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IMPROVEMENT IN SENSORY IMPAIRMENT AND SOCIAL INTERACTION IN YOUNG CHILDREN WITH AUTISM FOLLOWING TREATMENT WITH AN ORIGINAL QIGONG MASSAGE METHODOLOGY.

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ABSTRACT

In clinical research, sensory impairment is considered one of the core deficits in autism and is associated with impaired socialization, behavioral disturbances and bowel and sleep problems. The effectiveness of the Cignolini methodology, an original Qigong massage methodology, in treating sensory impairment in young children with autism was evaluated in a small, controlled study. Thirteen children with autism between the ages of three and six received daily treatment according to the methodology for five months. Compared with untreated children, treated children experienced significant improvement of their sensory impairment ($p<.01$), and demonstrated increased social skills ($p<.04$) and basic living skills ($p<.02$) on standardized measures. In addition, all of the children with bowel and sleep abnormalities demonstrated improvement following treatment.

Keywords: autism, sensory impairment, Qigong massage, impaired social development, Cignolini methodology

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INTRODUCTION

The majority of children with autism show sensory impairment of one or more of the five senses before the age of two years (Adrien, Perrot, Sauvage, Leddet, Larmande, Haneury & Barthelemy 1992, 1993; Baranek, 1999). Data from retrospective parent questionnaires (Dahlgren & Gillberg, 1989; Gillberg, Ehlers, Schaumann, Jakobsson, Dahlgren, Lindblom, Bagenholm, Tjuus & Blinder 1990) and retrospective chart review (Greenspan & Weider, 1997) show the prevalence of sensory impairment to be 83-100%. Although it is treated as a core deficit in the autobiographical and clinical literature of autism (Grandin & Scariano, 1986) and sensory hyposensitivities or hypersensitivities to the environment are common features associated with diagnosis (Baird, Cass & Slonims, 2003), sensory impairment has yet to be included in the DSM IV and ICD-10 criteria for diagnosis of autism.

In children with autism, sensory impairment correlates positively with repetitive, stereotypic behavior (Baranek, Foster & Berkson, 1997b) and inversely with adaptive behavior (Rogers, Hepburn, & Wehner, 2003) and social development (Dawson, 1983; Ornitz et al, 1978). This is true of other children with a primary sensory impairment, and is borne out in the literature on blind and deaf children of normal intelligence who also manifest repetitive behaviors and difficulty in learning language, social skills and adaptive behavior (Carville, 2001).

Children with autism are known to have a high prevalence of sleep problems (Polimeni, Richdale & Francis, 2005) which correlate with parent ratings of stress levels (Gabriels, Cuccaro, Hill, Ivers & Goldson, 2005) and measures of general health such as appetite and growth (Williams, Sears & Allard, 2004). Likewise, there have been many

reports of an association between autism and bowel problems (Goldberg, 2004). Both bowel and sleep problems have been found to intensify symptoms of autism (Horvath & Perman, 2002, Schreck, Mulick & Smith, 2004).

A review of Western manual and massage interventions (Baranek, 2002) indicated that there is no single therapy that reliably diminishes the sensory impairments for children with autism. There have been very few studies of treatment for sensory impairment in pre-school children with autism: one U.S. study measured the effect of massage therapy on touch aversion (Field, 1997), and two British studies explored the effect of a touch therapy program for parents and their children with autism (Cullen & Barlow, 2002; Cullen, Barlow & Cushway, 2005).

A review of the Eastern medicine research literature indicated that there is no published research on treating the sensory impairment of children with autism with manual massage or Qigong techniques. In China, massage modalities have long been in use for the full range of pediatric illnesses including delay of speech and motor development (Nan, l990) but there is no specific syndrome in Chinese medicine which corresponds precisely with the current Western diagnosis of autism and sensory impairment in young children. Although there has been active Qigong research in a number of hospitals in China since the l980s, there are only a few published studies in English on medical Qigong research for pediatric illnesses. Of these, there are two that may overlap with the Western diagnosis of autism: one uses Qigong to correct psychological abnormalities of school-aged children (Sato, l992) and the second to increase children's intelligence (Liu, l992). While there has been research showing improvement of autism with scalp acupuncture (Zhenhuan, 2006), to the best of our

knowledge, no research has been published regarding the use of medical Qigong or Chinese massage in the fields included in the Western diagnosis of autism.

The Cignolini methodology is a Medical Qigong massage methodology based on the theory of Chinese medicine deriving from an understanding of pathology and treatment in terms of energy flow, channels, organs and the transmission of information internally and externally with the environment (Cignolini, 2002). For Chinese medicine, a developmental delay in the area of communication and social interaction fits into a large classification of illnesses called "closure of the orifices". The orifices correspond to the ancient Taoist and Buddhist idea of the sensory doors that open to the world. The illness is explained as a partial block of one or several of the orifices such that external sensory information cannot be properly received and processed. According to this model, treatment aims at removing the impairment to the flow of Qi in and out of the orifices by Qigong massage of channels involved in clearing the brain and senses (Silva & Cignolini, 2005).

In the present protocol, a physician trained in Chinese medicine and experienced in working with families having children with autism, gives a series of Qigong massages to the child twice a week over two five-week periods one month apart. Concomitantly, she trains the parents to give the child the Qigong massage every day. With her support during the twenty visits comprised by the intervention, parents treat the child daily for the five-month period of the study, adapting it to the child as indicated.

The child's parents can be easily trained to perform the massage on their child, without having to be trained in the full range of Qigong massage. Chinese medicine considers that the parent and the child share the same Qi and have been exchanging it

since before birth. The parent-child bond is forged of thousands of touch, voice and feeling interactions and despite the sensory impairments, the child responds more readily to the parent than to anyone else. Likewise, the parent is more than happy to be part of a treatment that can help their child. Because of this, Qigong massage given by the parents becomes very effective even though the parent has no prior experience in Qigong (Shao, l994). The massage provided daily by the parents makes beneficial use of the parent-child bond, and augments the twice weekly treatment by the physician.

In a case series investigating the response of young children with autism to nine weeks of treatment with the Cignolini methodology (Silva & Cignolini, 2005), all the children with sensory impairments at the onset of the study showed improvement following treatment. Additional improvements in their socialization, communication and general health were noted.

The purpose of this study was to investigate whether the responses described in the case series (Silva & Cignolini, 2005) could be duplicated in a small controlled study with blinded examiners. In addition, information was to be collected on changes in bowel and sleep patterns in response to treatment.

The age group of children that this research is focused on is two to six years of age partly because the Qigong massage protocol used is easier for parents and therapists to carry out in this age group and partly because this is the age identified by Early Intervention Programs as being the most critical for intervention. Currently, with the new openness in the West to treatment approaches from the East, there is a rise of collaborative research efforts between East and West partners looking for joint approaches to difficult-to-solve modern illnesses. This research is one such

collaboration, and we were fortunate to have the support of the regional Educational Early Intervention Program leaders, without whom it would not have been possible to do this study.

METHOD

Fifteen children with autism under six years of age at the onset of the study were randomly assigned to a study group and a control group. Prior research suggests that children with higher cognitive function respond better to treatment interventions (Arick, 2003). Therefore, the children were stratified into three groups according to their initial Batelle Developmental Inventory cognitive scores and then randomly assigned to treatment or control within each cognitive group. Appropriate parental consents were signed allowing the children to participate in the study and for video recording to be done. Ethical considerations mandated that the control group also receive treatment in the event that the treatment group showed significant progress, and parents of control group children were informed that should this be the case, their child would also receive treatment.

The study group (N=8) received treatment according to the Cignolini methodology for five months. Tests measuring sensory impairment, adaptive behavior, autistic behavior and language skills were administered before and after the treatment period by qualified and experienced examiners who were blinded to the child's group assignment. Differences between the two groups were compared. Changes in bowel and sleep abnormalities were evaluated by parent questionnaires at the end of the five-month period.

Analysis of the data at this stage indicated that the methodology was effective in several areas, and the children in the control group (N=7) were therefore offered treatment. One child could not participate because of his mother's severe health problems, and one child began treatment but moved from the area after completing only nine weeks of treatment. Thus, five children in the initial control group received treatment according to the methodology for five months, after which they were retested.

Throughout the study, both groups received Early Intervention Pre-school Services for which they were eligible through the State of Oregon's Special Education program provided by Willamette Education Service District (WESD).

Selection Criteria

Children potentially qualified to participate in the study were identified by the WESD. Letters about the study were sent to the parents, and interested respondents were screened by telephone interview. Of 44 respondents, 15 children met eligibility criteria for the study and were invited to participate.

Eligibility criteria for the study were as follows:

1. Formal diagnosis of uncomplicated autism according to DSM IV criteria. Children with other neurological conditions such as seizures and children on chronic medication were excluded.
2. Age up to six years at time of enrollment in the study.
3. Parental commitment to giving the child massage every day for five months and to transporting the child to the clinic to receive treatment from the doctor 20 times.

4. Willingness of the parent not to initiate any new treatments while the study was underway.

Participants

The fifteen children in the study were between the ages of three and six at enrollment. Their mean age at the first standardized testing was four years ten months. Medical specialists diagnosed all 15 with Autistic Disorder according to DSM IV criteria. Of the 15 children, seven had the disorder since birth, and eight had the regressive form. The mean age of regression was 15 months. All children had sensory disturbances, six had abnormal bowel function, and seven had abnormal sleep. There were 13 males and two females. Two children had a sibling with a suspected autism spectrum disorder.

All children were enrolled in the Willamette ESD Pre-school Program in August, 2005 when the study began. The children attended preschool classrooms two to four times a week for two hours. Two children had been receiving services from the ESD over the summer, but entered first grade in September. None of the children were receiving supplemental occupational therapy, behavioral therapy or physical therapy. No new interventions were begun during the study. Four of the children had received speech therapy during the previous school year for one hour a week or less, and continued this during the study.

Evaluation and Testing Instruments

The principal author performed an initial 90-minute evaluation and observation of each child, at which time the history and records were reviewed, the child was examined, a Chinese medical diagnosis was ascertained (Yanchi, l988), and parental informed consent was obtained.

In order to measure the child's progress during the five months of the study, several standardized testing instruments, a parent questionnaire, and a scoring system specific to the massage protocol were employed. A brief description of each instrument follows below.

Batelle Developmental Inventory: Cognitive Domain Screening Test (Newborg, Stock, Wnek, Guidubaldi & Svinicki, 1984). This standardized assessment was used to measure each child's conceptual skills and abilities. Following testing, the children were stratified into three groups (score ranges of 7-15, 23-33, and 42-53) and then randomly assigned to treatment or control groups within each stratum.

Sensory Profile (Dunn, 1999). This standardized evaluation tool for measuring children's responses to commonly occurring sensory experiences is a 125 item parent questionnaire. Parents rate the frequency with which their child responds to 125 commonly occurring experiences using a five-point scale from "always" to "never". When scored, these ratings identify responses which are typical of children without disabilities, probably different, and definitely different from non-disabled children.

The questionnaire has 14 categories for which results are grouped into three main sections:

1. The Sensory Processing section contains six scales measuring the child's responses to auditory, visual, vestibular, touch and oral sensory stimulation.
2. The Modulation section contains five scales measuring how the child's behavior is modulated according to their tone/endurance, body position/movement, activity level and visual input.
3. The section on Behavior and Emotional Responses contains three scales reflecting the child's commonly occurring behavioral, emotional and social responses to daily life as well as their thresholds for responses.

The Sensory Profile also derives a score for nine factors that characterize responses to a variety of stimuli across the sensory categories listed above and that reflect patterns of sensory processing abnormalities that closely resemble patterns of behavior accepted as symptomatic for certain groups of children with disabilities (Watling, Deitz & White, 2000). These nine factors are Sensory Seeking, Emotionally Reactive, Low Endurance/Tone, Oral Sensory Sensitivity, Inattention/Distractibility, Poor Registration, Sensory Sensitivity, Sedentary and Fine Motor/Perceptual.

Thus, the profile delivers a score on 14 scales and nine derived factors for each child. For this study, these scores were coded as 0 for normal, 1 for somewhat abnormal, and 2 for significantly abnormal. Because each child exhibited a different pattern of sensory abnormalities across the 14 scales and nine factors, a composite measure of the total sensory profile score was used (summing scores on the 14 scales), as well as separate sums of each of the three sections and the factors.

Vineland Adaptive Behavior Scales: Interview Edition (Sparrow, Balla, & Cicchetti, 1984). This standardized interview provides an assessment of each child's adaptive behavior within four domains. For each domain, the assessment returns a developmental age equivalent in months. The authors define adaptive behavior as, "the performance of the daily activities required for personal and social sufficiency." Adaptive behaviors are typically defined by the expectations of others. Adaptive behaviors are also defined by how an individual usually performs rather than that individual's inherent ability levels. For example, a child may know his name, age and date of birth, but if they never or rarely communicate such information, that skill would not be considered mastered. Within the developmental age of the children in the study, the following skills were at issue:

Daily Living Skills domain: skills relating to self-care and function in the home: e.g. eating, drinking, dressing, bathing, toilet training, teeth brushing, and picking up and putting things away.

Socialization domain: skills relating to orienting, responding to another's voice, expressing emotion and affection, interest in siblings and peers, interest in new situations, participating in games, imaginative play, and saying please, thank you and good-bye.

Communication domain: skills relating to orienting, listening, smiling, imitating, understanding simple commands, pointing, understanding varying levels of complexity related to directions and the use of longer and more complex utterances to communicate needs, desires and experiences.

Motor domain: Developmental measures of fine and gross motor skills.

Autism Behavior Checklist, (ABC) (Krug, 1980). This is a widely utilized, sensitive checklist of non-adaptive behaviors as a measure of a child's progress or development (Wadden, Bryson & Roger, 1991). The ABC returns a score between 0 and 157. Scores above 54 are considered suggestive of autism, and scores above 67 indicate probable autism.

Parent Questionnaire. Parents were asked to specifically describe and quantify abnormalities in their child's bowel and sleep patterns before and after the study.

Scoring tool for Cignolini methodology. The child's specific response to touch of the 11 areas delineated in the Cignolini methodology was scored in a separate scoring tool designed by the principal investigator. Each child was scored according to the number of areas of aversion, with extra points given for intolerance to touch for more than a very short time, or the requirement of consistently firm touch. The child's response to touch of the various areas was also recorded by video at the first visit. It is important to note that in the first few weeks of treatment, additional areas of aversion appeared and then were resolved.

Treatment Protocol

The Cignolini methodology consists of 11 different Qigong massage movements which take place from head to foot along acupuncture channels, and requires about 15 minutes to administer (Cignolini, A. 2002). The protocol as it was applied in this study entails a trained practitioner giving the child treatment twice a week for two five-week periods, with five weeks in between. Over the same period, and for five weeks following each period of treatment by the practitioner, the parent administers

the same massage treatment at least once daily. Thus, the child is treated for a total of five months.

The treatment areas correspond to acupuncture points and channels involved in regulating the circulation in and out of the brain, opening the sensory system to receive and process external sensory and proprioceptive information, reinforcing and regulating metabolic functions and clearing toxicity from the organs and tissues (Cignolini 2002).

At the first visit after pre-treatment testing, parents were provided oral and written instruction in the procedure and the principal investigator gave the child his/her first treatment. Parents were tested on subsequent visits until they could perform the treatment satisfactorily. This never required more than two visits. At the end of five months treatment, all children were reevaluated by a blinded examiner, and a final interview was held with the parents of treated children to review their child's results and administer the end-of-study questionnaire. For each child, the first several treatment visits and the exit interview were video recorded. A few of the children were also filmed in the middle of the study.

DATA ANALYSIS

Changes in the children's performance were measured by subtracting pretest scores from posttest scores on each measure. Because of the small number of children, the wide variation in their scores on each measure and the wide variation in the amount the scores changed over the five months, the standard assumptions of normally distributed scores and group equivalence necessary to perform an analysis of variance

test for differences between treated and untreated children were not met. Instead, the Kruskal-Wallis test was used to compare rank ordered score changes. The test statistic, H, is distributed approximately as chi-square with df=number of groups-1. This statistic compares the relative (rather than absolute) changes of children in one group with the changes the other group, and thereby overcomes the effect of outlying scores and a non-normal distribution of scores.

A preliminary analysis was performed at the end of the first five months of treatment, comparing the eight children who received the Cignolini methodology plus the WESD program with the seven children who received only the WESD program. Results indicated that the treatment was beneficial, and therefore, the control group children were also treated. After the five children who had initially been in the control group had completed treatment, their second-phase change scores were added as additional cases. Thus, the data pool includes eight cases comparing before-and-after scores of the first phase treatment children, seven cases comparing before-and-after scores of the control children, and five cases comparing before and after scores of five of the initial control children. In these latter cases, the before scores are equivalent to the after scores of the control group. While this is a somewhat unconventional analysis, it allows a comparison performance of each child before and after treatment with the changes observed in the initial group of seven untreated children.

We can diagram the design as follows:

O_{1a} (n=8) → Treat → O_{2a}

Randomize

O_{1b} (n=7) → → O_{2b} → (n=5) Treat → O_{3b}

Change scores are therefore calculated as:

(O_{2a} - O_{1a}) : 8 treated children

(O_{2b} - O_{1b}) : 7 untreated children

(O_{3b} - O_{2b}) : 5 treated children

This results in a total of 20 cases. The results reported below include these 20 cases. Using the ratio of after to before scores (i.e. O_{2a} / O_{1a}) gives the same results as using the conceptually simpler difference scores.

RESULTS

1. Sensory Profile. Both the control group and the treatment groups demonstrated similar abnormalities and scores in their sensory profiles at the onset of the study. All five senses were involved, although different children had different combinations of involvement. After five months of treatment, children demonstrated significant improvement in their sensory impairment as measured by their total Sensory Profile scores. The average improvement was 5.4 points, compared with an average worsening of 2.7 points for untreated children (Kruskal-Wallis $H=7.35$, $p<.01$). The Sensory Processing scale which contains specific measures of the child's responses to auditory, visual, vestibular, touch and oral sensory stimulation showed that all five senses improved by an average of 2.4 points, compared to a small, average worsening in untreated children of 1.0 point ($H=7.85$, $p<.01$).

The average improvement in impairment of modulation was 1.9 points for the treated group, compared with -1.0 point for untreated children ($H=5.55$, $p<.02$), and the

average improvement in impairment of behavioral and emotional responses to sensory experiences was 1.1 point, compared to -0.7 point for untreated children ($H=5.69$, $p<.02$). On the factor scale which measures patterns of sensory-processing abnormalities, treated children improved by 3.1 points, and untreated children deteriorated by 1.4 points ($H=6.23$, $p<.02$). See Table 1 for the statistical summary of these and other changes.

Table 1

Comparison of Treated and Untreated Children

Measure	Group	Mean Initial Score	Mean Change	Kruskal-Wallace H statistic	p
Sensory Profile Total (items A-N)	Treated	16.2	-5.4	6.71	0.01
	Control	15.7	2.7		
Sensory Processing (items A-F)	Treated	7.2	-2.4	7.83	0.01
	Control	7.1	1		
Sensory Modulation (items G-K)	Treated	5.3	-1.9	5.55	0.02
	Control	5	1		
Sensory Behavioral/Emotional Abnormality (items L-N)	Treated	3.6	-1.1	5.69	0.02
	Control	3.6	0.7		
Sensory Factor Scale (factors 1-8)	Treated	8.5	-3.1	6.27	0.02
	Control	8.7	1.4		
Autism Behavior Checklist	Treated	71.3	-13.3	1.32	ns
	Control	87.7	-24.3		
Vineland Daily Living Skills	Treated	28.8	9.8	5.69	0.02
	Control	24.1	0.9		
Vineland Socialization	Treated	29.8	10	4.44	0.04
	Control	24.7	4.7		
Vineland Receptive Language	Treated	33.8	8.3	0.01	ns
	Control	23.6	10.6		
Vineland Expressive Language	Treated	31.5	8.9	0.13	ns
	Control	24.4	6.7		

Vineland Gross Motor Skills	Treated	37.5	6.5	0.63	ns
	Control	33.4	0.9		
Vineland Fine Motor Skills	Treated	36	8.8	0.1	ns
	Control	29	7.6		

2. Treated children also improved in living skills as measured by the Vineland inventory. The average improvement was 9.8 months, compared with 0.9 months for untreated children. ($H=5.65$, $p < 0.02$) The predominant skills that were acquired were: removing and putting on clothing, feeding, assisting with chores, bathing, wiping nose, understanding the concept of money, using seatbelts independently, using the phone and ordering meals in restaurants.

3. Socialization also improved for treated children. The average increase in the Vineland age equivalent was 10.0 months, compared with 4.7 months for untreated children. ($H=4.41$, $p < 0.04$) The predominant behaviors acquired were: beginning to play with siblings and peers, appropriate play with toys, use of names, adhering to social rules, making a friend, sharing possessions, and engaging in make-believe play.

4. No significant differences were observed between treated and untreated children regarding motor development and language.

5. Autistic behavior, as measured by the Autism Behavior Checklist, decreased in both treated and untreated children. There was no statistically significant difference between the two groups.

6. Scoring tool for Cignolini methodology: Comparison of a count of the number of areas of the body adversely reactive to gentle touch before and after treatment, showed a total decrease in the number of areas adversely affected of 94%. The three most common areas adverse to touch were: ears, fingers and toes.

7. General health measures: All children with bowel and sleep abnormalities improved with treatment, according to parent questionnaires. None of the group who did not receive treatment had improvement. The parent descriptions of the improvement follow in table 2.

Table 2

	BEFORE	AFTER
CM	Constipation: BM 0-3x/wk	BM regularly q.o.d.
LH	Undigested food in stool 2x/wk Falls asleep very late	Normal stool Goes to sleep at a normal time
JG	Bowels loose Nightly night terrors & sweats	Bowels normal No waking up at night
GZ	Constipation: frequent Sleep: awake till midnight or after 3 a.m. 2-4nights/wk	Constipation: rare Sleeps most nights at reasonable bedtime, still can wake early
TJ	Sleep: awake 2-3nights/wk till 3 a.m.	Sleeps every night through
AG	Constipation: BM every three days Awake for 2 hrs at bedtime	BM every other day Falls asleep easily

BA	Diarrhea 3x/d 5d/wk	No more diarrhea
AG	Loose stools	Normal formed stools

DISCUSSION

Western physiology considers the organs of touch-- the tongue, lips, skin and mucous membrane lining the orifices-- to be the largest and most important sensory organs, having the largest representation in the brain of all the senses. Should the child be deprived of touch early in development, the brain will not develop properly (Cole, 1999) and the child will not initiate social behavior (Montagu, l986). Pleasurable touch initiates the social response, and painful touch does the opposite.

For Chinese Medicine, the sense of touch is connected directly to the mind, and impairment of the energy flow in the channels connected to touch will impair the proper growth and development of the mind. In a similar way, the remaining senses and proprioception also connect to and enrich the mind. According to a model for autism derived from an understanding of Chinese medicine (Cignolini 2002), autism belongs to a classification of illnesses called “closure of the orifices”, “the orifices” being the sensory channels through which exteroceptive and proprioceptive sensory information is conveyed to the brain and the way through which information arrives from the acupuncture channels. This information forms the cognitive processes and activates the working and long-term memory. The distorted sensitivity of one or more of the sensory channels accounts for the many different hyper- and hypo-reactions of autistic children in

response to touch, pain, noise, taste, olfactory and visual stimuli; the abnormal behaviors of autism represent the child's response to this complex situation.

According to this model, treatment aims at removing the impairment of the sensory channels. As the impairments are removed, the child becomes aware of his/her environment, sensory information can be received and processed into social, cognitive and emotional memory, and normal learning and development can resume or start anew. At the same time, the child's aversive behaviors in response to distorted sensory stimuli decrease and normal responses to touch, sound, taste, et cetera, become possible.

In this study, initial testing showed participating children to have different combinations of sensory impairment, as well as delays in social development. With treatment, tests showed a normalization of the impairment of all five senses, along with an increase in the domains of social learning and living skills learning.

At the beginning of the study, video recordings documented each child's response to touch on different areas of their body. Each child had areas where they rejected gentle touch, as well as areas to which they did not respond, or responded with pleasure. These areas corresponded to acupuncture channels where the flow of energy was either impaired (rejection or non-response) or free-flowing (pleasure). As the treatment progressed, rejection of touch disappeared. We observed some cases where at the precise moment the child ceased to reject touch of an area, and began to enjoy it, he or she initiated social interaction with the treating physician or the parent in the room: eye contact, smiling, laughing, even verbal interaction. It seemed to give immediate validation to the thesis that at least part of what was standing in the way of social interaction for these children was their sensory impairment.

With the normalization of the child's response to touch, all the sensory impairments began to lessen and parents reported improvement in such things as the child eating a wider variety of food, and not being bothered by noises in the house. It seemed that the children were able to return to an earlier stage of normal development, where they could, over a period of time, establish, exercise and strengthen themselves as social beings. The parent began reporting that the child was now becoming more social at home -- for example playing with siblings for the first time -- and the Vineland Adaptive Behavior Scales ultimately indicated that the children were progressing in social development and living skills.

Both the treated and the control groups showed a decrease in their autistic behaviors, without a statistically significant difference between the groups. Both groups participated in the Oregon Early Intervention program, and we feel that the decrease reflects very favorably on the quality of this educational program and staff.

Likewise, both treated and control groups received speech and language therapy in their Early Intervention programs, and both groups improved in language skills, without a statistically significant difference between the groups. Because of the complexity of language, and the requirement that the child's social behavior and skills come together uniformly in order for language to develop properly, an observation period longer than five months may be required for treated children to develop statistically significant improvement in language.

All the improvements in bowel function and in sleep occurred shortly after the institution of therapy. In the West, we are largely unaware that massage of the

acupuncture channels can have a rapid and beneficial effect on bowel function and sleep; however, in the East these disorders are widely and successfully treated with massage.

The authors recognize that, while the measurement instruments used in this study are well validated, some are based on parent questionnaires and the results may therefore be subject to parent bias. However, with the average social age of the children in the study being 24 months, we felt that any changes in social behavior would appear first in the home with the parents, and we wanted to capture these. In addition, the authors are fully cognizant that the small numbers in this study require elaboration and replication. At the present time, planning is underway for a larger, longer-term study of this methodology, including validation of results with third-party observation.

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