

THE PHYSIOTHERAPIST and JUVENILE

RHEUMATOID ARTHRITIS

JOAN BALDWIN, B.Sc. Phys. (Rand)

Reprinted by kind permission from Journal of the Canadian Physiotherapy Association, Vol. 23, No. 3, June, 1971

The Juvenile Rheumatoid Arthritis Unit at The Hospital for Sick Children, Toronto, recently did physical assessments on 33 children suffering from rheumatoid arthritis. Many treatment programmes were revised in view of the findings.

Rheumatoid arthritis is a systemic disease which is defined by Jones as affecting four or more joints and lasting longer than three months. Initially the disease attacks joint synovial membranes progressively destroying cartilage and bone and producing disruption of the joint. The disease may encroach on surrounding muscles, nerves, tendons, bursae and may directly attack supplying blood vessels.

Juvenile rheumatoid arthritis, often called Still's disease, differs from the adult form in that it often presents with high spiking fevers and rashes, and also differs in the type of deformity (see list of common deformities). The onset in the adult is insidious and less dramatic. Several groups consider it may even be a different disease. Unlike adults, immobilized for lengthy periods, children tend to be mobile once the initial fever (lasting one to two weeks) has been controlled and in spite of acute joint involvement. Because of these differences the management of the disease has to be modified.

The peak onset ages were found to be between one to three and seven to ten years of age, closely conforming to the studies done by Laaksonen and Laine, and Ansell and Bywaters. The older the child at the onset of the disease, the more severely his joints were affected and the slighter his chance that the disease would become inactive. In 70 per cent of childhood cases, however, the disease is thought to become inactive after a duration of one to eight years.

Influenced by such findings, a programme was designed to help the child develop as normally as possible during the active phase of the disease.

A functional grading was also devised for both the upper and lower limbs. This took into account (a) the number of joints affected; (b) the number of fixed deformities; (c) the age of onset; and (d) the duration of the disease. The results of these assessments indicated that, due to the greater number of joints affected, the lower limb usually suffered greater functional impairment than the upper limb.

In order of frequency, the most common deformities seen in 33 cases were:

- (a) wrist fixed in a flexed position
- (b) hip flexion contracture
- (c) knee flexion contracture
- (d) loss of pronation and supination
- (e) limitation of neck extension
- (f) lack of flexion at the metacarpophalangeal joint and lack of extension and/or flexion at the proximal interphalangeal joints.

I. THE AIMS OF PHYSIOTHERAPY

In our programmes, minimal bed rest and maximal mobility are encouraged. Many children, however, especially

in the early stages, may require more rest and sleep than normal children.

Our aims are:

1. To relieve pain.
2. To prevent deformities by stretching, strengthening and splinting.
3. To record the process of the disease (Fig. 1).
4. To help prevent emotional disturbances by ensuring that the child participates in normal, daily activities.
5. To provide pre- and post-surgical treatment for children when necessary. These programmes vary with each patient and doctor. The post-surgical treatment is intensive and specific for each individual.

II. METHODS AND RATIONALE OF TREATING ARTHRITIC CHILDREN

It should be emphasized that only a small percentage of children seen in the Rheumatoid Clinic need physiotherapy treatment. The children are assessed by a rheumatologist, physiotherapist and social worker before a treatment regimen is established.

Education and household routines are disrupted as little as possible, treatments being done after school and in the patient's home whenever possible.

Much has been written on the parents' role in enforcing one hour of exercise daily. For the large family this may be an unnecessary demand and may create feelings of guilt in the busy mother who has difficulty finding the time. Specific exercises, such as quadriceps drill, are, however, taught to the parents when possible. These are simple and should be kept to the minimum. Regular daily activities and, in some cases, periodic supervision by a physiotherapist should be adequate to ensure that muscle strength and joint mobility are maintained.

A. Pool Therapy

In a heated pool, Group programmes that stress strengthening and stretching are popular with patients. The buoyancy of the water facilitates mobility; the setting promotes social mixing. More joints can be exercised simultaneously and more patients can be treated at one time.

B. Exercise Therapy

Exercises using proprioceptive neuromuscular facilitation (PNF) technique and/or isometric routines incorporate mass movement patterns and prove an efficient, time-saving way of exercising when several joints and muscle groups are affected. The adaptations for various age groups are discussed in the section "Treatment for Different Age Groups".

C. Using Daily Activities

Each age group has certain abilities, skills and activities which should be used as exercise.

D. Special Techniques

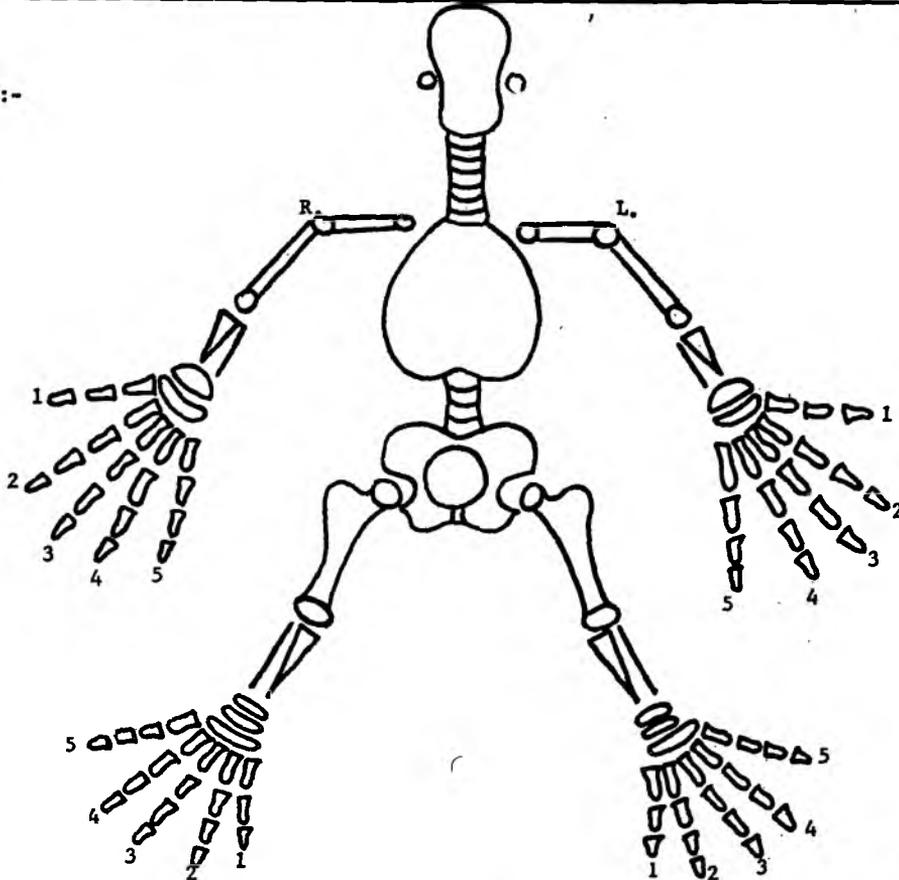
1. *Stretching* techniques can be used in specific cases where ligamentous and capsular tightening restrict accessory movements. Techniques using traction with minimal passive movements break the small fibrinous adhesions. Restoring these movements will in turn stimulate the synovial membrane and secretion of synovial fluid thus lubricating the joint. They are most effectively performed on affected finger joints but do not work in every case and should only be done by trained personnel.

Mrs. Baldwin graduated from the University of the Witwatersrand, Johannesburg, South Africa, in 1960. She worked in South Africa, England and Norway before coming to Canada where she worked in two other hospitals before joining the Hospital for Sick Children. She is now Research Therapist, Juvenile Rheumatoid Arthritis Unit.

GENERAL ASSESSMENT CHART
(JUVENILE RHEUMATOID PROJECT - HOSPITAL FOR SICK CHILDREN)

KEY		MOBILITY		GENERAL		
<u>JOINT INVOLVEMENT</u> (Mark in Red)		<u>PLANES OF MOTION</u>		*		
Affected Joint	○	I. Flexion & Extension	<u>RANGE OF MOTION</u> a.=Normal Range b.=Stretched Range c.=Shortened Range d.=Mid Range	†	Acute	
Fixed Deformity	◇	II. Abduction & Adduction			→	Tenderness on Palpation
Deformity Can Be Passively Corrected	□	III. Rotation (int. & ext. or pron. & supin)			↕	Tenderness on motion
				≡	Crepitus	
				↕↕	Tenderness on Extreme Motion	

NAME:-
DATE:-
HOSP. No:-
C.A.R.S. No:-



REMARKS
HANDS

FEET

2. *Splinting* is used either to prevent or correct deformities. Once a deformity has developed, an individual splint has to be devised to correct or minimize it.

In the past, splinting for children's joints has been the same as that for adults. Deformities in children, however, differ from those in adults (see earlier list of common deformities) and consequently the physiotherapist, Occupational Therapy Department and Orthopaedic Workshop (Orthotic Department) are experimenting with new splinting methods and materials. The children's splints have tended to be bulky, included unaffected joints, increased deformities and have not been durable. We are experimenting with plaster, coated plaster, fiberglass impregnated bandages and plastic materials such as sansplint and polycast. Most of

these splints are made in the patient's home, an important factor when selecting splinting material.

The wrist splint is applied after three months if the wrist remains swollen and limited in motion (especially extension) or if there is a wrist flexion contracture. A plastic backslab (sansplint®) is the most comfortable type of wrist splint because it "pulls" rather than "pushes" the wrist into slight extension. The backslab extends from mid-forearm to one-half inch proximal to the metacarpal heads; an anterior bar extends across the palm. Fingers are not included in the splint since finger motion should be encouraged especially at the metacarpo-phalangeal joint, which frequently lacks flexion. Furthermore, ulnar drifting of the fingers is uncommon in children. The splint is worn most of the day

and night, the time being decreased as pain subsides and movement returns.

The *knee splint* is applied to a swollen knee joint that has developed a flexion contracture. A bivalved stovepipe type of cast is used for this purpose and the patient is encouraged to walk as much as possible. The cast is removed for exercises. When walking with the knee extended, not only are the quadriceps muscles being worked statically against the resistance supplied by the body weight, but also the collateral ligaments and capsule are taught, thus stretching these tightened structures. The patient wears the cast day and night until the contracture has been corrected and the quadriceps are strong enough to maintain the knee in extension when walking. This may require three to four months. As this method of splinting differs so radically from the conventional resting splints, we are documenting all cases and studying the problems of managing knee flexion contractures in children.

For the children requiring a resting knee splint for pain, swelling and severe morning stiffness, a bivalved stovepipe cast seems most satisfactory. The foot is rarely enclosed in the cast since usually the knee can be fully extended without it. Since children are seldom immobilized in bed, there is no tendency to foot drop, even when the ankle is affected. Crutches are seldom used as the majority of children are able to bear weight and move well once the initial morning stiffness is overcome.

III. TREATMENT FOR DIFFERENT AGE GROUPS

A. One to Three Years

Tickling the bottoms of the feet results in hip and knee flexion. Placing a bracelet over the foot results in hip and knee flexion when the child tries to pull it off. Certain toys can be used to correct problems. A tricycle stresses hip and knee flexion as well as knee extension, ankle plantar, and dorsiflexion. Drums or xylophone encourage finger flexion and static wrist extension. Blocks and building toys require finger movements. The child should be encouraged to walk and feed himself.

Binding techniques, whereby the therapist grasps the child firmly and then encourages him to break free, results in the child unwittingly exercising isometrically against the manual resistance. For example when the therapist stretches the child's arms above his head he tries to bring his arms down producing isometric contractions of shoulder extensors, elbow, wrist and finger flexors.

When a child's legs are painful, he will prefer to sit, and his parents may have to lure him into walking by placing a favourite toy beyond reach. The mother is shown what play techniques will help her child exercise in his morning bath. The warm bath also relieves early morning stiffness.

B. Four to Six Years

Children in this age group enjoy hitting a balloon thus exercising shoulder elevators, elbow, wrist and finger extensors. Toys such as a bicycle or skipping rope provide additional exercise. Should there be increased swelling or pain after an activity such as skipping, the activity is decreased and eliminated if necessary. Pool therapy in warm water can be started in this age group. Isometric exercises using binding techniques (see under One to Three Years) are helpful.

The mother should teach her child to dress and undress. She should also encourage and praise him, and report to the physiotherapist any problems such as increase of pain and swelling after certain activities, inability to perform any daily activity, any new joint involvement, behavioural problems or problems with medication.

C. Seven to Ten Years

Play techniques such as ball throwing will promote mobility of the joints. Although body contact sports such as football are discouraged, activities such as ice skating, bicycling and swimming are encouraged.

Organized resisted exercises using isometric and PNF techniques can be fun especially if the routine is changed frequently.

Participation in either Brownies or Cubs is socially beneficial for the child. Domestic activities are also encouraged. Pool therapy is popular. The parent should support and encourage the child and report any problems to the therapist.

D. Eleven Years and Over

Organized resisted exercises using PNF with isometric exercises, or isometric exercises alone, are helpful. Dancing and swimming are popular and foster camaraderie. Pool therapy is excellent. Cooking and babysitting for girls and repair jobs for boys promote natural exercise. Taking medication and exercising are now the responsibilities of the child who can be taught exercises for specific problems. He should be encouraged to report any problems to the physiotherapist.

IV. GENERAL TREATMENT DISCUSSION

The majority of children with joint mobility loss and/or muscle weakness require only a weekly visit from the therapist. We found in comparing results of the "once weekly group pool therapy programme" to those of the "once weekly home exercise programme" that hip and knee mobility as well as quadriceps strength was maintained but not increased in 90 per cent of the patients in both groups. Twelve children (six per group) took part in these programmes and it was felt that, physically, the programmes were of equal benefit. Should specific muscle strengthening and joint mobilization be required, a minimum of three treatments per week is necessary and should be done in the child's home by either the parent or physiotherapist. When the child's arthritis becomes inactive, regular check-ups are still essential to prevent deformities resulting from weaknesses and to modify treatments. Such check-ups should continue until the child stops growing.

If the parents are unco-operative or unable to assist, the physiotherapist may have to assume the responsibility for the child's weekly treatment. The child of unco-operative parents may have difficulty coping with arthritis in later life.

In addition, a specialized treatment centre provides vocational guidance, aptitude testing and physical tolerance assessments, orthopaedic research brace shops, research units, and community physiotherapy. The physiotherapist is part of a team consisting of paediatric rheumatologists; paediatric orthopaedic surgeons; paediatric ophthalmologists; social workers; occupational therapists; public health nurses. Such a team is dedicated to caring for children suffering from juvenile rheumatoid arthritis.

BIBLIOGRAPHY

- Ansell, Barbara, and Bywaters, E. G.: "Diagnosis of 'Probable' Still's Disease and Its Outcome." 1962, *Ann. Rheum. Dis.*, 21: 253.
- Hollander, J. L.: "Arthritis and Allied Conditions," 6th Edition, 1960, Lea and Febiger, Philadelphia.
- Laaksonen, A. L., and Laine, U. A.: "Comparative Study of Joint Pain in Adult and Juvenile Rheumatoid Arthritis." 1961, *Ann. Rheum. Dis.*, 20: 386.

CORRECTION DECEMBER, 1971

Modular Lower Extremity Prosthetics

by J. FOORT, formerly Technical Director, Manitoba Rehabilitation Hospital, Winnipeg, Canada. South African Journal of Physiotherapy, 1971, 27(4): 2-5.

The photograph labelled "A Modular Hip Disarticulation Prosthesis of the Winnipeg type," on page 2, should be preceded by Fig. 3. It is an integral part of the article, "Modular Lower Extremity Prosthetics," by J. Foort, pages 3-5.

The last line of column 1, page 4, should read: "... the socket bolted on to the hip joint (Fig. 3)".