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CORR Insights®: A Crosswalk Between UCLA and Lower Extremity Activity Scales**Daniel P. O'Connor PhD****Where Are We Now?**

Ghomrawi and colleagues report on the development of a crosswalk (conversion table), between the University of California Los Angeles activity scale (UCLA) and Lower Extremity Activity Scale (LEAS) scores for patients who underwent THA or TKA. The distributions of the two scores were equated

using an equipercentile method, which locates the respective scores for each instrument that have the same percentile ranks. The table can be used to convert group means for one score to the other score for purposes of pooling data and comparing results from studies or registries that use either score. The current study provides important information that may facilitate the aggregation of data and results across different studies and registries that utilize the UCLA or LEAS scores for purposes of comparing outcomes across studies and conducting meta-analyses and systematic reviews.

Psychometric theory and methods for equating test scores has a more than 80-year history of application in the fields of psychology and education, where participants completing tests, questionnaires, and surveys are principal sources of data used in both practice and research [4, 12]. Equating has had a more limited application

with medical and surgical outcomes instruments. This may be an effect of a relatively short history (< 35 years) of patient-centered outcomes measures being collected and reported in clinical research, which has traditionally relied on technical indicators of treatment success (like radiographic evidence of fracture healing), clinical measures (ROM, joint stability) and ratings of symptoms (pain and stiffness). The focus on patient-centered outcomes in orthopaedic surgery has accelerated in the last 15 to 20 years, resulting in myriad validated instruments for a wide variety of orthopaedic conditions that may be used to evaluate patient health status and outcomes.

Where Do We Need To Go?

Having crosswalks for the multiple instruments used to measure the same constructs in the same populations would improve data collection in clinical research. There would be no need to use multiple instruments to measure the same construct, as is now often done so that comparisons may be made to other published work. Each investigative team may continue

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collecting the instruments they prefer to use while being able to compare their results to studies that reported results using different instruments. In addition, without increasing data collection burden the breadth of assessment may be expanded to multiple instruments that measure different constructs, such as activity, function, physical and mental health, quality of life, and a utility measure. Expansion of the scope of assessment allows for multifaceted comparisons as well as comparisons of treatment response and value between orthopaedic and non-orthopaedic conditions [10]. Despite these advantages, only a few such reports exist, offering plenty of research opportunities.

There are opportunities to explore the generalizability of crosswalks such as those reported by the authors of the current study. Additionally, because a crosswalk may be population-dependent, future studies should validate new crosswalks in different populations (whether by sampling different regions or countries, different databases, or other registry-based sources).

There is also an opportunity to conduct equating studies for other instruments measuring activity in THA and TKA, which potentially includes the KOOS [9], HOOS [5], or PROMIS Physical Function-Mobility [3] scales, particularly those subscales specifically assessing activity and the short or

arthroplasty-specific forms such as the HOOS, JR and KOOS, JR [2, 6]. These instruments are widely reported in studies of THA or TKA. If valid crosswalks among these multiple instruments can be developed, more of the existing data and literature may be aggregated to develop general conclusions and recommendations.

Finally, ample opportunities exist for equating instruments to measure outcomes for other common orthopaedic conditions, such as ACL injury and rotator cuff tear, as well as constructs other than activity level, such as function or dysfunction and joint-specific quality of life. A library of equating algorithms for instruments and populations would allow for data aggregation and meta-analyses across many different orthopaedic conditions and procedures. This would allow for optimizing use of the information in the existing literature to produce evidence-based practice recommendations.

How Do We Get There?

Well-designed equating studies featuring data collected from a representative sample to support generalizability of the resulting crosswalk would be ideal [12]. National registries designed to be representative of specific populations, conditions, or

procedures represent an opportunity for a well-designed equating study to work [7, 8]. Although arthroplasty registries exist in the United States [1, 11], many common orthopaedic conditions and procedures do not yet have registries. Equating studies may have to rely on large cohort studies to initiate the equating process in those populations.

Sampling of instruments and items is another strategy to facilitate equating studies. Inclusion of a core set of instruments or items for all patients in a large sample with either random assignment or user-selection of additional items or instruments to subsets of patients in the sample provides data from two or more measures for the same outcome or construct. The overlap of data allows for use of sophisticated analyses to produce crosswalks for multiple instruments, while minimizing response burden for each patient.

Finally, a collection of patient data from high-volume procedures like arthroplasty that provide large sample sizes can be used to derive and validate crosswalks between various pairs of instruments. These initial studies may be followed by additional validation testing in lower-volume procedures to determine whether the crosswalks may be applied among populations of patients receiving other procedures. If the score distributions predicted by the

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crosswalk sufficiently match the score distributions in the new population, the crosswalk can be reported as valid in the new population, and the study is complete. If the score distributions differ substantially, a new crosswalk may be derived using that sample and then tested in a new, independent sample to confirm its validity. This approach provides efficiency and feasibility for development of sets of crosswalks that are applicable across multiple instruments for a general population of patients undergoing a variety of procedures.

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