

# Challenges and the Impact of Obesity on Cemented Acetabular Cups

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## Description

Obesity has become a global health epidemic, affecting millions of people. Beyond its well-documented effects on cardiovascular health and metabolic disorders, obesity also exerts a significant impact on musculoskeletal health, particularly in the context of orthopaedic surgeries such as Total Hip Arthroplasty (THA). In recent years, the biomechanical challenges posed by obesity in THA, specifically regarding the utilization of cemented acetabular cups, have garnered increased attention from researchers and healthcare professionals alike. The cemented acetabular cup remains a popular choice in THA, particularly for patients with hip joint arthritis or injuries. Comprising metal, polyethylene, and ceramic components, these cups are secured to the pelvis using bone cement. However, in obese individuals, the excess weight places heightened stress on the hip joint, presenting unique challenges for implant stability and longevity. One of the primary concerns in utilizing cemented acetabular cups in obese patients is the increased risk of implant loosening or failure.

## Biomechanical Performance

The surplus weight amplifies loads on the hip joint, potentially compromising the integrity of the cement-bone interface over time. Moreover, the heightened stress can disrupt load distribution within the joint, further exacerbating the risk of implant instability and premature wear. Compounding these challenges is the fact that obese patients often present with weaker bone density and strength. This predisposes them to a higher likelihood of implant loosening and interface failure, as the compromised bone quality may not provide adequate support for the cemented components. As a result, surgeons must exercise caution and meticulous planning when considering THA in obese individuals, taking into account both

the demands of the procedure and the patient's unique anatomical and physiological characteristics. The global surge in obesity underscores the urgency of addressing these challenges in THA. With over 1.9 billion adults affected by obesity worldwide, the implications for joint health are profound. As such, researchers are increasingly focusing on understanding the biomechanical performance, and long-term durability of cemented acetabular cups in obese patients undergoing THA. To mitigate the risks associated with obesity in THA, interdisciplinary approaches are essential. Surgeons, biomechanical engineers, and rehabilitation specialists must collaborate to develop personalized treatment plans that account for the unique challenges posed by obesity.

## Implant failure

Preoperative optimization strategies, such as weight loss interventions and strengthening exercises, may help mitigate surgical risks and improve long-term outcomes. Furthermore, advancements in implant design and surgical techniques for enhancing the durability and longevity of cemented acetabular cups in obese patients. From improved cement formulations to bearing surfaces, ongoing research aims to develop solutions that can withstand the mechanical demands imposed by obesity while minimizing the risk of implant failure. In conclusion, obesity presents significant challenges in the department of total hip arthroplasty, particularly concerning the utilization of cemented acetabular cups. As the global prevalence of obesity continues to rise, it is imperative that healthcare professionals remain vigilant in addressing the unique biomechanical considerations and implementing strategies to optimize outcomes in obese patients undergoing THA. By leveraging interdisciplinary expertise and embracing approaches, we can navigate these challenges and ensure optimal joint health for all patients, regardless of weight.