MedCrave Step into the World of Research International Journal of Complementary & Alternative Medicine

Research Article

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Rehabilitation of handicapped children suffering from infantile cerebral palsy with combined embedding acupuncture (Ynsa + body acupuncture) and complex physiotherapy

Abstract

Objectives: The standard treatment of infantile cerebral palsy contain following elements: medication, developmental behavior therapy, surgery, assistive technologies and some form of CAM. Acupuncture treatment is difficult to be carried out in children due to less tolerance of inserted needles. Therefore we were looking for atraumatic, not frequently disturbing methods for these patients. The aim of this prospective, assesor-blinded randomized control trial study was to investigate whether a special form of acupuncture, namely the embedding acupuncture, especially Yamamoto's New Scalp Acupuncture (YNSA), combined with some effective body acupoints is of value for children suffering from cerebral palsy (CP) in addition to the different forms of motor and mental rehabilitation.

Design: A prospective, assessor-blinded randomized control trial was carried out in the past 15years with 585 children in an inpatient rehabilitation unit with day hospital service. After inclusion, patients were randomly stratified into a control group and an acupuncture group. The continous follow up was performed pediatric neurologists and physiotherapy, occupational and speech therapy in addition to skilled medical and nursing care.

Outcome measures: changes in optimizing mobility, learning potential, mental development, changes of primary conditions, Qualtiy of Life (QoL) and the independent neurological investigation were used to follow-up the efficacy of the treatment.

Results: In the permanent acupuncture group (combined YNSA and body acupuncture) all the sensory, motor and functional scores improved significantly during the examination period until 5years after birth. A significant development during the 2-year follow-up was found due to developmental behavior pediatrician activity and special daily performed moving exercices, but the embedding acupuncture with YNSA and some important body points (they are motoric trigger points of muscles) treatment facilitated the mental and functional development. Improved moving and mental function, more flexible joints and ligaments were observed in comparison to the small patients' condition prior to treatment. The number of seizures decreased, the reduction of antiepileptic drugs was possible, which resulted an elevated mental vigility. Statistical analyses showed significant improvement in Barthel index.

Conclusion: The data suggest, that the embedding forms of acupuncture of YNSA and body acupoints are useful additional accessor methods in the rehabilitation of some forms of infantile CP. It enhances their quality of life, helping their integration into healthy child population.

Volume 3 Issue 4 - 2016

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Received: February 02, 2016 | **Published:** April 21, 2016

Introduction

Infantile cerebral palsy (CP) is a non-progressive brain disease of children, where the ability of movement, muscle tone and posture is abnormal due to the insult of developing, immature brain, mostly before, during or sometimes after birth. Basically, CP started to develop impaired movement which associated with different abnormal reflexes, abnormal (hypotonic or hypertonic) muscle tone in extremities, the trunk of the patient. The abnormal posture and movements, walking disability occur or several times some combination of mentioned ones. Children suffering from cerebral palsy may have difficulty to swallow and commonly have eye muscle imbalance, which causes disturbance of view. They may have also reduced motion at joints due to different sized muscle stiffness. The effect of cerebral palsy on functional abilities varies widely. Some children are going to walk while others aren't to do. Some children show normal to nearly normal intellectual function, others may have different sizes of intellectual disabilities. Children are suffering from cerebral palsy often have underlying developmental brain abnormalities proved by MRI. This sad reality drives health professional with CP may be concerned primarily with one extremity or one side of their body, or it may affect the whole body of the small patient. The brain disorder causing cerebral palsy does not recover process later. Also, the symptoms don't worsen with age. The shortened muscles and different sized muscle rigidity will worsen if not treated intensively with physiotherapy and exercises. Brain anatomical changes associated with cerebral palsy also may contribute to other, later detected mild or severe neurological problems. Other sensorial disturbances are followings: epilepsy, blindness or deafness may also be present sometimes. Children suffering from cerebral palsy may also have the difficulty with sensorial organs, like vision and hearing functions, intellectual disabilities, course of seizures, urinary incontinence, abnormal touch or pain perceptions, mental health/psychiatric) conditions, etc. Standard worldwide used

treatments for handicapped children is a continuous rehabilitation course for a long time, personally applied physiotherapy, occupational and speech therapy according to skilled medical and nursing care. Despite intensive inpatient rehabilitation in the pediatric unit, more than 50% of handicapped pediatric patients remain moderately to severely percent disabled. This sad reality drives health professional all over the world to search for other modalities of treatment involving the CAM therapies) in an attempt to further improve the outcome of rehabilitation.

Dry needling --so-called Acupuncture - has been used as a part of the Traditional Chinese Medicine to treat pain and cure a variety of diseases for more than 3000years. Acupuncture has been used for handicapped children and stroke patients in China, Japan, Vietnam and Korea for more centuries, but the number of scientific studies on this topic has only recently started to emerge. They are only some and poor data to apply special acupuncture in Cerebral Palsy in childhood. Looking at published articles and reviews only some but not all have suggested a positive effect on recovery. There are numerous reports in the Chinese literature about the efficacy of acupuncture for children suffering from stroke and cerebral palsy for rehabilitation. However, the result was rarely quantitatively expressed by properly validated measures, and intention-to-treat analysis the. Two important reviews of acupuncture for treatment of patients suffering from stroke rehabilitation published in 1996.[1,2] These reviews are discussed to criticism because the literature was not searched systematically for them[3] or some inappropriate studies were not excluded.[4] Moreover, newer data have been published since that time. In 2001 was published a systematic review of the previous publications in this field. The authors focused only on the sham-controlled randomized clinical trials. 25 databases and 12 major Korean traditional medicine journals were searched. Based on the evidence of rigorous randomized and controlled trials, they found there is no compelling evidence to show that acupuncture would be effective in different size in stroke. The authors suggested, that better-designed studies should do. Since that time, some randomized controlled trials, reviews or opinion four were published, but the picture is still not clear on this topic.[5–7] In the previously cited studies, the traditional form of acupuncture- so-called dry needle application- has been using to treat the patients, but in the last few decades, some newer used forms of acupuncture were very intensively developed and Yamamoto's New Scalp Acupuncture (YNSA) is a unique and special form of acupuncture.[8,9] We reported in 2012 a controlled randomized pilot study with 25 stroke patients suffering from residual symptoms treated by YNSA (embedding acupuncture method) where we verified evidence positive effect of YNSA.[10] In China YNSA application is mainly used for neuro-musculoskeletal diseases, dysfunctions, and acute or chronic pain often. This acupuncture method composed of more by time to time developed categories: Basic- and Ypsilon-, Cerebral Ganglia-, Cerebellum points. Yamamoto New Scalp Acupuncture system also uses more specific points, sorted to Ypsilon points, which relate to the 12 acupuncture meridians (LU-lung, LI-large intestine, KI-kidney, BL-blase, HT-heart, SI-small intestine, LR-liver, GB-gall bladder, PC-pericardium, TB-treeple burner, SP-spleen, and ST-stomach). Since 1973, the YNSA method was started to apply in the treatment of stroke patients worldwide, published first time in Bristol by T. Yamamoto from Japan. In our outpatient-hospital,which is the official center of the TCM Confucius Institute at the University of Pecs - the method has been used since 1988. Acupuncture therapy is usually performed by the insertion of thin metal needles to the chosen acupoints. This followed with a slow manual twisting of the well- expertized medical acupuncturist. The needles, once correctly inserted into the acupoints, could be stimulated electrically too achieve the stronger effect. The application of needles is a noxious stimulus causing autonomic hyperreflexia. Another method is the permanent technique of acupuncture, where small absorbable threads applied into points with special needles, can make a continuous bio-stimulation of acupoints. Unfortunately, there is no information about the mechanism of the embedded acupuncture in the literature, but Shang and Fung find the same morphological changes in the connective tissue after electro-acupuncture and embedded acupuncture.[11,12] The most recent mechanism of action provided by electrical and embedded acupuncture therapy is believed to be totally different from traditional therapeutic electrical stimulation of needles. In 2010 a meta-analysis was published based on the previous studies, where Wu published a systematic review and meta-analysis of randomized trials of acupuncture efficacy in the rehabilitation of patients suffering from the post-stroke syndrome.[13] He searched 7 English and 2 Chinese databases, and concluded, that the randomized clinical trials demonstrate[1] acupuncture could be effective in the course of post-stroke rehabilitation. So, what is the truth about acupuncture in infantile CP rehabilitation? The main task of the present prospective assessor-blinded randomized controlled study, -performed between 2000-2015 with numerous participants was to try to make a strong hypothesis on whether acupuncture, especially the embedding form of Yamamoto New Scalp Acupuncture with combined body acupoints (at the same time verified being jumping „motoric trigger points" of muscle) has a significant effect in addition to standard handicapped motor/mental rehabilitation courses.

Materials and methods

Patients

We recruited small patients between 2000 and 2015, all of them had had neurological and pediatric diagnose, selected rehabilitation. Totally, 585 patients had been enrolled 293 to receive acupuncture treatment and 293 for the control group Inclusion criteria were the following children with CP due to hemorrhagic or ischemic stroke,[2] admission within 12months of brain damage,[3] children should have movement coordination problems including muscular troubles, in upper extremities hypotonic or hypertonic, spastic lower extremities or hemiparalysis, and also myasthenic symptoms, and[4] the degree of brain damage of handicapped children did not exceed 30% of damaged brain tissue. The last statement was important, because when the brain damage exceeds 30%, usually the dry needling treatment would not be successful, as we published in 2012.[14] The size and anatomical location of stroke lesions is evaluated by MRI imaging using subtraction lesion analysis.[15] Exclusion criteria were the following: (1) the absence of motor deficit, (2) hemodynamic instability. We have been treated 293 children with YNSA and body acupuncture points and the other 293 subjects were the non-treated control group (Figure 1). All patient's parents gave informed consent to participate in this study, which was performed according to the guidelines of the local ethics committee.

Ethics Committee approval granted, and the study performed in agreement with the Declaration of Helsinki. All the recruited small patients went under complex personal rehabilitation program using the Hungarian standard rehabilitation protocol for infantile CP. Two hundred ninety-three (293) of the small patients received additional permanent acupuncture therapy using the embedding acupuncture method, and these children were regarded as the acupuncture group. The other 293 children without acupuncture therapy regarded as the control group; they only received necessary rehabilitation therapies (according to Pethő, Bobath, HRG methods, as early neuro-

developmental exercises. The average age was 1,3-3.4 and 1-3,9years (in the acupuncture and control group, respectively).

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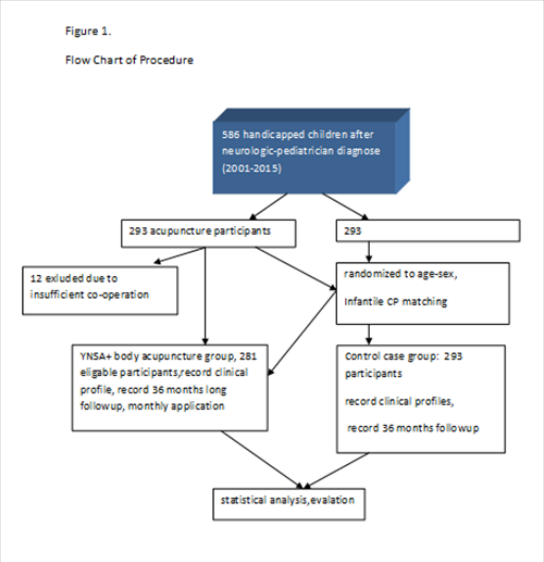

Figure 1 Flow Chart of procedure.

Design and acupuncture protocol

A prospective, assessor-blinded randomized controlled study was carried out in an outpatient stroke-CP rehabilitation unit with daily hospital service in Yamamoto Centre of Pécs University Health Science Faculty, TCM Confucius Institute, Budapest, Hungary. After inclusion, patients were shared with a control group and a combined YNSA-body form of acupuncture group. A simple randomization method was performed to create an acupuncture group and a control group (Table 1). YNSA is a special newer microsystem form based on traditional acupuncture[9,10] This method is based on a somatotopy of the scalp (Figures 2 & 3). In the same way as for ear, mouth, hand, nose acupuncture, the total organism is projected onto a defined area on the scalp. According to the currently applicable official rules of YNSA, before treatment can begin an examination must be made of abdominal region and the bilateral neck triangle by YNSA neck diagnostics.[15] In the case of any disorders affecting regions below the diaphragm, an inspection of the both hands and palpation according to point Hegu (LI 4) can be dispensed. The diagnostics provide basic information on which kind of the treatment should begin. It's depending on the subjective perception of the person being treated, about whether needles should apply. The frontal yin or dorsal yang side are the areas according to traditional Chinese medicine. The YNSA points are functional existing areas, stiffness or softness can be palpating insignificant area is a signal of disturbance performed by skilled MD.

YNSA is not a "ready-made" acupuncture form (no advised prescription or receipt for one disease) , but rather a treatment tailored to the individual sensitivity areas of the patient.[15,16,17] The small patients in the acupuncture group had been treated once in each month during the whole period of the course of the clinical trial using the dry needling method with removable dry needles according to YNSA (Figure 3). The absorbent monofilaments served as ''time release'' dry needling system with the inserted and permanently entered insertion.[18] The length of handmade the special stainless-steel needle is cca. 8cm, and the diameter of the lumen is 0.1mm. The threads (MAXOL-M Monofilamentum, Johnson and Johnson, USA) cut into 0,7-1cm pieces and then applied with the special needle. The threads placed into the lumen of this needle, and the material applied to the selected, by well-skilled acupuncturists. Altogether 14 "needles" were inserted into every subject per session. The depth of thread insertion is 0, 7-0.9mm. There was no other needle manipulation performed. The insertions of embedding method were applied once a month, based on the total absorption time of the previous threads being four weeks according to our previous studies. Embedded filaments stimulated the following YNSA points (Cerebrum, Cerebellum, Basal Ganglia, Liver on the skull contralateral)[19] and additionally bilaterally Kidney SHU back point (UB 23), St 36 (Zusanli), LI 4, LI 11, GB 34 bilaterally. The children with CP in the control group had not been treated by any form of acupuncture, but physiotherapy - developing exercises in our department, -as in many rehabilitation centers in Hungary-, for stroke and infantile CP rehabilitation were applied. The difficulty on the Pethő, Bobath method in an attempt to achieve normal movement and improve strength. Each patient of selected children received certain modalities of treatment (3times a week) as decided by the supervising neurologist doctors and senior physiotherapist according to the patient's need at different stages of recovery. The *Bobath couple method* contributes to the prevention and correction of formation and muscle strength decrease of deformities, which help provide a variety of tools, pads, rollers, supports, assisting specially trained investing, straddle seating, chairs, righting, helping position adjusters, balls, shafts, balancing boards, pylons, rails, shoes, helping walking, walkers, and wheelchairs.

Table 1 Acupuncture group and Control group

Characteristics	Control group	Treated group	P (Fischer's exact test for categorical variables) t-test
Male gender %	60	64	0,5
Age in month	8	9	0,8
Lesion of brain tissue	15,8	17,1	0,7
Upper hypotonic	68	68	1
Lower spasticity	70	71	1
Abnormal muscle tone	65	65	1
Oral motor dysfunction	32	32	1
Mental retardation	65	65	1

The Bobath method, taking into account the patient's condition may be supplemented by other healing process, other physiotherapy procedures, massage. Depending on the clinical symptoms and the severity of the damage to essential maintenance and kinetic teaching functions, the development of the Bobath method is based on moving therapy.

Pethő method (developed in Hungary): The Conductive Education is to become of central nervous system diseases due handicapped assists and handrail gives those affected and their families. The conductive education is based on the fact that the nervous system has certain reserves in spite of the damage, the possibility of new ties to the establishment. This "reserve" adequate control of the teaching-learning process effectively mobilized. The term conductive methods surname, meaning guidance. Here, the motion process is taught to perform, so to say, engages patients had only providing as much assistance as is necessary for the particular movements or gestures. The method is the most efficient when they start treatment as soon as

possible to the patient, so early detection is extremely important. The patented method HRG "Hungarian Rehabilitation Gymnastic" process since 1994. Warm water used for 370motion tasks can be taught to children at the age of 2-3years. Features: all the HRG thorough neuro-development and sensorimotor approach to testing preceded. The existing skills gaps and skills-part profile becomes known. The various elements of movement in water are easier to perform than on the mainland. This has a positive effect on children's motor and sensory abilities. Normalises the missing skills. And also increases comprehension of handicapped children.

Physiotherapy - developing exercises

The Bobath couple method contributes to the prevention and correction of formation and muscle strength decrease of deformities, which help provide a variety of tools, pads, rollers, supports, assisting specially trained investing, straddle seating, chairs, righting, helping position adjusters, balls, shafts, balancing boards, pylons, rails, shoes, helping walking, walkers, and wheelchairs. The Bobath method, taking into account the patient's condition may be supplemented by other healing process, other physiotherapy procedures, Ayres therapy, massage. Depending on the clinical symptoms and the severity of the damage to essential maintenance and kinetic teaching functions, the development of the Bobath method is based on moving therapy. *Pető method (developed in Hungary)*: The Conductive Education is to become of central nervous system diseases due handicapped assists and handrail gives those affected and their families. The conductive education is based on the fact that the nervous system has certain reserves in spite of the damage, the possibility of new ties to the establishment. This "reserve" adequate control of the teaching-learning process effectively mobilized. The term conductive methods surname, meaning guidance. Here, the motion process is taught to perform, so to say, engages patients had only providing as much assistance as is necessary for the particular movements or gestures. The method is the most efficient when they start treatment as soon as possible to the patient, so early detection is extremely important. The patented method *HRG "Hungarian Rehabilitation Gymnastic"* process since 1994. Warm water used for 370 motion tasks can be taught to children with age of 2-3years. Features: all the HRG thorough neuro-development and sensorimotor approach to testing preceded. The existing skills gaps and skills-part profile becomes known. The various elements of movement in water are easier to perform than on the mainland. This has a positive effect on children's motor and sensory abilities. Normalises the missing skills. And also increases comprehension.

Measurements

Changes in moving ability, in optimizing mobility, learning potential, mental development, changes of primary conditions, some seizures, the need of medicaments for epilepsy, changing of attention deficit, improving attention, Quality of Life (QoL).

Data analysis

The data of sensory and motor assessment were gathered during initial admission to the rehabilitation procedure and three years later. Statistical comparisons were performed based on these two-time points. Categorical variables were analyzed using the v2 test or Fisher's exact test for small samples. Measurement data were analyzed using two-tailed t-tests. All collected data were input using Epi Info software and statistically analyzed using SPSS 11 software. (statistical software SPSS, Chicago, IL) For all data, p 0.05 was considered to be statistically significant. Chi-square analysis of the acupuncture group and control group was also performed to determine homogeneity between both groups regarding age, gender, and pretreatment measurement outcomes. The calculation of the sample size is based on the primary outcome measure. It was estimated that 293 patients were required in each group to detect a clinically relevant 2-point Ritchie-Hegyi scores with a power of 80% and an a value of 0.05. Assuming a 20% dropout rate of selected patient, it was planned to randomize 293 patients to each group. Unfortunately, three patients in both groups needed to be excluded for no cooperation or other different reasons.

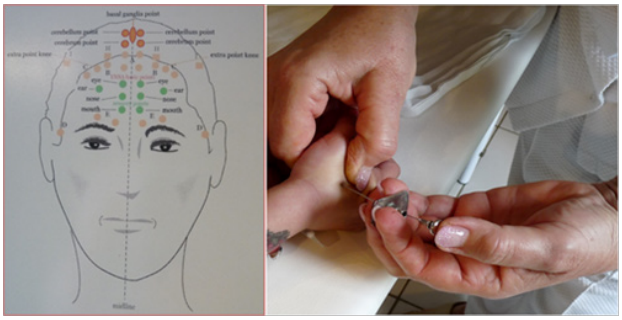

Figure 2 Somatotopy on scalp.

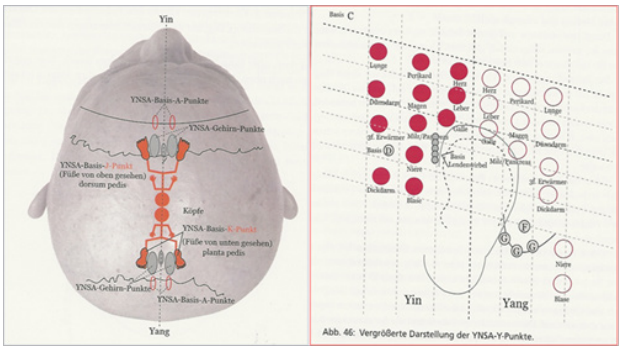

Figure 3 Dry needling method.

Results

During initial admission to the investigation (continuous checking process by time to time), all of the 586 handicapped children were randomly distributed to the acupuncture and control group with 293 patients in each group as we described in the Materials and Methods section. The neurologic and functional status of members of each group at the time of admission to the rehabilitation period, discharge from the hospital, and 3-year follow-up examination are summarized in Figure 4a & 4b. In the acupuncture group, all the sensory, motor, and functional scores improved significantly during the examination period until three years after treatment course. The hypotonic muscle ton in upper extremities detected to be increased in the acupuncture group. This index also increased in the control group, but the changes were verified to be significantly less than those patients who participated in of the acupuncture group (acupuncture versus control $p < 0.01$ at 36 months). The change of the parameters under the examination period shows, at least, two important results. There was a significant spontaneous recovery with physiotherapy group during the 3-year follow up; however, the YNSA + body acupuncture treatment facilitated the better recovery. The improved moving function of treated and control group, respectively, p<0. 01 at 36months) and the most flexible joints, ligaments as compared to their condition before treatment observed. Important changes were verified after 36months treatment course in following

Parameters:

1. Variations in muscle tone, such as being either too stiff or too floppy
2. Stiff muscles with normal reflexes (rigidity)
3. Stiff muscles and spasticity
4. Lack of muscle coordination in movement (ataxia)
5. Delays in reaching motor skills milestones, (pushing up on arms, sitting up alone or crawling, e.t.)
6. Favoring, such as reaching with only one hand or dragging a leg while crawling
7. Difficulties in walking, (such as walking on toes, a crouched gait, a scissors-like gait with knees crossing or a wide gait
8. Excessive drooling or problems with swallowing
9. Difficulties with sucking or eating
10. Delays in speech development or speech disorders
11. The difficulty with motions, such as picking up a crayon or spoon
12. Seizures (number of seizures per month, week, day)

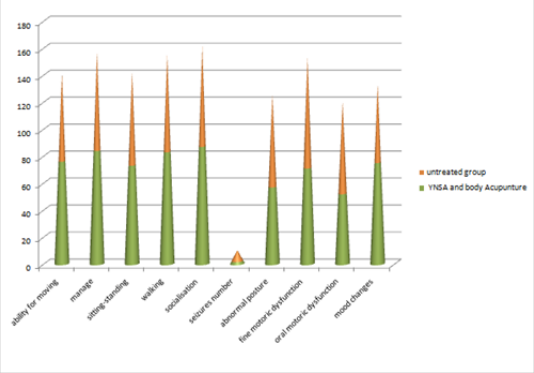

Figure 4a YNSA + body acupuncture treatment.

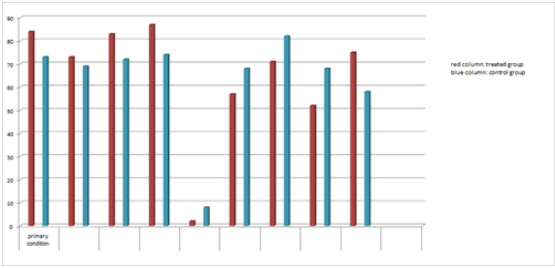

Figure 4b Graphical representaion of YNSA + body acupuncture treatment.

In the case of seizures the independent pediatric neurologist was several times able to decrease antiepileptic drugs, to enhance the vitality of children. The attention to environmental stimuli was elevated. Changes were registered in the improvement of abnormal posture and balance treated and control group, respectively, $p < 0.05$ at 36months) was also determined during the follow-up period. The moving ability was also enhanced in different size in all cases, but the members of the combined acupuncture group had more efficient function than the control group. In summary, according to the above-mentioned results, changes in the indexes are better in the acupuncture group than in the control group. The small patients well tolerated the intervention without side effects. No"throw-out reaction" of monofilament and another side-effect was observed under the treatment. According to the results of this study, embedding dry needling elevated the microcirculation of the brain, which was verified by the brain-scan investigation (Figures 4a & Figure 4b). Cerebral blood flow detected by single-photon emission computed tomography was increased by 15%-5% after YNSA treatments.[19]

Discussion

This type of therapy (YNSA+ body acupuncture) as a valuable complementary method of longer management of infantile CP offered to all infantile CP patients. We have to mention that we reported the positive effect of YNSA in our other pilot study in 2012 in residual symptoms of stroke (25 treated-25 untreated, with the same methods).[20] The aim of the recent study was to examine the long-term effects of monthly repeated embedded YNSA + body acupuncture treatment on moving development, spasticity of children compared with the non-acupuncture group. ''What can be accepted as to be the truth about acupuncture in infantile CP rehabilitation?'' asked we at the end of the Introduction section. According to our opinion, at least, two parameters are important to determine the efficacy of the acupuncture treatment in CP rehabilitation. The first is to enhance the Life of Quality of the small patients during and after the acupuncture and physiotherapeutic treatment.[21] The second is to find the possible link between the complex YNSA and acupuncture treatment and the supposed cellular mechanisms that activated in the recovery period of closed, non-progressive brain damage in childhood. Previous studies have reported the ineffectiveness of sensory stimulation by acupuncture or transcutaneous electrical nerve stimulation, functional electrical stimulation, electromyographic feedback, force feedback or body weight supported treadmill training on balance in patients with stroke.[21] Recent evidence has shown that impairment-focused programs (biofeedback, electric stimulation, muscle strengthening) failed to generate functional improvements whereas therapies that administered functional training improved activity levels.[22] However, in the current study, the used independent pediatric neurologist investigation was applied to evaluate the changes of life qualities of participants. The patients were followed for a 3-year period after the first treatment. All of the parameters were increased in the 36-month follow-up period in the acupuncture and control group; however, the changes were significantly greater in the acupuncture group than in the control group. The data suggest that the YNSA + body acupuncture is a useful method to treat the patients with infantile CP and enhance their quality of life. Using periodical measurement for the motoric function -status evaluation, the results showed that YNSA application with body dry needling is the effective complementary method in patients with CP for motor recovery. Regarding functional improvement, both the study group and the control group showed improvement in functional findings at follow-up assessments. However, there was a significantly marked tendency for the study group to be superior to the control group in most of the total scores at follow-up stages in development, and at the end of the follow-up period of all patient, it did reach statistical significance. However, the link still must be found between the effect of acupuncture and the cellular changes after early, closed cerebral brain damages. More evidence suggests that the acupuncture stimulation with a needle has generated some cellular - tissue effects and that the different types of acupuncture can enhance the release of some neurotransmitters. This process will facilitate angio- and neurogenesis in the central neural system of handicapped children. In 2006, (Li and at) in 2009 (Ding and colleagues) reported that electro acupuncture therapy could cause depolarization and enhance Ca++ influx of neurons. Moreover, intracellular Ca++ elevation could stimulate an autocrine neurotrophic mechanism, leading to the

synthesis and release of neurotrophic factors.[22,23,24] Long hurst recently described that electro acupuncture can modulate the responses of sympatho-excitatory reflex by decreasing the release of aminobutyric acid.[25] Carmichael reported that axonal sprouting and neurogenesis are induced in closed, non-progressive stroke-rehabilitation.[26,27] On a cellular level, the phenomenology of neural repair after brain damages have defined and unique regenerative environments in the brain can be identified. These data suggest, that acupuncture facilitates some molecular and cellular mechanisms that have an important role special in the angio-neogenesis and neurogenesis, tonic neuronal inhibition in a tissue of the brain. So it might be concluded, that acupuncture, especially the YNSA with combined body acupuncture points, is a useful complementary tool to facilitate above mentioned functions due to the rehabilitation of infantile CP as complementary CAM method among complex "lege artis" rehabilitation.[28] The combined methods (acupuncture and special early developing exercises) are the most efficient when the treatment starts as soon as possible after recognizing of disease, so the early detection is extremely important. The providers in health care should know this combined method used for outpatient /inpatient rehabilitation.[29]

Conclusion

These summarized data of treated handicapped children from 15years suggest that the use of YNSA therapy combined with some, effective body acupuncture points with embedded threads after closed, non-developing infantile CP can contribute to significant positive neurologic and functional changes, depending from starting stage individually. The result has a correlation to our previously investigated group's one in a pilot study according to stroke-patients[10] with small size, where we were able to elevate the QoL (Table 2, Case picture).

Changes due to course K.Á. 3years, Diagnose:

M. Little, epilepsy (45-50 absence/ day.

12months later: symptome free from epilepsy, sitting, standing ability

12months old boy, Diagnose: Mental retardation, attention deficit, hyperactivity, spastic upper muscle tone

We understand the weaknesses and limitations of the study because there was no sham control due to ethical consideration. Future research: This study has provided a long examination of complex usage of acupuncture therapy incorporation into Hungarian Early Developing System of handicapped children. A useful baseline and reference point for evaluating the process of developments in habilitation of the handicapped area in future.

The findings can support the positive value of complementary complex acupuncture methods in health care according to CP as perceived by skilled medical therapists, and that there is a place for therapists in-patient care in the hospital setting. This study enables medical acupuncture therapists in outpatient surgery settings to articulate this kind of work and identify in which this service can be successfully incorporated into healthcare structures and processes.

Acknowledgments

None.

Conflicts of interest

Author declares there are no conflicts of interest.

Funding

None.

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