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## Modified Ashworth Scale (MAS) Model based on Clinical Data Measurement towards Quantitative Evaluation of Upper Limb Spasticity

(Conference Paper)

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### Abstract

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Spasticity is common symptom presented amongst people with sensorimotor disabilities. Imbalanced signals from the central nervous systems (CNS) which are composed of the brain and spinal cord to the muscles ultimately leading to the injury and death of motor neurons. In clinical practice, the therapist assesses muscle spasticity using a standard assessment tool like Modified Ashworth Scale (MAS), Modified Tardieu Scale (MTS) or Fugl-Meyer Assessment (FMA). This is done subjectively based on the experience and perception of the therapist subjected to the patient fatigue level and body posture. However, the inconsistency in the assessment is prevalent and could affect the efficacy of the rehabilitation process. Thus, the aim of this paper is to describe the methodology of data collection and the quantitative model of MAS developed to satisfy its description. Two subjects with MAS of 2 and 3 spasticity levels were involved in the clinical data measurement. Their level of spasticity was verified by expert therapist using current practice. Data collection was established using mechanical system equipped with data acquisition system and LABVIEW software. The procedure engaged repeated series of flexion of the affected arm that was moved against the platform using a lever mechanism and performed by the therapist. The data was then analyzed to investigate the characteristics of spasticity signal in correspondence to the MAS description. Experimental results revealed that the methodology used to quantify spasticity satisfied the MAS tool requirement according to the description. Therefore, the result is crucial and useful towards the development of formal spasticity quantification model.

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