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### CHANGE IN MORPHOLOGIC SCORE AFTER RE-WARMING IN EUPLOID EMBRYOS DERIVED FROM FRESH VERSUS FROZEN OOCYTES

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**Title:**

CHANGE IN MORPHOLOGIC SCORE AFTER RE-WARMING IN EUPLOID EMBRYOS DERIVED FROM FRESH VERSUS FROZEN OOCYTES

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**Preferred Presentation Type:**

Oral or Poster

**Study Type:**

Retrospective Cohort Study (includes comparator groups)

**Category - Subcategory(ies):**

**ART:** Clinical

**ART:** Laboratory

**ART:** Outcomes

**References:**

1 Bergin K et al. Effect of postthaw change in embryo score on single euploid ET success rates. Fertil Steril. 2024;122(2):288-96.

2 Friedenthal J et al. Clinical implementation of algorithm-based embryo selection is associated with improved preg outcomes in single vitrified warmed euploid ETs. J Assist Reprod Genet. 202;38(7):1647-53.

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**Abstract Category:**

**Applied for the In-Training Award for Research**

**Abstract Text:**

**OBJECTIVE:** Day of blastocyst biopsy and morphologic score are key factors in evaluating the reproductive potential of euploid embryos. Prior research has shown that euploid embryos can experience a downgrade in morphologic score after re-warming, potentially contributing to lower clinical pregnancy and live birth rates [1]. Whether morphologic score shifts after rewarming differ between euploid embryos derived from fresh versus vitrified oocytes remains unclear. This study evaluates post-warming morphology dynamics in euploid embryos used in single euploid embryo transfers (SEET).

**MATERIALS AND METHODS:** This single center study included patients who underwent oocyte cryopreservation, re-warming, and SEET from January 2016 to January 2025. SEET cycles using vitrified oocytes ("frozen") were matched 1:3 by morphologic score at cryopreservation to those derived from fresh autologous oocyte ("fresh"). Morphologic score was determined by a decision support tool based on the day of blastocyst biopsy (5, 6, or 7), expansion, and trophectoderm and inner cell mass grades [2]. The primary outcome was change in morphologic score after warming, classified as: Downgrade, Unchanged, Upgrade, or No Score (due to blastocyst collapse). The secondary outcome was live birth per SEET of embryos with downgraded versus unchanged scores. Comparative statistics were performed with Wilcoxon rank and chi square tests. Logistic regression fitted with generalized estimating equations was used to compare odds of morphologic score change between embryos sourced from fresh versus frozen oocyte, and subsequent SEET outcomes. Analysis was adjusted for oocyte age, year of treatment, and morphologic score at embryo cryopreservation.

**RESULTS:** The study included 200 SEET cycles using embryos derived from frozen oocytes and 600 SEET cycles using embryos derived from fresh oocytes. Embryos from the frozen-oocyte group were as likely to experience a downgrade in morphologic score compared to embryos from the fresh-oocyte group (frozen 18.0%, fresh 14.3%,  $p=0.2$ ; aOR 1.64, 0.94-2.89). A similar proportion of embryos in both groups had an unchanged score (frozen 74.5%, fresh 74.3%,  $p=0.9$ ; aOR 0.89, 0.53-1.50), upgraded score (frozen 6.0%, fresh 8.2%,  $p=0.3$ ; aOR 0.60, 0.23-1.56), and no score (frozen 1.5%, fresh 3.2%,  $p=0.2$ ; aOR 0.64, 0.16-2.59). In both fresh and frozen cohorts, live birth after SEET was lower when morphologic score was downgraded compared to when score was unchanged (frozen: 38.9% vs. 56.4%,  $p=0.05$ , aOR 0.45, 0.21-0.92; fresh: 40.0% vs. 58.7%,  $p<0.01$ , aOR 0.48, 0.29-0.79). Embryos with a downgraded score had similar odds of live birth regardless of oocyte origin (frozen 38.9%, fresh 40.7%,  $p=0.9$ ; aOR 1.34, 0.45-3.99).

**CONCLUSIONS:** Euploid embryos derived from vitrified oocytes are just as likely to experience downgrade, upgrade, and no change in morphologic score after warming as those derived from fresh oocytes.

**IMPACT STATEMENT:** Patients undergoing SEET with euploid embryos from vitrified-warmed oocytes can be reassured that morphologic score downgrades are no more likely than with fresh oocytes, and even when downgrades occur, reproductive potential remains comparable.

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Within the past 2 years, have you or your spouse/partner had any potential COI?

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Biographical Sketch Early success, marked by his first publication in CELL at Harvard Medical School, inspired Joseph to continue his research endeavors in reproductive endocrinology and infertility. Joseph has been with Reproductive Medicine Associates of New York since 2011. Joseph has authored over 400 peer-reviewed abstracts & manuscripts. Passionate about development, he cultivates relationship with investors & entrepreneurs to advance reproductive endocrinology & infertility care.

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