

Assisted Hatching



**Southern Ontario
Fertility Technologies**

Introduction

Assisted hatching is a procedure sometimes used during the IVF cycle. It involves creating an opening in the zona pellucida or covering of the egg and embryo. It is thought to improve implantation or attachment of the embryo to the endometrium.

Background

The egg has a clear covering over it called the zona pellucida. When an egg is fertilized, the “successful” sperm must penetrate the zona in order to enter the egg. The egg, once fertilized becomes the embryo. The embryo then divides into more cells. For example, by day 3, the embryo usually consists of about 8 cells such as the one indicated to the right.

When the embryo divides in the earlier stages, it does not become larger. Each cell becomes smaller and the total embryo remains the same size or volume as the original egg. As it does this, it remains contained within the zona pellucida.



**A Day 3 Embryo with a Thick
Zona Pellucida**

Implantation

Implantation refers to the embryo gaining contact with the endometrium and imbedding itself into the endometrium. Implantation is probably the step which most commonly causes pregnancy to fail, not only in spontaneous cycles but also in IVF cycles. It is necessary for the embryo to break through the zona in order to make contact with the endometrium and be able to implant. It therefore seems logical that opening the zona (assisted hatching) might promote implantation.

The Evidence

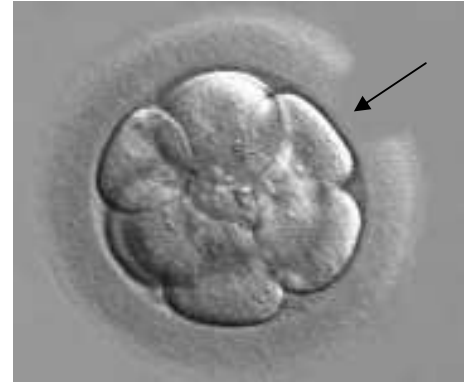
Surprisingly, **no clinical trial has shown assisted hatching to be beneficial for all patients** undergoing an IVF cycle. In fact, it may be harmful in some patients. However, there are probably some circumstances where it is beneficial. A good clinical trial has shown benefit for embryos which have been **frozen**. The freeze-thaw process may cause some structural changes to the zona that cause it to harden. It is also thought that three other circumstances may be indications for assisted hatching but these have not been proven. Assisted hatching is usually suggested for **older women** and in cycles where the zona is observed to be **unusually thick when the embryos are examined under the microscope**. Sometimes, assisted hatching is suggested for patients with **recurrent implantation failure**. For example, the woman who has had other IVF cycles with return of many (> 10) embryos without a pregnancy.

Indications for Assisted Hatching

- 1) **Frozen embryos**
- 2) **Older (≥ 40 years) Women**
- 3) **Thickened zona**
- 4) **Multiple implantation failures**

The Procedure

The zona can be opened in a number of ways. **Chemicals** can be used to weaken the zona and to allow the embryo easier hatching. Mechanical means can be used as well. A small **pipette** similar to the one used to inject the sperm into the egg (ICSI) can be used to cause a mechanical breach in the zona. Recently, **lasers** that can be aimed using a microscope have been used to open the zona. At S.O.F.T. (with ISIS) we use a laser to perform this task. The picture at the right represents the appearance of an embryo after a laser has been used to open the zona.



**Appearance of a Day 3
Embryo With After Laser
Assisted Hatching**

Pros and Cons

Assisted hatching should **not be for everyone**. The decision to use assisted hatching should be used only after discussions between the physician, patient and laboratory staff. This decision can sometimes be pre- made in the case of return of frozen embryos or if the patient is older or has had many failed IVF cycles. However, sometimes the decision cannot be made until the embryos are observed through the microscope on the day of transfer.

The use of chemicals or mechanical means this close to a fragile embryo is a delicate operation which can theoretically cause damage to the embryo. We think with experienced lab personnel this probably happens to less than 1% of embryos. Never-the-less, it still constitutes a risk. Sub-analysis of the large clinical trial that was done indicated it may be slightly harmful to the excellent prognosis patients (those most likely to get pregnant). There are also some reports of increased monozygotic twins and ectopic pregnancies with assisted hatching but these reports are controversial and unproven yet.

Smaller clinical trials and clinical experience has indicated that it is probably beneficial in the three circumstances indicated. A good randomized trial indicated benefit when used for return of frozen embryos. Smaller retrospective trials and clinical experience has indicated benefit in older women and where a thickened zona appears under the microscope.

Cost

Laser assisted hatching requires a dedicated costly laser and an experienced technician. At S.O.F.T. / ISIS you will be charged \$200.00 for the procedure.

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