Computer navigation versus conventional total knee replacement

Sir,

I read with interest the article by Spencer et al1 in the April 2007 issue entitled ‘Computer navigation versus conventional total knee replacement: no difference in functional results at two years’. While I do not support the use of ‘image free’ navigation systems in general, in their title the authors make an unjustified statement that is in danger of being taken out of context, and setting back the cause of accurate surgery. They are to be congratulated on having carried through an important study, attempting to correlate accuracy and function, but the title and conclusions of this paper are not supported by their data, which compares two groups of total knee replacements which were inserted in substantially different positions.

In their 2004 paper2 which is followed up in the current paper, the two groups of knee replacements were inserted in different positions. The conventionally inserted group’s tibial components were inserted with a substantial posterior slope, mode 10°, while the navigated group’s tibial components were inserted with little or no posterior slope, mode 2°, (p < 0.001). This difference is a significant change in surgical technique. The Duracon knee was designed for insertion with a posterior slope, but in this series, even if inadvertently, the surgeons used the navigation to put the prosthesis in a substantially different inclination to the conventional group. The conventionally inserted group, while more variably inserted, were actually inserted in the main rather well, by a surgeon who was clearly an expert. This earlier paper could thus be seen as an experiment, albeit one that was not planned, with the post-operative CT scans confirming the difference between the two groups who could thus be renamed: posterior slope/conventional and minimal posterior slope/navigated.

In this clinical follow-up study, the knee scores of the minimal posterior slope/navigated group were not better, but actually worse (mean Oxford scores of 26 vs 20), although this difference fails to reach significance. If the slope of the tibia was used in a univariate analysis, the authors might instead republish this series as conclusively showing that an increased posterior slope of the tibia is an important determinant of outcome following this particular total knee arthroplasty. A multivariate analysis of outcome in this important cohort would confirm whether this was the most important variable.

Total knee arthroplasty is an expensive and commonly performed operation, with a significant failure rate predicted,3 and a substantial rate of dissatisfaction if judged by scores designed to discriminate.4,5 Surgeons should not take the wrong message away from this series of operations by an opinion leader in total knee arthroplasty. Accuracy really does matter. We are still learning how best to perform this operation, and this paper suggests that a greater posterior slope is one factor that helps the function of this device, although variation between individuals may be substantial. If a knee is not functioning very well, it may be that a mismatch with the patient’s native posterior slope is one of the problems. As the authors have shown in their other work, a CT scan may help greatly in the analysis, even if a lower dose is now practicable.6 Alternatively, by performing the CT scan beforehand to document the pre-operative position and plan what is to be corrected, surgeons may one day choose to tailor the operation to each individual patient. This seems to work.7 doi:10.1302/0301-620X.89B8.19975

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We thank Professor Cobb for his interest in our paper. The original study randomly allocated patients to one of two groups: navigated or non-navigated. The alignment differences between these groups were documented. The only significant differences between the two groups related to implant position. This present paper objectively assesses the mid-term functional results of the two groups. We are therefore assessing two groups of patients with different

Author’s reply:

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component alignments. We too believe that accuracy matters but we can only report our mid-term results in as unbiased a manner as possible. It may well be that other studies will obtain differing functional results. We would be delighted to be able to prove navigation a significant advance but the last thing we would wish is to publish opinion which is not supported by evidence. It may be that the functional and survivorship differences between the two groups will only surface at the five or ten year mark (which we also hope to publish).

We are also preparing for publication the results of our institution’s entire experience in knee navigation (350 cases), involving a number of surgeons with varying degrees of skill and comparing these to our non-navigated patients. It may well be that the real place of navigation is in improving long-term survivorship or in reducing peri-operative morbidity.

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