

**Evidence-Based Practice Group Answers to Clinical
Questions**

**“Efficacy and/or Effectiveness of the Huber®
360 System as a Rehabilitation Tool among
Patients with Spinal Cord Injuries”**

A Rapid Systematic Review

By

WorkSafeBC Evidence-Based Practice Group

***Dr. Craig Martin
Manager, Clinical Services
Chair, Evidence-Based Practice Group***

February 2019



Clinical Services – Worker and Employer Services

About this report

Efficacy and/or Effectiveness of the Huber® 360 System as a Rehabilitation Tool among Patients with Spinal Cord Injuries

Published: February 2019

About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

Suggested Citation

WorkSafeBC Evidence-Based Practice Group, Martin CW. Efficacy and/or Effectiveness of the Huber® 360 System as a Rehabilitation Tool among Patients with Spinal Cord Injuries. Richmond, BC: WorksafeBC Evidence-Based Practice Group; February 2019.

Contact Information

Evidence-Based Practice Group
WorkSafeBC
PO Box 5350 Stn Terminal
Vancouver BC V6B 5L5

Email • craig.martin@worksafebc.com
Phone • 604 279-7417
Toll-free • 1 888 967-5377 ext 7417

View other systematic reviews by the EBPG online at:

<http://worksafebc.com/evidence>

Background/Objective

The Human Body Equalizer (HUBER®) system is a multi-axis motorized rehabilitation platform that was developed by Chattanooga (UK) (<https://www.fitness-gaming.com/news/health-and-rehab/huber-360-offers-dynamic-exercises-with-feedback-to-improve-balance-and-neuromuscular-control.html>) (Figure 1). It is advertised as an assessment, rehabilitation and sports health tool. It is also advertised as the first piece of equipment invented that could be used for neuro-muscular rehabilitation providing simultaneous physical and cognitive training (<http://international.chattgroup.com/products/huber-360-md>). The Huber® 360 system is promoted as providing rehabilitation through four movement fundamentals: flexibility and mobility, dynamic strengthening, posture and balance, and resistance (<http://international.chattgroup.com/huber360/>).



Figure 1. Huber® 360 system.

Further, on their website, Chattanooga listed six studies⁽⁴⁻⁹⁾ reporting the application of the Huber® 360 in six different diseases/conditions, including: balance training and fall prevention in the elderly, postural control among patients with multiple sclerosis, evaluating patients with ankle sprain, for overweight management and in cardio-vascular rehabilitation. Five of these studies were in the form of small case series^(4-7,9) (level of evidence 5. Appendix 1) and one was in the form of a small case control study⁽⁸⁾ (level of evidence 3. Appendix 1). However, none of the topics posted within the websites listed are relevant to our objective, i.e., to investigate the efficacy and/or effectiveness of the Huber® 360 system as a rehabilitation tool among patients with spinal cord injuries.

Methods

- A comprehensive, systematic literature search was conducted on February 7, 2019.
- The search was done on commercial medical literature databases, including Cochrane Database of Systematic Reviews® (2005 to February 6, 2019), ACP Journal Club® (1991 to January 2019), UK York University Database of Abstracts of Reviews of Effects® (1st Quarter 2016), Cochrane Clinical Answers® (January 2019), Cochrane Central Register of Controlled Trials® (December 2018), UK NHS Health Technology Assessment® (4th Quarter 2016), UK NHS Economic Evaluation Database® (1st Quarter 2016), BIOSIS Previews® (1969 to 2008), Embase® (1974 to 2019 February 06), Medline Epub Ahead of Print®, Medline In-Process & Other Non-Indexed Citations®, Medline Daily Update® and Medline® (1946 to February 06, 2019), that are available through the Ovid® platform.
- A wide-ranging combinations of keywords were employed in this search. These combinations include:
 - (huber **ADJ** "360") **OR** (huber **ADJ** "360" **ADJ** MD) **OR** (huber **ADJ** "360" **ADJ** MD **ADJ** technology) **OR** (huber **ADJ** system) **OR** (human **ADJ** body **ADJ** equalizer)
- A search was conducted on the Microsoft Bing® search engine, prior to the literature search, in order to gain more information regarding the Huber® 360 system. This internet search identified several websites with more information on this product (see "Background and Objectives").
- No limitations, such as on the date, language and country of publication, were employed in any of these searches.
- A manual search was also conducted on the articles that were retrieved in full.
- The website for the Spinal Cord Injury Research Evidence (SCIRE) Project (<https://scireproject.com/evidence/rehabilitation-evidence/>) by the Rick Hansen Institute was also searched for relevant information.

Results

- Three⁽¹⁻³⁾ published studies were identified through our comprehensive, systematic literature search. Upon examination of the titles and abstracts of these three⁽¹⁻³⁾ studies, two^(1,3) studies were thought to be relevant and were retrieved in full for further appraisal.
- Both studies by Bojinca et al.⁽¹⁾ and Letafatkar et al.⁽³⁾ were in the form of small "randomized" controlled trials (level of evidence 1. Appendix 1) investigating the application of the Huber® 360 system in

patients with chronic non-specific low back pain. Both studies reported that the Huber® 360 system was effective for short-term reductions in pain, improvement of activities and an increase in the quality of life among patients with chronic non-specific low back pain. However, the results and conclusions of these 2 studies have to be interpreted with a high degree of caution, not only because of their small sample size (total n=40⁽¹⁾ and 51⁽³⁾), but more importantly, due to unclear patient selection (potential selection bias) process, unclear randomization procedure, unclear hypothesis with unclear sample size calculations, and per-protocol analysis with multiple comparisons.

- A manual search on the references of these two^(1,3) published studies did not provide further evidence.
- The SCIRE project develops, maintains, as well as regularly updates, high quality systematic reviews (level of evidence 1. Appendix 1) on topics that are relevant to spinal cord injured patients (<https://scireproject.com/evidence/rehabilitation-evidence/>). We screened all systematic reviews produced under this project and identified eleven⁽¹⁰⁻²⁰⁾ of these reviews for further appraisal. Upon review, none of these provided data on the efficacy and/or effectiveness of the Huber® 360 system, nor do any of these systematic reviews provide any evidence on the role/utility of any multi-axis motorized rehabilitation platforms or rehabilitation tool, similar to the Huber® 360, within a rehabilitation setting, especially among patients with spinal cord injuries.

Summary/Conclusions

- At present, there are some high level, very low quality evidence on the short-term efficacy of the Huber® 360 system in reducing pain, increasing activities and quality of life among patients diagnosed with chronic non-specific low back pain.
- At present, there is no published evidence on the efficacy and/or effectiveness of the Huber® 360 system in helping with the rehabilitation of patients with spinal cord injuries.

References

1. Bojinca, M.; Bojinca, V.; Bida, D.; Mihai, C., and Milicescu, M.. Efficacy of exercise program with the HUBER system compared with classic exercise program in rehabilitation. *Annals of the Rheumatic Diseases*. 65(Suppl. 2):609, JUL 2006.
2. Kocahan, T.; Akinoglu, B.; Coban, O.; Birben, T.; Ozkan, T., and Un Yildirim, N. The comparison of hearing aid's effects on the balance in hearing impaired male karate athletes. *Fizyoterapi. Rehabilitasyon*. Conference: 6th National Physiotherapy and Rehabilitation Congress. Turkey. 28 (2) (pp S98), 2017. Date of Publication: August 2017.
3. Letafatkar, A. Nazarzadeh M, Hadadnezhad M, Farivar N. The efficacy of a HUBER exercise system mediated sensorimotor training protocol on proprioceptive system, lumbar movement control and quality of life in patients with chronic non-specific low back pain. *Journal. of back & musculoskeletal rehabilitation*. 2017 apr 21 2017.
4. Markovic G, Sarabon N, Greblo Z, Krizanac V. Effects of feedback-based balance and core resistance training vs. Pilates training on balance and muscle function in older women: A randomized-controlled trial. *Arch GerontolGeriatr*. 2015 Sep-Oct;61(2):117-23.
5. Couillandre A, Duque Ribeiro MJ, Thoumie P, Portero P Changes in balance and strength parameters induced by training on a motorised rotating platform: A study on healthy subjects. *Ann Readapt Med Phys*. 2008 Mar;51(2):59-73.
6. Maertens de Noordhout B et al. Using the HUBER® technique for the rehabilitation of patients with multiple sclerosis. Annual Meeting of Rehabilitation In Multiple Sclerosis (RIMS), XVIII technical workshop; May 10-12, 2006; Barcelona
7. Fabri S, Duc A, Constantinides A, Pereira-durif Y, Marc T, LacazeFj. Predictives evaluations of the sprain ankle. Fifty-eight cases report. *Journal de Traumatologie du Sport* 2009; 26(3):139-147.
8. FABRE JB. et al. Effects of a whole-body strength training program on metabolic responses and body composition. *GazzettaMedicaitalianaArchivio per le ScienzeMediche*. 2014; 173(1-2):47-56.
9. GUIRAUD T. ET AL. Whole-body strength training using a Huber Motion Lab in coronary heart disease patients: Safety, tolerance, fuel selection and energy expenditure aspects and optimization. *Am J Phys Med Rehabil*. 2014 Aug 28.
10. Haas S.B.; Barrack R.L.; Westrich, G., and Lachiewicz P.F. Venous thromboembolic disease after total hip and knee arthroplasty. *Journal. of Bone and Joint Surgery - Series A*. 90 (12) (pp 2764-2780), 2008. Date of Publication: 01 Dec 2008.
11. Laing R.E.; Hess, P.; Shen, Y.; Wang, J., and Hu S.X. The role and impact of SNPs in pharmacogenomics and personalized medicine. *Current. Drug Metabolism*. 12 (5) (pp 460-486), 2011. Date of Publication: June 2011.
12. Nikolaou V.S.; Desy N.M.; Bergeron S.G., and Antoniou, J. Total knee replacement and chemical thromboprophylaxis: Current evidence. *Current. Vascular Pharmacology*. 9 (1) (pp 33-41), 2011. Date of Publication: 2011.
13. Westrich G.H. and Bornstein L.J. Prophylactic Modalities: Pharmacologic and Mechanical Compression. *Seminars. in Arthroplasty*. 20 (4) (pp 235-240), 2009. Date of Publication: December 2009.
14. Warburton DER, Krassioukov A, Sproule S, Eng JJ (2018). Cardiovascular Health and Exercise

- Following Spinal Cord Injury. In Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Noonan VK, Loh E, Sproule S, McIntyre A, Querée M, editors. Spinal Cord Injury Rehabilitation Evidence. Version 6.0. Vancouver: p 1- 68. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/cardiovascular-health-and-exercise/> in Febr 8, 2019.
15. Lam T, Wolfe DL, Domingo A, Eng JJ, Sproule S (2014). Lower Limb Rehabilitation Following Spinal Cord Injury. In: Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Noonan VK, Loh E, Sproule S, McIntyre A, Querée M, editors. Spinal Cord Injury Rehabilitation Evidence. Version 5.0. Vancouver: p 1-74. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/lower-limb/> in Febr 8, 2019.
 16. Wolfe DL, McIntyre A, Ravenek K, Martin Ginis KA, Latimer AE, Eng JJ, Hicks AL, Hsieh JTC (2012). Physical Activity and SCI. In Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Mehta S, Sakakibara BM, editors. Spinal Cord Injury Rehabilitation Evidence. Version 4.0. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/physical-activity/> in Febr 8, 2019.
 17. Smith K, McColl MA, Aiken A, McColl A (2014). Primary Care for People with SCI. In Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Noonan VK, Loh E, McIntyre A, editors. Spinal Cord Injury Rehabilitation Evidence. Version 5.0. Vancouver: p 1-28. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/primary-care/> in Febr 8, 2019.
 18. Wolfe DL, Hsieh JTC, Mehta S (2012). Rehabilitation Practices and Associated Outcomes Following Spinal Cord Injury. In Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Noonan V, Mehta S, Sakakibara BM, Boily K, editors. Spinal Cord Injury Rehabilitation Evidence. Version 4.0. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/rehabilitation-practices/> in Febr 8, 2019.
 19. Hsieh JTC, Connolly SJ, McIntyre A, Townson AF, Short C, Mills P, Vu V, Benton B, Wolfe DL (2016). Spasticity Following Spinal Cord Injury. In Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Loh E, Sproule S, McIntyre A, Querée M, editors. Spinal Cord Injury Rehabilitation Evidence. Version 6.0: p 1-135. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/spasticity/> in Febr 8, 2019.
 20. Rice D, Faltynnek P, McIntyre A, Mehta, S, Foulon BL, Teasell RW. (2016). Upper Limb Rehabilitation Following Spinal Cord Injury. In Eng JJ, Teasell RW, Miller WC, Wolfe DL, Townson AF, Hsieh JTC, Connolly SJ, Noonan VK, Loh E, Sproule S, McIntyre A, Querée M, editors. Spinal Cord Injury Rehabilitation Evidence. Version 6.0: p 1-121. Downloaded from <https://scireproject.com/evidence/rehabilitation-evidence/upper-limb/> in Febr 8, 2019.

Appendix 1

WorkSafeBC - Evidence-Based Practice Group Levels of Evidence

(adapted from 1,2,3,4)

1	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
2	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
3	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

References

1. Canadian Task Force on the Periodic Health Examination: The periodic health examination. CMAJ. 1979;121:1193-1254.
2. Houston TP, Elster AB, Davis RM et al. The US Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition. AMA Council on Scientific Affairs. American Journal of Preventive Medicine. May 1998; 14(4): 374-376.
3. Scottish Intercollegiate Guidelines Network (2001). SIGN 50: a guideline developers' handbook. SIGN. Edinburgh.
4. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ. Aug 5, 2003; 169(3): 207-208.