

Preserve Fertility by Freezing



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INTRODUCTION: A woman is born with approximately two million eggs in her ovaries. By her teenage years, this number is reduced to about 400,000. She will subsequently lose about one thousand eggs each month, until eventually no eggs remain. At that point, she begins menopause. The pace of this inexorable loss of eggs as a woman gets older is not affected by birth control pills, pregnancies, nutritional supplements, healthy living, or youthful appearance.

The ticking of her ovarian biological clock, and not knowing where she is on that biological clock, is one of the biggest dilemmas every woman faces. Most women (98%) are fertile through their early twenties. Yet by their mid thirties, the infertility rate increases to almost 30%. This phenomenon, referred to as the “biological clock”, is a direct result of the limited egg supply with which each woman is born.

Assessing where a woman to her are on particular biological clock has always been like peering into a black box.

Some women remain fertile well into their forties, while others lose their fertility in their early twenties. Some of us have to face unexpected disease (like cancer, the treatment of which, though it can save your life, threatens to wreck your chances to have children). We all simply have to face age, as we are pressured to put off pregnancy by unexpected turns of career and marriage. women has her life and her

career, which in the modern world may mean putting off childbearing, but nonetheless she wants eventually to have children. Fortunately, there are now three new technologies to address this dilemma. They are called Antral Follicle Count (AFC), Ovarian Tissue Freezing, and Egg Freezing.

Presently, there is a simple test to determine where a woman is her on biological clock: The Antral Follicle Count (AFC).

Antral Follicle Count is a precise technique of determining ovarian reserve. Ultrasound is used to count the number of eggs left in ovaries. We can thus calculate where the woman is on the biological clock (and even calculate the time remaining until menopause). This ultrasound test can be performed by any radiology center or gynecologist who is aware of what to look for. Fortunately, the information needed to perform this test is not complicated, and can be easily described to the radiologist/ gynaecologist.

Antral Follicle Count is a singularly empowering tool in decisions about career, marriage, birth control, and when to start being concerned. It solves one half of the riddle of preserving the fertility: knowing how long it will last.

There are now safe, successful techniques to preserve a woman’s fertility indefinitely.

Recent advances in cryopreservation make it possible to preserve female fertility for any length of time. It’s well known that for some years we have been able to preserve fertilized eggs, or embryos; we can freeze them indefinitely, then thaw the embryos at a later date, and achieve high pregnancy rates in IVF. It’s essentially a time-delayed IVF procedure, with a waiting period as long as like, from when retrieve and fertilize the egg, until do the embryo implantation.

Preservation of fertility is generally done for one of two reasons: a woman requires medical treatment

such as chemotherapy, surgery, or radiation therapy that can negatively impact fertility, or she is not yet ready for childbearing or childrearing for a variety of personal reasons. In either situation, eggs can be retrieved and stored for use at a later time.

What is egg freezing?

Egg freezing is a method of storing a woman’s unfertilised eggs to allow her to try to conceive at a later date, when natural conception would be unlikely. It may be seen as a way of preserving the possibility of fertility for women who are not in a position to becoming pregnant straight away, or whose fertility is at risk for medical reasons such as cancer treatment. Frozen eggs may be stored for many years without significant deterioration. When the woman is ready to use her eggs, they are warmed, and then fertilised with sperm. The aim is for the fertilised egg to develop into an embryo, which can then be transferred to the woman’s uterus giving a chance of pregnancy.

Overview of the embryo and egg freezing process.

Ovulation Induction: During a typical menstrual cycle, the ovaries release one egg. In preparation for egg freezing, fertility drugs called gonadotropins are self-administered daily to stimulate the ovaries to mature numerous eggs in the month of the treatment cycle. If more eggs mature, more can usually be harvested and used. Our goal is to retrieve somewhere between 8 and 25 eggs per treatment attempt. Most often, a higher number of eggs improves the chances of fertilization and, ultimately, future pregnancy.

Egg (Oocyte) Retrieval: When the eggs are ready to be retrieved from the uterus, a 5 to 10 minute harvest procedure is performed at the Fertility Center using mild sedation. The doctor (using the aid of ultrasound visualization) guides a needle through the vaginal wall and into the ovaries to gently suction the eggs into a sterile test tube. After they are retrieved, the eggs are transferred to the embryology laboratory. Generally, about three-quarters of retrieved eggs are mature enough for freezing. An anesthesiologist is present for all egg retrieval procedures.

Cryopreservation in the Lab: After the eggs arrive in the embryology lab, analyzes them for maturity. Eggs can be fertilized with sperm at this time to create an embryo, if desired. If embryos are created, preimplantation genetic screening can be performed on them prior to freezing. If eggs are frozen unfertilized, pre implantation genetic screening can be performed after the eggs are thawed, fertilized, and allowed to develop for several days in the laboratory. After they are frozen, eggs and embryos remain on-site at the Fertility Center.

Embryo freezing: If there is a partner for the woman who is about to undergo medical treatment that might affect the fertility, she may choose to freeze embryos for future fertility treatment. Embryo freezing involves undergoing an IVF cycle where the ovaries are stimulated with hormone injections, prior to the eggs being retrieved in a short surgical procedure, then fertilised with sperm in a laboratory and the resulting embryos frozen and stored. Frozen embryos can be stored for many years.

Embryo freezing is a highly successful treatment option. As with a standard IVF procedure, women under the age of 38 at the time of egg retrieval will have a higher chance of pregnancy success in the future. When considering embryo freezing the stability of your relationship is important. Where embryos are created, both partners have the right to veto future use of the embryos. The serious consequences of this is that if the relationship is broken down, for either the woman or man undergoing fertility preservation, then they could lose access to their own reproductive material.

Ovarian tissue freezing: This involves removing a small piece of ovarian tissue from one ovary, cutting it into tiny slices and then freezing it. Later, when the woman are to ready to conceive, the ovarian tissue slices are grafted back into pelvis. Around nine months later, the grafted ovarian tissue can start to produce reproductive hormones and follicular development.

Pregnancy may be achieved either with ovarian stimulation and IVF, or perhaps even naturally. Further research and experimental work needs to be completed before this will be routine clinical treatment; at present this is still consider to be experimental.

What is cryopreservation?

Cryopreservation is freezing tissue or cells in order to preserve it for the future.

There are 2 methods currently used for freezing in IVF labs.

- ❖ Slow freezing
- ❖ Vitrification (ultra-rapid freezing)

How many embryos are frozen on the average with an IVF cycle?

- ❖ This is age dependent
- ❖ Younger women respond better to the IVF ovarian stimulation process and produce more eggs, resulting in a higher likelihood for having excess embryos available for freezing.

What is vitrification for IVF?

- ❖ To embryologists, vitrification is ultra-rapid IVF embryo freezing instead of the traditional slow freezing process.
- ❖ To a science dictionary, vitrification is the process of converting something into a glass-like solid that is free of any crystal formation.

For an example, by adding a cryoprotectant, water can be cooled until it hardens like glass without any ice crystals forming. This is important in the embryology world because ice crystal formation can be very damaging to frozen embryos (or other frozen cells).

- ❖ Vitrification in IVF can allow freezing of spare embryos with better post-thaw survival rates and higher pregnancy and live birth rates from frozen embryo transfer cycles.
- ❖ Started vitrification of blastocysts in IVF lab in early 2008 and have seen excellent post-thaw embryo survival and substantially higher pregnancy rates after frozen transfer procedures.

Conclusion

Some women may prefer egg freezing, because it does not involve a laparoscopy; only transvaginal ultrasound-guided needle aspiration. Still, it can require many aspirations plus preliminary medication to give them some assurance that they will have enough eggs frozen to insure them a high likelihood of future pregnancy. Other women will prefer ovarian biopsy because it involves no preliminary medication; only one brief outpatient procedure (and not multiple egg retrievals). Some women may prefer to do *both* just as an extra measure of assurance. Whichever strategy is chosen, a woman now has the option to breathe more easily, and not feel rushed into marriage or pregnancy before she is ready! Even those for whom egg donation is forbidden for religious reasons now have the option of ovarian tissue transplant or to read a detailed scientific paper on Ovarian Transplantation.

- ❖ The reasonable man adapts himself to the world:
- ❖ The unreasonable one persists in trying to adopt the world to himself.
- ❖ Therefore all progress depends on the unreasonable man – George Bernard Shaw.

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