

**A Construction Site Without Safety Protection:
Orthopaedic Surgeons and the Risks of Noise Exposure**

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Purpose: There has been a recent focus on identifying the occupational risks of health care with the goal of improving safety, health, and longevity of health-care workers. In orthopaedic surgery, this effort has largely focused on ergonomics, radiation, and body fluid exposure, but the effects of unsafe noise levels are understudied. Orthopaedic surgeons are at highest risk for auditory injury in the health-care setting due to the loud nature of necessary surgical instruments such as saws, hammers, and drills. The purpose of this study is to create a proof-of-concept analysis of noise exposure that orthopaedic surgeons are exposed to as an occupational risk in the hopes of informing future studies on hearing protection and preservation.

Methods: Several orthopaedic environments were tested for noise volumes using a decibel meter. Obtained values were recorded in decibels (dB) and compared against safety levels established by the National Institute for Occupational Safety and Health (NIOSH).

Results: Safe sound levels established by NIOSH have concluded that any sound under 70 dB is safe, and that exposure to sounds above 85 dB has a risk of hearing loss and recommends the use of hearing protection and /or modifying the work environment if possible. Cast saw use, hammering on broaches during hip arthroplasty, and burr use all had recorded dB above 85, with some measurements above 100 dB. In a typical operating room environment with multiple instruments being used simultaneously (eg, suction, drill, anesthesia monitors, IV pump beeping), recorded measurements also regularly exceeded 85 dB.

Conclusion: Noise exposure from common equipment used in the operating room regularly exceeds established safety thresholds during routine procedures. Unlike other high-risk jobs (eg, construction sites) that have modified their work environment and provided safety equipment for employees, this particular occupational exposure appears to have been given minimal consideration in contemporary operating rooms. Future studies measuring cumulative noise exposure in high noise exposure procedures and including trialing noise protection equipment in the operating room for providers could establish the prevalence and preventability of long-term hearing issues in this at-risk population.