



Effects of Massage and Attachment Promotion Program on Social Maturity, Child Autism and Attachment of Children with Autism and Their Mothers*

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= Abstract =

Purpose: The aims of this study were to evaluate effects of massage therapy and the attachment promotion program with autistic children. **Method:** A quasi-experimental design was conducted with a convenience sample of 44 autistic children. The experimental group (n= 23) attended the massage therapy and the attachment promotion program for 4 months. The control group (n=21) only had the attachment promotion program. Measurements were made twice for both groups using the social maturity scale and child autism rating scale. Recording of mother-child attachment was done for 15 minutes in only the experimental group twice using video equipment. **Results:** After 4 months of interventions, there was significant difference on social maturity ($F=9.01$, $p=.005$) between the groups. However, there was no significant difference on CARS ($F=2.47$, $p=.124$). The total scores of mother-child attachment between pre- and post-interventions showed a significant difference ($Z=-3.42$, $p=.001$). **Conclusion:** The results showed that massage therapy and the attachment promotion program might be an effective way for providing a chance to increase social maturation and to increase attachment between mother and autistic child.

Key words : Massage, Attachment Promotion, Autistic disorder

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Introduction

The attachment process is characterized by the seeking and keeping of closeness; the reciprocity of verbal and non-verbal exchanges as well as feeling that are generally positive(Howe, 2006). The behavioral goal of parent-child attachment is seeking toward or maintaining proximity. Seeking and maintaining proximity arouse feelings of love, security and joy. Within the affective exchanges between parents and children, children begin to build up an understanding of how their own and other people's minds work at the emotional, intentional and behavioral level, and how these mental states affect social interaction and relationships(Hong, 1993).

The social deficit of the autistic child is basic and serious qualitatively as well as quantitatively. Autistic children rarely initiate behaviors that actively engage others in social interactions. The profound social disability of autistic children affects their capacity to understand other people, initiating feelings, and establishing reciprocal relationships(Howe, 2006). So, children with autism do not show normal attachment behavioral abilities that involve social interaction, social cognition, emotional reciprocity, and mutual play(Hong, 1993).

Hong(1993) suggests that attachment promotion is one of important factors for social development with autistic children. Im(1997) and Oh(2002) also reported that improvement of social maturity and autistic behavior of autistic children depends largely on promotion of attachment. One of interventions for improving attachment and decreasing autistic behaviors that has only recently been explored with autistic children is massage therapy(Escalona, Field, Singer-Strunck, Cullen, & Hartshorn, 2001).

Field et al.(1997) reported that with massage therapy autistic children decreased off-task behavior and attention to irrelevant sounds and showed less autistic behaviors(orienting to sounds and stereotypic behaviors) and improved social relating as measured on the Autism Behavior Checklist and the early Social Communication Scales. Escalona et al.(2001) also suggested that the autistic children in the massage group exhibited more on-task and social relatedness behavior and a great decrease in the frequency of stereotypical behaviors during play observation at school. The studies with autistic children suggest that massage therapy enhanced the emotional bonding and attachment between mother and child(Cullen-Powell, Barlow, & Cushway, 2005a, 2005b), improved autistic

behaviors and social behaviors(Escalona et al., 2001; Field et al., 1997).

Massage may promote the autistic child's response to social stimulation, which, in turn, could facilitate the attachment with the mother. Through improving attachment and response to other's stimulation, the social behavior of the autistic child also may be better and finally show declines of autistic behaviors (Field et al., 1997).

Although a number of studies have been done on the effects of massage, there is little research on the effects of massage between mothers and children with autism. This study hypothesized that the autistic children in the experimental group who were participated in the attachment promotion program and massage therapy would have higher social maturation and a lesser degree of child autism than those in the control group who only were participated in the attachment promotion program. After attending massage therapy and the attachment promotion program, the autistic children in the experimental group would show better mother-child attachment than before attending massage therapy and the attachment promotion program.

Methods

Design and Sample

This study were an nonequivalent control group pretest-posttest design on social maturity and degree of autism and an one-group pretest-posttest design on mother-child attachment. Participants(mother-child dyads) were recruited from the attachment promotion program at the S University Hospital. All children were conveniently sampled from children who were diagnosed as having a pervasive developmental disorder(autism) by the psychiatrists. Aside from their autism, all of these children had normal medical examinations, which included neurological assessment and electroencephalogram(EEG). None of these children was taking medication. The study protocol and consent form were approved by the Review Board of child-psychiatry at the University hospital. Consents were obtained from all the mothers who attend this study with their autistic child.

The S University hospital has been started the attachment promotion program 10 years ago and always collected the data of social maturity and the degree of autism at the beginning

and the ending the program. So, this study used the data for the control group that the hospital had been collected before beginning this study. The experimental group attended the attachment promotion program and massage therapy for 4 months. However, the control group did not have the massage therapy, only the attachment promotion program for 4 months. For the experimental group, there were 25 children and there were 23 children in the control group at the beginning of the study. Four children were eliminated from this study because they did not complete the attachment promotion program and (or) massage therapy. Therefore, the data for 44 children (experimental group, $n=23$ and control group, $n=21$) were analyzed. Sample size calculations using two-group comparison measures to show a significant effect of massage therapy and the attachment promotion program with $\alpha = .05$, power $= .70$, effect size $= .40$, and $u=1$ needed a sample size of 20 per group (Lee, Im, & Park, 1998).

Intervention procedures

● Massage therapy

The experimental group had the massage therapy every Wednesday that lasted for one hour at the end of the attachment promotion program for that day. Two nurses (who managed the attachment promotion program) were trained according to the procedures developed by Field et al. (1997), and taught the techniques for massage. The nurses told the mothers that the massage procedure could be modified according to the child's response to avoid a negative reaction. The children took off their clothes or fully clothed (except for the removal of shoes and socks), their entire body was rubbed using moderate pressure and smooth stroking movements. Throughout the massage period, the mother tried to engage the eye-to eye contact and talk or sing with her child. The nurses demonstrated the massage strokes on a doll, while the mother worked with her own child. The experimental group agreed to provide massage to their child 3 days a week at home for the 4 month period. All mothers of the experimental group received forms and were asked to record whether or not they provided massage to their children. To confirm compliance, the records were checked weekly when the experimental mothers participated the massage therapy.

● The attachment promotion program

The attachment promotion program was held for the children of experimental and control groups for 4 months. The autistic children and their mothers attended the attachment promotion program 5 days per week, which lasted for 2 hours per day. Two nurses managed this program. This program consisted of play activities centered mother-child interactions, educational activities for the mothers in the form of lecture, video-feedback session, brief-feedback time, and other supportive activities.

Instruments

● Social Maturity Scale

The total number of items on the Korean Vinland Social Maturity Scale (Kim & Kim, 1977) is 120. However, 57 items were used to evaluate the level of social maturation because these items were developed to evaluate children less than 5 years old. The items of the scale with a pass-fail scale represent progressive maturation in the self-help (30 items), self-direction (1 item), locomotion (6 items), occupation (8 items), communication (6 items) and social relation (6 items). The scoring judgment was done through observation and interview by the psychiatrist and the nurse. The social maturity scale was measured two times at the beginning and the ending of the attachment promotion program.

The results from the sum of items passed by a given child are reduced to social age scores by the interpolation according to the social year score values. The social age scores are converted to the social maturation quotient. Calculation of the social maturation quotient is done by dividing the child's social age score by his chronological life age and multiplying by 100. One hundred interpreted that a given child has the normal average social maturation compared to one's chronological life age. The Cronbach's alpha was .86 at pre-intervention and .95 at post-intervention for social maturity scale.

● Childhood Autism Rating Scale (CARS)

The degree of child autism was measured two times for all participants when the attachment promotion program began and finished. The psychiatrists assessed the degree of autism with CARS (Schopler, Reichler, Devellis, & Daly, 1980) which is made up of 15 items. The psychiatrist assigned a score of 1 to 4 for each item: 1 indicated that the child's behavior is within normal limits for his or her age, 1.5 scored slightly

abnormal for his or her age, 2 for mildly abnormal, 2.5 for mild-moderately abnormal, 3 for moderately abnormal, 3.5 for moderate-severely abnormal, and 4 for severely abnormal behavior. The scores for the single items are added together into a total score, which classifies the child as not autistic (below 30), mild or moderately autistic(30-36.5) or severely autistic(above 36.5). The Cronbach's alpha was .94 at pre-intervention and .96 at post-intervention for CARS.

● Mother-Child Attachment

Mother-child attachment was measured two times only for the experimental group when the massage therapy and the attachment promotion program began and finished. Mother-child attachment was recorded for 15 minutes using video equipment in a room at the hospital. The indices of mother-child attachment were modified from Im's mother-child attachment scale(Im, 1997). The indices of attachment consisted of 26 items with a yes-no scale, which related proximity behaviors (18 items) and mutuality behaviors(8 items). Videotapes of the mother-child attachment were analyzed and scored by 2 treatment nurses. A time-sampling method was used, with 30-second observations followed by 30-second recording for the 15 minutes. A total mother-child attachment score was calculated by summing the time the child spent in each item. Higher scores indicate between mother and child has a better attachment. To maintain higher than 90% inter-rater reliability on the scoring of the mother-child attachment scale between the nurses, inter-rater reliability was calculated every 15 tapes. The inter-rater reliability for this study was .91.

Data analysis

The data were analyzed using the Statistical Package for

Social Science(SPSS) for Windows. Comparisons were first made to test the homogeneity of general characteristics by Chi-square test and Mann-Whitney U test. The homogeneity of social maturity and CARS was done by Mann-Whitney U test. The comparisons of social maturity and CARS between the two groups were done using ANCOVA. In the experimental group, mother-child attachment between pre- and post-interventions was analyzed by Wilcoxon Signed Rank test.

Results

Homogeneity of the Two Groups

Demographic characteristics of the two groups were shown in the <Table 1>. There were no significant differences in the participants; gender and developmental age in the children, and age in the mothers. All mothers have no jobs. However, chronological ages of the children($\chi^2=7.50$, $p=.006$) and education level of the mothers($\chi^2=4.86$, $p=.027$) were different.

Mann-Whitney U test was done to know for homogeneity of social maturity and CARS between the two groups in the <Table 2>. There was homogeneity of CARS($Z=-1.58$, $p=.10$) between the groups. However, social maturity was different ($Z=-2.56$, $p=.01$) between the two groups.

<Table 2> Homogeneity of social maturity scale and CARS between the two groups

	Experiment (n=23) M(SD)	Control (n=21) M(SD)	Z	p
Social maturity scale	63.13 (15.76)	51.24 (10.48)	-2.56	.01
CARS	44.31 (.57)	41.76 (5.07)	-1.58	.10

<Table 1> Homogeneity of general characteristics

			Experiment (n=23) n or M(SD)	Control (n=21) n or M(SD)	χ^2 or Z	p
Child	Gender	Male	20	18	.14	.905
		Female	3	3		
	Chronological age (Months)	~36	19	9	7.50	.006
		37~48	4	12		
	Development of age (yrs)	1.60(.38)	1.63(.36)	-.82	.410	
Mother	Age (yrs)	32.13(2.76)	33.85(3.08)	-1.76	.078	
	Education	High school	13	5	4.86	.027
		College or more	10	16		

Social Maturity and CARS

The chronological age of children, educational level of the mothers, and social maturity of children did not show homogeneity. However, the developmental age of children showed homogeneity and all mothers have no jobs and all mother always attended the attachment promotion program. Since the developmental age of children, mother' job, attendance of mother, and social maturity might influence on autistic behavior and the effects of massage and attachment(Im, 1997; Khilnani, Field, Hernandez-Reif, & Schanberg, 2003), the researcher tried to eliminate effects of social maturity by the statistical method. Because the influence of social maturity was removed with analysis of covariance, there was significant difference on social maturity($F=9.01$, $p=.005$) between the groups after finishing the massage therapy and the attachment promotion program in the <Table 3>. However, there was no significant difference on CARS($F=2.47$, $p=.124$).

Mother-Child Attachment

The means for mother-child attachment between pre- and post-interventions in the experimental group are shown in <Table 4>. The total scores for mother-child attachment in the experimental group increased from 49.78 to 77.43. Comparison of total scores for mother-child attachment showed a significant difference($Z=-3.42$, $p=.001$) between pre- and post-interventions. There were significant differences on child attachment($Z=-3.36$, $p=.001$) and mother attachment($Z=-3.05$, $p=.002$) between pre-and post-interventions. There were also significant differences for orienting behavior($Z=-3.08$, $p=.002$), proximity-seeking behavior($Z=-2.58$, $p=.010$), contact-maintaining behavior($Z=-2.83$, $p=.005$), discriminating behavior($Z=-2.96$, $p=.003$) and responsive behavior($Z=-3.25$, $p=.001$) in the total mother-child attachment scores between pre- and post-interventions in the experimental group.

Discussion

<Table 3> Comparison of social maturity scale and CARS between the two groups by ANCOVA

	Experiment (n=23) M(SD)	Control (n=21) M(SD)	F		F	
			Groups x social maturity scale	p	Groups	p
Social maturity scale	70.74(16.39)	52.86(10.18)	.04	.85	9.01	.005
CARS	37.74(7.49)	39.19(5.43)	1.19	.17	2.47	.124

Covariate : Social Maturity Scale at Pre-Interventions

<Table 4> Comparison of mother-child attachment at pre- and post-interventions in the experiment group

	Pre-Interventions	Post-Interventions	Z	p
Total mother-child attachment	49.78 (25.20)	77.43 (33.42)	-3.42	.001
Child attachment	43.04 (22.74)	67.65 (31.49)	-3.36	.001
Mother attachment	6.73 (3.53)	9.78 (3.43)	-3.05	.002
Proximity	28.73 (16.11)	44.04 (15.73)	-3.10	.002
Orienting behavior	13.39 (8.39)	20.09 (8.43)	-3.08	.002
Proximity-seeking behavior	9.65 (6.83)	14.35 (5.52)	-2.58	.010
Contact-maintaining behavior	5.69 (3.48)	9.61 (5.26)	-2.83	.005
Mutuality	21.04 (11.01)	33.39 (18.82)	-3.41	.001
Discriminating behavior	10.69 (8.41)	16.95 (8.34)	-2.96	.003
Responsive behavior	10.34 (4.29)	16.43 (12.17)	-3.25	.001

In this study, the autistic children who attended the massage therapy and the attachment promotion program significantly more increase social maturity than the children who only attended the attachment promotion program. Escalona et al. (2001), Field et al.(1997), and Khilnani et al.(2003) reported that the children who received massage therapy showed a greater decrease in stereotypical behaviors and a greater increase in on-task behavior on classroom observation. Also, the children who received massage therapy showed a greater decrease in the frequency of stereotypical behavior and a greater increase in social relatedness toward the teacher on playground observation. Silva and Cignolini(2005) and Silva and colleagues(2007) reported that the daily Qigong massage from the parents increased language motor skills and basic living skills. Kawk, Kang and Lee(2000) and Oh(2002) reported that children who participated in the attachment promotion program showed significant increase in their social maturity scores(the Korean Vinland Social Maturity Scale). Even children who participated in the attachment promotion program demonstrated negative behaviors to get the interest of others when the program started, but more than of the half children showed changes on 'knowing the social rules' and 'recognition to others(Im, 1997). Im(1997) suggested that recognizing other persons and knowing the social rules are basic elements to improve attachment with others. In the present study, the experimental group who were given massage therapy and attended the attachment promotion program showed a significant improvement in positive and adaptive behaviors such as self-help, self-direction, and socialization. Improvement in social behaviors will encourage appropriate behavior of autistic children for social interaction and attachment.

Because the social maturity at the beginning of this study did not show homogeneity between the two groups and the homogeneity of social maturity might influence on the CARS, statistical method was used to eliminate the effects of social maturity on CARS. However, there was not significant difference on CARS between the two groups. These results were not consistent with the results of Escalona et al.(2001) and Field et al.(1997). Even the assessment tools for degree of autism were not same tools with this study, Escalona et al. (2001) and Field et al.(1997) reported the massage group showed significantly greater improvement on autistic behaviors than the control group.

Im(1997), Kwak et al.(2000) and Oh(2002) found that the

attachment promotion program decreased the CARS scores for autistic children. Perry and colleagues(2005) described that CARS as one of the most widely used and useful measures in a variety of clinical settings, whereby decreases in CARS scores indicate positive response to treatment. They found a moderate negative correlation between CARS total scores and cognitive and adaptive levels. Lower functioning individuals tend to have higher(more severe) CARS scores. Even the number of moderate autistic child increased from 3 to 9 children in this experimental group after 4 months interventions, the control group only increased from 3 to 5 moderate autistic children. However, CARS scores in the experimental group did not significantly decrease more than those in the control group after completion of the interventions. These discrepancies between this study and the previous studies(Im, 1997; Kwak et al., 2000; Oh, 2002) were due to the length of intervention. The children of previous studies attended attachment promotion program for 6 months. However, in the present study, the children participated in only 4 months. This inconsistency suggested that there is necessary to repeat the study with a longer intervention period.

In this study, the total scores of mother-child attachment after finishing the interventions showed significantly increased than that of beginning the interventions in the experimental group. Cullen-Powell and Barlow(2002) and Cullen-Powell, et al.(2005a, 2005b) reported that autistic children became more socially responsive, lucid, and more communicative both verbally and non-verbally and made more eye contact after the massage therapy. The mothers of these children also demonstrated more appropriate physical contact, positive affect, and engagement of the child by directing vocalizations and being more aware of the child's vocal and behavioral cues after the massage therapy. These researchers proposed that massage therapy can help facilitate the mother-child relationship and produce a more secure attachment. Solomons(2005) also reported the autistic children showed increased attention behavior such making eye contact and offering their hands to the massage therapist. In addition to these behaviors, an increase in pleasurable facial expressions and vocalization were found after aromatherapy. Like the results of Solomons(2005), in the present study, there were also a significant increase on proximity subscales, such as eye contact, responding to direction of adult's gaze resulting in shared attention, expressing attention to a person or an object by gaze after

finishing the interventions in the experimental group. The autistic children had significant increases on mutuality subscales, such as responding to the mother's talk or soothing, obeying orders from the mother, smiling or laughing when the mother approached, and expressing preference or interest. All children showed significant increases in the frequency of behaviors like physical proximity and mutual interaction with their mother after finishing the interventions in the experimental group. Im(1997) also reported that the children who attended the attachment promotion program showed significantly higher the total score of attachment than that of the children who did not attend the attachment promotion program. While the proximity behaviors, mutual behaviors and affectionate behaviors of the experimental group had more active, voluntary, and reciprocal responses, those of the control group were one-sided. The mother's nurturing behaviors of the experimental group were more increased than that of the control group. In the present study, the scores for mother's attachment significantly increased at the end of the massage therapy and attachment promotion program. The response of mother to the child's behavior(examples, sounds, laughing, and contact of the child), communication with the child, and awareness of the child's behavioral cues significantly increased between pre and post-interventions in the experimental group. These results show that the massage therapy and the attachment promotion program could enhance attachment between a mother and her child with autism.

Conclusion

In summary, over the period that the massage therapy and the attachment promotion program were applied to the autistic children showed increased social maturity scores and improved mother-child attachment. When the massage therapy finished most mothers in the experimental group wanted to share their feeling after giving massage to their child and the benefits of massage and to encourage other mothers to give massage to their child. So, nurses in child-psychiatry in any hospital should try to include massage therapy in their own programs (e.g. the attachment promotion program) to provide a chance to increase the bond and attachment between mother and autistic child.

The generalizations of these findings may be limited, because the sample was a non-random convenient sample,

which was used to collect the data. In addition, confounding variables such as the child's resources, mother's resources and support of family members could not be controlled(Im, 1997; Khilnani et al., 2003). It is possible that the responses given by the children during massage may have partly been due to having spent a lot of time with their mother rather than the massage itself. Because there is only one-group pre- and post interventions to compare mother-child attachment, the internal validity might be confounded by maturation effect of children and history effects. Future research using a randomized sample with comparable intervention-control group and including confounding variables over a longer period would be worth doing.

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