A Systematic Review of Utilities in Hand Surgery Literature

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Purpose To systematically review the literature to determine if utilities (a quantitative way to express patient preferences for health outcomes) have been measured in hand surgery studies.

Methods A literature search was conducted using Cochrane, EMBASE, HealthSTAR, MEDLINE, and CINAHL electronic databases (1966–2013). This search was supplemented by cited and manual reference searches and expert consultation to retrieve all relevant studies. Studies were selected by 2 independent reviewers if they pertained to hand or wrist surgery, were published in English, and measured utilities as an outcome. Descriptive data were extracted, including the hand surgery procedure investigated, study design, value of utilities, and methodology of utilities measurement.

Results Eleven studies were included after reviewing 989 studies. Most hand conditions were associated with utilities less than 0.8. Utilities in the reviewed studies were measured using different methods and from different subjects. Three studies paradoxically mapped greater utilities for poorer heath states.

Conclusions Hand conditions cause impairment, as evidenced by their utilities. Measurement of utilities remains uncommon in hand surgery literature. Future studies should not only measure utilities but also do so with consistent and appropriate methodology to ensure that mapped values are valid and comparable. *(J Hand Surg Am. 2015;40(5):997–1005.*

Type of study/level of evidence Economic/decision analysis III.

Key words Hand, preferences, quality-adjusted life years, quality of life, utilities.

With growing emphasis on evidence-based medicine, the hand surgeon is often tasked with appraising different surgical techniques to justify their adoption or continued use. To evaluate these interventions, hand surgery studies have traditionally measured surgical outcomes such as strength, function, and pain. Whereas surgeons have long recognized these outcomes as measures of surgical success, their importance may not always hold the same value for patients.[1]

Would a gain in 20° of range of motion of the proximal interphalangeal joint of the index finger following surgery hold the same value for a musician who still could not return to playing piano? Likewise, would a 0.5-kg gain in grip strength be satisfactory for a patient who still experienced difficulties with basic activities of daily living? Differences in how disease and disability are perceived by the hand surgeon and experienced by the patient can make assessing the true impact of hand conditions and interventions difficult.[1]

To better understand the impact of hand conditions and interventions on patients, there is now greater emphasis on measuring a patient's physical, mental,

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TABLE 1. Utility Measurement Methods

	Methods	Valuation
Direct	VAS	Utilities are based on the valuation of a particular health state by subjects marking on a line from 0 (corresponding to death) to 1 (corresponding to perfect health).
	TTO	Subjects balance 2 outcomes, a certain number of years in a less desirable health state and variable reduction in lifespan but with full health. Utilities are based on the ratio of these 2 values, with the latter used as the numerator.
	SG[4]	Subjects balance 2 outcomes, the variable probability of full health "x" and death "1-x," and the 100% certainty of a less desirable health state. Utilities are based on the probability "x" at which point subjects consider the 2 strategies equivalent.
Indirect	EQ-5D,[9] SF-6D,[10] HUI,[11,12] QWB,[13] 15D,[14] Rosser Index[15]	Subject's functioning in one or more health domains are converted to utilities based on instrument-specific formulas, which were derived from directly measured utilities from large populations.

MAU, multi-attribute utility; QWB, quality of well-being scale.

emotional, and social well-being as a surgical outcome.[1] Collectively, this outcome is referred to as the patient's "quality of life" (QOL). One way to capture QOL is through the measurement of health utilities.[1–5] Health utilities are a quantitative method of representing a particular health state on a scale of 0 (death) to 1 (perfect health).[6,7] The numerical value of a utility score represents both the overall quality of and the patient preference for the health state in question. Utilities can also be integrated with QOL to produce quality-adjusted life years data by multiplying the utility gain after surgery with the amount of life remaining after the intervention.[2] Various methods have been suggested to measure utilities in either prospective studies or decision analyses[6,8] (Table 1).

In hand surgery studies, measuring utilities as an outcome is, therefore, a means of accurately quantifying the QOL impact of hand conditions and their corrective surgeries.[2,16] When combined with cost data, utilities also facilitate economic analyses of hand surgery techniques or technologies to determine their societal worth.[17] Lastly, as an outcome that can be measured for all types of interventions, utilities serve as a common metric by which comparisons between hand surgeries and surgeries in other specialties can be made.

In 2004, a systematic review highlighted the paucity of utilities measurement in all surgical studies, particularly those of plastic surgery, leading the authors to conclude that greater universal awareness and measurement of utilities was needed.[2] Since this publication, numerous articles have also been published to raise awareness and educate hand surgeons regarding utilities.[1,3–6,8] Nearly a decade later, how have we responded?

The primary objective of this study was to determine if utilities have been measured in hand surgery studies. The secondary objectives were to determine how utilities were measured in these studies and, if appropriate, to aggregate the collected data into an index of utilities specific to hand conditions and surgeries.

MATERIALS AND METHODS

A literature search was conducted in the Cochrane, EMBASE, HealthSTAR, MEDLINE, and CINAHL electronic databases (January 1966–May 2013). The key terms searched were hand surgery, hand, wrist, cost-benefit analysis, quality-adjusted life years, standard gamble (SG), time trade-off (TTO), EuroQol 5d (EQ-5D), Rosser Index, Quality of Well-Being Scale, and Health-Utilities Index (HUI). Search strategies were individualized to each electronic database to ensure comprehensive searches. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines (www.prisma-statement.org) were followed as appropriate.

Titles, abstracts and full articles were independently reviewed by 2 reviewers (Y.K.L. and N.A.). Inclusion criteria consisted of studies that pertained to hand surgery, were published in English, and measured utilities as an outcome. We considered hand surgeries as all surgeries involving the hand and wrist. This review process was supplemented by cited and manual reference searches and consultation with