



Position Statement regarding Robotically-assisted Hip and Knee Replacement Surgery

This position statement has been developed by the Arthroplasty Society of Australia (ASA) in collaboration with the Australian Knee Society (AKS), both being Subspecialist Groups within the auspices of the Australian Orthopaedic Association (AOA).

Background

All Hip and Knee Replacement surgery requires the creation of an operative plan, and a means of executing that plan. Historically, mechanical alignment instruments were (and indeed still are) used successfully to prepare the bone for the joint replacement prostheses. First introduced and reported in the late 1990s, Computer Assisted Surgery (CAS), otherwise known as Computer Navigation, has gradually become more widely used, and studies have now shown this to be more accurate and reproducible with bone preparation and alignment than mechanical instruments. In some studies, including a review of cases recorded in the Australian National Joint Replacement Registry (ANJRR), it has also been shown to produce improved survivorship, with a lower revision rate in younger patients compared to surgery using conventional mechanical alignment instruments.

In the early 2000's came the development of Patient Specific Guides (image-derived, customised alignment and cutting guides) as another means of achieving accurate bone preparation. Whilst making the surgery simpler and quicker, the accuracy of these guides has been shown to be less reliable than Computer Navigation which still remains the most accurate method of bone preparation.

Robotically-assisted Surgery

Robotic technologies have been developed with the aim of improving surgical precision, component alignment and soft-tissue balance, with the expectation that this improvement will result in better patient outcomes. Robotically-assisted Joint Replacement surgery includes an image-derived preoperative plan, the use of computer-assisted orientation for positioning (based on Computer Navigation), and the use of robotically-assisted cutting or burring tools for bone preparation.

While both robotically-assisted Total Knee, and Hip, Replacement surgery has been met with optimism, it will take some time to obtain the necessary scientific data to be able to clearly outline its role; and it may be many years before the benefits of improved alignment and balance are realised. Importantly, this technology comes with added costs to the health budget and a potential for increased operating time with its attendant risks: hence, close monitoring of outcome data will be imperative when evaluating this technology.

At this time, there are encouraging 2-year results from the ANJRR which have shown that robotically-assisted Partial Knee Replacement has an improved revision rate when compared to non-robotically-assisted Partial Knee Replacement: but of course, that is a short follow up period and such results may not necessarily infer an improvement in patient satisfaction.

As robotically-assisted Total Knee, and Hip, Replacement have only more recently been introduced, results for this technology in those scenarios are not yet known.

Conclusion

All new technologies and techniques require ongoing review and continual assessment of outcomes before a definitive role can be established for them. There is currently insufficient evidence to show that Robotically-Assisted Surgery delivers better outcomes for either Hip or Total Knee Replacement, but there are some early results which may suggest that it may be of benefit for Uni-Compartmental Knee Replacement.

Disclaimer

This statement is an expression of policy of the Arthroplasty Society of Australia, made in consultation with, and supported by, the Australian Knee Society. It is not a comprehensive review of the subject, nor is it intended as medical advice for the treatment of individual patients.