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Adult Reconstructive Surgery: A High-Risk Profession for Work-Related Injuries



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ABSTRACT

Background: Adult reconstructive surgery is an orthopedic subspecialty characterized by surgical tasks that are physical, repetitive, and require some degree of stamina from the surgeon. This can result strain and/or injury of the surgeon's musculoskeletal system. This study investigates the prevalence of work-related injuries among arthroplasty surgeons.

Methods: A modified version of the physical discomfort survey was sent to surgeon members of the Hip Society, the International Hip Society, and the Canadian Orthopedic Arthroplasty via email. One hundred and eighty-three surgeons completed the survey.

Results: Overall, 66.1% of the arthroplasty surgeons reported that they had experienced a work-related injury. The most common injuries that occurred were low back pain (28%), lateral epicondylitis of the elbow (14%), shoulder tendonitis (14%), lumbar disc herniation (13%), and wrist arthritis (12%). Overall, 27% of surgeons took time off from work because of the injury. As the number of disorders diagnosed increased, there was a significant increase in the incidence of requiring time off work because of the disorder ($P < .001$) and also exacerbation of a previously diagnosed disorder ($P < .01$). Factors that significantly increased the risk of the surgeon requiring time off because of the disorder were age >55 years, practicing for more than >20 years, and performing >100 total hip arthroplasty procedures per year ($P < .05$). In addition, 31% of the orthopedic surgeons surveyed required surgery for their injury.

Conclusion: Although most studies concentrate on the importance of patient safety and thus the quality of the health care system, the surgeon's safety is also considered an integral part of this system's quality. This study highlights a high prevalence of musculoskeletal work-related injuries among arthroplasty surgeons and indicates the need for the identification of preventive measures directed toward improving the operative surgical environment and work ergonomics for the surgeons.

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Occupational injuries and hazards have gained increased attention from the various surgical disciplines, and in particular, orthopedic surgery. An injury or illness is considered to be work related if an event or exposure in the work environment either caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or illness. Different aspects related to occupational hazards have been investigated including radiation,

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chemical, psychological, and musculoskeletal injuries. The orthopedic surgical environment has been identified as the main source of most of these hazards [1,2]. For example, it has been found that there is a 25-fold increase in thyroid cancer incidence in spine surgeons, which is most likely attributed to the increased exposure to radiation [3]. Polymethylmethacrylate cement, which is commonly used in arthroplasty surgery since the 1950s, has been shown to have toxic effects on the skin, respiratory, and nervous system [4]. Smoke inhalation from the electrocautery causes an exposure of toxic fumes to the lungs, which is higher than second-hand smoking [5]. Psychologically, loss of sleep and work demands were found to have a detrimental effect on the emotional health of physicians [6,7].

Orthopedic surgery can be quite physical in nature, and the operating room environment may not be ergonomically ideal. This

can put a high demand on the surgeon's body, and especially, the musculoskeletal system. Repetitive movements while using tools, prolonged standing, operating in constant and nonergonomic positions all contribute to this increased load on the bones and muscles [8]. Studies have shown an increased incidence of musculoskeletal complaints in orthopedic surgeons when compared with other specialties [9]. Most of the complaints involved the neck, back, and upper extremities [9]. Although guidelines to a more ergonomic environment in the operating room are available, lack of awareness and difficulty in applying these guidelines contribute to their ineffectiveness [10–12].

One of the orthopedic surgery subspecialties, which can be physically demanding on the musculoskeletal system is joint arthroplasty. In a study by Davis et al, examining the prevalence and impact of musculoskeletal injuries on the orthopedic surgeon, they found that overall, 44% of the 140 surgeons surveyed had sustained one or more injuries at the workplace during their career [1]. Although the surgeons were subdivided based on their specialty, the authors did not address those surgeons who subspecialized in hip arthroplasty. In this present study, we assessed the occurrence of musculoskeletal injuries from a survey of high volume and fellowship-trained arthroplasty surgeons, and examined the impact of these injuries on their practice.

Materials and Methods

A modified version of the physical discomfort Web-based anonymous survey [2,13] was sent, via email, to all surgeon members of the Hip Society, the International Hip Society, and the Canadian Arthroplasty Society (CAS). After review board approval, the survey was sent electronically to all members of the 3 societies between November 2014 and January 2015. A reminder was sent again between January and February 2015. The survey was closed in April 2015, and the data were evaluated.

The Web-based survey was divided into questions regarding the surgeon's demographics (age, gender, hand-dominance, type of practice "academic, community, private, or military," average number of cases per year, and number of years in practice) and specific work-related injury questions according to the anatomic region (neck, shoulder, elbow/forearm, wrist/hand, hip, knee, foot and ankle, and low back). In each anatomic region, the participants were asked about the diagnosis of any injuries they felt were work-related, the medical and/or surgical treatment required, if any, and time required off work as a result of the injury or treatment. This survey was initially piloted on 20 volunteers to assess length, ease of navigation, and comprehensibility before sending it to the members of the 3 arthroplasty societies. Data were collected, and descriptive statistics were analyzed. For data analysis, one-way analysis of variance and Fisher exact test were performed to compare the variables where appropriate. *P* values <.05 were considered statistically significant.

Results

A total of 183 surgeons completed the survey during the period of data collection. This included 50 surgeon members of the International Hip Society, 36 members of the Hip Society, 46 members of the CAS, 37 members of both the International and Hip Society, 12 members of both the Hip Society, and CAS and 12 members of all 3 societies. Overall, 75% of the membership of the 3 societies responded to the survey. The member respondent rates were 80% for the International Hip Society, 77% for the Hip Society, and 65% for the CAS. Most cohort were male orthopedic surgeons (98%), aged >55 years (57%), working in an academic institution (69%), and have been in practice for >20 years (67%; Figs. 1 and 2,

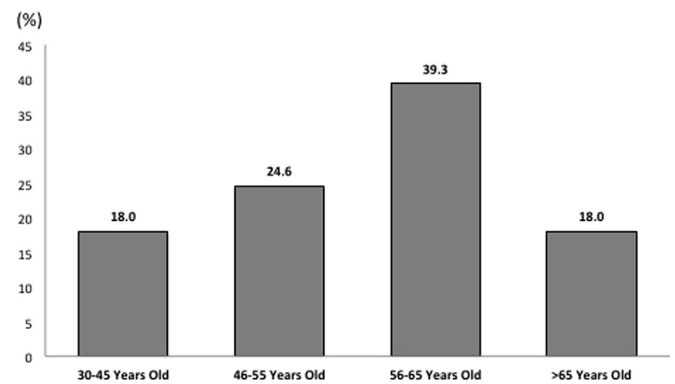


Fig. 1. Age distribution of arthroplasty surgeons who responded to the survey.

Table 1). Forty-seven percent of the surgeons performed between 200 and 400 arthroplasties per year, 27% performed more than 400 cases, and 26% performed less than 200 arthroplasties each year. On average, the surgeons performed 138 total knee arthroplasties and 183 total hip arthroplasties each year. Overall, 66% of the arthroplasty surgeons reported that they had experienced a work-related injury, of which 27% required time off work due to their injury. The treatment of the work-related injury was surgical in 31% of the cases (Tables 2 and 3). Gender, age, and hand dominance of the surgeon had no influence on presence of a disorder, number of disorders, or regions involved. However, surgeons older than 55 years old were significantly more likely to require time-off work ($P < .005$) than any other age cohort.

Most musculoskeletal injuries involved the lumbosacral spine and the upper extremities. Low back pain was the most commonly reported work-related back injury (28%), whereas lateral epicondylitis of the elbow (14%) and shoulder tendinitis (14%) were the most commonly reported upper extremity injury (Fig. 3, Table 4). Overall, knee and/or lower leg and neck injuries were the most likely to require treatment, with 73% of the surgeons requiring medical or surgical treatment of these injuries. Lower back injuries required surgical management more frequently than other injuries (39% of treated respondents). However, surgery was required in over 30% of the cases that required treatment for their work-related injury of the forearm/wrist/hand, hip, and knee regions. More than 35% of surgeons with a lower back injury that required treatment required time-off work due to their disorder, which was the most when compared with other musculoskeletal injuries (Table 4). At least 25% of surgeons required time off work if they needed treatment for an injury to their forearm/wrist/hand, hip/knee, or foot region. Varicose veins (9%), inguinal hernia (7%),

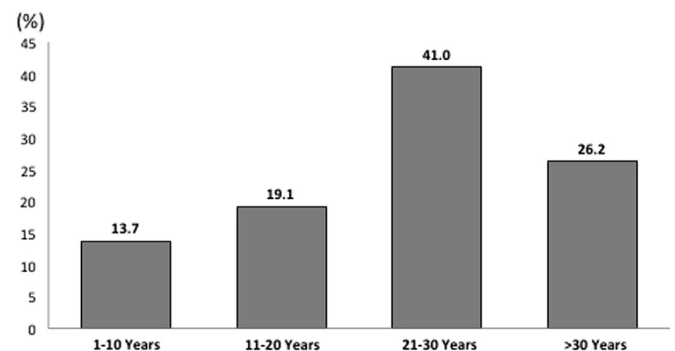


Fig. 2. Distribution of years in practice of arthroplasty surgeons who responded to the survey.

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