Recovery of the optimal number of functionally intact spermatozoa from thawed samples has always been a goal of semen cryopreservation programs. This study evaluated the kinematics of spermatozoa after two sperm preparation procedures used to process cryopreserved-thawed samples, and how motion characteristics and viability were maintained hours post-manipulation. Donor semen samples \( n = 15 \) were diluted 1:1 with TEST yolk-buffer freezing medium and then cryopreserved. After thawing, each sample underwent the following steps: (1) removal of the cryoprotectant; (2) processing using the swim-up method; and (3) incubation with BWW containing 3% BSA at 37°C under 5% CO\(_2\) in air for 3 hours. Percent motility and motion characteristics were determined after each step using a computer-assisted semen analyzer equipped with hyperactivation module software. Sperm viability was also assessed after each step. Dilution and centrifugation of cryopreserved-thawed specimens resulted in a 30% decrease in the sperm count. Compared with simple sperm washing, samples processed by swim-up had higher viability \( (P = 0.02) \), percentage motility \( (P < 0.05) \), curvilinear, straight-line, and average path velocities \( (P < 0.001) \), and amplitude of lateral head displacement \( (P < 0.05) \). Incubation of cryopreserved-thawed spermatozoa under capacitating conditions for 3 hours maintained motion characteristics while decreased percentage motility \( (P < 0.05) \) and viability \( (P < 0.001) \). Cryopreserved specimens processed by swim-up resulted in the recovery of spermatozoa with higher viability and superior quality as assessed by motion analysis. Appropriate timing in using these cells for artificial insemination or other assisted reproductive procedures seems to be crucial to enhance fertilization and pregnancy outcome, since freeze-thawed spermatozoa have reduced longevity. [Supported by a research grant from The Cleveland Clinic Foundation].