6-25-2018

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Effectiveness of Self-Feeding Interventions for Upper Extremity Tremors

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1 Ask: Research Question
What are effective approaches for reducing upper extremity tremor for self-feeding?

2a Acquire: Databases Used
PubMed, Scopus, CINAHL, Clinical Key, ProQuest, Cochrane Library

2b Acquire: Search Terms
Patient: Parkinson's Disease, essential tremor
Intervention: Adaptive equipment, orthotics
Comparison: Healthy controls
Outcome: Self-feeding, movement fluency, tremor amplitude, hand postural stability

2c Acquire: Selected Articles
Pathak, Redmond, Allen, et. al. (2013): Quasi-experimental clinical trial testing a self-stabilizing (Active Cancellation of Tremor [ACT]) spoon designed for individuals with essential tremors and Parkinson's Disease.

Ma, Tsai, Hsu (2009): Repeated measure with counterbalancing study examining effect of utensil weight on supporting kinematic upper extremity movement to support self-feeding in subjects with Parkinson's disease.


3a Appraise: Study Quality
Pathak, Redmond, Allen, et. al. (2013): Level III (n=15): Well-designed involving a variety of outcome measures, including a tremor rating scale, tremor amplitude, and participant self-report of perception of device use. Double blind experiment, participant and investigator unaware of device being on or off during testing. This study did not utilize randomization, and device could not be used for participants with severe tremor.

Ma, Tsai, Hsu (2009): Level III (n=36): Repeated measures design with randomized counterbalancing. Use of age-matched controls for participants. Limitation of lack of control group with Parkinson's Disease.

Meshack, Norman (2002): Level II (n=16): Repeated measures analysis of variance for three different methods. Counterbalancing of three conditions which consisted of holding a built-up spoon, holding a weighted spoon, and holding the built-up spoon while wearing a weighted wrist cuff. Three measures of tremor amplitude and two measures of tremor frequency were used to measure spoon displacement.

3b Appraise: Study Results:
Pathak, Redmond, Allen, et. al. (2013): Using the Tremor Rating Scale, use of ACT utensils can significantly improve holding (p=.016); eating (p=.001); and transferring (p=.001). Similarly, findings based on a self-report measure indicate improved eating (p=.0001), and transferring (p=.013). Accelerometer data demonstrated a 71-76% reduction in participant tremor while the ACT device was on.

Ma, Tsai, Hsu (2009): Lightweight utensils lead to increased peak velocity (reach p=.044, return p=.013), fewer movement units (p=.045), and shorter acceleration in reach segments (p=.010), equating to a smoother movement pattern. The use of heavier utensils decreased peak velocity, increased acceleration time, and completed more movement units, which equates to a more inefficient movement pattern.

Meshack, Norman (2002): There is a lack of significant findings to suggest difference in tremor amplitude and frequency across weighted utensils and cuffs. Suggesting there is a lack of clinical rehabilitation recommendations to use weighted utensils and weighted wrist cuffs to alleviate postural hand tremor in PD.

References:


4 Apply: Conclusions for Practice
Clinicians need to make informed decisions on making recommendations for adaptive equipment such as adaptive utensils or weighted orthotics. Emerging technology such as the Active Cancellation of Tremor (ACT) device indicates promising results, but may not always be clinically appropriate to recommend due to the cost. The results favor light weight utensils to be more useful in self-feeding tasks compared to weighted utensils and orthotics for individuals with Parkinson's Disease.

Medication management of tremors can be ineffective, it would be beneficial to determine what adaptations or approaches can help improve self-feeding ability and confidence for clients with upper extremity tremors.

Lightweight utensils can support smooth movement patterns for individuals with Parkinson’s Disease. Active Cancellation of Tremor (ACT) technology is promising, although availability can be prohibitive due to high costs.