

AMERICAN COLLEGE OF RHEUMATOLOGY RESEARCH AND EDUCATION  
FOUNDATION—HARTFORD—ASSOCIATION OF SUBSPECIALTY PROFESSORS  
JUNIOR CAREER DEVELOPMENT AWARD IN GERIATRIC MEDICINE

*Award Recipient:*



NAJIA SHAKOOR, MD  
RUSH-PRESBYTERIAN-ST. LUKE'S MEDICAL CENTER

**PROJECT:**

MUSCLE STRENGTH, PROPRIOCEPTION, AND DYNAMIC JOINT LOADING  
IN THE AGING KNEE

**MENTORSHIP TEAM:**

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Osteoarthritis (OA) is held to be, as other “degenerative” diseases, an invariable product of aging. However, as with many other degenerative diseases, the biomechanical and biochemical processes involved in the pathophysiology of OA are more complicated than simple age-associated “wear and tear.” An incomplete understanding of the factors involved in the pathogenesis of OA is responsible for our inability to treat the disease adequately and to prevent its significant contribution to disability in the elderly. This investigation will provide insights into basic neuromechanical factors involved in the age-related development of OA.

This study will be a cross-sectional evaluation of 30 patients over the age of 50 with symptomatic unilateral hip OA with the purpose of identifying asymmetries in muscle strength, proprioception, and dynamic joint loading between the knees and in exploring the interrelationships of these factors. We recently identified a non-random pattern in the evolution of lower extremity OA: patients who undergo a unilateral total hip replacement (THR) for endstage OA require a subsequent contralateral total knee replacement (TKR) significantly more frequently than they do an ipsilateral TKR. Abnormal dynamic joint loading has been shown to be central to the biomechanical pathophysiology of knee OA. Our analysis of a subpopulation of these patients

with endstage hip OA suggests that the non-random sequence of TKRs for OA may be a consequence of relatively higher contralateral knee loads, and moreover, that this asymmetric loading persists despite successful THR when patients are pain-free. We speculate that this differential loading is an end result of adaptations in the neuromuscular control of gait in response to chronic hip pain. These alterations may involve changes in muscle strength and proprioception. Each of these factors has been independently investigated and linked with aging as well as with the development of OA. However, no one study has examined the interactions between these factors.

The results from this investigation will clarify the associations between muscle strength, proprioception, and dynamic joint loading and their relative contributions to the evolution of lower extremity OA in the elderly. A better understanding of the role of these factors will then help elucidate potential avenues for therapeutic intervention in idiopathic OA.

This career development award will provide me an opportunity to integrate the gerontology and rheumatology clinical and research communities. Pilot data from this award will hopefully provide the foundation for future research and necessary support for me to develop into a successful independent clinical investigator.

