Trunnion Characteristics: Do We Know What We Are Implanting?

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INTRODUCTION: We currently perform over 1 million total hip replacements/year worldwide. Hundreds of studies have been published on stem design. These include - geometry biomechanics and fixation modality. The trunnion is a vital component of the design. We have identified a disease caused by trunnion issues and much has been published on trunnionosis. As trunnion designs have evolved, trunnion specs should be provided to surgeons by manufacturers. Trunnion design significantly impacts tribocorrosion at the taper head junction. This study aims to evaluate the availability of this information as provided by manufacturers.

METHODS: This study analyzed information provided by large manufacturers of hip stems representing over 70% of the U.S. market. Hip implants used for primary total hip arthroplasty were studied. We searched for information on trunnion diameter, length, taper angle, surface roughness, material composition, tolerances, and post-casting treatment that may influence trunnion microstructure. Technical documents, including brochures, surgical guides, design rationales, instructions for use, and surgical techniques, were reviewed to obtain these parameters. We followed up this documentation review with emails and phone calls to hip product managers to complete the profile.

RESULTS: Availability of most specifications was very limited. Material composition was available in 83.3% of reviewed stems, trunnion diameter for 66.7%, and post-casting treatment for 45.8%. Less than 25% of reviewed stems provided further detail. Email and phone outreach met limited success: Only 1 manufacturer provided information that was not previously available in their technical documentation.

DISCUSSION AND CONCLUSION: Surgeons and scientists lack the information needed to study the effect of trunnion design on outcomes. Manufacturers should provide complete trunnion detail on all their products. Access to detailed trunnion information is crucial to optimize design.