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Reliability of an observation protocol for foot motion assessment in a palletizing task

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60. Reliability of an observation protocol for foot motion assessment in a palletizing task

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Background: Foot placement during manual material handling (MMH) activities has been shown to affect posture and motion, and consequently low back loading. A classification taxonomy of foot motions for MMH tasks exists (Wagner et al. 2009) but assumes that a worker's feet always "face" the job and remain motionless during pickup and deposit. Furthermore, certain elements of the observation protocol result in discrepancies among raters, and the limited range of load masses manipulated limits its applicability to situations where the handling of heavy loads may require different foot motions. Consequently, this study presents an adaptation of Wagner et al.'s taxonomy to analyze foot motions during a palletizing task with 15-kg boxes.

Methods: The method for qualitatively describing foot motions is based on Wagner et al.'s taxonomy (Wagner et al. 2009). A terminal stance is defined as the relative placement of the feet with regard to the pickup/delivery location in MMH events: first contact with the box, pickup, steps between pickup and the last step before delivery, last step before delivery, and delivery. Terminal stances comprise a postural stance element (Split stance, Even stance, Parallel stance) and a foot motion element (No movement, Pivot, Move, Orient, Counterweight). Terminal stances from video data of box transfers from a previous laboratory study (Plamondon et al. 2014) were analyzed to assess intra-rater and inter-rater reliability. Intra-observer reliability (one rater only) was evaluated by re-observing data on 252 box transfers (1 month between assessments). Inter-rater reliability was assessed by calculating the percentage of agreement between two independent raters.

Results: Re-observing 252 transfers, the proportion of intra-observer reliability reached 86.2%. At pickup, reliability equaled 84.1%. Overall inter-observer agreement totaled 76.2% and 82.3% for the pickup.

Conclusion: Agreement percentages were adequate (Wagner et al. 2009). This taxonomy uses Wagner et al.'s terminology to analyze foot motions during a palletizing task involving the handling of heavy loads.