Position statement on Alignment in Total Knee Arthroplasty

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This position statement has been developed by the executives of the Arthroplasty Society of Australia (ASA) and Australian Knee Society (AKS), both being subspecialist groups within the auspices of the Australian Orthopaedic Association (AOA).

Background

Mechanical alignment (MA) has been the universal alignment approach in total knee arthroplasty (TKA) since its inception. Over the last fifteen years, there has been increasing interest in different alignment philosophies in TKA. Current individualised alignment (IA) philosophies include adjusted mechanical, anatomic, kinematic, inverse kinematic, restricted kinematic and functional alignment. Uptake of these approaches has resulted from research demonstrating significant variability in constitutional knee anatomy between patients and reduced ligament release rates with IA. The aim of these approaches has been to improve outcomes and reduce dissatisfaction rates.

Alignment in total knee arthroplasty

The alignment philosophy in coronal, sagittal and axial planes and restriction boundaries chosen for each individual patient is based on surgeon preference, experience, patient anatomy and delivery capabilities.

There is no conclusive evidence that any specific alignment philosophy has superior results, nor superiority in terms of patient-reported outcomes, nor component survivorship at up to 10 years of follow-up.

There is limited evidence that restoring constitutional knee alignment may improve soft tissue balance better than mechanical alignment in some patients, however quantifying soft tissue balance and the ideal soft tissue balance target remains unclear.

Enabling technologies in total knee arthroplasty

The surgical technique to perform TKR may include use of manual cutting guides, image-derived instruments, computer-assisted and robotic-assisted technologies. There is no conclusive evidence supporting improved patient outcomes and implant survivorship with enabling technologies (robotic-assisted, computer-assisted technologies) versus manual instrumentation.

Analysis of TKR patients with dissatisfaction

There are multiple causative factors to successful TKA surgery, including but not limited to alignment. Malalignment of TKA implants may be a factor in patient dissatisfaction however many TKA patients with dissatisfaction are within acceptable alignment boundaries, and many outside those boundaries are satisfied. Thus, the diagnosis of malalignment as a cause for dissatisfaction should be interpreted within the context of patient symptoms, clinical examination findings and expert surgical opinion.

Appropriate investigations for malalignment include long leg radiographs, EOS imaging or CT analysis to estimate coronal and sagittal positioning, and CT analysis to assess rotational positioning of implants. An implant placed between neutral and constitutional targets may be considered to be acceptably aligned. Intra-operative visual assessment of alignment during revision surgery with or without a handheld goniometer is unreliable.

Disclaimer
This statement is an expression of policy of the Arthroplasty Society of Australia and 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.