

# SLOW FREEZING OR VITRIFICATION? THE DILEMMA FOR THE FUTURE OF CRYOPRESERVATION OF HUMAN SPERM

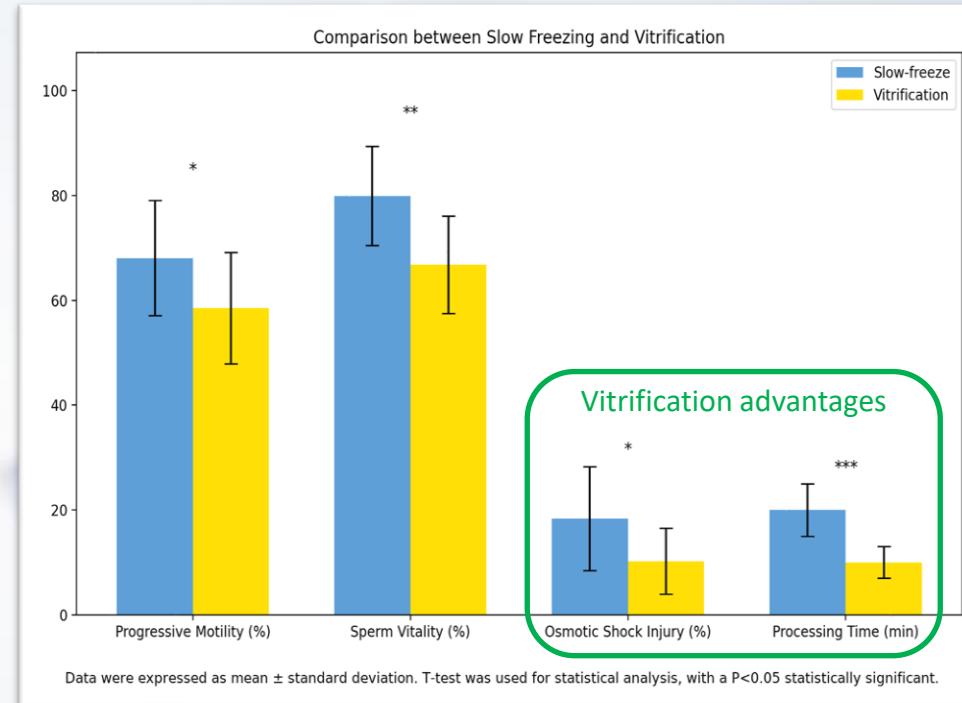
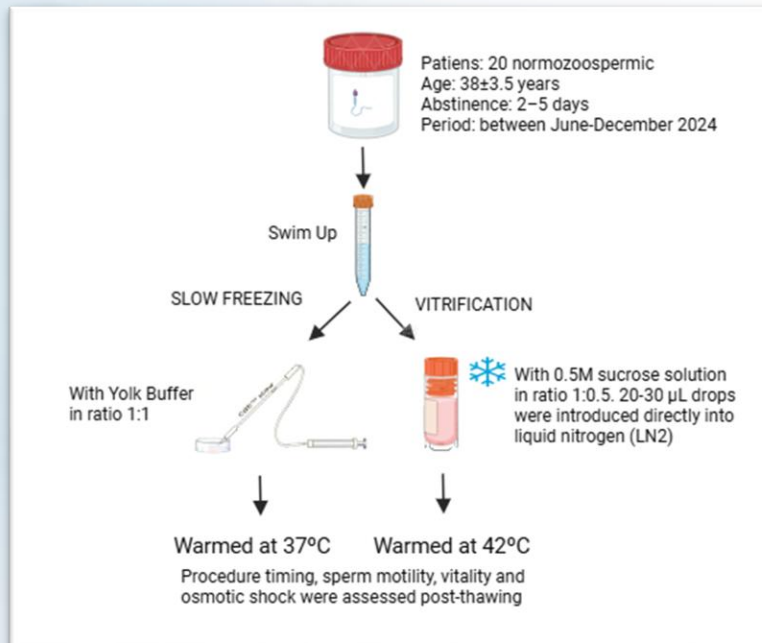
C. Nucera<sup>1</sup>, D. Paccagnini<sup>1</sup>, M. Musella<sup>1</sup>, G. Pirastu<sup>1</sup>, I. Listorti<sup>1</sup>, E. Greco<sup>1</sup>

## Introduction:

The current technique for sperm cryopreservation is slow freezing, which results in a post-thaw motility loss of 30-50% compared to the fresh sample. Additionally, the use of permeating cryoprotectants and the formation of ice crystals cause structural and functional alterations in sperm quality, leading to damage to the cytoskeleton, membrane, and DNA. Vitrification, on the other hand, involves ultra-rapid freezing using non-permeating cryoprotectants combined with a high cooling rate to prevent ice crystal formation.

## Aim of the study:

To evaluate the efficacy of sperm vitrification techniques by examining sperm viability, osmotic shock and motility compared to slow freezing.



## Results:

Progressive motility:  
slow-freezing (68.07%±10.99) > vitrification (58.50%±10.63), P=0.027;

Sperm vitality:  
slow freezing (79.93%±9.49) > vitrification (66.79%±9.33), P=0.001;

Osmotic shock injury:  
slow-freezing (18.36%±9.93) > vitrification (10.21%±6.28), P=0.0154;

Processing time:  
slow-freezing (20min ±5) > vitrification (10min ±3), P<0.0001.

## Conclusions:

The results of this study do not demonstrate a clear advantage of vitrification over slow freezing in terms of sperm vitality and progressive motility. However, sperm vitrification has the potential to be a reliable method for fertility preservation due to its shorter processing time and a significant reduction in osmotic injury. Further studies are needed to optimize the vitrification protocol and increase the sample size to fully validate these benefits.

