

The Use of Acupuncture in Conjunction with In-Vitro Fertilization

Search Results for XXXXXXXX

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Section I: Search Request

Your search request posted on the discussion board on April 10th reads:

I have read articles discussing the theory that acupuncture used in conjunction with in vitro fertilization greatly increases the mother's chance of conceiving. I have also read articles that suggest acupuncture is not scientifically proven to work and is all psychological. I guess I would like to know if there have been studies to prove one way or the other if acupuncture works, and more specifically, if it has been shown to work alone for increasing fertility or is it necessary to have it along with in vitro to see real results.

In emails sent on April 19th and 23rd, I asked the following questions:

- First, it sounds as though you are interested in the use of acupuncture in conjunction with IVF as well as acupuncture alone to treat infertility. When acupuncture is used alone to treat infertility, would you like me to focus only on females, or would you like studies that discuss acupuncture treatment for males as well?
- Second, are you interested in any studies that scientifically prove/disprove the use of acupuncture in general or would you only prefer those that scientifically prove/disprove the use of acupuncture for infertility?
- After a quick search, I noticed that many articles discussed the use of acupuncture during various stages of IVF, especially on the same day as embryo transfer. Would you be interested in articles that discuss the best times or stages to incorporate acupuncture, or are you simply concerned with the effectiveness of acupuncture at any stage?
- I know that acupuncture is very commonly accepted in Chinese medicine. For this reason, I am wondering whether you would prefer articles based on studies conducted only in the United States, only in North America, only North America and Europe, anywhere except Eastern Asia, or from anywhere in the world?
- Would you prefer research published during a certain time period (ie: the last year, the last 3 years, the last 5 years, etc.) or is publication date not a factor?
- If no clear consensus can be made on the efficacy of acupuncture as an infertility treatment, would you like an equal quantity of studies that support either side, the most recent scientific studies regardless of pro/con status, the studies that involve the largest number of subjects, or some other mix of articles?
- What research have you done so far? Have you found any articles that you particularly liked or disliked?
- Since we are looking for scientific data and proof, I have been focusing on articles for an academic or professional audience rather than for the average consumer. Does it matter to you whether these articles are peer-reviewed, or should they simply be intended for use in the scientific or medical communities?
- Do you want results in any language other than English?

Your emailed answers on April 19th and 23rd indicated that sources should be:

- in English, but could be published anywhere in the world.
- from approximately the last five years.
- focused primarily on female rather than male infertility.
- a mix of articles supporting either side in the event that a consensus could not be reached.

In addition, you noted that:

- “My main focus is on acupuncture for infertility, but I would like a few articles which prove or disprove the practice of acupuncture in general.”
- “I would like as much scientific data as possible, but would like maybe one or two articles that target the average, non-academic person.”

Section II: Sources Consulted

I searched six databases for information on your topic:

Academic Search Complete was selected as an interdisciplinary database with the potential for finding articles published in non-biomedical journals.

Alt Health Watch was selected for its focus on complementary and alternative medicine, including traditional Chinese medicine. In addition, indexed articles originated from both scholarly and trade journals.

EMBASE was selected because it includes articles from more than 2,000 biomedical journals not indexed by MEDLINE.

Gale Group Health and Wellness Database was selected because of its broad coverage of health and medicine, as well as its focus on both consumer and professional sources.

Health Source was selected for its focus on health and medicine. I used the Nursing/Academic edition for its more scholarly focus.

MEDLINE was selected because its focus is biomedicine and health, and a majority of cited articles are scholarly in nature.

I also used two web sites to locate information:

www.clinicaltrials.gov was searched for completed, current, and future acupuncture and infertility trials.

The U.S. National Library of Medicine site **www.nlm.nih.gov** was searched for appropriate medical subject headings as well as for retrieving full-text articles.

Section III: Search Strategies

From your search request, I selected the terms *acupuncture*, *in vitro fertilization*, and *infertility*. To the term *acupuncture*, I added the term *electroacupuncture* which was the preferred term for acupuncture performed with lasers rather than needles. (Adding laser acupuncture did not increase search results, but electroacupuncture added a few.) To the term *infertility*, I also added *fertility* and *subfertility* as these seemed to add relevant results. I chose not to add the related medical subject heading “sterility” as this tended to produce results focused on male subjects. To the term *in vitro fertilization* I added the abbreviation *IVF* as well as the term *assisted reproduction*. I truncated assisted reproduction to *assisted reproduct** so that it would also include the phrases “assisted reproductive treatment” and “assisted reproductive techniques.” I also noted that fertilization could also be spelled as fertilisation, so using a wildcard (*fertilization*) would allow for both results.

When searching for the effects of acupuncture in conjunction with IVF, I added the terms *conjunction*, *adjunct*, and *adjuvant*. When searching for acupuncture use for infertility but without IVF, I added the terms *improve** and *increase** as well as pregnancy rate (truncated and with proximity operator to read *pregnan* n3 rate**). In addition, for non-IVF patients, I found that the term *infertility* combined well with specific features of infertility, such as *ovulation* and *anovulation*, as well as specific conditions, such as *polycystic ovarian syndrome* or *PCOS*.

Because you requested some searches that dealt with the efficacy of acupuncture in general, I looked for results that included changes in hormones or brain activity. Terms included in these searches included *magnetic resonance imaging* as well as *fmri*, *hormone*, and *serum*. Because some articles mentioned that acupuncture was thought to decrease stress and affect the limbic system and sympathetic nervous system, I included the term *sympathetic*, the broader term *autonomic*, and the related term *limbic*. I also used terms such as *effective* and *efficacy*, truncated as *effect** and *efficac**.

All searches were created by combining related terms using Boolean operators. For example, a broad search was constructed as follows:

(*acupuncture* OR *electroacupuncture*) and (*infertility* OR *subfertility* OR *IVF* OR *in vitro fertilization* OR *assisted reproduct**)

A more selective search which retrieved a number of useful results was:

(*acupuncture* OR *electroacupuncture*) and (*improve** OR *increase**) and *pregnan* N3 rate**

Additional search strategies may be found in the search history appendix (Section VII).

Section IV: Key Findings

I found a number of articles that claimed that acupuncture improved pregnancy rate when used in conjunction with IVF as well as a number of articles that claimed that acupuncture did not affect pregnancy rate. In reading through abstracts, results, studies, meta-analyses, and summaries, I discovered several reasons why acupuncture efficacy may be so difficult to pinpoint. First, the most controlled studies should be double-blind. Double-blind placebo acupuncture needles are relatively new, with most studies being conducted since 2007. Second, many studies have been done using “sham acupuncture” in which sham acupoints are used rather than the identified acupoints. One criticism of this approach, however, is that sham acupuncture

still produces a physiological reaction and that these sham acupoints may not be a good comparison (Kaptchuk, Chen, & Song, 2010, p. 199-200). Third, studies have shown that there is inconsistency in the selection of acupuncture points for a given diagnosis, so results of studies conducted by different practitioners may not be suitable for comparison (Birkeflet, Laake, & Vøllestad, 2011). Fourth, the effects of acupuncture are often hard to separate from a placebo effect. This has been somewhat improved as the use of functional magnetic resonance imaging (fMRI) has shown the immediate and different brain reactions to various acupuncture points, although trials are still being conducted with fMRI to clarify and determine effects. Finally, for a result to be statistically significant, a large sample size is necessary. In the case of acupuncture and IVF, this sample size is limited to those who can afford expensive IVF treatments and who choose to participate in a study.

Overall, I discovered that the studies that promoted the use of acupuncture in conjunction with IVF had small sample sizes. In general, the articles that claimed that acupuncture did not improve pregnancy rates in conjunction with IVF were conducted with larger sample sizes. In addition, these studies more often included double-blind protocol and occurred more recently than those that promoted acupuncture. Scholarly literature of the past 2-3 years almost always seems to suggest that acupuncture does not improve pregnancy rates of IVF patients; however many trade publications claim that it does. Although acupuncture was not often seen as highly successful in improving pregnancy in conjunction with IVF, most studies from either viewpoint agreed that the best time to incorporate acupuncture was on the day of embryo transfer.

If we were to base our decision on the most scholarly articles, we would probably determine that acupuncture would not be useful for increasing pregnancy rate in conjunction with IVF. However, acupuncture has been shown to increase uterine blood flow and reduce stress and has been postulated to promote consistent ovulation. Because dysmenorrhea, stress, and anovulation are associated with female infertility, there is a possibility that acupuncture might be useful for treating infertility and increasing pregnancy when used alone rather than in conjunction with IVF.

Section V: Recommendations

The majority of useful articles I located were indexes in MEDLINE, Alt Health Watch, and Academic Search Complete. If you are interested in looking at newer studies or furthering your research, I would recommend the journal *Fertility & Sterility*. In addition to being published by the American Society for Reproductive Medicine, *Fertility & Sterility* has a significant number of articles dealing with the use of acupuncture for infertility.

I would also recommend two short articles. The first, “Reconsidering the Placebo Effect” from the December 2010 *Harvard Mental Health Letter*, proposes that the positive effects of acupuncture may not be from the actual treatment but from the positive interaction between the patient and clinician. The second item that may be of interest is an abstract published by doctors at Reproductive Medicine Associates of Connecticut in 2008, describing a study that included 1000 individuals assigned to laser acupuncture, sham laser acupuncture, needle acupuncture, relaxation, or a control group. The PDF abstract (with results), news release, and a video can be found at both www.rmact.com and www.prweb.com. Unfortunately, a full length paper has not yet been published for this study.

Section VI: Bibliography

Acupuncture:

- Ernst, E. E. (2006). Acupuncture – a critical analysis. *Journal of Internal Medicine*, 259(2), 125-137. doi:10.1111/j.1365-2796.2005.01584.x
- Kaptchuk, T. J., Chen, K., & Song, J. (2010). Recent clinical trials of acupuncture in the West: Responses from the practitioners. *Chinese Journal of Integrative Medicine*, 16(3), 197-203. doi: 10.1007/s11655-010-0197-x
- Quah-Smith, I., Sachdev, P., Wen, W., Chen, X., & Williams, M. A. (2010). The brain effects of laser acupuncture in healthy individuals: An fMRI investigation. *PLoS One*, 5(9), e12619. doi:10.1371/journal.pone.0012619

Acupuncture and Infertility:

- Andersen, D., Løssl, K., Andersen, A., Fürbringer, J., Bach, H., Simonsen, J., & Larsen, E. C. (2010). Acupuncture on the day of embryo transfer: A randomized controlled trial of 635 patients. *Reproductive BioMedicine Online*, 21(3), 366-372. doi:10.1016/j.rbmo.2010.03.029
- Birkeflet, O., Laake, P., & Vøllestad, N. (2011). Low inter-rater reliability in traditional Chinese medicine for female infertility. *Acupuncture in Medicine*, 29(1), 51-57. doi:10.1136/aim.2010.003186
- Cheong, Y., Nardo, L. G., Rutherford, T., & Ledger, W. (2010). Acupuncture and herbal medicine in in vitro fertilisation: A review of the evidence for clinical practice. *Human Fertility*, 13(1), 3-12. doi:10.3109/14647270903438830
- El-Toukhy, T., Sunkara, S., Khairy, M., Dyer, R., Khalaf, Y., & Coomarasamy, A. (2008). A systematic review and meta-analysis of acupuncture in in vitro fertilisation. *BJOG*, 115(10), 1203-1213. doi: 10.1111/j.1471-0528.2008.01838.x
- Madaschi, C., Braga, D., Figueira, R., Iaconelli, A., & Borges, E. (2010). Effect of acupuncture on assisted reproduction treatment outcomes. *Acupuncture in Medicine*, 28(4), 180-184. doi:10.1136/aim.2009.002022
- Manheimer, E., Zhang, G., Udoff, L., Haramati, A., Langenberg, P., Berman, B. M., & Bouter, L. M. (2008). Effects of acupuncture on rates of pregnancy and live birth among women undergoing in vitro fertilisation: Systematic review and meta-analysis. *BMJ: British Medical Journal*, 336(7643), 545-549. doi:10.1136/bmj.39471.430451.BE
- Moy, I., Milad, M. P., Barnes, R., Confino, E., Kazer, R. R., & Zhang, X. (2011). Randomized controlled trial: Effects of acupuncture on pregnancy rates in women undergoing in vitro fertilization. *Fertility & Sterility*, 95(2), 583-587. doi:10.1016/j.fertnstert.2010.05.024

- Smith, C., Coyle, M., & Norman, R. (2006). Influence of acupuncture stimulation on pregnancy rates for women undergoing embryo transfer. *Fertility & Sterility*, 85(5), 1352-1358. doi:10.1016/j.fertnstert.2005.12.015
- So, E. W. S., Ng, E. H. Y., Wong, Y. Y., Lau, E. Y. L., Yeung, W. S. B., & Ho, P. C. (2009). A randomized double blind comparison of real and placebo acupuncture in IVF treatment. *Human Reproduction*, 24(2), 341-348. doi: 10.1093/humrep/den380
- So, E. W. S., Ng, E. H. Y., Wong, Y. Y., Yeung, W. S. B., & Ho, P. C. (2010). Acupuncture for frozen--thawed embryo transfer cycles: A double-blind randomized controlled trial. *Reproductive BioMedicine Online*, 20(6), 814-821. doi:10.1016/j.rbmo.2010.02.02
- Stener-Victorin, E., & Humaidan, P. (2006). Use of acupuncture in female infertility and a summary of recent acupuncture studies related to embryo transfer. *Acupuncture in Medicine*, 24(4), 157-163. doi:10.1136/aim.24.4.157
- Westergaard, L. G., Mao, Q., Kroglund, M., Sandrini, S., Lenz, S., & Grinsted, J. (2006). Acupuncture on the day of embryo transfer significantly improves the reproductive outcome in infertile women: A prospective, randomized trial. *Fertility & Sterility*, 85(5), 1341-1346. doi:10.1016/j.fertnstert.2005.08.070

Section VII: Search History Appendix

Figure 1. Search conducted in Academic Search Complete, Alt Health Watch, Health Source, and MEDLINE (via EBSCO interface).

















Search ID#	Search Terms	Search Options	Actions
S8	 (electroacupuncture OR acupuncture) and (nervous system OR endocrin*) and (fertility OR infertility OR assisted reproduct* OR IVF OR in vitro fertilization)	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (21)
S7	 (electroacupuncture OR acupuncture) and sympathetic nervous system	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (74)
S6	 (electroacupuncture OR acupuncture) and ovulat*	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (28)
S5	 (electroacupuncture OR acupuncture) and hormon* and infertility	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (11)
S4	 (electroacupuncture OR acupuncture) and embryo transfer	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (46)
S3	 (electroacupuncture OR acupuncture) and (infertility OR IVF OR assisted reproduct*)	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (155)
S2	 acupuncture and (infertility OR IVF OR assisted reproduct*)	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (151)
S1	 electroacupuncture and (infertility OR IVF OR assisted reproduct*)	Limiters - Published Date from: 20050101-20111231 Search modes - Boolean/Phrase	 View Results (13)

Figure 2. Search conducted in Academic Search Complete, Alt Health Watch, Health Source, and MEDLINE (via EBSCO interface).











S5	 (acupuncture OR electroacupuncture) and (fmri OR functional magnetic resonance imaging) and (sympathetic OR autonomic OR limbic)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	 View Results (35)
S4	 (acupuncture OR electroacupuncture) and (fmri OR functional magnetic resonance imaging) and (effect* OR efficac*)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	 View Results (114)
S3	 (acupuncture OR electroacupuncture) and (fmri OR functional magnetic resonance imaging) and (clinical stud* OR clinical trial*)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	 View Results (15)
S2	 (acupuncture OR electroacupuncture) and (fmri OR functional magnetic resonance imaging)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	 View Results (156)
S1	 (acupuncture OR electroacupuncture) and (fmri OR functional magnetic resonance imaging)	Search modes - Boolean/Phrase	 View Results (218)

Figure 3. Search conducted in Academic Search Complete, Alt Health Watch, Health Source, and MEDLINE (via EBSCO interface).

Search ID#	Search Terms	Search Options	Actions
S7	(acupuncture OR electroacupuncture) and (improve* OR increase*) and pregnan* n3 rate*	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (40)
S6	(acupuncture OR electroacupuncture) and (infertility OR subfertility OR ivf OR in vitro fertilization OR assisted reproduct*) and (improve* OR increase*) and pregnan* n3 rate*	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (36)
S5	(acupuncture OR electroacupuncture) and (infertility OR subfertility OR ivf OR in vitro fertilization OR assisted reproduct*) and (improve* OR increase*)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (67)
S4	(acupuncture OR electroacupuncture) and (infertility OR subfertility OR ivf OR in vitro fertilization OR assisted reproduct*) and (conjunction OR adjunct OR adjuvant OR aid OR addition*)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (33)
S3	(acupuncture OR electroacupuncture) and (infertility OR subfertility OR ivf OR in vitro fertilization OR assisted reproduct*) and (conjunction OR adjunct OR adjuvant)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (13)
S2	(acupuncture OR electroacupuncture) and (infertility OR subfertility OR ivf OR in vitro fertilization OR assisted reproduct*) and (time OR timing)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (14)
S1	(acupuncture OR electroacupuncture) and (infertility OR subfertility OR ivf OR in vitro fertilization OR assisted reproduct*)	Limiters - Published Date from: 20050401-20111231 Search modes - Boolean/Phrase	View Results (171)

Figure 4. Search performed in EMBASE and Gale Group Health and Wellness Database (via DIALOG).

B 149, 72

? S ACUPUNCTURE AND HORMON?

24340 ACUPUNCTURE
432695 HORMON?
S1 1136 ACUPUNCTURE AND HORMON?

? S S1 AND PY=2005:2011

1136 S1
8309886 PY=2005 : PY=2011
S2 620 S1 AND PY=2005:2011

? S S2 AND (INFERTILITY OR IVF OR IN()VITRO()FERTILIZATION)

620 S2
56799 INFERTILITY
15228 IVF
12004363 IN
658398 VITRO
49046 FERTILIZATION
12834 IN(W)VITRO(W)FERTILIZATION
S3 48 S2 AND (INFERTILITY OR IVF OR IN()VITRO()FERTILIZATION)

Figure 5. Searches performed in EMBASE and Gale Group Health and Wellness Database (via DIALOG).

? S (ACUPUNCTURE OR ELECTROACUPUNCTURE) AND SERUM AND PY=2005:2011

24340 ACUPUNCTURE
2860 ELECTROACUPUNCTURE
504568 SERUM
8309886 PY=2005 : PY=2011
S7 325 (ACUPUNCTURE OR ELECTROACUPUNCTURE) AND SERUM AND PY=2005:2011

? S S7 AND (INFERTILITY OR FERTILITY OR IVF OR ASSISTED()REPRODUCT?)

325 S7
56799 INFERTILITY
55305 FERTILITY
15228 IVF
459539 ASSISTED
163196 REPRODUCT?
9364 ASSISTED(W)REPRODUCT?
S8 11 S7 AND (INFERTILITY OR FERTILITY OR IVF OR ASSISTED()REPRODUCT?)