



## **ICARE Award, Patents, Publications and Presentations List**

### **AWARD**

- 2013 *International daVinci Award, Recreation and Leisure* category for Madonna ICARE by Sports Art. Michigan Chapter of the National MS Society. Dearborn, MI.

### **PATENTS**

- Burnfield JM, Shu Y, Taylor AP, Buster TW, Nelson CA (August 30, 2011). Rehabilitation and Exercise Machine. U.S. Patent 8,007,405 B2.
- Burnfield JM, Shu Y, Taylor AP, Buster TW, Nelson CA (May 15, 2012). Rehabilitation and Exercise Machine. U.S. Patent 8,177,688 B2.
- Burnfield JM, Taylor AP, Buster TW, Nelson CA, Shu Y (August 19, 2014). Improved Rehabilitation and Exercise Machine. Canadian Patent 2,776,626.
- Nelson CA, Stolle CJ, Burnfield JM (April 9, 2019). Biomechanical Foot Guidance Linkage. U.S. Patent 10,252,100.
- Nelson CA, Stolle CJ, Burnfield JM, Buster TW, McCrory BJ (July 7, 2020). Assistive Rehabilitation Elliptical System. U.S. Patent 10,702,735.

### **SELECTED PEER-REVIEWED PUBLICATIONS, BOOK, AND BOOK CHAPTERS**

- Fallahtafti F, Pfeifer CM, Buster TW, Burnfield JM (2020). Effect of motor-assisted elliptical training speed and body weight support on center of pressure movement variability. *Gait and Posture*, 81: 138-143. DOI: 10.1016/j.gaitpost.2020.07.018.
- Burnfield JM, Cesar GM, Buster TW (2020). Variations in plantar pressure variables across elliptical trainers in older adults. Available online ahead of print August 1, 2020;80:105142, *Clinical Biomechanics*. DOI: 10.1016/j.clinbiomech.2020.105142.
- Cesar GM, Buster TW, Burnfield JM (2020). Comparison of plantar pressure profile of young adults during training on elliptical devices and overground walking: A pilot study. *The Foot*. 45: 101716. DOI: 10.1016/j.foot.2020.101716.
- Cesar GM, Buster TW, Burnfield JM (2020). Cardiorespiratory fitness, balance and walking improvements in an adolescent with cerebral palsy (GMFCS II) and autism after motor-assisted elliptical training. *European Journal of Physiotherapy*, 22(3):124-132. DOI: 10.1080/21679169.2018.1536764.
- Burnfield JM, Buster TW, Pfeifer CM, Irons SL, Cesar GM, Nelson CA (2019). Adapted motor-assisted elliptical for rehabilitation of children with physical disabilities. *ASME Journal of Medical Devices*, 13(1):011006. DOI: 10.1115/1.4041588.
- Burnfield JM, Pfeifer CM, Kwapiszeski S, Irons SL, Buster TW, Cesar GM (2019). Impact of ICARE training speed and motor assistance on cardiovascular response. *Cardiopulmonary Physical Therapy Journal*, 30(3):115-122. DOI: 10.1097/CPT.0000000000000098.

- Pfeifer CM, Rowen D, Buster TW, Cesar GM, Irons SL, Burnfield JM (2019). Design and validation of a heart rate and speed monitoring device with the ICARE. *ASME Journal of Medical Devices*. 13(1):015002. DOI: 10.1115/1.4041337.
- Burnfield JM, Cesar G, Norkin CC (2019). Chapter 7: Examination of Gait. Susan B. O'Sullivan, Thomas J. Schmitz, George D. Fulk (Eds). *Physical Rehabilitation, Seventh Edition*. F.A. Davis, Philadelphia, PA, pp 228-293.
- Burnfield JM, Cesar GM, Buster TW, Irons SL, Pfeifer CM (2018). Walking and fitness improvements in child with diplegic cerebral palsy following motor-assisted elliptical intervention. *Pediatric Physical Therapy*, 30(4):E1-E7. DOI: 10.1097/PEP.0000000000000541. PMID: 30277973.
- Burnfield JM, Cesar G, Buster TW, Irons SL, Nelson CA (2017). Kinematic and muscle demand similarities between motor-assisted elliptical training and walking: Implications for pediatric gait rehabilitation. *Gait & Posture*, 51:194-200. DOI: 10.1016/j.gaitpost.2016.10.018. PMID: 27810692.
- Burnfield JM, Powers CM (2017). Normal and Pathological Gait, Chapter 15. In Placzek JD, Boyce DA (Eds). *Orthopaedic Physical Therapy Secrets, Third Edition*. Hanley & Belfus. [Bookshelf Online].
- Burnfield JM, Buster TW, Goldman AJ, Corbridge LM, Harper-Hanigan K (2016). Partial body weight support treadmill training speed influences paretic and non-paretic leg muscle activation, stride characteristics, and ratings of perceived exertion during acute stroke rehabilitation. *Human Movement Science*, 47:16-28. DOI: 10.1016/j.humov.2016.01.012. PMID: 26845732.
- Irons SL, Brusola GA, Buster TW, Burnfield JM (2015). Novel motor-assisted elliptical training intervention improves Six-Minute Walk Test and oxygen cost for an Individual with Progressive Supranuclear Palsy. *Cardiopulmonary Physical Therapy Journal*, 26(2): 36-41. DOI: 10.1097/CPT.0000000000000007.
- Nelson CA, Stolle CJ, Burnfield JM, Buster TW (2015). Modification of the Intelligently Controlled Assistive Rehabilitation Elliptical (ICARE) system for pediatric therapy. Published online, *ASME Journal of Medical Devices*, 9(4): 6 pages. DOI: 10.1115/1.4030276.
- Burnfield JM, Irons SL, Buster TW, Taylor AP, Hildner GA, Shu Y (2014). Comparative analysis of speed's impact on muscle demands during partial body weight support motor-assisted elliptical training. *Gait and Posture*, 39(1):314-320. DOI: org/10.1016/j.gaitpost.2013.07.120. PMID: 23973354.
- Fager SK, Burnfield JM (2014). Patients' experiences with technology during inpatient rehabilitation: opportunities to support independence and therapeutic engagement. *Disability and Rehabilitation: Assistive Technology*, 9(2):121-127. DOI: 10.3109/17483107.2013.787124.
- McCrory B, Harlow AH, Burnfield JM (2014). Musculoskeletal risk to physical therapists during overground gait training: A case report. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting 10/2014*; 58(1):1219-1223. DOI: 10.1177/1541931214581254.
- McCrory B, Burnfield JM, Darragh A, Meza JL, Irons SI, Brusola G, Link AM. (2014). Work injuries among therapists in physical rehabilitation. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting 10/2014*; 58(1):1072-1076. DOI: 10.1177/1541931214581224.
- Buster TW, Burnfield JM, Taylor AP, Stergiou, N (2013). Lower extremity kinematics during walking and elliptical training in individuals with and without traumatic brain injury. *Journal of Neurologic Physical Therapy*, 37(4):176-86. DOI: 10.1097/NPT.0000000000000022. PMID: 24189335.
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disabilities and chronic conditions. *Physical Therapy*, 91(11): 1604-1617. DOI: 10.2522/ptj.20100332. PMID: PMC3367158.

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- Perry J, Burnfield JM (2010). *Gait Analysis, Normal and Pathological Function, 2<sup>nd</sup> Edition*. Slack: Thorofare, NJ.
- Kulig K, Burnfield JM (2008). The role of biomechanics in orthopedic and neurological rehabilitation. *Acta of Bioengineering and Biomechanics*, 10(2):3-14. PMID: 19031992.
- Burnfield JM, Jorde AG, Augustin TR, Augustin TA, Bashford GR (2007). Variations in plantar pressure variables across five cardiovascular exercises. *Medicine and Science in Sports and Exercise*, 39(11):2012-2020. PMID: 17986910.

## SELECTED ABSTRACTS AND PROFESSIONAL PRESENTATIONS

- Cesar GM, Buster TW, Patten A, Perlaki BA, Burnfield JM. Reliability and accuracy of commercially-available wrist step-count device for children and adolescents with neurologic-induced gait impairment. *2020 ACRM VIRTUAL Annual Conference*.
- Nimmo SM, Catcher BJ, White HJ, Buster TW, Cesar GM, Burnfield JM. Impact of backward motor-assisted elliptical training on upper extremity muscle activation patterns when using reciprocally moving handles. *2020 ACRM VIRTUAL Annual Conference*.
- Jacobsen A, Buster TW, Cesar GM, Burnfield JM (2020). Comparison of electromyographic demands on trunk musculature during forward and reverse motor-assisted elliptical training. *2020 ACRM VIRTUAL Annual Conference*. October 23, 2020.
- Nalamasu R, Schwery NA, Rasmussen, CM Buster TW, Cesar GM, Burnfield JM (2020). Motor-assistance and resistance during elliptical training alter upper extremity muscle activation patterns when using reciprocally moving handles. *American Academy of Physical Medicine and Rehabilitation 2020 Annual Assembly*. San Diego, CA. November 12-15, 2020.
- Baker BC, Burnfield JM, Buster TW, Cesar GM, Mestelle Z, Olbrantz CR (2020). Comparison of lower extremity joint kinematics and electromyographic demands during backward walking and reverse motor-assisted elliptical training. *American Academy of Physical Medicine and Rehabilitation 2020 Annual Assembly*. San Diego, CA. November 12-15, 2020.
- Burnfield JM. ICARE: An integrated approach for addressing gait, fitness, balance and upper extremity rehabilitation goals. *Ability KC*. Kansas City, MO. November 20, 2019.
- Burnfield JM. ICARE: An integrated approach for addressing gait, cardiorespiratory, balance and upper extremity rehabilitation goals. *Rancho Los Amigos National Rehabilitation Center*. Downey, CA. November 26, 2018.
- Burnfield JM, Buster TW, Cesar GM, Irons SL, Pfeifer CM. ICARE to improve walking and fitness in adults and children with physical disabilities and chronic conditions (2018). *NIDILRR 40<sup>th</sup> Anniversary Celebration Poster Session*. Great Hall of the Hubert H. Humphrey Building, Washington, DC. October 18, 2018.
- Pfeifer CM, Whorley BA, Buster TW, Cesar GM, Burnfield JM (2018). Investigation of center of pressure during gait and motor-assisted elliptical training in adults. *Archives of Physical Medicine and Rehabilitation*, 99(12):e206. DOI: <https://doi.org/10.1016/j.apmr.2018.09.052>.

- Huang C-K, Buster TW, Siu K-C, Burnfield JM (2018). Combining virtual reality gaming with motor-assisted elliptical impacts children's engagement in exercise. *Archives of Physical Medicine and Rehabilitation*, 99(12):e195. DOI: <https://doi.org/10.1016/j.apmr.2018.09.020>.
- Burnfield JM. Invited Keynote: Foot and Ankle Rockers: Contributions to Progression, Shock Absorption and Stability during Gait. *2018 Nederlandse Vereniging van Podotherapeuten Conference*. Congrescentrum NBC in Nieuwegein, Netherlands. September 21, 2018.
- Burnfield JM. SportsArt ICARE Motor-Assisted Elliptical Training to improve walking, fitness, and wellbeing. *International Council on Active Aging (ICAA) Product Webinar*. November 6, 2018.
- Burnfield JM. ICARE Clinical Use for Walking, Fitness, Balance and Arm Rehabilitation: An Integrated and Affordable Approach. *ExercisABILITIES Physical Therapy and Medical Fitness*. Rochester, MN. August 16, 2018.
- Burnfield JM. ICARE: Customizing Use for First Rehabilitation Hospital of Shanghai, China. *The First Rehabilitation Hospital of Shanghai, China*. April 21, 2018.
- Burnfield JM. Robotic ICARE Technology for Walking, Fitness, Balance and Arm Rehabilitation: An Integrated and Affordable Approach. *The 4<sup>th</sup> China Rehabilitation Forum (CRF2018)*. Shanghai, China. April 20, 2018.
- Burnfield JM. ICARE: A Practical Rehabilitation Solution to Address Complex Patient Challenges. *Osceola Regional Medical Center - HCA*. Kissimmee, FL. January 24, 2018.
- Burnfield JM. Improving Walking and Fitness Following Neurologic Injury: Practical Solutions to Complex Challenges. 2018年中美康复医学与研究论坛 / 2018 Sino-US Rehabilitation Medicine and Research Symposium. Shanghai, China. January 15, 2018.
- Cesar GM, Irons SL, Garbin A, Eckels E, Buster TW, Burnfield JM (2017). Child with traumatic brain injury improved gait abilities following intervention with pediatric motor-assisted elliptical training: A case report. *Journal of Neurologic Physical Therapy*, 41(1):84. DOI: 10.1097/NPT.000000000000156.
- Irons SL, Buster TW, Karkowski-Schelar E, Johns E, Burnfield JM (2016). Individuals with multiple sclerosis improved walking endurance and decreased fatigue following motor-assisted elliptical training intervention. *Archives of Physical Medicine and Rehabilitation*, 97(10):e34.
- Burnfield JM, Buster TW, Irons SL, Cesar GM, Nelson CA, Rech NR, Nichols EM (2016). Pediatric walking vs. training on prototype motor-assisted elliptical: Kinematic comparison at self-selected comfortable speed. *Archives of Physical Medicine and Rehabilitation*, 97(10):e99.
- Burnfield JM, Irons SL, Cesar GM, Buster TW, Khot R, Nelson CA (2016). Pedi-ICARE training improves walking and endurance of child with cerebral palsy. *Archives of Physical Medicine and Rehabilitation*, 97(12):e19-e20.
- Burnfield JM, Buster TW, Irons SL, Rech N, Cesar GM, Pfeifer CM, Nelson CA (2016). Pediatric Intelligently Controlled Assistive Rehabilitation Elliptical for walking and fitness: Prototype development and biomechanical analysis. *RESNA/NCART (Rehabilitation Engineering Society of North America/National Coalition for Assistive and Rehab Technology) 2016 annual convention*. Arlington, VA, July 13, 2016.
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- Buster TW, Burnfield JM (2016). Movement variability during walking and elliptical exercise for individuals with chronic severe traumatic brain injuries. *9<sup>th</sup> World Congress for Neurorehabilitation*. Philadelphia, PA, May 12, 2016.
- Trejo LH, Buster TW, Stolle CJ, Nelson CA, Burnfield JM. Influence of Rocker and Crank Arm Lengths on *Intelligently Controlled Assistive Rehabilitation Elliptical (ICARE) Coupler Trajectories*. *Biomedical Engineering Career Conference (MBECC) 2014*, Detroit, MI. November 7, 2014.
- Burnfield JM. Development and Implementation of the ICARE for Use in Rehabilitation and Fitness. *Hospital Corporation of America*. Nashville, TN. Presented October 14, 2013.
- Burnfield JM. Desarrollo e implementación del ICARE para uso en rehabilitación y entrenamiento físico. *Instituto Nacional De Rehabilitación*. Lima, Perú. September 12, 2013.
- Burnfield JM. Desarrollo e implementación del ICARE para uso en rehabilitación y entrenamiento físico. *TechnoSalud*. Lima, Peru. September 11, 2013.
- Burnfield JM. ICARE Training to Improve Walking and Cardiovascular Fitness for Individuals Living with Physical Disabilities and Chronic Conditions. *Quality Living Incorporated*. Omaha, NE. Presented April 10, 2013.
- Burnfield JM. ICARE Training to Improve Walking and Cardiovascular Fitness for Individuals Living with Physical Disabilities and Chronic Conditions. *Marionjoy Rehabilitation Hospital*. Wheaton, IL. Presented April 24-25, 2012.
- Burnfield JM. ICARE Training to Improve Walking and Cardiovascular Fitness for Individuals Living with Physical Disabilities and Chronic Conditions. *Hospital for Special Care*. New Britain, CT. Presented April 2-3, 2012.
- Yeseta MC, Taylor AP, Buster TW, Shu Y, Burnfield JM (2012). Exercise endurance and functional mobility improve for individuals with physical disabilities after training on a motorized elliptical. Online proceedings, *Rehabilitation Engineering and Assistive Technology Society of North America's 2012 Annual Conference*.
- Nelson, CA, Burnfield JM (2012). Improved elliptical trainer biomechanics using a modified Cardan gear. *Proceedings of the ASME 2012 International Design Engineering Technical Conference & Computers and Information in Engineering Conference [Conference Paper #: DETC2012-70439]*. Chicago, IL.
- Burnfield JM, Yeseta M, Buster TW, Taylor AP, Shu Y (2012). Individuals with physical limitations can benefit from training on a motorized elliptical for community-based exercise. *Medicine and Science in Sports and Exercise*, 44(5 Supplement), pg. 524.
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- Buster TW, Goulet C, Shafer D, Burnfield JM (2012). Comparison of kinematic demands of walking and elliptical training between individuals with and without mild to moderate multiple sclerosis. *Proceedings, Gait and Clinical Movement Analysis Society 2012 Annual Meeting*, pgs. 232-233.

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- Burnfield JM, Hildner GA, Buster TW, Taylor AP, Shu Y (2011). Speed's impact on muscle demands during partial body weight supported training on a motorized elliptical. *Archives of Physical Medicine and Rehabilitation*, 92(10): 1700.
- Burnfield JM, Taylor AP, Buster TW, Shu Y, Goldman AJ, Nelson CA (2011). Use of Intelligently Controlled Assistive Rehabilitation Elliptical trainer to improve walking and fitness during acute stroke rehabilitation. *Stroke*, 42(3), pg. e326.
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- Burnfield JM, Shu Y, Buster TW, Taylor AP, Merriman L, Nelson CA (2010). Comparison of lower extremity electromyographic (EMG) demands during ICARE training and walking. *Online Proceedings, American Society of Biomechanics 34<sup>th</sup> Annual Meeting*.
- Buster TW, Taylor AP, Frazier M, Burnfield JM (2010). Kinematic analysis of five cardiovascular exercises. *Online Proceedings, American Society of Biomechanics 34<sup>th</sup> Annual Meeting*.
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