Trends in Total Hip Arthroplasty Utilization

Jonathan S Yu, Joshua Winograd, Gabrielle Dykhouse, Adam Anton Sassoon, Alexandra Stavrakis[1], Ajay Premkumar
[1]UCLA

INTRODUCTION: The increasing volume of total hip arthroplasty (THA) has been accompanied by substantial improvements in our understanding of hip physiology and technology including implant materials, designs, and robotics. Paired with the rapid growth in number of implants available on the market over the last 30 years, these improvements have led to shifts in utilization of different implants. Despite changes in utilization patterns, there has been limited research investigating overall trends in implant and technology utilization. Thus, the purpose of this study was to analyze trends in implant and technology utilization for THA, controlling for changes in implant costs, in the United States between 2012 and 2021 to provide a foundation for improving clinical decision making.

METHODS: Implant utilization and pricing data was extracted from the Orthopaedic Network News (ONN) database. While the American Joint Replacement Registry (AJRR) releases utilization trends in its Annual Report, the ORN dataset is linked to a greater proportion of community hospitals and also includes cost data. In 2021, the database included 245 US hospitals. Data from a total of 383,764 THAs were collected between 2012 and 2021 and analyzed for utilization and pricing trends. Categories included femoral stem type, femoral head material, femoral head size, acetabular cup design, and acetabular bearing surface material. In addition, average selling price of implants and overall market trends were analyzed.

RESULTS: In 2021, THA femoral stem utilization comprised 80% cementless, 11% cemented, 6% long stems/revision, and 3% other. Cementless stems increased slightly from 75% in 2012 to 80% in 2021 while cemented stems decreased slightly from 15% in 2012 to 11% in 2021 (**Figure 1**). For primary THA, utilization ceramic femoral heads increased substantially from 32% in 2012 to 71% in 2022 while metal femoral heads fell from 68% in 2012 to 29% in 2021 (**Figure 2**). For acetabular liner material, highly-crosslinked linked polyethylene (HXLPE) decreased slightly from 83% utilization in 2012 to 75% utilization in 2021, anti-oxidant polyethylene rose from 12% in 2012 to 19% in 2021, and regular polyethylene/hard/unknown remained relatively steady with 5% in 2012 and 6% in 2021 (**Figure 3**). Between 2012 and 2021, the utilization of ultraporous versus not ultraporous acetabular shells shifted markedly (2012: 40% ultraporous and 60% not ultraporous versus 2021: 59% ultraporus and 41% not ultraporous) (**Figure 4**). For revision THA stem utilization, body/stem implants increased from 41% utilization in 2012 to 58% in 2021, 1-piece implants decreased from 31% in 2012 to 23% in 2021, temporary Prostalac implants increased from 5% in 2012 to 19% in 2021, and modular (sleeve or neck) implants decreased drastically from 23% in 2012 to 0% in 2021 (**Figure 5**). Robot usage in THA stayed relatively constant at 2-3% from 2019 to 2021.

DISCUSSION AND CONCLUSION: Trends in primary THA implant utilization feature a current preference for cementless femoral stem fixation, ceramic femoral heads, HXLPE acetabular liner, ultraporous acetabular shells, and no acetabular screw usage. Recent trends also indicate increased utilization of 3-piece mobile bearing cups compared to 2-piece mobile bearing cups. Trends in robotic usage should continue to be tracked with future studies providing further guidance on their efficacy. These overall utilization trends are similar to those reported in the AJRR Annual Report.