

CLINICAL RESEARCH

Efficacy of Acupuncture for Male Infertility with Low Sperm Quality 102 Male Cases of Idiopathic Asthenospermia, Oligospermia and Teratospermia

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Abstract—Objective: To observe the clinical effect of acupuncture used to treat male infertility, specifically with low sperm-quality in three patterns (asthenospermia, oligospermia and teratospermia) in a retrospective case study. **Method:** This article analyzed 102 clinical cases of idiopathic men over the past 10 years (June 2010–June 2020) who received acupuncture treatments to improve sperm quality and increase the success rate of pregnancy and live-birth outcomes for their female partners.

Keywords: acupuncture, low sperm quality, asthenospermia, oligospermia, teratospermia, homogeneity of liver and kidney

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INTRODUCTION

Male infertility refers to a male’s inability to effect pregnancy in a fertile female. It is an alarming and global health issue. Approximately 40 to 50% of the cases of infertility are due to male infertility³, which is usually the result of deficiencies in the semen. A test of semen quality is a measure of male fertility which includes both sperm quantity and quality. There are three common findings in semen quality that cause male infertility. Asthenospermia is the medical term for the reduced motility of sperm. Oligospermia refers to semen with a low sperm count or a low concentration of sperm. Teratospermia is a condition characterized by the presence of sperm with an abnormal morphology.

The age of the patients ranged between 25 and 56, and the breakdown of case distribution according to age range was as such: age 25 to 30, 21 cases; age 31 to 35, 15 cases; ages 36 to 40, 18 cases; age 41 to 45, 27 cases; age 46 to 50, 15 cases, and age 51 to 56, 6 cases.

The criteria for inclusion in the data collection was: (1) males between age 25 to 56; (2) a history of an active sexual life without contraceptive measures for more than 1 yr; (3) female partner with normal fertility; (4) had had several failed IUI or ICSI-IVF attempts; (5) the types of TCM pathologies are liver qi stagnation and kidney yang deficiency; (6) no urinary tract infections.

SUMMARY OF CLINICAL PATIENTS

Data was collected from 102 male patients with low sperm-quality (asthenospermia, oligospermia and teratospermia) in Montreal at the clinic Acuenergie Acupuncture from June 2010 to June 2020 (see Table 1). The types of TCM pathologies that cause low sperm-quality are kidney yang deficiency and liver qi stagna-

DIAGNOSTIC CRITERIA

The criteria for sperm analysis from the World Health Organization (WHO) was used (2010) [1]: Asthenospermia, which is a percentage of progressively motile sperm below the lower reference limit 32%; oligospermia, which is a sperm concentration fewer than 15 million/mL; and teratospermia, which is

Table 1. Summary of the 102 cases

Sperm parameters	Lower reference limits (WHO2010)	Number of cases
Oligospermia (low sperm count)	15 million per mL	46
Asthenospermia (reduced sperm motility)	32%	35
Teratospermia (abnormal morphology)	4% normal form	21

Table 2. Outcomes of 102 cases

Pregnancy	Miscarriage	No change	Live births
81	13	21	68
79%	13%	21%	67%

a percentage of the morphologically normal sperm fewer than 4%.

TCM DIAGNOSTIC CRITERIA [2]

Kidney yang deficiency syndrome includes an inability to stay warm, cold extremities, low sex drive, frequent urination, oedema, fatigue, impotence, premature ejaculation and pain in the lower back, a pale tongue with a thin white coating, a deep and forceless pulse.

Liver qi stagnation syndrome is characterised by depression, anxiety, impatience, insomnia, tightness in the chest, tense muscles, digestive disorders including abdominal bloating and pain, side rib or groin pain, perineal pain or perineal bulge, hernia, a dark red tongue with yellow coating, a string and slippery pulse.

ACUPOINTS

The principal treatment involves two aspects: (1) invigorating kidney yang and essence, which strengthens the congenital foundation, and (2) improving qi and blood flow by nourishing and harmonising the liver and kidneys. 20 acupuncture points were selected which were mainly on the liver, kidney, bladder, stomach, spleen meridians as well as the meridians of the conception and governing vessels. They were divided into two groups, the use of which alternated each session i.e. each session used one group. Group1: LV1 (DaDun), LV3 (TaiChong), LV12 (JiMai), KD12 (DaHe), KD3 (TaiXi), CV6 (QiHai), CV4 (GuanYuan), CV3 (Zhongji), ST29 (GuiLai), ST36 (ZuSanLi), SP9 (YinLingQuan), SP6 (SanYinJiao), GV20 (BaiHui); Group2: GV4 (MingMen), BL18 (GanShu), BL23 (ShenShu), BaLiao points BL31 (ShangLiao), BL32 (CiLiao), BL33 (ZhongLiao), BL34 (XiaoLiao). Additionally, one or two ASHI non-acupoints were selected based on the palpation along the liver meridian.

102 patients were treated with acupuncture once a week over the course of 12 weeks. After completing 1 course of treatment, the rates of clinical pregnancy, miscarriage and live-births were observed (see Table 1).

RESULTS

After 12 sessions of acupuncture, the total number of pregnancies of the patients' partners was 81, including 13 cases of miscarriage. The total cases of live births was 68 (37 boys; 31 girls). There were 21 cases in

which there was no change. The rate of clinical pregnancies was 79%, miscarriages 13%, and live births 67% (see Table 2). The rate of overall effectiveness was 67%.

ETIOLOGY AND PATHOGENESIS IN TCM THEORY

The Function of the Liver and Kidneys in Traditional Chinese Medicine (TCM)

According to TCM, the liver and the kidneys are intimately related in the male reproductive system; consequently, the main pathogenesis of male infertility is kidney deficiency and liver qi stagnation. The liver stores blood and regulates blood flow, while the kidney stores essence and receives qi. The liver and kidneys transform vitality and blood, and regulate the circulation of qi and blood. Kidney essence and liver blood complement each other, and the two meridians of the liver and kidneys link qi and blood. Consequently, the kidneys and the liver affect the male reproductive function. Therefore, a low sperm count is due to a deficiency in kidney essence; low motility is due to a deficiency in kidney yang; and low morphology is due to a deficiency in kidney essence or the accumulation of damp heat. Chen Shiduo, a renowned TCM author from the early Qing Dynasty (1644–1911 AD), in his classic *Secret Records in a Stone Room* (in Chinese: 石室秘录) wrote: "Men do not have children because they have six diseases. These are cold sperm, weak qi, excessive phlegm, ministerial fire excessive, kidney essence in shortage and depression".

The Kidneys

The kidneys store congenital essence which controls a human being's growth, development, reproduction and fertility, and is the physiological function of kidney essence and kidney qi. A deficiency in kidney essence will result in insufficient reproductive essence, and ultimately lead to male infertility. In the Chinese medical classic *General Treatise on Causes and Manifestations* (in Chinese: 诸病源候论) written by Chao Yuanfang, a medical author during the Sui Dynasty (581–618 CE), it is stated: "The kidney governs the bone marrow and stores the essence. A tired and weak kidney qi causes semen deficiency". The TCM ancient treatise *The Yellow Emperor's Classic of Internal Medicine* (in Chinese: 黄帝内经) believes that a man's life is directly affected by kidney energy and divided into cycles of 8 yr.

“In the male, at eight years of age the kidney energy becomes full, the permanent teeth appear, and the hair becomes long. At sixteen years of age kidney energy is ample, the Tian Gui (fertility essence) is mature, and the Jing is ripe, so procreation is possible. At twenty-four years the kidney qi is abundant, bones and tendons grow strong, and wisdom teeth come in. At the thirty-second year the body is at its peak of strength, and the functions of the male are at their height. By forty the kidney qi begins to wane, teeth become loose, and the hair starts to fall out. At forty-eight the yang energy of the head begins to deplete, the face becomes sallow, the hair grays, and the teeth deteriorate. By fifty-six years the liver energy weakens causing the tendons to stiffen, the sex energy begins to deplete, the semen becomes scanty; the kidneys are weakened with the result that all parts of the body begin to grow old. At sixty-four the Tian Gui dries up and the Jing is drained, resulting in kidney exhaustion, fatigue, and weakness. When the energy of the entire organ is full, the excess energy stored in the kidney is excreted for the purpose of conception. But now, the organs have aged and their energies have depleted, the bones and tendons have become frail and stiff, and the movements are hampered. The kidney qi becomes empty, marking the end of the power of conception”.

The Liver

The liver regulates the function of reproductive. The liver plays another important role in male fertility based in TCM because it regulates the storage of blood and the smooth flow of qi throughout the body. The *Yellow Emperor's Classic of Internal Medicine* (in Chinese: 黄帝内经) refers to the liver as a general in the army which coordinates the functions of qi movement. The liver qi regulates men's ejaculation. If liver qi fails, men will lose their reproductive ability.

The liver stores blood which moistens and nourishes the liver so it can function normally. The insufficient storage of blood in the liver may cause night blindness, blurred vision, insomnia and infertility. The liver qi controls the reproductive function and regulates men's ejaculation. The male reproductive function gradually matures during adolescence. The excretion of normal sperm occurs when the liver and kidneys are synergetic. The abnormal movement of liver qi causes reproductive problems or sexual dysfunctions such as infertility, premature ejaculation, impotence, a lack of libido, and others. The stagnation of liver qi causes hernias, pain in the ribs, a sensation of fullness, and pain in the groin, lower abdomen and testicles.

The liver promotes ejaculation. Ejaculation in men is closely related to the function of the liver which maintains the free flow of qi. The storage and emission of semen requires the freeing actions of the liver qi working in coordination with the closing action of the kidney qi. When the liver qi maintains a normal flow of qi, semen can be released smoothly. When the liver

fails to maintain a normal flow of qi, the normal emission of semen can be affected negatively. The liver is the source of reproductive function. For men, both liver qi and blood are often implicated in issues of sexual function in that deficient blood and disordered liver qi are seen as one cause of impotence.

The TCM Theory of Homogeny of the Liver and the Kidneys

The kidneys are considered the congenital foundation of men. The TCM treatise *Questions of Fundamental Nature* (in Chinese: 素问) said: “The kidneys govern the bone marrow, and the bone marrow produces the liver”. This indicates that the liver and kidneys are homologous, and essence and blood are mutually produced. The essence of reproduction as the foundation of reproduction depends on the essence of the kidneys and the blood of the liver. It is also closely related to the dredging of the liver and the storage of the kidney.

The liver stores blood and controls the regulation of qi. If the liver's function of dredging and draining is normal, the qi and blood are harmonized, the meridian is tonic, the muscles can be nourished, and the normal physiological activities of men can be maintained. According to the theory of meridians, the liver and the kidneys are responsible for the yin organs, which are complementary to each other. The liver and kidneys are homologous. The liver governs drainage, and the kidneys govern storage. They coordinate with each other and maintain male sexual and reproductive activities. Physiologically, the liver stores blood, the kidneys store the essence, which means the essence and blood are intergrowth. Pathologically, if liver qi stagnates, it causes blood stasis, which affects the function of spermatogenesis, and then it decreases the quality of semen and leads to male infertility. Therefore, the theory of the homogeny of the liver and kidneys offers the theoretical basis for the treatment of male infertility.

The Pathway of the Liver and Kidney Meridians

In TCM, the meridians and collaterals are connected to Zang Fu organs. For example, the location of the liver and kidney meridians are closely connected to the testes. Therefore, the basis of the treatment of male infertility should focus on the liver and kidney meridians. The liver meridian originates from the medial corner of the big toe then runs externally through the web between the big toe and second toe, up the center of the foot and continues up towards the medial side of the lower leg and the upper thigh, encircles the external genitalia, enters the lower abdomen, and connects with the liver and gall bladder. The kidney meridian begins on the inferior side of the little toe, diagonally crosses the middle of the sole of the foot and curves behind the medial side of the ankle

then runs upward along the medial side of the leg, enters the body, connects to conception vessel meridian near the coccyx, and travels upward to connect to the kidney. The classic TCM book *Spiritual Pivot: Meridian Tendons* (in Chinese: 灵枢·经筋) says: “The tendon of the kidney meridian follows the tendon of the spleen meridian, continues along with the inner thighs, ends in the genitals”.

AGE AND SPERM QUALITY

Both Western medicine and TCM agree on the strong correlation between sperm quality and age. Clinical studies show that sperm quality changes with age and sperm production will begin to drop after age 40. Stone et al. (2013) [4] examined sperm quality in 5081 men aged 16.5 to 72.3 years and the authors found that the concentration of sperm and the proportion of sperm of normal morphology declined after the age of 40. Sperm motility fell after the age of 43 and ejaculate volume fell after the age of 45. Johnson et al. (2015) [5] in a meta-analysis which used data from 90 studies, found that the age of males was associated with a decrease in semen volume, a decrease in total sperm count, a decrease in motility and a decrease in the percentage of normal sperm morphology.

ACUPUNCTURE AND LOW SPERM-QUALITY

ICSI-IVF was invented to treat male infertility specifically caused by low sperm-quality. However, the success rate of the treatment is still low. The 2018 SART statistics show that for women younger than 35 the percentage of live births per IVF cycle was about 55.6 percent [6]. Some people turned to natural or alternative treatment after several failed ICSI-IVF.

Research studies on the use of acupuncture to treat infertile men have shown that acupuncture has a positive effect on low sperm-quality. Siterman et al. (1997) [7] demonstrated that acupuncture therapy improved the total motility in ejaculate. Zhang et al. (2002) [8] showed that acupuncture could improve sperm quality and fertilization rate. Pei et al. (2005) [9] indicated a general improvement in the quality of sperm, specifically in the ultrastructural integrity of spermatozoa on idiopathic males who received acupuncture twice a week for five weeks. Dieterle et al. (2006) [10] found, in a randomized placebo-controlled study, that acupuncture improved severe oligoasthenozoospermia (reduced sperm motility and low spermatozoon count). Siterman et al. (2009) [11] reported successful acupuncture treatment on males who suffered from low sperm count due to inflammation of the genital tracer causing scrotal hyperthermia. Acupuncture treatment resulted in decreased scrotal temperature and increased sperm count. The systematic review of the use of acupuncture to treat male infertility done by Hu Yuan et al. (2015) [12] also shows that acupuncture can effectively improve the quality of semen, thereby

increasing male fertility. The clinical studies of Sun Yiming et al. (2015) [13] have shown that acupuncture regulates the secretion of hormones by regulating the hypothalamus-pituitary-testicular axis. Acupuncture increases the concentration of testosterone and reduces the concentration of estradiol so as to achieve normal sperm density and a normal rate of sperm survival.

ACUPUNCTURE POINTS AND MANIPULATION

Before inserting the needles, the patient was told to empty his bladder, then the acupuncturist palpated along the liver meridian (because it encircles the genital area). The localized disorders in the reproductive organs are often traced to a blockage in the liver meridian. Ashi points are based on the palpation of the liver meridian.

Disposable sterile needles (size 0.25 × 25 mm and 0.30 × 40 mm) were inserted perpendicularly in all points to a depth 15 to 25 mm (except LV 1 shallow puncture 3 mm), depending on the region of the body undergoing treatment. A KWD- 808 I electro acupuncture instrument was connected at ST29 (GuiLai, bilateral), KD12 (DaHe, bilateral) and BL31-34 (Baliao, bilateral), and was set to a continuous wave, the intensity of which was based on the patient's preference. The manipulation of needling used the technique of even reinforcing-reducing, evoking the sensation of the needle (DeQi) until the patients felt various sensations of soreness, numbness, tingling, warmth or tension. When needling the lower abdomen points such as KD12 (DaHe), ST29 (GuiLai), CV6 (QiHai), CV4 (GuanYuan), and CV3 (Zhongji), the sensation of the needle is transmitted to the perineum. When puncturing BL31-34 (BaLiao), the needling sensation is transmitted to the sacral or perineum area and anterior hypogastric zone. After DeQi sensation, the needles were left in the acupuncture points for 30 min and then removed. The frequency of acupuncture was twice a week for a total of twelve weeks, which constituted one course of treatment.

DISCUSSION

The acupuncture protocols to treat low sperm-quality are based on the TCM theory of the homogeneity of the liver and kidneys. The *Yellow Emperor's Classic of Internal Medicine* (in Chinese: 黄帝内经) incisively reveals that Tian Gui, kidney qi and kidney essence are the three elements that constitute the basis of the ability of a male to reproduce. Tianguai is a key substance which promotes male reproductive ability, which depends on the maturation of Tianguai. The circulation of qi in the liver meridian and kidney meridian is closely related to the health of the testes of male reproduction. The pathogenesis of oligospermia and asthenospermia is due to insufficient kidney qi and essence.

The pathogenesis of teratospermia is kidney qi deficiency, liver dampness and blood stagnation. Therefore, the main treatment of low sperm-quality is to invigorate the kidney qi and essence, to clear the liver of dampness, and to regulate liver qi.

Acupuncture treatment is mainly based on the meridians of the kidneys, liver and bladder, which are supplemented by the meridians of the conception vessel, the governing vessel, the spleen and stomach. The method of treatment is to warm kidney yang, to nourish the liver and kidneys, to promote the circulation of blood and to clear obstruction in collaterals. At the same time, electric acupuncture stimulation is also used. Of the group of selected acupoints, the three acupoints CV6 (QiHai), CV4 (GuanYuan) and CV3 (Zhongji) are closely related to reproduction. Together they strengthen the vital energy, nourish kidney yang and kidney essence, and dispel cold and damp in genitals. The combination of acupoints of ST36 (ZuSanLi) and SP9 (YinLingQuan) have the effect of replenishing the spleen and stomach, regulating qi and blood, eliminating dampness and heat, and nourishing the congenital qi. SP6 (SanYinJiao) has the effect of enriching blood, activating blood and dredging collaterals. GV20 (BaiHui) belongs to the governing vessel, where all yangs meet. This acupoint point invigorates qi and increases yang, and coordinates with other acupoints to adjust yin and yang.

LV1 (DaDun) is the Jing-Well point of the liver meridian, which helps with problems of the reproductive system and seminal emission by regulating qi and blood. LV3 (TaiChong) is the Yuan-primary point of the liver meridian, which spreads liver qi, nourishes liver blood and yin, and discharges damp heat in the genitals. The liver and kidneys have the same source of essence and blood. If liver qi is regulated, essence and blood can be generated. LV12 (JiMai) clears channels and dispels cold, and helps in treating hernia and genital pain. KD3 (TaiXi) tonifies kidney yang, yin and essence, and cools heat. It is the main point for problems with fertility problems and sex. KD12 (DaHe) is the meeting point of the kidney meridian with the meridian of Chong vessel, where the primary qi of the Lower Jiao is plentiful. It regulates the meridians of the conception vessel and the governor vessel. It helps in treating impotence, and pain in the external genitalia. ST29 (GuiLai) regulates qi in the abdomen, which helps in treating hernia and abdominal pain. BL18 (GanShu) benefits the liver and gall bladder. It cools damp heat and moves stagnating qi. GV4 (MingMen) is the point of the governing vessel, where the congenital essence is stored, and is the foundation of life. It controls the reproductive and developmental functions of the human body, and at the same time it strengthens kidney yang.

BL23 (ShenShu) and BL31-34 (Baliao) are the points of the bladder meridian. The kidneys and the bladder correspond to each other. The essence of the

kidneys is infused in the back. Back Shu points are used to treat yang, and abdomen Mu points are used to treat yin. In alternating treatment sessions, the acupoints are selected on the abdomen and on the back so that yin and yang reconcile and complement each other. The conception vessel and governing vessel are the chief leaders of yin and yang, which play a leading role in the six yin and six yang meridians and are the preferred meridians for adjusting the balance of yin and yang. This combination of acupuncture points warms the kidney yang, soothes the liver qi, nourishes the kidney essence and the liver blood, and invigorates the congenital and acquired qi, thereby improving the quality of the sperm.

TYPICAL CLINICAL CASES

Case 1: Teratospermia (low morphology)

43 year-old male, consultation date October 29, 2020.

History: The couple had 2 failed IVFs in 2019; his wife had 1 miscarriage at 3 months in May 2020; 1 stillbirth at 25 weeks in December 2019. The main reason for consultation was a low sperm morphology 1.09% and penile varicose veins. His main symptoms are frequent fatigue, low energy, pale complexion, sensitivity to cold, cold limbs and feet, low appetite, sometimes pain in the left side of testicles. White beard, grey hair since the age of 25, anxiety, depression, he has lots of stress from work, and he sleeps well but goes to bed late (after 12 pm). Has erection trouble from time to time; pale tongue and a thin pulse. TCM opinion is kidney yang deficiency; liver qi stagnation. He completed 15 sessions of acupuncture treatment from Oct. 29, 2020 to Dec. 23, 2020 followed by the protocol mentioned above. Many symptoms improved such as warm feet, more energy, less fatigue, and more powerful ejaculations. He even started to play tennis. He did the DNA fragmentation test on Dec. 15, 2020. The result was normal. Then he confirmed his wife became pregnant on Dec. 30, 2020. His wife gave birth naturally at 39w3d to a healthy baby girl on Sept. 3, 2021 (Baby picture below).

Case 2: Asthenospermia (low motility) and Oligospermia (low sperm count)

39 year-old male, consultation date May 31, 2019.

History: His wife had 9 failed IUIs from 2018 to 2019 due to his low sperm quality. The main complaint is mobility progression 23%; a low sperm count of 5 million. His main symptoms are overweight with BMI 29.5, eczema on the feet, many moles on his back, seasonal allergies every summer, stress from work, irritable, go to bed late, low energy at the end of the day, lower back pain with neck and shoulder blade tension. Digestion is slow, constipation, likes to eat sweet stuff and raw vegetables, heart burn sometimes. Red tongue with yellow coating, slippery pulse. TCM opinion is kidney yang deficiency; liver qi stagnation;

Case 1



Case 2



damp-heat accumulation. He completed 12 sessions of acupuncture treatment from June to Aug 2019, followed by the protocol mentioned above. All of the relevant symptoms changed. Eczema healed, no allergies in the summer, lower back pain decreased, digestion was back to normal. He announced that his wife became pregnant naturally in September 2019. She gave birth to a happy boy on June 19, 2020 (Baby picture below).

LIFESTYLE MANAGEMENT

Except for the effects of aging, diet and lifestyle choices have an impact on the quality of sperm. Liver qi is disrupted due to stress and lifestyle choices such as going to bed late (after midnight), consuming heavy sugar and other substances. Kidney yang deficiency can be caused by drinking cold beverages, eating raw and cold food. Recreational drugs, including cannabis, amphetamines, and opiates, and excessive alcohol consumption reduce sperm quality. Smoking can reduce fertility and has been shown to affect sperm motility. But changes to a man's diet and lifestyle improve the health of future sperm. In order to have healthy sperm, a combination of a healthy diet and lifestyle, along with exercise support acupuncture. For example, exercising regularly and losing weight; avoiding tobacco, alcohol and illegal drugs; reducing the amount of caffeine consumed; avoiding hot tubs and baths; wearing loose-fitting underwear; going to bed earlier (before 11 pm); eliminating sugar, cold drinks, carbonated beverages, raw food; eating foods or supplements rich in antioxidants every day; reducing spicy, greasy foods; and decreasing stress. Note

that it takes about three months to produce new sperm, so any changes in diet or lifestyle will require some time before improvements are seen.

CONCLUSIONS

Acupuncture is effective in treating low sperm-quality and in restoring male fertility. It can be used in clinical practice in treating male infertility. Acupuncture can be considered an effective alternative treatment after several failed attempts at IUI or ICSI-IVF.

ABBREVIATIONS

ICSI	Intracytoplasmic Sperm Injection
IUI	Intrauterine insemination
IVF	In vitro fertilization
TCM	Traditional Chinese medicine

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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