How acupuncture may relieve infantile colic symptoms—melatonin, serotonin and circadian rhythmicity

Reinthal et al’s study of minimal acupuncture effects on infantile colic was a great support for paediatric acupuncture. Although acupuncture has long been used for infantile colic, there were no randomised controlled trials until Reinthal et al’s study. Six years before that, Zhao had reported treatment of infantile morbid night crying with acupuncture at point PC9 in 100 cases, which were not referred to in Reinthal et al’s study.

In the Reinthal et al study, the effect of needling of the chosen point LI4 was attributed to the motor and autonomic nerve system, spinal reflexes and also to the segmental innervation of the viscera. The conclusion was therefore focused on the potential reduction of the intestinal peristaltic movements. However, it’s worth mentioning why infantile colic recovers spontaneously at about the age of three months.

It has been hypothesised that the melatonin timing mechanisms, which code for day length, are initiated prenatally by the maternal pineal gland, and three months postnatally the melatonin nocturnal secretion rhythm is maintained by the infant’s pineal gland. Peak serotonin concentration causes intestinal cramps associated with colic because serotonin increases intestinal smooth muscle contractions. Melatonin has the opposite effect of relaxing intestinal smooth muscles. Both serotonin and melatonin exhibit a circadian rhythm with peak concentrations in the evening. However, serotonin intestinal contractions are opposed by melatonin during the first three months because only serotonin circadian rhythms are present at birth. Melatonin circadian rhythms appear at three months of age as the cramps of colic disappear.

It is now clear that melatonin is a key regulator of clock gene expression in the suprachiasmatic nucleus, because modulation of the endogenous profile of melatonin secretion changes clock gene profiles. Like melatonin, serotonin is associated with alterations in circadian rhythmicity. Injection of serotonergic receptor agonists have been shown to decrease expression of two clock genes.

It has been shown that electro-acupuncture attenuates stress-induced defecation in rats with chronic visceral hypersensitivity via serotonergic pathway and modulate the availability of 5-hydroxytryptamine to restore the balance between 5-hydroxytryptamine synthesis and removal.

Further, it has been demonstrated that five weeks of acupuncture treatment (as in the Reinthal et al study) was associated with a significant nocturnal increase in endogenous melatonin secretion and significant improvements in polysomnographic measures of sleep onset latency, arousal index, total sleep time and sleep efficiency.

It can be assumed that acupuncture relieves infantile colic symptoms by regulating the serotonin and melatonin secretions and thereby the circadian rhythm. For such an effect, regulation of the circadian rhythm genes is mandatory. Further studies are needed to clarify the relationship of the clock genes, acupuncture and infantile colic.
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Yusuf Ozgur Cakmak

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