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CORR Insights®: Patient Activity After TKA Depends on Patient-specific Parameters

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Where Are We Now?

The current study by Lützner and colleagues not only introduces a successful attempt to

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assess the community-based performance of a commonly performed surgical procedure, but it also makes it clear that the results of this procedure are far from what they should be. A few decades ago, it was sufficient merely to assess the results of total knee replacements in the clinic by measuring such things as ROM, strength, ability to perform certain functional tasks, and relief of pain. More recently, patient “outcome scores” have become more popular. These rely heavily on the patient’s own subjective assessment of his or her functional level and satisfaction with the new surgically-created state [2, 6].

In parallel with these efforts, researchers have attempted to use more-objective approaches to assess actual performance and activity levels, both of patients with joint replacements but also of age-matched individuals who have not had joint reconstruction. While some studies measured total energy expenditure and used functional performance tests [4], they mainly relied on pedometers and daily activity diaries, which have proven both to be difficult to use and flawed in other important ways [2]. Lützner et al. have successfully introduced an effective use

of accelerometers to determine activity levels in patients who have undergone total knee replacement. Remarkably, with the accelerometers, these authors have been able not only to determine when the patients are inactive, but also to categorize activity levels when patients are mobile.

Where Do We Need To Go?

As pointed out in this paper, patients with total knee replacement are usually only about half as active as their age-matched controls. They not only sit more, but are much less likely to perform strenuous activity. While individual comorbidities and wishes of each patient can account for some of this, it is obvious that we have a long way to go in the design and application of knee replacement, as well as in the rehabilitation. Based on the information available in this study, the development of a universally accepted way of routinely measuring community-based performance levels may be feasible. In order to complete the TKR picture, we need to add a sophisticated package of performance assessments as patients move about the community,

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on top of the usual description of the comorbidities and classic clinical exam assessments (eg, ROM, strength, pain relief). Why is it that an adequate ROM observed in the clinic is not used during daily activities? It may be that not only are improved prosthetic designs needed, but also that our rehabilitation programs should be redesigned and extended in a manner similar to the reconditioning and return to sports of a competitive athlete.

How Do We Get There?

The development of new design features will continue and laboratory efforts assessing *in vivo* kinematics and kinetics of the new designs will continue to be essential [1, 3, 5, 7]. However, using today's available electronic technology to assess actual performance during daily activities should soon be possible in every surgeon's office. The addition of not only lower extremity accelerometers but

other tracking devices such as GPS systems, and even heart rate monitors, can offer a routinely available and user-friendly package that can supply interesting answers in helping all patients maximize the benefits of surgical intervention. At the elite level in the field of sports performance, such devices are already increasingly deployed to assess performance in a sophisticated manner. They can and should be used in the rehabilitation of our arthroplasty patients.

References

1. Banks SA, Fregly BJ, Boniforti F, Reinschmidt C, Romagnoli S. Comparing *in vivo* kinematics of unicondylar and bicondylar knee replacements. *Knee Surg Sports Traumatol Arthrosc.* 2005;13:551–556.
2. Bize R, Johnson JA, Plotnikoff RC: Physical activity level and health-Related quality of life in the general adult population: A systematic review. *Prev Med* 2007, 12;45:401–415.
3. Catani F, Ensini A, Belvedere C, Feliciangeli A, Benedetti MG, Lear-dini A, Giannini S: *In vivo* kinematics and kinetics of a bi-cruciate substituting total knee arthroplasty: A combined fluoroscopic and gait analysis study. *J Orthop Res.* 2009;27:1569–1575.
4. Frisard M I, Fabre JM, Russell RD, King CM, De Lany JP, Wood RH, Ravussin E. Physical activity level and physical functionality and nonagenarians compared to individuals aged 60 – 74 years. *J Gerontol A Biol Sci Med Sci.* 2007;62:783–788.
5. Nutton RW, Wade FA, Coutts FJ, Van Der Linden ML. Does a mobile-bearing high-flexion design increase knee flexion after total knee replacement? *J Bone Joint Surg Br.* 2012;94:1051–1057.
6. Sinclair KM, Hamlin MJ. Self-reported health benefits in patients recruited into New Zealand's 'Green Prescription' primary health care program. *Southeast Asian J Trop Med Public Health.* 2007;38:1158–1167.
7. Stiehl, JB; Komistek R; Dennis DA: A novel approach to knee kinematics. *Am J Orthop (Belle Mead NJ).* 2001;30:287–293.