

# Girdlestone Resection Arthroplasty: Indications, Outcomes, and Complications

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## Introduction

Hip resection arthroplasty, better known as Girdlestone Resection Arthroplasty (GRA), is a surgical technique that was first described and popularized by Gathorne Robert Girdlestone in 1928 as a last resort salvage technique for the treatment of tuberculosis of the hip [1]. GRA is a technique that involves removal of the femoral head and neck without replacement, leaving only a crude articulation between the proximal femur and the acetabulum [2]. Girdlestone's first iteration of GRA was an invasive procedure involving a transverse incision, excision of the gluteal muscles and greater trochanter, and healing by secondary intention [2,3]. The modern GRA is a far less invasive procedure, having seen several modifications since its original development [2].

The modern GRA has primarily been used for the treatment of Periprosthetic Joint Infection (PJI) in the setting of failed Total Hip Arthroplasty (THA) [2-6]. In such scenarios, GRA may be used as part of a two-part revision arthroplasty procedure in which a new prosthetic is later fitted to the patient [7]. GRA may also be elected for as a definitive treatment in THA failure cases that are not indicated for revision [8]. However, as GRA is commonly categorized as a salvage procedure of last resort rather than an alternative to a revision procedure, the former option is rarely exercised [9].

Several studies have analyzed the use of GRA and its clinical and functional outcomes since its initial development [3,8,10-14]. This article is a review of Girdlestone resection arthroplasty, with special consideration to its indications and contraindications, outcomes, and complications.

## Indications and Contraindications

Despite the modern-day use of GRA, there is not a clear

consensus in the literature on its indications. Although GRA is primarily indicated in rather niche circumstances, the procedure is indicated for one of the most common and severe complications of THA: PJI [7,13,15]. PJI is a serious postoperative complication for THA patients as it is related to increased morbidity and mortality [16]. GRA is primarily indicated as a last resort procedure intended to salvage primary THA's and subsequent revisions with persistent PJI, resisting less invasive methods [17]. Although two stage revision arthroplasty is the preferred treatment for chronic PJI, GRA is particularly well equipped to address patients with comorbidities including poor bone stock, risk of recurrent infection, or poor general condition [16,17]. Other indications for GRA include septic arthritis, avascular necrosis of the hip, aseptic loosening, neuromuscular disease hip degeneration, malignancy, and nonunion of femoral neck fractures in non-ambulatory patients [11]. It is particularly important to note its status as a last resort option, as opposed to a primary alternative to revision, due to non-negligible associations of increased morbidity and mortality [16,17]. Because of these risks, extensive discussion with patients is imperative to emphasize the potential of long-term leg length discrepancy, reduced function, and pain [10].

## Outcomes

The current literature on GRA reports data on postoperative outcomes that is widely varied, with subjective satisfaction levels varying between 15% to 100% [17]. However, patient demographics could be used in an attempt to mitigate this variability. Sharma et al. found that older age patients reported better outcomes from the procedure, potentially due to their more sedentary lives compared to younger patients, who require better functional ability to meet

their needs [17]. GRA also appears to fall short of most functional outcome goals, being accompanied by postoperative walking aid reliance, reduction in hip joint range of motion, and limb length discrepancy [10,18]. That being said, despite these poor functional outcomes, most patients still maintain acceptable autonomy postoperatively [3]. Castellanos et al. highlighted that pain relief and infection control are the areas in which GRA boasts its strongest outcomes [8]. Some studies argue that achieving infection control and better pain management even at the expense of poor functional outcomes, makes the procedure worthwhile especially given its indications as a last resort procedure [13,19].

## Complications

GRA is accompanied by a significant risk for postoperative complications, potentially in part owed to the high-risk patient population that the procedure is primarily indicated for [16,17]. Although, when evaluating postoperative complications, Nazemi et al. found that increased BMI and a history of COPD were the only factors significantly associated with increased risk of complication, excluding age as a risk factor [11]. In comparison to revision total hip arthroplasty (rTHA), Nazemi et al. found similar relative risk for major, minor, and infectious complications following GRA in the short-term window of 30 days [11]. When analyzing a longer postoperative period of 90 days, Malcom et al. found a significantly greater complication rate in comparison to rTHA [12]. 90 days post operation, the GRA yielded major complication rates of 34%, minor complication rates of 11%, and reoperation rates of 8% while literature on rTHA reported respective rates of 3.8%, 0.68%, and 1% [12]. Malcom et al. also found a significant mortality rate of 11% following GRA.

In light of these differences, it is important to reiterate that the GRA is typically indicated in a setting for which rTHA may not be suitable or has already failed [17].

## Conclusion

This review highlights the GRA's use as a salvage technique for pain and infection control in an elderly population with significant comorbidities [17]. Despite its success in pain and infection control, poor functional outcomes and high complication rates must be considered when discussing the right approach for each respective patient [7]. Although the GRA may not be a common primary surgical option, it continues to warrant consideration in the management of hip arthroplasty patients [3].

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