

Treating Female Infertility and Improving IVF Pregnancy Rates With a Manual Physical Therapy Technique

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Abstract

Context: Infertility and pregnancy

Objective: To assess the effectiveness of site-specific manual soft tissue therapy in (1) facilitating natural fertility and (2) improving in vitro fertilization (IVF) pregnancy rates in women with histories indicating abdominopelvic adhesion formation.

Design and Intervention: Pursuant to 2 promising pilot studies, 53 infertile, premenopausal patients received a 10- to 20-hour series of site-specific manual physical therapy treatments. Seventeen patients hoped to achieve a natural pregnancy; 36 planned to undergo IVF within 15 months. The primary criteria for inclusion in the studies were the inability to conceive following a minimum of 12 months of unprotected intercourse and suspected or confirmed pelvic adhesions due to abdominal and/or pelvic surgery, infectious or inflammatory disease (eg, endometriosis, PID), or trauma. Treatments were specifically designed to address biomechanical dysfunctions of the pelvis, sacrum, and coccyx and restricted soft tissue and visceral mobility due to adhesions or microadhesions affecting the reproductive organs and adjacent structures.

Main Outcome Measures: (1) Natural fertility group: pregnancy within 1 year of therapy and subsequent full-term delivery; (2) Pre-IVF group: pregnancy (via transfer of fresh embryos from nondonor eggs) within 15 months of the last manual treatment date.

Results: *Natural fertility group:* Of the 14 patients available for follow-up (ages 25 to 44; mean, 33.5 years), 10 (71.4%) became pregnant within 1 year, and 9 (64.3%) reported full-term deliveries. Three of the 9 women who delivered reported a subsequent pregnancy, suggesting that the treatment protocol might have lasting effects. Two women have had a second live birth delivery; and the third is still pregnant. *Pre-IVF group:* Of the 25 patients available for follow-up (ages 28 to 44; mean, 36 years), clinical pregnancies were documented in 22 of 33 embryo transfers vs the US Centers for Disease Control and Prevention (CDC) 2001 age-adjusted expected number of 12.7 ($P < .001$). The estimated odds ratio for a successful pregnancy in a cycle (manual treatment: no treatment) is 3.20 (95% confidence interval = 1.55–8.4).

Conclusions: The data trend across these studies suggests that this innovative site-specific protocol of manual soft-tissue therapy facilitates fertility in women with a wide array of adhesion-related infertility and biomechanical reproductive organ dysfunction. The therapy, designed to improve function by restoring visceral, osseous, and soft-tissue mobility, is a nonsurgical, noninvasive manual technique with no risks and few, if any, adverse side effects or complications. As such, it should be considered a new adjunct to existing medical infertility treatments.

Introduction

The purpose of the present series of investigations was to assess the effectiveness of site-specific manual soft-tissue therapy in treating infertility in women with a history indicating probable abdominopelvic adhesion formation, eg, prior surgery, endometriosis, infection, inflammatory process, trauma, or tubal obstruction.

Adhesions and Infertility

In the United States, infertility is defined as the inability to conceive after 12 months of unprotected sexual intercourse.^[1,2] Internationally, the time frame is generally longer -- 24

months.^[3] Infertility is a common problem affecting 10% to 15% of heterosexual couples. Estimates suggest that 40% of the problems are attributable to the female, 40% to the male, 20% to both or unknown, and that some 25% of infertile couples have > 1 factor impeding fertility.^[3] As most infertility research lacks control couples for comparison, much of the infertility literature is anecdotal.^[4]

Of the approximately 5 million infertile women in the United States, it is estimated that 2 million (40%) have medical or hormonal infertility; 1 million (20%) have idiopathic infertility; and 2 million (40%) have mechanical infertility.^[5]

Pelvic adhesions are often cited among the primary causes of mechanical infertility.^[4,6] Adhesions are deposits of fibrous tissue that form as a natural inflammatory response to tissue damage after surgery, infection, inflammation, or trauma. They form as a by-product of the healing process and may remain long after the original site of inflammation or trauma has healed. They may adhere to a specific organ or muscle, either within the myofascial structure of the organ, on its surface, or as an attachment to neighboring structures. Wherever they occur, adhesions distort the anatomy and cause decreased mobility and function.^[4]

In addition to being a common outcome of pelvic surgery, the formation of pelvic adhesions is known to accompany related conditions such as endometriosis, pelvic inflammatory disease (PID), tubal obstruction, polyps, pelvic spasms, bowel obstruction, and chronic abdominopelvic pain.^[6-8] It is presumed that some of these dysfunctions cause, or are caused by, adhesions. Moreover, a certain proportion of idiopathic infertility may be due to microadhesions that have formed in the pelvis as the body healed from a previous inflammation or trauma. Microadhesions are often too small to see, and thus difficult to diagnose.

Effects of Abdominopelvic Adhesions

In sum, adhesions can restrict the mobility and function of the organs, ligaments, osseous structures, muscles, fascia, and nerves. Thus, they affect the biomechanics of the entire abdominopelvic region, limiting the ability to conceive even with in vitro fertilization (IVF) and other assisted reproductive technologies (ART).

Infertility-causing adhesions may form in the following locations:

- on uterine walls and ligaments, increasing the possibility of uterine spasm, implantation problems, and miscarriage and decreasing the ability to conceive;
- at and within the tissues of the cervix, creating stenosis, affecting the relaxed midline position, contributing to uterine spasms, and complicating sperm transfer to the uterus;
- on the surface of the ovaries, preventing exposure of the ovum and making transfer to the fallopian tube difficult;
- at the distal aspect of the fallopian tube, restricting the tentacle-like grasping of the egg by the fimbria, hence increasing its risk of being wasted in the abdominal cavity; and
- anywhere on the inside or outside of the fallopian tube, causing partial or total tubal occlusion, decreasing the probability of conception, and increasing the chance of an ectopic pregnancy.^[9-11]

Value of Intervention

Clinically, we have observed that site-specific manual soft-tissue therapy improves soft-tissue mobility, elasticity, and distensibility. Theoretically, mobilization of the soft tissue may break collagenous cross-links and adhesions that cause pain and dysfunction,^[12] including physician-diagnosed mechanical infertility.

In addition to its apparent use as a natural infertility treatment, this therapy functions as an adjunct to regular gynecologic care when applied before intrauterine insemination (IUI) and IVF. We suspect that the therapy specifically helps improve mobility and motility of the reproductive organs by decreasing the following:

- adhesions and microadhesions on and within the uterine walls, helping to create a more hospitable surface for implantation;
- uterine and cervical hypertonicity and spasm, thus creating a more relaxed environment for implantation;
- cervical stenosis, adhesions, and tensions within the cervix and its attachments, thus improving cervical mobility and facilitating transfer to the preferred implantation site.

Connective Tissue and Adhesions

The ability of manual therapy to affect connective tissues and adhesions has support in the basic literature on mechanical tissue testing and connective tissue physiology and remodeling. Specific sustained physical forces applied to a given area alter connective tissue length and mobility.^[13]

Adhesion formation occurs after soft-tissue trauma and is caused by an inflammatory response to tissue damage. The body responds to injury by activating macrophages to debride and clean the damaged area. Fibroblasts begin to replace lost collagen, producing a fibrinous exudate. Myofibroblasts then appear, anchor to adjacent collagen fibers, and contract, thus shrinking the tissue.^[14-17]

As collagenous fibroblasts align within the structure, collagen is laid down in a haphazard manner, and cross-links begin to form. The result is the formation of a fibrinous adhesion, which may cause a subsequent adherence of the adjacent serosal surfaces. Tissue shrinkage leads to dysfunctional movement of the area that, in turn, creates more mechanical irritation, thus perpetuating the cycle.^[14-17] These mechanical components have been proposed as the underlying mechanism of adhesion-related pain.^[18]

As healing time increases, cross-links may grow into microadhesions, then adhesions, and eventually thicken into scars.^[15,16] Minor adhesion formations are often limited and may be absorbed within a few days by fibrinolytic mechanisms, but permanent adhesions can form between the peritoneum and the serosal surface of adjacent organs. These permanent adhesions are considered a pathologic state in which the continuous unity of the peritoneal wall or serosal surface of organs is destroyed, leading to impairment of their physiologic functions.^[19,20] Mobilization of the soft tissues using site-specific manual therapy appears to break the attachments of the collagenous cross-links within the adhesions, thus restoring normal mobility and function to the previously adhered organs.

Physical Therapy and Infertility

A search into the use of manual physical therapy as an infertility treatment yielded a series of studies conducted between 1978 and 1989 in the Czech Republic. The Mojzisoová method includes a combination of soft tissue and osseous mobilization techniques, post-isometric relaxation, and a home exercise program over a 6-month treatment period. It is based on the premise that accidents (including falls) and sedentary lifestyles can cause blockages or constrictions in the lower spine that lead to pelvic spasms and other functional disturbances of the pelvic region. Thus, according to Mojzisoová, "there is a direct relationship between the condition of the lower back muscles and the way the reproductive organs function."^[21,22]

The purpose of the second Prague study, based on 2006 randomly selected infertile women, was to determine which types of infertility were best suited for treatment by the Mojzisoová method.

Results showed that conception rates ranged from a low of 11% for women aged 40 to 44 to a high of 46% for the age group 20 to 24. Other factors increasing the chance of success included an active lifestyle and the absence of tubal obstructions and other intrusive conditions, such as PID, abdominal and/or pelvic surgery, and ectopic pregnancy.^[21]

A subsequent study (1987 to 1989) based on the above findings compared the Mojzisoová method with several control treatments. Criteria for participation were as follows: (1) age between 22 and 30 years; (2) normal quality/quantity of partner's sperm; and (3) patency of fallopian tubes. The study population included 166 women whose mean duration of infertility was 4 years; 118 women completed the trial. The mean conception rate for the main experimental group was significantly higher than that for the 3 control groups, who either performed "non-genuine" exercises or did not exercise at all – 34.3% (12/35) vs 8.4% (7/83) ($P < .01$).^[22]

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