

Acupuncture in Neonates – Old Experience or New Evidence?

Thiel M^{1*} and Stockert K²

¹Chief Doctor of the clinic for children and adolescents, Sana-Klinikum Remscheid, Germany

²Austrian Society for Acupuncture, Austria

Abstract

Background: Despite great efforts in the past 20 years, there is still a need for more suitable therapeutic options in neonatology. Complementary and alternative medicine could offer such opportunities.

Objective: To determine the present state of knowledge on the use of acupuncture in neonates, this is an update of a formerly published study.

Design: Performing a systematic literature review in Medline, BIOSYS Previews, DAHTA, Deutsches Ärzteblatt, EMBASE, EMBASE alert, gms, gms-Meetings, Karger-Verlagsdatenbank, Krause & Pachernegg Verlagsdatenbank, SciSearch, Thieme-Verlagsdatenbank PrePrint, Thieme-Verlagsdatenbank. Keywords were: neonatology, newborn, preterm, acupuncture, laser acupuncture; furthermore considerations from theoretical and practical points of view.

Results: We have found one randomized controlled study, one study with a crossover design, one observational study, one study concerning methodology, 3 case reports, 2 reviews and one protocol for a Cochrane Review.

Discussion: This topic has not yet really been evaluated scientifically, the literature is very scarce. According to international literature, acupuncture does not play a significant role in the treatment of children so far, not only in neonatology. The results of the Cochrane protocol could provide an assessment and may contribute to a better understanding. The other papers represent some interesting ideas that need further research. There is some practical limitation for acupuncture especially for very young infants.

Conclusion: If acupuncture is practiced in neonates it needs further evaluation.

Keywords: Integrative medicine; Integrative neonatology; Complementary and alternative medicine; CAM; Acupuncture; Laser acupuncture; Acupressure; Preterm; Newborn; Neonatology

Abbreviations: TCM: Traditional Chinese Medicine; CAM: Complementary and Alternative Medicine

Background

A recent poll among the German population [1] revealed that 61% of the interviewees would like to be treated with a combination of western and traditional medicine and 89% of those who already have had experiences with TCM would like to receive acupuncture. The use of complementary and alternative medicine in the treatment of children has been shown [2-4] as well as its use during pregnancy [5-7]. In all these papers and age groups, except childhood, acupuncture plays a relevant role [8]. Although not being questioned on the subject, the results could implicate that families would welcome this method in the treatment of their child as well. Acupuncture is part of traditional Chinese medicine which is based on the idea of energy ("Chi") circulating through the body by using meridians as pathways. When stimulated with needles, these pathways are influenced to increase healing energy as their disturbance is made responsible for the disease. Using needles makes the application difficult for young children up to twelve years of age. Co-operation at this age cannot be expected. Laser acupuncture or acupressure could be suitable alternatives. So far there has been no review focusing on acupuncture for neonates. However, a recently published cochrane study plan implicates that acupuncture might be beneficial for neonates [9].

Recent technical developments of the past 20 years had a tremendous effect on morbidity and mortality in neonatology. Examples are the improvement of mechanical ventilation [10] or the introduction of Surfactant [11-13]. Besides, a preterm needs an adjustment in terms of the range of vital parameters different

to older children or adults. Being not so ambitious with oxygen supplementation, blood-pH [14,15] or blood pressure led to a smoother medicine, less mechanical ventilation and thus to less adverse effects [15]. Under these circumstances, unconventional methods came more and more into focus. Kangaroo-care, analgesia by glucose, non-nutritive sucking with and without sucrose use, swaddling or facilitated tucking, music therapy and multi-sensorial stimulation have been tried and papers published about their use and aspects of it have become well accepted alternatives or complements [16-18]. Acupuncture could be such a complement as well.

Our main focus is to assess complementary and alternative methods in neonatology [19-22]. Regarding specialists' experiences of its use in neonates, the results of studies in other age groups and the cochrane study plan, the next step should be to summarize the published data on acupuncture in neonatology in order to have a basis for further scientific investigation. This is an update of data published in 2011 [23].

Methods

- Search strategy:

***Corresponding author:** Dr. Michael T. Thiel, Chief Doctor of the clinic for children and adolescents, Pediatrics, Neonatology and Naturopathy, Sana-Klinikum Remscheid, Burger Str. 211, 42859 Remscheid, Germany, Tel: 02191-13-5400; Fax: 02191-13-5409; E-mail: Michael.Thiel@sana.de

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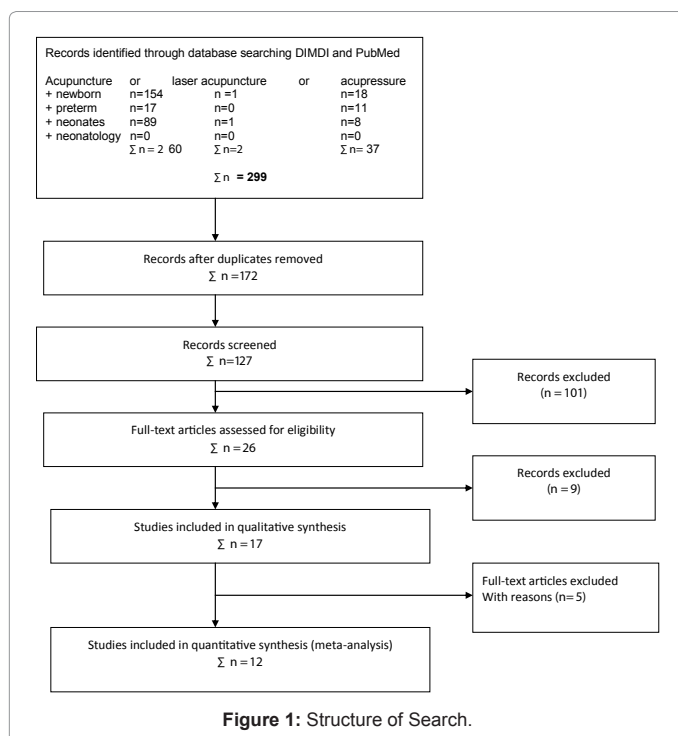
A systematic search in the following databases has been performed:

Medline, BIOSYS Previews, DAHTA, Deutsches Ärzteblatt, EMBASE, EMBASE alert, gms, gms-Meetings, Karger-Verlagsdatenbank, Krause & Pachernegg Verlagsdatenbank, SciSearch, Thieme-Verlagsdatenbank PrePrint, Thieme-Verlagsdatenbank by using the German DIMDI-service.

- The keywords were: neonatology, newborn, preterm and acupuncture, laser acupuncture, acupressure.
- Age: birth to day 28 or explicit concern with preterm or newborn infants.
- Languages were: English and German
- Other limitations: human.
- No limitation regarding publication date.
- The search was done in March 2013.
- Inclusion criteria: clinical studies or case reports or reviews regarding the use of acupuncture, laser acupuncture or acupressure in neonates, i.e. up to day 28.
- Exclusion criteria: Opinions, studies without clear relation to questions of research or theoretical or practical concern. Studies which included infants do not fulfill the inclusion criteria.
- Due to the very few data we decided to include case reports in order to give an overview what has been published at all.

Results

When searching by combining acupuncture, laser acupuncture or acupressure with newborn, preterm, neonates or neonatology, most of the studies had to be dropped because of the age of the reported patients and the lack of relation to the topic, i.e. obstetrics or pregnancy that misled to the keywords or their combination (Figure 1).



Acupuncture and vojta therapy in infantile cerebral palsy

This is an opinion paper, reflecting own experience on acupuncture on one hand and effects, parallels and possible synergism to Vojta-therapy on the other. A main point is the finding that there are more or less identical points and muscle chains for the treatment of infantile cerebral palsy. This can be a reason for common use of these methods and [24].

Acupuncture as a part of CAM-methods in the treatment of neonatal pain and stress

As part of a review on complementary and alternative medicine in neonatology [16,17] non nutritive sucking, with and without sucrose use, swaddling or facilitated tucking, kangaroo care, music therapy, multi-sensorial stimulation for painful procedures have been compared. The authors state that acupuncture may provide an effective non-pharmacological approach, even moderate or severe pain, within complex approaches on neonatal pain. Unfortunately there is a lack of a more specific evaluation.

A case report on a 28 weeks preterm with a very difficult postnatal period, extreme periods of agitation and crying was evaluated in order to find a diagnose using the criteria of TCM. Then a treatment with laser acupuncture was initiated. Over the 14 days before and during laser therapy the child was calmer, able to relax, sleep more frequently, during the time of the treatment the mean heart rate dropped over more than ten beats per minute [25].

In 2011, a study on the effect of acupuncture on pain reaction due to a heel prick has been published. In a cross-over-design acupuncture had a positive effect using the neonatal infant pain scale (NIPS) representing pain in 10 neonates [26].

Acupressure

The only randomized controlled double blinded study evaluated the effect of acupressure and meridian massage on increasing body weight in 40 premature infants. The treatment was administered for 15 minutes per session, one hour before meals, three times daily over 10 days, body weights and volume of milk ingested was recorded daily. The study group received acupressure, the control group received routine care and observation. The daily average weight gain of the infants in the experimental group was 32.7 g (SD=8.1) compared with 27.3 g (SD=7.7) in the control group. In the first week no significant difference in weight gain between the two groups; in the second week, the weight gain observed in the experimental group was significantly higher than in the control group. The authors assessed that acupressure and meridian massage have a significant effect on weight gain in premature infants [27].

Acupuncture as a therapeutic option in neonatal intensive care

A study protocol for a Cochrane-study has been published in 2009 [9]. Without details being published, the topic is to evaluate the effect of acupuncture in neonates with hypoxic ischemic encephalopathy compared to “Standard therapy”. Short term endpoints are seizures and death, long term are development delay, visual or auditory impairments, speed and extent of rehabilitation/disability as well as quality of life and adverse effects.

Ear acupuncture points in neonates

Four studies have been published in order to determinate ear acupuncture points.

In the first of these studies premature triplets of 31+2 weeks of gestational age were tested. By using the Svessa point selector 1070 the authors showed that these points exist. Psychotropic points were not found. There was a good correlation with the clinical state, i.e. the sickest child showed the most active ear points [28].

An observational study also intended to determine the presence and absence of acupuncture ear points in healthy neonates. Male (n=27) and female (n=23) newborns were tested using a neuronal pen [SVESA 1070, SVESA GmbH, Munich, Germany] and an integrated optical signal detected the ear points that were assigned to the Chinese ear map. The authors compared right and left lobe, term and preterm, caesarean sections vs. vaginal deliveries, male and female. In 66% no points were found. 0-4 points were detected on the right, 0-2 points on the left lobe. The most common point was the psycho vegetative rim in 26%. No psychic points were detected, no significant differences were found between right and left ear, male and female, term and preterm with respect to numbers of points, access of points, among modes of delivery [29].

Another prospective observational study [30] aimed to determine the presence and absence of acupuncture ear points in neonates with neonatal abstinence syndrome (NAS). 5 neonates (3 male, 2 female, mean gestational age: 37+3, mean birth weight: 2 655 g) were examined on day 3 (mean value: 72.3 h) with a neuronal pen (PS 3 © Silberbauer, Vienna, Austria) and an integrated optical signal detected the ear points that were assigned to the Chinese ear map.

They all showed the presence of active ear points. Again the psycho vegetative rim was the most common point in 100% of the children. All showed psychic ear points (frustration point, R point and the psychotropic field nasal from the incisura intertragica).

A small case series [31] was published recently in 2011 with a similar approach and aim. In order to determine the presence of acupuncture ear points in neonates with Neonatal Abstinence Syndrome (NAS) 6 neonates (4 male, 2 female) were examined on the 3rd day after delivery (mean value 70.3 hours) by a neuronal pen (PS 3 © Silberbauer, Vienna, Austria). An integrated sound and optical signal detected the active ear points that were then placed on an ear map. Again all investigated neonates showed the presence of active ear acupuncture points. The psycho vegetative rim was the most common organic area of the children, followed by a few organic points. This corresponds with the results found in healthy neonates.

Methodology of acupuncture in neonatology

In 2012 the skin temperature using laser needle acupuncture in preterm neonates has been measured thermographically. In 10 preterms the maximum temperature was 37.9°C, which is lower than those reached in transcutaneous blood gas measurements [32].

Discussion

Acupuncture is an accepted method in the treatment of some indications, often with contradicting outcomes [33-35]. Examples are headache [36-38] anaesthesia, perioperative analgesia, drug withdrawal and others [39]. Due to the very few data we decided to include case reports in order to give an overview what has been published at all.

Acupuncture and vojta therapy in infantile cerebral palsy

The observation of Stockert [24] leads to an interesting parallel between the method of Vojta and acupuncture points and could create a new therapy modification and combination between two methods.

Vojta's method is a physiotherapeutic approach on a neurophysiologic basis that is based on the principle of reflex locomotion, which is used to treat various physical and mental disorders through the stimulation of the human sensimotoric system's reflex points. Originally used in the treatment of spastic children, the technique is now used on babies and adults. A crucial part within the therapy is the existence of several pressure points that lead to the idea of comparison. Vojta's points are meant to provide specific movements and aim to re-construct or help to establish alternative neural pathways.

Thus, it is a western-medicine-bound therapy with close relationship to neurophysiological and neuroanatomical background. It is at least interesting, that an "ancient" Chinese method reveals that lot of parallels. A possible idea could be to add acupuncture to Vojta therapy and evaluate the differences to children who were only treated with Vojta. As before, the precondition for the parallels needs acceptance of the method.

Acupuncture as a part of cam-methods in the treatment of neonatal pain and stress

The review of Golianu [18] is generally helpful when investigating the idea of a "graduated multidisciplinary algorithm for neonatal pain management". Acupuncture is considered as a fundamental part of this, but unfortunately, the way to this statement remains unclear. Thus, although the idea might sound promising, the conclusion is very risky.

A positive, calming effect of acupuncture on an agitated preterm was observed by Raith et al. [25] It could inspire other users to publish their experience in order to help generating hypotheses, but as a case report the level of evidence is too low.

Although only a small number of preterms had been examined the results of Ecevit's study [26] is very interesting because of its crossover design and the fact that it is the first one on this issue.

Acupressure

The only randomised controlled study published by Chen et al. [27] is the only study concerning acupressure and one of the few randomised controlled study as well. Here, the control group received standard therapy although it would have been more interesting to compare acupressure with massage, because it has been shown that massage has a weight gaining effect on newborns [40,41].

Acupuncture as a therapeutic option in neonatal intensive care

The protocol of the planned Cochrane review [9] reveals the great scientific interest looking for evidence of acupuncture. These results could provide an assessment and maybe a better understanding of acupuncture in neonates. Although the prognosis of Hypoxic Ischemic Encephalopathy improved, there is still a need of helpful support.

Ear acupuncture points in neonates

Stähler Van Amerongen et al. [28] were able to show some interesting details in triplets, like the correlation with the clinical state, that sheds a light on genetic disposition and environmental factors.

They have also shown the existence of specific acupuncture points in neonates [29]. The conclusion that ear points in neonates could be

used for diagnostic and as a therapeutic option in neonates in the future is very general. However, the findings could lead a way towards that, at least as a basis for further studies. Again, for both papers the level of evidence of the study is very low as well. The precondition is that one does not doubt acupuncture, otherwise the results are delicate and questionable. The method being used, the SVESA point selector is being discussed among acupuncturists and not evidence based.

In small case series, Raith et al. [30,31] evaluated the existence of ear acupuncture points in neonates with neonatal abstinence syndrome. Again, if the method itself is not without doubt, it is difficult to claim evidence of its usage. On the other hand, parts of the results show great congruency with those of Stähler Van Amerongen [28,29].

The SVESA point selector measures the skin resistance, which differs at the acupuncture point compared to the surrounding tissue, and signalizes the affected acupuncture point via light-diodes. It is quite disturbable, because even with little sweat secretion a false positive signal will be created.

Practising acupuncture in low birth weight infants

Considering the practical point of view acupuncture with needles is almost impossible in neonates except skull acupuncture by Yamamoto [42] and ear acupuncture. Theoretical reasonable alternatives are acupressure and laser acupuncture. Study results in older children [43] underpin that, especially in laser acupuncture.

Own experience shows that if one performs soft laser acupuncture (5 MW) on a preterm of less than 1000g the whole baby enlightens because there is so little absorbing subcutis. That means that the laser impulse is too strong in little preterms. A lower limit of maturity or weight has not been published, but is probably about 3000g. Thus below that weight only acupressure could be possible. Skull and ear can be treated with mini needles, because the infant hardly notices them and is even able to move with them.

Regarding safety aspects Raith's study [32] revealed astounding skin temperatures which are lower than the common transcutaneous blood gas measurement. As safety aspects are crucial for implementation of new methods, CAM or conventional, this study should be considered for any discussion in this field.

Young, but not neonate

Some work done just outside the 28 days limit would be interesting to be investigated in newborns as well. For example acupuncture for infantile colic could be an option for newborns as well [44-46]. The published work concerns children from 2-8 weeks. These papers were concerning infants at the limit of being neonates and thus the inclusion criteria. They partially showed positive effects on feeding, sleeping and stooling using minimal acupuncture.

Other aspects

Regarding safety aspects there is no evidence in literature that acupuncture carries a risk for severe adverse effects [47]. The patient collective itself could be problematic due to its heterogeneity, for example to evaluate the development delay of the Hypoxemic-ischemic encephalopathy systematically [9].

Evidence

Acupuncture needs further scientific evaluation in neonates. According to international literature in the Netherlands [2], Australia [48] and the USA [49] acupuncture does not play the major role in

the treatment of children of all ages, probably due to the needles. This becomes even more evident when compared for example with pregnancy, where it is probably the most commonly used unconventional method at least in Germany [5,6]. The few published data give us an overview of ideas, but not much more. The result of the cochrane study still has to be expected. It will be interesting due to the fact that it is a prospective study and maybe it will have a high level of evidence. Acupressure is perhaps a suitable alternative not only in neonates but needs further investigation as well.

Complementary and alternative medicine in neonatology

It is quite typical for many areas of complementary and alternative medicine, that special background information and sometimes even the knowledge of specific philosophies or religions are necessary for understanding or at least accepting it. Sometimes one has to look at the effects without understanding the mechanisms so far. This is a well known fact concerning studies on acupuncture. Research on complementary and alternative medicine maybe needs even more accuracy than those on conventional medicine [34,35].

Assuming that the interpretation of a review in complementary and alternative medicine is a difficult problem [50] the ideas represented in the published data reflects the spectrum of possible indications for acupuncture in neonates, but not a scientific basis yet. A very interesting aspect is that except for one no paper is older than three years. This could be an indicator that there is new awareness for the need of research.

A big data source about acupuncture comes from China itself. Unfortunately most papers are not available in English. Another reason why these sources have not been taken into account is their methodological doubtfulness [51].

The aim of our review is to underpin the necessity of studies as long as acupuncture is practiced in neonates and as long as there is need or at least questioning for methods of complementary and alternative medicine in neonatology.

Conclusion

There is no evidence for acupuncture in Neonates. This topic needs further evaluation in theoretical as well in practical concerns.

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