Back Lift Versus Leg Lift: A Dynamic Lifting Strategy Index

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This paper presents an index that quantitatively characterizes different dynamic postural strategies employed during sagittal plane lifting. The dynamic lifting strategy is analyzed in the velocity domain as a strategy of partitioning postural changes between the torso and leg segments. The index consists of two parameters assigned to two leg segments that quantify their partitioning relative to the torso. Parameter values, ranging from 0.1 to 10, are estimated through a simple enumeration search. The use of this index is illustrated by applying it to 12 lifting movement performed by six subjects using either a back-lift or a leg-lift strategy. Results suggest that the lifting movements can be well characterized by this parsimonious index. It not only clearly differentiates the two general strategies but also provides additional quantitative information regarding the involvement of each segment in a lifting movement.

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