

# TAI CHI FOR ATTENTION DEFICIT HYPERACTIVITY DISORDER

## Attention Deficit Hyperactivity Disorder

### Benefits from Tai Chi

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## Abstract

Thirteen adolescents with ADHD participated in Tai Chi classes twice a week for 5 weeks. Teachers rated the adolescents' behaviors on the Conners Scale during the baseline period, after the 5 week Tai Chi period and two weeks later. After the 10 Tai Chi sessions the adolescents displayed less anxiety, daydreaming behaviors, inappropriate emotions and hyperactivity and improved conduct. These changes persisted over the two-week follow up (no Tai Chi) period.

## Attention Deficit Hyperactivity Disorder Benefits from Tai Chi

Attention Deficit Hyperactivity Disorder (ADHD) is characterized by cognitive and behavioral deficits including inattention, impulsivity and hyperactivity levels inappropriate for age and gender (DSM-III-R, American Psychiatric Association, 1987). Although short-term improvements have been reported in academic and social functioning with drug therapy such as methylphenidate or Ritalin (Schachar & Tannock, 1993; Swanson et al, 1995), side-effects such as motor tics, insomnia, headaches, and social withdrawal make this treatment controversial (Handen, Feldman, Gosling, Breaux et al., 1991; Parraga & Cochran, 1992).

Non-pharmacological treatments include counseling, parent/family training in behavior modification techniques, relaxation and massage therapy. Counseling treatments have received little empirical attention and reports are mostly anecdotal (Schwiebert, Sealander & Tollerud, 1995). Behavior modification techniques have attempted to facilitate the child's performance and attention by including scheduling changes, rearranging home and classroom settings, and training teachers, parents and siblings in differential reinforcement techniques (Blakemore, Shindler & Conte, 1993). Although some studies have shown that behavioral modification is effective (Damico & Armstrong, 1996), one study showed that ADHD adolescents had a weak behavioral inhibition system (Iaboni, Douglas & Blaine, 1997), which made them poor candidates for behavioral programs. Although relaxation therapy has alleviated depression in adolescents

(Platania-Solazzo, et al, 1992), it has had limited effects in treating ADHD (Field, Quintino & Hernandez-Reif, 1997) perhaps because of the demands relaxation therapy places on concentration. Massage therapy, in contrast, has been effective in increasing time spent on task, reducing fidgeting, improving mood and lowering hyperactivity scores in adolescents with ADHD (Field, Quintino & Hernandez-Reif, 1997).

Tai Chi has been effective with adults by reducing stress and

stress hormones (Jin, 1992), anger and confusion, and improving mood (Brown, Wang, Ward, Ebbeling, Fortlage, Puleo, Benson & Rippe,

1995; Wolf, Barhhart, Kutner, McNeely, Coogler & Xue, 1996). In

addition, Tai Chi results in lower blood pressure (Channer, Barrow, Barrow, Osborne & Ives, 1996) and

improved balance (Wolfson, Whipple, Derby, Judge, King, Amerman, Schmidt & Smyers, 1996). The

present study examined the effects of Tai Chi on anxiety, mood, hyperactivity and conduct in adolescents with ADHD.

#### Method Participants

Thirteen adolescents (11 males), with a mean age of 14.5 years, (R = 13-16) and a DSM-III-R diagnosis of ADHD were recruited from a remedial school for adolescents with developmental problems. The adolescents came from middle class families ( $M = 2.2$  on Hollingshead Two Index Factor) and were ethnically distributed 70% Caucasian, 15% Hispanic and 15% African American.

#### Procedure

Tai Chi. The adolescents engaged in Tai Chi postures for 30-minute sessions twice a week for 5 weeks.

Each mid-afternoon session began with slow raising and lowering of the arms in synchrony with breathing exercises for 5 minutes. The adolescents were then taught to perform slow turning and twisting movements of the arms and legs, shifting body weight from one leg to the other, rotating from side to side and changing directions in a sequence of Tai Chi forms.

An A1B1A2 design was used consisting of a baseline phase

(without Tai Chi) (A1), a one-week Tai Chi phase (B1), and a two-week

follow up phase without Tai Chi (A2). At the end of each phase, the

teachers, who were not aware of which adolescents were receiving Tai Chi at what time completed the Conners Teacher Rating Scale.

Conners Teacher Rating Scale - Revised (CTRS-R; Goyette,

Conners & Ulrich, 1978). This 28 item teacher rating scale yields a total hyperactivity score in addition to the subcategories of anxiety, asocial behavior, conduct, daydreaming, emotion and . hyperactivity. Test-retest reliability coefficients of .97 have been reported over a one-week period for this scale (Goyette, Conners & Ulrich, 1978).

Results Repeated measures analyses of variance were performed on the subcategories and total hyperactivity score of the Conners. As can be seen in Table 1, repeated measures effects were obtained for all but the asocial scale.

Insert Table 1 about here

Bonferroni t-tests suggested the following baseline to Tai Chi therapy changes: 1) less anxiety, 2) improved conduct, 3) less daydreaming, 4) less inappropriate emotions, and 5) less hyperactivity during Tai Chi versus before Tai Chi (see Table I). Bonferroni t-tests also revealed that these improved scores persisted over the two-week follow-up (no Tai Chi) period.

## DISCUSSION

The results of this study and our earlier massage therapy study (Field, Quintino & Hernandez-Reif, 1997) suggest that at least two non-drug therapies are effective for adolescents with ADHD. The positive effects of Tai Chi on the adolescents with ADHD parallel the positive effects for adults including reduced mental and emotional stress (Jin, 1992) and improved mood (Jin, 1989).

Although stress hormone levels were not assayed in this study, the adolescents were perceived by their teachers as being less anxious, emotional and hyperactive following Tai Chi. The adult literature has reported reduced stress hormones (cortisol) with Tai Chi (Jin, 1992).

Tai Chi research on adults has identified changes in cardiovascular, respiratory, electroencephalographic, and biochemical levels (e.g., lower cortisol stress hormone levels) (Brown, Mucci, Hetzler, & Knowlton, 1989; Jin, 1989). Reduced sympathetic activity, or enhanced parasympathetic activity, has been considered a potential underlying mechanism (Hsu, Wang & Kappagoda, 1985). This mechanism might also account for the marked behavioral changes observed *in* the adolescents *in* this study and our earlier ADHD massage study (Field, Quintino & Hernandez-Reif, 1997). The lower stress hormones (cortisol) observed following at least the massage therapy in our other studies (Field, et al, in press, Field; Seligman, Scafidi & Schanberg, 1996; Ironson, et al, 1996) is consistent with a mechanism of enhanced parasympathetic activity.

Future studies might compare Tai Chi and massage therapy effects on the reduction of stress hormones (e.g., salivary cortisol or urinary catecholamines) in ADHD adolescents. The comorbidity of ADHD with other psychiatric disorders, such as depression and anxiety, and the potential side effects of a multidrug therapy makes Tai Chi and massage therapy attractive alternative treatments. In addition to little or no side effects, especially appealing are the documented effects of Tai Chi and massage therapy on reducing anxiety and hyperactivity, the major and most difficult symptoms in ADHD children.

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Table 1. Means (and standard deviation in parentheses) on Conners Teacher Rating Scale for baseline, Tai Chi and two-week follow-up period.

Baseline Tai Chi No Tai Chi

Variables First Day Last Day 2-weeks later F= p-value- CONNERS

-Anxiety 56.7(11.3). 43.5( 9.6)<sup>1</sup> 44.5( 6.3)<sup>1</sup> 11.94 .000 -Asocial 52.3(15.2)<sup>a</sup> 46.5( 9.7)<sup>a</sup> 48.7(10.9)<sup>a</sup> 1.42 .262 -Conduct 56.2( 8.0)<sup>&</sup> 49.0(11.8)<sup>b1</sup> 50.5(11.9)<sup>b1</sup> 5.18 .013 -Daydream 61.0( 6.4)<sup>&</sup> 48.4(11.6)<sup>b3</sup> 50.5( 7.0)<sup>b3</sup> 13.75 .000  
 ;  
 -Emotion 60.4( 8.9)<sup>a</sup> 50.2(13.5)<sup>b2</sup> 52.0(12.3)<sup>b2</sup> 9.04 .001 -Hyperactive 60.1( 7.9)<sup>&</sup> 45.8(1~.1)<sup>b4</sup> 51.7( 8.2)<sup>1</sup> 23.25 .000  
 - Total 81.5(11.6)<sup>a</sup> 58.6(17.8)<sup>b4</sup> 66.2(13.9)<sup>b4</sup> 19.49 .000  
 Hyperactivity

means. Superscript indicates level of significant difference between first and last days and between first day and 2-weeks later based on Bonferroni t-test (1 p = .05, 2p = .01, 3p = .005, 4p = .001).