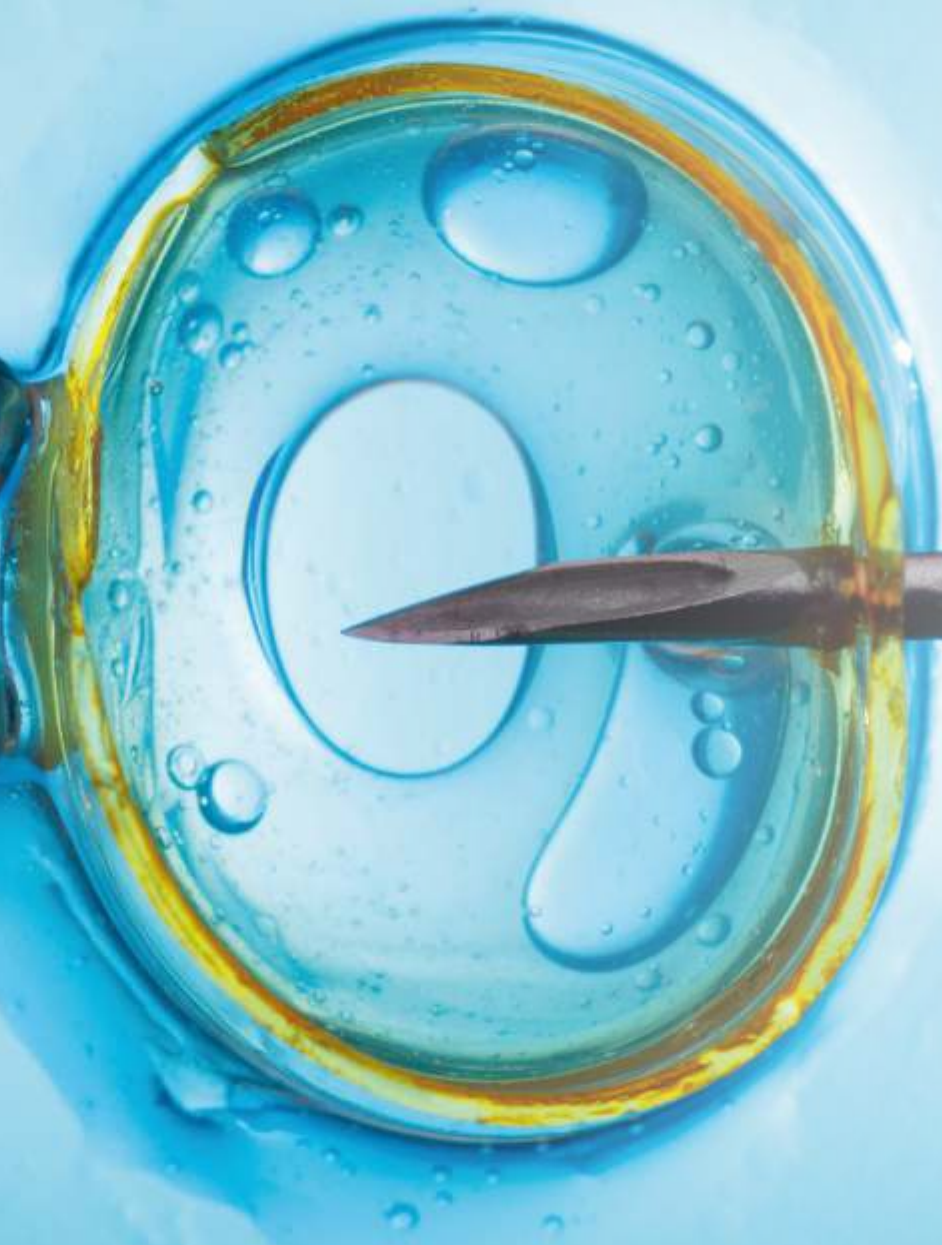


# EXPERIENCE THE JOY OF PARENTHOOD

Centre of Excellence:  
**Infertility**







Globally, infertility affects more than 15% of the couples. In Africa, infertility has higher prevalence and the percentage is even higher due to a high rate of sexually transmitted infections (STIs), post-abortive complications, and HIV/ AIDS. Infertility often has a devastating impact on the couples concerned, especially in societies where parenthood is culturally mandatory. Infertility strongly impacts on the emotional aspect at a personal level and adversely impacts on marital relationships.

In Africa, scarcity of healthcare resources and infrastructure, and the heavy burden of other life-threatening diseases such as HIV/ AIDS and maternal mortality pushes the issues of infertility to the back seat. In view of the severity and diversity of the effects of infertility, at Mediheal Group of Hospitals, we are committed to increasing the knowledge and awareness about infertility and childlessness among couples with no children.

At Mediheal Group of Hospitals, our efforts are aimed at addressing the underlying challenges of infertility by educating our patients and by building adequate infrastructure for providing quality treatment. We complement this commitment with technology-driven treatment processes and procedures which are at par with some of the developed countries in the world. Our world-class treatment facilities across the continent will continue to provide adequate treatment to the needy people in Africa.





“Complementing  
the great African dream  
with comprehensive  
healthcare support...”

Today, Africa is the youngest continent in the world that is developing very fast, hosting about 1 billion people, which is 14% of the world population and very compatible with the modern smart electronic age. Complementing the great African dream with comprehensive healthcare support is Mediheal Group of Hospitals.

We have been leading the healthcare segment with high quality medical services and have participated in inspiring improvements with our patients in mind. Thanks to their incessant trust and support, our spectrum of services today is spread across Kenya, Uganda, Tanzania, Rwanda and Burundi.

We are constantly looking to attract highly qualified medical professionals who live up to the high standards we set for ourselves. We always procure state-of-the-art equipment that is being used across the world, and make sure that our diagnostic labs consistently meet international standards for accuracy and reliability.

As I look back on the years of successful development and aspirations beginning with the establishment of Mediheal Group of Hospitals, I feel both proud and excited about the future.

As a progressive healthcare provider, we aim to keep expanding with new facilities and continue the momentum as one of the fastest growing healthcare groups in Africa.

**Dr. S. R. Mishra**

MS - Obstetrics & Gynaecology (India)

Dip. Gynae Endoscopy (Germany)

Chairman, Mediheal Group



**“We are committed to increasing the knowledge and awareness about infertility and childlessness among couples with no children.”**

Infertility is a global problem. In Africa, the problem acquires different dimensions due to the region's socio-cultural and economic issues. While infertility affects the physical health of both men and women globally, in Africa, women in particular suffer from severe negative social consequences such as stigmatization, ostracism, abuse and economic deprivation. In this part of the world, infertility is a major reproductive health problem with regional prevalence rates of 30 - 40%.

Having worked for the past several years in this field, I have been a witness to the issues infertility can bring to the lives of people. I specialize in the field of In-vitro Fertilization (IVF) and have managed Pre and Post ART patients over the years. My areas of expertise include High-risk Pregnancy, Gynaecological Endoscopy, and Infertility & Reproductive Endocrinology.

At Mediheal, we offer modern infertility treatment ranging from Endoscopic Reconstructive Tubal Surgery to assisted reproductive techniques. Every year, we treat hundreds of couples at our advanced facilities. We have continuously expanded our infrastructure capabilities with evolved technology and trained manpower to maintain the effectiveness of our services despite increasing demand. While the increase in demand for quality infertility treatment reflects a rise in treatment-seeking behaviour and expectations in the couples, for Mediheal we feel privileged to serve the needy couples of the continent.

**Dr. Pallavi Mishra**

MBBS, MS - Obstetrics & Gynaecology



**“We have been setting up highly specialized facilities across the region with an aim to offer quality infertility treatment.”**

In the recent decades, Africa has seen lesser development in the field of infertility treatment compared to other parts of the world. Scarce financial resources (for patients, clinics and pharmacies), instability of infrastructure, volatile political scenario and unavailability of trained personnel in assisted reproductive technology (ART) in sub-Saharan Africa are some of the reasons for the prevailing situation in the continent.

I have been practising assisted reproduction techniques since 1991. I have performed more than 50,000 In-vitro Fertilization (IVF) cycles in my career and have helped 20,000 couples conceive and have children. Mediheal Group of Hospitals performs over 700 cycles a year with a clinical pregnancy rate of 45%. I am currently practicing as a Clinical Director of IVF, Mediheal Group, and Consultant IVF at Mediheal Diagnostic and Fertility Centre, Nairobi.

Mediheal Group of Hospitals have been renowned for bringing quality healthcare services to the region, and we are no exception in the area of infertility treatment. We have been setting up highly specialized facilities across the region with an aim to offer quality infertility treatment. We are employing experts in assisted conception, trained fertility specialists, Embryologists, and specialist IVF nurses along with experienced Obstetricians and Gynecologists to ensure that we achieve our goals in infertility treatment across the locations we serve.

**Dr. Shounak Khandwala**

Clinical Director - IVF, Mediheal Group



“Our patients remain the centre of all our endeavours as we evolve with changing times. Thousands of smiling Africans bear testimony to our dedication...”

We, at Mediheal Group of Hospitals, have always strived to raise the bar for healthcare in Africa to meet the highest international medical standards. A warm and friendly ambience, high-quality medical services and personalized nursing care have always been the hallmarks of hospitals since inception.

Our patients remain the centre of all our endeavours as we evolve with changing times. Thousands of smiling Africans bear testimony to our dedication, to the quality of care and sensitivity to everyone who walk through our doors. The continuum of care is an added edge that we offer as we aim to elevate the overall health of the society.

With eminent doctors leading each practice, we are committed to delivering world-class healthcare to an increasing number of people who have come to consider Mediheal as their preferred choice of hospital. We recruited doctors with training and experience at top international hospitals and implemented evidence-based protocols that are followed by leading global institutions. They provide treatment, supportive care and preventive measures spanning over 15 specialties and super-specialties of medicine. We receive a large number of international patients every year trusting our expertise and services.

We believe technology plays a vital role in delivering superior healthcare and hence have made effective outlays in procuring the best of equipment to serve our patients. We have introduced several cutting-edge technologies and procedures to the people of Africa that have improved the clinical outcomes significantly.

As we evolve, we try to sustain the highest level of competence through various academic programs and initiatives for our staff. Together, we aim to bring our vision for Africa to life by embarking in a journey to redefine healthcare in Africa.

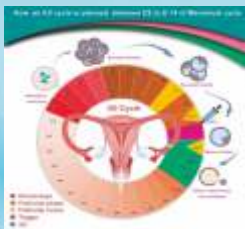
**Mr. Gokul Prem Kumar**

Vice President - International Patient Services



## INTRAUTERINE INSEMINATION (IUI)

Intrauterine Insemination (IUI) is a fertility treatment that involves placing sperm inside a woman's uterus to facilitate fertilization. The goal of IUI is to increase the number of sperms that reach the fallopian tubes and subsequently enhance the chance of fertilization. IUI provides the sperm an advantage by giving it a head start, but still requires it to reach and fertilize the egg on its own. It is a less invasive and less expensive option compared to In-vitro Fertilization.



### When is IUI used?

- The most common reasons for IUI are a low sperm count or decreased sperm motility.

### Who might benefit?

- IUI can help couples where the male partner has a low sperm count or poor motility (the ability of the sperm to move), as long as there are sufficient levels of healthy, motile sperm to make the treatment worthwhile.
- As sperm is placed directly inside the female's uterus, IUI can also help couples who are unable to have intercourse because of disability, injury, ejaculation dysfunction or difficulties, e.g., premature ejaculation.
- It is also recommended for women with mild Endometriosis and hostile cervical condition, including cervical mucus problems.
- IUI may be selected as a fertility treatment for the condition of cervical scar tissue from past procedures, which may hinder the sperm's ability to enter the uterus.
- It is used as the first line of assisted conception, treatment for couples with unexplained infertility.

### Success Rates

- Success rates depend on the causes of female and male partner's infertility and age.
- Success rates also depend on the partner's overall sperm count. Typically, the lowest sperm count to be used with sperm washing is one million, however, success rates are significantly lower if the sperm count falls beneath five to ten million. The best sperm counts for use with sperm washing are those between 20 and 30 million.
- The success rate for IUI with fertility drugs is about 15% per cycle.





# IN VITRO FERTILISATION (IVF)

In-vitro Fertilization (IVF) is the most commonly implemented assisted reproductive technology (ART), and has helped thousands realize their dreams of parenthood. IVF is a process of fertilization where an egg is combined with sperm outside the body. The process involves monitoring and stimulating a woman's ovulatory process, removing an ovum or ova (egg or eggs) from the woman's ovaries and letting sperm fertilize them in a laboratory. The fertilized egg (zygote) undergoes embryo culture for 2 - 5 days, and is then transferred to the same or another woman's uterus, with the intention of establishing a successful pregnancy. IVF may be used to overcome female infertility where it is due to problems with the fallopian tubes, making in-vivo fertilization difficult. It can also assist in male infertility, in those cases where there is a defect in sperm quality.



## Steps Involved:

- Ovarian hyperstimulation for follicle development
- Egg retrieval
- Sperm collection
- Fertilization
- Embryo development
- Embryo transfer
- Pregnancy test

## Egg Retrieval and Egg Scanning

Egg Retrieval is done under Transvaginal Ultrasound guidance under general anesthesia in the operation room.



The eggs retrieved are sent through the hatch into the IVF lab where the Egg Scanning is carried out by a qualified Embryologist.



## Human Oocytes: GV, MI & MII





## Fertilization, Embryo Development & Laser Assisted Hatching in IVF Lab



### Who might benefit?

- Female with damaged or blocked fallopian tubes, or structural defects (congenital abnormalities) of the uterus
- When the ovaries do not respond to infertility medications
- For females with luteinized unruptured follicles
- When male partner has low sperm count or poor sperm motility or poor survival rate
- Immunological factors
- The woman has significant Endometriosis leading to infertility
- When the infertility is “unexplained”

### Success Rates

- IVF Success Rate is the percentage of all IVF procedures which result in favorable outcomes. Depending on the type of calculation used, this outcome may represent the number of confirmed pregnancies, called the Pregnancy Rate, or the number of live births, called the Live Birth Rate.
- The success rate depends on variable factors such as maternal age, cause of infertility, embryo status, reproductive history and lifestyle factors.
- The procedure has an average success rate of 30 - 35%. This rate is affected by the woman's age at the time of treatment and upon their particular fertility problem.



## INTRACYTOPLASMIC SPERM INJECTION (ICSI)

Intracytoplasmic Sperm Injection (ICSI) is very similar to conventional IVF where the gametes (eggs and sperm) are collected from each partner. The difference between the two procedures is the method of achieving fertilization. In ICSI, a single sperm cell is injected directly into the cytoplasm of an egg. This technique is used in order to prepare the gametes for the obtention of embryos that may be transferred to a maternal uterus. This procedure is most commonly used to overcome male infertility problems, although it may also be used where eggs cannot easily be penetrated by sperm, and occasionally in sperm donation.

This procedure requires the use of micromanipulator which allows fine control of microscopic movements of the micropipettes. At Mediheal Hospital, we have RI Integra Macromanipulator from UK which we use for our ICSI procedures. Immediately after ICSI is performed, the oocytes are returned to the incubator for about 18 - 20 hours. They are inspected by an Embryologist the next day to determine successful fertilization. The normally fertilized egg, also known as 'zygote or embryo,' is identified by the appearance of two round structures called 'Pronuclei' in its cytoplasm, in addition to two polar bodies on its periphery.





### What does ICSI involve?

From a patient perspective, undergoing an ICSI treatment cycle is exactly the same as a conventional IVF cycle. Patients should however be aware of the risks associated with ICSI.

- Stimulation of the ovaries to encourage development and maturation of the eggs
- Retrieval of the eggs
- Fertilization of the eggs and culture of the embryos
- Transfer of the embryos back into the uterus



### Who is ICSI suitable for?

Circumstances in which ICSI might be benefit include:

- When the sperm count is very low
- When the sperm cannot move properly or are in other ways abnormal
- When sperm has been retrieved surgically from the Epididymis (MESA/PESA) or the testes (TESA/TESE), from urine or following electro-ejaculation
- When there are high levels of antibodies in the semen
- When there has been a previous fertilization failure using conventional IVF
- ICSI can be successful in men with a history of Vasectomy, Congenital Absence of the Vas Deferens (CAVD), or non-obstructive Azoospermia
- ICSI is also beneficial when abnormal oocytes are retrieved, which may not allow the sperm to penetrate the zona pellucida
- ICSI can benefit couples who have a history of suboptimal fertilization rates with conventional IVF

### Azoospermia

Azoospermia is the medical condition of a man whose semen contains no sperm. It is associated with infertility, but many forms are amenable to medical treatment. In humans, Azoospermia affects about 1% of the male population and may be seen in up to 20% of male infertility situations. There are two types of Azoospermia, considering where the problem takes place, i.e., Secretory Azoospermia (non-obstructive) and Obstructive Azoospermia.

#### Secretory Azoospermia

Secretory Azoospermia or non-obstructive is the a more serious condition, as the testis do not produce spermatozoa. The causes can be either hormonal or testicular.

#### Obstructive Azoospermia

Obstructive Azoospermia, refers to an effective production (the testicles of the patient do produce sperm), that is not ejaculated because of a problem with delivery. The ducts that transport the sperm to the urethra are not working properly.

#### Diagnosis

Azoospermia is usually detected during the course of an infertility investigation. It is established on the basis of two semen analysis evaluations done at separate occasions (when the seminal specimen after centrifugation shows no sperm under the microscope) and requires a further work-up.

#### Treatment

Pre and post-testicular Azoospermias are frequently correctable and Testicular Azoospermia is usually permanent. In the former, the cause of Azoospermia should be considered as it opens up possibilities to manage the situation directly.

### Testicular Sperm Aspiration (TESA)

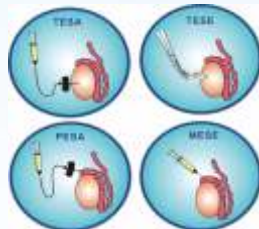
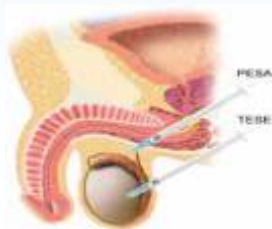
TESA is one of the surgical sperm harvesting techniques used for retrieving sperm in patients with Azoospermia. A number of surgical sperm retrieval or recovery methods have been devised to recover sperm from the male reproductive tract.

TESA is performed by sticking a needle in the testis for removing a small portion of tissue and aspirating fluid with negative pressure from the testicle under local anesthesia and extracting the few viable sperm cells present in that tissue for intracytoplasmic sperm injection.



### Percutaneous Epididymal Sperm Aspiration (PESA)

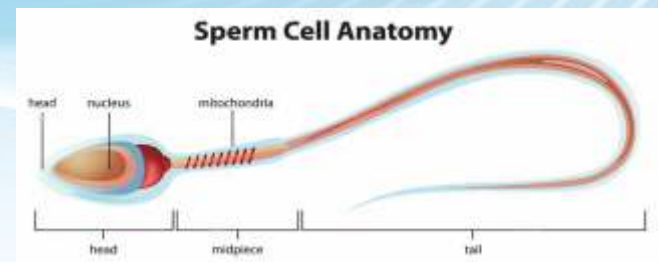
PESA mainly involves a procedure where a fine needle is passed into the epididymis to obtain the sperm under local anesthesia or even sedation. PESA is the least complex procedure and can be used if there are sperms present in the epididymis.



## INTRACYTOPLASMIC MORPHOLOGICALLY SELECTED SPERM INJECTION (IMSI)

Intracytoplasmic Morphologically Selected Sperm Injection (IMSI) is a technique used in IVF treatment to examine and select sperm using a high-magnification digital imaging microscope for microinjection into the egg. IMSI is a real-time method where the sperm is selected before the microinjection takes place. This is done using an inverted microscope that is able to provide much greater magnifying power (around 6000 times) than that normally used in reproductive laboratories (400 times) to carry out ICSI.

The shape of the sperm (morphology) is important in diagnosing male fertility problems and in predicting fertilization and pregnancy outcomes - and studies have shown that selecting better shaped sperm does improve ICSI outcomes. IMSI may improve the chances of fertilization in-vitro and can be used if you have performed several unsuccessful IVF attempts.



### Who might benefit?

The patients who benefit from this technology are:

- Previous IVF and ICSI failures
- Extreme cases of male infertility
- Unexplained infertility
- Recurrent abortion from previous IVF/ICSI
- High degree of DNA fragmentation of the sperm



## EMBRYO TRANSFER

Embryo transfer refers to a step in the process of assisted reproduction in which embryos are placed into the uterus of a female with the intent to establish a pregnancy. This technique is often used in connection with In-vitro Fertilization (IVF). Embryo transfer can be done at day two or day three, or later in the blastocyst stage, which was first performed in 1984.



### EMBRYO TRANSFER PROCEDURE

**Uterine Preparation:** For the procedure, uterine lining (endometrium) needs to be appropriately prepared, so that the embryos can be implanted. In a natural cycle, the embryo transfer takes place in the luteal phase at a time where the lining is appropriately undeveloped in relation to the status of the present Luteinizing Hormone. In a stimulated or a cycle where a 'frozen' embryo is transferred, the recipient woman could be given first estrogen preparations (about 2 weeks), then a combination of oestrogen and progesterone so that the lining becomes receptive for the embryo.

### Steps Involved:

- The embryo transfer procedure starts by placing a speculum in the vagina to visualize the cervix, which is cleansed with saline solution or culture media. A soft transfer catheter is loaded with the embryos and handed to the clinician after confirmation of the patient's identity. The catheter is inserted through the cervical canal and advanced into the uterine cavity.
- There is good and consistent evidence of benefit in ultrasound guidance that is, making an abdominal ultrasound to ensure correct placement, which is 1 - 2 cm from the uterine fundus.
- There is evidence of a significant increase in clinical pregnancy using ultrasound guidance compared with only 'clinical touch.' Anesthesia is generally not required.
- Single embryo transfers in particular require accuracy and precision in placement within the uterine cavity. The optimal target for embryo placement, known as the maximal implantation potential (MIP) point, is identified using 3D/4D ultrasound.
- After insertion of the catheter, the contents are expelled and the embryos are deposited. After withdrawal, the catheter is handed to the embryologist, who inspects it for retained embryos.



## THIRD PARTY REPRODUCTION

### Oocyte/Egg Donation

Eggs from a healthy, young woman are given to women who do not have their own eggs or in whom ovarian function has almost ceased e.g., women over 40 yrs. of age, perimenopausal women etc.

#### Egg Donors are screened for:

- Physical characteristics
- Infectious diseases
- Family history - parents, siblings
- Educational qualifications and profession
- Egg reserve in ovaries
- Previous history of egg donation and if eggs resulted in a pregnancy

Most of our egg donors are women who are graduating or have graduated from known universities in and around Nairobi. We have database of egg donors from multiple ethnic backgrounds e.g. Kenyans, Ethiopians, Asians and Caucasians. The egg donors are matched with recipients but their identities are kept anonymous.

We have a success rate of 55% pregnancies per attempt for those women who go in for egg donation.

Fertilization may be performed using the woman's husband/partner's sperm or by using donor sperm (Embryo donation).

#### Who might benefit from Egg/Embryo Donation?

- Women with premature ovarian insufficiency/failure - who have lost their ovarian function at earlier age
- Women who are perimenopausal but still desire to have a pregnancy
- Women with previous IVF failures in whom egg/embryo quality was defective or the cause for failure
- Women with severe tubo-ovarian masses (PID) or endometriosis.







## FERTILITY PRESERVATION

Both female gametes (oocytes) and male gametes (sperms) can be cryopreserved by vitrification for preservation of fertility status. This would be especially beneficial for:

- Prior to Chemotherapy/Radiotherapy in cancer
- Work priorities not allowing room for marriage/relationship. Such women can have 3 or 4 sessions of ovarian stimulation with egg retrievals and their oocytes can be cumulatively frozen for fertilization in the future

We have an Egg and Sperm as well as an Embryo Bank with all details mentioned and we also cryopreserve oocytes/sperms of patients going for cancer therapy.



## Gestational Surrogacy

Surrogacy is a method or agreement whereby a woman agrees to carry a pregnancy for another person or persons, who will become the newborn child's parent(s) after birth. Intended parents may seek a surrogacy arrangement when pregnancy is medically impossible, pregnancy risks present an unacceptable danger to the mother's health, or a man or male couple wish to have a child. Monetary compensation may or may not be involved in these arrangements.

It is not necessary that the embryo transfer be performed on the female who provided the eggs. Thus, another female whose uterus is appropriately prepared can receive the embryo and become pregnant.

Embryo transfer may be used where a woman who has eggs but no uterus and wants to have a biological baby; she would require the help of a gestational carrier or surrogate to carry the pregnancy.

Embryos may be specifically created by using eggs and sperm from donors and these can then be transferred into the uterus of another woman. A surrogate may carry a baby produced by embryo transfer for another couple, even though neither she nor the 'commissioning' couple is biologically related to the child.

Gestational Surrogacy has become a viable option for many infertile couples to have a biologically related child when it is impossible on medical grounds for the intended mother to carry the child herself - in conditions such as:

- Severe medical condition incompatible with life
- Hysterectomy or absence of uterus
- Repeated failure of IVF/ICSI
- Recurrent abortion

### Success Rates

- If you consider the success rate of the entire IVF and Surrogacy procedure (including subsequent embryo transfers with frozen embryos) the success rate is obviously much higher.
- Our success rate is among the highest in the region for both IVF and surrogate procedures. Mediheal offers these services with a pregnancy rate of 60% per attempt.



Intended  
parents



Gestational  
carrier





## CRYOPRESERVATION

We run a very successful cryopreservation program with success rates similar to our fresh transfer cycles. This is possible with the latest method of an ultra-rapid flash freezing protocol called Vitrification, where a very high concentration of cryoprotectant is used.

The sperms/oocytes/embryos are plunged directly into liquid nitrogen. The result is a solid glass-like cell, free of ice crystals. Vitrification cools the cells in an extraordinarily faster speed greater than 15,000 per minute so that there is no time for ice crystals to be formed, but instead a kind of gel appears, leaving the cells undamaged. In the classical freezing method, embryos were slowly cooled at rate of  $0.3^{\circ}$  per minute in order to avoid ice crystal formation around within the cells.

At Mediheal, we cryopreserve all our embryos and oocytes using the Vitrification method only. This is because, Vitrification offers an improved survival rate of the embryos as well as oocytes as compared to classical slow freezing method. This results in better rates of implantation and pregnancy.



### Advantage of Cryopreservation

- Cryopreservation allows for several advantages that would otherwise be unavailable to patients seeking to get pregnant by natural, usual methods. It is important to increase the IVF success rates in the Africa, same as other parts of the world.
- Cryopreservation of oocytes is a favorable choice for women currently undergoing assistive reproductive therapy, but do not wish to freeze embryos, due to personal reasons such as conflict with ethics or religious beliefs. By freezing oocytes instead of embryos, the issue of disposal of unused, living embryos, or blastocysts further along in development is entirely avoided.
- It also allows women who have been diagnosed with breast cancer and who have not yet started therapy to preserve their eggs for when they have completed Chemotherapy/Radiotherapy. These treatment modalities have been well documented as potentially harmful to ovaries. Also, women who simply choose to postpone motherhood until they have found the right partner, have established their careers, or have attained a level of personal maturity or financial security can benefit from cryopreservation.
- Cryopreservation can be used as a first-line means of preserving fertility for men undergoing vasectomy or treatments that may compromise their fertility, such as Surgery/Chemotherapy/Radiotherapy.



- For men, cryopreservation of their sperm or testicular tissue is similarly useful in cases where they face cancer treatment that is potentially toxic to reproductive tissues. They can then attempt assistive reproductive therapies in the future, after successfully completing their treatment regimen.
- Preserving testicular tissue is a solution for treating Azoospermia, allowing men to maximize their full reproductive potential.
- Cryopreservation can also be applied to later stages of development, typically in the embryonic stage. Both embryos and blastocysts (i.e. an embryo at 5-6 days after fertilization) can be stored in this manner. Sperm can also be harvested from the male partner, through collection from his testicular tissue, in cases where it is indicated.
- If the transfer of the embryo into a woman's uterus fails, other embryos, which had been previously preserved, can be transferred instead. By having more embryos available, the chances of a successful pregnancy are increased. Embryo cryopreservation is what makes this possible.
- Embryos that have not been used can be donated to another woman or couple who have unsuccessfully tried getting pregnant, and are diagnosed with infertility. They too can undergo assistive reproductive therapy using donated embryos and start families of their own.

## FROZEN EMBRYO TRANSFER (FET)

Frozen Embryo Transfer (FET) is a cycle where a frozen embryo from a previous fresh IVF cycle is thawed and transferred back into a woman's uterus. This means you won't have to undergo another cycle of hormone stimulation and an egg collection. Frozen embryo cycles can be undertaken on your natural cycle or using hormone preparation, or ovulation induction. When planning a frozen embryo transfer, the endometrium of the uterus is prepared through oral medication. The frozen embryos are thawed the day before the planned embryo transfer or on the same day depending on whether it is a day 3 or day 5 of embryo transfer.

The pregnancy rate of Frozen Embryo Transfers at our clinic is approximately 40 - 45%. We also accept embryos from overseas for transfer into surrogates (surrogacy program). Our clinic runs successful Cryoshipper Program and we can help you ship your embryos to us.



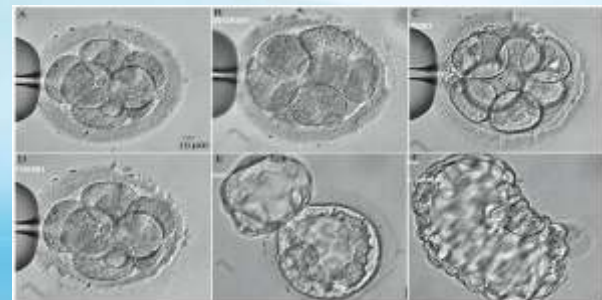
## ASSISTED HATCHING OF EMBRYOS

Couples may face difficulty and frustration after IVF and ICSI treatments due to failure of successful implantation of healthy looking embryos into the womb. In general, the embryos are transferred back into the womb on the 2nd or 3rd day, i.e., when they are in the 4 cell or 8 cells stage. Once they are placed back into the womb, they keep on growing till day 5 (5 days after oocyte retrieval). At this time, the embryos are multicellular and differentiated into an inner cell mass and an outer cover called the Trophectoderm. This embryo is called a Blastocyst. The Blastocyst starts expanding and cracks open the cover of the zona and escapes out. This process is known as 'Hatching'.

During the initial stages of development, your embryo is contained in a shell or layer of proteins, known as the Zona Pellucida. The Zona Pellucida is designed to protect the embryo until it reaches the blastocyst stage of development.

In order to successfully implant into the uterine lining, the embryo needs to 'hatch out' of Zona Pellucida and attach itself to the walls of the uterus. In certain situations, Zona Pellucida (the outer shell or wall surrounding the embryo) is abnormally thick and/or hardened. If this is the case, then it may make it difficult or impossible, for an otherwise normal embryo, to break out, or hatch, from the Zona Pellucida at the time of implantation. This condition, would then compromise the ability of the embryo to implant on the uterine wall.

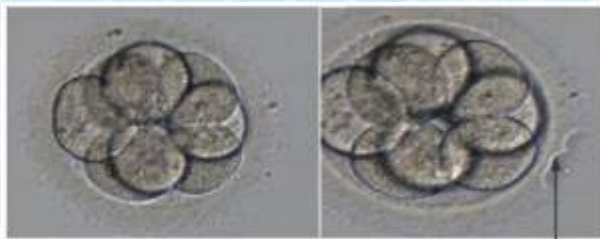
This situation is improved with Assisted Hatching (AH). Assisted hatching is a procedure where a microscopic hole is made in Zona Pellucida using micromanipulation techniques. At the same time, in assisted hatching, any lysed or dead cells are removed from the embryo. These embryos are then placed back into the womb. The cut, also called Assisted Hatching, weakens the Zona and helps in the hatching process. This in turn results in better pregnancy rates.





### Laser Assisted Hatching (LAH)

The advent of the laser has allowed the development of precision techniques to manipulate embryos for enhanced fertility. Laser-assisted Hatching (LAH) can potentially enhance implantation/pregnancy rates or turn around a history of failure for embryos to implant themselves in the uterine wall. LAH is used to help the embryo hatch from its protective outer shell, the Zona Pellucida, and promote implantation in the uterine wall after embryo transfer. LAH uses a highly focused infrared laser beam to remove a very small section of Zona Oellucida, or outer wall of an embryo, in very precise increments. Prior to the clinical availability of the laser-assisted hatching, only mechanical or chemical methods (acid) could be used for assisted hatching of human embryos in clinical settings. Laser-assisted hatching requires less handling of the embryo than these other assisted hatching methods. Also, laser-assisted hatching is faster than the other methods and, therefore, the embryo spends less time outside the incubator.



Laser assisted hatched egg wall

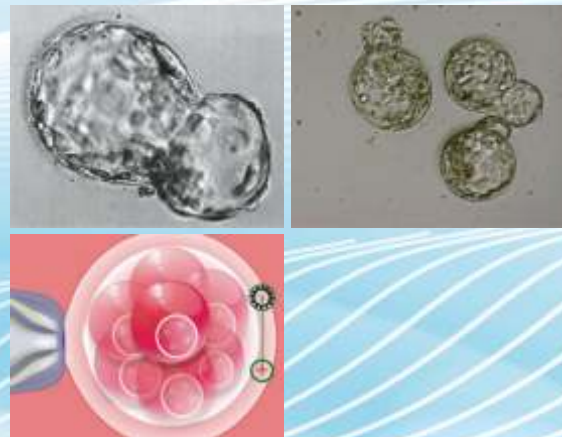


Assisted Hatching

Laser Zona Thinning

### Who might benefit?

- Patients with day 3 embryos, and having a thick Zona
- Patients with unsuccessful IVF/ICSI cycles.
- Women older than 37 years
- Patients with high Follicular Stimulating Hormone (FSH) level
- Patients who are poor responders to gonadotropic or poor ovarian response
- Patients involved in an earlier IVF cycle with poor fertilization rate



## PREIMPLANTATION GENETIC SCREENING/DIAGNOSIS (PGS/PGD)

Genetic Testing is broken down into two separate categories: Preimplantation Genetic Screening (PGS) and Preimplantation Genetic Diagnosis (PGD).

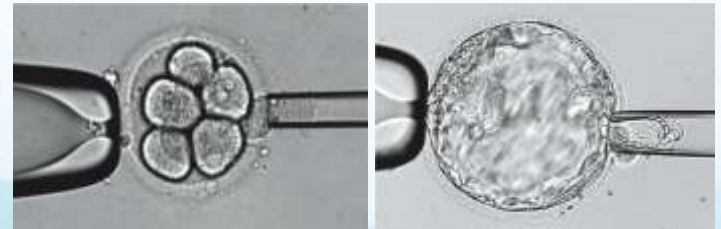
PGS analyses biopsied cells from the embryo to screen for potential genetic abnormalities when there are no known potentially inherited disorders. PGD, on the other hand, uses the same process to detect a specific disorder that has a high probability of being passed down from parents to their offspring.

Primarily, PGD was designed for couples who carried serious genetic disorder with the aim to avoid transfer of affected embryos. Over time, the scope of genetic diagnosis in preimplantation embryo increased to include ploidy determination. Then, we are referring to PGS that does not look for a specific disease but uses PGD techniques to identify embryos carrying formed, not inherited, genetic errors.

The aim of PGS is to prevent recurrent miscarriages and to avoid having a child affected with the most common Aneuploidy disorders - Down Syndrome (trisomy 21), Edwards Syndrome (trisomy 18), Patau Syndrome (trisomy 13), Turner syndrome (monosomy X), and Klinefelter syndrome (Gonosomal trisomy XXY). These trisomies originate from meiotic errors that may arise during the formation of gametes, especially in women. In terms of preimplantation diagnosis, they are very dangerous because they do not affect early embryo development and may lead to the birth of disabled child. Therefore, PGS is indicated if meiotic errors are expected, for example in the cases of advanced maternal age and severe male factor infertilities.



For diagnosis of diseases based on affected genes and chromosomal translocations as well as meiotic errors, both PGD and PGS require Embryo Biopsy, an invasive procedure for the removal of cell(s) needed for genetic analysis. The risk of mitotic errors can be significantly decreased with continuous time-lapse monitoring.



### Is PGS right for me?

PGS is recommended for parents who have no known genetic abnormalities, as well as patients who meet any of the following conditions:

- Female partner who is 38 of age or older
- Couples interested in a single embryo transfer
- History of pregnancy loss (recurrent miscarriage)
- History of failed IVF/implantation failure

### Is PGD right for me?

- PGD is recommended for couples who have a genetic predisposition and/or have any probability of passing down a known genetic abnormality
- Any couple with a family history of Aneuploidy (abnormal number of chromosomes) which results in miscarriage, birth defects, or down syndrome can be screened
- In addition, families that have a history of single-gene defects such as cystic fibrosis, sickle cell anemia, and muscular dystrophy can consider PGD testing



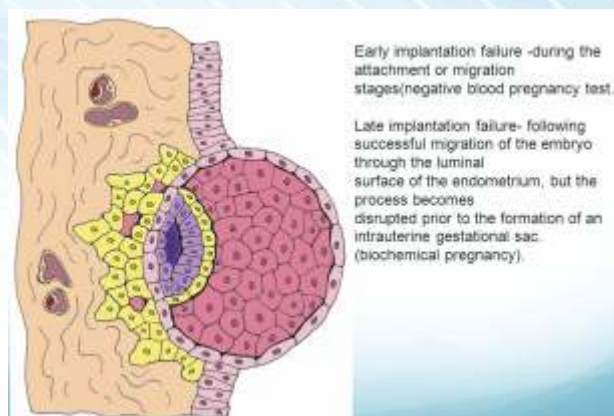
## RECURRENT IMPLANTATION FAILURES (RIF)

Recurrent implantation failure refers to failure to achieve a clinical pregnancy after transfer of at least four good-quality embryos in a minimum of three fresh or frozen cycles in a woman under the age of 40 years. The failure to implant may be a consequence of embryo or uterine factors.

Thorough investigations should be carried out to ascertain whether there is any underlying cause of the condition. Ovarian function should be assessed by measurement of Antral Follicle Count, FSH and anti-Müllerian hormone. Increased sperm DNA fragmentation may be a contributory cause.

Various uterine pathology conditions including fibroids, endometrial polyps, congenital anomalies and intrauterine adhesions should be excluded by Ultrasonography and Hysteroscopy. Hydrosalpinges are a recognized cause of implantation failure and should be excluded by hysterosalpingogram. If necessary, laparoscopy should be performed to confirm or refute the diagnosis. Treatment offered should be evidence-based, aimed at improving embryo quality or endometrial receptivity.

Gamete donation or surrogacy may be necessary if there is no realistic chance of success with further IVF attempts.



Recurrent implantation failure is an important cause of repeated IVF failure. It is estimated that approximately 10% of women seeking IVF treatment will experience this particular problem. It is a distressing condition for patients and frustrating for clinicians and scientists.

Recurrent Implantation Failure (RIF) following Embryo Transfer (ET) is a major factor in the lack of a clinical pregnancy after several IVF/ICSI attempts. The causes of RIF are still poorly known.

A variety of aetiologies have been suggested including decreased endometrial receptivity, embryonic defects and multifactorial causes.

Various uterine pathologies (such as a thin endometrium and the altered expression of cell adhesion molecules and immune factors) may decrease endometrial receptivity, whereas male or female genetic abnormalities, sperm defects, embryonic aneuploidy and zona hardening are cited among the embryonic causes of implantation failure. Endometriosis and hydrosalpinx may influence both endometrial receptivity and implantation.

To experience a negative result after undergoing an IVF cycle is disappointing. In cases of recurrent IVF failure, this can particularly be a distressing experience.

At the Mediheal Hospital, we can assist in investigating and treating the likely causes of repeated and unsuccessful assisted conception treatment.

### **Investigations to overcome RIF:**

- Ovarian Function Tests
- Sperm DNA Integrity Testing
- Detection of Sperm Fragmentation: Sperm Chromatin Structure Assay (SCSA) and Sperm Chromatin Dispersion Test (SCD)
- Preimplantation Genetic Screening (PGS)
- Comparative Genome Hybridization (CGH)
- Chromosome Screening of Polar Bodies
- New methods of Embryo Assessment: Metabolomics Analysis

Based on the results of these tests, we can offer the supportive treatment pertinent to each individual with a view to help them conceive successfully.

### **PREGNANCY SUCCESS RATES**

Our pregnancy success rates are consistently high (50 - 60%) for women less than 35 years of age and (40 - 50%) for women more than 35 years of age.

Our live baby birth rate is 35% - 40%. We have a massive experience of more than 20,000 ART cycles and a phenomenal pregnancy rates.

At Mediheal Hospital, our team of doctors and nurses will carefully and thoroughly evaluate a couple's case, sifting and poring through previous medical history and conducting relevant tests and investigations to ensure we have a clear picture prior to suggesting a management plan. The management plan proposed will include the treatments that are the most appropriate for the couple and most likely to result in a pregnancy.

At every step of the way, the couple is included in the management of their case and we are extremely supportive of the patients through what is, undoubtedly an arduous and challenging process.





## TRAINING PROGRAMS FOR DOCTORS AND EMBRYOLOGISTS

### Objectives:

- To divulge a comprehensive overview of all aspects of the ART laboratory, specific procedures, and quality control to ensure highest possible success rates in an IVF program
- To provide each apprentice an opportunity to have a complete learning experience
- Hands-on training on simulators which are almost the real thing
- Audio-visual concept of education
- Didactic and practical





Mediheal Fertility Clinic, Nairobi, will soon start Live Workshops in IVF, IUI etc. with live relays of procedures done in OR and IVF Lab. We are also equipped with having oocyte retrieval, embryo transfer and ICSI simulators, which would allow the participant to practice these techniques thoroughly. These Training Programs are ideal for Clinicians and Embryologists. We plan to become IVF Training Hub of East and East Central Africa.





## ANDROLOGY LAB FACILITIES & EQUIPMENT:



Andrology Workstation



Micro Galaxy Incubator



Spermfuge SF 800



Heating Block



## MEDIHEAL HOSPITAL DOCTORS PLAZA - ELDORET



## MEDIHEAL HOSPITALS - EASTLEIGH



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