

Proceedings of the 2nd Annual World Conference
of the Society for Industrial And Systems Engineering
Las Vegas, NV, USA
November 5-7, 2013

Handling of Pump and Reservoir Interface in the Comparison of Design Option on Maximal Pressure and Wrist Angle

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Abstract: This study was laboratory experiment designed to characterize ergonomic factors involved in two main tasks during the use of an insulin pump reservoir; reservoir installation (Turning reservoir handling portion clockwise until it lock in place to connect the reservoir into the insulin pump chamber) and removal (Turning the reservoir handling part counter-clockwise then pull out from the pump chamber to un-connect). The maximal operating force during these two steps as well as the wrist angle while handling and operating four representative reservoir set models was recorded. The force exerted on each and three finger-tip sensors was measured in the glove pressure mapping system (FSA, Verg Inc., Winnipeg, Canada) during the installation and removal of each of reservoir set into and from the pump chamber, along with wrist angle using DataLog Bluetooth[®] Goniometer (Biometrics Ltd., Gwent, UK). The four reservoir set models investigated were ADR Reservoir model I, ADR Reservoir model II, ADR Reservoir model II with ERG (Easy Reservoir Grip Accessory), and Medtronic Paradigm[®], together with insulin pump models: Medtronic Paradigm[®] 754. A total of 8 different tasks by 10 subjects with 3 repeated measures were included in this study. Ten subjects volunteered to participate in the study. Analysis of the data showed that there are significant differences only in the average maximal pressure required to connect and un-connect the reservoir from the pump but no significant differences in the wrist angles among the different models tested.