

A comparison between the Felix™ electrophoretic system of sperm isolation and conventional density gradient centrifugation: a multicentre analysis

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- PMID: 36515800
- DOI: [10.1007/s10815-022-02680-0](https://doi.org/10.1007/s10815-022-02680-0)

Abstract

Purpose: Developing optimized techniques for the isolation of human spermatozoa possessing low levels of DNA damage is an important objective for the ART industry. The purpose of this study was to compare a novel electrophoretic system (Felix™) of sperm isolation with a conventional method involving density gradient centrifugation (DGC).

Methods: Five international ART Centres in Australia, India, Sweden, the USA, and China have collaborated in order to compare the quality of the sperm populations isolated by Felix™ and DGC in terms of processing time, sperm concentration, motility, vitality, and DNA integrity as assessed by 3 methods: SCSA, Halo, and TUNEL.

Results: Across all centers, 112 comparisons were performed. Although significant differences were noted between centers in terms of the quality of the semen samples subjected for analysis, overall, both methods were equally capable of isolating populations of spermatozoa exhibiting high levels of vitality and progressive motility. The absolute numbers of spermatozoa recovered were significantly ($p < 0.001$) lower with the Felix™ device although sperm quality was higher with 4/5 centers reporting

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a significant improvement in DNA integrity relative to DGC ($p < 0.01$ - $p < 0.001$). In practical terms, the Felix™ device featured a standardized 6 min preparation time whereas clinical DGC protocols varied from center to center but generally took around 40 min to complete.

Conclusions: The Felix™ device is a positive technical development capable of isolating suspensions of highly motile spermatozoa exhibiting low levels of DNA damage in a fraction of the time taken by conventional procedures such as DGC.

Keywords: DNA damage; Density gradient centrifugation; Electrophoretic separation; Motility; Sperm selection.

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