

# Outcome Instruments for Prosthetics: Clinical Applications

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## KEYWORDS

- Artificial limbs • Amputation • Assessment of patient outcomes
- Outcome and process assessment (health care) • Prostheses • Treatment outcome

## KEY POINTS

- Accreditors expect prosthetists to monitor patient outcomes as part of routine clinical practice.
- Outcomes of patient care can be performance-based or reported by patients.
- Important aspects of care to be monitored include mobility, functional status, quality of life, and satisfaction with services.
- Instruments may be developed specifically for adults with amputations or for general populations; several general-purpose instruments are suitable for adults with amputations.
- Routine monitoring of outcomes allows clinicians to address patient concerns in a timely manner and to implement quality-improvement initiatives while fulfilling accreditation requirements.
- Emerging information about responsiveness of outcome measures improves their clinical utility.

## INTRODUCTION: NATURE OF THE PROBLEM

The American Board for Certification in Prosthetics, Orthotics and Pedorthics (ABC) accreditation standards are designed to enhance the quality of health care in prosthetic and orthotic practice, and to help increase efficiency and support initiatives that improve patient outcomes. Facility accreditation helps ABC achieve specific

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goals, including promoting the welfare of persons with disabilities by establishing standards for those engaged in the fitting of prostheses and orthoses. ABC defines 6 categories of standards including quality assessment and improvement. However, provider enthusiasm for quality improvement through routine outcomes monitoring is diminished by the time and expense required as well as limitations in the psychometric properties of many instruments, in particular the validation of generic instruments with prosthesis users, availability of norms, and evidence of responsiveness or sensitivity of measures to change. This review is designed to provide up-to-date information on the psychometric properties of outcome instruments, allowing prosthetists to select instruments to improve the quality of their services.

In recent years, the American Academy of Orthotists and Prosthetists (AAOP) have published findings from a series of state-of-the-science conferences, 2 of which address lower and upper limb prosthetic outcome instruments. The review of lower limb prosthetic outcome measures by Condie and colleagues<sup>1</sup> identified 25 instruments that assess mobility, function, and quality of life. Wright's<sup>2</sup> review of upper limb prosthetic outcome measures identified 7 outcome measures for adults in 4 categories: hand function, upper limb functional abilities, overall functional abilities and participation, and quality of life.

Several other recent reviews of lower and upper limb outcome measures for prosthesis users have been organized using the International Classification of Functioning, Disability and Health (ICF). Hebert and colleagues<sup>3</sup> reviewed measures of body function applicable to lower limb amputation and identified 12 measures of global mental function, 1 measure of sensory function and pain, 1 measure of cardiovascular and respiratory function, and 2 measures of neuromuscular and movement function. Deathe and colleagues<sup>4</sup> reviewed measures of activity applicable to lower limb amputees and identified 4 walking tests, 1 mobility grading, 5 generic activity of daily living (ADL) and mobility measures, and 7 amputee-specific measures. Lindner and colleagues<sup>5</sup> reviewed outcome measures applicable for upper limb amputees, including 1 measure for subjects of all ages, 5 pediatric measures, and 2 adult measures. Most upper limb instruments measured activity and participation, while 2 measures also measured quality of life. These reviews all highlighted the lack of information about instrument responsiveness. **Table 1** summarizes the recommendations made by the authors of these reviews.

This article provides an update on the development of outcome instruments that are suitable for prosthetic practice, focusing on instruments published in English that are suitable for adult populations. The authors highlight recently published information about the psychometric properties of these instruments, especially responsiveness, and provide updated recommendations as to their suitability for clinical practice.

## REVIEW METHODS

The authors replicated the search strategy described by Condie and colleagues<sup>1</sup> for publications from January 2006 to May 2013, and the search strategy described by Wright<sup>2</sup> from January 2009 to May 2013 using PubMed and CINAHL. Articles were included if they proposed a new outcome instrument or evaluated an existing outcome instrument, helping to provide insight into the instrument's performance. Articles were excluded if they were not about outcome instruments or an application of an instrument as part of a research study, were written in a language other than English, or were about an instrumented outcome measurement system. Also excluded were reports about validation of instruments translated into languages other than English.

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