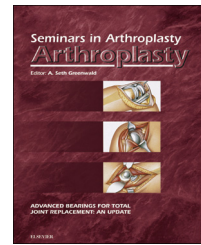


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# The jumbo cup: Curtain calls and caveats

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## ABSTRACT

Use of an oversized “jumbo cup” is an effective technique for revision of most failed acetabular components. The jumbo cup is prepared with hemispherical reamers and provides a large porous ingrowth surface area in direct contact with the host bone. However, since the oversized cup is larger than the native acetabulum, the hip center can be raised, which may require use of a longer femoral head to maintain soft tissue tension and leg length. The anterior edge of the cup may also protrude through the anterior wall, which could be a cause of iliopsoas tendonitis resulting in groin pain.

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## 1. Introduction

Acetabular revision total hip arthroplasty (THA) with use of a large (jumbo) cementless cup is an effective treatment for many cavitary and moderate-sized segmental peripheral bone defects. A jumbo cup has been defined as 62 mm or larger in females and 66 mm or larger in males [1,2]. This is approximately 10 mm larger in diameter than the average male and female native acetabulum. The jumbo component provides a broad porous-coated surface area for ingrowth. Cavitary defects are filled with morselized bone graft. The cup is supported directly on the host bone so the bone graft is not load bearing. Many studies have shown that a cementless porous-coated jumbo cup fixed with screws achieves satisfactory clinical results in revision THA [1–6]. Survivorship rates of over 95% at 10 years and 90% at 15 years have been reported [1–3].

## 2. Jumbo cup technique

Reaming for the jumbo cup requires sequentially increasing-sized reamers to provide a hemispherical shape to the remaining acetabular bone bed. The cup is ideally supported on superior, anterior, and posterior bone. The anterior wall may be reamed away during preparation for the jumbo cup,

which can still provide posterior, superior, and anterosuperior host bone support [3]. Cavitary and small segmental defects are filled with morselized autograft obtained from reamings or allograft. Although the component is directly supported by the host bone, press-fit stability cannot generally be achieved since the jumbo cup is larger than the native acetabular rim.

Supplemental fixation is obtained with use of screws. A long (40–50 mm) intramedullary “homerun” screw is generally directed into the posterior column of the pelvis just anterior to the sciatic notch. This area of cancellous bone between the inner and the outer tables of the pelvis is relatively thick (Fig. 1). Historically, the Ring prosthesis that had a 75 mm long and 9.5-mm diameter threaded screw attached to the cup was similarly directed into the “iliopubic bar” or the posterior column of the pelvis [7]. Additional screws can be directed posteriorly toward the sciatic notch to achieve bicortical fixation. Ischial screws may also add to stability of the component [8]. Some jumbo cups permit use of peripheral screws that are inserted along the rim, perpendicular to the face of the component.

## 3. Issues with jumbo cups

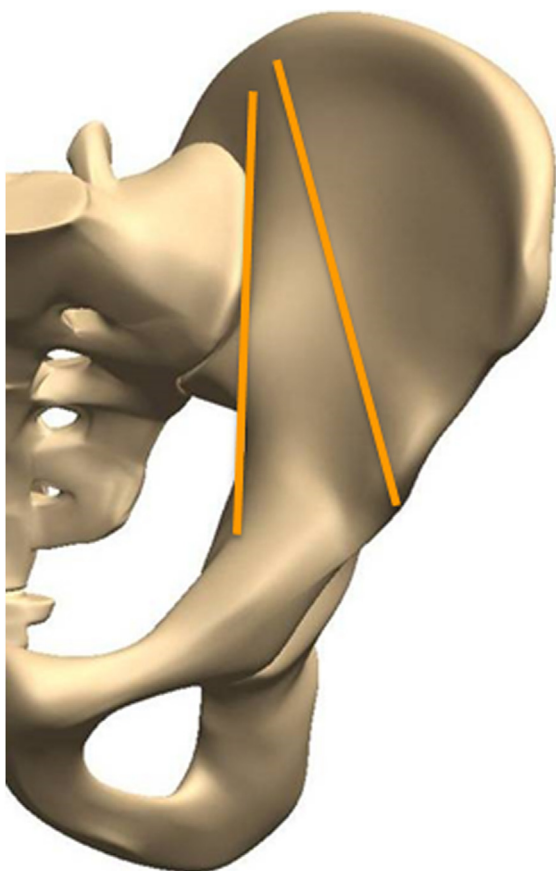
The jumbo cup is larger than the physiologic size of the native acetabulum, which may result in elevation of the hip

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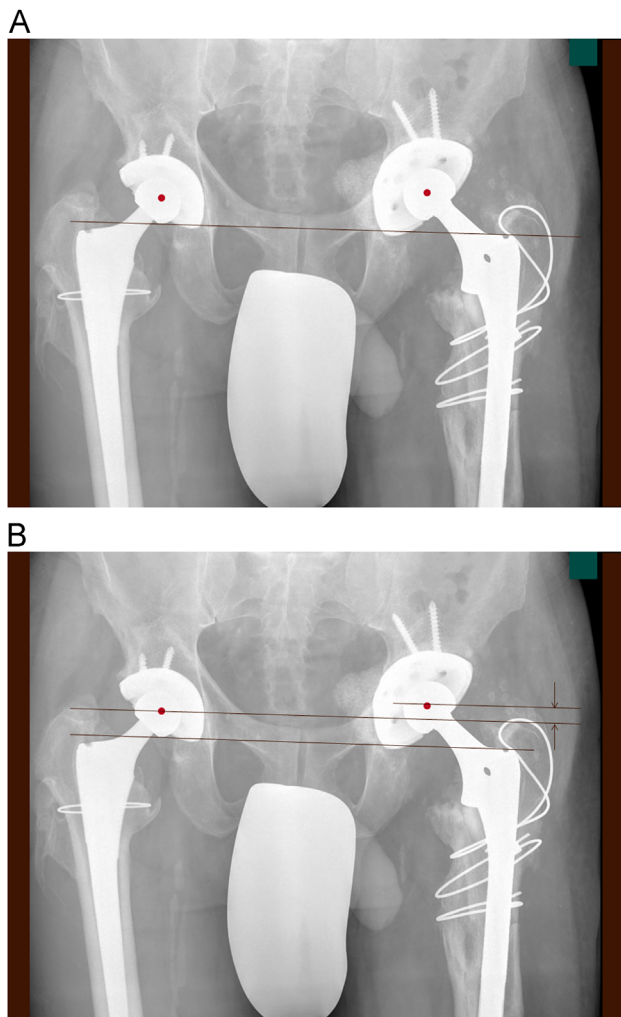
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center (Fig. 2) [9,10]. Hip center elevation can occur from reaming superiorly to place the cup directly on viable host bone (high hip center) and/or due to the increased diameter of the oversized cup compared to the native acetabulum [9,11]. In a computer simulation of jumbo cup revision THA, the hip center was elevated 0.27 mm superiorly and 0.02 mm anteriorly, and anterior column bone removal increased 0.86 mm for every 1 mm increase in reamer diameter [9]. In this study, the inferior edge of the cup was placed adjacent to the inferior acetabulum so that hip center elevation was not caused by reaming superiorly. In a clinical radiographic study of jumbo cup revision THA, hip center elevation of approximately 1 cm occurred despite placement of the inferior cup at the level of the teardrop [10]. Revision THA is often associated with leg length discrepancy, and shortening is more common than lengthening [12]. This suggests that an increase in femoral head length may be needed to compensate for the hip center elevation caused by the use of an oversized cup. Hip center elevation can alter the biomechanics of the hip [13,14]. Long-term studies indicate that dislocation is a common complication after revision THA with a jumbo cup [4]. Although the causes of hip instability after THA are



**Figure 1 – A hemipelvis that shows the thick triangular area of posterior column bone stock outlined between two lines. A long intramedullary cancellous screw can be directed through the dome of the cup into this region of the bone.**



**Figure 2 – (A) An anteroposterior (AP) radiograph of a patient after primary right and revision left THA with a jumbo cup. The center of each hip is marked with a dot. A line between the inferior right and left teardrops indicates that the inferior edge of the revision cup has been placed at the level of the interteardrop line and the hip center was not raised by reaming superiorly into a high hip position. (B) A middle line parallel to the interteardrop line through the center of the right hip and an upper line parallel to the interteardrop line through the center of the left revision hip indicate that the center of the left hip is higher than the right (distance between arrows).**

multifactorial, hip center elevation resulting in soft tissue laxity could be a contributing factor.

Weight-bearing forces are directed toward the posterior and superior acetabulum. In order to provide better superior coverage for a jumbo cup, the reamer may be directed through the medial wall [15,16]. In order to preserve the posterior wall, the reamer may penetrate through the anterior wall (Fig. 3) [3]. The large cup can protrude through the medial and/or the anterior wall. This can cause the anterior edge of the cup to impinge on the anterior soft tissues and iliopsoas tendon that is located along the anterior acetabular rim, resulting in iliopsoas tendinitis (Fig. 4). Acetabular components that are inadequately anteverted or oversized and protrude beyond the bony

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