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A comparison of three spermatozoa selection techniques for intracytoplasmic sperm injection (ICSI) using swim-up, cumulus oophorus model and PICSI ® dish

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Introduction:
Spermatozoa selection for intracytoplasmic sperm injection (ICSI) is a paramount factor in the outcome of a fertility treatment cycle. Nature has perfected the selection process by using the cumulus matrix to select spermatozoa that are morphologically and genetically normal.

Aim:
To determine which method of semen preparation delivers the best results in terms of spermatozoa selection for ICSI.

Methods:
Patients were randomized into 3 groups of spermatozoa selection techniques namely the routine swim-up or density gradient, the Cumulus Model or the PICSI® dish (hyaluronic acid). The prepared collected spermatozoa were used to make slides to record the percentage of normal spermatozoa (morphological staining), the capacitational status (chlorotetracycline test), chromatin packaging quality (chromomycin A_3 (CMA_3) staining) and the deoxyribonucleic acid (DNA) quality (acridine orange staining). These results were then compared to the fertilization, cleavage, pregnancy and implantation rates of the patients used in the study.

Results:
All three groups displayed improvements in morphology, capacitational ability, chromatin packaging quality and DNA quality (or fragmentation). There was no significant difference in pregnancy rates between the groups and no difference in implantation rates. The PICSI® group did however show a significant improvement in the chromatin packaging quality, only if the baseline values were low.

Conclusions:
All 3 groups of spermatozoa selection techniques showed improvements in spermatozoa quality. The swim-up/gradient group showed a statistical improvement in the fertilization rate when compared to the cumulus and PICSI® groups. PICSI® showed a greater improvement in selected spermatozoa parameters when baseline values for CMA_3 were low.

Keywords: ICSI, cumulus oophorus, PICSI®, morphology, capacitation, acrosome reaction, DNA fragmentation.