Effects of seated posture on static strength, lower-body isometric muscle contractions, and manual tracking performance

Abstract
This research evaluates the effects of seat back angle and armrest angle on performance of the following variables: (1) static force generation capabilities on an isometric force-stick; (2) lower-body isometric muscle contractions used in anti-gravity straining maneuvers (AGSMs); and (3) tracking performance for a manual tracking task.

The purpose of this research is to determine if certain body postures significantly affect force generation, isometric muscle contractions, and tracking error. Subjects perform three different tasks over four experimental sessions. In the first session, subjects generate maximum force on a sidearm isometric force-stick at 18 seat back and armrest combinations (six seat back angles x three armrest angles) in two directions (roll left and roll right). In the next three sessions, subjects perform either a manual tracking task or a manual tracking task concurrent with lower-body isometric muscle contractions at each of the 18 seat back and armrest combinations.

The dependent measures used to evaluate performance are stick force, blood pressure, and tracking error. The results indicate the following: (1) static force generation ability is significantly affected by gender, seat back angle, and direction in which the force is applied; (2) lower-body isometric muscle contractions used to elevate blood pressure are not significantly affected by seatback angle and armrest angle; and (3) tracking error is significantly affected by seatback angle.

Some results are consistent with previous research that found force capabilities are affected by the direction in which force is applied, and that body posture does not affect isometric muscle contractions used to increase blood pressure. However, other results indicate the need for further research to determine the relationship of body posture to isometric muscle contraction used in AGSMs and manual tracking.

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