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Research Result Summaries

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### Effectiveness of Vibration Massage in Automotive Seating

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Various types of massage systems are being incorporated into the design of automotive seating as consumer demand for comfortable seating in automobiles increases. However, research regarding vibration massage, specifically in automotive seating, is very limited to date. A vibration massage system has been developed by the partner organization, Leggett & Platt Automotive, but the performance of the system needed to be evaluated in terms of its physiological effectiveness, and how seat occupants respond to it. Seat occupant's responses to different vibration frequencies and types of vibration (e.g., continuous, pulsed) in different locations within a standardized automotive seat, were examined. Heart rate monitoring, galvanic skin response (GSR), facial expression analysis and subjective surveys were administered to assess participants' preferred vibration conditions. Twenty (10 male and 10 female) participants performed two phases of the study, an initial pilot test and final massage pattern test. Results from the subjective surveys of the initial pilot test determined which vibration frequencies, the types of vibrations (e.g., continuous, pulsed) and the locations within the seat were preferred among participants. As a result, two different vibration massage patterns were created for the final massage pattern test. There were no statistically significant results found for heart rate, photoplethysmography (PPG) or blood volume pulse (BVP). However, there was a statistically significant difference for GSR for both vibration massage patterns. The exit survey revealed that 78% of participants found that the vibration massage had an effect on their comfort; 44%, 33%, and 0% of participants said it had a positive, neutral and negative effect, respectively. The partner organization successfully developed and tested a vibration massage system for automotive seating. Future plans include pursuing a patent on the vibration massage system and implementing it into future vehicles that are manufactured by a customer with whom they work.