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Osteopathic practitioner´s considerations on infertility treatment

A qualitative study

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The impact of infertility prevalence affects a large part of the world's population, as approximately 1 in 6 people experience infertility during their lifetime.
Osteopathy is a person-centred healthcare discipline that facilitates the body's innate ability to heal itself and promotes a holistic approach using manual treatments. The aim of this master´s thesis is to describe experienced osteopath´s considerations of infertility treatment observing and exploring the knowledge, the clinical reasoning, the approaches, and the techniques considered by osteopaths treating infertility.

Qualitative research methods with a phenomenological approach were used. Participants were recruited through purposeful and snowballing sampling. Inclusion criteria consisted of osteopaths having more than five years of experience treating people with infertility and speaking Spanish or English language. Data was collected from 10 participants through semi-structured in-dept interviews and was analysed by inductive content analysis, creating codes, themes, categories, and subcategories.

Four main themes were emerged from data. The osteopathic view of each attempt to conceive as a unique event, recognised through the patients' narrative, the therapeutic relationship and the osteopath's scope of practice. The identification of possible underlying causes, and restoration and optimisation of physiological functions. The osteopathic reasoning for underlying multifactorial infertility causes, such as inflammatory, thermoregulatory, circadian cycles, postural, organic, and structural factors. And the osteopathic intervention to identify and treat physiological disruptors, using an integrative and/or global approach, and manual skills, which included hand-based communication and types of techniques.

The tendency to delay motherhood and the high prevalence of infertility rates might require considering a broad spectrum of treatment options osteopaths have developed a general and specific overview and combined integrative, holistic, individualised and person-centred model with the effectiveness of osteopathic manual treatment. It may enable the design of a personalised treatment plan and to focus on specific manual interventions that could be highly relevant to the person's condition.

Keywords	infertility, osteopathy, osteopathic manual treatment

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Contents

1 Introduction

Infertility lifetime prevalence affects a high proportion of the global population, with around 1 in 6 people encountering infertility in their lifetime (WHO 2023). Global infertile people rates, in 190 countries from 1990 to 2010, were estimated to be 186 million and couple's rates were 48,5 million of which 19,2 million suffer from primary infertility and 29,3 million from secondary infertility (Mascarenhas et al. 2012: 2; Starc 2019: 508; Cox 2022: 2). After 35 years of the emergence of assisted reproduction techniques, there are many locations where assisted reproduction techniques are absent, inaccessible, or unaffordable for most infertile couples (Inhorn & Patrizio 2015: 423; Butts 2021: 289; Feng et al. 2021: 1). Growing global prevalence has significantly increased in infertility rates among individuals aged 15–49 years globally from 1990 to 2021, with predictions suggesting this tendency will continue through 2040 (Liang et al. 2025: 530). The current impact of infertility is reported to affect millions of individuals and couples worldwide, frequently with negative health and societal consequences, such as physical and mental distress, social stigma, and economic hardship. The global burden of infertility requires urgent efforts to improve fertility care. (Cox 2022: 2.)

Optimal health requires synchronisation between internal circadian cycles and external environmental cycles (Shao 2021: 2). Circadian rhythms are used to describe gene expressions, metabolism, activity patterns and hormone levels over 24 hours (Sciarra et al. 2020: 1). Hormones are essential for reproductive functions; therefore, endocrine disorders can cause hormonal and reproductive system abnormalities and thus lead to infertility. Specifically in women, it can be presented as uterine, tubal, and ovarian disorders. (Silva et al. 2023: 7070.)

The presence of fibrous tissue deposits can be found in the formation of adhesions when there is an impairment in the formation and degradation of fibrin in physiological healing. Pelvic adhesions can result after an inflammation, trauma, surgery, or infection processes. (Ghobrial, Ott & Parry 2023: 3; Wurn 2004: 189; Brüggmann et al. 2010: 770.) The incidence of adhesions after abdominal and gynaecological surgery can be as high as 67-93% and 97% respectively (Liakakos et al. 2001: 261). These adhesions established in an organ, muscle or myofascial tissue could alter the anatomy and mobility and therefore, the physiology of the affected tissue and contribute to pelvic

pain, sexual dysfunctions, and infertility (Ghobrial et al. 2023: 1; Becker, Silver, Seufert & Muensterer 2019: 4; Goldberg et al. 2019: 421; Thakur et al. 2021: 2076).

Sexual dysfunction is defined as a sexual problem linked to physical, psychological, relational, and socio-cultural factors, which may affect at all stages of sexual response, such as orgasm disorders, pain, desire, arousal, and lubrication difficulties (Facchin et al. 2019: 1066; Dong et al. 2021: 2). Couples undergoing infertility treatment sometimes might not be assessed for sexual dysfunctions (Starc et al. 2019: 513).

Osteopathy is a person-centred healthcare discipline founded on the assumption that the structure (anatomy) and function (physiology) of the body are intimately related and that a person's well-being relies on the equilibrium of visceral, somatic, and neurological structures. It is a type of holistic, essentially manual therapy which can be integrated with other lifestyle interventions, such as exercise, nutrition, and postural advice. Osteopaths regard human beings as dynamic functional units considering body, mind, and spirit. (Osteopathy Europe 2023; WHO 2010; 1; Bagagiolo, Rosa & Borrelli 2022: 1.)

The aim of this master´s thesis is to describe experienced osteopath´s considerations of infertility treatment with the purpose of observing and exploring the knowledge, the clinical reasoning, the approaches, and the techniques considered by osteopaths treating infertility, to benefit patients seeking pregnancy and osteopaths interested in this topic.

2 Theoretical background

Infertility is increasingly common in developed societies, and its growth is mainly related to women delaying motherhood, the decline in sperm quality, exposure to environmental factors and lifestyle (Ramírez-Moran, Bayeux, Fajardo-Iglesia & Grave de Peralta 2019: 286). The lowest percentage of infertility is among women aged 15-29 and increases with age (Phillips, Raimot, Olanrewaju & Follashade 2023: 623). The combination of a social tendency to postpone motherhood and the decrease of fertility due to age, are therefore elements to consider (Ramírez-Moran et al. 2019: 289).

2.1 Infertility

Infertility, also known as subfertility, is a reproductive system disease characterised by the failure to become pregnant after 12 months or more of regular unprotected sexual intercourse (Vander Borght & Wyns 2018: 2; Zegers-Hochschild et al. 2017: 395; Mascarenhas et al. 2012: 2; Dong et al. 2021: 2; WHO 2023; Feng et al. 2021: 1). Infertility may be primary when a person has never been able to achieve pregnancy, and secondary when at least one prior pregnancy has been accomplished (WHO 2023; Phillips et al. 2023: 623).

Unexplained or idiopathic infertility is defined as the inability to conceive without finding any identifiable reason, therefore, a diagnosis based on exclusion is made in couples who do not meet the criteria for male or female infertility, such as absence of ovulation, impaired fallopian tubes or uterine cavity, endometriosis or cervical or vaginal obstruction (Raperport et al. 2023: 880; Moghissi & Wallach 1983: 5; Zegers-Hochschild et al. 2017: 406). Crosignani et al. (1993) suggested that the diagnosis of unexplained infertility is founded on normal ovarian and sperm function and at least one patent fallopian tube (Buckett & Sierra 2019: 634; Phillips et al. 2023: 627).

The main cause of infertility worldwide is genital infection in both men and women (Ramirez-Moran et al. 2019: 289). Other main causal elements are male factor in 25-35% of couples, due to seminal alterations, and female factors, such as the tubal and peritoneal issues in 17-20% of patients, due to impairments of the fallopian tubes and their surroundings. Endometriosis can affect ovarian and tubal function in 5-15% and the ovulatory function between 25-35% of cases. In addition, there may be an unknown origin or a mixed or combined causes. (Ramirez-Moran et al. 2019: 289.)

Infertility sources can also be considered as female, male or unexplained factors. Female causes range 35%-50%, male causes account 40-50%, and unexplained causes account more than 30%. (Phillips 2023: 623; Raheem & Ralph 2011: 8.) Female impaired functions may be due to genital, extragenital or psychological factors (Starc 2019: 509). Male disturbances might be caused to non-obstructive (sperm production), obstructive aetiology (sperm transport) or conditions that interfere with the

erection and the ejaculation. The underlying causes are alterations in the number, volume, morphology, and motility of spermatozoa. (Phillips et al. 2023: 623.)

Infertility may also be the result of genetic mutations, chromosomal abnormalities, lifestyle aspects, ovarian and tubal disorders, endometriosis, and unexplained factors (Bala et al. 2020: 1). Female hormonal underlying causes of infertility can be hyperprolactinaemia, hypothyroidism, ovarian, tubal, and uterine disorders, elevated levels of follicle stimulating hormone, indicating decreased ovarian function, polycystic ovary syndrome and sexual dysfunctions (Rice et al. 2015: 36; Becker et al. 2019: 1; Phillips et al. 2023: 626). Inflammation, in endometriosis, causes infertility through hormonal imbalance, preventing follicle maturation and fertilisation, damaging DNA, oocytes and sperm, and inhibiting embryo implantation and sperm motility (Raheed & Hamid 2011: 1).

2.1.1 Lifestyle factors

The current trend towards delaying motherhood has resulted in a greater interest in studying the influence of lifestyle, reproductive health, and infertility, since it has become apparent that ovarian aging, decreased oocyte and sperm quality, and an increase in age-related medical conditions decrease fertility (Prieto-Huecas et al. 2023: 1; Ramirez-Moran et al. 2019: 286). Lifestyle is critical in neuroendocrine regulation and in the physiology of homeostasis and fertility (Bala et al. 2020: 11; Cornejo et al. 2016: 1; Lakoma 2023). In terms of exercise and nutrition, lifestyle differs considerably between fertile and infertile people (Khosrorad et al. 2015: 552). Frequency and intensity of physical activity can affect fertility. High-intensity sport may influence the hypothalamic-pituitary axis, potentially leading to hypothalamic amenorrhea and subsequently infertility. Moderate physical activity is recommended to improve ovarian function and fertility, especially among women with obesity. (Oostingh et al. 2019: 90.)

In modern society, circadian cycles are impaired by disruptions in sun exposure, eating and sleeping rhythms. Altered clock genes, which fine-tune body homeostasis, environmental stimuli or stress can disrupt the feedback loop involved with infertility. (Shao 2021: 2; Bendarska-Czerwinska 2023: 7.) Seasons and cycles of light and darkness regulate the secretion of melatonin from the pineal gland, which is involved in development and function of the cells of female and male reproductive systems and the processes of growth (Sciarra et al. 2020: 5; Bendarska-Czerwinska 2023: 4).

Nutrition can contribute to positive or negative effects on fertility in both men and women according to the quantity and quality of the properties of the food ingested (Lakoma 2023: 16). Healthy eating habits prior to conception in both men and women have a beneficial effect on fertility and assisted reproductive technology processes. (Lakoma 2023: 16; Skoracka et al. 2021: 1.) Negative dietary influences include mainly high-glycaemic carbohydrates, sweets, sugary drinks, high quantities of animal protein, particularly red and processed meat, saturated fatty acids, and trans-fatty acids. It leads to a low intake of vegetables and fresh fruits, vitamins, dietary fiber, unrefined cereals, low-fat poultry, and seafood. (Arab et al. 2018; Salas-Huetos 2019: 1; Lakoma 2023: 4.) A healthy diet based mainly on plant foods and fish is positively associated with indicators of high sperm quality, a lower risk of type 2 diabetes, weight control, anti-inflammatory effects, antioxidants, improved gut microbiota and fertility (Chen et al. 2021: 664; Lakoma 2023: 2; Skoracka et al. 2021: 2373; Ferramosca & Zara 2022: 10). A balanced diet that has a positive effect on fertility should follow a Mediterranean pattern, be anti-inflammatory and/or avoid protein deficiency and excess or deficiency of fibre (Lakoma 202: 16). The Mediterranean diet is characterised by high consumption of vegetables, legumes, fruits, olive oil, unrefined carbohydrates, low-fat dairy products and poultry, oily fish and limited consumption of red meat, red wine, and simple sugars. It is low in saturated fatty acids, rich in unsaturated fatty acids and rich in complex carbohydrates and fibre. (Yang et al. 2023: 618.) The Mediterranean diet has been associated with improvements in insulin resistance, metabolic decline, obesity risk and infertility (Skoracka et al. 2021: 2373).

The Western diet and unhealthy diets rich in refined and simple carbohydrates such as sugar, sweets, sugary drinks, trans fatty acids, and red and processed meat, are associated with infertility through exacerbation of inflammation (Grieger et al. 2018: 1069; Lakoma 2023: 6; Skoracka et al. 2021: 2374). It was shown to impair ovarian cycles, and decrease progesterone, and anti-Müllerian hormone (Bishop et al. 2021). In some cases, nutritional supplementation of vitamin B12, vitamin D, zinc, selenium, calcium, iodine, acid folic, and iron can be considered to prevent the deficit of micronutrients (Lakoma 2023: 8; Skoracka et al. 2021: 2381).

A relevant variable that appears to influence reproductive function is the existence of microorganisms in male and female reproductive tracts (Battacharya, Duta, Sengupta & Bagchi 2023: 1; Moreno & Franasiak 2017: 35; Koedooder et al. 2019: 1044). The composition of the intestinal microbiota is largely dependent on nutrition, and it

influences the immune system´s function. Intestinal dysbiosis provokes local inflammation and increased intestinal permeability, linked with a decrease in bifidobacteria. (Skoracka et al. 2021: 2373.) Plant-based diets, high in fiber and polyphenols, are associated with a varied gut microbiota that produces metabolites and has an anti-inflammatory role that can be very beneficial for a couple's fertility (Craig et al. 2021: 1; Skoracka et al 2021: 2380). A low percentage of Lactobacillus in the vaginal sample has been found to decrease the likelihood of successful implantation (Koedooder et al. 2019: 1050). Lactobacillus depletion and the presence of specific pathogenic bacteria as bifidobacterium, atopobium, gardnerella, chryseobacterium, streptococcus, and klebsiella in endometrial fluid and/or klebsiella, bardnerella, bifidobacterium, and neisseria in endometrial biopsy were associated with unsuccessful reproductive outcomes. (Moreno et al. 2022: 2.)

2.1.2 Psychological factors

Stress is an influential factor that can affect both physically and emotionally, and thus alter the body homeostasis of the circadian rhythm and disturb the hypothalamic-pituitary gonadal axis (Bendarska-Czerwinska 2023: 7; Szkodziak, Krzyzanowski & Szkodziak 2020: 2; Joseph & Whirledge 2017: 1). Psychological stress can increase the level of cortisol, stress hormone from adrenal glands, which reduces estradiol production, decreasing the growth and development of the oocyte and reduces oocyte quality (Prasad, Tiwari, Pandey, Shrivastav & Chaube 2016: 4). In addition, stress caused by infertility diagnosis and treatment has been reported to reduce the chances of pregnancy and can increase depression and anxiety (Humeniuk et al. 2023: 581). Increasing social and professional pressures on women delay childbearing and therefore, potential genetic modifications, pathologies and lifestyle may reduce the likelihood of childbearing (Hart 2016: 888).

Women diagnosed and treated for infertility report their experiences as stressful, arduous, anxious, depressive, and they also have a higher risk of mental illness (Kjaer et al. 2011: 2401; Dong et al. 2021: 8; Feng et al. 2021: 15). Infertility-related stress is associated with conjugal conflict, diminished sexual self-esteem, and reduced sexual intercourse (Freeman, Boxer, Rickels, Tureck & Mastroianni 1985: 52; Monga, Alexandrescu, Katz, Stein & Ganiats 2004: 126). Women who fail to have a child after an infertility evaluation have a greater risk of suicide than women who succeed (Kjaer et al. 2011: 2402).

2.1.3 Hormonal factors and endocrine disruptors

The hypothalamic-pituitary-gonadal axis regulates the function of the gonadal glands, which are especially influential for fertility. The hypothalamus releases gonadotropin-releasing hormone which, at adequate pulse frequency, stimulates the release of luteinising hormone and follicle-stimulating hormone, from the anterior lobe of the pituitary gland. Gonadotropins are involved in the production of sex hormones, for both sperm and ova, and are crucial for a normal ovulatory menstrual cycle. (Stamatiades & Kaiser 2018: 132; Koyyada & Orsu, 2020: 313; Bendarska-Czerwinska 2023: 4.) Adrenocorticotropic hormone and growth hormone are also produced by the anterior lobe of the pituitary gland. Adrenocorticotropic hormone is responsible for the cortisol production in the adrenal glands. Growth hormone improves the quality of the oocyte and the follicle-stimulating hormone-induced ovarian steroidogenesis and it is influenced by sleep, physical activity, fasting, hypoglycemia, hypovolemia, and surgery. (Bendarska-Czerwinska 2023: 4.)

Prolactin is a peptide hormone, released by the anterior part of the pituitary gland, which synthesises lactotrophic cells influenced by dopamine through negative feedback. Excessive levels, known as hyperprolactinaemia, decreases the secretion of gonadotropin-releasing hormone therefore, also that of luteinising hormone and follicle-stimulating hormone, which are both imperative for fertility. (Koyyada & Orsu 2020: 315; Bendarska-Czerwinska 2023: 6.) Severe thyroid hormone deficiency, called hypothyroidism, can affect fertility by inhibiting ovarian ovulation and the pituitary-ovarian axis (Bendarska-Czerwinska 2023: 9).

Insulin resistance is the loss of insulin sensitivity, resulting in hyperinsulinaemia, hyperglycemia and oxidative stress (Özer et al. 2016: 736). Insulin resistance might induce a slowing of ovulation, impaired oocyte maturation and anovulation through premature activation of luteinising hormone. Hyperinsulinaemia interferes with the intrafollicular microenvironment during folliculogenesis, decreases the fertilisation rate and embryo development potential during the natural ovarian stimulation period. The inflammation associated with insulin resistance and obesity affects fertilisation and

ovulation. (Wang, Zhang, Fang, Kwak-Kim & Wu 2021: 2; Bendarska-Czerwinska 2023: 13.)

Oxidative stress is the impairment of the balance between antioxidant defense mechanisms and reactive oxygen species, that can damage cell membrane lipids and is often increased with zinc deficiency and copper abundance (Ayaz et al. 2015: 1). Oxidative stress may be involved in the pathogenesis of unexplained infertility, anovulation, male-caused infertility, and impaired oocyte quality in the human reproductive system (Özer et al. 2016: 733). This process in the ovary provokes apoptosis of the granulosa cells and the oocyte in the ovary (Prasad et al 2016: 4). Antioxidant enzymes reduce the damaging effects of an oxidative burden. When it exceeds the natural defense system, the cellular and reproductive tissue environment becomes unstable (Sharifi et al. 2020: 15). Insulin resistance and oxidative stress have negative effects on a couple's fertility and in turn, the intake of processed foods and lack of exercise play an influential role in the induction of oxidative stress (Lakoma 2023: 8; Sharifi et al. 2020: 9).

Due to social changes in lifestyle and high exposure to toxic products from agriculture and industrial waste as well as climate change, there is a growing interest in the role of endocrine disruptors, because of their major impact on public health and reproductive health (Hart 2016: 874; Bala et al. 2020: 1; Silva, Carreiro, Ramos & Sanches-Silva 2023: 1). Endocrine disruptors are chemical substances capable of interfering with normal hormonal action, leading to detrimental effects on the health of an organism or its future generations (Silva et al. 2023: 1; Czarnywojtek 2023: 221). Endocrine disruptors implicated with female infertility include bisphenol A, dioxins, phthalates, heavy metals, dioxin-like compounds, organophosphate pesticides, and organochlorine. These substances are increasingly present in our environment, in plastics food packaging, baby bottles and cosmetics. Bisphenol A can migrate into food and beverages with changes in container temperature and/or food. (Ma et al. 2020: 2; Son et al. 2019: 655; De Toni 2020: 2; Silva et al. 2023: 7070.) Endocrine disruptors can enter the body through the digestive tract, respiratory tract, and skin (EFSA Panel on Food Contact Materials and Aids 2015; Ma et al. 2019: 2).

Endocrine disruptors can alter the synthesis, metabolism and function of endogenous hormones and the hypothalamic-pituitary-gonadal axis (Tamayo, Agaméz, Aparicio & Márquez 2022: 178; Czarnywojtek 2023: 221; Ma et al. 2019: 1). Since endocrine

disruptors are similar in chemical structure to gonadal sex hormones, the reproductive system is affected by the actions of endocrine disruptors (Silva et al. 2023: 7071). Endocrine disruptors can bind to oestrogen receptors, androgen receptors, and thyroid hormone, disrupting the normal endocrine function acting as agonist or antagonist and thus, causing reproductive, immune, metabolic, nervous, and reproductive system hazards, as well as in the offspring. (Marques-Pinto, 2013: 16; Czarnywojtek 2023: 222; EFSA Panel on Food Contact Materials & Aids, 2015: 5.)

Bisphenol A can affect male and female fertility, thyroid hormones, weight gain, nervous system, and oxidative stress, potentially leading to infertility (Huang et al. 2020: 2; Meli et al. 2020: 1; Tamayo et al. 2022: 178). In men, bisphenol A can decrease the number, motility, and concentration of sperm, increase apoptosis in the seminiferous tubes and cause DNA damage. In women, it can be associated with endometriosis, ovarian reserve, and oocyte maturation. (Hart 2016: 874; Adoamnei et al. 2018: 123; De Toni et al. 2020: 2.) Bisphenol A and phalates can impair folliculogenesis, stereidogenesis, follicle formation and can unbalance the hypothalamic-pituitary-ovarian axis, creating reproductive tract failure and disturbing hormonal homeostasis (Silva et al. 2023: 7072).

2.1.4 Structural factors

Infertility may be triggered by pelvic adhesions, which are responsible for 15-20%, and in some cases up to 40%, on female causes (Ramirez-Moran et al. 2019: 287; Liakakos 2001: 261; Wurn 2004; Wurn et al. 2008: 1). Intra-abdominal adhesions occur subsequently in more than 50% of abdominal surgeries and can cause conditions such as chronic pelvic pain, dyspareunia, and infertility (Brüggmann et al. 2010: 770; Ghobrial et al. 2023: 2). Two types of adhesions are described: congenital and acquired. Congenital ones might be formed during organogenesis, due to some abnormal embryological process and are usually diagnosed incidentally causing no symptoms, while the acquired ones are secondary to an inflammatory response, whether post-surgical or not. Non-surgical inflammatory causes of adhesions can be pelvic inflammatory disease, peritonitis, diverticulitis, cholecystitis, endometriosis, infections, gynecologic and obstetric procedures, or complications of intrauterine contraceptive methods. (Ghobrial et a. 2023: 2; Liakakos 2001: 262.) Post-surgical adhesions are produced due to incisions, cauterisations, sutures, and any type of trauma, where the injured tissues fuse together resulting in scar tissue. Additional risk

factors are the complexity of the surgery, the extent of the peritoneal trauma, the patient's nutritional status and comorbidities (Ghobrial et al. 2023: 3). Genetic predisposition can influence the quality of scar tissue production (Browm & Bayalt 2009: 8; Thakur et al. 2020: 2076). Healing process recognises several phases to restore tissue integrity and function. Normally, there is a finely balanced relationship between genes and the molecules they encode, so that any imbalance in their expression can result in impaired healing (Browm & Bayalt 2009: 8).

The formation of adhesions after surgery can contribute to ischaemia, impaired lymphatic drainage and vascularisation (Ghobrial et al. 2023: 3). For example, appendicitis has a strong impact on the formation of adhesions and, consequently, on female infertility (Becker et al. 2019: 4). Adhesion formation may decrease the movement and functionality of structures such as organs, muscles, ligaments and thus, limit conception and assisted fertility processes. Adhesions can be formed between and within organs, such as in the uterus, ligaments, cervix, or ovaries, reducing the passage to the uterus and fallopian tubes, and the collection of oocyte fimbriae. If such a situation occurs, at the proximal or distal end of the fallopian tubes, it can lead to partial or total occlusion of the fallopian tubes. (Brüggmann 2010: 770; Wurn 2004; Ghobrial et al. 2023: 3-6.) The mobility of the pelvis is influenced by the suspensory ligaments of the urogenital system, such as the uterovesical ligament, suspending the bladder from the uterus, the uterosacral ligaments, supporting the uterus from the sacrum, and the ovarian and tubo ovarian ligaments (Kramp 2012: 681).

Wound repair is accomplished through the process of cell proliferation, migration, extracellular matrix deposition and remodeling. Fibroblasts are the key type of cells of the fascia involved in synthetising, organising and remodeling collagen, which is essential for the formation of new blood vessels in injured areas. They provide granular tissue locally and rapidly create structure in the wound. (Zein-Hammoud & Standley 2014: 491.) Fibroblasts subjected to mechanical forces in vitro can secrete pro- and ant-inflammatory cytokines modifying cell shape and alignment (Dodd, Good, Nguyen, Grigg, Batia & Standley 2006: 165).

In women, the pelvic floor consists of three compartments: the anterior compartment, which contains the bladder and urethra; the centre compartment, containing the uterus and vagina; and the posterior compartment contains the anal canal, rectum, and sigmoid colon. The support structures of the pelvic floor form three layers from the

superior to inferior aspects: the endopelvic fascia, pelvic diaphragm, and urogenital diaphragm. The endopelvic fascia is a sheet that continuously covers the pelvic organs and the elevator ani muscle, is composed of collagen, elastin, and non-vascular smooth muscle fibres, and is traversed by blood vessels, lymphatics, and nerves. It is located immediately beneath the peritoneum. (Chamié et al. 2018: 288.) The peritoneum is the largest of the serous cavities of the body and forms the superior wall of the pelvic cavity and the Douglas pouch between the rectum and the uterus in women (Isaza-Restrepo et al. 2018: 2; Bordoni, Escher & Girgenti 2023:1). The different regions of the endopelvic fascia, specifically the ligaments and fascia, are individually named, such as the uterosacral and cardinal ligaments which simultaneously hold the uterus and upper vagina in their proper places. At the posterior part, there is the septum that allows mobility between the rectum and the posterior wall of the vagina. The pelvic diaphragm is formed by the coccygeal muscles and the elevator ani muscle, which in turn is comprised of the pubococcygeal and the iliococcygeal muscle. The urogenital diaphragm is a musculofascial structure located below the pelvic diaphragm and anterior to the anorectum. It provides support and connection from the inferior pubic rami to the perineal body. (Chamié et al. 2018: 290.)

The upper and posterior part of the endopelvic fascia is called the uterosacral ligaments, which have three portions. The first is the vascular portion, due to its relationship with the hypogastric artery and vein, which originate from the internal iliac vessels and travel to the rectum, uterus, vagina, and bladder. The second portion is the neural portion, given its proximity to the pelvic splanchnic nerves originating from the sacral plexus, which together with the inferior hypogastric nerves and fibres of the sympathetic chain establish the inferior hypogastric plexus. The third portion is the sacral portion, due to its insertion into the sacral periosteum, and forms a vertical line running from S1 to S4. (Otcenasek, Baca, Krofta, & Feyereisl 2008: 625.)

2.1.5 Thermal factors

Body temperature is homeostatically regulated around a set point, which protects the body from large variations in ambient temperature (Morf & Schibler 2013: 539). The optimum temperature in human body and in tissue culture is 37 degrees and that prolonged exposure to different temperatures can reduce the probability of fertilisation, implantation, and successful pregnancy (Ng et al 2017: 17; López-Gatiusa & Hunter 2019: 421; Charkoudian & Stachenfeld, 2014: 795). Extreme temperature changes

provoke molecular responses in cytokines and microRNAs (Ng et al 2017: 16; López-Gatiusa & Hunter 2019: 421). Thermoregulatory centres receive information from hypothalamic receptors from the central nervous system, the preoptic area, and the skin and combined with heat dissipation processes, such as in the muscle, adipose tissue, vascular tissue, and skin, operate to maintain a constant body temperature (Charkoudian & Stachenfeld 2014: 795; Morf & Schibler 2013: 539).

Thermoregulatory system fluctuates throughout the day, which gives rise to circadian variations in body temperature, reaching maximum body temperature in the late afternoon and minimum at the end of the sleep phase (Ng et al 2017: 28; Morf & Schibler 2013: 539). There is an increase of 0.31-0.46ºC in the luteal phase in comparison with the follicular, due to the thermogenic action of progesterone (Ng et al 2017: 28). Different temperature gradients have been observed in different pelvic structures. The mean vaginal temperature in the morning is 36.48ºC and in the afternoon 37.20ºC, the caudal region of the isthmus is 1-2 ºC cooler than the ampullary oviduct, which directs the sperm towards fertilisation and finally, the pre-ovulatory follicles are 1.3-1.7 ºC cooler than the surrounding ovarian tissue. (Ng et al 2017: 28; López-Gatius & Hunter 2019: 419; Hunter & López-Gatius 2018: 643; Hunter & López-Gatius, 2020: 382; Hunter et al. 2017: A.)

2.2 Osteopathy

Dr. Andrew Taylor Still, an American surgeon and physician, founded the profession of osteopathy in the end of the 19th century. One of his students, John Martin Littlejohn, brought it to Europe in the beginning of the 20th century and founded one of the leading osteopathic schools, the British School of Osteopathy in United Kingdom (UK) and from then on, osteopathy started to spread to different countries. Currently, osteopathic practice, depending on the legal basis of the different countries in the world, is considered a medical profession, a health profession, or a complementary or alternative medicine (WHO 2010; Bagagiolo, Rosa & Borrelli 2022:1). At present, in Europe, Denmark, Cyprus, France, Finland, Iceland, Liechtenstein, Malta, Luxembourg, Norway, Switzerland, Portugal and the United Kingdom have succeeded in regulating the osteopathic profession by law (Osteopathy Europe 2023; Bagagiolo et al. 2022: 11).

2.2.1 Definition

Osteopathy is an independent healthcare profession recognised by the WHO and the European Committee for Standardization, CEN, which issued a European Standard on Osteopathic Healthcare Provision in 2015 (EN 16686). CEN standard establishes a theoretical framework for high quality clinical practice, safety, education, and ethics for osteopathy in Europe. (European Committee for Standardisation CEN 2015: 7; Horta & Alvarez 2021: 3; Osteopathy Europe 2023: 6.)

> Osteopathy is a patient-centered, health discipline that emphasizes the interrelationship of structure and function of the body, facilitates the body's innate ability to heal itself, and advocates a whole-person approach to all aspects of health and healthy development through the practice of manual treatment (European Committee for Standardisation CEN 2015: 7).

Osteopathic practice uses osteopathic, scientific, and medical knowledge to apply the principles of osteopathy to the diagnosis and treatment of patients which can be preventive, curative, palliative or adjuvant (Osteopathy Europe 2023: 7; European Committee for Standardisation CEN 2015: 8). It is considered a health discipline that traditionally involves mainly manual treatment and emphasises its self-regulatory mechanisms and the structure-function interrelationship of the body to underpin a whole-person clinical approach to health and wellbeing (European Standard 2015: 8; Bagagiolo et al. 2022: 1).

Osteopaths use a holistic approach to enhance the function of somatic, skeletal, arthrodial, and myofascial structures, and the function of vascular, lymphatic, and neurologic systems. The structure-function relationship is essential for biomechanical diagnosis and for interpreting the significance of neuromuscular features on the general health of the patient. (WHO 2010: 1; Bagagiolo et al. 2022: 1.) Osteopathy involves the way the biomechanics of the musculoskeletal system is integrated with the physiology of the whole body. Osteopaths consider that the signs and symptoms presented by patients are the result of the interaction of physical and non-physical factors and highlights the importance of the dynamic interrelationship between these factors and the therapeutic relationship. (WHO 2010: 3.) Osteopathic healthcare essentially consists of osteopathic manipulative treatment, using techniques ranging from direct

high-speed manipulations to indirect or gentle techniques and can be combined with other interventions related to nutrition, physical activity, and postural advice (WHO 2010: 1).

2.2.2 Basic principles of osteopathy and core competences

Osteopathy address health maintenance and disease management and is based on three tenets. Firstly, the human being is a dynamic functional unit, whose state of health is influenced by body, mind, and spirit. Secondly, the body has self-regulating mechanisms and heals itself in a natural manner. Finally, structure and function are interrelated at all levels of the human body. Osteopaths in patient care apply osteopathic principles and current medical and scientific knowledge. (WHO 2010: 3; Stark 2013: 7.) Osteopaths have been educated with a set of essential core components that are the foundation of their approach to patient care. There is a foundation in history, philosophy, and approach to the health care, as well as the understanding of the sciences within the context of the models of structure-function, including the role of the lymphatic, vascular, neurological, and biomechanical factors on health and disease. The core competences allow the development of the ability to create an adequate differential diagnosis and treatment plan, recognise the mechanism of action of manual interventions and be able to critically evaluate the scientific literature to implement the relevant information into practice. (WHO 2010: 8; Stark 2013: 6.)

Competences are developed by practitioners to identify dysfunctional areas in the lymphatic, vascular, neurological, and biomechanical systems, and expand the usefulness of osteopathic manual techniques. Osteopaths have been educated in the physical examination, the comprehension of the biomechanics of the human body, without limiting the articular, fascial, muscle and fluid systems of the limbs, spine, head, pelvis, abdomen, and torso. They have been educated in the diagnosis and manual osteopathic treatment of neuromusculoskeletal dysfunctions and acknowledge the indications and contraindications of osteopathic treatment. (WHO 2010: 8.)

2.2.3 Osteopathic manual treatment

Osteopathic manual therapy is a whole-body intervention and a drug-free manual medicine, which is developed to facilitate self-regulatory mechanisms that impede normal neural, vascular, and biomechanical functionality (Verzella, Affede, Di Pietrantonio, Cozzolino & Cicchitti 2022: 1). Barral (1989) highlights the influential role of the structure and function of the ligamentous system at the articular level as well as the mobility and function of the pelvic organs (Kramp 2012: 681). Several positive effects of osteopathic manual treatment have been described, such as increased conception, and pregnancy rates, improved hormone levels and positive changes in secondary or unexplained infertility. The heterogeneity of designs and the high risk of bias limit the recommendation of osteopathic practice. (Ruffini, D'Alessandro, Cardinali, Frondaroli & Cerritelli 2016.)

Osteopathic manual treatment and manual therapy has been demonstrated to increase the success rates of in vitro cycles, in cases of female infertility caused by obstructed fallopian tubes, hormonal imbalance, endometriosis or other unknown causes (Ruffini et al. 2016: 76; Rice et al. 2015: 41). Pelvic manual therapy should be considered as a standard adjuvant gynecological approach in the case of tubal occlusion, and it is used by osteopaths to treat pelvic floor dysfunctions (Wurn et al. 2008: 23). Site-specific manual soft tissue therapy was shown to increase pregnancy rates in infertile women and in vitro fecundated patients. The aim of site-specific manual soft tissue therapy seems to be breakdown collagen cross-links and the "building blocks" of adhesions around the fallopian tubes and pelvis. (Wurn et al.2004.)

Certain elements, such as scar tissue, fascial restriction and/or lymphatic congestion, can hinder congestion. Manual therapy seems to improve these conditions, which should consider the environment and anatomy at the cellular and tissue level for infertility treatment. Arterial, venous, and lymphatic circulation is fundamental, as the abdomen and pelvis contain about 250 lymph nodes: uterine, tubal, ovarian draining into the internal iliac, obturator, aortic and inguinal nodes. A fundamental principle of osteopathy is that manual therapy has an impact at the cellular level. Therefore, visceral manipulation techniques, muscle energy, craniosacral therapy and lymphatic drainage have not been investigated in infertility, although their effects could extend to the pelvic region and the reproductive system. (Kramp 2012: 681.)

Osteopathic techniques produce biomechanical stimuli to both superficial and deep tissues. Different types of osteopathic manual therapy can affect cellular mechanisms thus influencing cellular function, direct muscle contraction and processes such as wound repair. (Zein-Hammoud & Standley 2015.) According to Meltzer et al. (2010), pro-inflammatory cytokines IL-3 and IL-6 were significantly reduced by repetitive motion strain in human fibroblasts, using myofascial release technique, which is a direct-indirect manual technique used in osteopathic manipulative treatment (Meltzer et al. 2010: 2; Zein-Hammoud & Standley 2015: 491; Leicht, Kennedy & Richardson 2022: 6).

Indirect techniques seemed to decrease inflammation by promoting equilibrium in the autonomic nervous system, by attenuating the sympathetic nervous system and stimulating the parasympathetic nervous system, which in turn modifies the vasovagal inflammatory reflex, the so-called cholinergic anti-inflammatory pathways. Indirect techniques can intervene in the wound healing process through the effect of fibroblasts under repetitive muscle strain. (Leicht et al. 2022:1.) Stone (2007) states that inflammation and other pathological processes affect visceral physical properties and characteristics, such as deformation, compressibility, and elastic capacity. Osteopaths can distinguish to some degree whether a tissue is normal or not. (Kramp 2012: 683.)

Disorders of the reproductive system may be manifested by pelvic asymmetry, sacral dysfunction, swelling or pain. Symptoms related to lymphatic congestion and hormone imbalance may be dysmenorrhea, premenstrual syndrome, ovarian cysts, emotional instability, and depression. Reducing pressure on blood vessels by fascial and ligament release can optimise vascular supply and lymphatic efficiency. (Chila 2011: 795-797.) The restoration of normal blood intake and decongestion of the lymphatic system can allow the organs to enhance their function and thus, normalise hormone levels, menstrual cycles, and pregnancies (Kramp 2012: 681).

3 Purpose, aims and research questions

The aim of this master´s thesis is to describe experienced osteopath´s considerations of infertility treatment with the purpose of observing and exploring the knowledge, the clinical reasoning, the approaches, and the techniques considered by osteopaths

treating infertility, to benefit patients seeking pregnancy and osteopaths interested in this topic.

This master´s thesis was conducted to find answers to the following two research questions:

1. What sort of considerations do osteopaths have when treating people with fertility problems?

2. What kind of clinical reasoning and approaches are used by osteopaths to treat infertility patients?

4 Methods

This master´s thesis is conducted using a qualitative research methodology following a phenomenology approach. Qualitative research is defined as an interpretative and naturalistic approach which attempts to comprehend and explain beliefs, behaviours, values, opinions, phenomena, and social situations, in their natural context. It describes deeper meanings that people attribute to their life experiences. (Draper 2004: 642; Mack & Woodsong 2005: 1; NHS 2017; Renjith et al. 2021:1; Todres 2005: 109; Moser & Korstjens 2017: 271.) Qualitative studies are associated with constructivism or naturalism, which means that there are many interpretations of reality, so the researcher seeks to understand how individuals construct their reality (Moser & Korstjens 2017: 271). Qualitative research constructs a complex and holistic image of human behavior and the interaction between disease and society, analysing the words, reporting insights, and allowing the understanding of a problem (Mack & Woodsong 2005: 1; Vaismoradi, Turunen & Bondas, 2013: 398; Renjith et al. 2021:1; Draper 2004: 642). It can contribute to exploring healthcare needs and models, to develop behavioral theories, and design health interventions and it is considered the most humanistic and person-centered way of discovering the opinions and behaviors of human beings. (Draper 2004: 642; Renjith et al. 2021: 1.)

Phenomenology is used commonly in social sciences to study individual´s perceptions, feelings and lived experiences. Smith, Flowers and Larkin (2009) defined phenomenology as a “philosophical approach to the study of experience that shares a

particular interest”. The nature of phenomenology is to understand individual experiences, felt emotions, behaviors, and the social meaning of experiences. (Guest, Namey & Mitchell 2013: 10.) The author of this master's thesis has chosen the interpretative approach to gain a deeper understanding of the participants' experiences. Furthermore, it has tried to reveal hidden meanings, understanding the context, and focusing its attention on the person having the experience. Therefore, it includes personal opinions, philosophy, and theories, so that the result is based on human experiences. (Matua & Van der Val 2015: 23; Tuffour 2017: 2).

4.1 Participants

A purposive sampling using snowballing procedures was selected to include participants according to pre-determined criteria relevant to the research question (Mack & Woodsong 2005: 6). The sampling criterion might be a key trustworthiness element, as it depends on the knowledge that the recruited participants present (Adeoye-Olatunde & Olenik 2021: 1361). Purposive sampling strategy selected people for the important contribution they can offer, and it could not be provided as well without them (Maxwell 2008: 235). It is used for identification and selection of individuals who were knowledgeable and experienced about the phenomenon of interest and who could provide valuable, deep, and rich information (Maxvell 2008: 235; Pallinkas et al. 2015: 534). The people recruited were representative of the specific role and the participants' availability and willingness to collaborate was essential, likewise their ability to communicate and relate their experiences and opinions (Palinkas et al. 2015: 539).

The advantage of snowball sampling consists of collecting key informants recommending other potential participants who were experts in the subject matter (Palinkas et al. 2015: 535). It was particularly useful for identifying expert wisdom and high-value studies (Suri 2011: 69). Recruitment strategies were flexible and could be modified in case the initial strategies were not successful (Mack & Woodsong 2005: 7). During the sampling period, participants were asked to recommend other participants, who were then contacted. The size of the sample was determined according to theoretical saturation of collected data (Mack & Woodsong 2005: 6; Vasileiou et al. 2018: 3). Saturation was defined as not achieving new codes, during data collection and data analysis (Suri 2011: 72; Braun & Clarke 2021: 204). In addition, it was described as “the building of rich data within the process of inquiry, by attending to

scope and replication, hence, in turn, building the theoretical aspects of inquiry" (Morse 2015: 587). It is the point where there is a comprehensive understanding of the different categories and their relationships, so that the theory can arise and finishes data collection (Miles & Huberman 1994). The selection criteria were based on the choice of professionals who, in recent years, have given lectures or offered education on osteopathic approaches to infertility. Subsequently, professionals recommended by the initial selection were contacted.

Inclusion criteria (Table 1) were osteopaths with five or more years of experience treating people with infertility and who spoke Spanish or English. The exclusion criteria (Table 1) were osteopaths with less than five years' experience treating infertility patients and who did not speak Spanish or English.

Table 1. Summary of inclusion and exclusion criteria.

Inclusion criteria	**Exclusion criteria**
Osteopaths with five or more years of experience treating people with infertility	Osteopaths with less than five years of experience treating people with infertility
Osteopaths speaking Spanish or English language	Not speaking Spanish nor English

A total of sixteen osteopaths, meeting the selection criteria, were contacted. Some of them were reached directly and others were recommended by other professionals. Three of the contacted osteopaths did not participate due to time constraints and personal and/or unexplained circumstances. Data saturation was obtained subsequently to the tenth interview, as no new aspects emerged and therefore, the author decided to conclude data collection.

All participants had a minimum of ten years' experience and two had twenty years or more dedicated to the field of fertility. Two of the participants were educated exclusively in osteopathy, while the rest were trained in osteopathy and in other fields such as physiotherapy, psychoneuroimmunology, nursing, endocrinology, medicine, and nutrition. Participants were currently practicing in Spain, France, United Kingdom, and

Canada, thus representing diverse legal and cultural frameworks in which professionals work (Table 2).

Table 2. Demographic characteristics.

Variables	**Values (%)**
Gender	
Female	80%
Male	20%
Years of experience on fertility	
0-5 years	0
5-10 years	0
10-15 years	70%
15-20 years	20%
More than 20 years	10%
Countries of practice	
Spain	50%
France	20%
UK	10%
Canada	20%
Educational background	
Osteopaths	100%
Physiotherapists	60%
Psychoneuroimmunology	30%
Nurses	10%
Endocrinologist	10%
Nutritionist	20%

The interviewed osteopaths all practiced in private clinics. Some of them worked as part of a multidisciplinary team with other professionals, such as physiotherapists, psychoneuroimmunologists, psychologists, nutritionists, acupuncturists, gynecologists, and doctors specialised in assisted reproduction. Others operated on a more individualised basis, although they appreciated that the collaboration or intervention of other professionals is often required.

4.2 Data collection

The author of the master's thesis pre-prepared thoroughly, a semi-structured in-depth interview with open-ended questions to gain a deeper understanding of the opinions, perspectives, and experiences of the participants, and to offer them the opportunity to raise and expand on the issues that were fundamental to them. Semi-structured interviews were used in a flexible way, which allowed adaptations to be made during the intervention, and they also permitted both the interviewer and the interviewee to guide the process and enabled new perspectives to be gained that the researcher did not anticipate (Appendix 1) (Rabionet 2011: 563). This type of interview was used to create a vivid picture of the participant's perspective on a certain topic, as well as to find out about their feelings, opinions, and experiences. This form of interviewing was especially appropriated for dealing with sensitive issues that would not normally be discussed in other contexts. (Mack & Woodsong 2005: 1; Rabionet 2011: 564.) The aim of the interview was obtaining the interpretation, personal experiences, attitudes, perceptions, beliefs, and meaning of the phenomenon described by key informants (Kvale 2007: 1; DeJonckheere & Vaughn 2019: 1).

Initially, potential participants were contacted by email. Once they had agreed to participate and a meeting appointment, respecting their schedule priorities, was agreed, participants received another email with the participation information sheet (Appendix 2 and 3), the informed consent form (Appendix 4 and 5) and the Zoom meeting link. The in-depth interviews were conducted on an individual basis and online via the Zoom platform, due to the data protection offered by this platform. They were recorded on video using the Zoom platform, on audio using a digital voice recorder (Bbeiyy 128 GB, 3072 kbps) and field notes were also taken. The author confirmed that the participants knew the recording manner, that they could freely expand their discourse, and they could refuse to answer or withdraw at any time. The interviewer

could also ask for more information if considers it relevant (DeJonckheere & Vaughn 2019: 5-6).

Data was stored on the secure Metropolia drive, to which only the author had access. The interviewer adopted a friendly, non-judgemental, attentive, empathic attitude and a warm conversational tone to invite and engender talk (DeJonckheere & Vaughn 2019: 6). The interviews conducted in Spanish were attentively translated into English by the author and then all the interviews were transcribed verbatim. Approximate length of the interview was between 35-60 minutes and the data collection period was from September 2024 to February 2025.

4.3 Data analysis

Inducted content analysis was used in this master´s thesis since there was a lack of knowledge on this subject. Content analysis is a method that attempts to replicate and validate inferences in their context, thus creating new insights and knowledge. (Elo & Kyngäs 2008.) The aim was to analyse information from the live story narrative, break it down into small units and perform a descriptive analysis. Content analysis was used with large amount of textual information to identify trends, patterns, frequency of words and discourses. (Sparker 2005; Vaismoradi et al. 2013: 400.) Coded categories were extracted directly from the data text (Sandelowski 2000: 338; Hsieh & Shannon 2005: 1286; Elo & Kyngäs 2008: 109; Vaismoradi et al. 2013: 401).

Inductive approach departed from specific data to achieve general statements and consisted of three different stages: preparation, organisation and resulting phase. The preparation phase started selecting the units of analysis, which could be words, themes or sentences, and proceeds making sense of the data. The author’s aim was to be familiarised with and become fully immersed in the data. During the organisational phase, groups of categories were created with headings which enabled the information to be classified according to the belonging group, so it could be compared with other groups. Last stage was abstraction where a general description of the topic was formulated through the categories. (Elo & Kyngäs 2008: 111.)

The author conducted the reduction of the text as faithfully and intelligibly as possible. Comprehension was not only in the words, but also in the meaning of the whole and of the details of the text. (Trodes 2005: 111.) Content analysis required reading texts

several times, dive into it and highlighting key words to label the codes from several key concepts. Codes were listed in categories depending on their links and finally, meaningful clusters were created. (Hsieh & Shannon 2005: 1279.) The process of data collection and data analysis was carried out simultaneously, with each phase complementing the other and allowing data being modified and adapted to new perspectives (Sandelowski 2000: 338).

4.4 Data management plan

A Data Management Plan was created using DMPTuuli; ID:25559. The list of participants, their personal information, their interviews, and field notes comprised the data collected. The eligibility of the participant was ensured by requesting name, contact details, length of time dedicated to infertility, educational background, voice, and image. Each participant was treated anonymously by assigning them an individual code. The main responsible for data management is the author of the master's thesis and the Metropolia University of Applied Sciences is the supervising institution. The properties of the data were video recording by zoom in MP4 format, approximately 300MB/interview, audio recording by digital voice recorder (Bbeiyy 128GB, 3072 kbps) for back up in case of data loss, verbatim transcription in word document, approximately 1MB/interview and field notes of interviewer observations on paper. Consistency and accuracy of data were ensured when transcribing verbatim within the hours following the interviews. Videos and audio recordings were reviewed several times to minimise errors, and transcripts were sent to interviewees upon request.

The guideline to conduct responsible research has been rigorously respected (TENK 2023). Interviews were anonymous and data was coded and processed in compliance with European Union General Data Protection Regulation (ARENE 2017). Data management was saved in digital and physical storage units approved by Metropolia UAS, such as the Metropolia Zoom account, and a Metropolia secure drive. The original personal data was destroyed at the end of the master´s thesis from the secure drive Metropolia and from the field notes, so that no one can access them. Therefore, only anonymised, and processed data was saved.

5 Results

The inductive content analysis from data collection of 10 in-depth interviews revealed four major themes: osteopathic lenses to uniqueness of each pregnancy attempt, goals to be achieved through osteopathy, osteopathic clinical reasoning to multifactorial causes and osteopathic intervention to determine and treat physiological disruptors.

5.1 Osteopathic lenses to uniqueness of each pregnancy attempt

The first characteristic observed was the osteopathic vision, revealing the uniqueness of each attempted pregnancy, recognising three main categories: detailed observation and attunement to the patients' narratives, the ability to successfully create a therapeutic relationship and the acknowledgement of the osteopath's scope of practice (Illustration 1).

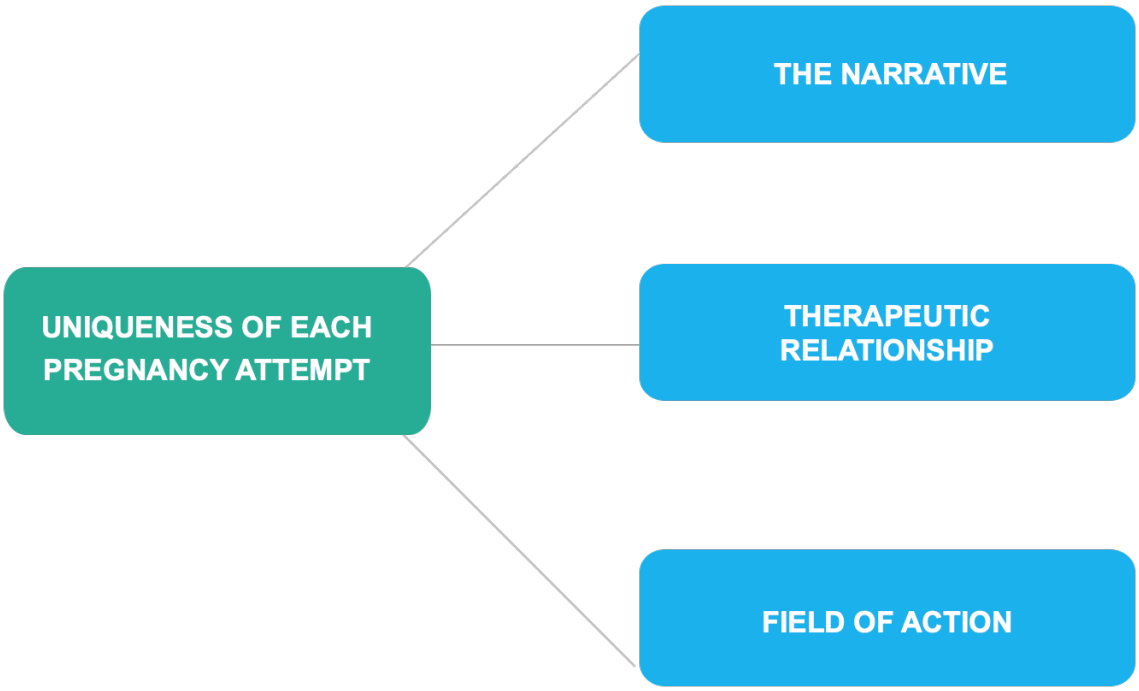

Illustration 1. Main categories of the theme osteopathic lenses to uniqueness of each pregnancy attempt.

5.1.1 The narrative

The osteopathic approach emphasised the ability to observe and recognise each attempt to conceive as a unique and individualised couple or personal journey. Understanding the history of the couple or the woman who provides her body, in the case of two-woman couples or surrogacy, might be influential in understanding the complexity of gamete contact.

> You must know very well, very intimately, what the history of each pregnancy attempt is. They are all unique, due to their age, the presence of chronic disease or not, their life history, expectations, number of failed attempts…etc (Participant C).

> Identify their sexual and reproductive health history and include both partners (Participant C).

> We must have a lot of respect, and be very aware of what each couple, each woman, contributes in terms of experience on this journey (Participant C).

Prior to physical examination of the couple, it is advisable to talk to them and observe how they interact as a couple and assess whether there could be any problems in their relationship, or in their sexual practices. It is considered what the pregnancy means for them, and where the desire come from.

> Sometimes, the couple forget to take care of their love and relationship (Participant G).

> Even if the woman has some issues, that may not be the main issue. You would have to talk through with the guy and look at how their interaction is with their couple, and their sexual practices, and their relations, and relationships in general (Participant I).

> Whether she desire the pregnancy for someone else or for herself. The desire for pregnancy is not the same as the desire for a child (Participant C).

Certain women have previous history of physical or sexual abuse that are not recognised, and through invasive assisted reproduction techniques, previous traumas can manifest themselves with dissociation feelings of certain parts of the body. On other occasions, women may be subject to professional and social pressures, so it is helpful to acknowledge their reality. Seeking help and advice from a psychologist or a

sex therapist might be essential when observing and recognising the conflict of an individual or a couple.

> Sometimes, they may need the help of a psychologist or a sexual counsellor…. I don't go right into that part, but I recognise when it's an issue and seek a way of discussing that accordingly (Participant I).

> Sometimes, the man desires the pregnancy, but the woman doesn't and sometimes the grandparents have the desire. In these cases, I don't dig any deeper, since I'm not a psychologist, I just try to understand it (Participant G).

> We must be prepared to direct them towards a psychologist specialised in sexual and physical violence, since it can be a very big obstacle for them to be able to conceive (Participant C).

Most osteopaths, especially those trained in psychoneuroimmunology, nutrition, nursing or who are interested in a more integrative approach, understood the impact of lifestyle and environmental factors to which individuals were exposed. During the first interview, they would ask the couple, if present, or the person, about their nutritional habits, sleeping patterns, level of stress, and amount of physical exercise.

> The four pillars are: managing emotions well, fighting against sedentary lifestyles, and maintaining physical activity, and ensuring good rest and healthy nutrition. These are believed to be the basis for any pathology (Participant D).

> … I tell the patient that changes in lifestyle habits will probably be essential (Participant E).

Other environmental aspects considered were exposure to toxins or endocrine disruptors such as city pollution, the quality of water and food consumed, the use of plastic or teflon cookware, cosmetics, and deodorants. One of the participants stated that there were some fundamental and non-negotiable environmental aspects such as a good rest, physical activity, sun exposure for vitamin D levels, and finally, nutrition and being aware of endocrine disruptors.

> How many hours do you sleep and how many hours do you rest? They are non-negotiable. The immune system is nocturnal. Therefore, the hormonal system is mainly nocturnal (Participant E).

> Sun exposure has been seen to be so influential, with the inflammation of the body being reduced so much, by something as silly as being in contact with nature (Participant E).

One participant insisted that avoiding toxic substances such as drugs, alcohol, and tobacco, improving diet, and nutritional supplementing could have a positive impact on spermatogenesis. In approximately three months, sperm quality could be improved and, therefore, so could general health.

> Avoid the consumption of toxic substances such as drugs, alcohol, and tobacco, and improve nutrition and supplements. If the sperm is contaminated, the fertilisation capacity drops dramatically (Participant C).

5.1.2 The therapeutic relationship

Most of the participants highlighted the need to establish a good therapeutic relationship, creating a bond of trust with the patient through touch, empathy, communication, companionship, and support, so that they can share their concerns, frustrations, and needs.

> I believe that through touch, and a good therapeutic relationship or therapeutic alliance, we also have an important impact on more psychosocial aspects, because we establish an important bond with the patient, not only what we do with our hands counts, but also what we talk and share with them (Participant A).

> It is a safe space that we offer. We have the privilege to treat for one hour and to have really a good dialog about their fears, sometimes they will just come up with the update and they will express themselves (Participant H).

> The type of space they have with us is unique. I do not distinguish whether it is because we simply offer empathy or since we are completely with them at this moment. I think we are a pillar in their follow-up, perhaps it is the therapeutic link or that everything is individualised (Participant H).

All those interviewed expressed that men generally found it more difficult to request for help when facing fertility problems and that they had more social restrictions. Sometimes, they accompanied their partners and, if symptoms or associated problems were observed, the men were advised to receive treatment. Certain participants tried to meet with both partners during the first visit to complete the medical history, and to make them understand the importance of the proposed lifestyle changes and their possible positive repercussions on sperm quality and general health. One-on-one visits

were organised subsequently, which included a physical examination and osteopathic treatment.

> …from a fertility point of view, it is very rare that I treat a man. 95% of the cases I treat the woman (Participant A).

> During the first visit, I make a medical history of both, for two hours. Then, if I see that there are issues that need attention, I will certainly make an individual visit to see the physical examination and the osteopathic treatment (Participant B).

> I never had the man come to me first. Never. Most of the times he comes with the woman. He attends if I require it (Participant D).

> I like both to be there. Sometimes, there can be couple problems and I want to intuit them. There should be also a purely individual session to get to know each other, so they can explain you their needs and fears, which are their difficulties… (Participant D).

> I would love to see men and women, but the reality is that men don't show up at the clinic. I always mention that we can approach male too. When I do coach, …, I always have the men there, so at least they know about what to eat, what can be damaging the sperm quality (Participant H).

5.1.3 The field of action

A few participants commented on the importance of determining whether there were known or unknown reasons for the couple's incapacity to conceive. The woman's age and the origin of the infertility were two key elements to appreciate when approaching patients. Participants considered the above factors and their own limitations when deciding whether they could help patients and, above all, valued not wasting time, as the passage of time is detrimental to fertility. One participant commented that osteopathy is especially useful in cases of functional infertility, those in which tests have been completed and doctors cannot find an explanation for what is preventing the pregnancy.

> It is important for us to know our limits; in which case we can help, or in which case we can´t help (Participant J).

> We must be cautious and not make them waste time (Participant C).

> First, it's important to know our limitations, I should know if I will not be able to help them. In this case, perhaps they must go to medical care… (Participant J).
>
> …If they try for a year in a natural manner and are not successful, they should first go to the doctor to see what is occurring. If something recognised should be treated, to ensure that they don't waste time with osteopathic treatment, as fertility then simply continues to decline" (Participant J).
>
> …it depends whether the woman has had any testing or any known conditions before the osteopath starts, or whether she simply is currently failing to get pregnant (Participant I).
>
> The infertility causes and the age of the woman are two important factors (Participant J).
>
> When compiling all the patient's information and observing elements, which may be influenced, if there are no influential factors indicating infertility, we consider it an inability to conceive (Participant C).
>
> When couples tell you: we've had all the tests, and there's nothing wrong with us. That is where our work from different areas is fundamental (Participant F).

5.2 Goals to be achieved through osteopathy

The second theme observed by the author is the focus on two core objectives through osteopathic treatment. First, all participants try to identify the underlying causes, although they use different criteria to find them. Some focus on the extent of the problem, others on whether the problem is inside or outside the pelvis, and others focus more on the lack of mobility. Secondly, the restoration and optimisation of physiology, in terms of self-regulation, thermoregulation, and psychological balance (Illustration 2).

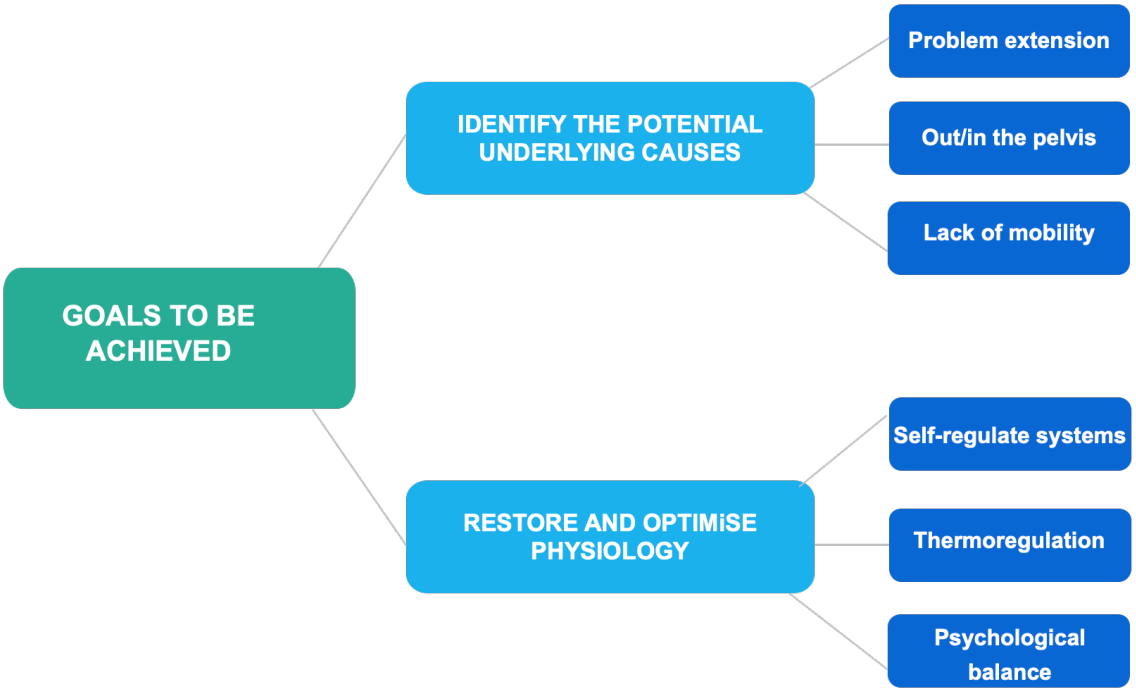

Illustration 2. Main theme, main categories, and subcategories.

5.2.1 Identify the potential underlying causes

All the participants coincided on the importance of identifying the potential causes that could be compromising people's fertility, and some of them pointed out that multifactorial elements might be having a role. Several factors at the same time could be compromising the function of different systems, and therefore contributing to an unfavourable context for conception to occur.

> Infertility is multifactorial (Participant A).
>
> Infertility is always a multifactorial issue (Participant D).
>
> They must recognise what the problem is, and whether the causes of infertility have been identified (Participant C).
>
> If you really want to get into all the ranges of subfertility, it really depends on what the cause is (Participant I).
>
> …it is necessary to try to understand the origin of the problem (Participant J).

It seemed that each osteopath had developed their own different processes for identifying possible causes. One of the participants initially sought to identify the extent of the possible causes, whether they were more simple and anatomically localised, or on the contrary, more complex, and systemic.

> I try to identify whether it is a simple local-regional problem, or whether it is more complex and systemic. The simpler, more local, and mechanical it is, the easier it will be to favour the function from a technical and manual point of view. The more complex-systemic it is, the more influential the participation of other professionals, and the lifestyle education of the patient will be (Participant A).

One participant emphasised the importance of investigating the initial causes, which may be psychological, hormonal, inflammatory, nutritional and/or mechanical, and unrelated to the reproductive system.

> You then have to think of the initial causes, so psychological, hormonal, inflammatory, dietary, nutritional, and drainage-wise, and then peristalsis-wise, global movement-wise, pain perception-wise, body image-wise, and so on. They may have some or all those issues…most of them don't have anything to do with the uterus or the fallopian tubes, or the ovaries (Participant I).

Infertility causes could be attributed to a lack of mobility in the pelvic area, digestive system, nervous system, cranium, and sacrum. Participants sought to recognise and treat those tissues that were not functioning properly.

> Infertility could be due to reduced mobility in the pelvic, abdominal, or digestive area and throughout the craniosacral and nervous systems (Participant G).

> We have different techniques for identifying which tissue is not functioning for the reproductive system, conducting more specific procedures in gynaecology and andrology. We work on the mobility and function of the reproductive organs, the central nervous system, the immune system, etc (Participant B).

Participant A revealed that areas of restricted movement were searched for, both in terms of quantity and quality of the tissue, as significant impairments in texture quality could sometimes be found that did not involve a quantitative restriction of movement.

> I search for areas of quantitative or qualitative restriction, since sometimes from a quantitative point of view, there is mobility of a

> particular tissue or structure, but qualitatively there are impairments in its texture and/or its sensitivity (Participant A).

5.2.2 Restore and optimise physiology

All experts unanimously agreed on the need to re-establish and/or optimise the physiology of the individual or couple, since they understood fertility to be the result of good or optimal health. One participant mentioned the relevance of considering basic preconditions, such as lifestyle or environment, prior to initiating assisted reproduction treatments, so that the person or couple are in the best possible health for pregnancy. Participant I observed that sometimes, after assisted reproduction treatments, patients feel a certain disconnection from their bodies, which affects their body image and their sense of self. The osteopath explained that she/he often worked in this manner to help patients reconnect and accept their pelvis, their body, their body image, and their sense of self.

> Fertility is an indication of health. Therefore, I am not searching to improve fertility in patients, but rather I am seeking to enhance health and when we obtain this, we obtain fertility (Participant E).

> The purpose would be to look at the physiology of that couple to see what is not working, since in the end it is pure physiology (Participant F).

> Technical fertility possibilities offered has evolved. In many cases there is a kind of short-circuit, where the necessary preconditions are forgotten to meet the optimal conditions for a pregnancy (Participant C).

> We promote the function of the reproductive system, locally or regionally, but we also put in place mechanisms to promote a good function of the neuroendocrine system and the vegetative nervous system (Participant A).

> Between cycles of in vitro fertilization, the aim is getting the patients to have a better body image, a better connectedness, and a sense of self as a functioning woman, person, even before you get to a functioning person in a couple. I do a lot of that work, bringing their fear and their dissociation to accept their pelvis again, or even for the first time (Participant I).

Different keystones were found to restore people's physiology, by encouraging self-regulation of the systems, increasing mobility and fluid exchange, and balancing thermoregulation and emotions. Participant A found helpful to engage in a mechanical way with the anatomical structures related to the self-regulation systems to release restrictions and improve the fluids and function. The endocrine and neurovegetative

systems, or autonomic nervous system, were considered self-regulating and function involuntarily to maintain homeostasis in the body. Another participant described the importance of osteopathic treatment for adhesions and vascular congestion, as improving such conditions could increase the supply of nutrients to the target organs.

> I work extensively on the self-regulation systems, where they are anatomically located, such as the endocrine system, the neurovegetative system and the control areas, so that they are free and fluid, and so that there are no mechanical restrictions that could influence their function (Participant A).

> What we do in osteopathy is to encourage the patient's self-regulatory mechanisms to activate them (Participant A).

> Osteopathically we are generating the unblocking of all the systems that do not manage to self-regulate (Participant F).

> I try to mobilise the joints to improve circulation, the venous and blood systems, and then I work on the mobility of the nervous, digestive, and pelvic systems, and the diaphragm and pelvic floor (Participant G).

> If there is an adhesion or congestion at the circulatory level, nutrients are not going to pass through …so we are the channel, we could say (Participant B).

> If there is a good exchange of fluids, tissues can eliminate toxins, can be well vascularized, can regulate from their function and their tone (Participant A).

The psychological balance of individuals was found to be influential in the fertility process. A person's psychological balance was considered influential in the fertility journey. When a person feels empowered and sees that there are aspects that can be improved and that are in their hands, then they can enhance their emotional and physical state.

> We are going to provide couples with more information, help them to better control their general and reproductive health, and raise awareness that changes may allow this to happen under better conditions (Participant C).

> I try to help them be part of the process, I think it gives them power to understand and see the changes in their body as well (Participant H).

> Empower patients and make them aware that they can do many things to improve. Then, their state of mind, their brain, their system changes, and they are no longer in a sympathetic state (Participant F).

Two osteopaths described how individuals request someone to accompany them through this unique process. An emotional accompaniment has a great impact on the physical part. All have expressed that emotional stress can be highly present and can negatively affect fertility.

> When we treat them with osteopathy, we see how those emotions come out, tissues relax, body improves and that, all of that also predisposes obviously to better health and better fertility (Participant B).

> There is a lot of stress on every examination, therefore, we work on the level of anxiety and stress, because it will cause disorder with hormonal axis, and specially at suprarenal gland and cortisol levels and it´s not appropriate for fertility (Participant J).

5.3 Osteopathic clinical reasoning on multifactorial factors

The results showed that multifactorial causes were involved, such as inflammatory, thermoregulatory, circadian cycles, postural, organic, and structural factors (illustration 3).

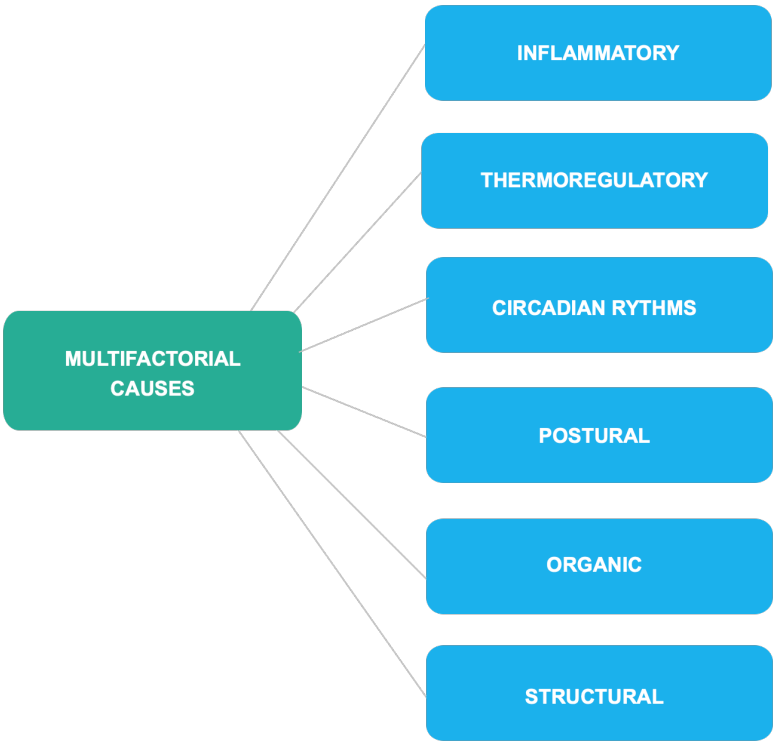

Illustration 3. The main categories of osteopathic clinical reasoning on multifactorial factors theme

5.3.1 Inflammatory factors

Most participants stated that the possible causes of fertility problems could be related to mechanical, postural, vascular, neurological, hormonal, and digestive factors. Certain experts prioritised the search for systemic and/or local inflammatory conditions. They analysed whether there was a history of inflammatory processes and oxidative stress, in which nutrition and the functioning of liver and glucose system had to be understood. In case of inflammation, a type of immunological and metabolic support was needed, such as focusing on the spleen, thymus, lymph, thyroid, adrenal glands, liver and subsequently the small intestine. The level of inflammation in the uterus during each menstrual phase was influential, as a pro-inflammatory state at the inappropriate time in the menstrual cycle could prevent implantation and impede the viability of a pregnancy.

> The first screening is into all of that as whether they've got an inflammatory history, because then they need ostensibly an immunological type support, a lymph movement type support, and then

> moving into metabolic support, which takes us then from the immune organs, spleen, lymph, thymus, thyroid, adrenal, and then into the liver before you get to the small intestine (Participant I).
>
> To implant, you need to have the inflammatory level in your uterus at the right level (Participant I)

5.3.2 Thermoregulation factors

An expert highlighted the importance of the combined action of the immune, hormonal, and neural systems immediately after ovulation to have a thermoregulatory effect on the uterus and cause a low inflammatory state in the uterine lining. When this combination does not occur at the precise moment, a pro-inflammatory state may then be established that may prevent implantation.

> The thermoregulatory immunological system combines hormonal, and neural events in the uterus immediately post ovulation to lead to a low inflammatory status within the uterine lining (Participant I).
>
> That needs to be maintained for the 5-7 days of when, hopefully, the egg has been impregnated with the sperm and that is then trying to create the initial change in the fallopian tube so that when it implants into the uterine lining, there's a low inflammatory state. If that doesn't happen in the time, then the pro-inflammatory state of the uterus is made rise, which will just then prevent any implantation (Participant I).
>
> If the uterus or the ovaries are not at the right temperature, this whole process and the inflammatory chemical basis, are distorted, since various biological processes will not occur (Participant I).
>
> …to maintain thermoregulation is a hypothalamic problem. There are many hypothalamic issues related to sleep and pineal-circadian disorders related to overall thermoregulation. But thermoregulation is also a cardiorespiratory, sympathetic, and vasoconstrictive issue (Participant I).

For the maintenance of a balanced thermal range and immune regulation, it is necessary to address the hypothalamic axis, the liver, the microbiota, the gut-brain axis, and the common mucosal system that interrelates the lungs, mouth, intestine, and genitourinary tract. The activation of a systemic inflammatory cascade could arise when a chronic situation occurs in any of the tissues. This context of immunological irritability, together with an increase in cortisol, could impair sperm health and disrupt the uterine environment for embryo implantation.

> You'll get your increased cortisol and your increased immune irritability. So not only will your genital tract be awkward as a result, which may have issues for sperm health as opposed to inflammation, you're then going to have an immunologically potentially hostile uterus for implantation (Participant I).

> Keeping the thermal range right, means that you have to consider the immune system and the immune responsiveness, so you have to obviously work with liver and microbiome. That microbiota gut-brain thing, it's more than a gut-brain, because all mucosal interfaces will have a microbiome (Participant I).

> If you've got any one of those things, like chronic something, or you've got small intestine bacterial overgrow, then both of those, they'll all cross-irritate. They'll all bring centralised activation of a global immune cascade (Participant I).

> You have to be able to maintain the thermoregulation and ultimately, that's a hypothalamic story (Participant I).

Another aspect to appreciate in monitoring temperature is the vascular and lymphatic drainage system, as its deterioration can lead to prolonged temperature increases. Adequate vascularisation and venous drainage of the pelvic organs were unanimously considered an influential factor in ensuring their proper functioning.

> If the vasculature opens, you can have metabolic processes which create heat. But if you can't drain that blood or fluid, then you remain too heated for too long. Drainage is about getting rid of heat so that then heats up your venous system (Participant I).

> I want to make sure the vascular aspect is okay. If there's a big congestion of the small intestine or the colon and it's compressing, I want to work that (Participant H).

> Vascularisation is very important when we talk about fertility. All the blood or fluids carry all the hormones, minerals, vitamins, and nutrients that must reach the organs to function (Participant B).

> Thermoregulation is also a cardiorespiratory, sympathetic, vasoconstrictive story (Participant I).

5.3.3 Circadian rhythms' factors

Sleep patterns and circadian rhythms were mentioned for their influence on hypothalamus and the endocrine system. The production of neurohumoral signals that

trigger thyroid function could be influenced by melatonin and cortisol levels, the pineal gland, and portal venous drainage around the hypothalamus.

> There's a lot of hypothalamic sleep-based issues and pineal-circadian issues related to global thermoregulation (Participant I).

> Most people are not willing to put enough effort into getting their sleep hygiene good enough to make sure that, for example, their melatonin and cortisol levels get into the right circadian rhythm (Participant I).

> Venous drainage route is what then delivers the chemicals to give the hormonal cascade. It has to be delivered through the venuos route, back out into the arterial system (Participant I).

> The immune system is nocturnal, so we are going to encourage rest and if something is failing, we insist on changing habits (Participant F).

> It has recently been observed that sun exposure has a significant influence, as it considerably reduces inflammation in the body (Participant F).

5.3.4 Body postural sway factors

An additional factor to assess is the body postural sway, as improving it brings balance to the vestibular and cerebellar systems and therefore manages to relieve the autonomic nervous system and balance signals throughout, to achieve a gravitationally flexible and integrated postural balance.

> As your habitual posture and balance improve, the vestibular and cerebellar system become balanced. It connects directly to the central autonomic network. Only the central autonomic network release or balance to signal out to everywhere, including the hypothalamus, if you are in postural equilibrium and you are gravitationally pliable and integrated. Hormonally, you have to be gravitationally organized (Participant I).

5.3.5 Organic factors

Participants considered the visceral system crucial for ensuring the appropriate transmission of forces and pressures for the functionality of the uterus, bladder, ovaries, and the entire pelvic area. Among the organic systems, participants considered the lungs, liver, bile ducts, intestinal mesentery, lymph nodes, spleen, adrenal glands, thymus, thyroid, their adjacent areas, and related neural reflexes.

Based on the results, the relationship with the visceral system and the vagus nerve was highlighted. Afferent and efferent branches of the vagus nerve were described as possible sites of irritation. The afferent implied an integration of the internal structures, such as the liver, spleen, and stomach. The efferent and motor system consisted of two branches: the dorsal branch, which exercises motor control of the oropharyngeal space, and the ventral branch, which monitors cardiac dynamics. Therefore, one practitioner emphasised the importance of examining the mediastinum, the cardiac area, the great vessels, and the carotids. Autonomic integration together with the cardiovascular and cardiorespiratory systems, provided the capacity to divert blood from the central circulation to the peripheral circulation, thus enabling thermoregulation.

> The visceral system is on top. We must ensure that there is a good transmission of pressures, a good distribution of fascial tensions at that level so that they do not impair the function of that area (Participant D).

> …pelvis and all the endopelvic fascia, mobility of all the viscera, uterus, bladder, ovary, sacrum, rectum, with the pelvic floor, in other words, the whole pelvic pack (Participant F).

> …looking at either the lungs, or the liver, or the gut mesentery interface within the organ systems, within the nodes, spleen adrenals, thymus, thyroid…I go for body areas around them, but I also go for neural reflex areas related to them (Participant I).

> The digestive peritoneum is on all the pelvic organs, uterus, urinary, bowl, rectum, and forms the Douglas pouch, where some abdominal liquid can be accumulated (Participant G).

> The vagus gets irritated in two ways, the afferent system from the global celomic region… it's about continuity, harmony, and integration within the celomic body cavity structures, not just visceral ligament release. You then need to balance that with the afferent-efferent loop…the efferent motor control of the oropharyngeal space, and so you need to look at the local proprioceptive feedback loop of that vagally innervated musculature group to look at activities, tension, and reflex dynamics. You have to integrate that with a ventral vagal group, which is cardiac (Participant I).

> Autonomic integration, that is the basis for the ability of your autonomics to shunt blood from the central circulation to the periphery for thermoregulation and heat loss (Participant I).

Participant I emphasised working in the subdiaphragmatic area to influence the inmune response due to the relationship between the diaphragm and the celiac plexus, ganglion, vessels, and cisterna chyli.

> The subdiaphramatic zone as a whole world which mediates the immune responsiveness because it relates to the celiac plexus, celiac ganglion, celiac vessels, blood vessels, cisterna chyli (Participant I).

Two experts highlighted, as key structures to explore and treat, the posterior parietal peritoneum because of its relation to the pelvic organs such as the uterus, bladder, rectum, and pouch of Douglas. The peritoneum has a close relationship with the great vessels such as the aorta and iliac vessels and the mesenteric plexus. The accumulation of fluid in the pouch of Douglas could alter the function of the pelvic organs, so treatment of the diaphragm and peritoneum could help this fluid to return to the venous system and therefore improve the mobility of the abdominal and pelvic organs.

> The whole posterior part of the endopelvic fascia is very important, its relationship with the posterior parietal peritoneum, all this retroperitoneal space and pre-sacral and then that relationship with the great vessels, the aorta, and the pre-aortic nervous system as it is being organised, and then at the level of L5-S1 (Participant A).

> Retro-membranous space is very important and the posterior part of the endopelvic fascia because many times in that part there are adhesions, restriction and it is through that area where the iliac vessels and mesenteric plexuses are going to be distributed to the organs (Participant A).

> Digestive peritoneum is on all the pelvic organs, and it forms the pouch of Douglas, where often there is some abdominal liquid. If this area doesn't move well all the pelvic organs could be not functional enough. So, treat the diaphragm and the peritoneum, to make the abdominal liquid move and go back better in the venous system under the diaphragm. (Participant G).

5.3.6 Structural factors

Most experts emphasised biomechanical factors which could affect fertility, especially in the pelvis, such as adhesions and lack of mobility. One of them thought that pelvic tensions were irrelevant to begin with, since they are common in all people. The participants who considered mechanical pelvis problems as a priority explored tensional issues that could affect the positioning and functioning of the uterus, fallopian tubes, ovaries, bladder, sacrum, rectum, endopelvic fascia, and the pelvic floor, creating tightness and stiffness in certain tissues or organs. It was recommended that the osteopath ensured free mobility in the area, so that the uterus could assume its position without being compressed by the surrounding structures. Two participants

described the strong connection from spinal levels in T5-T9 dorsal nerves level with the vagus nerve.

> Balancing the ligaments of the uterus to avoid tensions and weird positioning of the organ is going to influence all the vascular aspect, maybe the fallopian tubes, maybe the ovary on this side… (Participant H).

> Everyone will always have tensions in the pelvis, and they´re of an irrelevance for me to begin with (Participant I).

> If a long-time dysfunction of the organ by a weird positioning, you will find an area of the organ that is stiffer or has a congested feeling (Participant H).

> I think it's very important as osteopath that, we make sure that the area is free of movement as well so that the uterus can take its space without rubbing with the neighbors (Participant H).

> The cranium and the whole hypothalamic-pituitary axis, diaphragms, the thoracic diaphragm are fundamental, and the pelvis and all the endopelvic fascia, mobility of all the viscera, uterus, bladder, ovary, sacrum, rectum, with the pelvic floor, in other words, the whole pelvic pack (Participant F).

> You won't get the vagal mitigation of sustained inflammatory drives without working on that T5 to T9 celiac area as a central nervous system responsiveness (Participant I).

> Do not forget the main parasympathetic which is the vagus, and dorsolumbar area where there is the sympathetic nervous system and the thoracic diaphragm (Participant D).

One expert referred to a principle of osteopathy, which is ‘structure governs function and function governs structure’ to illustrate that an alteration in the biomechanical structures of the body could impair its function and in the opposite direction.

> We also have to understand the function governs the structure and vice versa. We have to understand these basic osteopathic concepts and I apply them in techniques (Participant B).

One expert reiterated the importance of the correct functioning of the L5 joint to guarantee the vascularisation of the uterine arteries and prevent pelvic congestion in both women and men.

> If there is restriction of L5, there is less blood in uterine artery. L5 is very important for vascular, nervous, and renal systems (Participant J).

An expert pointed out the importance of working mechanically and locally around the continent where the implantation is going to take place. Therefore, the hip, lumbosacral area, sacroiliac joints and L5-S1 area should be treated. The participant also emphasised the influence of the sympathetic and parasympathetic nervous systems, and of the vagus nerve, with its relationship with the sacrum, the dorsal lumbar region, and the thoracic diaphragm. The visceral system was perceived as another key point since good transmission of pressures and distribution of fascial tensions could not compromise the function of the area.

> Fundamental mechanical structures are hips, lumbosacral area, sacroiliacs and L5-S1. It is influential because is where it will nest and host the embryo. It is the continent where the contents are inside (Participant D).

> Parasympathetic and sympathetic nervous system are essential. We go back to the sacral area. Let's not forget the main parasympathetic, which is the vagus and dorso-lumbar area, where there is the thoracic diaphragm (Participant D).

5.4 Osteopathic clinical intervention to determine and treat physiological disruptors

Participants revealed two main categories. The first one was the integrative and global approach, considering lifestyle, funnel and top-down approaches, patient individualisation and emotional support. The second main category was manual skills, including hands-based communication and types of techniques.

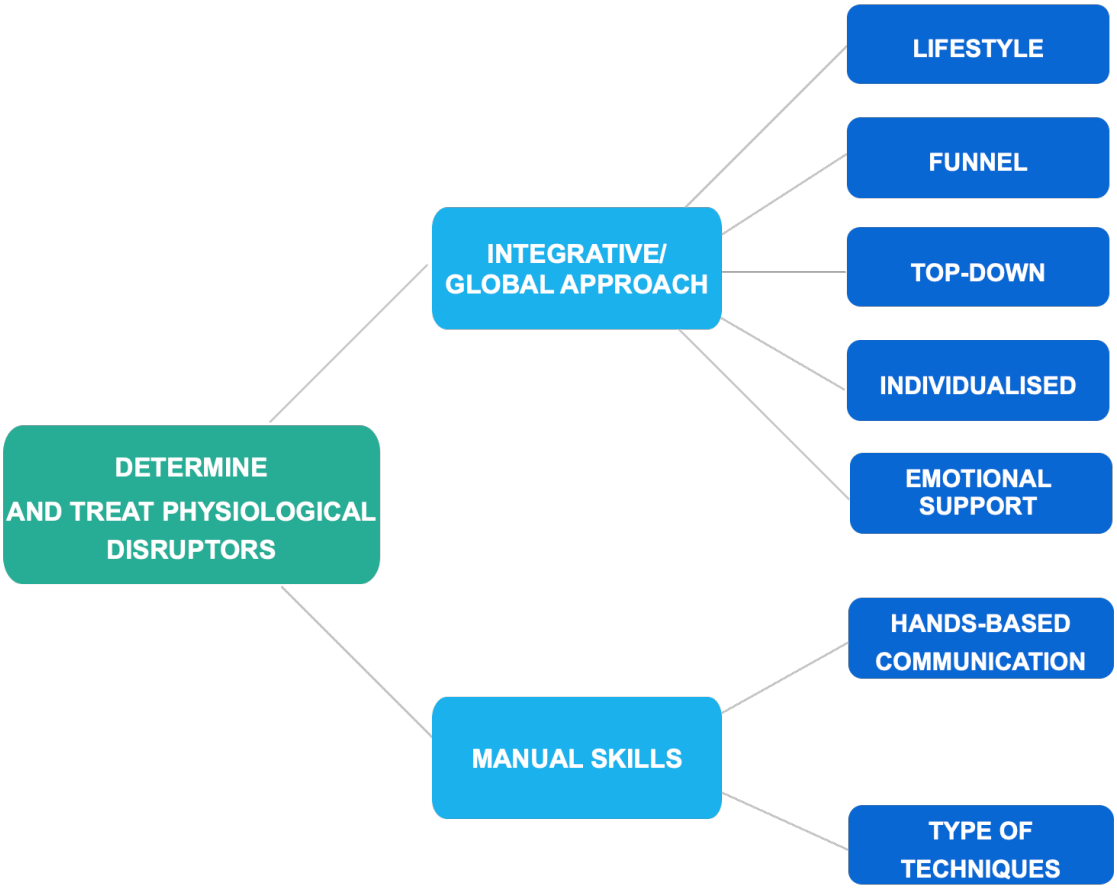

Illustration 4. Main categories and subcategories of an osteopathic clinical intervention to determine and treat physiological disruptor's theme.

Osteopathic interventions were aimed at determining and treating the disruptors that may be compromising the person's physiology. They described the type of approach and the manual skills they used.

> Together with all these other approaches that are also necessary to enhance the normal function of the body (Participant E).

> Once you've got some insights to the number and range of potential physiological disruptions, you're going to have an equal standing between postural equilibrium and therefore, fluids and autonomic tone and subdiaphragmatic, splanchnic, inflammatory, immunological dynamics through that celiac zone (Participant I).

5.4.1 Integrative and global approach

Numerous experts, especially those educated in psychoneuroimmunology, nutrition, endocrinology, and nursing, used what they called an integrative approach. They

meant that they considered all aspects of the person, such as physical, emotional, and social aspects. One participant emphasised the importance of using a general integrative approach and an osteopathic integrative approach, in which any structure related to the pelvis is supported.

> First, we always use an integrative approach. We must see that person in all their spheres, their physical, emotional, and social spheres, since it has a big impact (Participant C).

> I try to do integrative approach. It's a functional medicine training in fertility… integrative approach with lifestyle, nutrition, and supplements, and all of that (Participant H).

> I really trust the integrative approach, which means to look at the individual as all aspect of the person (Participant H).

> Being more integrative in the approach in general, but also integrative in the osteopathic approach as well. In this way, we can focus on the pelvic area, but we have to support everything else around it, as treating only the pelvis will not be enough (Participant H).

Several participants used the concept of a global approach. One of them to address the disciplines of structural, visceral, and cranial osteopathy for their influence on the uro-gynaecological, hormonal, fluidic and neurological systems.

> Osteopathy is obviously global… the osteopath must master the three great disciplines that is structural, visceral, and cranial osteopathy, as all have their influence on the uro-gynaecological system, either hormonal, fluidic, or neurological (Participant D).

Two practitioners referred to the osteopathic global vision as the process of obtaining as much information as possible and conducting an examination and treatment in different areas of the body. The exploration of these areas, such as the skull, spine, pelvis, organs and diaphragms, established priorities in the treatment plan.

> I talk to them a lot to get as much information as possible from all areas. Then I can make a global vision. I look at the craneum, at the spine, at the pelvis, the diaphragms, and then depending on how I perceived the areas, I prioritise and start working there (Participant F).

> My approach is very global. Osteopathy is already global (Participant E).

> If hormonal axes don't work, I work cranial, I start here. If there is a problem at the thyroid level, I work the neck. If there is a problem with the

> adrenal glands… I work the whole visceral part, the thorax and the diaphragmatic pressures and the intestine which is essential (Participant E).

Under the concept of the global approach, four experts use funnel reasoning, meaning that they perform both the examination and treatment, first considering the body's systems and overall functioning and then gradually narrowing in and focusing on more specific structures or interventions.

> I try to go from the global to the regional, from the big to the small (Participant A).

> I go from the global to the analytical, concentrating first on the spheres I'm going to work on. I work a lot with spheres and diaphragms (Participant F).

> Often, I am working on the cranial level or on the vegetative nervous system for several sessions before I start working on the pelvis (Participant F).

> I always do my general assessment, a basic test, pressure test to see where I'm going to start. Sometimes, I will spend 20 minutes just freeing cranial, dorsal, ribs, diaphragm, it could be visceral, mechanical pelvic, coxal or iliac, anything. I will really do my assessment by funnel (Participant H).

> It's always a global approach. I would work also on making sure the nervous system is part of the game, because most of the patients are really stressed (Participant H).

Most osteopaths considered lifestyle intervention to be a central aspect, and mentioned nutrition, physical activity, rest habits, sun exposure, and emotional management. Those who were not sufficiently trained in nutrition referred patients to other professionals for further support. They also suggested the importance of minimise contact with endocrine disruptors in the environment, and in the products people use for cleaning, personal hygiene, and cooking.

> The lifestyle changes will probably be essential (Participant E).

> I suggest them to go out and get some sun, or otherwise they can always take vitamin D (Participant E).

> I ask them about the number of toxics around them and if they take that toxicity into account (Participant A).

> I consider lifestyle and environment. I always ask if they live in a city or at the mountains, what do they work on, in terms of toxins, endocrine disruptors that can have an impact on the reproductive system (Participant B).

> When exposed to endocrine disruptors, observe the physiology of the female cycle. If she recognises her fertile period and knows how to calculate it, she can use this in an optimal manner (Participant C).

> I approach the four pillars, which are managing emotions well, fighting against sedentary lifestyles and maintaining physical activity, ensuring good rest, and healthy nutrition (Participant D).

> I recommend lifestyle changes, which are fundamental, such as nutrition, physical exercise, and supplementation, if necessary, in the first interview (Participant F).

> I provide them a recommendation sheet to minimise exposure to endocrine disruptors (Participant J).

One expert described the approach used as “top-down”, while Participant A used similar model without using this nomenclature. When using this method, the examination and treatment began in the cranial area, considering the hypothalamic-pituitary axis and its influence on the hypothalamus, pituitary gland, hippocampus, and pineal gland. The assessment continued with the thyroid and adrenal glands, due to their connection with cortisol and progesterone. The adequate supply of vascular fluid to the ovaries and the detoxification process in the liver were then examined. Finally, freedom of movement and possible adhesions of the uterus were evaluated, as these were very common due to inflammatory responses.

> I start with the hypothalamus-pituitary, as a very influential area at the cranial level and influenced by the hippocampus and the pineal gland. I jump into the thyroid… and adrenal glands are fundamental (Participant E).

> I end up addressing the gonadal axis, I must see if the fluids are reaching the ovary well, if these fluids are coming out well with these hormones, if the whole hormonal process is looking good. The liver is participating in the right way in this detoxification (Participant E).

> It ended up at the uterine level, whether that uterus has freedom of movement. Most patients have uterine adhesions… since it is very common when there has been inflammation in a local and/or distal place, such as intestinal inflammation (Participant E).

> From the neuroendocrine system, I refer to the base of the skull, the whole thyroid region, the perithyroid region, the cervical region, the region of the adrenal glands, the whole perirenal region, the environment of the ovaries or the ovarian sellae and their relationship with the endopelvic fascia (Participant A).

Some of the participants who highlighted the importance of the integrative approach also emphasised the individualised approach and specific treatment. One participant raised the concept of patient-centred practice, respecting patients' decisions, as such choices, beliefs, and desires.

> It's all individualised. It's not like everyone will need the same approach, but for sure, something I will never miss doing in the fertility follow-up is the local aspect, because I think it's something that we can really have a great effect on (Participant H).

> There is also the choice of the patient. It must be patient-centred and respect what are the choices, beliefs, and desires (Participant C).

Some participants provided information to individuals and couples so that they could have more control over their own health and tried to clarify their doubts about what they had understood from previous medical explanations.

> We're going to make couples more informed, more in control of their general health status, and their reproductive health (Participant C).

> I try to clarify their mind. What did you understand in terms of your fertility potential? What did they tell you? Since sometimes there are terms that are not well understood or that, being neophytes, they take a term and fill it with a very, very pessimistic interpretation or the other way around (Participant C).

Several participants remarked on the emotional and psychological support provided by the osteopath, who encouraged them to build confidence in their bodies and improve their wellbeing. Other participants supplied stress management tools, both verbally and in writing.

> I ensure that they reduce their stress levels, to provide techniques only to control the level of cortisol (Participant C).

> They will have the stress management information document (Participant H).

> I give them confidence also just by making them feel that the area is better. I really reinforce trust feeling when touching the area (Participant H).

Participants D and J commented on that osteopaths could provide emotional support, conveying calmness and security, as well as reducing anxiety levels with their hands.

> We as osteopaths are so close to the patient with our hands, we help a lot to balance them, since we give them calm and then we work on the emotional aspect and lower their anxiety (Participant D).

> We as osteopaths bring patients emotional support by hands and if it is necessary to undergo psychological therapy, they are advised to consult another specialised professional (Participant J).

> I talk to women a lot precisely so that they are with me, because many times, they disassociate themselves from their body. It is emotionally or physically painful, so that is where we really meet (Participant C).

5.4.2 Manual skills

Participant D highlighted the importance of starting de treatment with listening techniques during the first contact between the osteopath's hand and the patient's body.

> The contact between the therapist's hands and the body it´s important. I always start with listening techniques, indirect techniques (Participant D).

Participant I recognised that each osteopathic manual act creates a physiological interaction and that it has a biological consequence. Therefore, with their palpation, osteopaths engage in a conversation with biology and do not act only on isolated structures. The main objective of the manual techniques was that, through movements and changes produced on certain structures, the information of change would be transmitted at a neurological level. This new signal would reach the nucleus of the solitary tract, which would coordinate with information of the thalamus, the locus coeruleus and the periaqueductal grey. It was considered how stress or hypervigilance could overload the amygdala and lock the system in an inappropriate biological and behavioral state. The importance of knowing all the possible routes, where the information converged and then, detecting where there was a barrier and intervening was underlined.

> The whole premise of osteopathy is that it's a physiological interaction. Whatever you do has to have a biological consequence (Participant I).

> The original purpose it's supposed to create changes in neural information, not just from the bone tissue, but as you move the bones and the body, many tissues are then moved, so they're mechanistic (Participant I).

> …those signals that are going up through the vagus, have to be heard, which means you have to understand about the two vagal nuclei, then may have converging signals from other things. So, the vagal nuclei might not listen because they're over clouded by other things, such as balance and breathing (Participant I).

> …next relay station, which is the nucleus tractor solitarius, coordinating signaling on through to things like thalamus, locus coeruleus, periaqueductal gray, and all those things which ultimately also speak to your orienting (Participant I).

> You have to think about all of those routes. You start with doing something in a periphery and it sends signals in. Observe all the bits that converge to there and look at all of those and do stuff in those which represent a barrier (Participant I).

Participant I expressed that once the area to be treated had been determined, it was necessary to establish which other areas it interacted with, and then trace the path backwards until reaching an area of mechanoreceptors or chemoreceptors. The organ was then examined to see its activity, reactivity, and mobility, both quantitatively and qualitatively. An assessment was conducted to determine whether the sensation was one of deregulation or inappropriateness, and when the tissues began to respond in accordance with what was being applied. Once communication was established between the hands and the tissues, the latter began to change, react, calm down and activate responses. It was noticeable how the organs or tissues increased in temperature and the vascular congestions start to circulate. It automatically seemed that the interstitial chemistry was compromised, and signals were activated.

> You start on the level that you want to affect. Then you say, what does it connect to this one? You trace it backwards until you eventually get to the tissues that are receptors, such as mechanoreceptors and chemoreceptors (Participant I).

> Then you go in the liver and try to explore how normal, reactive, active, agitated, or quantitatively or qualitatively inappropriately (Participant I).

> I'm going to say inappropriate or dysregulated…what do the tissues start to speak back to you doing? (Participant I).

> …if you are having a hands-based conversation within the tissues, if the tissues are changing, acting against you, or calming, then you know that is triggering signals (Participant I).

> If you could feel that the organ is warming or that it feels more fluid filled or less congested, then if you flushed the fluids, any fluid stasis change will automatically alter the interstitial chemistry, and so that will be sending signals (Participant I).

Participant I remarked that when the tissues felt more harmonious and regulated, it was possible to detect that some kind of conversation had occurred. It was underlined that biology was stochastic, that there were many biological factors that could be influencing it and that it was not possible to predict or discern which of them was acting, since it was not possible to isolate just one of them.

> You will not know literally which bit sent which signal through which pathway, you simply do something, have a conversation with the structure, hopefully so that it then feels more somehow harmonious or somehow less dysregulated in an ill-defined manner, and then you'll know that some biological conversation will have occurred (Participant I).

> Biology is stochastic and is indeterminable. It's very difficult to get very precise biological measures (Participant I).

In general, the participants did not use any particular technique for infertility patients but rather considered the type of technique depending on the person, the previous global approach and the person's needs at the moment of the consultation. However, one participant mentioned her/his election on visceral techniques.

> I have to be very sensitive. I have to ask myself what this person needs today from me. What can I do for her/him today to meet her/his current needs? Patient is the centre of the procedure (Participant C).

> I use structural techniques that can be depending on the level of pain or discomfort or preference. It also can be direct structural or functional, that can be fascial, visceral, and vascular techniques (Participant C).

> The kind of technique I use depends on the person and the tissue we have to treat. I combine structural, visceral, and cranial techniques (Participants B).

> At the beginning, we have to be global to be able then to give specific techniques, as internal, nervous or arterial technique and then integrate them (Participant J).

> I use techniques depending on the person in front of me, and the tissue I have to treat. I use a combination of techniques structural, visceral, and craniosacral (Participant A).

> I´m looking for quantitative and qualitative aspects, I work on what I find through manual techniques adapted to that situation and then, I look for local, regional, or systemic changes (Participant A).

> I spend a lot of time during the session working on visceral techniques (Participant E).

Participant A mainly used functional techniques with the aim of reducing nociception and creating a continuous conversation with the tissue and the nervous system. Occasionally, she/he used high-velocity techniques to produce a vegetative reflex in the paravertebral chain or ganglia.

> I use functional techniques, fundamentally. I work mainly on the connective tissue, seeking to reduce nociception as much as possible, establishing a continuous conversation with the tissue and with the nervous system, so that the texture, the response of the tissue, and the response of the organism changes (Participant A).

> I do use high velocity techniques, but very punctually because I am not interested in mobilising a segment, I am interested in giving an input to look for a vegetative reflex of a certain region of the paravertebral chain or ganglia (Participant A).

Participant C outlined that, rather than techniques, she/he prioritised developing awareness of body sensations and the changes that occur during the practice.

> I try to make them aware of what they feel, of the vascularisation with the temperature changes, the sensation of relaxation, of greater movement, of better breathing capacity, of greater movement of the diaphragm, of better coordination of the respiratory and pelvic diaphragm (Participant C).

> I often don't make so many techniques and it is a moment where they come out feeling better... It's a moment where they recover energy and optimism and a better preparation of their body to face what's coming (Participant C).

Certain participants used intracavitary techniques and participant H commented on the fact that internal techniques could be more precise than external techniques.

> There is a big range of possible difference between what you think is the story when you just palpate the fundus above the pubic bone from external approach and when you really find how the uterus is internally. I think it adds up on precision and relief (Participant H).

> …there will be other techniques at the gynaecological level, both intracavitary and external that can be performed (Participant E).

6 Discussion

Fertility problems have been increasing in many societies, as has the tendency for women to delay motherhood. It has been seen that advanced age was one of the factors that can affect ovarian reserve and how oocyte and sperm quality can be influenced by an individual's lifestyle and context. (Prieto-Huecas et al. 2023: 17; Ramirez-Moran et al. 2019: 285.) High rates of infertility due to male factors have been demonstrated (Phillips 2023: 623; Raheem & Ralph 2011: 8). According to the results, it is observed a generalised difficulty for men in searching for help. It is argued that, in general, men show greater resistance to actively seeking healthcare, since they might consider it to be a sign of weakness, and a threat to their masculinity. The importance of men being able to openly share their feelings, obtain more information, empower themselves and feel emotionally stronger is therefore highlighted, enabling them to search for infertility treatment as a couple. (De Jonge et al. 2023: 211.) The aim of the master´s thesis was to describe experienced osteopath´s considerations of infertility treatment. Two research questions were composed to observe and explore the sort of considerations and the kind of clinical reasoning and approaches that are used by osteopaths to treat patients/couples with infertility. The purpose was to observe and explore the knowledge, clinical reasoning, approaches, and techniques considered by osteopaths who treat people with that condition to benefit patients seeking for a pregnancy, and osteopaths interested in this subject.

The collection of data provided a broad perspective on the experiences, perceptions, and considerations by a group of experts in the field. The results of this master´s thesis reflected how osteopathic practitioners from different countries around the world approached fertility problems. Participants generally presented a common denominator, although prioritising and focusing on different mechanisms of action,

clinical reasoning, and type of techniques to achieve a shared goal, which was to succeed in conception and implicitly improve the health of the patients. Although in some countries, national regulations might limit the performance of certain techniques, such as intracavitary techniques, the consensus among participants was that osteopathic treatment can contribute to improve physiology, and therefore, to improve health and fertility.

6.1 Interpretation of key findings

Four principal themes emerged: osteopathic lenses to uniqueness of each pregnancy attempt, goals to be achieved through osteopathy, clinical reasoning to multifactorial causes, and osteopathic intervention to determine and treat physiological disruptors. Osteopathic lenses to uniqueness of each pregnancy attempt, draw a picture of the osteopath's vision, and how they observe, listen, tune in, relate, interact, and communicate, when they face a person or a couple with fertility problems. According to the results, participants acknowledge the specificity and uniqueness of each attempt of pregnancy, and therefore emphasise the importance of gathering as much information as possible about the history of the ongoing process, and generally use an individualised biopsychosocial perspective to approach infertility.

Osteopaths during the first consultation dedicated a large amount of time to gather detailed information, to gain a better understanding of the overall situation, and to investigate and delve deeper into the most relevant aspects. They mention that they were using open questions during the anamnesis to assess the patient's state of health, lifestyle, living environment, emotional state, physical activity, and circadian cycles, while at the meantime tried to further explore into those aspects that have most caught their attention. Storytelling of the people lived experience allows to make sense of themselves and their world (Shaw, Abbey, Casals-Gutierrez & Maretic 2022: 5; Venema 2000: 239). Ricoeur (1984) shows how through the interconnection between narrative discourse and human experience, gives unity and order to our experience (Venema 2000: 238). Narrative medicine is a medicine practised with narrative competence, implying the ability to recognise, absorb, interpret, and act on the stories and difficulties of others and it is a framework for the health sciences that values people's stories and experiences as integral aspects of the lived experience of health and disease (Remein et al. 2020: 1). Narrative medicine influences lived experiences perception of symptoms and narratives about the body and the self (Shaw et al. 2022:

5). Patients and osteopaths are encompassed by a body approach with shared meaning in the dyadic, or triadic space. Co-constructed narratives depend on the ability of professionals to find entry points into the patient's world, and imply narrative competence, and listening skills. The role of professionals is not to find solutions to problems, but to allow people to regain confidence in their own bodies. (Tyreman 2015: 477; Shaw et al. 2022: 5.) Narrative education might increase relationship building, empathy, reflection, resilience, adoption of perspectives, and bridge gaps between medical terms and the language of lived experiences (Remein et al. 2020: 2; Deen, Mangurian, & Cabaniss 2010: 438; Shaw et al. 2022: 5).

Humility is one of the main characteristics of narrative medicine, as practitioners must be aware that they cannot know the whole of the other person's experience. Humility allows professionals to collaborate and interact with ethical implications to balance power in clinical relationships. (Shaw et al. 2022: 5.) On the contrary, assuming that our reading of the patient's history is the definitive interpretation of that history risks losing valuable details and nuances (DasGupta 2008: 981). In relation to the analysis of results, some osteopaths did not fully embrace the concept of humility, tending to show that they recognise with certainty what the patient should do and that, when satisfactory results are obtained, they are due to their intervention.

The results showed that during the anamnesis process, osteopaths seemed to consciously observe the emotional state of the patients to try to find out if there was a real desire to become pregnant, any relationship or sexual practices problems, any type of current or past physical or sexual abuse, social pressure, or any stress factor that could affect the patient's emotional state and impair their physiology. It has been demonstrated that daily perceived stress interferes with the normal functioning of the menstrual cycle and reproductive health (Schliep et al. 2015: 8; Prasad et al. 2016: 1; Humeniuk et al. 2023: 581; Szkodziak, Krzyzanowski & Szkodziak 2020: 9). Stress is a real or perceived state of threat to the body's homeostasis. Several systems such as the endocrine, neurological, and immune systems can be activated to restore homeostasis, thus establishing a stress response. This response, modulated by the hypothalamic-pituitary-adrenal axis, ensures the survival of the species before growth or reproduction. (Joseph & Whirledge 2017: 1.) Unanimously, all participants agreed that fertility problems cause a high degree of psychological stress, which can lead to anxiety or depression, and this is also supported by evidence (Hazlina, Norhayati, Bahari & Arif 2022: 6).

Based on the results, osteopaths emphasised the importance of establishing an appropriate therapeutic relationship, and alliance with the couples wishing to become pregnant, by placing them where they feel safe, and comfortable to share and express their emotions. Some osteopaths felt that once this secure bond has been established, they act as counsellors and accompany these patients through conception and possibly through pregnancy. It was described that positive therapeutic alliances predict beneficial outcomes for patients, and that communication, and contextual factors, contribute to building a robust therapeutic alliance. (Shaw et al. 2022: 3; Bishop et al. 2021: 2.)

Most osteopaths attempted to discern whether there was a known medical diagnosis or a failure in conception. The importance of time and its considerable influence on these patients was highlighted. Depending on the presence or absence of a known cause of infertility, they decided upon the need for osteopathic follow-up of the patient, or whether other prior, or simultaneous interventions were indicated. Osteopaths should be able to refer patients when their condition requires therapeutic intervention not within the scope of osteopathic practice (Ellwood & Carnes 2021: 15). Some osteopaths mentioned that osteopathy could be of great value when the cause of infertility is unknown. One practitioner noted that it is convenient to use a patient-centred approach, and therefore appreciate the patient's wishes, needs, beliefs, and socio-economic situation to select the most appropriate intervention at any moment. Supporting the previous definition, patient-centred care is also achieved when healthcare professionals involve patients in discussions and decisions about their healthcare (Constand, Macdermid, Bello-haas & Law 2014: 1; Baroni et al. 2021: 1; Horta 2023: 2).

The results showed that osteopaths sought to identify the underlying causes, and that the causes of infertility may be multifactorial. This was confirmed and the addition of multidisciplinary treatment was recommended (Popescu et al. 2024: 472). The approach to identify potential causes of infertility differed from osteopath to osteopath. While some focused more on the extent and location of the disorders, or on the quantity or quality of movement of the impaired structures, others paid more attention to the mechanisms that could be compromising the physiology. Everyone used their own criteria to identify the tissues, systems or disruptors that may be affecting the patient's homeostasis. Some osteopaths adopted a global approach and others a more specific one to discern the patient's priority and to focus the intervention on the body or

beyond, such as lifestyle, environment, and relationships. Osteopaths with a broader education of lifestyle, and/or environment elements tend to show greater attention on these aspects, to try to improve physiology. Osteopaths not trained in psychoneuroimmunology or nutrition, although considering environmental and lifestyle factors, they concentrate more on seeking and treating through the physical body.

According to the results, some participants assumed that fertility reflects overall health. Many people tent to consider infertility as an impediment rather than a disease. However, fertility and overall health seem to be interconnected, since infertile individuals are at higher risk of certain types of cancer and cardiovascular disease. (Wyrwoll & Steingröver 2024: 186; Del Giudice et al. 2020: 356.) Once the causes were understood, osteopaths attempted to re-establish and optimise the person's physiology by improving the body's homeostasis. It was sought by promoting appropriate lifestyle habits and performing manual techniques. In relation to physical activity, many participants mentioned its importance for improving fertility. Physical activity has been shown to reduce infertility through biological and physiological mechanisms, increasing antioxidants, and reducing inflammation in body fluids, organs, and tissues. It also appears to have positive effects on the immune system, on insulin resistance, and on the regulation of sex hormones. (Xie et al. 2022: 2.) One of the functions that emerged was improving self-regulation, to assist the person's systems in adapting in a more optimal way to the circumstances encountered. This function is considered one of the principles of osteopathy. (European Committee of Standardization 2015; Bagagiolo et al. 2022: 1; WHO 2010: 3; Stark 2012: 7.)

Several osteopaths searched for potential causes in the alteration of different systems and/or structures, while one of them particularly highlighted the importance of the optimal functioning of the thermoregulatory mechanisms in the reproductive system. All agreed on the importance of increasing and optimising mobility and fluid exchange and, similarly, balancing emotions. Osteopaths mainly searched for and worked on anatomical structures with restrictions on movement to mobilise them. Experts focused on the structures related to the systems they wanted to influence, for example, in the cranial area to act on the hypothalamic-pituitary-gonadal axis and in the pelvis to impact the reproductive system. Following the basic principles of osteopathy, it is assumed that a quantitatively and qualitatively broader movement improves the function of the anatomical structure in question and its related structures (WHO 2010: 3. Stark 2012: 7). The anatomical possibilism approach, the desire to find anatomical

relationships or systems that give clinical meaning, could cause undesirable nocebo effects in the person. A shift from a traditional anatomy-based framework to a more person-centred one is proposed, including values, lived experiences, autonomy, and social relationships, which constitute their personhood. (Hidalgo, McMillan & Thomson 2024: 3.)

The multifactorial underlying causes were explored in deeper detail from the osteopathic clinical reasoning. Based on the results, six major causes could potentially impair fertility mechanisms which were inflammation, thermoregulation, circadian rhythms, visceral, structural, and postural factors. The dysregulation of one or more physiological systems, such as the immune, vascular, nervous, digestive, and musculoskeletal might be involved in each of the six potential causes.

Osteopathic manual techniques have been shown to have anti-inflammatory effects, promote balance in the autonomic nervous system, modify the vasovagal reflex and reduce pro-inflammatory cytokines (Meltzer & Cao 2010: 2; Leicht, Kennedy & Richardson 2022: 6; Licciardone, Kearns & Hodge 2013; Gillan et al. 2024: 173). The results showed that osteopaths considered two types of inflammation which are approached differently. A general inflammation, triggering systemic inflammatory cascades, and a localised inflammatory process, usually related to falls, accidents or infections and surgeries. For the management of general inflammation, some osteopaths have adopted a more integrative and contextual approach, while some emphasise the use of a manual approach focused on treating areas of the body that could potentially facilitate anti-inflammatory mechanisms, such as the spleen, thymus, and areas where venous and lymphatic return may be compromised. In cases of localised inflammation, osteopaths have opted for a manual musculoskeletal approach, targeting the affected structures, and integrating the function of these structures into their immediate and general environment.

Regarding thermoregulatory factors, several osteopaths highlighted the importance of regulating the immune system by treating potentially influential areas, such as the hypothalamus, liver, gut-brain axis, lungs, intestine, and genitourinary tract with manual treatment. All osteopaths outlined the importance of ensuring an effective vascular and lymphatic system to promote the optimal functioning of each anatomical structure of the reproductive system, thereby enhancing a healthy menstrual cycle and implantation. Only one mentioned that this might be essential for maintaining optimal temperature in

structures such as the uterus, ovaries, and fallopian tubes. Ensuring the lowest temperature of the pre-ovulatory follicular fluid and the increase in temperature within the oviduct just before the ovulatory phase are both highly influential in the optimal maturation of the oocyte (Wang et al 2009: 4; Ng et al 2017: 29; Hunter & López-Gatius, 2020: 382). Heat production is obtained through active metabolic tissues or is lost through conduction to other nearby tissues. Therefore, impediments to the vasculature, tissue density or secretions in the reproductive tract, such as adhesions or endometriosis, may be associated to subfertility and could prevent the optimal temperature gradient and ovulation. (Ng et al. 2018: 29; Hunter et al. 2017: A; Hunter & López-Gatius, 2020: 383.) The mechanisms for reducing the temperature of pre-ovulatory follicles are still unknown, although they involve endothermic reactions and the effective heat exchange (Hunter & López-Gatius, 2020: 301: Ng et al. 2018). According to the results, osteopaths generally searched for structures in need of mobility that impeded vascular or lymphatic supply, such as adhesions in organic structures or connective tissues. The underlying reasoning of most osteopaths was more oriented towards reducing inflammation than thermoregulation, although it probably has a thermal effect. Osteopathic manipulation might increase skin temperature suggesting an autonomic parasympathetic effect (Bohlen et al. 2025: 10). Reproductive hormones play an essential role in the mechanisms regulating body temperature and on the cardiovascular and neurological systems. Oestrogen facilitates heat dissipation through peripheral vascular effects that enhance vasodilation, as well as central neural effects that promote vasodilatory and sudoriferous skin responses. Progesterone act in the opposite way, while the combination of both hormones favours the conservation of heat, as in the center of the menstrual cycle. This hormonal contribution is an integral part of reproduction, with the main purpose of promoting a more favourable environment for conception and foetal development. (Charkoudian & Stachenfeld, 2014: 798-802.)

Most osteopaths considered vitally important to assess patients' circadian rhythms, with particular attention to sleep patterns and sun exposure. Lifestyle changes could be recommended, when necessary, to regulate neuroendocrine and therefore reproductive functions. Melatonin is a neurohormone synthesised and released by the pineal gland at night. It acts directly on the hypothalamic-pituitary-gonadal axis, regulating circadian rhythms, pubertal development, seasonal adaptability, and reproductive organs such as the uterus, ovaries, and mammary glands. (Li et al. 2022: 1; Hardeland et al. 2011: 370.) Its fertility-enhancing properties have been

demonstrated through its antioxidant effects and biological functions. Melatonin has been shown to increase follicular concentrations by inhibiting oxidative stress, and thus improving oocyte quality. (Olcese 2020.) Melatonin was recommended as an adjunctive treatment for infertility due to its safety and antioxidant effect, as infertility is known to be associated with high levels of reactive oxygen species that can impair oocyte quality. (Fernando & Rombauts 2014: 10; Almansa-Ordonez et al. 2020: 15.)

Visceral dysfunction is defined as an impairment of the mobility or motility of the visceral system or related elements such as the neurological, fascial, skeletal, lymphatic, or vascular systems (Glossary 2017: 73; Wójcik et al. 2025: 2). Due to ischemia or inflammation, visceral nociceptors are activated, which in turn can transmit nociceptive stimuli to the somatic system through visceral reflexes (Wójcik et al. 2025: 2). Viscero-somatic reflexes are defined as a localised visceral stimulus that produce reflex response patterns in segmentally related somatic structures and transmit information through the afferent nerves of dysfunctional organs (Glossary 2017: 73; Wójcik et al. 2025: 8). Somatic and visceral information from the same segmental level is monitored through the autonomic nervous system in the spinal cord. This information converges and forms synapses, producing a sympathetic signal to the internal organs. (Wójcik et al. 2025: 8.) Osteopathic manual treatment was demonstrated to influence the autonomic nervous system and its parasympathetic effect (D´alessandro, Cerritelli & Cortelli 2016: 6; Ruffini et al. 2015: 11). Similar effects have been confirmed in manual therapy, although it has not been possible to distinguish the effects that arise, depending on the regions of the body where the techniques were applied (Roura, Alvarez, Solà & Cerritelli 2021: 29). Regarding the results, osteopaths assessed the mobility of certain organs and the physical relationships that could influence their drainage or neurological reflexes. While some osteopaths focused on the functioning of the structures supporting the organs, others focused on mobilising them to modify the afferent neural information, the maladaptive reflex arc, and the autonomic nervous system via the vagus nerve.

A broader understanding of the structure and function of the pelvis facilitates the process of identifying and guiding the treatment decisions (Chamié et al. 2018: 288). Adhesions, which arise after trauma, surgery, tumors, and inflammatory processes, may affect soft tissues. The loss of mobility involved in adhesions extends from the epidermis to the subcutaneous tissue and to the muscular and visceral structures, which may contribute to local tissue dysfunction, pain, visceral issues, and infertility.

(Wójcik et al. 2025: 2; Carranco et al. 2021.) Adhesions might be formed during the healing process and remain at the original site for a long time, affecting organs and muscles, in the surface, in the myofascial structure of the organ, and in neighboring structures (Wurn et al. 2004: 3; Wurn et al. 2008: 18; Ghobrial et al. 2023: 6). One and two months after the lesion, collagen fibrils organise themselves into bundles that eventually mature and become a fibrous band. Cross-links in collagen can evolve from microadhesions to adhesions and eventually to scars. (Wurn et al. 2008: 19.) Most osteopaths highlighted how adhesions and/or lack of mobility in certain anatomical structures could restrict mobility and function of organs, bones, ligaments, fascia, muscles, and nerves, such as endopelvic fascia, pelvic floor, and diaphragm. It was mentioned that adhesions may affect the entire abdominopelvic biomechanics, limiting the ability to conceive naturally or with assisted reproductive technologies. Osteopaths assume that osteopathic manual treatment can be beneficial for improving mobility in tissue adhesions. Aligned with the results, manual therapy has been shown to cause structural changes in adhesions by applying specific, sustained physical force to a targeted area, modifying the length and mobility of the connective tissue. The “Wurn technique” is described as a specific soft tissues manual therapy that facilitate fertility related to adhesions and reproductive organ dysfunction. Its aim is to restore visceral function and enhance the elasticity, mobility and distensibility of soft tissues, resulting in a significant improvement in pregnancy and in vitro fertilisation rates. The specific goal at the tissue layer is to break down the tiny, powerful bonds of the collagen cross-links that form adhesions, to separate them from neighboring structures. It is a non-surgical and non-invasive treatment. (Wurn et al. 2004: 5; Wurn et al. 2008: 19; Wurn et al. 2011: 189.) “Clear passage approach” has been proven to be effective in women with infertility caused by endometriosis, elevated follicle-stimulating hormone levels, tubal obstruction, unexplained infertility, and polycystic ovary syndrome. It combines several manual physical therapy techniques for the whole body and site-specific, focusing on reducing adhesions and cross-links that bind neighboring tissues during a previous healing process. (Rice et al. 2015: 41.) Osteopathic manual therapy was suggested to improve fertility; however, the evidence is considered low-to-moderate quality (De Stroper et al. 2024; 8). Many participants emphasised the importance of improving mobility in the lumbosacral or L5 joint. It has been shown that sexual dysfunction can arise due to sacral radiculopathy caused by a lumbosacral annular tear. (Goldstein et al. 2025: 2.)

In relation to the postural balance, it is defined as a condition of optimal distribution of body mass in response to gravity (Glossary 2017: 45). Postural stability involves the ability to maintain the body in a position that permits successful performance of a particular task. The smaller the oscillation surface of the body's centre of gravity, the higher the body's balance. (Park et al. 2022:934; Wójcik et al. 2025: 9.) Impairments or dysfunctions in the pelvic floor or lumbar-pelvic complex can affect stability and posture. (Wójcik et al. 2025: 2). Some participants considered that abnormalities in any body structure may affect balance and posture. It has been observed that some people with conditions such as endometriosis adopt pain-relieving positions that alter their posture (Wójcik et al. 2025: 2; Award, Ahmed, Yousef & Abbas, 2017: 2112). According to the results, osteopaths considered postural balance and the biodynamics of the body in three dimensions, including the musculoskeletal system, the musculo-fascial structures, the connection of organ tissues and the reflex activity of the central and peripheral nervous systems, including the circulatory and fluid drainage systems. Osteopaths pay special attention to the connective tissue surrounding the internal organs, the muscular system and all the systems and structures of the body that enable the circulation of bodily fluids, such as blood and lymph, to improve the health and functioning of the human body (Wójcik et al. 2025: 2). Based on the results, it was considered vitally important to find and treat those structures and the somato-visceral reflexes that may be interfering with the healthy functioning of the human body's balance and posture. Somato-visceral reflexes were defined as localised somatic stimuli that produce reflex response patterns in segments related to visceral structures (Glossary 2017: 49).

Experts generally reported using an integrative and/or global approach to their intervention. Most of them used the concept of a global approach, while some of them, especially those who had trained in psychoneuroimmunology, nutrition, or nursing, used the term integrative approach. The terms used to describe healthcare can be impregnated with philosophical nuances, conceptual implications, attributes of phenomena, and theoretical frameworks representing practice, and may also be used for education and research (Frisch & Rabinowitsch 2019: 1).

The holistic concept is derived from philosophy and humanism. Its main characteristic is that it recognises the person as a whole and that all aspects are interdependent. It is understood that the person encompasses body, mind, and spirit and includes context and environment. The term holism requires understanding the nature of human beings

and how they fit into the universe. Holistic professionals aim to empower patients and encourage self-care and the relationship between the patient and the professional is based on transparency, equality, and reciprocity. (Frisch & Rabinowitsch 2019: 1-9.)

The term integrative approach refers to the combination of two or more paradigms, for example conventional and complementary medicine, or two or more types of treatment modalities (Coulter, Khorsan, Crawford & Hsiao, 2010: 691; Frisch & Rabinowitsch 2019: 6). Integrative medicine recognises the philosophy and values of care and creates an important partnership between professional and patient. The concept of holism treats the person, acknowledging each person's innate healing abilities and encouraging well-being, health, and prevention. In integrative medicine, care is interdisciplinary and a non-hierarchical combination of conventional medicine, alternative and complementary medicine, utilising a collaborative team, resulting in effective care. (Frisch & Rabinowitsch 2019: 9.) There is a growing number of individuals and couples seeking holistic approaches through integrative and complementary medicine to improve their fertility and health (Johnson et al. 2016; Sehgal et al. 2023: 1). It is to emphasise treating the person, from a physical, psycho-emotional, and spiritual perspective, rather than focusing exclusively on a specific organic condition in a particular place (Sehgal et al. 2023: 2).

Osteopaths develop their own methods. Some used the “funnel approach”, some the “top-down approach”, one searches for a “local or systemic cause”, and another examines first at the nervous system, then the digestive system and finally, focuses on the pelvis. The characteristic that everyone had in common was the individualisation of the intervention. Complementary and integrative medicine uses evidence-based methods and considers an individualised approach to be ideal rather than a standardised one (Dyer et al. 2022: 619). The individualised approach includes the patient's characteristics, such as their physical, mental, emotional, social, and spiritual health, as well as their life circumstances, in the treatment plan (Dyer et al. 2022: 619). Individualised medicine involves tailoring an intervention or treatment strategy based on person's medical history, family history, genetic information, and environmental risk factors to individualise prevention or treatment (El-Alti, Sandman & Munthe 2019: 48; Cornetta & Brown 2013: 2). The results showed that most osteopaths reported using an individualised approach, while only one mentioned using a patient-centred approach. This was unexpected, given that the European Committee for Standardisation CEN (2015) defines osteopathy as a patient-centred health discipline.

Some osteopaths have demonstrated that they only use some of the characteristics of the person-centred approach, and do not frequently appreciate shared decision-making. Patient-centred approach is defined as care that is in accordance with the values, needs and wishes of patients and is accomplished when healthcare professionals engage patients in discussions and decisions about their healthcare (Constand, Macdermid, Bello-haas & Law 2014: 1; Baroni et al. 2021: 1; Horta 2023: 2). Another concept is the person-centred approach. This is like patient-centred approach, but emphasises the fact that patients are people and should not be reduced entirely to their health status (European Committee for Standardisation CEN 2020; Olsson, Ung, Swedberg & Ekman 2012: 455; Hutting et al. 2022: 1; Fahlgren, Nima, Archer & Garcia 2015: 2). A notable difference between the individual and the person is that the first is placed at the centre of a group to be recognised and is a passive receptor of the intervention, whereas the person communicates, interacts, and actively participates in the care process (Olsson et al. 2012: 457). The person is considered from a biopsychosocial perspective that shares power, responsibility, and therapeutic alliances (Hutting et al. 2022: 1). In the person-centred approach, the relationship between the person and the care provider is a key component, using person-centred communication establishes meaningful connections, facilitates shared decision-making, and supports self-management (Hutting et al. 2022: 1; Olsson et al. 2012: 457).

Person-centred approach has been reported to be effective in improving quality of life, self-managing results, depression, and post-traumatic stress disorder. It should encourage patients to identify their strengths, preferences, and abilities to perform activities, and to focus on areas over which they have influence. (Guedes de Pinho et al. 2021: 2.) Person-centred approach promotes the need to recognise each person as a unique being, and to address their therapeutic needs in a comprehensive manner. It helps to raise awareness of behaviors that cause distress, as well as to enable autonomous decisions that promote well-being and life satisfaction. (Fahlgren, Nima, Archer & Garcia 2015: 2; Wong & Cloninger 2010: 199.) The World Health Organisation has long acknowledged that health is a state of physical, mental, and social well-being, and not merely the absence of disease. In order to address the therapeutic needs of the whole person and optimise clinical outcomes and health, it is necessary to appreciate how diet, exercise, leisure, work, sexual relationships, and spiritual practices influence the person. (Wong & Cloninger 2010: 199.)

The emotional support provided by osteopaths at a verbal level, and in certain cases also in writing, through stress management strategies, may be complemented by muscle tension reduction and relaxation techniques. Relaxation techniques can be applied with breathing techniques, which provide quick stress control and relaxation of the body through slow, deep breathing. Evidence shows that a change in breathing pattern can reduce respiratory rate and influence the nerve centres involved in regulating emotions. Similarly, reducing muscle tension has a positive effect on the nervous system, decreasing anxiety, and relaxation techniques reduce negative emotions. (Humeniuk et al. 2023: 583.)

Manual techniques were chosen based on the patient's preferences and the structures to be treated, considering that changes could extend beyond the area of treatment. Manual therapy is defined as a whole-body intervention which seeks to facilitate the functioning of the neural, vascular, and biomechanical systems (Verzella et al. 2022: 1). The interaction between touch and the body activates mechanisms that produce effects at different neural levels generating mental representations in the brain, termed feelings. These are influenced by metabolic, structural, and functional stimuli at a given moment, a process known as interoception. Touch can modulate different stimuli, ultimately modifying perceptions of the internal and external world. The insula is the critical center for multimodal interoceptive integration, such as awareness of bodily sensations and exteroceptive elements, like the perception of touch. (Cerritelli et al. 2020: 1; Craig 2009: 59.) Osteopathic manual therapy can have therapeutic effects, as touch has been recognised as having an exteroceptive and interoceptive effect, the latter via activation of small-diameter, unmyelinated, low-conductivity C-tactile fibres and stimulation of the spinothalamic lamina I, thereby promoting homeostasis and the basis of feelings (Cerritelli et al. 2017: 2; McGlone et al. 2014: 4; Cerritelli et al. 2020: 1). The results explained the way in which, through manual intervention and touch, interaction and communication with biology were sought, recognising the connecting pathways and their possible responses. Touch is a strong communication channel that plays a fundamental role in controlling our emotional well-being and self-perception. Interpersonal tactile communication is a bidirectional process, as a specific cognitive state maintained by the operator can cause significant effects on the functional connectivity of subjects between the areas that process the interoceptive and attentional value of touch. (Cerritelli et al. 2017: 7.) Interoceptive touch can be top-down cognitively modulated, by subjects in their response to touch received during the treatment (McCabe et al. 2008: 97; Cerritelli et al. 2017: 7). The outcomes showed that,

when performing any type of manual technique, participants were attentive to the process of adapting the technique to the patient, the type of tissue being treated, and the search for system regulation. The objective was to achieve observable changes for the patient, such as a change in local temperature and mobility in the tissues. Techniques were suggested to be personalised or tailored hands-on using the characteristics of physical stimuli, such as size of contact area, location, speed of execution, intensity, frequency of contact and timing, and emotional stimuli, such as kindness, acceptance, affection, and firmness (Baroni et al. 2021: 5; Geri et al. 2019: 3). Osteopaths emphasised that any technique could be used to achieve the objective if it was personalised and adapted to the tissue and the patient. Direct and indirect musculoskeletal techniques were used, as well as visceral, cranial, fascial, and vascular techniques. Osteopathic manipulative treatment has been shown to be effective especially in musculoskeletal conditions, particularly in chronic nonspecific low back pain or pregnancy low back pain, and in neurosensory conditions (Zipp et al. 2025: 1195; Khalaf et al. 2023: 12; Bagagiolo, Rosa & Borrelli 2021: 1; Franke 2017: 760; Wójcik et al. 2025: 11). In addition, it has been associated with significant improvement in general gynaecological conditions, digestive symptoms, and quality of life in women with colorectal endometriosis (Daraï et al. 2017: 474). The effectiveness of manual osteopathic treatment in reducing pain during pregnancy and childbirth, and positive outcomes in conception rates, have been observed. However, the limited number of studies and inconsistent results, hinder the recommendation of this treatment. (Ruffini et al. 2016: 77.) Positive effects have also been seen in non-musculoskeletal techniques and visceral techniques in polycystic ovarian syndrome, and irritable bowel syndrome (Yosri et al. 2022: 420; Lotfi et al. 2023: 5). Some osteopaths have commented on their use of intracavitary techniques to enable more specific examination and treatment. The use of internal approaches by osteopaths, through the vagina and rectum, to assess palpatory findings in pelvic pathology and pelvic surgery has been described. Since tissue tensions and torsions are unique, it is impossible to describe the subtleties of the variations and directions required for treatment, so it depends on how it feels during the assessment. Manual treatment cannot be protocolised, it is completely individualised. (Stone 2007: 185.) It was suggested that manual therapy in the pelvis is beneficial in cases of female infertility and with a small number of treatments manual medicine could be an economical therapeutic option for infertility. Manual mobilisation techniques do not seem to carry the risks associated with traditional infertility treatments. (Kramp 2012: 683; Ruffini et al. 2016: 76.)

6.2 Limitations

This master's thesis methodology implies that the results could not be peer reviewed, following the requirements proposed by Metropolia University of Applied Sciences, thus no second person had access to the interviews, and therefore the results could present a risk of bias. Purposive sampling requires the ability to access key informants in the field who can help identify information-rich cases (Suri 2011: 66). The choice of purposive sampling involves that the search for and selection of participants who can provide rich information may be biased and that there might be potentially highly interesting individuals who have not been detected. Based on the results, one outlier was identified, which provided much more information than the rest of the participants, suggesting that there could potentially be other outliers with similar levels of knowledge that were not detected and that this could condition the results.

During the interviews, it was observed that two participants, whose native languages were neither English nor Spanish, had difficulty expressing themselves orally in English and lacked fluency and precision, which may have limited the results. Similarly, regarding languages, the author of the master's thesis is a native Spanish speaker and, although she has a professional level of English and has carefully translated the data, it could be subject to possible bias.

6.3 Ethical considerations

This master's thesis was performed in accordance with the guidelines for responsible research conduct with reliability, honesty, respect, and accountability, following the code of conduct introduced by the Finnish National Board on Research Integrity (TENK 2023). It was essential to consider human beings as the focus of qualitative research and therefore to respect the participants' rights to provide valid information. Ethical guidelines were followed by voluntary participation, anonymity, confidentiality and privacy, and the choice to withdraw from the research at any time. (Laryeafio & Ogbewe 2023: 105.) Issues related to anonymity and confidentiality were thoroughly considered to protect participants. No personal or sensitive personal information was used at any time, so no research permit, nor an ethical approval was needed (TENK 2023). All participants were adults and voluntarily agreed to participate. Participants were contacted via email for the invitation. Once they responded positively, they were sent another email with the Participant Information Sheet (Appendix 2), the Consent

Form (Appendix 4), and finally, the Zoom link with the previously agreed appointment time. Through the participation information sheet, participants were informed of the study's goals, procedures, and their involvement in the study, including the benefits, risks, and their right to withdraw from the study at any time. Participation Information Sheet and Consent Form were sent in English or Spanish according to the language of each participant, to prevent language barriers. Personal data was processed according to the European Union General Data Protection Regulation (679/2016) and current national regulation. Personal data collected was the name, contact information (email), video and voice data, date of graduation, years of experience in fertility field, and other educational backgrounds. Participants were informed about voice and video recordings and protection procedures, and they signed and returned the written consent form before the interview. The recordings and transcripts were stored in a Metropolia´s secure drive and only the author had access to it. The Zoom online platform was used for data collection, with the approval of Metropolia University due to the European Union's General Data Protection Regulation (GDPR 679/2016). Transcription, translation, and data analysis were carried out entirely by the author. Participants' identities were coded during transcription. All information were stored in secure drive and destroyed once the final report has received approval.

6.4 Trustworthiness

The trustworhiness of qualitative research is analysed and evaluated by assessing credibility, transferability, reliability, and confirmability. Credibility means that the results of the study are accurately and honestly reported, from the perspective of the participants and readers, and that the categorisation of data is appropriate. (Yilmaz 2013: 319; Elo & Kyngäs 2007: 112.) The author of the master thesis prepared the interviews meticulously and conducted a pilot interview, from which she received positive feedback. As the interviews were conducted, the author gained experience in the interview process. The interviews were listened to and reviewed many times to ensure that the results were as accurate as possible when transcribed. The results obtained included direct quotes from the interviews, which reinforced the credibility and transparency of the study. Member checking, the process that involves participants confirming the data collected, was only carried out at the request of the participants.

Dependability refers to the assumption of repeatability or replicability of study results. The large amount of data obtained in the interviews and the inductive content analysis

process could limit the dependability of the study results. Confirmability is the degree to which the investigator can demonstrate that the results are related to the data and could be confirmed by others. (Renjith et al. 2021: 6; Thompson et al. 2011: 119.) The author has attempted to detail the methods used to collect and analyse data at all stages of the study to enable the reader to follow and verify the process as an ‘audit trail’ to increase the dependability and confirmability of the qualitative study (Thompson et al. 2011: 119). Transferability is the extent to which the resulting ideas can be applied to other people or situations and can be understood as the generalisability of the findings (Thomson et al. 2011: 118). The author has tried to follow Lincoln and Guba's (1985) recommendations and provided a thorough description so that readers can evaluate the applicability of the data in other contexts (Renjith et al. 2021: 6).

7 Conclusions

The tendency to delay motherhood and the high prevalence of infertility rates might require considering a broad spectrum of treatment options. This master's thesis observes and explores how osteopaths approach patients with this condition. Four major themes have emerged; the osteopathic lenses to uniqueness of each pregnancy attempt, the goals to be achieved through osteopathy, the osteopathic clinical reasoning to multifactorial causes and the osteopathic intervention to determine and treat physiological disruptors.

Osteopaths consider every attempt to conceive as unique event. Carefully listening to the person's narrative and establishing an appropriate and trusting therapeutic alliance and relationship can provide an individualised and biopsychosocial perspective. The assessment of the patient's general health, physical and emotional, lifestyle, environment, woman´s age, and the osteopath's own limitations are critical in deciding whether the priority is osteopathic treatment or referral to other professionals.

The causes of infertility might be multifactorial while stablishing an unfavorable context for conception. Osteopaths’ goals are to focus on identifying the underlying causes and restore and optimise physiological functions. The attempt is made to improve mobility, fluid exchange and release any restrictions, adhesions and/or vascular congestion that may be impairing the self-regulating systems and person's physiology. Osteopaths assist patients in achieving emotional balance and empowerment to actively improve their health. Clinical reasoning is primarily based on the possible causes that may be

affecting fertility and physiology. These key elements include inflammatory, thermoregulatory, circadian, postural, organic, and structural factors.

Osteopathic interventions use an integrative and/or global approach, considering aspects of the person, such as physical, emotional, social, lifestyle, and environmental factors. Lifestyle is one of the key aspects to consider, including nutrition, physical exercise, rest habits, sun exposure, managing emotions, and avoiding toxics and/or endocrine disruptors. Individualisation and a person-centred approach are essential for planning a tailored treatment, considering all biopsychosocial aspects, and appreciating the values, preferences and needs of the person when making shared decisions. When performing any type of manual technique, the experts focus mainly on the process of adapting the technique to the patient, the type of tissue involved, the connection and communication with different structures to achieve observable changes, such as a local changes temperature and/or mobility. Osteopaths consider working locally and globally to search for an effect on different tissues and systems and, broader regulation and homeostasis. Osteopaths tend to assume that what they feel is really what is happening, and this may be limiting and conditioning clinical results. A person-centred approach could allow a paradigm shift from treatment based on the osteopath's feelings to a treatment proposal with decision-making shared between parties. Osteopaths have developed a general and specific overview and combined integrative, holistic, individualised and person-centred approach with the effectiveness of osteopathic manual treatment. This current combination of approaches may enable the design of a personalised and tailored treatment plan, that addresses lifestyle and environmental interventions, while assessing the person’s values, needs and preferences. It may allow to focus on specific manual interventions that could be highly relevant to the person's condition.

The current combination of approaches could be used in prevention and treatment for infertility and in preparation for assisted reproduction processes. This master’s thesis provides information about how osteopaths manage infertility and could be useful in inspiring future master´s thesis that focus specifically on the effectiveness of osteopathic treatment for infertility.

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Appendix 1

Guiding interview questions (English)

1. How many years ago did you graduate in osteopathy?

2. Have you trained in other disciplines apart from osteopathy?

3. What is your main source of knowledge?

4. How long have you been treating infertility patients?

5. In your experience, do you think that osteopathy can contribute to improve infertility conditions? How does osteopathy influence/contribute to fertility problems?

6. What approach or approaches are more appropriate or effective in the treatment of people with infertility?

7. What are the key concepts in the osteopathic approach to infertility?

8. What aspects do you take into consideration when planning the treatment?

9. Do you usually visit men and women? What criteria do you use to decide whether to treat one partner or the other?

10. What kind of techniques do you mainly use in your treatments? Are there any specificities in the osteopathic techniques you use to treat fertility problems?

11. Are there certain anatomical structures that you consider key addressing fertility problems in both men and women?

12. Do you normally take environmental aspects into consideration? Which ones?

13. Do you work together with other professionals? which professionals? Other professionals refer patients to you? Which ones?

14. Do you work in collaboration with assisted reproductive techniques? How long has it been?

15. Do you think osteopathy has a potential to be developed in assisted reproduction clinics?

Appendix 2

PARTICIPANT INFORMATION SHEET (English)

Study title: Osteopathic practitioners' considerations on infertility treatment. A qualitative study

Invitation to participate in the research study

We would like to invite you to take part in our research study, where osteopaths with more than five years of experience treating infertility and speaking English or Spanish are welcomed. The aim is to describe experienced osteopath´s considerations of infertility treatment approaches. The chosen and invited participants are osteopaths who are known or recommended in the professional osteopathic environment and who are involved in the training of osteopaths or who lead their own fertility-related practices. The intention is to interview between 10 and 15 participants.

This information sheet describes the study and your role in it. Before you decide it, it is important that you understand why the research is being done and what it would involve for you. Please take time to read this information and discuss it with others if you wish. If there is anything that is not clear, or if you would like more information, please ask us. After that we will ask you to sign a consent form to participate in the study.

Voluntary nature of participation

The participation in this study is entirely voluntary. You can withdraw from the study at any time without giving any reason, and without there being any negative consequences. If you withdraw from the study or withdraw your consent, any data collected from you before the withdrawal can be included as part of the research data.

Purpose of the study

This is a qualitative study and data is analyzed by inductive content analysis. The purpose is to observe and explore the knowledge, the approaches**,** the techniques, and skills considered by osteopaths treating infertility, to benefit patients seeking pregnancy and osteopaths interested in this topic**.**

Who is organising and funding the research?

The study is conducted by a master student Silvia Triay Salamanca and supervised by senior lecturer Heini Maisala-McDonnell. The facilitating organisation is Metropolia University of Applied Science, Helsinki, Finland.

What will the participation involve?

Your participation will involve scheduling an interview and your time preference will be respected. The interview will then last between 45-60 minutes and will be conducted via Zoom and recorded using the same platform, an audio recorder and the interviewer will also take notes. Normally, the time commitment will be around 45-60min once only and occasionally, the author may contact you for a specific clarification.
In-depth semi-structures Interviews will be conducted for a qualitative study from autumn to winter 2024 and the study will be finished in spring 2025.

Possible benefits of taking part

Participation is voluntary and there is no remuneration for it. Your participation may contribute to increase the knowledge of the osteopathic approach to infertility that can be used in future research, and to open new opportunities in the field. Further studies may lead to more knowledge and the possibility of broadening the range of target patients.

Possible disadvantages and risks of taking part

All data will be treated anonymously. If you do not feel comfortable, you can withdraw from the interview at any time.

Financial information

Participation in this study will involve no cost to you. You will receive no payment for your participation. This study has not received any funding.

Informing about the research results

The results will be published anonymously with no information that can identify you. This study will be published after its completion in Theseus. This is a Master´s thesis of Silvia Triay Salamanca, from Metropolia University of Applied Sciences, in Helsinki, Finland.

Termination of the study

The completion of the master's thesis will take place in spring 2025, except in the case of serious circumstances preventing its conclusion.

Further information

Further information related to the study can be requested from the researcher/person in charge of the study.

Contact details of the researchers

Researcher / Student
Name: Silvia Triay Salamanca
Tel. number: [redacted]
Email: silvia.triay@metropolia.fi

Person in charge of the study / Supervisor
Name: Heini Maisala-McDonnell
Helsinki Metropolia University of Applied Sciences / Senior lecturer
Tel. number [redacted]
Email: heini.maisala-mcdonnell@metropolia.fi

Appendix to the Participant Information Sheet: A Privacy Notice for Scientific Research

Within this study, your personal data will be processed according to the European Union General Data Protection Regulation (679/2016) and current national regulation. The processing of personal data will be described in the following items.

Data controller of the study

Data controller is the natural or legal person, public authority, agency, or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data.

Silvia Triay Salamanca
[redacted]
silvia.triay@metropolia.fi

Metropolia University of Applied Sciences Ltd,
business identity code: 2094551-1
Address: PO Box 4000,
FI-00079 Metropolia. Finland
studentservices@metropolia.fi

Contact person for matters related to the processing of personal data

Silvia Triay Salamanca
silvia.triay@metropolia.fi
[redacted]

Types of personal data that will be collected

Personal data collected will be:
-Name, contact information (email), video and voice data

-When graduated and how many years of experience in fertility field
-Other professions

There is no statutory or contractual requirement to provide your personal data, participation is entirely voluntary.

Personal data will be collected also from other sources

Other personal data will not be collected from other sources.

Personal data protection principles

Data collection is carried out by:

-Video recording by Zoom in MP4 format, approximately 300MB/interview.
-Audio recording by digital voice recorder (Bbeiyy 128GB, 3072 kbps) for back up in case of data loss
-Verbatim transcription in Word document, aproximately 1MB/interview.
-Field notes of interviewer observations on paper.

Personal data will be stored on an Metropolia secure drive to which only the main author will have access.

The data that is to be processed in the information systems has been protected using the following:
☐ user ID ☒ password ☐ user registration ☒ access control (physical location)
☐ other methods, please specify:

For what purpose will personal data be processed?

The purpose is to extract meaning and generate knowledge from the subjective experiences of individuals.

Legal basis of processing personal data

Consent of the person concerned (participant).

If the legal basis is a consent granted by the data subject. You have the right to withdraw the consent at any time as described in this Privacy Notice.

Nature and duration of the research (how long will the personal data be processed):

☒ One-time research ☐ Follow-up research

The data collection will take place in autumn 2024 and the thesis will be finalised in late spring 2025.

What happens to the personal data after the research has ended?

How the personal data will be processed after the research has ended:
☒ Any research materials containing personal data will be destroyed
☐Any research materials containing personal data will be archived
☐ without identifiers
☐ with identifiers

Where the materials will be archived and for how long:

Personal data will be stored on a Metropolia secure drive to which only the main author will have access.

Data transfer outside of research registry:
Personal data will not be transferred outside of study registry.

Possible transfer of personal data outside the EU or the EEA:
Your data will not be transferred outside of the EU or the EEA.

Your rights as a data subject

Because your personal data will be used in this study, you will be registered to study registry. Your rights as a data subject are the following

- Right to obtain information on the processing of personal data
- Right of access
- Right to rectification
- Right to erasure (right to be forgotten)
- Right to withdraw the consent regarding processing of personal data
- Right to restriction of processing
- Notification obligation regarding rectification or erasure of personal data or restriction of processing
- Right to data portability
- The data subject can allow automated decision-making (including profiling) with his or her specific consent
- Right to notify the Data Protection Ombudsman if you suspect that an organization or individual is processing personal data in violation of data protection regulations.

If the purposes for which a controller processes personal data do not or do no longer require the identification of a data subject by the controller, the controller shall not be obliged to maintain, acquire, or process additional information to identify the data subject for the sole purpose of complying with this regulation. If the controller cannot identify the data subject the rights of access, rectification, erasure, notification obligation and data portability shall not apply except if the data subject provides additional information enabling his or her identification.

You can exercise your rights by contacting the data controller of the study.

Personal data collected in this study will not be used for automated decision-making

In scientific research, the processing of personal data is never used in any decisions concerning the participants of the research.

Pseudonymisation and anonymisation

All information collected from you will be handled confidentially and according to the legislation. Individual participants will be given a code, and the data will be stored in a coded form in the research files. Results will be analysed and presented in a coded, aggregate form. Individuals cannot be identified without a code key. A code key, which can be used to identify individual research participants and their responses, will be stored (by the author), and the data will not be given to people outside the research group. The final research results will be reported in aggregate form, and it will be impossible to identify individual participants. Research registry will be stored in a Metropolia secure drive for two years, after which it will be destroyed.

Researcher has to inform the participant if the collected data will be used for later research. The participant has the right to request information of people who have received data for their use. If the legal basis for processing personal data has been consent and you wish to use the data in further studies, a specific consent for that has to be received.

Please mention if you intend to cooperate internationally and clarify the confidentiality and protection of the data as well as possible agreements on data processin

Appendix 3

PARTICIPANT INFORMATION SHEET (Spanish)
Título del estudio:

Consideraciones de los practicantes de osteopatía en el tratamiento de la infertilidad. Un estudio cualitativo

Invitación a participar en el estudio de investigación

Nos gustaría invitarle a participar en nuestro estudio de investigación, en el que osteópatas con más de cinco años de experiencia en el tratamiento de la infertilidad y que hablen inglés o español son bienvenidos. El objetivo es describir las consideraciones de los osteópatas experimentados sobre las aproximaciones en el tratamiento de la infertilidad. Los participantes elegidos o invitados son osteópatas conocidos o recomendados en el entorno osteopático profesional y que están implicados en la formación de osteópatas o que dirigen sus propias consultas relacionadas con la fertilidad. La intención es entrevistar entre 10 y 15 participantes.
Esta hoja informativa describe el estudio y su papel en él. Antes de decidirlo, es importante que entienda por qué se realiza la investigación y lo que implicaría para usted. Tómese su tiempo para leer esta información y comentarla con otras personas si lo desea. Si hay algo que no está claro o si desea más información, pregúntenos. Después le pediremos que firme un formulario de consentimiento para participar en el estudio.

Carácter voluntario de la participación

La participación en este estudio es totalmente voluntaria. Puede retirarse del estudio en cualquier momento sin dar ninguna razón y sin que haya consecuencias negativas. Si se retira del estudio o retira su consentimiento, cualquier dato recogido antes de la retirada puede incluirse como parte de los datos de la investigación.

Finalidad del estudio

Se trata de un estudio cualitativo y los datos se analizan mediante un análisis de contenido inductivo. El propósito es observar y explorar el conocimiento de los enfoques, técnicas y habilidades consideradas por los osteópatas que tratan la infertilidad, para beneficiar a los pacientes que buscan embarazo y a los osteópatas interesados en este tema.

¿Quién organiza y financia la investigación?

El estudio está dirigido por la estudiante de máster Silvia Triay Salamanca y supervisado por la profesora Heini Maisala-McDonnell. La organización facilitadora es Metropolia University of Applied Sciences.

¿En qué consistirá la participación?

Su participación consistirá en concertar una entrevista y se respetará su preferencia horaria. La entrevista durará entre 45 y 60 minutos y se realizará a través de Zoom y grabada utilizando la misma plataforma, una grabadora de audio y la entrevistadora también tomará notas.
Normalmente, el compromiso de tiempo será de unos 45-60min una sola vez y, ocasionalmente, el autor podrá ponerse en contacto con usted para alguna aclaración.
Se realizarán entrevistas semiestructuradas en profundidad para un estudio cualitativo de otoño a invierno de 2024 y el estudio finalizará en la primavera de 2025.

Posibles ventajas de participar

La participación es voluntaria y no está remunerada. Su participación puede contribuir a aumentar el conocimiento del enfoque osteopático de la infertilidad que puede utilizarse en futuras investigaciones y abrir nuevas oportunidades en este campo. Nuevos estudios pueden conducir a un mayor conocimiento y a la posibilidad de ampliar el rango de pacientes objetivo.

Posibles desventajas y riesgos de participar

Todos los datos se tratarán de forma anónima. Si no se siente cómodo, puede retirarse de la entrevista en cualquier momento.

Información financiera

La participación en este estudio no supondrá ningún coste para usted. No recibirá ningún pago por su participación. Este estudio no ha recibido ninguna financiación.

Información sobre el resultado de la investigación

Los resultados se publicarán de forma anónima, sin información que pueda identificarle. Este estudio se publicará tras su finalización en Theseus. Esta es una tesis de máster de Silvia Triay Salamanca de Metropolia University of Applied Sciences.

Finalización del estudio

La finalización de la tesis de máster tendrá lugar en la primavera de 2025, salvo en el caso de circunstancias graves que impidan su conclusión.

Información adicional

Se puede solicitar más información relacionada con el estudio a la investigadora responsable del estudio.

Datos de contacto de los investigadores

Investigadora / Estudiante
Nombre: Silvia Triay Salamanca
Tel: [redacted]
Correo electrónico: silvia.triay@metropolia.fi

Responsable del estudio / Supervisor
Nombre: Heini Maisala-McDonnell
Metropolia University of Applied Sciences Helsinki / Profesora titular
Número de teléfono: [redacted]
Correo electrónico: heini.maisala-mcdonnell@metropolia.fi

Apéndice de la Hoja de Información para el Participante: Aviso de privacidad para la investigación científica

Dentro de este estudio, sus datos personales se procesarán de acuerdo con el Reglamento General de Protección de Datos de la Unión Europea (679/2016) y la normativa nacional vigente. El tratamiento de los datos personales se describirá en los siguientes puntos.

Responsable del tratamiento de los datos del estudio

Responsable del tratamiento es la persona física o jurídica, autoridad pública, agencia u otro organismo que, solo o conjuntamente con otros, determina los fines y los medios del tratamiento de los datos personales.

Silvia Triay Salamanca
[redacted]
silvia.triay@metropolia.fi
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Código de identificación empresarial: 2094551-1
Dirección: Apartado de correos 4000,
FI-00079 Metropolia. Finlandia
studentservices@metropolia.fi

Persona de contacto para asuntos relacionados con el tratamiento de datos personales

Silvia Triay Salamanca
silvia.triay@metropolia.fi
[redacted]

Tipos de datos personales que se recogerán

Los datos personales recogidos serán:
-Nombre, información de contacto (correo electrónico), datos de vídeo y voz.
-Cuándo se graduó y cuántos años de experiencia en el campo de la fertilidad
-Otras profesiones
No existe ningún requisito legal o contractual para facilitar sus datos personales, la participación es totalmente voluntaria.

También se recopilarán datos personales de otras fuentes

No se recopilarán datos personales de otras fuentes.

Principios de protección de datos personales

La recogida de datos se lleva a cabo mediante:
-Grabación de vídeo mediante Zoom en formato MP4, aproximadamente 300MB/entrevista.
-Grabación de audio con una grabadora de voz digital (Bbeiyy 128GB, 3072 kbps) como copia de seguridad en caso de pérdida de datos.
-Transcripción literal en documento Word, aproximadamente 1 MB por entrevista.
-Notas de campo de las observaciones del entrevistador en papel.
Los datos personales se almacenarán en una unidad segura de Metropolia a la que sólo tendrá acceso el autor principal.

Los datos que se tratarán en los sistemas de información se han protegido utilizando lo siguiente:
☐ identificación de usuario ☒ contraseña ☐ registro de usuario ☒ control de acceso (ubicación física)
☐ otros métodos, especifíquese:

¿Con qué finalidad se tratarán los datos personales?

La finalidad es extraer significado y generar conocimiento a partir de las subjetivas experiencias de los individuos.

Base jurídica del tratamiento de los datos personales

Consentimiento del interesado (participante).
Si la base jurídica es un consentimiento otorgado por el interesado. Tiene derecho a retirar el consentimiento en cualquier momento, tal como se describe en el presente Aviso de privacidad.

Naturaleza y duración de la investigación (durante cuánto tiempo se van a procesar):

☒ Investigación única ☐ Investigación de seguimiento

La recogida de datos tendrá lugar en otoño de 2024 y la tesis se finalizará a finales de la primavera de 2025.

¿Qué ocurre con los datos personales una vez finalizada la investigación?

Cómo se tratarán los datos personales una vez finalizada la investigación:

☒ Se destruirá todo el material de investigación que contenga datos personales.

☐ Se archivará cualquier material de investigación que contenga datos personales

☐ sin identificadores

☐ con identificadores

Dónde se archivarán los materiales y durante cuánto tiempo:
Los datos personales se almacenarán en una unidad de disco segura de Metropolia a la que sólo el principal autor tendrá acceso.

Transferencia de datos fuera del registro de investigación:

Los datos personales no se transferirán fuera del registro del estudio.

Posible transferencia de datos personales fuera de la UE o del EEE:
Sus datos no se transferirán fuera de la UE o del EEE.

Sus derechos como interesado
Dado que sus datos personales se utilizarán en este estudio, se le inscribirá en el registro del estudio. Sus derechos como interesado son los siguientes
- Derecho a obtener información sobre el tratamiento de sus datos personales
- Derecho de acceso
- Derecho de rectificación
- Derecho de supresión (derecho al olvido)
- Derecho a retirar el consentimiento relativo al tratamiento de datos personales
- Derecho a la limitación del tratamiento
- Obligación de notificar la rectificación o supresión de datos personales o la limitación del tratamiento
- Derecho a la portabilidad de los datos
- El interesado puede permitir la toma de decisiones automatizadas (incluida la elaboración de perfiles) con su consentimiento expreso
- Derecho a notificar al Defensor de la Protección de Datos si sospecha que un tratamiento de datos personales infringiendo la normativa de protección de datos.

Si los fines para los que un responsable del tratamiento de datos personales no requiere o ya no requieren la identificación de un interesado por parte del responsable del tratamiento, éste no estará obligado a mantener, adquirir o tratar información adicional para identificar al interesado con el único fin de cumplir el presente Reglamento. Si el responsable del tratamiento no puede identificar al interesado, los derechos de acceso, rectificación, supresión, obligación de notificación y portabilidad de datos no se aplicarán a menos que el interesado facilite información adicional que permita su identificación.
Puede ejercer sus derechos poniéndose en contacto con el responsable del tratamiento del estudio.

Los datos personales recogidos en este estudio no se utilizarán para la toma de decisiones automatizada

En la investigación científica, el tratamiento de datos personales nunca se utiliza en ninguna decisión relativa a los participantes en la investigación.

Pseudonimización y anonimización

Toda la información que se obtenga de usted se tratará de forma confidencial y de acuerdo con la legislación vigente. A cada participante se le asignará un código, y los datos se codificados en los archivos de la investigación. Los resultados se analizarán y presentarán de forma codificada y agregada. Los individuos no podrán ser identificados sin una clave codificada. Una clave de código, que puede utilizarse para identificar a los participantes en la investigación y sus respuestas, será almacenada (por el autor) y los datos no se facilitarán a personas ajenas al grupo de investigación. Los resultados finales de la investigación se presentarán de forma agregada y será imposible identificar a los participantes individuales. El registro de la investigación se almacenará en una unidad segura de Metropolia durante dos años, tras lo cual será destruido.

El investigador tiene que informar al participante si los datos recogidos se utilizarán para investigaciones posteriores. El participante tiene derecho a solicitar información de las personas que han recibido datos para su uso. Si la base jurídica del tratamiento de datos personales ha sido consentida y se desea utilizar los datos en estudios posteriores, debe recibirse un consentimiento específico para ello.

Mencione si tiene intención de cooperar internacionalmente y aclare la confidencialidad y la protección de los datos, así como posibles acuerdos sobre su tratamient

Appendix 4

PARTICIPANT CONSENT FORM (English)

Title of the study: Osteopathic practitioners' considerations on infertility treatment. A qualitative study

Location of the study: Metropolia University of Applied Sciences, Helsinki, Finland. Silvia Triay Salamanca, Master´s student, silvia.triay@metropolia.fi, telephone number [redacted]. Heini Maisala-McDonnell, senior lecturer.

I…… have been invited to participate in the above research study. The purpose of this study is to describe osteopath perceptions of infertility treatment.

I have read and understood the written participant information sheet. The information sheet has provided me sufficient information about above study, the purpose and execution of the study, about my rights as well as about the benefits and risks involved in it. I have had the opportunity to ask questions about the study and have had these answered satisfactorily.

I have had sufficient information of the collection, processing, and transfer/disclosure of my personal data during the study and the Privacy Notice has been available.

I have not been pressurised or persuaded into participation.

I have had enough time to consider my participation in the study.

I understand that my participation is entirely voluntary and that I am free to withdraw my consent at any time, without giving any reason. I am aware that if I withdraw from the study or withdraw my consent, any data collected from me before my withdrawal can be included as part of the research data.

By signing this form, I confirm that I voluntarily consent to participate in this study.

If the legal basis of processing personal data within this study is a consent granted by the data subject, by signing I grant the consent for process my personal data. I have right to withdraw the consent regarding processing of personal data as described in the Privacy Notice.

Date

_____

Signature of Participant

The original consent signed by the participant and a copy of the participant information sheet will be kept in the records of the researcher. Participant information sheet, privacy notice and a copy of the signed consent will be given to the participant

Appendix 5

PARTICIPANT CONSENT FORM (Spanish)

Título del estudio: Consideraciones de los practicantes de osteopatía en las aproximaciones al tratamiento de la infertilidad. Un estudio cualitativo

Lugar del estudio: Metropolia University of Applied Sciences, Silvia Triay Salamanca, estudiante de máster, silvia.triay@metropolia.fi, teléfono [redacted]. Heini Maisala-McDonnell, profesora titular.

Yo..... he sido invitada/o a participar en el estudio de investigación mencionado. El propósito de este estudio es describir las consideraciones de los osteópatas sobre el tratamiento de la infertilidad.

He leído y comprendido la hoja de información del participante. La hoja de información me ha proporcionado información suficiente sobre el estudio, sobre el propósito y ejecución, sobre mis derechos, así como sobre los beneficios y riesgos que conlleva. He tenido la oportunidad de hacer preguntas sobre el estudio y se me han respondido satisfactoriamente.

He recibido información suficiente sobre la recogida, el tratamiento y la transferencia de mis datos personales durante el estudio y sobre la política de privacidad.

No se me ha presionado ni persuadido para que participe.

He tenido tiempo suficiente para considerar mi participación en el estudio.

Entiendo que mi participación es totalmente voluntaria y que soy libre de retirar mi consentimiento en cualquier momento, sin dar ninguna razón. Soy consciente de que, si me retiro del estudio o retiro mi consentimiento, cualquier dato obtenido de mí antes de mi retirada puede ser incluido como parte de los datos de la investigación.

Al firmar este formulario, confirmo que consiento voluntariamente en participar en este estudio.

Si la base jurídica del tratamiento de datos personales en el marco de este estudio es un consentimiento otorgado por el interesado, con mi firma otorgo el consentimiento para el tratamiento de mis datos personales. Tengo derecho a retirar el consentimiento relativo al tratamiento de datos personales tal como se describe en el Aviso de privacidad.

Fecha

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Firma del participante

El consentimiento original firmado por el participante y una copia de la hoja informativa del participante se conservarán en los archivos del investigador. Se entregará al participante la hoja informativa, el aviso de privacidad y una copia del consentimiento firmado.