

to be met in a comprehensive way. At the same time the treatment programme facilitates and complements in every way the education and research functions of the Unit. It is evident that the responsibility for developing Rheumatic Disease Units will fall upon various parties, including University Departments of Medicine, Teaching Hospitals and Government Hospital Insurance Commissions, as well as local Medical Societies. However, the effort of planning and seeking out methods of achieving the desired goal in each area, is a responsibility to be met, if at all, only by interested lay groups such as the Canadian Arthritis and Rheumatism Society.

In summary, the rationale for and aims of the Rheumatic Disease Unit concept as well as our Unit approach to the management of rheumatoid arthritis have been described. We have been greatly heartened by our experiences to date and hope that the establishment elsewhere of similar units will lead not only to better methods for controlling the various forms of arthritis, but will also enhance education about the rheumatic diseases, and lead to new knowledge about them.

The authors wish to thank Miss Rosemary Jacobson of Johannesburg, a recent physiotherapist with the Unit (see Figure 3, third from the right) for encouraging us to write this account.

REFERENCES

1. The Canadian Arthritis and Rheumatism Society: 'Arthritis—plan for attack.' *Canad. Med. Ass. J.* 62:34, 1950.
2. OGRYZLO, M. A., GORDON, D. A. and SMYTHE, H. A. 'The Rheumatic Disease Unit (R.D.U.) Concept Arthritis and Rheumat.' in press.
3. 'HART, F. D. 'Complicated Rheumatoid Disease,' *Brit. Med. J.*, 2, 131, 1966.
4. ROPES, M. W., BENNETT, G. A., COBB, S., JACOX, R. F. and JESSAR, R. A. '1958 Revision of Diagnostic Criteria for Rheumatoid Arthritis,' *Bull. Rheum. Dis.*, 9:175, 1958.
5. BELL, D. A., GORDON, D. A., BAUMAL, R. and BRODER, I. 'Correlation between the Rheumatoid Biologically Active Factor (RBAF) and Clinical Features of Rheumatoid Arthritis (RA) Arthritis and Rheumat.' 10:266, 1967.
6. OGRYZLO, M.A. University of Toronto Rheumatic Disease Unit Five Year Report 1960-65.
7. COHEN, B. S. BAUM, J., LOGGINS, B. and TERRY, E. 'Home care programme in the management of arthritis.' *J. Chronic Dis.* 19:631, 1966.
8. ENGELMAN, E. T., SELLINGER, E. and METTIER, S. R. 'Problems in the Administration of an Exemplary Arthritis Clinic in a Teaching Centre,' *Arthritis and Rheumat.* 6:78, 1963.

Place of Physiotherapy in the Treatment of Rheumatoid Arthritis

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In 1964 The American Rheumatism Association established 6.4 per cent of the population were reported to have Arthritis and Rheumatism. The Socio-economic impact of the rheumatic diseases can be appreciated from data obtained from the U.S. National Health Survey (1964)—this showed that of the one million persons confined to the house 17 per cent attributed their restriction to arthritis and rheumatism and the same conditions were blamed for a work loss of approximately 27 million days annually.

The management of rheumatoid arthritis is of necessity somewhat pragmatic and the care of each patient must be adapted to his own needs.

This article is a description of the general principles employed by the physiotherapist in the treatment of rheumatoid arthritis. The ideal situation for such patients is a unit where all the therapists are geared to the education and effective techniques of management.

TYPES OF PATIENTS ADMITTED TO THE UNIT

- (a) First timers—these patients demonstrate the active stage of the disease.
- (b) Flare up's—reassessment of the condition and re-organisation of treatment.
- (c) Advanced cases—these require maintenance of strength and maximal usage of remaining joint function.
- (d) Post surgical management.

Before considering the approaches available in this condition, it is essential to comprehend the forces producing the pain and deformity. (See Table I).

JOINT DEFORMITY

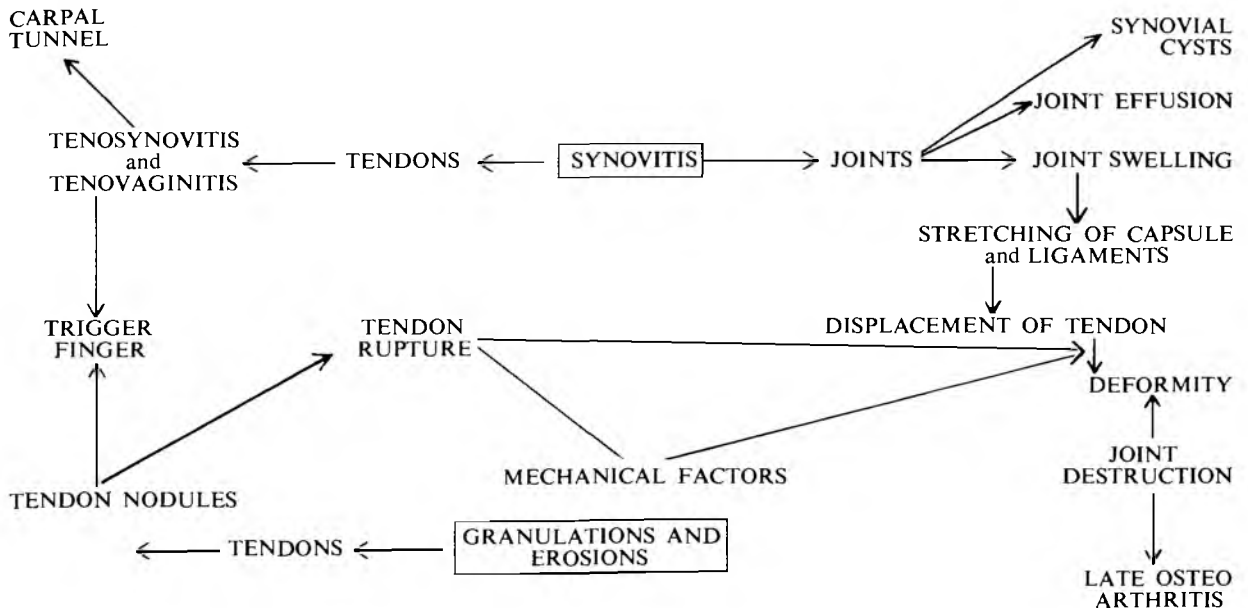
Joint function depends on the architectural integrity of bones bearing surfaces and restraining ligaments, on muscle power and neural regulation and freedom from adverse external circumstances; in the rheumatoid all of these may be involved.

Movement

In the normal person activities of daily living result in maintaining muscle strength and an adequate blood supply; the nutrition of the cartilage is dependent on joint movement and the most effective stress on bone preventing disuse osteoporosis is from muscle contraction. In the person with changes characteristic of the rheumatic type exercise cannot be left to chance but is regulated by a therapeutic regime controlled for load, direction, duration and frequency.

Capsule, ligament, cartilage and bone

Effusion in a joint will produce a raised intra-articular pressure. This may result either from active disease process or traumatic inflammation. DeAndrade, Grant and Dixon suggested that stimuli from the knee joint reflexly inhibit lower motor neurons supplying the quadriceps. In patients with articular disease pain precedes weakness. The highest pressures noted in the knee are during full knee bend whereas the lowest pressure noted was with the knee in a position of slight flexion.



Another effect of effusion may be to stretch the joint capsule and ligaments so that tendon having pulley attachments will have its line of pull shifted. Proliferating synovium may also cause distention. Some capsules are stretched others may be thickened, resulting in a loss of joint mobility.

Pannus invades and erodes articular cartilage at the joint margins, at the junction of cartilage and synovium and at the attachments of collateral ligaments bone erosion occurs.

Muscle, tendon and nerve

Muscle weakness is postulated to be due to inhibition, disuse and reflex vascular changes. It is considered that both muscle spasm and inhibition may be mediated on a neural reflex basis by stimulation of the proprioceptive nerve endings in the inflammatory process. Tendon lesions interfere with the muscle action.

Dynamic aspects of deformity

- (a) Structural relationships are changed. Antagonistic muscle pull is not opposed and force is exerted against ligament and capsule resulting in a shift.
- (b) A new joint equilibrium is thus established.

ASSESSMENT OF PATIENT

Emotional factors

As with any condition it is necessary for the therapist to understand the effect a chronic deforming illness has upon a patient. Emotional factors cannot be identified as real cause, however, long periods of continual pain, and disability render patients less able to cope with their disease. An education programme is essential as the patient usually feels antagonistic and resentful.

Functioning of the patient

The patient is carefully questioned about his ability to cope in the work, home and leisure situations, e.g. ability to cope with physical requirements at work, ability to cope with stairs, get in and out of chairs, bed, cars, etc.

Individual joint assessment

Each joint is examined for tenderness, temperature, swelling deformity, active range of movement, forces

required to counteract deforming forces. Total limb function is carefully noted and difficulties observed.

Muscle strength

Group muscle strength and component strength are both assessed, e.g. grip strength—a bomanometer bag is used; quadriceps setting ability.

TREATMENT PROGRAMME

(a) Education

Both family and patient must be educated as to the nature of the disease. The following topics should be discussed:

- i. Description of joint structure.
- ii. Affect rheumatoid arthritis has on joints. Emphasis that there is as yet no cure.
- iii. Common deformities e.g. flexion of the knees. Preventative treatment should be discussed.
- iv. Reason for rest, exercise and the balance between these.
- v. If possible films about the disease should be shown.

Working on a rheumatoid unit I found that maximum co-operation from the patients was obtained if the above discussions were held; also the patients benefitted greatly from group discussion.

(b) Rest

Rest is individually prescribed as a treatment in the acute phase. In the later stages a balance of rest and exercise is established. Many patients try to keep as active as possible to prevent deformity and loss of function. At certain stages in the disease excess use of joints keep them in a state of sustained and continuous inflammation so accelerating destruction.

Light removeable splints are worn intermittently during day and night.

i. Rest during the acute phase

Rest means temporary non weight or non use of a joint, keeping it in an optimum position of function. When the

joints demonstrate acute symptoms total body rest and splinting of specific joints is valuable resulting in decreased inflammation and so increased mobility and function.

Total immobilisation is not the answer, the patient must **ACTIVELY** move each joint through as full a range as possible **ONCE** daily. Rest is decreased progressively with improvement and subsidence of pain.

ii. Sub acute phase

Rest periods are interspersed with periods of physical therapy. The rest splints are worn at night and during rest periods.

iii. Chronic phase

Rehabilitation is very active—the patient sets the pace. Periods of strenuous exercise are followed by rest.

Positions of rest

In bed. Every patient must lie **PRONE** for at least one hour daily to prevent hip flexion contractures.

Patient in Supine

- (a) 1 in. plywood bed board to prevent flexion of hip while supine.
- (b) Foot board.
- (c) No pillow or very small pillow under head.
- (d) No pillow under knees.
- (e) 6 in. blocks under casters to elevate bed—this permits the patient to get in and out of bed with minimal joint strain.

Prone Position

- (a) Hips fully extended.
- (b) If possible feet at right angles.

In a chair. If possible chairs are raised 4 in. so as to prevent the hips being flexed to an angle greater than 90°.

SPLINTING

If possible aluminium splints or prenyl splints are used—if this is not possible p.o.p. splints serve this function equally.

Splinting aiming at: reduction of pain.
prevention of deformity.
improvement of function.
correction of deformity—as in serial splints.

Leg splints. Extend from mid thigh to M/P joints of foot. The knee must not be hyperextended, ankle in the mid position with the foot at right angles. If the patient demonstrates a tendency to external rotation at the hip a rotator bar can be attached to the splint. Velcro strapping is used to attach the splints—one strap is mid thigh, one directly over the patella (avoid pressure on the tibial tubercle as the tibia tends to sublux on the femur due to the laxity of the cruciate ligaments).

Arm splints. It has been stated that one quarter of patients suffering from rheumatoid arthritis demonstrate major deformity of the hands. Although types of deformity are varied there is frequently a wrist flexion deformity with volar subluxation of the ulna, radial deviation of the carpus and ulnar drift of the fingers. The wrist being the key joint in functional balance of the hand. When flexion deformity occurs at this level an imbalance of long flexors and extensors to the digits occurs leading to finger deformity.

Common hand deformities include flexion deformities of M.C.P. joints with volar subluxation, ulnar deviation of the P.I.P. joints of the fingers. At the level of the phalanges there may be swan neck deformities with hyperextension of P.I.P. joints and flexion of D.I.P. joints or the Boutenniere deformity with hyperextension of D.I.P. joints and flexion of P.I.P. joints—this deformity is caused by the lateral slips of the Extensor Digitorum slipping toward the volar side of the finger and so acting as flexors.

A hand splint must therefore be made to accomplish the following:

- i. The wrist in the mid position (the patients complained of increased pain if wrist put into any degree of extension).
- ii. Splint must control radial deviation at the carpus.
- iii. Support heads of meta-carpals and limit flexion at M.C.P. joints to 30°.
- iv. Splint must not extend beyond mid shaft of proximal phalanges so as to allow flexion of phalanges with support under metacarpal heads.
- v. Ulnar deviation of the fingers must be controlled.
- vi. Velcro strapping is used—one directly over the wrist, one directly over the M.C.P. joints.

EXERCISE THERAPY

Muscle weakness and atrophy is a constant factor. Individual attention is given to muscles and joints.

Applicable principles

Passive movements are never given to a rheumatic joint.

Static exercise given where severe bone on bone crepitus is present.

Resistance through range given if pain not too severe.

Specific therapy as well as class work should be given.

An exercise routine should be established.

Class work—should be given with the aim of putting each joint through as full a range as possible. A hand and foot class given daily following wax as well as a general ward class should be given. The ward class should include postural exercises, quadriceps drill, hip extension exercises as well as general mobilising and strengthening exercises should be given. These classes were typed out and supervised while the patient was in hospital so that a similar routine could be followed at home.

P.N.F. techniques proved most valuable when combined with ice especially in reduction of pain, spasm and increase in strength. Routine exercises such as straight leg raising using sandbags were taught. Rheumatic shoulders and knee joints responded exceptionally well to ice plus static contractions in various parts of the range later progressing to movement through range in all P.N.F. diagonals.

POOL THERAPY

This proved most beneficial when individual supervision of each patient was given. The technique which was most successful was demonstrated to me by a physiotherapist from Bad Ragaz in Switzerland. No individual muscle was exercised but movement patterns were used. Re-education of walking in the pool post surgery (e.g. after synovectomy, osteotomy, cup replacements in the hip joint) allowed patients to weight bear correctly and so retrain their pattern of walking. Resisted walking in the pool was given to re-educate, strengthen and increase endurance of the patient. This can be done by giving direct resistance to the patient or by altering the speed of movement in the water.

PAIN

Maximum increase in muscle strength is gained when the patient is pain free. Each patient responds to each technique of pain relief differently.

- (a) Drug therapy: The drugs vary with each group of physicians supervising the patients therapy.
- (b) Rest: Described above.
- (c) Heat: Can be used in either the dry or the moist form. I did not find any dramatic relief of pain when using S.W.D. or infra-red. However patients reported relief of symptoms in the sub acute and chronic stage of the disease when moist heat was used: wax baths to hands and feet, pool therapy, hydrocolator packs.

In many patients symptoms were aggravated by the application of heat in any form even in the chronic stage of the disease.

- (d) Ice: "In spite of the fact that some rheumatoid patients hate the cold weather, their natural prejudices against it have to be tactfully handled when introducing them to the treatment" (Knott 1964).

The application of ice towels proved most useful in combination with isometric exercise in the reduction of pain in all the large joints. Many patients have obtained relief of painful hands when immersing them in ice for few short repeated applications. Not only was ice beneficial in reduction of pain but good fast results were obtained when joint deformity was present the flexion contractures of the knees—ice packs applied to the hamstring group combined with "hold relax" to the contracted group with strengthening to the quadriceps mechanism.

- (e) Exercise: Described above.
- (f) Walking aids: Walking frames used in patients who are severely disabled. Canadian gutter crutches (fore-arm support crutches) are preferable to canes for many reasons: A patient invariably demonstrates pathology at the wrist—with the continuous flexion and extension required at the wrist when using canes an increase in pain results as well as possible rupture of extensor tendons of the digits. Also hand deformity does not allow patient to use cane efficiently. Gutter crutches tend, if correct height to prevent flexion at the hip when walking.

REHABILITATION

All activities of daily living must be checked and if necessary a domiciliary visit should be made to check height of stairs etc. the patient must therefore be taught the easiest manner of climbing these stairs and the necessary adjustments to home made.

Discharge of patients

Total re-assessment performed. Regular reports to the arthritic clinic must be made. All patients must continue their home programme of exercise.

CONCLUSION

In this paper I have only discussed the very general treatment of the arthritic patient, also there has been no discussion of the post-surgical approach to these patients. A physiotherapist can make a vital contribution to the habilitation of the rheumatoid patient, especially when such therapy is supplemented and complemented by all treating the patient.

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BIBLIOGRAPHY

1. BLAND, J. H. 'Arthritis—Medical treatment and home care.'
2. BROWN, M. E. 'Rheumatoid Arthritic Hands,' *American Journal Occupational Therapy*, 1966, Vol. XX.
3. EYRING, E. J. *Arthritis and Rheumatism*, 1963, Vol. 6.
4. HOLLAND, Arthritis.
5. HAINES, J. 'A survey of recent development in cold therapy,' *Physiotherapy*, July, 1967.
6. Rheumatic Diseases, *American Journal of Occupational Therapy*, Sept., 1965.
7. ROBB, J. and ROSE, B. S. 'Rheumatoid Arthritis and Maternal Depravation,' *British Medical Journal of Medical Psychology*, 1965.
8. SHALIT, I. and DECKECKER, J. *Lancet*, 16 Jan., 1965.

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