

## عنوان مقاله:

Intraoperative Acoustics: Auditory Cues in Hip Reconstructive Surgery

## محل انتشار:

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## نویسندگان:

Jeffrey Henstenburg - *Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA*

Walaa Abdelfadeel - *Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA*

Anthony Boniello - *Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA*

Joseph Schmitz - *Drexel University College of Medicine, Philadelphia, PA, USA*

Jeffrey Vakil - *Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA*

Andrew Star - *Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA*

## خلاصه مقاله:

Background: Orthopaedic surgeons rely on visual and tactile cues to guide performance in the operatingroom (OR). However, there is very little data on how sound changes during orthopaedic procedures and how surgeons incorporate audio feedback to guide performance. This study attempts to define meaningful changes in sound during vital aspects of total hip arthroplasty (THA) within the spectrum of human hearing. Methods: ۸۴ audio recordings were obtained during primary elective THA procedures during sawing of the femoral neck, reaming of the acetabulum, acetabular cup impaction, polyethylene liner impaction, femoral broaching, planning of the femoral calcar and press-fit of a porous-coated stem in ۱۴ patients. We graphed changes in frequency intensity across the human spectrum of hearing and sampled frequencies showing differences over time for statistically meaningful changes. Results: Sawing of the femoral neck, polyethylene impaction, and stem insertion showed significant temporal increases in overall sound intensity. Calcar planing showed a significant decrease in sound intensity. Moreover, spectrographic analysis showed that, for each of the critical tasks in THA, there were characteristic frequencies that showed maximal changes in loudness. These changes were above the ۱ dB change in intensity required for detection by the human ear. Conclusion: Our results clearly demonstrate reproducible sound changes during total hip arthroplasty that are detectable by the human ear. Surgeons can incorporate sound as a valuable source of feedback while performing total hip arthroplasty to guide optimal performance in the OR. These findings can be extrapolated to other orthopaedic procedures that produce characteristic changes in sound. Moreover, it emphasizes the importance of limiting ambient noise in the OR that might make sound changes hard to distinguish. Level of evidence: IV

## کلمات کلیدی:

Acoustics, Arthroplasty, Hip, Performance, Sound

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