Clinical Observations

Acupuncture Combined with Music Therapy for Treatment of 30 Cases of Cerebral Palsy

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Objective: To observe clinical therapeutic effects of acupuncture combined with music therapy for treatment of cerebral palsy. Methods: Sixty children with cerebral palsy were randomly divided into an acupuncture group (Group Acup.) and an acupuncture plus music group (Group Acup. + M). Simple acupuncture was applied in Group Acup., and acupuncture at 5 groups of points plus music were applied in Group Acup. + M. The treatment was given once every two days with 3 treatments weekly, and 36 treatments constituted a therapeutic course. Therapeutic effects including movement improvement were observed for comparison after 3 courses of treatments. Results: The comprehensive functions were elevated in both groups, and the total effective rate in Group Acup. + M was obviously better than that in Group Acup. (P<0.05). Movement functions were also improved in both groups, but the differences in improvement of creeping and kneeling, standing, and walking were significant between the two groups (P<0.01), showing the effect in Group Acup. + M was better than that in Group Acup.. Conclusion: The therapy of acupuncture plus music gained better therapeutic effect on cerebral palsy than simple acupuncture, which provided new thoughts for treating the disease by comprehensive therapies.

Key words: acupuncture; musical therapy; cerebral palsy; comprehensive function

Cerebral palsy (CP) is a mostly encountered syndrome with cerebral functional disorder in children, which is either a congenital disease, or a disease developed at the perinatal stage. Epidemiological studies have shown that its incidence varies in different countries and regions with about over 2% in living babies.1 Investigations made in China in 1998 showed that there were 310000 children suffering from CP of the age ranging from 0 to 6 years, accounting for 1.86%, and the cases were increasing by 46000 per year.2 Clinically, multiple and integrated treatments have been applied to treat defects and promote various functions for living, so as to make them get into the society with ability of independent living. The authors have treated 30 children with CP by acupuncture plus music, and compared its effect with those treated by simple acupuncture. The results are reported as follows.

CLINICAL MATERIALS

Criteria for Diagnosis
According to the criteria set in National Conference of Cerebral Palsy held in Kunming of Yunnan Province in 2004,3 the cases in accord with the following situations were diagnosed: non-progressive symptoms occurring at the infantile stage with central motor dysfunction or abnormal posture and maybe with complication of epilepsy.

Criteria for Case Inclusion and Exclusion
The cases under the age of 14 years in accord with the above-mentioned criteria with their parents’ signing in the informed consent were included in this study. The cases with severe organic diseases, acute or chronic infectious diseases and coagulation disorder, severe visual and auditory dysfunctions, progressive cerebral diseases, such as brain neoplasms, moyamoya disease etc., and some other
cases with the same abnormal motor dysfunctions as CP, but actually with such hereditary diseases as 21, trisomy 21 syndrome, and those with interruption of their treatment within 3 months were excluded.

**General Data**
Sixty children with CP, who were in accord with the above-mentioned criteria for case inclusion and treated by acupuncture in the Department of Acupuncture, Shenzhen TCM Hospital were randomly divided into an acupuncture group (Group Acup., 30 cases) and an acupuncture plus music group (Group Acup. + M, 30 cases). Of the 30 cases in Group Acup., including 12 boys and 18 girls under 14 years in age (mean 8.65±2.76 years), 4 cases were flaccid in type and 18 cases were in spastic type, 2 cases were complicated with epilepsy, 1 case with optical internal strabismus, 3 cases with strephenopodia, and 2 cases with language disorders. Of the 30 cases in Group Acup. + M, including 14 boys and 16 girls under 14 years in age (mean 8.48±3.29 years), 5 cases were flaccid in type and 16 cases were in spastic type, 2 cases were complicated with epilepsy, 2 case with optical internal strabismus, 2 cases with strephenopodia, and 3 cases with language disorders. There were no significant statistic differences in general conditions between the two groups (P>0.05), showing their comparability.

**METHODS**

**Methods of Treatment**
Simple acupuncture was applied in Group Acup., and acupuncture combined with music applied in Group Acup. + M.

1. Acupuncture treatment:
The following groups of combined three points were used: *Sishengzhen* (Four Mind Points 四神针, the four points being anterior, posterior, medial and lateral to Baihui (GV 20) with 1.5 cun apart from it); bilateral *Niesanzhen* (Three temple points 额三针, one point being 2 cun directly above the ear apex within the hairline and another two being 1 cun anterior and posterior to the first one, six needles in all bilaterally.); *Naosanzhen* (Three Brain Points 脑三针) including Naohu (GV 17) and bilateral Naokong (GB 19); *Zhisanzhen* (Three Intelligence Points 智三针) including Shenting (GV 24) and bilateral Benshen (GB 13); *Shousanzhen* (Three Hand Points 手三针) including Quchi (LI 11), Waiguan (TE 5) and Hegu (LI 4); *Shouzhizhen* (Hand Intelligence Points 手智针) including Neiguan (PC 6), Shenmen (HT 7) and Laogong (PC 8); *Zuzhizhen* (Foot Intelligence Points 足智针) including Yongquan (KI 1), Quanzhong, and medial Quanzhong; *Zusanzhen* (Three Foot Points 足三针) including Zusani (ST 36), Sanyinjiao (SP 6) and Taichong (LR 3). Auxiliary points selected according to differentiation of syndromes were as follows: Jiexi (ST 44), Taixi (KI 3), Kunlun (BL 60), Bafeng (EX-LE10) and quick needling at into Weizhong (BL 40) were added for the cases with paralyzed lower limbs; Baxie (EX-UE9) added for those with hand dysfunction, unilaterial or bilateral Lianquan (CV 23) added for those with language disorder, asophia, dysphagia and salivation; Yangbai (GB 14), Taiyang (EX-HN5), Jingming (BL 1) and Sibai (ST 2) on the affected side were added for those with strabismus; pricking needling cervical Jiaji points was made for those with feeble neck; pricking needling Jiaji points was made for those with lumbar debility; Ermen (TE 21), Tinggong (SI 19), Tinghui (GB 2) and Yifeng (TE 17) were added for those with hearing disorders; Dingshen (Sedation) I, 0.5 cun above Yintang (EX-HN3) and Dingsheng II (1.5 cun above the eyebrow, directly above the pupils when looking forward) were added for those with mental retardation or absence of mind; Shenmai (BL 62) and Zhaohai (KI 6) were added for those complicated with epilepsy. Assisted points selected according to differentiation of symptoms and signs were as follows: for the cases with congenital deficiency, deficiency of the liver and kidney, the points in the Governor meridian and bilateral Ganshu (BL 18) and Shenshu (BL 23) were used, and for those with malnutrition after birth with deficiency of the heart and spleen, Shangwan (CV 13), Zhongwan (CV 12), Xiawan (CV 10), Juque (CV 14), Qihai (CV 6) and bilaterall Tianshu (ST 5) were added, and for those
with obstruction induced by phlegm and stasis, and occlusion of the brain and orifice, Fenglong (ST 40) and Geshu (BL 17) were added.

30-guaged needles with 25 mm in length and 0.3 mm in diameter were used.

In the position either sitting by themselves or sitting on their parents' legs, acupuncture was applied in the following sequence: firstly, prompt pricking needling the points selected by differentiation of syndromes; secondly, needling Sishenzhen, Zhisanzhen, bilateral Niesanzhen, Naosanzhen, thirdly, needling acupoints in the upper limbs, and finally, needling acupoints in the lower limbs. Needle withdrawal was made in the same sequence as that of needle insertion.

Prompt pricking needling to the depth of 0.1–0.3 cun was used for the auxiliary points selected according to differentiation of syndromes without needle remaining. For the basic acupoints and those in the head, needles were inserted subcutaneously to the depth of 0.5–0.8 cun, and for the other points perpendicular insertion was made to the depth of 0.5–0.8 cun. By way of so called flying needling method, needles were inserted by rotating, and they were retained for 30 minutes, during which needles were rotated for 1 second for each point without applying reinforcing or reducing maneuver. The manipulation was given once every 10 minutes, and the needles were withdrawn after 3 times of rotation.

Needling was applied once every two days with three times weekly. Thirty-six treatments constituted a therapeutic course, and 3 courses of treatments were given.

2. Music intervention therapy:

During acupuncture treatment, nursery songs or rhymes were played with volume gradually increased. After acupuncture treatment, under the guidance of instructors and with the help of their parents, the children with CP participated in playing a musical instrument for children, such as beating a drum, knocking a stringed instrument, ringing a bell, beating a tube to generate one or two sounds, wearing hand-ringers, shaking egg-shaped hammers with sand inside, or wearing wrist-ringers. One or two items were chosen each time, based on their age, preference and symptoms, and appropriate adjustment was made according to their situation.

Musical treatment was given once every two days for 1 hour, including listening to music during acupuncture treatment for 30 minutes and participating musical activities for 30 minutes. Three times of musical treatment were given weekly. Thirty-six treatments constituted a therapeutic course, and 3 courses of treatment were given.

Indices for Observation

1. Scoring for comprehensive functions:
According to Comprehensive Functional Assessment Chart for Children with CP, 450 items were estimated. The ability of successful completion of each item was scored as 2, most completion scored as 1.5, half completion scored as 1, incompletion scored as 0.5 and failure as 0, with the total of 100. The total score was assessed before and after treatment by doctors.

2. Scoring for gross motor functions:
According to the Gross Motor Function Measure (GMFM), 580 motor indices were included, and they were divided into the following 5 functional aspects: 1) turning the body over by combination of supine and prone positions, surviving of primitive reflex and establishment of static reflex; 2) kneeling and creeping by combined four quatre positions; 3) sitting combined with balance reflex; 4) standing; 5) walking, running and climbing. Scores were evaluated as follows: no ability of completing the above-mentioned actions was scored as 0, that of completing the actions being <10% scored as 1, that being 10%–90% scored as 2, that being >90% scored as 3. The score in various functional aspects was estimated in the following way: the score obtained in the aspect tested / the total score of the functional aspects × 100%.

Criteria for Estimating Therapeutic Effects

Therapeutic effects were evaluated according to
Comprehensive Functional Assessment Chart for Children with CP. The increase of the total score by \( \geq 20\% \) was evaluated as markedly effective, that by \( 1\%–19\% \) as effective and no increase but decrease evaluated as failed. Training effects = (scores obtained after treatment – scores obtained before treatment) / the total score \( \times 100\% \).

Statistical Analysis
SPSS12.0 software was used for statistical analysis. Data comparison between two groups and that before and after treatment were made by using \( t \)-test, numeration data comparison made by using \( \chi^2 \) test, and ranked data comparison made by Ridit analysis.

RESULTS
Comparison of Therapeutic Effects
The total effective rate in Group Acup was 73.3\%, and that in Group Acup. ± M was 93.3\% with a significant difference between the two groups \((P<0.05)\), showing the latter was superior to the former.

<table>
<thead>
<tr>
<th>Group</th>
<th>Cases</th>
<th>Markedly effective</th>
<th>Effective</th>
<th>Failed</th>
<th>Total effective rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acup.</td>
<td>30</td>
<td>3 (10.0)</td>
<td>19 (63.3)</td>
<td>8 (26.7)</td>
<td>22 (73.3)</td>
</tr>
<tr>
<td>Acup. + M</td>
<td>30</td>
<td>4 (13.3)</td>
<td>24 (80.0)</td>
<td>2 (6.7)</td>
<td>28 (93.3)</td>
</tr>
</tbody>
</table>

Comparison of Scores for Gross Motor Function Measure (GMFM)
As shown in Table 2, before treatment there was no difference in motor function scores between two groups \((P>0.05)\), indicating their comparability. After 3 courses of treatment, motor functions in both groups were all obviously improved \((P<0.01)\). There were differences in improvement of motor functions between the two groups, showing more improvement in creeping, kneeling, standing and walking in Group Acup. + M than that in Group Acup. \((P<0.01)\), but no difference was found in the improvement of turning the body over from the prone position and in functional aspects in sitting position between the two groups \((P>0.05)\).

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Cases</th>
<th>Decubitus &amp; Turning over</th>
<th>Creeping and kneeling</th>
<th>Sitting</th>
<th>Standing</th>
<th>Walking, running &amp; Climbing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acup.</td>
<td>Before treat.</td>
<td>30</td>
<td>75.16±21.92</td>
<td>54.26±5.92</td>
<td>60.54±15.01</td>
<td>17.05±7.24</td>
<td>2.29±6.19</td>
</tr>
<tr>
<td></td>
<td>After treat.</td>
<td>30</td>
<td>93.40±14.15*</td>
<td>70.20±21.10*</td>
<td>80.95±20.28*</td>
<td>38.12±8.97*</td>
<td>28.38±6.23*</td>
</tr>
<tr>
<td>Acup + M</td>
<td>Before treat.</td>
<td>30</td>
<td>74.73±23.03</td>
<td>53.49±9.53</td>
<td>60.18±15.64</td>
<td>16.95±8.17</td>
<td>2.02±6.73</td>
</tr>
<tr>
<td></td>
<td>After treat.</td>
<td>30</td>
<td>94.34±12.35*</td>
<td>75.29±24.01*</td>
<td>81.18±15.27*</td>
<td>40.73±5.12*</td>
<td>30.11±4.50*</td>
</tr>
</tbody>
</table>

Note: * \( P<0.01 \), compared before and after treatment; ** \( P<0.01 \), compared between the two groups.

DISCUSSION
Cerebral palsy is caused by brain injury in the process of fetal development, and its lesion is located in the brain. Clinical practice has shown that head acupuncture is superior in treating CP, for which it is the preferred measure used in this study. The 5 groups of needles selected in this study (Sishenzhen, Zhisanzhen, bilateral Niesanzhen and Naosanzhen) were used for the five organs based on their locations, so as to make their vital energy reach the brain. As stated in the 28th chapter of Miraculous Pivot (灵枢·口问), encephalopathy must result in shaking of five zang and six fu organs, and disorder of zang and fu organs must result in abnormality of five sense organs, five tissues, five expressions of emotion, five
kinds of liquid, and five kinds of Shen (Mind). Meanwhile, pathological changes in zang-fu and meridians can also induce or aggravate cerebral diseases. Besides, children’s zang-fu organs are delicate, qi is insuficient, so treatment should be given to regulate zang-fu organs and strengthen the body resistance to eliminate pathogenic factors by needling twelve meridians to promote their growth and development.

There have been few reports on treating CP by musical therapy or its combination with acupuncture. Musical therapy is an ancient but also a new therapy. Though music, medicine and treatment are three different therapies, they have the same source. The ancient people held that there was relationship between the melody of universe and vital rhythm. By means of iconography of neural functions, researchers overseas have demonstrated that music and human brain are closely related, and various important musical elements give different impact on individual brain areas. Since there are endogenous rhythms in human body, musical rhythms can induce resonance (resonation, sympathetic response), since musical activities do not associated with correctness and incorrectness, children with CP are willing to make movement with musical sounds in response to music. Various musical activities can induce children with CP to perform different kinds of movement. For instance, beating musical instruments is beneficial to training general and fine motor ability, phonating and singing are good for breathing exercise, and playing string instruments is good for training fine motor ability and coordinating functions of the two hands. In addition, proper arrangement of various musical activities is beneficial to facilitating coordination ability of the brain, hands and eyes. In some Western countries, there is a therapy called Melodic Intonation Therapy (MIT), by which phonation can be facilitated due to conversational voice plus melody strengthening unification of cerebral functions. It is one of the methods for promoting communication skills by speech. By means of musical instruments and their own sound, auditory perception can become conscious and be elevated, and speech skills can be adjusted, so as to find their appropriate ways of expressing themselves. During interactive activities, they can learn the way of communicating with others to progress sociability, their mental stability can be acquired, and their psychological requirement would be satisfied, especially during group therapies, in which they can learn series of social and communication skills, such as how to play by turns, wait with patience, participate actively, follow instructions, do exercise with coordination, express emotion etc.

It was shown in the present study that after 3 courses of treatments by acupuncture plus music the synthesized functions of the children with CP, including cognitive function, speech function, motor function, self-care actions and social adjustment ability were improved, and their total effective rate was higher than those treated by simple acupuncture ($P<0.05$). According to GMFM, motor functions in both groups were all improved, and the improvement in creeping, kneeling, standing and walking was found more in Group Acup. + M than that in Group Acup., but no obvious difference was found in the improvement of turning the body over from the prone position and in functional aspects in sitting position between the two groups. It may be related to the musical activities designed in this study. Further studies will be made to reform musical therapies to observe therapeutic results in decubitus, turning the body over and functional aspects in sitting position. Moreover, it was also found that musical therapy was good for alleviating anxiety and pain sensation during acupuncture, which may also be beneficial to treating CP. To sum up, acupuncture combined with musical
therapy is superior to simple acupuncture in treatment of CP, which has provided new thoughts for treating CP by integrated therapies.

REFERENCES

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