

ISSUE 11

ShARC BITE

HUMERAL PLANNING IN ANATOMIC TSA

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Mission Statement

The Shoulder Arthroplasty Research Committee (ShARC) is a forward-looking global collaboration among research-focused surgeons of which the primary goal is to advance patient care. The ShARC Patient Registry is utilized to conduct patient monitoring, inform evidence-based implant design, and allow for the integration of novel technologies into clinical practice. Supported by Arthrex, the ShARC will continue to have tremendous influence on the advancement of shoulder arthroplasty through innovative research and a commitment to improve patient outcomes.

ShARC Bites are developed through registry data analysis and processing of the committee's preferences, cross-referenced with available ShARC and non-ShARC publications, to provide recommendations on current techniques and implants.

Summary Recommendation

The majority of ShARC surgeons (65%) use humeral planning in the Virtual Implant Positioning™ (VIP™) system in all anatomic total shoulder arthroplasty (aTSA) cases. An additional 18% of ShARC surgeons use humeral planning in at least 50% of cases. ShARC surgeons report a strong correlation between humeral size planning and implantation, with 95% indicating they implant the planned size in at least 75% of aTSA cases. When planning aTSA, approximately half of surgeons aim to fill Iannotti's circle, while the other half attempt to fill less than the circle. ShARC surgeons prioritize avoiding overhang of the trunnion in the anterior-posterior direction, followed by centering the trunnion as the next most critical aspect of planning the trunnion. When planning humeral resection, ShARC surgeons feel the height of resection is most critical, followed by resection angle to avoid varus placement.

Background

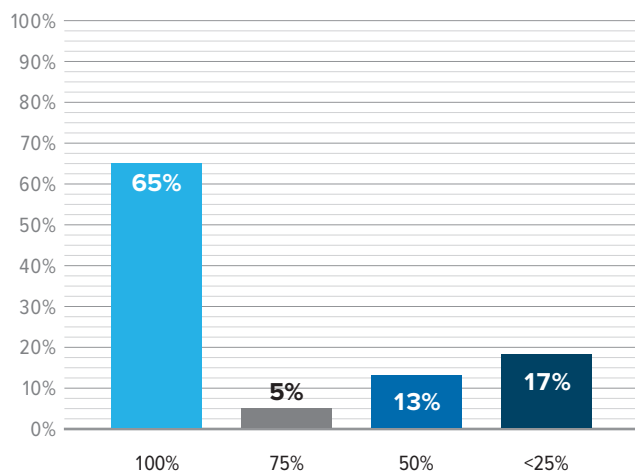
Preoperative planning in aTSA may lead to improvement in component positioning and patient outcomes and may improve patient outcomes. While initially limited to the glenoid, humeral planning is now available in many planning systems such as the VIP software. Known priorities for humeral planning include resection height, resection angle, assessment of humeral bone, and priorities in screw placement. Additionally, the size of the humeral components, including the head size, and trunnion positioning are top priorities. Recent evidence has established that functional outcomes are improved when the prosthetic center of rotation is within 2.7 mm of anatomic references.¹ Stemless components have been shown to result in improved radiographic restoration of humeral anatomy when compared to stemmed implants.² Understanding the best way to position all components to avoid complications and obtain the optimal patient outcome remains critical.

Results

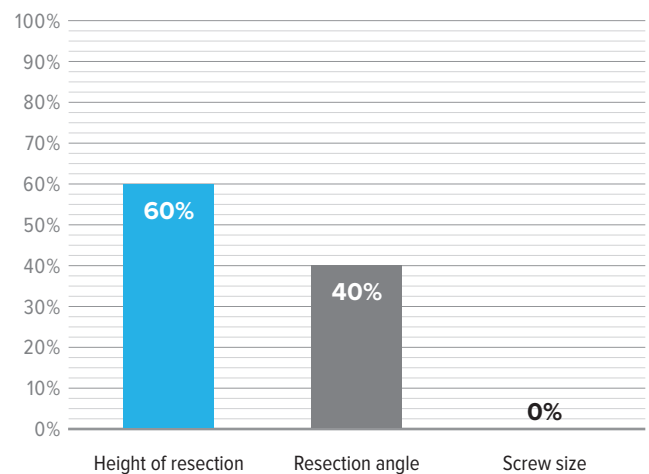
Forty high-volume shoulder arthroplasty surgeons were surveyed regarding their goals and preferences for humeral planning in aTSA.

The majority of ShARC surgeons (65%) use humeral planning in the VIP system in all aTSA cases. An additional 18% of ShARC surgeons use humeral planning in at least 50% of cases. When asked to rank planning priorities, 60% of surgeons chose resection height as the most important factor. Resection angle was the most important planning priority for 40%. Screw sizing was noted as helpful when planning but not as critical as resection height and resection angle.

In what percentage of cases do you use the humeral planning feature in the VIP™ system?

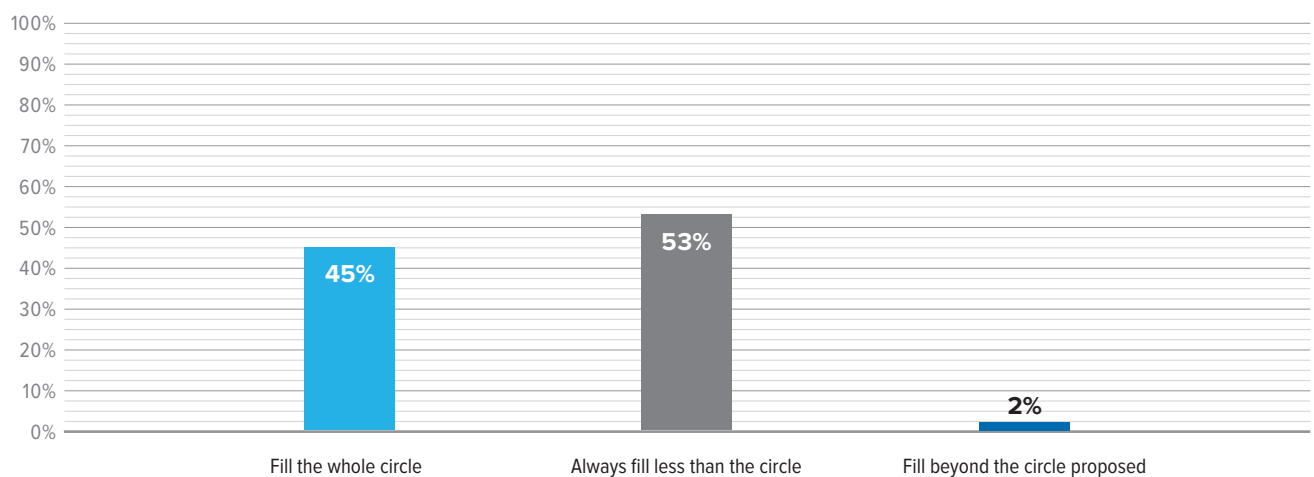


Rank the following in importance (1 being the MOST important) when planning your humeral cut in aTSA:

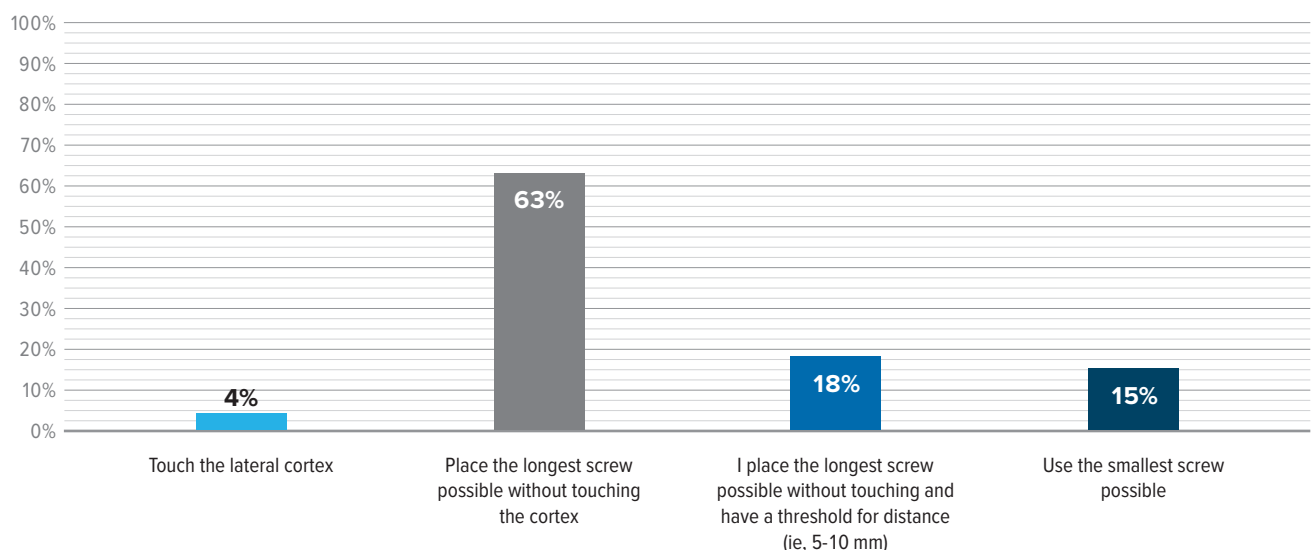


With respect to Iannotti's circle when planning the humeral component, 53% of surgeons aimed to fill less than the circle to avoid overstuffing, while 45% filled the circle fully but not beyond. Sixty-three percent of surgeons planned the longest cage screw possible without touching the lateral cortex, while 15% of surgeons used the smallest screw possible.

With respect to Iannotti's circle when planning the humeral head implant I tend to:



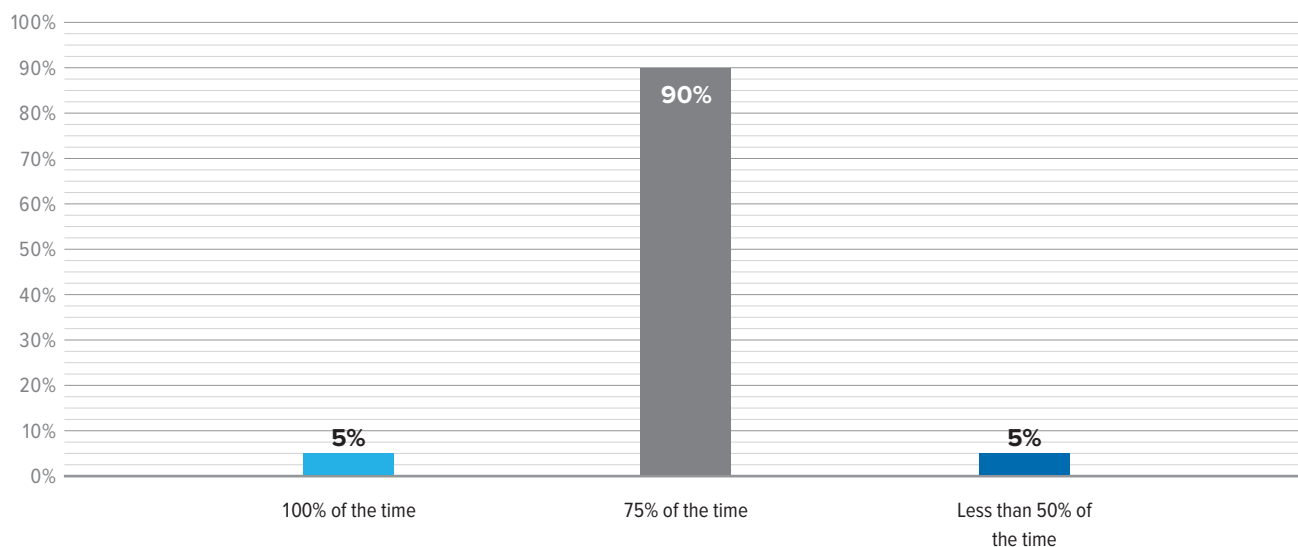
When planning the central Eclipse™ cage screw in humeral planning, my goal is to:



When planning the humerus for aTSA, surgeons were asked to rank the importance of various parameters for placement of the Eclipse™ trunnion. The top priority for 50% of ShARC surgeons was to avoid anterior-to-posterior overhang of the trunnion, followed by centering the trunnion in the humeral cut (27%). Other priorities such as loading the inferior calcar and leaving a peripheral rim of bone were less important than overhang to ShARC surgeons.

Once the case is planned, 5% of ShARC surgeons reported perfect sizing, 90% tend to use the plan 75% of the time, and only 5% used the plan less than 50% of the time. Surgeons reported that when using the Eclipse stemless implant, bone quality and/or cyst recognition generally did not change their plan.

Once I finalize a plan, I typically implant the planned sizes:



References

1. Werner BC, Creighton RA, Denard PJ, Lederman E, Romeo A, Griffin JW. Prosthetic humeral head center of rotation shift from ideal is associated with inferior clinical outcomes after anatomic total shoulder arthroplasty. *Semin Arthroplasty*. 2021;31(4):668-676. doi:10.1053/j.sart.2021.04.004
2. Sears BW, Creighton RA, Denard PJ, et al. Stemless components lead to improved radiographic restoration of humeral head anatomy compared with short-stemmed components in total shoulder arthroplasty. *J Shoulder Elbow Surg*. 2023;32(2):240-246. doi:10.1016/j.jse.2022.07.024



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