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Variation in semen parameters derived from computer-aided semen analysis, within donors and between donors

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The development of computer-aided semen analysis (CASA) has made it possible to study sperm motility characteristics objectively and longitudinally. In this 2-year study of 8 sperm donors, we used CASA to measure 7 semen parameters (concentration, percentage of motile spermatozoa, curvilinear velocity, average path velocity, straight-line velocity, amplitude of lateral head displacement, and beat/cross frequency). The frequency distributions of the 7 parameters in the semen samples of each donor were investigated. All parameters but one were normally distributed; concentration was distributed log-normally. Variation within individual donors and between donors was studied. Analysis of variance demonstrated that variation between donors was not explained by the longitudinal variation within individual donors. Variations in motility characteristics between donors were substantial, which may make motility characteristics of limited value as a tool for establishing fertility. Strong correlations were found between the 7 parameters, partly because by definition, motility characteristics are interdependent. Fisher's discriminant analysis demonstrated that each donor appeared to have his own set of semen characteristics and, more specifically, his own motility signature. From this data set it can be predicted that in order to find population means among sperm, it may be more efficient to measure more subjects than to increase the number of samples per subject.