We welcome letters to the Editor concerning articles which have recently been published. Such letters will be subject to the usual stages of selection and editing; where appropriate the authors of the original article will be offered the opportunity to reply.

Letters should normally be under 300 words in length, double-spaced throughout, signed by all authors and fully referenced. The edited version will be returned for approval before publication.

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Movement patterns of the C-stem femoral components: an RSA study of 33 primary total hip arthroplasties followed for two years

Sir,

We read with interest the article by Sundberg et al¹ in the October 2005 issue. They found the mean levels of posterior migration and retroversion for the C-stem were higher than those recorded by others for the Exeter stem at two years, but the rate of retroversion after three months was similar to that for the Exeter stem. They wrote: "The Exeter femoral component appears to stabilise as it migrates distally, but the C-stem does not show this pattern up to two years and does not, therefore, appear to be more stable than the Exeter femoral component, suggesting that the triple taper design has no advantages at this stage of follow-up".

We are also conducting an RSA study of the same prosthesis and would like to comment on some of their results and conclusions.

First, since the triple-taper design of the C-stem was introduced to reduce the effects of strain shielding,² the success of this 'improvement' in design cannot be judged for several years when proximal bone resorption would be evident.

Secondly, since the rate of C-stem retroversion was similar to the Exeter after three months, the main difference between the two stem types was in the actual magnitude of retroversion which, at two years differed by 0.7° to 0.8°. With RSA, migrations are measured with respect to the initial (reference) recording. Since the Exeter and C-stem are force-closed³ designs (i.e. they are designed to slip until restrained by the elastic expansion forces in the cement-bone complex), the timing of the reference recording is of crucial importance if one wants to compare actual migration levels recorded by different groups. The authors carried out the reference recordings on the C-stems at a median of one day (1 to 2 days) after surgery. The two quoted studies on the Exeter prosthesis had reference recordings at a median of two days⁴ (1 to 4 days) and "as soon as the patient could stand safely with crutches".⁵ Since the prostheses are effectively loose immediately after surgery, a large amount of migration will occur within the first few days, and, if the reference recording was late, much of this migration could be missed.

Furthermore, the patient's weight, level of activity and rehabilitation protocol can affect the amount of migration in these early stages. It is very difficult, therefore, to standardise the technique so that the magnitudes of migration can be fairly compared.

Unlike the RSA work of Karrholm et al⁶ on shape-closed cemented femoral components, there have been no long-term RSA studies on force-closed femoral component designs. Consequently, there is no working hypothesis on the level of migration that can predict medium-to-long-term failure. The best we can do is to assume that a reduction in the rate of migration to a very low level after about two years predicts long-term success. The graphs in this paper appear to show this is happening.

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Authors' reply:

Sir,

In response to the letter by Derbyshire and Porter we would like to make the following comments.

The aim of our study was not to investigate the strain shielding but the migration and rotation pattern of the stem, since this might predict prosthetic failure earlier than clinical studies.

Regarding distal migration and retroversion the pattern is about the same as the Exeter stem.¹ The small difference in retroversion could perhaps be a matter of timing of the index examination, but in both studies the majority of the patients were examined before weight bearing.

Posterior migration is higher and increases over time for the C-stem. This is the major difference between the two designs, irrespective of when the index examination was performed. The paper by Stefansdottir et al¹ examined the movement pattern up to five years, which is longer than normal RSA studies. After the first two years the Exeter stem stabilises in rotation and distal migration which could also be the case with the C-stem. With posterior migration it is more difficult to predict whether the C-stem stabilises after two years. We will have to wait a few more years to see

if the C-stem stabilises or perhaps tolerates this migration pattern. We look forward to seeing the RSA results on the C-stem from Wrightington Hospital.
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