

# Manual Wheelchair Configuration and Training: An Update on the Evidence 2014.

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## INTRODUCTION

In the past few years, there has been an abundance of evidence that is related to manual wheelchair selection, set-up, and consumer training. While there are many accessible documents that summarize and give recommendations as part of the evidence-based practice (EBP) process, we must constantly update our database and remain current by reviewing new studies as they are published. In order to meet the needs of persons with a disability, knowledge translation must occur from the research arena, through the experience and skills of the rehabilitation professional, directly to the client[1]–[3].

In 2005, The Consortium for Spinal Cord Medicine published Preservation of Upper Limb Function Following Spinal Cord Injury: A Clinical Practice Guideline for Health-Care Professionals[4]. The guideline is accessible through the Paralyzed Veterans of America website (<http://www.pva.org> or [http://go.osu.edu/PVA\\_CPG](http://go.osu.edu/PVA_CPG)). It is an excellent document that systematically compiled the current research, produced guidance based on evidence-based practice, and provided access to a multitude of clinically relevant studies. The guidelines are an excellent example of knowledge translation, given that the results utilize the skills and experience of the rehabilitation professional and are directly applicable to the individual who uses a manual wheelchair. However, numerous peer reviewed articles and reports have been published since that systematic review of the literature was performed. The most recent articles listed in the guidelines are from 2003. Since then, there have been a variety of studies that provide further insight into the appropriate configuration of manual wheelchairs and training for a person who uses a manual wheelchair. Therefore, the goal is to apply evidence-based practice with a focus on the external evidence, specifically the scientific literature, to address the problems associated with upper limb pain and injury. The list of scientific literature is an update to the external evidence described at the past International Seating Symposia [5]–[7].

## FRAMEWORK

The process utilized in collecting and reviewing the scientific literature is similar to the framework described by Sackett, et al. and re-printed below[1], specifically steps 1-3.

1. Convert [the] information needs into answerable questions
2. Track down, with maximum efficiency, the best evidence with which to answer them (whether from the clinical examination, the diagnostic laboratory, from research evidence or other sources).
3. Critically appraise that evidence for its validity (closeness to the truth) and usefulness (clinical applicability)
4. Apply the results of this appraisal in our clinical practice
5. Evaluate our performance.

Questions were developed based on the Guideline[4] recommendations that are most closely associated with manual wheelchair propulsion.

- Ergonomic – Guideline recommendations 3-5.
- Equipment Selection, Training, and Environmental Adaptations – Guideline recommendations 6-11 and 14.
- Exercise – Guideline recommendations 17 and 18.

Furthermore, questions were developed in areas of interest to the authors based on their own clinical experience. These include pediatrics, older adults, and outcome measures. An update alerting service for PubMed (<http://pubcrawler.gen.tcd.ie>) was utilized to provide daily updates via email on any journal articles that matched a keyword search for “wheelchair”. From this search, as well as the authors’ input on relevant conference proceedings, the authors reviewed over 350 citations that were published online or in print between January 1, 2012 and December 31, 2013. The authors removed papers that did not have a focus on manual wheelchairs. Based on the authors’ review of the articles, 62 journal articles were selected due to their usefulness (clinical applicability) and categorized based on their applicability to the specified questions. It is important to note, that for efficiency purposes and to demonstrate real-world applications, a rigorous and systematic methodology was not implemented when performing the literature search or review. The results of the review process and categorization are listed below.

- ERGONOMICS [8]–[17]
  - Minimize the frequency of repetitive upper limb tasks
  - Minimize the force to complete upper limb tasks
  - Minimize extreme or potentially injurious positions at all joints
- EQUIPMENT SELECTION, TRAINING, AND ENVIRONMENTAL ADAPTATIONS
  - **Equipment Selection**[8]–[10], [18]–[30]
    - Pros and cons of changing to a power wheelchair
    - High strength fully customizable wheelchair made of the lightest material
    - Rear axle horizontal placement
    - Other
  - **Training** [31]–[45]
    - Use long smooth strokes that limit high impacts on the pushrim
    - Allow the hand to drift down naturally keeping it below the pushrim.
    - Promote an appropriate seated posture and stabilization.
    - Other – Wheelies; Education for the clinician; General
  - **Environmental Adaptations** [46]–[48]
    - Complete a thorough assessment of the patient’s environment, obtain the appropriate equipment, and complete modifications to the home
- EXERCISE – Health and wellness [49]–[55]
- OUTCOMES – Outcome Measures [56]–[64]
- PEDIATRICS [65], [66]
- OLDER ADULT [67]–[69]

## SUMMARY

The role of evidence-based practice within the service delivery process is increasing due to demand from consumers, 3<sup>rd</sup> party payers, government agencies and professionals working within the field of seating and wheeled mobility. We have demonstrated the application of external evidence, specifically clinically relevant scientific literature, in providing an update on the Preservation of Upper Limb Function Following Spinal Cord Injury: A Clinical Practice Guideline for Health-Care Professionals. Finally, we have demonstrated the process necessary to incorporate evidence-based practice into clinical practice. The clinically relevant literature review within the evidence-based practice framework provide rehabilitation professionals further guidance on how to improve the services they provide to individuals with disabilities. Given the increase in the amount of research with a focus on manual wheelchair propulsion over the past 10 years, a systematic review of the literature, and a revision of the clinical practice guidelines is necessary.

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