

## **Shear stress during embryo transfer**

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### **ABSTRACT**

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**Purpose:** This study was designed to analyze the influence of injection speed on the shear stress acting on the embryo during the ejection phase of embryo transfer.

**Methods:** Computational fluid dynamics was applied to calculate shear stress for the following injection speeds: 0.01, 0.1, 1, 6, 12 and 20 m/s. A 3D geometrical model of the flow domain was created in ANSYS Modeler. The computations were carried out using the CFD code Parallel ANSYS Fluent 12.1 with the segregated solver SIMPLE (Semi-Implicit Method for Pressure-Linked Equations). The model was solved in double precision on a control volume unstructured 3D mesh made in ANSYS Mesher.

**Results:** The results of the present study indicate that shear stress increases with the rise of the injection speed. Furthermore, shear stress is lower when the embryo is positioned in the midstream of the catheter instead of in proximity to the catheter's wall.

**Conclusions:** Taking these results into consideration, it is advised to transfer embryos with minimal injection speed because the strength of shear stress increases with the injection speed of the transferred load.

**Key words:** Catheter, embryo, embryo transfer, fluid velocity, shear stress.

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