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The influence of body position on leg kinematics and muscle recruitment during cycling.

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The effects of upper body orientation on neuromuscular control of the leg during cycling are not well understood. Our aim was to investigate the effects of upper body orientation on control of movement of distal leg segments during cycling. We compared three-dimensional leg and foot kinematics and muscle recruitment patterns between upright and aerodynamic riding positions. Comparisons were made between 10 elite cyclists, 10 elite triathletes and 10 novice cyclists. We found that upper body orientation did not influence kinematics of the leg and foot or primary muscle activity (i.e., the main bursts of muscle activity). The aerodynamic riding position was, however, associated with less modulation of muscle activity (i.e., less relaxation of the muscle during secondary muscle activity) and greater coactivity in elite triathletes and novice cyclists. Our results suggest that orientation of the upper body influences neuromuscular control of the leg during cycling in elite triathletes and novice cyclists. The change in muscle recruitment (i.e., the change in how the goal movement was achieved) implies that the ability of the central nervous system to execute the cycling movement in the most skilled manner was adversely influenced by upper body orientation in elite triathletes and novice cyclists. Less modulation of muscle activity and greater coactivation in elite triathletes when cycling in the aerodynamic position, and the similarity of changes shown in elite triathletes and novice cyclists, may be interpreted as further evidence of less skilled control of movement in elite triathletes when compared to cyclists matched for cycling training history.