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New Semen Quality Scores Developed by Principal Component Analysis of Semen Characteristics

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The purpose of this study was to determine whether semen characteristics can be reduced to 2 semen quality (SQ) scores and whether these new scores can help the clinician in assessing the reproductive outcome. A cross-sectional sample of 250 patients seeking infertility treatment were analyzed for semen characteristics. In addition, 177 male-factor patients (prostatitis with infection, n = 40; varicocele, n = 77; varicocele with infections, n = 11; and vasectomy reversal, n = 43) were also assessed. Sperm motion kinetics were measured by computer-assisted semen analysis (CASA) (concentration, percent motility, curvilinear velocity [VCL], straight-line velocity [VSL], average path velocity [VAP], linearity [LIN], and amplitude of lateral head displacement [ALH]). Sperm morphology was assessed by both World Health Organization (WHO) guidelines and Tygerberg strict criteria. The principal component analysis model was used to construct an SQ score and a relative semen quality (RQ) score. A separate set of 25 normal donors was included as controls to determine normal ranges of the semen scores. Among the patient samples, SQ and RQ scores (median and 25% and 75% interquartile values) were 89.9, 25.1, and 130.4 and 106.1, 45.2, and 165.9, respectively. The SQ score for the varicocele and varicocele with infection groups was comparable (78.6 ± 17.4 and 84.8 ± 20.6) but significantly different from the control (100 ± 10 , $P < .001$ and $.03$). Vasectomy reversal patients had an SQ score of 78.2 plus or minus 16.8 that was significantly lower than controls ($P < .001$). The correlation among semen characteristics allows for the efficient combining of semen measures. The composite scores can summarize overall SQ and quantity. Both SQ and RQ scores provide meaningful information on the quality of semen specimens for the clinician.

Key words: Computer-assisted semen analysis, infertility, spermatozoa, morphology

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