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Laser-Assisted Hatching in Assisted Reproduction

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Aim. The use of a 1.48 μm diode laser for assisted hatching was investigated in animal experimentation. Laser assisted hatching was offered to patients with advanced maternal age to evaluate a possible benefit.

Methods. Using the Fertilase® system we investigated the impact of openings with different size in the zona of mouse embryos on the hatching process, as well as that of two openings. Laser-drilling was performed at the blastocyst stage to look for differences in timing and efficacy of hatching. The possible benefit of assisted hatching was studied in 24 couples with advanced maternal age (38.8 ± 2.1 years) and compared to a control group (37.8 ± 2.5 years) treated in the same time period but without assisted hatching.

Results. A certain diameter of a laser drilled opening in the zona pellucida is necessary for efficient hatching. When two openings are present in the zona, the embryo will use both openings for hatching and subsequently become trapped. Laser-drilling at the expanded blastocyst stage causes an immediate collapse of treated blastocysts and the onset of hatching is retarded. Assisted hatching in 24 patients with advanced maternal age resulted in a significant increase ($p < 0.01$) in the implantation rate when compared to 24 untreated patients.

Conclusion. The use of a 1.48 μm diode laser to drill an opening into the zona pellucida provides a good alternate to conventionally applied techniques. The procedure is efficient and safe as long as it is applied properly. In a human in vitro fertilization program, selected patients will have a benefit from assisted hatching.

Key words: blastocyst; conception; embryo, preimplantation; lasers; fertilization in vitro; maternal age 35 and over; ovum-sperm interactions; reproduction; sperm penetration