

# Adherence of Hip and Knee Arthroplasty Studies to RSA Standardization Guidelines - A Systematic Review of Studies Published from 2007 to 2011

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Since the introduction of radiostereometry (RSA), the method has continuously proven to be a valuable tool in the assessment of micromotion following hip and knee arthroplasty as well as in the stepwise introduction of new orthopaedic implants (1–3). The guidelines for standardization of radiostereometry of implants were published in August 2005 (4). In this paper, an appendix of 13 main items that should be used to account for the results of a clinical RSA study to facilitate comparison between different centers was presented. Furthermore, since RSA is a highly technical method, the reliability and reproducibility of a study can only be assessed when all guideline items have been adequately addressed. The aim of this study was to evaluate how well studies have adhered to these guidelines.

## Methods

We carried out a literature search using OVID Medline, OVID Cochrane central register of controlled trials and SCOPUS Embase to identify all articles published between January 2007 and December 2011 that utilized RSA in the evaluation of hip or knee prosthesis micromotion. Study identification was performed according to the PRISMA statement (Figure 1). Only English language clinical studies with at least two follow-up time points were included. Two investigators independently evaluated each of the studies for adherence to the 13 individual guideline points. Since some of the 13 points included more than one criterion, studies were assessed on whether each point was fully met, partially met, or not met. Disagreement was resolved by consensus.

## Results

A total of 66 studies that met our inclusion criteria were identified. 44 (67%) studies evaluated hip and 22 (33%) studies knee arthroplasty. None of the studies fully met all 13 guidelines. 32 (48%) studies adhered at least partially to 10 of the 13 guidelines. Only 7 (11%) studies published after guidelines adhered at least partially to all guidelines. Adherence to RSA guidelines improved from 2007 to 2011.

The most commonly unaddressed guidelines were related to determination of precision from double examinations as well as mean error of rigid body fitting and condition number cut-off levels. Furthermore, window of tolerance, type of image acquisition and system/scanner details, type of calibration cage, whether fixed or portable x-ray tubes were used, and accuracy levels were often lacking.

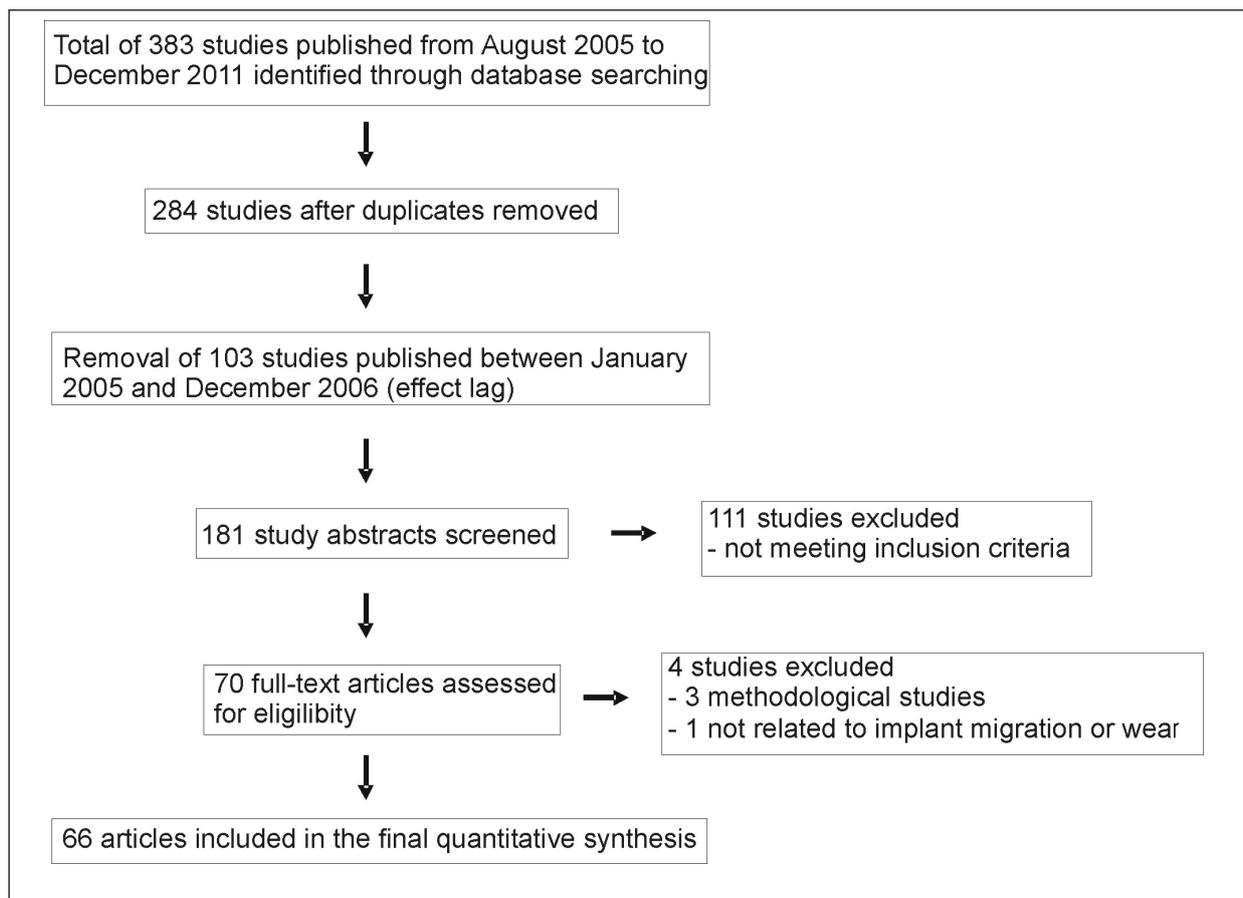


Figure 1. PRISMA flow chart of study selection.

## Discussion

The guidelines have resulted in improved methodological reporting in RSA studies but adherence to these guidelines is still relatively low. There is a need for more stringent adherence to RSA guidelines. Updating the guidelines and making them clearer for researchers as well as peer review purposes is crucial in ensuring that RSA continues to be the gold standard of migration and wear measurement in the future. We suggest an updated mandatory appendix of minimum requirements that must be published with all clinical RSA studies.

## References

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