Massage Therapy for Children With Autism Spectrum Disorders: A Systematic Review

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Objective: We aimed to assess the effectiveness of massage as a treatment option for autism.

Data Sources: We searched the following electronic databases using the time of their inception through March 2010: MEDLINE, AMED, CINAHL, EMBASE, PsycINFO, Health Technology Assessment, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Psychology and Behavioral Sciences Collection, 6 Korean medical databases (KSI, DBpia, KISTEP, RISS, KoreaMed, and National Digital Library), China Academic Journal (through China National Knowledge Infrastructure), and 3 Japanese medical databases (Journal@rchive, Science Links Japan, and Japan Science & Technology link). The search phrase used was "(*massage* OR *touch* OR *acupressure*) AND (*autistic* OR *autism* OR *Asperger's syndrome* OR *pervasive developmental disorder*)." The references in all located articles were also searched. No language restrictions were imposed.

Study Selection: Prospective controlled clinical studies of any type of massage therapy for autistic patients were included. Trials in which massage was part of a complex intervention were also included. Case studies, case series, qualitative studies, uncontrolled trials, studies that failed to provide detailed results, and trials that compared one type of massage with another were excluded.

Data Extraction: All articles were read by 2 independent reviewers (M.S.L. and J-I.K.), who extracted data from the articles according to predefined criteria. Risk of bias was assessed using the Cochrane classification.

Results: Of 132 articles, only 6 studies met our inclusion criteria. One randomized clinical trial found that massage plus conventional language therapy was superior to conventional language therapy alone for symptom severity ($P < .05$) and communication attitude ($P < .01$). Two randomized clinical trials reported a significant benefit of massage for sensory profile ($P < .01$), adaptive behavior ($P < .05$), and language and social abilities ($P < .01$) as compared with a special education program. The fourth randomized clinical trial showed beneficial effects of massage for social communication ($P < .05$). Two nonrandomized controlled clinical trials suggested that massage therapy is effective. However, all of the included trials have high risk of bias. The main limitations of the included studies were small sample sizes, predefined primary outcome measures, inadequate control for nonspecific effects, and a lack of power calculations or adequate follow-up.

Conclusions: Limited evidence exists for the effectiveness of massage as a symptomatic treatment of autism. Because the risk of bias was high, firm conclusions cannot be drawn. Future, more rigorous randomized clinical trials seem to be warranted.

J Clin Psychiatry 2011;72(3):406–411

Submitted: *November 23, 2009; accepted May 3, 2010.*
Online ahead of print: *December 28, 2010 (doi:10.4088/JCP.09r05848whi).*
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Autism is a serious developmental disorder that often proves difficult to treat. Commonly used therapies include speech-language therapy, applied behavioral analysis, and medication such as antidepressants, antipsychotics, and stimulants.[1] A wide range of complementary and alternative medicine approaches are used, including biologically based therapies, mind-body interventions, and manipulations.[2]

Massage therapy can be defined as a means of manipulating soft tissues using pressure and traction.[3] There are many variations on the theme, and most cultures have developed their own techniques. A recent survey suggested that 11% to 16% of all autistic patients used massage.[4,5] Massage affects both the psychological and the physiologic state of the recipient.[6-8] The objective of this systematic review was to summarize and critically assess the evidence for or against the effectiveness of massage as a symptomatic treatment for autism.

METHOD

Data Sources

The following electronic databases were searched from their inception through March 2010: MEDLINE, AMED, CINAHL, EMBASE, PsycINFO, Health Technology Assessment, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Psychology and Behavioral Sciences Collection, 6 Korean medical databases (KSI, DBpia, KISTEP, RISS, KoreaMed, and National Digital Library), China Academic Journal (through China National Knowledge Infrastructure [CNKI]), and 3 Japanese medical databases (Journal@rchive, Science Links Japan, and Japan Science & Technology link). The search phrase used was "(*massage* OR *touch* OR *acupressure*) AND (*autistic* OR *autism* OR *Asperger's syndrome* OR *pervasive developmental disorder*)." In addition, we manually searched our own files and the journals *Focus on Alternative and Complementary Therapies* and *Forschende Komplementärmedizin und Klassische Naturheilkunde*. The references in all located articles were also searched. Dissertations and abstracts were included. No language restrictions were imposed.

Figure 1. Flowchart of Trial Selection Process

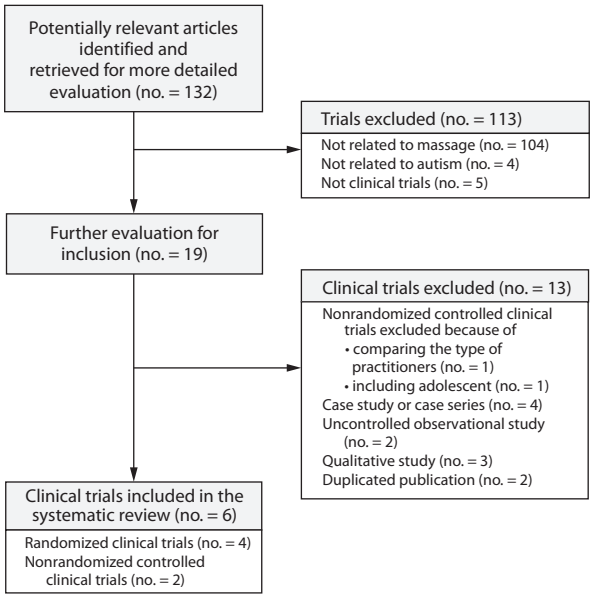

Table 1. Excluded Studies of Massage for Autism Spectrum Disorders

Study	Reason for Exclusion	Direction of Main Outcome
Blairs et al (2007)[10]	Case study (n = 1)	Positive
Regina-Whiteley (2005)[11]	Case series (n = 2)	Positive
Solomons (2005)[12]	Case series (n = 4)	Positive
Konno (2003)[13]	Case study (n = 1), qualitative	Positive
Kim (2007)[14]	Case study (n = 1), qualitative	Positive
Cullen and Barlow (2002)[15]	Uncontrolled qualitative study (n = 10)	Positive
Cullen-Powell et al (2005)[16]	Uncontrolled qualitative study (n = 14)	Positive
Silva and Cignolini (2005)[17]	Uncontrolled observational study (n = 8)	Positive
Williams (2006)[18]	Uncontrolled observational study (n = 12)	Positive
Silva et al (2008)[19]	Nonrandomized controlled clinical trial (n = 26) comparing 2 types of practitioner	Positive
Kim et al (2003)[20]	Nonrandomized controlled clinical trial (no specific data, n = 8), adolescent	Positive

Study Selection

All prospective controlled clinical studies of any type of massage therapy for autistic patients were included. Trials in which massage was part of a complex intervention were also included. We excluded case studies, case series, qualitative studies, and uncontrolled trials. Trials that compared one type of massage with another type and studies that failed to provide detailed results were also excluded.

Data Extraction and Quality and Validity Assessment

All articles were read by 2 independent reviewers (M.S.L. and J-I.K.), who extracted data from the articles according to predefined criteria, including design, sample size, diagnostic criteria, interventions, main outcome measures, results, and authors' conclusions. The risk of bias was assessed using the Cochrane classification.[9] Disagreements were resolved through discussion between the 2 reviewers (M.S.L. and J-I.K.).

RESULTS

A total of 132 articles were located, and 113 were excluded for reasons given in Figure 1. Eleven articles were excluded for the reasons listed in Table 1.[10–20] The remaining 6 studies consisted of 4 randomized clinical trials[21–24] and 2 nonrandomized controlled clinical trials.[25,26] Key data from the included studies are summarized in Table 2.

Details of Included Studies

Zhou and Zhang[21] investigated the effect of acupoint massage on communication attitude and symptom severity. Thirty patients were randomized into 2 groups: one group received massage on selected acupuncture points and the face plus language therapy (n = 16), and the other group received language therapy only (n = 14). After 4 months of treatment, the response rate (symptom severity) and communication attitudes were significantly better in the massage group than in the control group (see Table 2).

Silva et al[22] assessed the effectiveness of massage on the sensory profile, the Vineland Adaptive Behavior Scales, and the Autism Behavior Checklist. Fifteen participants were randomized into 2 groups: one group received qigong massage plus a special education program (n = 8), and the other group received the special education program (n = 7) with a partial crossover design. At the end of the treatment period, the sensory profile and Vineland Adaptive Behavior Scales, including daily living skills and socialization, were improved in the massage group, while the Autism Behavior Checklist did not differ between the groups.

Silva et al[23] replicated and extended their earlier study with a larger sample size. Outcome measures were the Pervasive Developmental Disorders Behavior Inventory done by teachers and parents, the Sense and System Checklist, and the Autism Behavior Checklist. Forty-six patients were randomly allocated to receive either qigong massage plus a special education program (n = 25) or the special education program only (n = 21). After 20 treatments over 5 months, there were significant group differences in the Autism Behavior Checklist, the Sense and System Checklist, and some subscales of the Pervasive Developmental Disorders Behavior Inventory, including maladaptive behavior, language and social abilities, and the autism composite (see Table 2).

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Table 2. Summary of Clinical Studies of Massage for Autism Spectrum Disorders

Study	Country	Design	Risk of Bias[a]	Sample Size (randomized/ analyzed)	Age, y	Diagnostic Criteria	Intervention (regimen)	Control Intervention (regimen)	Main Outcome Measures	Intergroup Differences	Authors' Conclusion
Zhou and Zhang (2008)[21]	China	RCT, parallel	U,U,N,U,U	30/30	2–10	Not reported	(A) Massage (acupoint and face, 45 min, 5 times weekly for 4 months, n = 16), plus (B); practitioner	(B) Conventional language therapy (n = 14)	(1) Response rate (2) Communication attitude	(1) $P < .05$ (2) $P < .01$	"Language therapy combined with point massage is effective for communion disability in autism children" (p 24)
Silva et al (2007)[22]	United States	RCT, partial crossover	U,Y,N,Y,U	15/15	2–6	*DSM-IV*	(A) Massage (qigong, 60–80 min [1 session: 2 times weekly for 5 weeks by practitioner plus once daily by parents for 5 weeks], total 2 sessions, n = 8), plus (B); practitioner and parents	(B) Special education program (n = 7)	(1) Sensory profile (2) Vineland Adaptive Behavior Scales (3) Autism Behavior Checklist	(1) $P < .01$ (2) Daily living skill, $P = .02$; socialization, $P = .04$ (3) Not significant	"Treated children experienced significant improvement of their sensory impairment and … social skill and basic living skills" (p 393)
Silva et al (2009)[23]	United States	RCT, parallel	Y,Y,N,Y,U	46/43	2–6	Not reported	(A) Massage (qigong, time not reported, total 20 times over 5 months by practitioner and once daily by parents, n = 25), plus (B); practitioner and parents	(B) Special education program (n = 21)	(1) Pervasive Developmental Disorders Behavior Inventory (2) Autism Behavior Checklist (3) Sense and System Checklist	(1) Maladaptive behavior: teacher, $P = .133$; parents, $P = .0003$; Language and social abilities: teacher, $P = .010$; parents, $P = .007$; Autism composite: teacher, $P = .052$; parents, $P = .001$ (2) $P = .003$ (3) $P = .0002$	"Qigong Sensory Training intervention reduces the severity of autism" (p 430)
Field et al (1997)[24]	United States	RCT, parallel	U,U,N,Y,U	22/22	Mean, 4.5	*DSM-III-R*	(A) Massage (touch type, 15 min, 2 times weekly for 4 weeks, total of 8 sessions, n = 11); volunteer student	(B) Attention control (play game: selecting different color/ form/shape toys, 15 min/d per 2 days weekly for 4 weeks, n = 11)	(1) Classroom observations (2) Autism Behavior Checklist (3) Early Social Communication Scales	(1) Touch aversion, not significant; off-task behavior, not significant; orienting to irrelevant sounds, $P < .05$; stereotypical behaviors, $P < .05$ (2) $P < .05$ (3) Joint attention, $P < .05$; behavior request, $P < .05$; social interaction, $P < .05$	"Touch therapy may have contributed to … fewer autistic behaviors … and improvement on social relating" (pp 337–338)

(continued)

Table 2 (continued). Summary of Clinical Studies of Massage for Autism Spectrum Disorders

Study	Country	Design	Risk of Bias[a]	Sample Size (randomized/analyzed)	Age, y	Diagnostic Criteria	Intervention (regimen)	Control Intervention (regimen)	Main Outcome Measures	Intergroup Differences	Authors' Conclusion
Escalona et al (2001)[25]	United States	CCT, parallel	N,U,N,U,U	20/16	3–6	*DSM-III-R*	(A) Massage (touch type, 15 min, 2 times weekly for 4 weeks, total of 8 sessions, n = 10); parents	(B) Reading story book (n = 10), volunteer student sat with the children on her lap	(1) Revised Conners Scales (2) Behavioral observation (3) Sleep	(1) Teacher's rating: emotional index, $P < .05$; *DSM-IV* criteria for inattentiveness, $P < .05$. Parents' rating: ADHD index, $P < .05$; restless-impulsive behavior, $P < .05$; *DSM-IV* criteria for inattentiveness, $P < .05$ (2) Observation behavior: stereotypical behaviors, $P < .05$; on-task behavior, $P < .05$. Playground observation: stereotypical behaviors, $P < .05$; social relatedness, $P < .05$ (3) Not significant	"Children in the massage group exhibited less stereotypic behavior and showed more on-task and social relatedness behavior during play observation at school and they experienced fewer sleep problems at home" (p 513)
Lee (2008)[26]	Korea	CCT, parallel	N,Y,N,N,U	48/44	1–3	Not reported	(A) Massage (touch type, 60 min, once weekly for 4 months, and 3 times weekly home-based massage for 4 months, n = 25), plus (B); practitioner and parents	(B) Attachment promotion program (n = 23)	(1) Social Maturity Scale (2) Childhood Autism Rating Scale (3) Mother-child attachment	(1) $P = .005$ (2) Not significant (3) Not reported (the value of control)	"Massage therapy … might be an effective way for providing a chance to increase social maturation and to increase attachment between mother and autistic child" (p 14)

[a]Risk of bias: (1) sequence generation, (2) incomplete outcome measures, (3) patient blinding, (4) assessor blinding, (5) allocation concealment; Y = low risk of bias, N = high risk of bias, U = unclear.
Abbreviations: ADHD = attention-deficit/hyperactivity disorder, CCT = nonrandomized controlled clinical trial, RCT = randomized clinical trial.

Field et al[24] investigated the effect of massage on classroom observations, the Autism Behavior Checklist, and the Early Social Communication Scales. Twenty-two patients were randomized into 2 groups: one group received touch-type massage (n = 11), while the other group was an attention (play game) control (n = 11). After 4 weeks, there were significant intergroup differences in classroom observations including orienting to irrelevant sounds and stereotypical behavior, the Autism Behavior Checklist, and the Early Social Communication Scales in subscales such as joint attention, behavior request, and social interaction (see Table 2).

Escalona et al[25] tested the effects of massage on autism in a nonrandomized controlled clinical trial. Twenty participants were allocated into 2 parallel groups: touch-type massage (n = 10) or storybook reading group (n = 10). After 4 weeks, behavior observations according to the revised Conners Scales significantly favored the massage group over the control group (see Table 2). No differences were noted in sleep patterns between the 2 groups.

Lee[26] assessed the effectiveness of massage on the Social Maturity Scale, the Childhood Autism Rating Scale, and mother-child attachment. Forty-eight participants were nonrandomly divided into 2 groups: one group received touch-type massage (massage by practitioner and home-based massage by parents) plus an attachment promotion program (n = 25), and the other group received the attachment promotion program only (n = 23). After 4 months, the Social Maturity Scale favored the massage group, while the Childhood Autism Rating Scale did not differ between the groups.

DISCUSSION

Few rigorous trials have tested the effectiveness of massage for autism. These provide suggestive evidence for the effectiveness of massage as an adjunct to various conventional interventions in treating symptoms of autism. However, the total number of randomized clinical trials is low, and the risk of bias is high.

Of the 6 included studies, 3 randomized clinical trials[22–24] employed assessor blinding, and only 1 randomized clinical trial[23] adopted appropriate random sequence generation. All of the included trials also suffered from a lack of adequate allocation concealment

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and sufficient sample size to draw meaningful conclusions. Trials with inadequate blinding and inadequate allocation concealment are likely to show exaggerated treatment effects.[27,28] Small trials may also overestimate treatment effects by about 30%.[29] None of the studies had a power analysis. None of the included trials employed an intention-to-treat analysis, so bias may have occurred because we see results only for patients in whom the treatment worked.[29] Two[25,26] of the 6 studies in this review were nonrandomized controlled clinical trials, which are open to selection bias that can lead to false-positive results. Four studies had prior hypotheses that justify selection of outcome measures.[23–26] The main limitations of the included studies were small sample sizes, predefined primary outcome measures, inadequate control for nonspecific effects, and a lack of power calculations or adequate follow-up.

Three randomized clinical trials demonstrated the superiority of massage plus conventional language or special education programs for children with autism compared with conventional language or special education programs alone.[21–23] However, due to their design (A + B versus B), these randomized clinical trials are unable to demonstrate specific therapeutic effects of massage.[30] Another randomized clinical trial[24] also reported favorable effects of massage on behavior. This trial compared massage with playing games, which is an inappropriate control to demonstrate treatment efficacy. Two nonrandomized controlled clinical trials[25,26] found that autism symptoms were significantly improved by massage as compared to the control intervention. These findings could result from nonspecific effects. Four studies,[22,23,25,26] in which parents provided additional home-based massage, had additional unmeasured help provided to parents who would know treatment condition. This unaccounted-for help threatens the validity of these results.

The uncontrolled observational studies, case studies, and qualitative studies also suggest that massage improves symptoms of autism.[10–20] However, these data are highly susceptible to bias, and, hence, they provide little useful information on the value of massage as a therapeutic intervention for autism.

This systematic review has several limitations. Even though our searches were extensive, we cannot be certain that all relevant trials were located. The distorting effects of publication bias and location bias on systematic reviews and meta-analyses are well documented.[31,32] Further limitations include the paucity and often suboptimal quality of primary data. However, it should be noted that design features such as use of placebos and blinding are difficult to incorporate into studies of massage and that research funds for massage are scarce.

Future randomized clinical trials of massage for autism should adhere to accepted methodological standards. The reviewed studies have a number of problems, eg, expertise of practitioners, the pluralism of massage, frequency and duration of treatment, employing validated primary outcome measures and adequate statistical tests, and heterogeneous comparison groups. Even though it is difficult to blind subjects to treatment, employing assessor blinding and allocation concealment is important for reducing bias.

In conclusion, our systematic review provides limited evidence for the effectiveness of massage as a symptomatic treatment of autism. However, the risk of bias in the primary data is high, and firm conclusions cannot be drawn. Future rigorous randomized clinical trials seem warranted.

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Potential conflicts of interest: None reported.
Funding/support: Dr Lee was supported by the Korea Institute of Oriental Medicine (K10251).

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