Abstracts

This section is published in collaboration with *Abstracts of World Medicine* and *Ophthalmic Literature*, published by the British Medical Association, and also includes a great many which are specially commissioned for this Journal. They are divided into the following sections:

- **Acute Rheumatism**
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  - Pararheumatic (Collagen) Diseases
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At the end of each section is a list of titles of articles noted but not abstracted. Not all sections may be represented in any one issue.

**Acute rheumatism**

A Day Hospital for Children with Rheumatic Fever

**SPAGNUOLO, M., GAVRIN, J., and RYAN, J. (1970)** *Pediatrics*, 45, 276 1 fig., 11 refs

In the rheumatic disorders of children, as in other illnesses, the amount of medical supervision needed decreases with time, although continued observation remains desirable. The need to avoid the overuse of specialized and expensive hospital facilities, has led to the establishment in several places of Day Hospitals, upon an experimental basis. This report is from the Irvington House Day Hospital, New York, where the patients have the benefit of whatever medical attention and auxiliary services may be needed and can return home at night.

The authors report on one hundred consecutive children with acute rheumatic fever who attended during the latter part of their illness at a time when they were able to tolerate near-normal activities. Most of them were finally discharged shortly after discontinuation of therapy, although a few of the exceptions who are described had to be readmitted with clinical rebounds and other residual disorders.

The incidence of permanent heart disease in those who attended the day hospital did not differ from that in children who had been subjected to full hospitalization for the entire duration of their illness. The authors conclude that a long period of hospital care and convalescence is required only in that 5 per cent. of patients who have chronic rheumatic fever. The others who attended the Day Hospital were able to resume normal activities including schooling much sooner than they had continued as in-patients.

Role of Tonsils in predisposing to Streptococcal Infections and Recurrences of Rheumatic Fever


Indirect Immunofluorescence in the Serological Diagnosis of Streptococcal Diseases I. Application in Rheumatic Fever


Decreasing Incidence of a History of Acute Rheumatic Fever in Chronic Rheumatic Heart Disease


Some Aspects of Epidemiology and Surveillance of Rheumatic Fever


Studies on the Serum Level of Neuraminic Acid in the Course of Cardiac Failure in Children with Rheumatic Fever [In Polish] Sowińska, J., and Wojtecka, E. (1969) Reumatologia (Warsz.), 7, 341 3 figs, 6 refs


Criteria of Rheumatic Fever Davis (1970) Lancet, 1, 1045


Transient Complete A-V Block in Two Siblings during Acute Rheumatic Carditis in Childhood Stocker et al. (1970) Pediatrics, 45, 850

Rheumatoid arthritis


Pericarditis as an autopsy finding in 30 to 40 per cent. of cases of chronic rheumatoid arthritis has been reported in many series since Charcot's paper in 1881 which recorded such a finding in four out of nine examinations. The present authors report detailed post mortem observations in 47 cases of seropositive rheumatoid arthritis and confirm these findings—in an equal number of unmatched controls it was uncommon. Such lesions, although almost always benign, are often associated with electrocardiographic changes during life. They also appear to relate to long duration of the arthritis disease and severe musculoskeletal disability. Constrictive pericarditis and rheumatoid granuloma, however, are rarely found. Myocarditis was found most frequently in patients with severe osteoporosis. Coronary arteritis, when discovered, seemed to be more frequently relevant to the rheumatic condition; functionally important valvular disease was rare. Non-specific endocarditis, although found to be quite common, was not more so than in the control group. The authors conclude that most—but not all—heart disease found in rheumatoid arthritis patients is innocuous. W. S. C. Copeman


Among 35 patients with classical or definite rheumatoid arthritis, in whom there was no clinical evidence of arthritis or amyloidosis and in whom renal function was grossly normal, the 5-hour urine xylose was significantly reduced (below 6·2 g.) in eighteen, and in six of these the serum xylose was raised. A low urine xylose was virtually restricted to females; it was not related to the titre of rheumatoid serum factor, nor explicable by the use of phenaceta. The authors consider these results to indicate renal impairment rather than intestinal malabsorption and suggest that the former may be commoner than is generally supposed. J. Ball


Microscopic Appearance of Baker's Cyst in Cases of Rheumatoid Arthritis WAGNER, T., and ABGAROWICZ, T. (1970) Reumatologia (Warsz.), 8, 21 3 fgs, 9 refs


Rheumatoid Disease: Rheumatoid Arthritis as a Systemic Disease (La enfermedad reumatoidea. La artritis reumatoide como afecion sistémica) LASALA, F. G., and PODESTA, H. A. (1970) Pren. méd. argent., 57 149

Choroidal Nodules and Retinal Detachments in Rheumatoid Arthritis. Improvement with Fall in Immunoglobulin Levels following Prednisolone and Cyclophosphamide Therapy HURD et al. (1970) Amer. J. Med., 48, 273


Still's disease


Still's disease


Radiological Diagnosis of Juvenile Rheumatoid Arthritis (Röntgendiagnostik der juvenilen Rheumatoid-Arthritis) LORENZ, K., and BERGER, G. (1969) Radiol. diagn. (Berl.), 10, 647 9 figs, 18 refs


Osteoarthrosis


Rapidly Destructive Osteoarthritis of the Hip (La coxarthrose destructrice rapide) LEQUESNE, M. (1970) Rhumatologie, 22, 51 10 figs, 10 refs


Osteoarthritis and Osteitis with Multiple Foci in the Course of Septicaemia due to ‘Reading’ Salmonella complicating Sickle-cell Thalassaemia (Ostéoaarthrite et ostéite à foyers multiples au cours d’une septicémie à Salmonella ‘Reading’ compliquant une thalasso-drépanocytose) DOURY, P. (1970) Rev. Rhum., 37, 359


Spondylitis


Gout


Of sixty patients with cerebrovascular episodes, fourteen were found to have sustained hyperuricaemia. It is therefore suggested that hyperuricaemia may be a predisposing factor to atheroma.

[The definition of hyperuricaemia—values above 7 mg./100 ml. in males and 6 mg./100 ml. in females—was obtained after reference to an undefined control group of 200 subjects. Comparison of the two populations was not made by the proper statistical method and interpretation of the study is therefore slightly unsatisfactory.]

J. T. SCOTT


Blood from sixty patients with cerebrovascular disease was examined with reference to uric acid, cholesterol, free fatty acids, triglycerides, and phospholipids. To determine whether these results were abnormal, the percentage of subjects having levels over the estimated normal 95th percentile was compared with the estimated 5 per cent. of normals, normal figures being obtained from published sources. It was concluded that the patients showed raised levels of all the lipid fractions, especially in respect of triglycerides. All the lipid fractions tended to
be elevated together, but these changes did not correlate with hyperuricaemia.
[The study and its interpretation would have been facilitated by the inclusion of a control group.]  

Effect of Colchicine on Human Platelet Behaviour  
*J. Atheroscl. Res.*, 10, 247 4 figs, 17 refs

Because of the capacity of colchicine to combine with microtubules, it has been found to inhibit clot retraction. The present investigation from the Department of Medicine, Nottingham University, extends this observation to other aspects of platelet behaviour.

The effect of colchicine in various concentrations on platelet aggregation produced by ADP, by nor-adrenaline, and by a connective tissue preparation ('collagen') was tested *in vitro*. In each instance, platelet aggregation was inhibited, the degree of inhibition varying with the concentration of colchicine. Colchicine was also shown to diminish platelet adhesiveness. By the use of -SH inhibitors it was demonstrated that the action of colchicine was probably not due to -SH blockade. By the use of an acetylated analogue of colchicine it was further shown that the inhibition of platelet aggregation by colchicine was not due to the presence of an acetyl group.

It is concluded that, because of its capacity to inhibit platelet retraction, aggregation, and adhesiveness, colchicine may modify some fundamental property of platelets, perhaps related to their microtubular/contractile protein system.

D. L. GARDNER

Intestinal Malabsorption induced by Oral Colchicine. Comparison with Neomycin and Cathartie Agents  
*Amcr. J. med. Sci.*, 259, 32 4 figs, 18 refs

(See *Abstr. Wild Med.*, (1970) 44, 587)

Treatment of Gout with Thiopurinol (with Reference to 50 Cases)  
(Simplet de la goutte par le Thiopurinol (A propos de 50 observations))  
*Rhumatologie*, 21, 319 4 figs, 4 refs

(See *Abstr. Wild Med.*, (1970), 44, 456)

Liver Involvement in Gout (Leberbeteiligung bei Gicht)  
*Disch. med. Wschr.*, 59, 59 3 figs, 17 refs

(See *Abstr. Wild Med.*, (1970), 44, 456)

Current Problems of Gout (Aktuelle Gichtprobleme)  
*Z. ges. inn. Med.*, 25, 458 82 refs

Sacrococcygeal Gout associated with Hemoglobin E and Hydropsplenism  
*Radiology*, 95, 413 2 figs, 13 refs

Radiological Appearance of the Spine in Gouty Patients  
In Polish  
*Reumatologia (Warsz)*, 7, 325 2 figs, 15 refs


Manifestations of Gout in the Hip (Manifestations de la goutte à la hanche)  
*Rhumatologie*, 22, 77 2 figs, 4 refs

Gout and Myxoedema (Goutte et myxödème)  
*Rev. Rhum.*, 37, 333 6 refs

Dynamics of Metabolism in Gout (Dynamik des Stoffwechsels bei Gichtkranken)  
*Med. Klin.*, 65, 790 3 figs, 49 refs

Circadian Rhythm of Uricemia (Ritmo circadiano en la uricemia)  
*Pren. méd. argentin.*, 57, 241 2 figs, 27 refs

Renal Excretion of Uric Acid in Various Conditions causing Hyperuricaemia (L'escrezione renale dell'acido urico in diverse condizioni iperuricemizzanti)  
*Policlinico, Sez. prat.*, 77, 245 7 refs

Renal Function Studies with Radioisotopes in Gouty Arthritis (Nierenfunktionsuntersuchungen mit Radioisotopen bei Arthritis urica)  
*Z. Rheumaforsch.*, 29, 85 4 figs, 15 refs

*Acta med. philipp.*, 6, 48 2 figs, 10 refs

Hyperuricemia and Neurologic Deficits: A Family Study  
ROSENBERG et al. (1970)  
*New Engl. J. Med.*, 282, 992

Hyperuricaemia in Northern Finland  
*Ann. clin. Res.*, Suppl. 1 to Vol. 1

Calcium Pyrophosphate Crystal Synovitis with Articular Chondrocalcinosis (‘Pseudogout’ Syndrome)  
*Med. J. Aust.*, 1, 466 26 figs, 21 refs

Disorder of Purine Metabolism due to Partial Deficiency of Hypoxanthine-Guanine Phosphoribosyltransferase  
*Amcr. J. Med.*, 48, 148 10 figs, 57 refs

Enzymopathic Types of Gout. Disorders of Purine Metabolism due to Deficiency of Hypoxanthine-Guanine Phosphoribosyltransferase. Frequency and Clinical Characteristics of the Enzyme Deficiency (Gouttes enzymopathiques. Dyspurinuries par déficit en hypoxanthine-guanine phosphoribosyltransférase. Fréquence et caractères cliniques de l'enzyme)  
*Presse méd.*, 78, 729 4 figs, 10 refs
Clinical Trial of L2214 in the Treatment of Gout or Rheumatological Syndromes associated with Hyperuricaemia (Essai clinique du L2214 dans le traitement de la goutte ou des syndromes rhumatologiques associés à une hyperuricémie) BOGAERT, PH. VAN (1969) J. belge Rhum. Méd. phys., 24, 295 1 fig, 5 refs


Diagnosis of Lesch-Nyhan Syndrome by Skin Specimens FROST et al. (1970) J. Amer. med. Ass., 212, 316

Other forms of arthritis


A review of temporal arteritis and its association with arteritis of the lower limbs and with rheumatism, with a report of one case.

The patient was a woman aged 60 years, with scapular and pelvic pain, fever, leukocytosis, anaemia with increased sedimentation rate, and changes in the plasma proteins. She developed gangrene of the legs, requiring bilateral amputation. Histological examination of the main arteries of the legs showed giant-cell arteritis of the type seen in temporal arteritis, although biopsy of the right temporal artery failed to show any histological abnormality. In the affected vessels the media was infiltrated with lymphocytes and other inflammatory cells; the intima showed fibrous thickening with obliteration of small vessels: the internal elastic lamina was destroyed by granulomatous inflammatory tissue containing giant cells. Atheromatous changes were not present. Treatment with corticosteroid hormones was effective.

It is suggested that arteries other than the temporal artery can be involved by a giant-cell arteritis, that this is more frequent than has been previously supposed, and that as in the present case the involvement of other arteries may dominate the clinical picture.

H. A. SISONS


The arthropathy associated with chondrocalcinosis has been compared in twenty patients with haemochromatosis and forty with idiopathic chondrocalcinosis at King's College Hospital. In the idiopathic group, osteoarthritis affecting the lumbar spine, hips, and knees was commonly found. In the haemochromatosis group, a specific arthropathy, mainly affecting the metacarpophalangeal joints, was present in sixteen, superficially resembling rheumatoid arthritis, but without synovial thickening. X-ray examination showed small cysts in the metatarsal heads, followed by degenerative changes but without any marginal erosions of rheumatoid arthritis. Osteoarthritic changes were also found in the elbows, shoulders, hips, and knees. Acute episodes of crystal synovitis were equally frequent in either group, most commonly affecting the knee. Synovial biopsy revealed calcium pyrophosphate crystals in six of 24 in the idiopathic group, but in none of seven with haemochromatosis, although iron deposits were identified in two of these. Fibrocartilage calcification was similar in the two groups, but hyaline cartilage calcification was significantly more common with haemochromatosis, and there was a correlation between the degree of calcification and the severity of arthropathy in this group, but not in the idiopathic group.

A. B. MYLES


Articular Chondrocalcinosis and the Problem of Pathogenesis (La chondrocalcinose articulaire et son mystère pathogénique) SOLNICA (1970) Presse méd., 78, 873


Gonorrhea with Skin and Joint Manifestations WOLFF et al. (1970) Brit. med. J., 1, 271


Investigations into the Hereditability of Psoriatic Arthropathy (Untersuchungen über die Vererbarkeit des Syndroms Psoriasis arthropathica) VILÅGY, I., and KREBS, A. (1970) Dermatologica (Basel), 140, 209 8 refs


Bone disease


Aseptic Necrosis of the Femoral Head (La nécrose aseptique de la tête fémorale) LAGIER, R., MARTIN, E., and RADI, I. (1970) Schweiz. med. Wschr., 100, 814 4 figs, 21 refs


Non-articular rheumatism


There have been nineteen cases between 1963 and 1966 at the Department of Surgery, Turku University, in which a patient with lumbar disc prolapse has also had urinary symptoms from 1 to 7 days. This study is principally concerned with eighteen such patients treated by immediate surgery: this group is compared with another 98 patients operated upon during the same period for uncomplicated lumbar disc prolapse. Most patients had a short history of dorsal pain radiating to the extremities. The straight-leg raising test was positive and there was some loss of sensation in all patients: the residual urine exceeded 500 ml. in fifteen patients. Follow-up examinations were made in seventeen cases at from 6 mths to 3 yrs after operation. Motor and sensory disturbances showed little change. Mild urinary symptoms were present in about 30 per cent. of cases. Urinary function was studied by cystometry: an atonic bladder was present in about 70 per cent., but the residual urine exceeded 10 ml. in only 25 per cent. and none had ureteral reflux. All patients were at work after 6 months, but some had to change to lighter occupations.

A. J. PALFREY

Effects of Torsion on the Lumbar Intervertebral Joints: The Role of Torsion in the Production of Disc Degeneration


Calcifying Tendinitis (Tendinites calcifiantes) Szeze, S. De, and Welpling, J. (1970) Rhumatologie, 22, 45 2 refs


Connective tissue studies


Experimental Study of the Effects of Growth on the Relationship of Tendons and Ligaments to Bone at the Site of Diaphyseal Insertion Videman (1970) Acta orthop. scand., Suppl. 131


Cultures of the Synovial Membrane Lining Cells [In Polish] Abgarowicz, T., and Koziorowska, J. (1969) Reumatologia (Warsz.), 7, 291 1 fig., 6 refs


Pararheumatic (collagen) diseases


(See Abstr. Wild Med. (1970), 44, 526)


(See Abstr. Wild Med. (1970), 44, 559)


(See Abstr. Wild Med. (1970), 44, 548)


(See Abstr. Wild Med. (1970), 44, 548)


(See Ophthal. Lit., vol. 24)


(See Ophthal. Lit., vol. 23)


(See Ophthal. Lit., vol. 24)


(See Ophthal. Lit., vol. 23)


Connective Tissue Disease following Anti-Epileptic Therapy Danø, P. (1969) Epilepsia (Amst.), 10, 481 19 refs


Takayasu’s Syndrome and Lupus Disease (Syndrome de Takayasu et maladie lupique) Siguer et al. (1970) Ann. Méd. intern., 121, 531


Proliferative Myositis Heyden et al. (1970) Acta path. microbiol. scand., 78A, 33


Treatment of Scleroderma by Rheomacrodex ALANI, M. D. (1970) Acta derm.-venereol. (Stockh.), 50, 137 20 refs


Systemic Sclerosis associated with Auto-Immune Haemolytic Anaemia CHAVES et al. (1970) Brit. J. Derm., 82, 298


Measurement of Creatine Phosphokinase in Patients with Scleroderma and Dermatomyositis (Die Bestimmung der Kreatin-Phosphokinase bei Sklerodermie und Dermatomyositis-Kranken) DEBRECZI, M., and LADÁNYI, É. (1970) Hautarzt, 21, 81 7 refs


Disseminated Lupus Erythematosus as the Rheumatologist sees it Today (Le visage actuel pour le rhumatologue du lupus érythémateux disséminé) KAHN, M. F., and SÉZE, M. DE (1970) Rhumatologie, 22, 65 12 refs


Systemic Lupus Erythematosus BRANDSMA et al. (1970) Angiology, 21, 172

Type 1 Dysgammaglobulinemia, Systemic Lupus Erythematosus, and Lymphoma SMITH et al. (1970) Amer. J. Med., 48, 113


Occurrence of Systemic Lupus Erythematosus in Association with Ethosuccimide Therapy DABBOUS and IDRIS (1970) J. Pediat., 76, 617


Immunology and serology

Immun Complexes in Rheumatoid Synovitis: A Mixed Staining Immunofluorescence Study  

This study describes the demonstration of immune complexes in rheumatoid synovial tissue. It deals with the detection, by immunofluorescence microscopy, of in vivo formed deposits containing IgG and rheumatoid factor (RF), and IgG and complement component (β1C). The presence of such complexes, involving complement RF, and antibody globulin has been suspected from other observations, including that of low levels of complement in rheumatoid synovial fluid, but it has hitherto not been demonstrated.

The authors, working at the University of Bari Medical School in Italy, examined synovial tissue from seven sero-positive and three sero-negative rheumatoid patients, and from two controls. Immunoelectrophoretically pure, specific antisera of human and rabbit origin, conjugated with contrasting fluorescent dyes were used to visualize the components of the immune deposits by mixed direct staining of tissue sections.

Sections of synovial tissue from the seven sero-positive patients contained IgG-RF complex, and all ten patients had IgG-β1C synovial deposits. No specific fluorescence was seen in control sections. The distribution was similar in all patients and with both types of deposit in the interstitial connective tissue, in vessel walls and perivascular areas, and in the cytoplasm of tissue phagocytes. However, the patterns differed in that IgG-β1C formed smaller and more numerous connective tissue foci than IgG-RF, and the latter was present to a greater extent in vessel walls, while IgG-β1C stained mainly perivascular tissue.

These findings are discussed in the light of hypotheses concerning pathogenicity and the role of RF in rheumatoid arthritis.

K. Rhodes

Serum Immunoglobulin and β1C/β1A Globulin Levels in Rheumatoid Arthritis  

Serum total Ig, IgG, IgA, IgM, and β1A globulin (which is closely correlated with total complement activity) were estimated by a radial immunodiffusion method in 55 patients with rheumatoid arthritis and 48 'controls' (blood donors), both groups being divided into approximately equal groups aged < 55 years or ≥ 55 years.

The mean Ig, IgG, IgA, and IgM were higher in the patients than in the controls, though when age was taken into consideration the difference with respect to IgA and IgM was not significant. The increase in IgG and Ig levels was greater in patients with a relatively high ESR and low haemoglobin levels. No significant difference in β1A values were found between patients and controls.

In controls, total Ig and IgG rose with age whereas IgM fell. In the patients there was no relation with age. In patients but not in normals IgA levels were higher in males than females. β1A was positively correlated with total Ig and with IgG in patients but not in controls.

J. Ball

Elevated IgG Antiglobulins in Patients with Seronegative-Rheumatoid Arthritis  

The authors, working in the departments of immunology and rheumatology at the Middlesex Hospital, London, have previously reported that a large proportion of so-called sero-negative rheumatoid arthritics possess rheumatoid factors of the IgG class. These were detected by adsorption upon insoluble cross-linked rabbit gamma globulin (Cohn fraction II), elution at low pH, and quantitative estimation by radial diffusion on Mancini type plates.

The present study compares the results obtained when insoluble cross-linked horse γ-globulin was used in place of the rabbit globulin. With very few exceptions higher values were obtained with the horse globulin adsorbent. By the use of this method many more of the seronegative rheumatoid arthritics gave results well outside the range found in normal and osteoarthritic subjects.

The result also suggest a positive correlation between the amount of IgG antiglobulin and the activity and extent of the disease.

L. E. Glynn

Rheumatoid Anti-Gm Factors with Specificity for the pFc' Subfragment of Human Immunoglobulin G  

Studies on the sites of the determinants on the IgG molecules reactive with rheumatoid factors have localized these to the Fc portion of the heavy chains. Several of these determinants are allotypic, i.e. they are present in some individuals but not in others and their presence is genetically controlled. Amongst these determinants are those of the Gm system but, although their existence was first discovered by the use of rheumatoid sera, some doubt has been thrown upon the specificity of these sera and in consequence studies of the Gm groups are now usually made using nonrheumatoid anti-Gm reagents chiefly derived from individuals who have received multiple transfusions.

The present study from the Rikshospitalet University Hospital, Oslo, and the Institute of Child Health, London, shows that the anti-Gm activity of rheumatoid sera can indeed be specific, although some four to eight times less sensitive than corresponding non-rheumatoid reagents. The specificity of these rheumatoid anti-Gm reagents was especially well shown when a fragment of the Fc portion referred to as pFc' and carrying the Gm (c) grouping was used to inhibit the agglutination system employed. This pFc' fragment is a dimeric subunit of 26,000 mol.wt. derived from the C terminal end of the heavy chains. The other Gm groups studied (s, g, and b) apparently have their determinate sites further towards the free amino end of the heavy chains.

L. E. Glynn

Altered Reactivity in Mixed Lymphocyte Culture of Lymphocytes from Patients with Rheumatoid Arthritis  
Astorga, G. P., and Williams, R. C., Jr. (1969) Arthritis and Rheum., 12, 547 3 figs, 17 refs

A series of 22 patients with classical rheumatoid arthritis, six of whom were on small doses of corticosteroid, and
controls from among healthy blood-bank volunteers, were investigated using a one-way stimulation mixed lymphocyte culture (MLC). In fourteen of 22 experiments the rheumatoid arthritis lymphocytes showed no mutual stimulation, but in another eight cultures pairs the cells showed positive responses as much as six times above base-line values. When mitomycin-treated lymphocytes from normal subjects were cultured with lymphocytes from patients with rheumatoid arthritis, the normal cells produced marked cell stimulation in sixteen of the 22 pairs tested; there was no stimulation in the remaining six pairs. When control normal lymphocytes were cultured with stimulating rheumatoid arthritis lymphocytes, marked blast transformation occurred in nineteen of the 22 experiments. The difference in response among various pairs of rheumatoid arthritis lymphocytes was consistent when re-studied on two or three occasions. If there was apparent lack of MLC cell response, the capacity for lymphocyte stimulation was verified by positive phytohaemagglutinin response.

The lack of cross-stimulation could not be correlated with the presence or absence of serum anti-gammaglobulin factors nor with the use of anti-inflammatory drugs. The apparent lack of mutual lymphocyte response observed among the rheumatoid pairs studied may be related to critical ratios of mixed cells. No explanation could be given for these results; it was suggested that heterogeneity within the lymphoid system may be altered in patients with rheumatoid arthritis, so that the cells capable of responding to histo-incompatibility antigens is in some way altered.

B. M. ANSELL

Cardioglobulin: Tissue Localization and Plasma Activity with Special Reference to Cardiovascular Disease and Lupus Erythematosus


Mammalian plasma contains a group of proteins, cardioglobulins, which together mediate increased contractility of isolated frog heart, according to previous reports of these authors. Plasma cardioglobulin A is increased in patients with hypertension and aortie stenosis, and plasma cardioglobulin C is decreased in some patients with congestive heart failure. The present report deals with the localization of cardioglobulin C in tissues. Frog hearts pretreated with human cardioglobulin B and rat cardioglobulin C were purified with guinea-pig antiserum against rat cardioglobulin C. This inhibited the effect of subsequently purified cardioglobulin A. Fluorescent staining (by a method inadequately described) showed binding of antia cardioglobulin C antibody on the frog heart muscle. On sections, the same antisera showed binding with various rat tissues, including intercellular material in muscle and apparently basement membrane in kidney. Further investigations of cardioglobulin levels in human plasma showed especially low levels in 24 cases of systemic lupus erythematosus, but normal levels in seventeen cases of rheumatoid arthritis or other connective tissue disease. The authors suggest that plasma concentrations of cardioglobulin may vary inversely with tissue activity, and that the low plasma concentrations in systemic lupus erythematosus may indicate the functional significance of cardioglobulins in the tissues.

E. J. HOLBOROW

Removal of Aggregated and Nonaggregated Autologous Gamma Globulin from Rheumatoid Joints


The authors, at Georgetown University Hospital, examined the effects of IgG injection into knee joints in the presence and absence of rheumatoid factor. Reduced and alkylated IgG is a particularly suitable material, since it does not cause inflammation by itself.

Eleven patients with rheumatoid arthritis were studied, and two with degenerative joint disease. Autologous IgG was produced from serum by DEA cellulose chromatography. This was treated with 2-mercapto-ethanol. Radio-labelling was with 131I or 125I. Heat-aggregation was at 63°C. for 15 to 30 minutes. Albumin was heated more strongly. An external counter was used for body-counting.

It was found that the rate of protein removal, though variable from patient to patient, was faster the greater the inflammation of the joint. Although albumin is at first removed faster, the rate after the first 2 days is similar to that of IgG or reduced IgG, which are removed at similar rates. However, heat aggregation of reduced autologous IgG enhanced the rate of removal from the joint, in both rheumatoid and osteoarthritic patients. Heat-aggregated albumin was also removed more quickly. An inflammatory joint reaction was noted in only one of the 24 injections in all thirteen patients. During the reaction there was delayed removal of IgG and reduced IgG.

G. LOEWI

Agammaglobulinaemia with Poliarthritis and Subcutaneous Nodules


This paper from the Department of Medicine, University College of Los Angeles, describes a study of a 4-year-old boy with polyarthritis, no detectable serum immunoglobulin, a normal delayed hypersensitivity response, and subcutaneous nodules resembling rheumatoid nodules histologically but in atypical sites.

The patient's parents were healthy, but their cultured blood lymphocytes showed defective uptake of thymidine and only half the expected number of immunoglobulin-producing cells. The patient's lymphocytes transformed in the presence of phytohaemagglutinin but did not produce immunoglobulins.

Cells containing immunoglobulins were found in the synovium in which complement was also detected. Synovial fluid complement was depressed; its immunoglobulin content was 2-5 mg. per cent. for IgG (compared with less than 0-019 mg. per cent. in the serum); it contained no ragocytes; rheumatoid factor was detected only at a titre of 1 : 2. The authors conclude that locally-produced complement-fixing antibodies may be responsible for the arthritis but that ragocytes cannot be implicated.

The patient's nodules, which disappeared after treatment with gammaglobulin, contained neither immunoglobulins nor complement.

J. BALL
Lymphocytic Transformation in Patients with Amyloidosis

Clin. exp. Immunol., 6, 439 20 refs

This paper, from Guy’s Hospital Medical School, investigates whether there is any impairment of cellular immunity, as judged by the lymphocyte transformation test, in patients with amyloidosis. Seven patients with biopsy-verified renal amyloidosis were investigated, together with nine controls. The test was carried out according to a method previously described, using phytohaemagglutinin (PHA), purified protein derivative (PPD), extract of Candida albicans, herpes simplex virus, and a homogenate of foetal liver as antigens. In addition, amyloid fibrils, prepared by differential centrifugation from the liver of a patient with primary amyloidosis, were used. Only the test involving stimulation with herpes simplex virus revealed any impairment of cell-mediated immunity in the amyloid group. Stimulation by the amyloid fibrils caused lymphocyte transformation in five out of seven patients with amyloid, but also in three out of eight healthy controls. The reaction is thus insufficiently specific to be used as a diagnostic test for amyloidosis.

J. R. DALY


Beta_a—(C')—Globulin Concentration in the Serum in Acute and Chronic Renal Disease, Liver Disease, and Rheumatic Diseases (Die Beta_a—Globulin—(C')—Konzentration im Serum bei akuten und chronischen Nephropathien, Hepatopathien und rheumatischen Erkrankungen) POGLITSCHE, H., GIESSAUF, W., FELDNER, H., and STÖCKL, G. (1970) Wien. med. Wschr., 120, 381 4 figs, 17 refs


Rheumatoid Factor as a Functional Protein or an Anomaly of Protein Structure (Gedanken zum Rheumafaktor-Funktionsprotein oder Proteinstruktur anomalie) KÜHN, R. A. (1970) Z. Rheumaforsch., 29, 14 2 figs, 14 refs


Comparative Studies of the Sensitivity, Value, and Dependability of Serological Tests in Rheumatic Diseases (Vergleichende Untersuchungen zur Empfindlichkeit, Wertigkeit und Zuverlässigkeit serologischer Rheumatests) Schmidt, K., Mueller-Eckhardt, Ch., and Beckmann, D. (1970) Z. Rheumaforsch., 29, 20 17 refs


Gm Distribution in Rheumatic Diseases with Special Reference to Rheumatoid Arthritis. Part I. Gm (a) and Gm (x) Factors in Rheumatic Diseases (Gm-Eigenschaften bei rheumatischen Erkrankungen unter Berücksichtigung der Polyarthritis chronica progressiva. I. Mittelung: Gm (a)- und Gm (x)- Faktoren bei rheumatischen Erkrankungen) Neumann, W., Barthel, E., Tanner, E., and Seidel, K. (1970) Z. ges. inn. Med., 25, 308


Importance of Antibody Concentration, Binding Constant, and Heterogeneity in the Suppression of Immunity to the Rh Factor Pollack, W., and Kočesky, R. J. (1970) Int. Arch. Allergy., 38, 320 4 figs, 16 refs


Experimental studies in animals


This investigation, from the Department of Pathology, Institute of Orthopaedics, Royal National Orthopaedic Hospital, Stanmore, Middlesex, describes the arthritic response of rabbits to the intra-articular injection of the L-form of the C 203 S strain of group A streptococci used previously for the production of streptolysin S, and of the L-form of the non-haemolytic variant C 203 U. The reactions to these L-forms were compared with those caused by the intra-articular injection of the parent organism C 203 S and by the injection of protoplast membranes obtained from C 203 S streptococci.

A chronic nonarticular arthritis was produced by injecting the L-forms. Heating at 80°C for 20 min., a temperature which inactivates the haemolytic lysosomelabilizing fraction of streptolysin S, did not impair the response to the organisms, a procedure which, however, caused organisinal death. The histological changes produced resembled those of rheumatoid arthritis. Only two of 32 animals given C 203 S L-form developed precipitating antibodies against a suspension of the organ-
ism; weak reactions against horse serum (present in the medium in which the L-forms were first cultured) were occasionally detected, but there was no association between antihorse serum antibody formation and the development of arthritis. No evidence of rheumatoid factor formation was detected in rabbits which developed arthritis.

The experiments show that an arthritis similar to that produced previously by the injection of streptolysin S can be caused by the injection of the killed L-form of the group A streptococcus used to produce the streptolysin S. The nonhaemolytic mutant organism the L-form of which does not contain streptolysin S, was equally effective in causing arthritis.

The possibility is suggested, without evidence, that the L-forms which cause arthritis transform lymphocytes, releasing cytotoxic factors injuring joint tissue. A second unsubstantiated possibility to which attention is drawn is the presence in the L-form surface of an antigen cross-reacting with a synovial antigen. D. L. GARDNER


Cell-free extracts of normal and of rheumatoid synovial tissue were injected intraperitoneally into newborn mice. The site and time of injection was found to be unimportant. No abnormalities were discovered in the control animals or their litters. In some of the animals injected with extract from rheumatoid cells changes were noted which bore gross and histological similarities to rheumatoid arthritis. Vertical congenital transmission to the fourth or fifth generation was noted. The results indicate the presence of an active transmissible agent in human rheumatoid arthritis tissue. W. C. DICK

Inhibition of Adjuvant Disease in Rats by the Interferon-Inducing Agent Pyran Copolymer KAPUSTA, M. A., and MENDELSON, J. (1969) Arthr. and Rheum., 12, 463 3 figs, 34 refs
(See Abstr. Wild Med. (1970), 44, 409)


Adjuvant Arthritis in the Rat. III. Investigations on Pathogenesis (Die Adjuvansarthritis der Ratte. III. Untersuchungen zur Pathogenese) KETTL, W., and ZEIGELER, J. (1979) Z. Rheumaforsch., 28, 434 4 figs, 11 refs


Biochemical studies

Arthritogenic Effect of Indole, Skatole, and Other Tryptoanthin Metabolites in Rabbits NAKONECZNA, I., FORBES, J. C., and ROGERS, K. S. (1969) Amer. J. Path., 57, 523 1 fig., 17 refs

In view of the reports on abnormal tryptophan metabolism in RA, it was considered worthwhile to examine metabolites of this pathway for their ability to induce lesions in rabbit joints. Indole and skatole produced a synovitis consisting of early polymorph infiltration followed by synovial cell hyperplasia and a mononuclear cell infiltrate. Subsynovial fat was infiltrated and replaced by granulation tissue. Multiple prolonged injections produced chronic disease with pannus and cartilage destruction.

In contrast, the other metabolites, tryptophan, kynurenine, 3-hydroxykynurenine, kynurenic acid, ananthralic acid, zanthurenic acid, 3-hydroxyanthranilic acid, nicotinic acid, nicotinamide, oxindole, isatin, and indican into rabbit knee joints did not produce any pathological changes.

An explanation involving the lipophilic activity of the arthritogenic compounds is offered, postulating interaction of such compounds with cell and organelle membranes, leading to lysosomal release. G. LOEWI


Therapeutic Action of Antirheumatic Drugs through their Influence on Collagen Metabolism (Beeinflussung des Kollagenstoffwechsels durch Antirheumatika als therapeutisches Prinzip) Fegler, K., and Gerlach, U. (1970) Z. Rheumaforsch., 29, 107 7 figs, 49 refs


Therapy


This report from the Georgetown University School of Medicine describes the use of azathioprine (1-7 to 4.3 mg./kg./day) in eleven patients with nephritis of systemic lupus erythematosus. Renal biopsy was performed in six patients before starting therapy. Prednisone had been used in all the patients but had been ineffective in ten and the eleventh patient had developed steroid cataracts. Four patients died during or shortly after therapy; three of these had renal failure and in two the disease appeared to increase in severity shortly after the azathioprine was commenced. Two other patients showed no improvement in renal function, but follow-up of 18 months and 4 years respectively has shown no progression of the renal lesion. A further two patients showed temporary improvement in urinary abnormalities and in tests of renal function, but they died approximately 6 months later, having been lost to follow-up. Acute infection during azathioprine therapy developed in two patients. Both recovered and there followed a gradual remission in the renal findings despite reduction in one and cessation in the other of the immunosuppressive therapy. The final patient had already partly remitted with corticosteroid therapy but was changed to azathioprine when cataracts developed. She went on to achieve a full remission.

The authors consider that failure to respond to azathioprine usually indicates chronic renal disease with fibrosis. On the other hand, evidence of active disease, as shown by inflammatory glomerular lesions and a low serum complement level, and maintenance of normal renal function do not always imply a good therapeutic result. Leucopenia occurred in all the patients who responded to immunosuppressive therapy, but there was no appreciable fall in the white blood count in non-responders, indicating that improvement is most likely to occur with doses that approach or reach levels of toxicity.

D. A. Pitkeathly


Locally-acting corticosteroids, previously injected into a joint, are a potential source of error in the interpretation of crystals discovered in synovial fluid. The authors, at the University of Pennsylvania, incubated five commonly-used suspensions of corticosteroids with synovial fluid. This did not alter the morphology of the crystals. Methyl prednisolone acetate and triamcinolone acetonide esters had no definable longitudinal axis under polarized light. Birefringence could not be determined and their crystals least resembled those of sodium urate or calcium pyrophosphate. Prednisolone terbutate crystals retained a longitudinal axis and a positive birefringence somewhat like calcium pyrophosphate. Triamcinolone hexacetoniand betamethasone acetate esters showed strongly negative birefringent rod-shaped crystals which might be indistinguishable from sodium biurate. Triamcinolone hexacetoni crystals had been detected in joints injected more than a month previously. The authors urge the greatest caution in the interpretation of crystals found in synovial fluids from joints previously injected with suspensions of corticosteroids.

A. St. J. Dixon


In this paper from the Kingsseat Hospital, Newmachar, Aberdeenshire, the authors re-analysed their own earlier data from a comparative trial of 'Prodnon' and Imipramine in the treatment of depression. By using statistical methods for the analysis of trends,* more detailed and clinically useful information could be obtained than was revealed by conventional statistical methods.

M. J. Jeffreyn


First Trial of Treatment of Inflammatory Rheumatism by Intra-articular Injection of 224Ra (Thorium) (Premiers essais de traitement des rhumatismes inflammatoires par injection intra-articulaire de radium 224 (Thorium) LOUYOT, P., MONTEM, Y., LEGRAS, J., DIEBOLD, P., and POUREL, J. J. belge Rhum. Méd. phys., 24, 265 6 figs


A Comparison of Phenylbutazone and Flufenamic Acid in the Treatment of Acute Gout


Side-Effects of 6-Azauridine Triacetate in Rheumatoid Arthritis


Double-Blind Clinical Trial of Analgesic Activity of Mefenamic Acid (Sperimentazione clinica a cecità doppia sull’attività analgesica dell’acido mefenamico) COTORTI, M., and SIMONE, A. DI (1970) Minerva med., 61, 1355 24 refs


Disorders of the Eyes due to Parenteral Gold Treatment of Rheumatoid Arthritis (Augenaffaktionen bei parenteraler Goldbehandlung der chronischen Erkrankung) BEHREN, T., and RODENHÄUSER, J. H. (1969) Z. Rheumaforsch., 28, 441 3 figs, 12 refs

Intra-articular Radiogold Therapy (Intraartikuläre Radiogoldtherapie) FELLINGER, K., and THUMB, N. (1970) Z. Rheumaforsch., 29, 36 3 figs, 8 refs


Pharmacological Analysis of Aspirin


Management of Foot Problems in Arthritis


Family Expectations and Arthritis Patient Compliance to a Hand Resting Splint Regimen


Investigation of Radioactive Yttrium (90Y) for the Treatment of Chronic Knee Effusions


Gastric Blood Flow and its Distribution during Indomethacin Administration


Procainamide-induced Lupus Erythematosus in Man


Relationship of the Enterohepatic Cycle to Ulcerogenesis in the Rat Small Bowel with Flufenamic Acid

Surgery

Silicone Rubber Implants for Replacement of Arthritic or Destroyed Joints  Swanson, A. B. (1969) Hand. 1, 38

The author has been responsible for the development of silicone rubber implants for the replacement of joints. This material has great flexibility, very good force dampening qualities, and biological inertness. The finger joint implant has now been in use for 4 years and has proved satisfactory. But being a relatively soft material, it does not offer strong lateral stability and therefore control must be exercised over the joint until capsular repair or replacement has been achieved.

A small number of wrist and elbow replacements have also been tested.

K. M. Backhouse


This report from the Orthopaedic Surgery Department at the University of Iowa analyses data on 543 cup arthroplasties in 475 patients treated between 1950 and 1963; 251 patients (294 hips) were reviewed at least 3 years after the operation. Most of the operations were performed for degenerative arthritis or complications of trauma or congenital hip diseases. The paper sets out to answer three questions:

1. What is involved in the operation in terms of risks, time in the hospital, time on crutches, and time lost from work.
2. What kind of result can be expected in terms of pain relief and functional ability.
3. How much time is required to obtain this result and once obtained will the result last.

The original should be consulted for details, but the results are incomplete because this is in part a retrospective survey.

P. J. L. Holt


This paper describes the indications, the operative technique, and results of double osteotomy of the knee, in both rheumatoid arthritis and osteoarthritis.

The operation was performed for disabling pain that did not respond to at least one year of conservative treatment in patients who had 90° of movement in the absence of gross deformity.

A total of 150 knees were subjected to double osteotomy, and 57 knees (36 with osteoarthritis and 21 with rheumatoid arthritis) operated on between 1961 to 1965 are reviewed.

In many, the relief of pain was dramatic, there being no significant difference between the two groups. Only four rheumatoid patients considered that they had not benefited. Loss of movement amounting to 20° or more was noted in twenty knees, only five of which were in the rheumatoid arthritis group.

At operation the femur was divided just distal to the upper border of the articular cartilage (intra-articularly) and the tibia not more than 2.5 cm. distal to the joint.

The patient was allowed up on the first or second day in a plaster cylinder, and at 5 weeks the plaster was removed, but 6 to 12 months were required to reach a final state of recovery.

A. R. Taylor


This paper describes a novel method of arthroplasty specifically designed to increase the range of painless knee flexion to allow the use of the squatting position on tatami mats. 54 patients with stiff knees mainly due to local fractures had an average range of knee joint motion of 34.4° before operation and 102.8° after operation. Only one patient had decreased function.

The operation consists of two parts. A polyethylene membrane is shaped to make a sack to correspond to the antero-posterior pneumoarthrogram of the contralateral knee. This rests within the potential suprapatellar pouch with a fringe hanging down to lie in the tibiofemoral joint space. Within the sack a small polyethylene bag containing 1 g. powdered magnetic iron is placed. An external magnetic field is used to move the bag containing magnetic iron about within the sack and thus prevent adhesions developing within the suprapatellar bursa.

The quadriceps tendon is lengthened by a Z-plasty to achieve the required flexion. The authors calculate that a lengthening of 1 cm. is necessary for each 20° of flexion.

Postoperatively the knee is immobilized semiflexed at 120 to 110° for several days. In the fourth or fifth postoperative week the polyethylene bag is removed through a small incision.

No loss of stability has been noted, but extensor power recovers more quickly when the lengthening of the quadriceps tendon is least.

P. J. L. Holt


Replacement of the tibial plateau by a stainless steel prosthesis and the femoral condyle by a vitallium mould resulted in a particulate sediment in the synovial fluid. This proved to be due to metallic particles which were mainly extracellular. Similar particles were found in the synovial tissue. Little inflammatory reaction occurred. X-ray diffraction patterns suggested that the stainless steel prosthesis was the source of the metal. This is further evidence for the dissolution of metal joints particularly when the opposing surfaces are metallic and of dissimilar nature. The long-term effects of this are as yet unknown.

P. J. L. Holt


Restoration of movement in a stiff digital interphalangeal joint can present some of the greatest difficulties in hand surgery. The differential diagnosis is wide and often uncertain until surgical exposure is obtained. Limitation in
flexion is often caused by blocking of the collateral ligaments. A method of repairing this condition is described, together with suggestions for treatment of other causes of defective flexion. Among the treatments for repairing fixed-flexion deformity, operations for clearing an adherent volar plate or, if necessary, a volar capsulectomy are described.

This paper presents, in brief, an excellent review of the possibilities for mobilization of the joint.

K. M. BACKHOUSE

Excision Arthroplasty of the Metacarpophalangeal Joints

HARRISON, S. H. (1969) Hand, 1, 14

Excision arthroplasty is often practised for the treatment of gross rheumatoid destruction of the metacarpophalangeal joints and to establish a fibrous but mobile ankylosis. By removing the destroyed joint, pain can be reduced or eliminated and the progress of the disease slowed. There can also be a marked improvement in function, but there is often a tendency for the fingers to drift back into severe ulnar deviation. In order to control this tendency, half the extensor digiti minimus is divided proximally and the proximal end is passed around the base of the proximal phalanx of the little finger. It is then passed through the dorsal hoods and sutured to the extensor indicis proprius which is itself relocated into the first dorsal interosseous muscle.

The results in 32 cases are stated to be good for up to 3 years, but the authors also points out that this time is too short for too definite conclusions.

K. M. BACKHOUSE

Correction of the Rheumatoid Boutonnière Deformity


In this paper from the Department of Orthopaedic Surgery of the University of Cape Town, a small series (9 fingers) is presented in which the treatment was by a method of tendon reconstruction which, it is suggested, is less likely to produce adhesions. A follow-up of from 1 to 3 years showed that this method was successful in a high proportion of cases. A Table is included, giving the details of progress and the operative findings.

The author stresses the scant attention paid to the methods of tendon reconstruction in the rheumatoid variety of this condition. He recognizes three stages of deformity:

1. Pre-boutonnière synovitis of the proximal interphalangeal joint, in which he advocates immediate synovectomy.
2. Mobile boutonnière deformity, in which active but not passive extension is lost; this is treated by reconstruction of tendons.
3. Fixed deformity, in which passive extension is lost; here the treatment advocated consists of arthrodesis or decompression of the joint.

The described method of reconstruction consists of synovectomy of the joint and anastomosis of the disinserted ulnar lateral band to the radial one just distally to the joint line. The middle slip is repaired by two mattress sutures close to the periosteum. Another suture secures the transverse fibres connecting the lateral bands.

A useful list of references is given to which the following could be added: a review of 101 cases by Souter (1967) and two papers by Matev (1964, 1969) relevant to those cases in which the lateral bands show some degree of shortening and the central slip destruction is well advanced.

[The anastomosis of the lateral bands and suture of their connecting fibres tend to restrict flexion of the interphalangeal joints and fine judgement is required to leave enough sideways movement of the lateral bands to allow for flexion of the distal interphalangeal joint.]

K. KUCZYNSKI

Role of Spleenectomy in Felty's Syndrome


Felty’s syndrome of active rheumatoid arthritis, splenomegaly, and leucopenia is reported in fourteen patients seen during a period of 30 years at Vanderbilt University Hospital.

Rheumatoid arthritis had been present for from 2 to 30 years and the total white count was between 500 and 4,050 per cu. mm. There was a relative eosinophilia in one patient. Eleven had anaemia and ten hepatomegaly. Half had weight loss and half had susceptibility to infection. Two had lymphadenopathy but none had increased skin pigmentation. The erythrocyte sedimentation rate was elevated in all the patients.

The seven patients who were tested had a positive latex fixation test. There were no L.E.-cells in the five tested. Of the ten with hepatomegaly, four had mild cirrhosis. Ten patients had marrow aspiration and this showed erythroid hyperplasia with maturation arrest in eight. The remaining two had marrow hypoplasia and these died later.

Six patients, aged between 48 and 74 years, had splenectomy and were followed postoperatively for from 2 to 6 years. The remainder were aged 45 to 69 years and were followed for from 1 month to 13 years. Severe refractory hypersplenism was the sole indication for splenectomy. In four the white cell count became normal and three had arthritic improvement. One with hypoplastic marrow showed no blood response but the arthritis became inactive. This patient died after 4 years with recurrent severe infections. Microscopy of the spleens showed chronic passive congestion.

Of the remaining patients, four died with leucopenia and thrombocytopenia and with their arthritis unchanged or worse. The six patients who received steroids showed no permanent improvement.

C. D. D’A. EARN

Pituitary Adrenal Responses to Surgical Stress in Patients receiving Corticotrophin Treatment


Surgery in Arthritis


Total Hip Replacement in England


Smith-Petersen Mould Arthroplasty of the Hip: Results after 12 to 21 Years


(a) to women walking on the level with either flat- or high-heeled shoes (these made little difference to the joint force patterns in the knee except at heel strike when there was an increase up to 24 per cent. (b) to men walking up and down a ramp or climbing stairs. The greatest value for muscle force was 564 lb for men in the quadriceps femoris muscle during resisted muscle extension, i.e. in walking down a ramp. Lesser forces developed in other muscles or during other activities.

[Only positive, compression joint force is treated here. Distraction force, as in the non-weight bearing phase of knee joint activity, is ignored, although it may have physiological importance in, e.g. pumping, nutrition of cartilage.]

A. ST. J. DIXON


(See *Abstr. Wild Med.*, 44, 479)


Fine Needle Biopsy Diagnosis in Nodular Pulmonary Amyloidosis. DAHLGREN et al. (1970) *Acta path. microbiol. scand.*, 78A, 1


Other general subjects


In this paper (from the University of Strathclyde, Glasgow), the author takes joint force in the knee as approximately equal to the total force perpendicular to the plane of the tibial condyles during knee joint activities. This and the forces in the cruciate ligaments and in the main muscle groups acting on the knee were previously calculated for men in normal walking (see *Bio-med. Engng.*, (1968) 3, 164), using a force plate on which the subject walks, with cinephotography and electromyography to correlate attitude of joint, phase of walking, and muscle activity with computer analysis. The present study extends the observations
8 figs, 28 refs


Palindromic Rheumatism (Le rhumatisme palindromique (Apport de 16 observations et revue générale)) Renier, J.-C., Brégeon, Ch., and Besson, J. (1969) Rev. Rhum., 36, 583 78 refs
