

Summary of research proposal LROI



Title:

Effect of glenohumeral radial mismatch on aseptic loosening of the cemented glenoid component in total shoulder arthroplasty in patients with Walch A glenoids; a study from the Dutch National Registry

Authors: M van den Bekerom, AA Macken, A van Noort, D Eygendaal, GA Buijze, I Sierevelt

Abstract:

Anatomic total shoulder arthroplasty (ATSA) is used to treat glenohumeral pathologies, such as osteoarthritis. One of the most common reasons for a revision after ATSA is aseptic glenoid component loosening, occurring in 1-4% of patients. The glenohumeral radial mismatch is an important aspect of ATSA with regards to aseptic loosening and is defined as the difference in the radii between the humerus and glenoid. The choice for the amount of radial mismatch has to be balanced; a greater radial mismatch causes higher peak stresses on the poly-ethylene, whereas the higher constraint in a smaller radial mismatch causes more shear forces on the poly-ethylene, cement, and bone interfaces, which is associated with radiological signs linked to implant loosening. There is currently no consensus with regards to the optimal radial mismatch. Specifically in cemented glenoid components, the component retention is highly dependent on the amount of radial mismatch. Cadaveric and retrieval studies have shown increased central stress with a higher radial mismatch but more peripheral, eccentric stress and more micro-motion with a low radial mismatch. These forces may cause disruptions and osteolysis at the cement-bone interface. Two previous studies have found higher rates of radiolucency in patients undergoing ATSA with a glenohumeral radial mismatch.

Specifically in cemented glenoid components, the component retention is highly dependent on the amount of radial mismatch. Cadaveric and retrieval studies have shown increased central stress with a higher radial mismatch but more peripheral, eccentric stress and more micro-motion with a low radial mismatch. These forces may cause disruptions and osteolysis at the cement-bone interface. Two previous studies have found higher rates of radiolucency in patients undergoing ATSA with a glenohumeral radial mismatch.

To our knowledge, no studies have yet found a correlation between glenohumeral radial mismatch and implant survival. However, previous studies include relatively small cohorts, while implant loosening requiring a revision is rare. National registries provide large amounts of data, which can be used to assess trends and associations in relatively rare complications, such as glenoid component loosening. For these reasons, the aim of this study is to assess the influence of a high (≥ 5 mm) or low (< 5 mm) glenohumeral radial mismatch on the glenoid component survival (time without revision due to loosening or breaking out of the glenoid component) in patients with a Walch A glenoid undergoing ATSA.

Approval date: July 2023