Noise-Induced Hearing Loss: Should Surgeons Be Wearing Ear Protection during Primary Hip and Knee Arthroplasty?

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INTRODUCTION:
The risk of noise-induced hearing loss (NIHL) to orthopaedic surgeons due to occupational exposures in the operating room (OR) is unknown. Noise exposure is considered hazardous at 85 decibels (dB) over an 8-hour time weighted average (TWA), with hearing protection recommended for any dB level greater than 85 dB irrespective of length of exposure. The purpose of this study is to identify whether primary arthroplasty procedures place surgeons at risk of developing NIHL.
METHODS:
Intraoperative recordings were taken from a microphone attached to the surgeon during manual total knee arthroplasty (TKA), manual total hip arthroplasty (THA), and robotic-assisted total knee arthroplasty (RTKA). Recordings were taken in respective operating rooms prior to surgical start time to serve as baseline controls. Decibel levels were reported as “maximum dB level,” defined as the highest sound pressure level during the measurement period, and “TWA,” defined as the average dB level projected over an 8-hour time period. Percentage of maximum allowable daily noise dose was reported as “dose,” and the measured dose projected forward over 8-hours was reported as “projected dose.”
RESULTS:
One-hundred-fourteen recordings were collected, comprised of 46 baseline, 15 THA, 32 TKA, and 21 RTKA recordings. Maximum dB level ranged from 102.2 to 129.6 dB, with all procedures demonstrating significantly greater dB levels than controls ($p<0.001$). Maximum dB level was greater than 85 dB for all cases. RTKA had the highest dose (89.0%) and highest projected dose (1265.3%). No significant differences were found between THA and TKA for maximum dB level, TWA, dose, or projected dose, but RTKA was significantly greater than both for all variables ($p<0.001$). All RTKAs exceeded a projected dose of 100% with an average dose of 24.3%.
DISCUSSION AND CONCLUSION:
While manual THA and TKA procedures do not exceed recommended noise limits during a single procedure, RTKA surpass projected doses of 100%. Surgeons performing over two RTKAs per day place themselves at risk of NIHL and should consider measures such as ear protection to minimize exposure.