included much rubbish in his lecture. It did not save time of preparation, in that the time expended on preparing the presentation was the equivalent of 10 years lecturing on this topic.

Discussion

DR. A. G. S. HILL (*Stoke Mandeville*) Do you think that the bigger standard deviation in the lecture group represents those who were, in fact, asleep?

PROF. WRIGHT Sir, students do not sleep during our lectures!

DR. K. LLOYD (*Cardiff*) How does the television presentation differ from the lecture? Is it something more than a lecture on the television?

PROF. WRIGHT Yes; it is important to use the full resources of the medium, otherwise there is no point in it. For instance, we demonstrated both interview and examination of two patients on the television.

DR. R. N. MAINI (*London*) How did you control the intelligence of the three groups of students? The results suggest that the groups may not have been evenly matched for this, as those who failed to attend either of the two teaching sessions seemed to be the most intelligent!

PROF. WRIGHT We failed to find any correlation with these results and the students' second M.B. marks. I shall remember in the final examination those who did not attend the lecture!

Controlled Trial of Joint Aspiration in Acute Haemophilic Haemarthrosis. By G. I. C. INGRAM, J. A. MATHEWS, and A. E. BENNETT (*St. Thomas' Hospital, London*)

Twelve severely affected haemophiliacs presenting with 22 acute haemarthroses of the knee were admitted to a trial in which, with their consent, they were treated either by intravenous infusion of human antihemophilic factor alone or by aspiration of the knee joint in addition. The trial was restricted to patients with haemarthroses of intermediate size, as only in this situation were the indications for aspiration considered doubtful. Thus, patients were excluded if there was insufficient knee swelling to make it likely that blood could be withdrawn, or if aspiration was positively indicated by distension causing continuous pain at rest.

By the next day, a significantly greater average range of movement had been regained in the eleven aspirated knees than in the eleven knees not aspirated, although after 5 days the average improvements were nearly equal. In planning treatment of individual cases, this benefit must be set against the painfulness of the procedure.

Discussion

DR. P. J. L. HOLT (*London*) In many haemophiliacs we have found a very high incidence of antibodies to the antihemophilic factor. In a patient with these antibodies you can give as much factor as you like and it will not do any good; I would suggest a little caution rather than overuse of antihemophilic globulin.

DR. MATHEWS We know which of our patients have circulating antifactor VIII and none of these was included in the trial.

PROF. V. WRIGHT (*Leeds*) I was not quite sure why you aspirated the knee in the flexed position? We showed some time ago that you cannot get all the fluid out if you aspirate it in that position; you need to aspirate it in the extended position in order to do that.

DR. MATHEWS Flexion was usually the only comfortable position for the patient and we aspirated until we were unable to withdraw any further fluid.

DR. M. JAYSON (*Bath and Bristol*) Can antihemophilic globulin be given directly into the joint? Would it be of any advantage to be given by that route?

DR. MATHEWS I cannot answer that directly, but it would seem illogical to do so as this would cause clotting of the blood already in the joint, whereas haemostasis is needed in the vessels which are actually bleeding.

DR. J. M. GUMPEL (*Harrow and Taplow*) Did any of the patients come into the trial for a second time and was there any patient preference for aspiration?

DR. MATHEWS Six patients were entered for the trial more than once but we did not record their preference for treatment. The mechanism for allocation was explained on each occasion and insistence on one sort of treatment would have led to exclusion. Documented exclusions from the trial include one subject who declined aspiration.

Repair of Rupture of Extensor Pollicis Longus using Extensor Pollicis Brevis. By S. HARRISON, A. SWANNELL and B. M. ANSELL (*Wrexham Park Hospital and Canadian Red Cross Memorial Hospital*).

To be published in full with the Discussion in the November, 1972, issue of the *Annals*.

Radiotherapy in the Treatment of Osteoarthritis of the Knee. By T. J. GIBSON, P. J. WINTER, and R. GRAHAME (*Guy's Hospital London*)

There has long been a need for a controlled study to assess the effectiveness of external irradiation in the treatment of osteoarthritis. The purpose of this trial was to evaluate the response of patients with osteoarthritis of the knee to deep x-ray therapy by comparison with the results obtained with standard physiotherapy.

Patients selected for inclusion were aged 60 years or more and had experienced symptoms of osteoarthritis involving a knee which were sufficiently severe to warrant regular analgesics. Treatment was allotted blindly and at random. Those who received radiotherapy were given a total skin dose of 800 rads in four weekly doses of 200 rads. Physiotherapy, comprising short wave diathermy and standard quadriceps exercises, was prescribed over a similar period three times a week, i.e. a total of 12 treatments.

Assessment was made before and after treatment and then at 6 and 24 weeks after starting treatment. Note was made of subjective alleviation in pain and stiffness; changes in analgesic consumption; changes in range of knee flexion and an estimate of the volume of synovial effusion. Functional grading was assessed according to the patients' ability to stand from the sitting position.

There were 29 subjects who underwent radiotherapy and seventeen who received physiotherapy.

The results revealed no significant difference between the two treatment groups.

Discussion

DR. G. D. KERSLEY (*Bath*) The first controlled trial of radiotherapy in arthritis was performed in Bath by Max Desmarais. Rheumatoid subjects, osteoarthritis, and spondylitis were treated and the controls in each group were put under the machine but the current was not turned on. They were assessed at 3 and 6 months. In general, radiotherapy was found to be of no value in rheumatoid arthritis, but in ankylosing spondylitis it was of dramatic benefit, and in osteoarthritis there was a significant improvement.

DR. J. GLYN (*London*) I think that one should separate those patients with degenerative arthritis who manifested effusions from those who did not. The former presumably have a much greater potential for improvement than those with dry and chronically worn-out joints. Did you, in fact, find that those with effusions derived greater benefit?

DR. GIBSON We analysed these patients and we failed to find any improvement in the group with effusions.

DR. A. G. S. HILL (*Stoke Mandeville*) We heard some years ago in this Society the results of treating hip joints with a radioactive source inserted into the femoral head. I cannot recall having heard anything about this since. Does anyone know anything about this work? (Robson and van Miert, 1965).

ANON They have stopped using it.

DR. J. J. DEBLÉCOURT (*Holland*) We have published the results of a double-blind clinical trial of radiotherapy in 330 patients with osteoarthritis of the knee, the hip, and the cervical spine (*Acta rheum. scand.*, 1958, 4, 908). These patients were given a placebo dose, 150 rads over 3 weeks, or 250 rads over 3 weeks. We found no significant therapeutic differences between the three regimes and concluded that there was no point in treating osteoarthritis with radiotherapy.

This trial also included patients with ankylosing spondylitis and periartthritis humeroscapularis, in whom the result of treatment with a placebo dose was significantly less than that obtained by 'substantial' radiotherapy.

References

- Desmarais, M. H. L. (1953) *Ann. rheum. Dis.*, 12, 25
Robson, P. N., and van Miert, P. J. (1965) *Ibid.*, 24, 176 (Abstract)

Inter-relationship of Articular Cartilage Thickness and Cellularity. By R. A. STOCKWELL (*Department of Anatomy, University of Edinburgh*)

Knowledge of the cellularity of articular cartilage is important in the interpretation of various aspects of normal and abnormal tissue. It is useful to possess data which permits the comparison of different joints in the same species or the same joint in different species. The present investigation is a study of the cell density of articular cartilage in a number of young adult synovial joints in eight mammalian species.

Measurements were made in sections cut vertical to the articular surface. The basal calcified layer was not included in the measured cartilage thickness; nuclear counts also were confined to the uncalcified part of the tissue and were corrected for nuclear diameter.

Cell-density varies from about 14,000 cells/mm.³ in

human femoral condylar cartilage to about 330,000/mm.³ in the mouse.

The results indicate that there is an inverse relationship between cartilage cellularity and thickness. For all specimens studied this may be expressed by a formula of the allometric type: $y = 27,900x^{-.89}$ (y = number of cells per mm.³; x = cartilage thickness in mm.). Similar relationships hold either for small and large joints of the same species or for the same anatomical joint of small and large species. Therefore, the absolute number of cells deep to 1 mm.² of articular surface is of the same order in all specimens, the mean value being $25,500 \pm 8,800$.

With respect to the nutrition of cartilage, the results of the present study, when related to what is known of the metabolism of articular chondrocytes, suggest that the glucose requirement for the cartilage tissue deep to the same unit area of articular surface will be approximately the same in all joints. They suggest also that the cell clusters found in fibrillated cartilage are a response to the increased surface area available for diffusion from the synovial fluid.

Discussion

DR. R. J. FRANÇOIS (*Belgium*) Does the number of cells increase from the surface to the deeper layers of the cartilage? Did you take into account that some animals have perforating channels through the epiphyseal bone plate and other animals do not?

MR. STOCKWELL The cell density decreases with distance from the articular surface. I have ignored any possibility of nutrition from the subchondral marrow spaces but have treated it entirely as a relationship of the thickness of the uncalcified tissue.

PROF. E. G. L. BYWATERS (*Taplow*) Evidence has been produced of increased synthetic activity in the cells of fibrillated cartilage. Could we not then think of this the other way round, so that the increased or abnormal synthesis could be considered as the primary factor responsible for cartilage matrix degeneration?

MR. STOCKWELL The evidence for an increased synthetic activity per cell in fibrillated cartilage is not conclusive. In my paper I have accepted the conventional idea that cell cluster formation is preceded by vertical fibrillation.

DR. J. GLYN (*London*) Do you think that your observations might have a clinical implication in relation to the development of osteoarthritis? I ask this because of some recent experimental work in which the destruction of articular cartilage cells by cryoprobe was followed by undoubted loss of metachromatic staining and a depletion of chondroitin sulphate. However, in a 6-months follow-up, no evidence of classical degenerative arthritis was seen.

MR. STOCKWELL I cannot make any comment on that. The evidence suggests that the cell clusters are not very effective anyway in repair processes.

MR. A. R. TAYLOR (*Stoke Mandeville*) Have you compared the cell populations in weight-bearing and non-weight-bearing joints of roughly the same size in the same animal?

MR. STOCKWELL I have no results that I can quote. I would expect that weight-bearing areas with thicker cartilage would have a lower cellularity than thinner and non weight-bearing areas.