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

operation and again 3 days after operation. A further dose of Au¹⁹⁸ colloid was introduced into the operated knee after an interval of either 6 or 12 months and the scanning was repeated.

Discussion

DR. H. L. F. CURREY (*London*) One does not know to what extent work on animals is comparable in this situation, but in experimental synovitis in rabbits the synovium is completely and fully regenerated by 6 weeks after synovectomy. But very often the disease process is back in it again to the same extent. I think there is some data on reoperated human knees, which suggest that the rate of regeneration of synovium is about 6 weeks.

A SPEAKER I quite agree that synovium is obviously fairly rapidly regenerated but this need not be the normal or, shall we say, the abnormal previous synovium. All you need are cells capable of taking up this colloid; they could be macrophages.

DR. J. H. GLYN (*London*) If you only take up two-thirds of the synovium by the anterior approach and leave behind most of the other third, it seems that what is important is whether the synovium is regenerating from the tissue in the posterior part of the knee joint. If so, it would be interesting to remove the other third of the synovium by a posterior synovectomy and see if the same speed of regeneration follows.

Athetoid Movements in Cervical Spondylosis. By E. R. BICKERSTAFF (*Birmingham*)

The combination of high cervical spondylosis with an abnormally narrow cervical canal can cause compression of the posterior part of the cord and loss of postural sense in the arms (and not the legs), resulting in athetoid 'searching' movements of the upper limbs when the eyes are shut. This causes serious disability, but other signs of the disease are often lacking, and if the existence of this condition is not appreciated many patients may be diagnosed as 'hysteria'.

Discussion

A SPEAKER Does this condition occur if the upper segments of the cervical spine are affected by arthrosis?

DR. BICKERSTAFF The fibres for position sense travel some distance up the spinal cord after entry, in a very irregular manner. For the muscles innervated from the upper part of the cervical cord to be affected the lesion would need to be at least as high as the foramen magnum. In occasional lesions at that level, such as in basilar invagination and some cases of syringomyelia, one may see it affecting the whole arm. But in cervical spondylosis the lesion is usually at a slightly lower level and affects the much lower fibres to the fingers.

DR. J. A. MATHEWS (*London*) How do you establish the causal relationship of cervical spondylosis to the athetoid movements?

DR. BICKERSTAFF This is of course an enormous question to answer. Usually one expects athetoid movements to be associated with disease at some very much higher level. But when one has seen a large number of patients who have no disease, as far as one can tell, of the brain or brain stem, who have a reproducible syndrome which is seen over and over again with lesions at one particular level in the cervical area, somewhere between the foramen magnum and C4/C5, this seems to me to make an association that one cannot escape from. The nicest way of proving this would be to find some method that completely cured the cervical spondylosis, and if the whole thing cleared up that would be proved indeed. I can only say that, in one or two patients who have had tumours affecting the posterior part of the spinal cord, these movements have cleared up on removal of the neoplasm.

DR. D. N. GOLDING (*Harlow*) Have you ever seen any improvement following the application of collars?

DR. BICKERSTAFF In the patients who have reached the advanced state that I showed here the answer certainly is 'no'.

Hypospray Treatment of Tennis Elbow. By G. R. HUGHES and H. L. F. CURREY (*London*) Published in full in the *Annals* (1969), 28, 58.

Thyroid Disorders presenting with Musculoskeletal Symptoms. By D. N. GOLDING (*Harlow*) Published in full in the *Annals* (1970), 29, 10.

Rheumatic Disease in Patients suffering from Scleral Disease. By P. FOWLER (*Manchester*)

Observations during a clinical trial of treatment of episcleritis and scleritis had suggested an unusual prevalence of rheumatic disease. This paper reports the findings in 42 patients diagnosed as having episcleritis (26) or scleritis (16) and selected at random from the Scleritis Clinic at Moorfields Eye Hospital, London, who were examined for associated diseases with special reference to the locomotor system.

Three patients had definite rheumatoid arthritis and a fourth had possible inactive rheumatoid arthritis. The diagnostic clinical features and radiological and laboratory findings were related to population studies of rheumatoid arthritis.

Sacroiliac joint changes were found in seven patients. There were one definite and one possible male case and one possible female case of ankylosing spondylitis, no cases of gout, one case of Reiter's disease, and many cases of degenerative joint disease.

While rheumatoid arthritis is known to be related to scleral disease, the finding of overt ankylosing spondylitis in overt or in a sub-clinical form with symptomless changes in the sacroiliac joints has not previously been reported in this connection.