

Effect of short abstinence time on sperm motility parameters

H. Alipour^{a,*}, F. Dardmeh^a, G. Van Der Horst^b, G. Manoharan^a, A. Askeland^a, H.I. Nielsen^a

^a Laboratory of Reproductive Biomedicine, Biomedicine group, Dept. of Health Science and Technology, Aalborg University, Aalborg, Denmark

^b Department of Medical Biosciences, University of the Western Cape, Cape town, South Africa

*Contact: hiva@hst.aau.dk; Abstr. no.: 16

Background:

The examination of semen is generally performed in accordance with the World Health Organization (WHO) "laboratory manual for examination and processing of human semen" manually (subjective), or using CASA - computer aided sperm analysis systems (objective).

The Sperm Class Analyzer (SCA) CASA system assesses various detailed motion and velocity parameters, which are not possible in the subjective method and can give indications of kinematic properties like speed, direction and straightness as biomarkers of sperm fertility potential.

To maximize the likelihood of success in Assisted reproductive technology (ART), semen parameters such as volume, spermatozoa concentration and motility are expected to be within normal limits classified by the WHO. Several factors have shown to have an influence on semen quality parameters, one of which is the length of sexual abstinence before sample collection. The mentioned WHO (2010) guideline has suggested that a 2-7 days abstinence time before sample collection is optimal. However, there is not much supporting evidence provided for this recommendation.

Due to the limited research with contradictive results about the ideal period of abstinence, this study aimed to assess the effect of short sexual abstinence time on spermatozoa motility and kinematic parameters to establish an evidence-based timeframe for an optimal abstinence time which could lead to higher ART success rates.

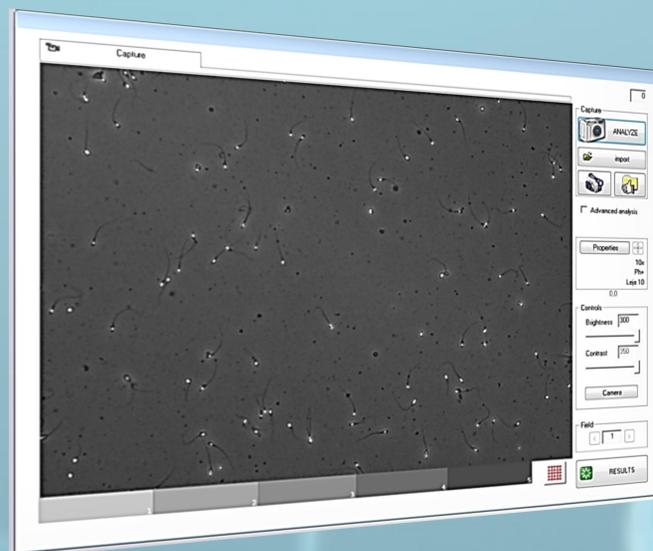
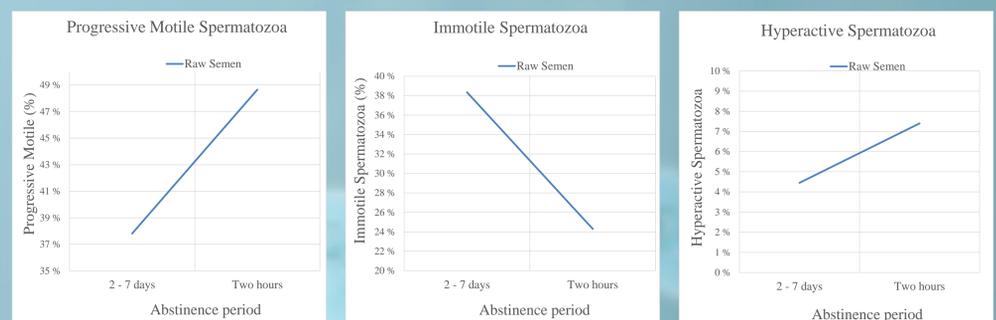
Results:

The results showed that samples collected after a two-hour abstinence period had a significantly ($P=0.009$) higher percentage of progressively motile sperm and a significantly ($P=0.006$) lower percentage of immotile sperm. Non-progressive motile spermatozoa did not demonstrate any significant difference ($P=0.534$).

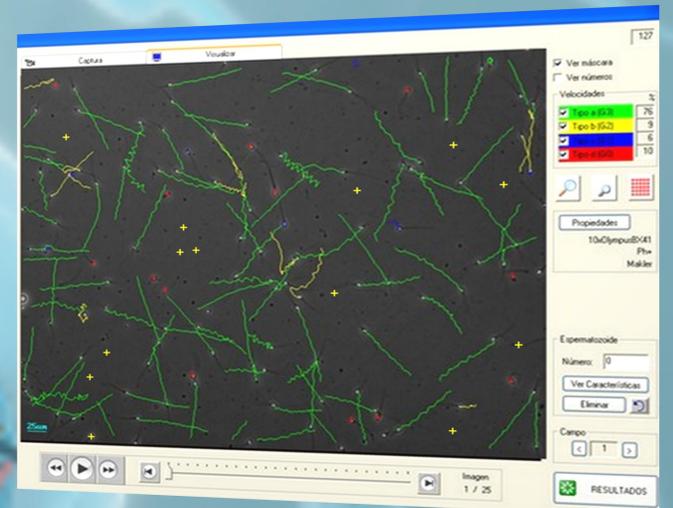
In the kinematic parameters:

VCL ($p = 0.021$), VSL ($p = 0.022$), VAP ($p = 0.018$), ALH ($p = 0.018$), BCF ($p = 0.032$) and Hyperactivity ($p = 0.002$) demonstrated significantly higher values in the second ejaculate compared to the first.

LIN ($p = 0.114$), WOB ($p = 0.209$), STR ($p = 0.217$) did not show any significant change.



SCA Sperm Class Analyzer®



Materials and Methods:

Semen samples were collected from 17 participants after a 2-7 day abstinence period followed by a second consecutive sample after two hours by masturbation.

The samples were allowed to liquefy in room temperature before being analyzed by the Sperm Class Analyzer® 5.1 (SCA®) CASA system for the quantitative analysis of the below parameters:

- Motility grading based on WHO5 categories: progressively motile (%), non-motile (%), immotile (%)
- Motion kinematic parameters: VCL, curvilinear velocity ($\mu\text{m/s}$); VSL, straight-line velocity ($\mu\text{m/s}$); VAP, average path velocity ($\mu\text{m/s}$); LIN, linearity (%); STR, straightness (%); WOB, wobble (%); ALH, amplitude of lateral head displacement (μm); BCF, beat-cross frequency (Hz) and hyperactivity (%).
- Results were analyzed by repeated measures analysis of variance using the SPSS (Ver. 23, IBM, USA) software package.

Discussion and Conclusion:

The significantly higher values of VCL, VAP, ALH, Hyperactivity and progressively motile along with the decrease in immotile spermatozoa in the second sample suggest that semen ejaculated after a two hours abstinence period could have a possibly higher capability of reaching the female oocyte when compared to spermatozoa collected after 2-7 days.

Based on the results of this study, decreasing the sexual abstinence time to as low as 2 hours could increase the chance of successful treatment in patients with male factor infertility in ART. Further investigation is required in order to compare the effect of abstinence time on additional sperm quality parameters and ART treatment outcomes.

Acknowledgements

The Authors would like to thank Afshin Samani for his help in the statistical analysis, Microptic S/L for their great technical support throughout the study and Ferring Pharmaceuticals for the grant providing the SCA® system.

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Fig 1. Motion and velocity parameters as defined by the 5th edition of the WHO laboratory manual for the Examination and processing of human semen (right) and assessed by the SCA® (below).

