar in the children randomized to the friendly visit control group ( $885 \pm 535$  cells/mm<sup>3</sup>) and the massage arm ( $802 \pm 423$  cells/mm<sup>3</sup>) and significantly higher for the control group for baseline CD8 ( $p = 0.03$ ) and CD3 ( $p = 0.02$ ) levels. Following the intervention, the mean CD4 cell count increased in the massage group and declined in the controls. Changes in mean CD4 cell count differed significantly ( $p < 0.03$ ) from baseline to the last day of the 12-week study period for the massage vs. the control group. Moreover, the relative risk of having >20% decrease in CD4 count over the 3-month period was significantly higher in controls than in the massage-treated children (RR = 5.7,  $p = 0.03$ ). Lymphocyte loss (>150 T cells) was more extensive in the controls relative to the massage group ( $p < 0.02$ ), and a higher proportion of the control group (57%) lost significantly more >50 CD8 lymphocytes than the massage group (10%),  $p = 0.03$ . In addition, a 5% decline in B cells was observed in 43% of the controls, compared to 20% of the massage group.

## DISCUSSION

The compelling findings of this study, while based on a small sample size, indicate for the first time that massage therapy appears to have a positive impact on immune function in HIV+ children not receiving antiretroviral medications. Although CD4 cell count is an important disease marker, preservation of other lymphocyte populations is equally vital. CD8+ T lymphocytes have a crucial protective role against HIV infection as well as in HIV disease progression. Those who do not progress to advanced disease (non-progressors) have been shown to exhibit increased CD8+ cells (Mendila et al., 1999). Moreover, CD8+ antiviral activity, which controls productive HIV infection, is not evident in progressors, suggesting that CD8+ cells may be critical in preventing the establishment of infection by other HIV strains (Barker et al., 1996).

Restoring and preserving immune function is a key component to successfully managing HIV-1 disease and the role of massage therapy in maintaining immunocompetence and preserving CD4, CD8, and CD3 lymphocytes may offer hope to the thousands of children worldwide without access

to antiretrovirals, or who may not benefit from antiretroviral treatment.

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