As you might expect, we did not get a decisive answer after 6 months. Like Dr. Dixon we found a very striking placebo response after 3 months. 84 per cent. of the patients on placebo were improved at 3 months and over 50 per cent. at 6 months. There are two other points I should like to make. As in Dr. Dixon's trial no physical treatment was to be given to our patients unless absolutely necessary; but when the results were analysed, ten patients in the placebo group had had additional physical treatment, whereas only two in the Rumalon treated group had this treatment. The other point is that, unlike the hip trial, at the end of 6 months there was a definite trend in all the radiological parameters in favour of Rumalon; in one of these parameters, the reduction in the medial joint space approached a significant level. 5 per cent. of the Rumalon treated patients (with Grade 2 or 3 osteoarthritis) showed deterioration at 6 months and 25 per cent. of the placebo group showed deterioration. The x rays were read independently by three observers and are now going to be re-read by Dr. Popert and Dr. Golding.

DR. J. H. GLYN (*London*) If you want to get the Rumalon into the joint cartilage, why don't you put it there directly instead of giving it systemically? The cartilage presumably does not receive the Rumalon in high concentrations and it would seem more logical to inject directly into the joint. Has this been done? Could the difference in concentration explain the difference between the experimental results and the clinical results?

DR. DIXON I am not aware of any experiments with local injections. I do not think that you can assume that the conditions for the nutrition of chondrocytes in fairly advanced destructive osteoarthritis are the same as in the normal cartilage. It may well be that the nutrition from the subchondral vascular supply is far more important.

DR. A. J. POPERT (*Droitwich*) When we consider the results of any therapeutic trial it is important to have clearly in mind what information it is possible for that trial to produce. When a disease has run its full course it seems naïve to expect that any method of treatment should have any effect at all. I think that we should have learnt, by this time, that patients in advanced stages of a disease are best excluded from a therapeutic trial. Secondly, the duration of an experiment should bear some relation to the natural history of the complaint. In a disease with a life history extending perhaps over 20 to 50 years it would seem to me incredible that any treatment given over a period of weeks or months could produce any noticeable effect. Trials of this nature should be conducted over a long period of time, and preferably on patients in an early rather than an advanced stage of the disease. Finally, although I have not assessed patients in this trial, I have seen some of them from time to time. In an osteoarthritic knee with fairly advanced changes, crepitus is a striking physical sign; never yet have I seen crepitus, once present in an osteoarthritic knee, disappear. In two of the patients in this trial, however, whether they received the active substance or not, this sign has disappeared. One further patient I know, with severe rheumatoid arthritis and secondary osteo-

arthritis in the knees, was treated by her physician with Rumalon. She chanced to be referred to me later; I asked her whether it had helped her, and she said 'It did nothing to my knees, but it straightened out my fingers beautifully'.

Stiffness of the Knee in Normal and Osteoarthrotic Subjects. By R. GODDARD, D. DOWSON, M. D. LONGFIELD, and V. WRIGHT (*Leeds*)

Part of the programme of the Bioengineering Group for the Study of Human Joints has been devoted to characterizing stiffness of the knee. Studies on the metacarpophalangeal joint have been extended to measure quantitatively and qualitatively the stiffness of a weight-bearing joint.

The apparatus imposes a sinusoidal motion on the knee at various amplitudes and frequencies of rotation. The torque resisting this motion was measured and related to rotational displacement. Physiological variations in stiffness of the knee were measured in relation to sex, age, and body temperature. Joints with osteoarthritis were studied, and in particular the characteristic phenomenon of 'articular gelling' was investigated.

Discussion

DR. J. A. MATHEWS I should like to ask whether, as the knee is a weight-bearing joint, an attempt was made to measure stiffness in the knee joint when it was in a weight-bearing condition?

DR. GODDARD We are aware of this problem of weight-bearing and we can see no other means at present of loading the joint physiologically and measuring it. In fact the only loading present was the slight load imposed by the weight of the thigh, and at present this is the only loading condition we are investigating.

DR. H. L. F. CURREY (*London*) May I ask whether the changes were recorded at different body temperatures? Might they be due to altered viscosity of the synovial fluid, for example, or perhaps to altered physical properties of the subcutaneous fat around the joints?

DR. GODDARD In the temperature investigations the major changes were in the elastic range of stiffness; changes in the viscous effect were negligible as far as we could tell.

Radioisotope Studies of Rheumatoid Knees before and after Synovectomy. By A. KAY, A. KATES, E. N. COOMES, C. B. CAMERON, and E. CHANDLER (*London*)

Ten patients with rheumatoid arthritis and knee involvement about to undergo synovectomy were studied to assess the amount of synovial tissue left at operation and the extent to which the synovium regenerated over the subsequent year.

In each patient the knee was scanned after the introduction of 50-70 μ ci of Au¹⁹⁸ colloid, first 2 days before