

Efficacy of sperm selection device for ICSI: a sibling-oocyte study of blastocyst quality and euploidy

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Introduction:

Novel sperm selection devices (SSDs) use microchannels and membranes to isolate motile sperm while exploiting physiological mechanisms such as rheotaxis, chemotaxis, and thermotaxis. By avoiding centrifugation-related stress, SSDs have been proposed to enrich sperm populations with lower DNA damage. However, evidence regarding their clinical effectiveness remains limited and inconsistent.

Study question:

What is the impact of using an SSD method on blastocyst quality and euploidy rates when compared to a conventional sperm preparation method?

Materials and methods:

This study presents an interim analysis of an ongoing prospective randomized trial conducted at a single tertiary centre (September–December 2025). A total of 388 mature oocytes (MII) from 40 patients were inseminated in a sibling-oocyte design using sperm prepared by either density gradient preparation (DGP; PureCeption™, 45–80%) or a sperm selection device (SSD; Zymot™).

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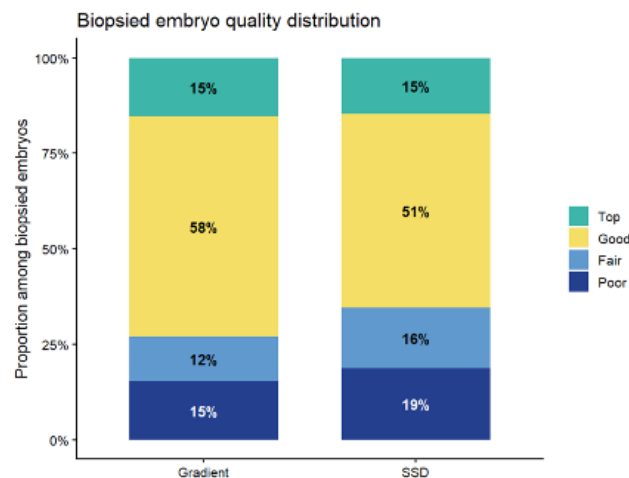


Figure 1: Blastocyst quality distribution in DGP vs. SSD ($P > 0.05$).

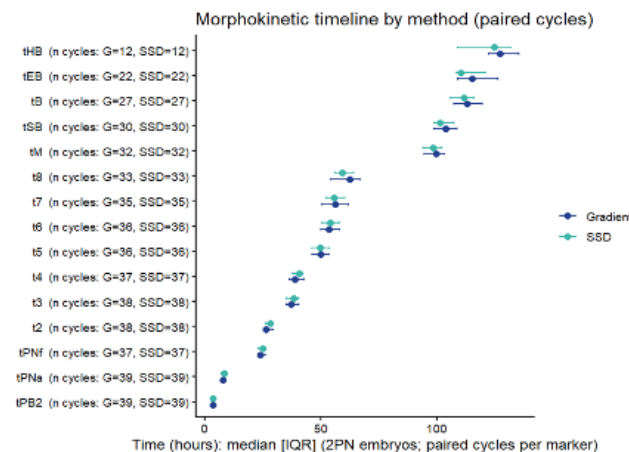


Figure 2: Morphokinetic parameters of embryos from DGP vs. SSD ($P > 0.05$).

Main results:

In the paired split-oocyte cohort, median maternal age was 37.0 years (IQR: 34.0–40.5), and median paternal age was 38.0 years (IQR: 32.0–42.2). Overall, 203 MII were allocated to DGP and 196 to SSD. Normal fertilization rates, blastocyst utilization per inseminated MII, blastocysts quality and euploidy rates were similar between groups (Table 1).

Table 1: Main outcomes of sperm prepared by DGP or SSD (OR: 95%CI).

Outcome	DGP	SSD	P value
Normal fertilization rate (%)	78.8	73.5	OR 0.79, 95% CI: 0.49–1.28 p=0.34
Blastocyst utilization rate (%)	45.3	38.5	OR: 0.74, 95% CI: 0.48–1.14 p=0.17
Top/good vs. fair/poor quality blastocyst (%)	72.8	64.5	OR: 0.81, 95% CI: 0.50–1.32 p=0.40
Euploidy rate (%)	40.2	44.0	OR: 1.32, 95% CI: 0.62–2.79 p=0.47

Note. Data are presented as percentage (%) and calculated per oocyte within each sperm preparation group. Blastocysts utilization indicates embryos with a recorded Day 5–7 morphology grade and biopsied. Ultimate embryo quality was assigned using the grade recorded on the corresponding day): Top/Good = AA/AB/BA/BB for Day 5–6; Fair/Poor = AC/BC/CA/CB/CC for Day 5–6 and all graded Day 7 embryos.

Conclusion:

Interim analysis shows that SSD yields blastocyst quality and euploidy rates comparable to DGP.