

Noise-Induced Hearing Loss: Standard Mallet versus Automated Broaching

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INTRODUCTION:

Hearing protection is recommended for decibel (dB) levels greater than 85. The risk of noise-induced hearing loss (NIHL) appears to be greater for adult reconstruction surgeons due to occupational exposures, such as saws striking cutting guides, and/or mallets striking impactors. One manufacturer's automated broaching system was designed to reduce surgeon fatigue and mitigate work-related injury but may elevate the risk of NIHL. The purpose of this study is to identify whether automated broaching places surgeons at greater risk of developing NIHL.

METHODS:

Intraoperative recordings were taken during manual total hip arthroplasty (THA) and automated broaching THA (aTHA). Decibel levels were reported as "maximum dB level (MDL)," defined as the highest sound pressure level 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:

Sixty-eight recordings were collected, comprised of 42 THA and 26 aTHA recordings. Total hip arthroplasty using an automated broaching system demonstrated significantly greater dB levels than THA for all variables ($p < 0.001$). The average dose and projected dose was 7% and 81% for THA compared to 17% and 128% for aTHA. Sixty-three percent of aTHA (17/27) exceeded a projected dose of 100%. The loudest aTHA had a dose of 56% and a projected dose of 298.3%.

DISCUSSION AND CONCLUSION:

Manual THA procedures already place adult reconstruction surgeons at a greater risk of NIHL compared to other orthopaedic subspecialties. Automated broaching systems attempt to minimize physical injury and strain for surgeons but appear to increase overall noise levels in the operating room. Surgeons performing over five THAs per day using an automated broaching system place themselves at even greater risk of NIHL.