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Fractures: "The Breaking of Old Traditions"

B. J. S. Grogono, *M.B.

"Make the Patient Use the Limb"

— George Perkins

Vertebrates have survived and healed their fractures since the days of the Dinosaur, providing open wounds and accompanying infection did not complicate the break in bony continuity. Most fractures united solidly and allowed the victim to continue his relentless pursuit of life in the Darwinian struggle for existence.

For the most part, quadrupeds adapt more readily to fractured limbs than bipedal man. The injured limb is held protected from stress during the initial painful stage when blood passes to the fracture site to form a solid blood clot. Within a week or two a firm fibrocartilaginous callus forms, restoring continuity to the useless extremity. As solidification of the fracture site occurs, the function is gradually restored so that the surrounding muscles instead of merely splinting the limb, begin to control and move the distal components of locomotion and apprehension, despite any deformity.

Provided the other limbs are unaffected the animal continues his activities relatively unimpaired. A three legged-dog has surprising agility. Only in horses and in birds is a simple fracture catastrophic.

SPLINTS AND CASTS

The treatment of closed fractures in homo sapiens remains controversial. Splints have been used for thousands of years. A type of cast was used by Egyptians who employed different types of flour! Hippocrates described a splint for the fracture of the tibia which allowed knee and ankle movement.²

Which is the best treatment today for closed fractures? Do we understand the basic physiological, biochemical and biophysical mechanisms that underlie the reasons why one fracture will heal in anatomical position, allow early weight-bearing and restore perfect function of the limb, while another will progress to deformity, prolonged disability, and remain ununited. The result depends largely on the nature and force of the agent producing the injury, (although treatment does have some effect on the outcome, and the site of the fracture is important).

Charlotte Resch has written a scholarly article on Cast Bracing stimulated by an elective in orthopaedics at the Halifax Infirmary, 1978. She traces the perennial controversy concerning the immobilization or modified immobilization of fractures, from the early medical origins to a more practical and pragmatic approach of today.

The arguments between the school of complete immobilization, and that of active movement have not lost their vitality.

Certainly the results reported by Sir Reginald Watson Jones of 800 fractures of the femur and tibia in which there was not one non-union are impressive.³ It is important to remember that although he insisted on complete immobilization of fractures in casts, he insisted on muscle activity, toe and finger movement, and a comprehensive physiotherapy program throughout all phases of treatment. The concept of Cast Brace in which the fracture is protected from shearing and rotational stress was applied with astonishing success by Smith in 1840.⁴

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Champions of this approach were Lucàs Championiere and George Perkins.⁶ To witness fractures treated by this system of rational splintage, devised by Perkins, was an encouraging experience. His formula was rational: (Fig. 1)

The aim in the treatment of fractures is to prevent malunion, non-union and stiffness. If a fracture is not displaced, it does not require reduction or prolonged splintage although it may require protection.

In fractures with displacement, splintage is seldom necessary after reduction to prevent redisplacement. He called this "Simple" splintage and it is applicable to most fractures such as a fracture of the shaft of the humerus. Here he used a collar and cuff, encouraged biceps and triceps exercises and protected the fracture from angulation and rotary stress. Only in "Complex" fractures, — fractures of the scaphoid, femoral neck or radial shaft, is "Pure" splintage required. This involves prolonged, uninterrupted, rigid and extensive immobilization. In this case the fracture requires internal fixation or splintage which includes the joints above and below the fracture, until bony union is present.



FIGURE 1

Professor George Perkins. English exponent of the dynamic treatment of fractures, teaching at St Thomas's Hospital London, 1959.

COMPLEX FRACTURES

Sarmiento has been largely responsible for the introduction of Cast Bracing techniques on this continent.⁷ His methods utilize plastic molded shells which incorporate the limb snugly and are attached to hinges opposite the joints. They can be used for fractures of the middle and lower third of the femur, fractures of the tibia, humerus, ulna and lower end of the ulna and radius.

OPERATIVE TREATMENT

Internal fixation of fractures

Plating or intramedullary rodding has reached a high standard thanks to Kuntscher,⁸ Müller⁹ and other meticulous workers, allied with the development of excellent instrumentation.

A. Intramedullary Nailing

There is little doubt that intramedullary nailing produces superb results in fractures of the femur if applied properly. Kuntscher's results, first published in 1940 for closed intramedullary nailing for fractures of the femur, are difficult to surpass even today.⁸ His method involved insertion of an intramedullary nail, (shaped like a clover leaf on cross-section), through the fracture site, under fluoroscopic control. He devised a special jig to manipulate the fracture and worked in a darkened room. Radiation hazards to his workers must have been considerable. The nail gripped the bone initially and its open section allowed enough flexibility of the nail to accommodate changes in the diameter of the femur. In his early cases he reinforced fixation with a cast. Most patients walked within a few days; office workers returned to work in 14 days; and soldiers returned to the front within a few weeks. Improvements in this technique in the last 30 years have included the reaming of the medullary cavity and changes in design of the nail.

Complications: infection, breakage of the nail, and delayed union have been few, if the procedure is expertly applied and the operation is confined to fractures in which it is best suited i.e. fractures of the mid-shaft of the femur and certain fractures of the shaft of the tibia.

B. Plating of Long Bones

The plating of fractures was introduced by Arbuthnot Lane¹⁰ and Lambotte¹¹, but results were marked by erosion of the implants by electrolysis. Venable and Stuck were the first to employ vitalium, a non-reacting alloy of cobalt, nickel and molybdenum, and it insures a reliable method of plating fractures.¹² The results, however, continue to be unreliable until the universal adoption of the "AO" technique. For the past ten years, thousands of fractures of the radius and ulna, femur and tibia have been treated by this method. Meticulous surgery, intrafracture compression, and rigid immobilization have become by-words in orthopaedics.

C. External Fixators

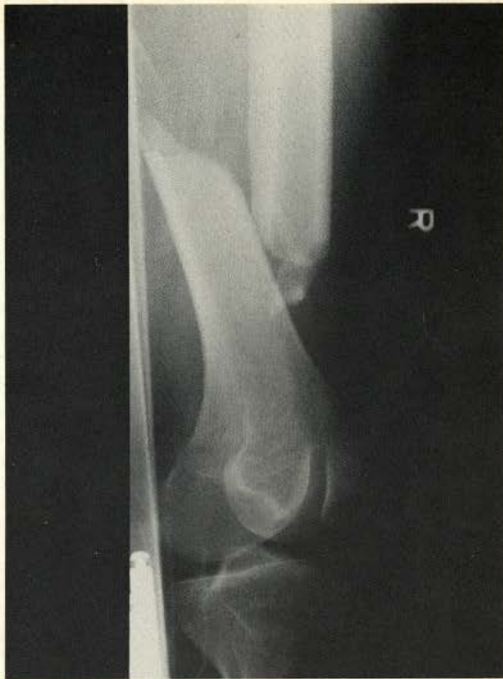
External fixation apparatus has been improved recently. Transfixion pins hold the bone below and above the fracture site. These are suitable for severely comminuted or infected fractures, in cases where the bone ends need to be held apart while the union progresses (as in a severely displaced comminuted Colles' fracture in a young patient).

Is internal fixation of a fracture necessary and how does it work? The true disciples of rigid internal fixation at first believed the compression of fixation resulted in a compression of the bone on the cortex opposite to the plate, the plate itself acting as a tension band.

In cases where perfect apposition occurred, primary bone union across the fracture resulted without the formation of bone callus. To ensure a compression of the fractured site, prebending of the plate has been advocated. Subsequently, restoration of bone continuity the internal fixation device, may actually relieve some of the stress on the underlying bone so that osteoporosis may occur. This is why most authorities advise removal of the plate some six months after the fracture has united. Recently, pliable plates made of a composite of graphite polysulfone or glass epoxy laminates have been used experimentally.¹⁴ Such plates protect the fracture from shearing or rotational forces and yet allow stress to be transmitted from the bone as it heals.



A



B



C



D

FIGURE 2

Fracture of mid-shaft of femur. (A & B)

Three months later. Fracture shows slow union and varus angulation, resulting from early application of cast brace. (C & D)



A



B



C



D

FIGURE 3

Fracture of mid-shaft of femur. (A & B)

Six months later. Fracture has consolidated in good position, following application of cast brace. (C & D)

NEW IDEAS ON FRACTURE HEALING

Sarmiento demonstrated a considerable movement which occurs in tibial fractures treated by cast braces, confirming hypotheses that intermittent compression and weight bearing, and muscle action all encourage the healing process.

The idea that the fracture is healing is an electro-physiological process has recently gained wide acceptance. The work began with a curious experiment proving that regeneration of frog's limbs could be influenced by electrical stimuli. Subsequently, it was found that the bone formation at the fracture site can be induced by direct current of ten micro amps.

In addition, an alternating electro-magnetic field can also induce osteogenesis. Basset and other authors have obtained union in 70% of pseudarthroses, resistant to other forms of therapy.¹⁶ Similar success has been achieved by Brighton, by insertion of electrodes into fracture sites and the application of ten micro amps for three months.¹⁷

Becker, one of the original workers in this field explains the sequence of events.¹⁶ He distinguishes between the piezo-electric effect on intact bone which is of short duration and is responsible for the bone responding to stresses placed upon it, and electrical stimulation of regeneration in fractures which is a long-lasting mechanism.

The trauma of injury triggers the neuro-electrical control system which produces cellular proliferation. The erythrocyte plays a vital part in this process and becomes part of the fracture blastema.

Subsequently, experimental and clinical work of Brighton¹⁶ and Basset¹⁷ have shown that bone union can be induced, even when prolonged immobilization has failed, by the application of electrical osteogenesis. Brighton uses a direct current and inserts electrodes. Basset employs an alternating current which is applied by an external device into which the limb is placed.

Attempts in speeding up the process of union in fresh fractures by electrical stimulation has so far been disappointing.

WHICH METHOD TO USE

For the most part clinical experience and judgement are the most important ingredients of fracture management. Comparative studies show that intramedullary nailing is ideal for fractures of the mid-shaft of the femur in adults. Forearm fractures in adults are best treated by plating. Cast bracing should be considered in fractures of the mid and lower third of the femur, after an initial period of traction.

The cast brace needs adequate supervision, but does not require elaborate apparatus. It has been applied in the Arctic (Frobisher Bay) and can be used where skilled surgical procedures are not available. For fractures of the tibia, Sarmiento's apparatus which uses a plastic sleeve, hinged knee and ankle attachments is ideal, but a model made of plaster works well.

THE MAIN PROBLEMS

Angulation and shortening of fractures may occur, as seen in Figure 2. In this patient with a fractured femur, the convalescence was slow and varus angulation of the fracture

occurred. In a similar patient, the cast brace technique was very successful after initial traction treatment had allowed the fracture to stabilize. In this case a full range of movement of the knee was restored. Shortening was less than half an inch and the fracture consolidated satisfactorily. (Figure 3)

FUTURE PROSPECTS

Modern techniques have shed a new light on the mechanism, management, and pathophysiology of fractures, but our methods are still largely empirical. We still need better methods of assessing bone union, better methods of operative fixation of fractures that eliminate the possibility of infection or failure of the implant, and devices that allow immediate weight bearing with full use of the affected limb so that all stiffness and muscle wasting are avoided.

New methods of intramedullary nailing; new materials, electromagnetic systems, new braces, all promise improvement but, unless the methods are reliable and simple to apply, they will not supersede the more traditional ways of bone settings.

TRAINERS BEWARE — OVERUSE SYNDROME IN ATHLETES

Whilst bone response to the stresses placed upon it, according to Wolf's law or the electrical piezo - electric impulses, too much stress applied too suddenly results in breakdown — a fatigue or stress fracture.

Dr. Micheli's excellent article emphasizes the need for careful training methods through evaluation of the athlete, assessment of any anatomical abnormalities, and careful selection of his footwear during his sporting activities. Stress fractures are more common than is appreciated and there may be confirmed by bone scans even when the tell-tale radiological appearance is not present. □

ACKNOWLEDGEMENTS

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Top to bottom: 300 SD, 300 CD, 300 TD, 300 D and 240 D.

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1980 EPA fuel economy estimates

Model	Estimated Rated Consumption (liters/100 km)	Cruising Range (km)
240 D (manual)	7.8	833
240 D (auto)	8.6	755
300 D	9.1	851
300 CD	9.1	851
300 TD	9.5	786
300 SD	8.6	953

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Cast-Bracing: A Functional Method of Treating Fractures

Charlotte S. Resch*,

Halifax, N.S.

Objective: Cast-bracing is a relatively new method of fracture treatment, based on controlled motion rather than immobilization. This article will attempt to provide an overview of its development and uses. For the sake of brevity and convenience we shall deal primarily with the treatment of femoral fractures, with only brief mention of other types of cast-braces.

INTRODUCTION

The treatment of fractures is as old as the practice of medicine itself. Unlike internal illness, the injury in a fractured limb is usually obvious and the damaged part readily accessible. The treatment can be derived largely from common sense: correct what deformity exists (i.e. reduce the fracture), then fix the bone to something to prevent recurrence of the deformity (splintage). This simultaneously relieves pain. The results of early man's efforts were sometimes better than might be expected.

THE CONCEPT OF IMMOBILIZATION

"We do not expect union of the bones if motion of the fragments is permitted."

Hugh Owen Thomas²⁶

"There is only one cause of non-union . . . inadequate immobilization."

Sir Reginald Watson-Jones²⁶

Observation led to the discovery that fractures not well fixed and subject to excessive motion failed to unite by bone, resulting either in a fibrous union or a pseudarthrosis. This gave rise to the theory that only absolute immobilization, i.e. fixation of the joints above and below the fracture site, provided the necessary environment for satisfactory healing by bony union. This theory was espoused by such eminent orthopaedic surgeons as Hugh Owen Thomas and Sir Reginald Watson-Jones, and dominated the field of fracture treatment until the 1950's. Watson-Jones maintained that such factors as gaps, infection, plating, and poor blood supply did not in themselves cause non-union, but that the fracture only progressed to this state when the attending surgeon failed to prolong immobilization appropriately in response to the new situation.²⁶ Even fractures fixed internally should, according to this author, be completely immobilized until union is sound.²⁶

The risks of this method, which include muscular atrophy, contractures, and potentially permanent crippling, were well

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known to Watson-Jones. He repeatedly stressed the need for continual exercise of all non-immobilized joints in a fractured limb, which completely prevents stiffness in mobile joints and reduces stiffness in immobilized joints.²⁶ He had great success with this method (in a series of 800 femoral and tibial fractures he had not one non-union).²⁶ As a result while strict immobilization was so firmly entrenched in medical practice that the use of movement in the management of fractures, first proposed over a century ago, has only recently been generally accepted.

THE CONCEPT OF CONTROLLED MOVEMENT

"Life is motion."

Lucàs-Championere⁵

John Hunter, sometimes cited as the originator of the concept of controlled movement, reported a case in 1791 of non-union of a fracture of the proximal femur in which he advised the patient to "walk upon crutches and to press as much upon the broken thigh as the state of parts would admit, with a view to rouse the parts to action forcing them by a species of necessity to strengthen the limb".⁵ The result was that the fracture united, and the patient was able to walk with a cane in two months. With hindsight it might appear that Hunter was advocating compression as a positive factor in osteogenesis, but it is possible that he merely intended to excite an inflammatory response through enforced walking on an unsupported and probably painful limb. In that case his innovation was in method, not in principle, for inflammation was widely held at that time to be a necessary precursor to fracture healing.

Henry H. Smith is generally credited with the introduction of the first cast-brace in 1855, a radical departure from traditional methods of fracture treatment. At that time, treatment of delayed union and non-union consisted of various methods of provoking inflammation and a supply of "good pus", including injection of tincture of iodine into the pseudarthrosis, re-opening of the fracture and rasping off the sclerotic bone ends followed by repeated applications of caustic potash, insertion of ivory pegs into holes drilled near the bone ends, and even acupuncture.^{22, 23} In the pre-antibiotic era, intervention such as this was very dangerous. In 1848, after nearly losing a patient as a result of one of these treatments, Smith decided that a better method might be merely to brace the non-united fracture, providing a partially functional limb and sparing the patient surgery except as a last resort.²³ For this purpose he designed three braces, for the humerus, the femur, and the tibia. These braces, the precursors of the modern cast-brace, splinted the limb enough to prevent shearing and rotational stresses which could result in angulation, deformity, and pain, but unlike conventional splints, allowed motion at all joints; weight-bearing was encouraged.

Smith discovered that ambulation in a cast-brace was not palliative only, but promoted osseous union in what were previously established non-unions, so that the patient could discard the prosthetic device eventually. Unlike John Hunter, he seems to have been aware of the implications of these "cases illustrative of the advantages of pressure at the seat of the fracture", and suggested that it would be "an inquiry worthy of note . . . whether . . . very perfect rest may not be one cause of the deficiency of the new bond of union", noting that "moderate motion has certainly induced union" and ". . . [perhaps] rest in the treatment of fractures has been too strongly insisted on".²³

Smith's revolutionary concept did not meet with much general acceptance. First, it was difficult to bring about so radical a departure from standard methods of treatment. Secondly, rapid development in fields such as antisepsis, anaesthesiology, and radiology made surgical repair of fractures more feasible, and dramatically reduced the incidence of fatal and near-fatal complications of surgery that had prompted Smith to develop the cast-brace in the first place. With the introduction of the skeletal pin by Fritz Steinmann in 1907 and the skeletal wire by Martin Kirschner in 1909, skeletal traction became the non-operative treatment of choice for femoral shaft fractures.

There were a few people who received the innovation with enthusiasm. Lucàs-Championiere (1910) advocated early ambulation and weight bearing for fractures of the tibia.¹⁹ Delbet in 1910 developed a spring-loaded traction apparatus which allowed ambulatory treatment of fractures,⁵ and in 1916 he treated fractured femurs with an ischial weight-bearing brace,² much as Smith had done 60 years before. In North America, cast-bracing was in virtual disuse until the 1950's when Dehne reintroduced weight-bearing casts for fractures of the tibia in military personnel, with excellent results.² It was not until 1970 that the hinged cast-brace first proposed by Smith was reintroduced by Vert Mooney for the treatment of femoral shaft fractures.¹⁷

WEIGHT-BEARING AND THE HEALING OF FRACTURES

"Motion promotes healing; healing enhances motion."¹⁰

I. Compression

One of the advantages of cast-bracing is that the compression through the fracture site resulting from weight-bearing (the load sparing effect of the cast-brace is never greater than 25% — 50%)^{14 17} encourages osteogenesis.⁸ In an elegant study conducted in 1914, Eggars *et al.*⁸ demonstrated conclusively the beneficial effect on osteogenesis of "contact-compression" (a word he coined to indicate the importance of both factors in promoting osseous union). Using the parietal bone of the adult rat as a model, it was found that where compressive force was maintained across the fracture site, union by callus occurred within 17 days, whereas sites where compression was lacking still demonstrated non-union at 24 days. Also, while both contact and compression were important determinants of the speed of union, if only one factor was missing (as in internal fixation by plating, where there is contact but the plate prevents further compression, or in the application of compressive forces across a fracture site where a small gap exists precluding contact), union, though delayed, still occurred.

When both factors were absent (as in excessive traction, where there is both a gap *and* distractive forces), fibrous union was liable to occur.

It was further demonstrated that infection, which merely delayed union of a compressed fracture, caused necrosis and resorption of bone if compression was lacking. There were limits to the amount of compression desirable: excessive pressure caused bone necrosis with little osteogenic activity.

Compression also influences the strength of the bony union. In 1892, Julius Wolf demonstrated that bone conforms architecturally to the stresses placed upon it.⁹ Bone formed under the weight-bearing stresses of cast-bracing probably has an advantage in terms of functional remodelling over bone formed in the absence of compression or, worse, in the presence of distraction, and may thus be less liable to subsequent refracture on removal of the cast-brace.

The compressive forces in cast-bracing are generated by weight-bearing, gravity, and the active muscular contraction resulting from ambulation. The beneficial effects of weight-bearing and contact-compression have been demonstrated clinically in numerous studies.^{1 2 5 6 9 13 17 20 21 24 25 27}

II. Rotation and Shearing

In addition to compression, weight-bearing also produces shearing and rotational forces which tend to disrupt the newly formed callus, delaying or even preventing union. For this reason, attempts at instituting ambulation in a conventional long-leg plaster are doomed to failure for, as Watson-Jones pointed out, unless the hip joint is immobilized, not even tibial fractures, much less fractures of the femur, are adequately protected from rotatory stresses.²⁶ These shearing and rotatory stresses result from twisting of the limb within the cylindrical cast and can be prevented by accurately contouring the plaster to the shape of the limb, so called "total-contact" support.^{2 17} When properly molded there is, in the great majority of cases, less rotation while walking in a cast-brace than while lying in bed in traction,⁴ since in traction the distal fragment is fixed in position while the rest of the patient is free to move through a wide range, resulting in inevitable twisting at the fracture site.

III. Angulation and Translation

Angulation and over-riding of the fracture fragments, which may result in deformity and shortening, is avoided by ensuring that the brace extends the full length of the fractured limb. This, combined with the total-contact nature of the plaster, converts the limb into a semi-rigid hydraulic tube so that the pressure of the surrounding tissues maintains the fragments in alignment.^{2 17}

THE ALTERNATIVES: TRACTION, INTERNAL FIXATION, AND CAST-BRACING

I. Traction

Traction is inferior to cast-bracing in terms of quality of results, percent union vs. non-union, and rapidity of healing. Wardlaw²⁵ found that while traction yielded 63% good or excellent results and 13% very poor, cast-bracing in a similar group of patients yielded 78% and 3%, respectively. Since 1960, traction for treatment of femoral shaft fractures has resulted in incidences of malunion and non-union ranging

from 11% to 29%.⁵ With cast-bracing, the incidence drops as low as 1%.⁵ Mooney¹⁹ and Wardlaw²⁵ both found that union in a cast-brace occurred in just over half the time required in traction. This is because traction does not provide compression across the fracture site or protect the callus from rotational and shearing stresses.⁴ There is also the possibility of distraction leading to delayed union or non-union.^{9, 26}

Traction has disadvantages arising from its immobilization of the limb and the patient. Decreased flexion of the knee is one such complication of non-operative treatment of femoral shaft fractures,^{17, 19} particularly if the fracture is near the knee or associated with extensive soft tissue damage. Immobility may lead to atrophy of the limb involved and of the body as a whole.^{13, 17, 20} Complete rest also produces a negative calcium balance and osteoporosis,⁹ interfering with bone healing and increasing the risk of refracture once weight-bearing is resumed. Although these complications can be avoided in large part by an adequate and vigorous exercise program,²⁶ achieving satisfactory results requires a motivated patient and, not infrequently, a great deal of cajoling on the part of the attending physicians.

II. Internal Fixation

There are two principal means of internal fixation: intramedullary devices and plates, with either indicated in fractures with soft tissue interposition since this necessitates open reduction. For transverse and slightly oblique fractures, intramedullary nailing is the treatment of choice because the fracture fragments undergo excessive pistoning during weight-bearing in a cast-brace. This pistoning is painless but, since the fracture tends to heal at the midpoint of the translation range, the end result is excessive shortening of the limb.⁴

Internal fixation is contraindicated in the treatment of severely comminuted or infected fractures (which do, however, respond well to cast-bracing).

Complications of internal fixation include infection,^{5, 27} and possible adverse effects from anaesthesia, particularly when the patient is suffering from multiple injuries. Further trauma to an already damaged periosteum may compromise the blood supply to the fracture site,⁹ delaying union. Plating may hold the fracture fragments apart and prevent contact-compression, also delaying union.^{5, 9} Conversely, attempted application of compressive forces with mechanical fixation devices must be undertaken with care because, as Eggers *et al.* pointed out, both excessive pressure at sites of bone-to-bone contact and any pressure where this bone-to-bone contact is lacking (i.e. metal on bone) are liable to produce bone necrosis and resorption rather than stimulate healing.⁸ And lastly, while perfect anatomical reduction may be achieved by surgical means, any errors that result are much more difficult to correct than those occurring in cast-brace,⁵ and in most cases require reoperation. However, internal fixation can have excellent results; in one series of 80 patients treated with intramedullary devices, there were no non-unions, malunions, or infection.³

III. Cast-Bracing

Aside from the contraindications noted above, a wide variety of femoral shaft fractures are amenable to treatment by cast-bracing, including severely comminuted and/or contaminated fractures.^{2, 4, 5, 17, 27} Connolly *et al.*^{4, 5} found in

compound fractures that, following debridement, wounds left open under the cast healed rapidly. In their treatment of 30 compound fractures, including 8 with positive wound cultures prior to cast-bracing, none went on to develop osteomyelitis when treated with the method just described.⁵ In an analogous series of 1000 tibial fractures treated by cast-bracing, 30% of which were compound, there were no instances of persistent infection or non-union.¹⁷ These results in compound fractures have been repeated in numerous studies,^{2, 4, 5, 17, 27} although some take the added precaution of antibiotic coverage.¹⁴ Vieyra²⁷ and Joseph Noll (cited by Brown and Preston) have used cast-bracing to treat successfully severely comminuted compound fractures resulting from high velocity missiles (gunshot and mortar).

Cast-bracing may be used for the treatment of fractures around the knee (lower $\frac{1}{3}$ femur and upper $\frac{1}{3}$ tibia), despite the fact that the knee remains mobile.¹⁴ In the case of double fractures, e.g. femoral fracture with ipsilateral patellar or tibial fractures, or bilateral femoral fractures, a cast-brace may be used on both fractures, with results as good or better than those achieved by conventional methods.^{1, 12, 27} Even fractures associated with lower limb amputations are amenable to cast-bracing, the temporary prosthesis functioning in lieu of the leg portion of the cast-brace.

Cast-bracing is also better suited than traction for the treatment of the patient with brain injury who may alternate between coma and agitation, or the patient with chest injury in whom the upright position improves cardiovascular and respiratory function.⁵

The rapid healing time results in a shortened hospital stay, conserving both money and hospital beds.^{13, 25, 27} In the paediatric age group (cast-bracing has been used in children as young as 2 years old),¹⁶ it means less time lost from school, and in all patients the ability to walk around and gain some self-sufficiency results in improved morale during convalescence.²⁷

The disadvantages of cast-bracing include a painless knee effusion developing in some patients and necessitating intermittent elevation of the leg,⁴ slight ankle stiffness, problems of alignment of fractures of the upper $\frac{1}{3}$ of the femur,^{2, 3, 13, 15, 17} and, in cast-braces which incorporate the tibial pin, pin-tract infections.

THE METHOD

I. When to Apply the Cast-Brace

The decision when to apply the cast-brace is based on clinical judgement. It cannot be applied immediately, since a cast applied on an acutely injured and edematous limb will loosen as the swelling subsides, losing its ability to maintain alignment during weight-bearing. In the case of a severely injured patient incapable of walking, the aim of cast-bracing is defeated until his general condition improves. For these reasons, the fracture is usually reduced immediately and then maintained in traction from 1 to 8 weeks.^{1, 2, 5, 10, 13, 15, 17}

Criteria for application of the cast-brace vary from author to author, some recommending clinical evidence of callus formation (i.e. no pain or gross motion at the fracture site),^{2, 15, 17} others waiting until the patient's condition allows

ambulation,^{5 13} and another basing his decision on evidence of good quadriceps control, which is essential for ambulation in a cast-brace.¹ There is no advantage in delaying application of the cast-brace for longer than is required for the swelling to subside. Where this was done, the healing time was prolonged relative to patients whose cast-braces were applied at an earlier date post-injury.^{5 13}

II. Application of the Cast-Brace for Femoral Fractures

The cast-brace consists of two parts: the thigh portion, and the leg and foot portion, joined by two hinges, one on either side of the knee. The application of the brace may be carried out under general anaesthesia, which affords muscle relaxation and ease of manipulation of the injured limb, or with sedation only,^{17 18} the advantage of which is that, with the patient conscious, a pain-free range of motion can be confirmed.¹⁷ The equipment necessary for this procedure is illustrated in Figure 1.

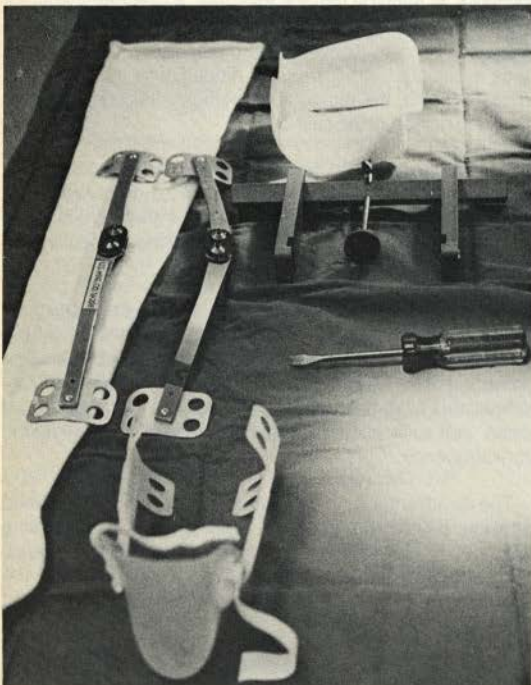


FIGURE 1

Cast brace apparatus.
Wore thigh piece and socknette.
Hinges.
Jig to orientate hinges.
Foot piece.

(i) **The Thigh Portion** The thigh plaster is applied first, and there are two crucial elements to this step. One is the length: the cast must be applied as far proximally as possible on the thigh¹⁷ while an assistant maintains manual longitudinal traction on the femur.² This manoeuvre ensures that the case maintains maximum thigh length and protects against shortening of the limb during ambulation. The second

important consideration is molding. As mentioned above, because the hip joint is not included in the plaster cast, the fracture would be subject to a considerable degree of rotational stress were it not for careful molding of the thigh portion of the cast-brace to achieve a total contact effect. This can be accomplished by two means. One can carefully mold the wet plaster by hand to a quadrilateral shape, with femoral triangle compression and contouring along the adductor channel,^{2 27} Alternatively, one can use a prefabricated plastic quadrilateral thigh socket, which can be applied either beneath the plaster and incorporated into the cast, or externally, serving as a molding device to be removed once the plaster is dry.

(ii) **The Leg and Foot Portion** Following application of the thigh portion of the cast, a cast for the leg is formed to suspend the thigh cast via two hinges, preventing it from sliding down the thigh and losing its ability to maintain alignment of the fracture. In order to accomplish this, the leg portion itself is suspended, either by constructing a foot portion or by incorporating the pin used for skeletal traction into the cast, in which case the foot may be omitted.^{4 11 13} The latter method results in a lighter, less cumbersome cast, encouraging ambulation,¹³ but carries the risk of necrosis of the skin around the pin or actual pin tract infection. However, Connolly and King reported that of 30 patients treated in this manner, none developed a pin tract infection.⁴ Should skin necrosis develop around the tibial pin, it can be removed and a cast with a foot applied.¹³ Although the foot portion immobilizes the ankle, Mooney found that in a series of 300 patients none developed significant limitation of ankle motion.¹⁷

(iii) **The Hinges** When both halves of the cast are complete, the hinges are applied. There are 3 different types of knee hinges: uniaxial, biaxial, and multiaxial (made of metal cable or plastic). Biaxial hinges conform most closely to the actual motion at the knee joint. Some authorities use uniaxial joints maintaining that the "give" in the soft tissues about the knee allows uniaxial joints to perform as well as biaxial ones.^{11 17} Multiaxial joints offer an advantage in that their positioning relative to the axis of the knee is not as crucial and as such they can be applied by less skilled persons. However, since they are made of flexible material, they provide less lateral support to a possibly weakened knee.²⁸

During the application of the hinges, there are two important factors. First, for the leg portion to suspend the thigh portion effectively, the latter must be pulled as far proximally as possible during application of the hinges.¹³ The second, more important consideration, is the alignment of the knee joints, for if improperly aligned they promote angulation at the fracture site by forcing the limb through an abnormal range of motion.²⁵ The optimal position is one in which the centre of the hinge is in line with the axis of the knee joint, which lies postero-inferior to the adductor tubercule.^{4 17 25} In order to facilitate alignment of the knee joints and to ensure that the two hinges are parallel, an alignment jig is used with the crossbar resting on the midpoint of the patella (see Figure 2). The alignment can be checked by attaching the hinges temporarily with two jubilee clips and determining the range of motion of the knee.²⁵ By bending the arms of the hinges, the knee can be aligned in varus or valgus in order to take strain off lateral or medial tibial plateau fractures, respectively.¹⁷

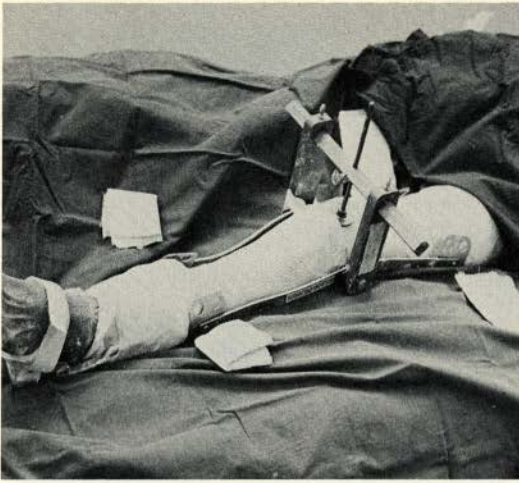


FIGURE 2

Cast brace apparatus.
Application for fractured lower end of femur.

(iv) **Checking the Alignment** When the cast brace is complete, the position of the fracture fragments must be checked radiographically.¹⁷ If the position is unsatisfactory, several courses of action are available. Providing the tibial pin has been left in place, one can re-institute intermittent longitudinal traction to correct the deformity.⁵ Alternatively, one can wedge the cast to correct angulation.^{5, 17} This may add undesirable weight and bulk to the cast-brace,²⁰ in which case the entire cast can be removed and replaced.⁴ Finally, if open reduction and fixation are indicated, they are still possible and no more difficult to carry out than in a fresh fracture, even after one to two weeks in a cast-brace.⁵ However, all the above procedures are easier to carry out relatively soon after the date of injury,⁵ another reason why unnecessary delay in application of the cast-brace is unwise.

Fractures of the proximal $\frac{1}{3}$ of the femur are more prone to problems of alignment during treatment by cast-brace than those of the middle and distal thirds.²⁵ This has been demonstrated both clinically and by electrogoniometric measurements showing that of all types of femoral fractures, only in those of the proximal third is rotation controlled less well by cast-brace than by traction.⁴ While Lesin *et al.*¹⁴ and Mooney *et al.*¹⁷ state that fractures of the proximal third of the femur should not be treated by means of a cast-brace, others, including Connolly *et al.*⁴ find that they are stable enough for this method of treatment with the addition of a pelvic band and hip joint (the axis of which is centered over the greater trochanter). This holds the limb in thirty degrees of abduction, overcoming the tendency to rotational and varus deformity of the limb.^{2, 4, 15} If varus angulation occurs despite these measures, the cast-brace can be extended to include the hip joint forming a hip spica.⁵

III. Removal of the Cast-Brace

The decision to remove the cast-base is also based on clinical judgement. The criteria generally accepted are full, pain-free weight-bearing, with the patient using crutches only

for balance.^{2, 5, 13, 17} Radiographs, while they may confirm the clinical findings by demonstrating good callus formation, should not be used as a basis for determining union, and must be discarded if they conflict with clinical evidence.^{13, 17} Radiographic evidence of healing often lags behind actual healing. Refractures occurring after removal heal uneventfully following reapplication of the cast-brace.⁵

VARIATIONS IN THE METHOD

I. Waistband

Suspending the thigh portion of the cast-brace via a waistband obviates the need for a leg cast and hinges. Although not many details are available in the literature, Deyerle and Patterson found that thirteen (primarily midshaft) femoral fractures treated by weight-bearing in such a cast united without shortening.⁷

II. Intermittent Traction-Ambulation

Introduced in 1977 by Levin, Mooney, and Ashby,¹³ this method replaces the plaster thigh portion of the conventional cast-brace with an adjustable, pre-fabricated, polypropylene thigh support. Because it is adjustable and can be tightened as the circumference of the limb decreases, the thigh support can be applied as soon as the patient's condition allows ambulation (average 9.3 days), without consideration for thigh swelling. Since the cast-brace is applied before the fracture is clinically stable, traction must be maintained whenever the patient is not walking. For this purpose special wire loops are incorporated into the anterior portion of the plaster leg cast to allow application of traction via the roller traction system of Neufeld. Patients are able to get into and out of traction unassisted.

Open wounds are dealt with the same way as with the regular cast-bracing method, with the additional advantage that the thigh support can be loosened to provide ready access to healing wounds for dressing changes, etc. Since the tibial pin is incorporated into the cast, the foot portion can be removed when the patient is ready for discharge. This, combined with the plastic thigh support, results in a much lighter cast-brace, encouraging ambulation. The earlier institution of ambulation avoids prolonged periods of time in traction resulting in a further reduction in hospital stay. This method may be utilized even if the performed plastic thigh supports are unavailable, simply by removing an anterior longitudinal strip from a plaster thigh support and adding straps for adjustment.

The primary disadvantage of this method is that it requires the cooperation of the patient to ensure that the straps are snug each time before walking, otherwise non-union and/or deformity may result from walking on the unsupported fracture.

III. Other Types of Cast-Brace

Although the details lie beyond the scope of this article, the reader should be aware that the cast-bracing method described above can be adapted for the treatment of fractures of the tibia, ankle, calcaneus and humerus, with results as good as or better than those obtained with conventional casts. (Figure 3 & 4)



FIGURE 3

Note plaster boot and stalker heel replace plastic foot piece.



FIGURE 4

Complete cast brace with foot piece.

SUMMARY

Cast-bracing, by taking advantage of the beneficial effects of contact-compression on osteogenesis, dramatically shortens the time necessary for fracture healing and decreases the incidence of mal-union and non-union. It is suitable for fractures of the femur, tibia, humerus, ankle, and calcaneus both compound and comminuted, and when properly utilized the side effects are minimal. However, contraindications for its use do exist, and one should be aware of the pitfalls of indiscriminate use to which new and successful treatments are sometimes subjected. Furthermore, the length of time required for the value of this method to be recognized serves as a warning of the dangers inherent in placing too much faith in "traditional" methods.

"... Our reverence for our predecessors must not prevent us from using our own judgements ..."

Percival Pott²⁰

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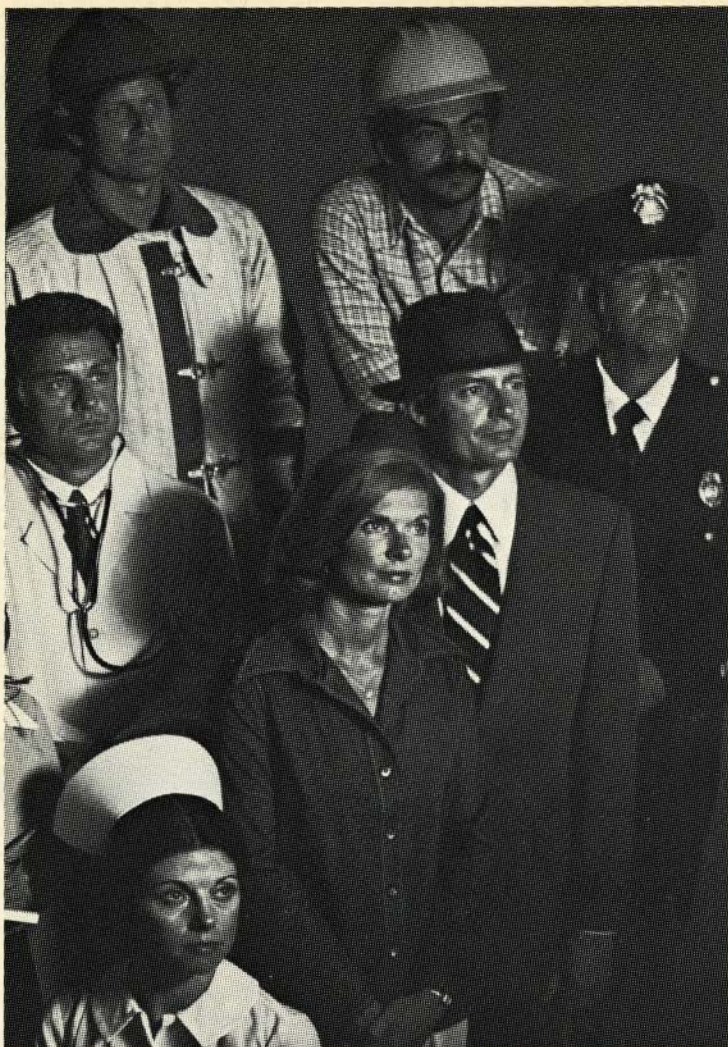
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Etiologic Assessment of Overuse Stress Fractures in Athletes*

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INTRODUCTION

The number of people of all sexes and ages participating in organized and recreational sports in North America has increased rapidly. While the majority have had some experience with athletics in the past, knowledge of training and conditioning techniques is often fragmentary or dated. As a result of inappropriate training techniques, poor equipment or inadequate fitness, many of these new or renewed athletes and fitness enthusiasts will be injured. These "overuse injuries", as they are often called, encompass a variety of injury types and anatomic sites, ranging from low back strain and hip bursitis to tendinitis of the ankle and stress fractures of every possible bone of the lower extremity.¹

While encompassing a variety of injury types and tissue sites, these injuries have in common a similar natural history and mechanism. As opposed to the more traditional sports injuries — fractured clavicles, sprained ankles or deranged knees, which are usually the result of a single episode of macro-trauma exposure, the overuse injuries usually result from recurrent micro-trauma, with tissue injury the result of nothing more than the repetitive impact of the foot against the ground in running or the repeated acceleration and deceleration of the arm in throwing or swinging a racquet.^{9 10 17}

Traditionally, the medical approach to musculo-skeletal injury has placed major emphasis on the diagnosis and treatment of these injuries. More recently, studies of musculoskeletal injury and of overuse injuries in particular, have also attempted to determine the etiology of these injuries, as a first step in injury prevention. These studies have suggested that a number of predisposing factors are often present which can explain, at least in part, why a given athlete sustained injury.^{4 13 16 20}

In our Sports Medicine Division at the Children's Hospital in Boston, we have developed a standard checklist for etiologic factors associated with lower extremity overuse injuries. (Table I) This checklist has proven useful in both determining the probable cause of a given injury, and at the same time suggesting means of preventing the occurrence of other overuse injuries in that athlete in the future. As an example, a runner with a significant leg length discrepancy may initially present with a tibialis anterior tendinitis of the

short leg, and, if the discrepancy is uncorrected, may be next seen with a trochanteric bursitis of the long leg.

When this checklist is applied to a given athlete presenting with an overuse injury, we have usually found that at least two and frequently, three of these factors are present. Although the novice athlete is more subject to overuse injury, an athlete at any level of performance or training may present with an overuse injury. Thus, a nationally ranked distance runner who had decreased his level of training during a two week exam period to 55-60 miles per week from a base of 90 miles per week sustained a tibial stress fracture when he immediately resumed his previous level. Additionally, he was found to have tight heelcords and hamstrings and admitted to only token stretching exercises, and had resumed running in a worn pair of racing flats left over from the spring track season.

Of the various lower extremity overuse injuries, stress fractures are of particular concern to both athlete and physician. Serious delays in diagnosis and treatment can result from unrecognized stress fractures, and inappropriate management, including "running through the tendinitis," can result in complete fracture and serious disability.^{4 6 7 16}

As with other overuse injuries, much attention has been directed recently to the diagnosis and management of stress fractures in athletes, but relatively little attention has been given to determining why a given stress fracture occurred in a given athlete.^{4 13} Although several early studies of stress fractures in athletes emphasized the role of training rate and intensity in the occurrence of stress fractures, no prospective study has previously been done to determine the relative

TABLE I

FACTORS TO CHECK IN OVERUSE SYNDROME

1. TRAINING ERRORS, abrupt changes in intensity, duration or frequency of training.
2. MUSCULO-TENDINOUS IMBALANCE — of strength, flexibility or bulk.
3. ANATOMICAL MALALIGNMENT OF THE LOWER EXTREMITIES, femoral anteversion, patella alta or lateral alignment, genu valgum, tibia vara, pes planus or cavo varus.
4. FOOTWEAR: improper fit, inadequate impact absorbing material, excessive stiffness of sole, and/or insufficient support of hindfoot.
5. RUNNING SURFACE: concrete pavement versus asphalt, versus running track, versus dirt or grass.
6. ASSOCIATED DISEASE STATE OF THE LOWER EXTREMITY, osteoarthritis, neuromuscular disease, vascular insufficiency, or old fracture.

*Based on a talk given at A Symposium in Sport Medicine, Halifax, N.S. October 13 and 14, 1979, presented by The Nova Scotia Chapter Canadian Academy of Sport Medicine.

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importance of other factors in the occurrence of this injury.^{6,7,16} It was the purpose of the present study to assess the variety of different lower extremity stress fractures occurring in athletes in our clinic and to attempt to determine the relative importance of etiologic factors associated with stress fractures of the lower extremity.

MATERIAL AND METHODS

All patients presenting to our Sports Medicine Division over a seven month period, between January and August of 1978, who were suspected of having a lower extremity stress fracture on the basis of history and physical examination and in whom the diagnosis was confirmed by radiographic evidence of callus formation at the site of suspected fracture or increased uptake of radioactive isotope on bone scan, were included in the study. Each patient diagnosed as having a stress fracture was assessed by an orthopaedic surgeon, podiatrist, and physical therapist.

Each examiner recorded associated risk factors in each fracture using the overuse injury checklist. The records were then reviewed by a research assistant and risk factors were compiled for each stress fracture, and listed as primary risk factors if identified by at least two of three examiners.

While there are objective criteria for determining anatomic malalignment or musculo-skeletal imbalance, the determination of whether training error, shoe or running surface were etiologic factors was often subjective — based on the opinion of the examiner and frequently the patient, as to whether they were contributing factors in a given injury. For example, a runner who had not previously done hill running and then

began doing five to seven miles a day of hill work in cross country training for three weeks prior to a stress fracture was classed as having training error as a primary etiologic factor — despite lack of objective measurement of change in rate or intensity of training.

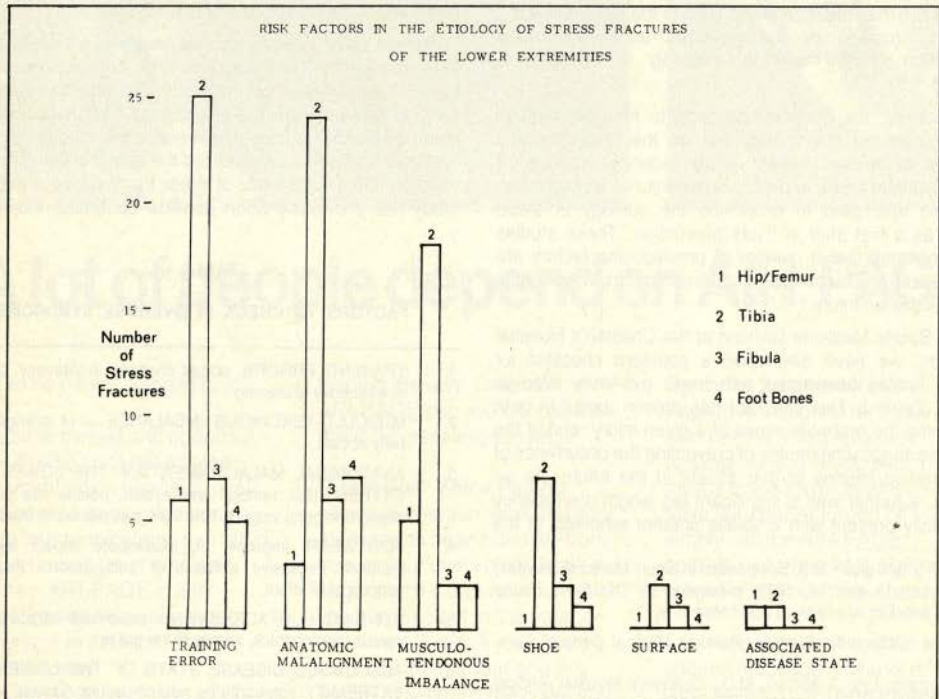
RESULTS

A total of fifty-five stress fractures were diagnosed in forty-seven patients — twenty-nine female and eighteen male. There were a total of six fractures of the femur, with four at the base of the neck of the femur and two in the distal femur. In the lower leg there were thirty-four fractures of the tibia and eight of the fibula. Seven stress fractures of the bones of the feet were diagnosed, including one of the calcaneus, one of the navicular, and five of the metatarsals. Six of the eight bilateral stress fractures occurred in the contralateral tibia and two in contralateral metatarsals.

When the assigned risk factors were combined for each anatomic site of fracture, a number of interesting associations were found. In the hip stress fractures, all six of the fractures were associated with significant training error and, in five of the six, muscle-tendon imbalance was also found. In four of the six, anatomic malalignment was also present with three having leg length discrepancies of greater than one half inch. One of these patients was found to have an old but previously undetected partial slip of the capital femoral epiphysis, which severely limited rotation of the involved hip. (Figure 1a, 1b)

In twenty-five of the thirty-four tibial stress fractures, training error was felt to be a significant association, followed

TABLE II



Incidence of primary risk factors compared to anatomic site of fifty-five stress fractures diagnosed in athletes.

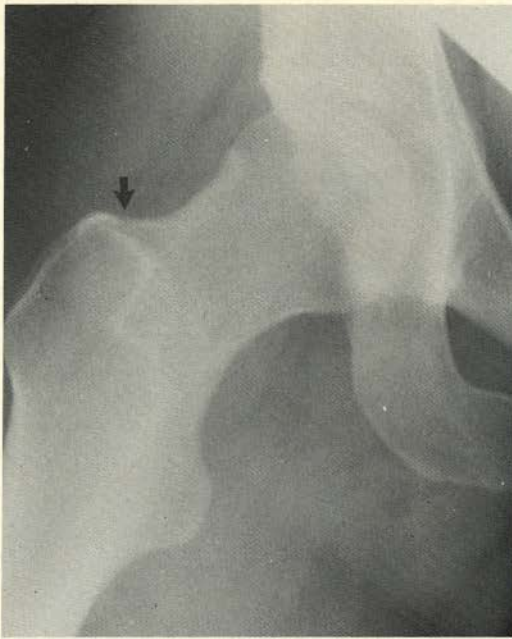


FIGURE 1a

Roentgenogram of the proximal femur of a 28-year-old female rugby player who suddenly increased her training from three to four miles per day. Hip pain initially diagnosed as tendinitis proved to be due to stress fracture at the base of the neck of the femur, with slight cortical defect noted.

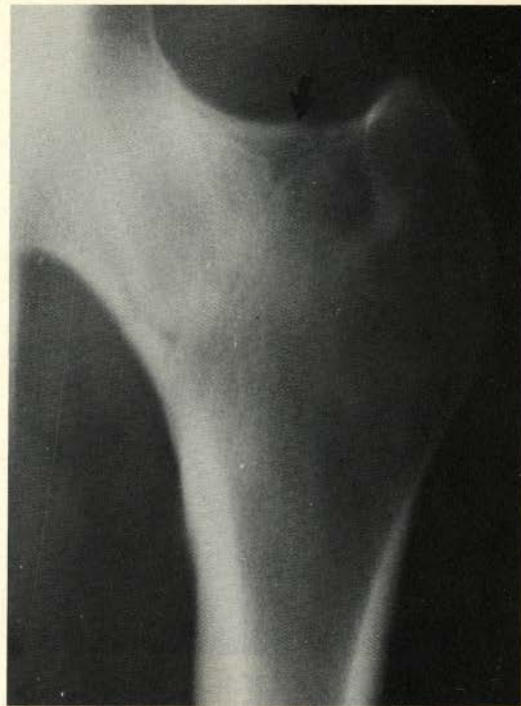


FIGURE 1b

Tomograms taken 3 days later. This cut clearly demonstrates the fracture line.

closely by anatomic malalignment — usually genu valgum with tibia vara — in twenty-four instances. In nineteen of these, muscle-tendon imbalances particularly tightness of the tendo Achilles and weakness of ankle dorsiflexors, were felt to be important associated risk factors. (Figure 2)

The associated etiologic risk factors in stress fractures of the fibula were similar to the tibia. Training error was felt to be a significant factor in seven of the eight fractures, with anatomic malalignment found to be a significant association in six, and muscle-tendon imbalance and shoe wear felt to be important in two. (Figure 3a, 3b)

By contrast, in stress fractures of the foot, anatomic malalignment was felt to be the most frequently associated factor, and was noted in all seven of these fractures, while training error was noted to be significant in five of the seven.

DISCUSSION

The results of this study serve to further emphasize the importance of including musculo-skeletal assessment in the format of any fitness or exercise prescription program. Most fitness programs have been geared toward attaining or improving levels of cardiovascular fitness and, too often, cardiovascular indices alone: pulse, blood pressure, or maximal oxygen uptake, in combination with such simple anthropometric measures as height, weight, and skin fold thickness, have been the only criteria used to determine the level of intensity and rate of progression of a given fitness program. Little, if any attention has been paid to the relative musculo-skeletal fitness of the participant.⁵

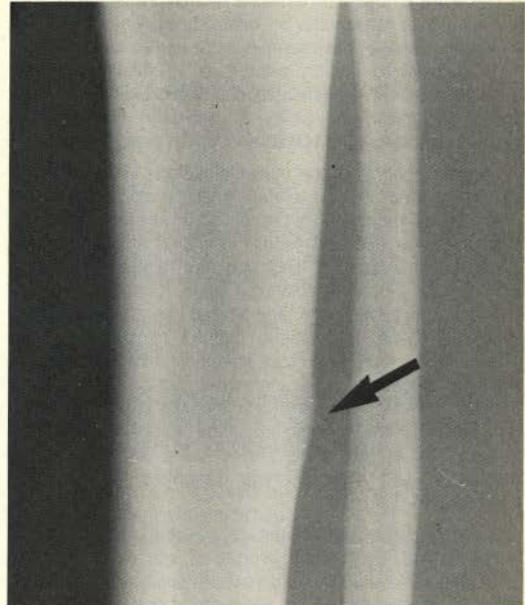


FIGURE 2

Healing stress fracture of the tibia in a twenty three year old female runner. She had marked varus deformity of the tibia and forefoot, with tight heelcords and hamstrings.

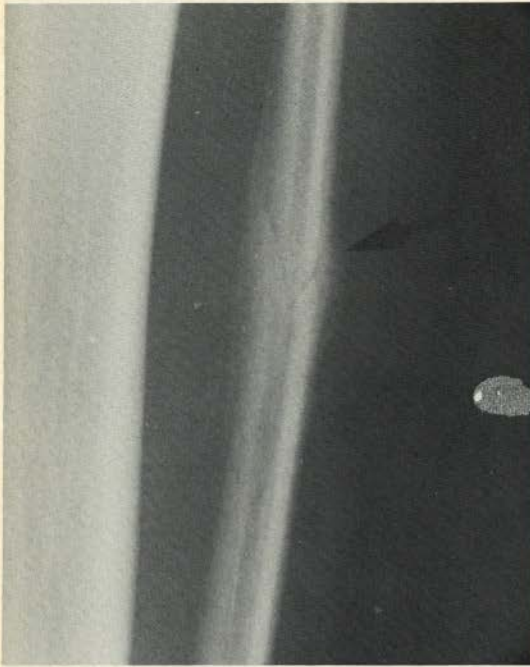


FIGURE 3a

Fibular stress fracture in a fifteen year old runner. He had tight hamstrings and heelcords and was running eight to ten miles per day on concrete.



FIGURE 3b

One month later, healing of the fracture with cortical thickening and callus formation.

There are a number of reasons for this. While the level of cardiovascular fitness can be relatively easily assessed by measuring resting and maximal pulse rates, rate of return from maximal to resting pulse rate, or maximal oxygen uptake (VO_2MAX), the fitness status of the lower extremities, and in particular, the ability to withstand the repetitive microtrauma of running, is difficult to determine.^{12 15}

The components of the musculo-skeletal system: bones, ligaments, and muscle-tendon units, undergo structural changes in response to repetitional stress. In bones, repetitive force exposure results in altered architecture and increased strength.^{3 8 12} This structural alteration includes both circumferential appositional bone formation, with increased cortical thickness, and altered internal architecture. In cortical bone, this altered internal structure involves increased numbers and cross linking of osteonal systems, while in cancellous bone, increased numbers and size of trabeculae result. The dramatic increases in bone size and density seen in the throwing arm of the baseball pitcher or the serving arm of the tennis player are a reflection of this protective and strengthening response to recurrent microtrauma.^{10 11 17}

Each of these alterations of internal architecture is characterized by bone resorption, as well as bone formation.^{3 12} In situations where the intensity and duration of imposed stress results in excessive bone resorption at certain sites of maximal stress (stress risers), and there is insufficient recovery time to allow for bone remodeling and strengthening, complete disruption of bony architecture, or a stress fracture may occur, similar to a fatigue fracture in metal.^{2 6 7}

The soft tissues of the lower extremities, including ligaments and muscle-tendon units have been shown experimentally to have a role in dampening and absorbing forces applied to the foot in walking or running.¹⁸ This appears to be partly dependent on their bulk alone, and partly on their role in prolonging the time course of force exposure. The importance of both muscle strength and joint flexibility in preventing dismount injuries in such sports as gymnastics, figure skating, and dance has been frequently noted, clinically, and the same importance could be presumed of running in the repetitive footfall.¹⁴

The way in which such anatomic malalignments as femoral anteversion, genu valgum, tibia vara, and pes planus or cavo varus pre-dispose to stress fractures remains to be demonstrated.¹⁹ Such malalignments might serve to concentrate forces at certain anatomic sites and increase the possibility of stress fractures occurring at these sites. We have observed one striking example of progressive remodeling of tibial architecture in a runner with severe tibia vara, with sequential medial bone formation and lateral resorption, in the course of which two different stress fractures were sustained medially at the juncture of the proximal and midthirds of the tibia, but, ultimately, a straighter tibia was formed. Again, while clinical impressions are often encouraging, the degree to which we can compensate for these anatomic malalignments by altering the foot-ground interface with shoe wear of specially made orthoses remains to be proven, biomechanically.

Finally, these data seem to emphasize that running shoes and running surface are not as important in injury prevention

as some lay running magazines or shoe manufactures might indicate. Training error and muscle-tendon imbalance appear to be much more frequently associated with this overuse injury. As noted above, however, properly designed running shoes may be important in helping the body to compensate for some of the anatomic malalignments of the lower extremities. Additionally, variations in the hardness of running surface in different running sessions should be a factor in deciding rate or duration of training, at least early in a running program. We will customarily recommend that a novice runner run on a softer surface such as grass or dirt for the first six to eight weeks of his program, if possible, as an aid in avoiding overuse injury.

This study also serves to demonstrate the multiplicity of factors often associated with the occurrence of a given overuse injury. Most frequently, at least two different factors were found to be associated with the occurrence of a given stress fracture, and often three or even, four factors were observed. A complete and systematic evaluation before beginning a running program, can help to decrease the incidence or severity of these injuries by suggesting supplemental exercises, as well as an appropriate rate of training progression. Unfortunately, no simple, non-invasive technique now exists to determine the relative strength of the bones of the lower extremity or their ability to withstand repetitive micro-trauma. For the present, the clinician must empirically recommend an exercise or running program which takes into account the athlete or patient's past history of activity, anatomic alignment, and musculo-skeletal status, and be prepared to alter the program if signs of overuse develop. □

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Correspondence

To the Editor:

In the last December issue of the *Bulletin* a number of excellent articles appeared on earlier Anaesthesia in Nova Scotia. Without making more than a few specific comments for the sake of accuracy I feel that the following should be noted:

James D. Fraser of Pictou made the first chloroform in Nova Scotia in 1848. Robert P. Fraser was his son, born when James D. Fraser administered the chloroform to his wife in labour. I knew R. P. Fraser in his later years.

In 1911 Dalhousie University assumed the teaching of medicine from the Halifax Medical College. It was then agreed that in future, appointments to the Staff of the Victoria General Hospital would involve teaching of students in medicine. At that time the Hospital had 180 beds, including five for private patients.

Dr. Fred Lessel was appointed as anaesthetist sometime between 1911 and 1921 to give anaesthetics and to teach anaesthesia. Certainly he was more than active immediately following the Halifax Explosion in 1917, when he worked steadily for 14 hours. Of course he had help from doctors doing general practice in the City. His own practice was confined to anaesthesia; he did nothing more. The same applied to Dr. Walter Muir when he joined the Staff. By that time 67 beds had been added for private and semi private patients.

Anaesthetics were never given by undergraduates unless under supervision, as part of regular instruction. As the work load increased, more help was secured by appointing resident anaesthetists for service in the General Ward section of the Hospital and for a period two practising physicians in the City were engaged. For private patients the surgeon chose his own.

The Staff of the Hospital consisted of the Visiting Staff and the Courtesy Staff, the latter caring for private and semi-private patients only. Its members had no obligation to teach students.

The Appointed Staff were all specialists acting as such in and outside the Hospital. Patients were admitted to a surgeon, for example, by rotation, or as seen by him and referred to his service by request. There was an interne available for each Staff member. For many years after 1925 this would be a sixth year undergraduate medical student, who had at least two years of clinical training behind him.

There was no Departmental organization. It was Staff Organization without Departmentalization.

I hope these remarks will serve to clarify a situation which once existed but which has changed with the passing of time.

Yours sincerely,

H. L. Scammell, M.D.
Halifax, N.S.

To the Editor:

After reviewing the names of the Editorial Board of *The Nova Scotia Medical Bulletin*, I was somewhat aghast to find that this august body had allowed the English language to be sorely abused in the most recent issue of the *Bulletin*. In Table 2 of the article by Currie and Purkis on "Principles of Planning, Funding and Evaluation of Short Courses at Dalhousie" the word **prioritize** glares at the reader. I have searched several English dictionaries, several medical dictionaries and even one scientific dictionary, and can find no citations for the word "prioritize." Although I was not an English major in my undergraduate studies, I wonder whether the Division of Continuing Medical Education at Dalhousie University has coined a new word. If this is so, I suggest that we forward the word to the Gage Canadian dictionary, a publication which is always interested in new Canadianisms in our language.

A recent editorial in the *New England Journal of Medicine* coined the expression, "Medspeak". It appears that we now have "Dalspeak" to contend with as well. Pity the poor physician in rural Nova Scotia who not only has to contend with the proliferation of medical literature, but now must also cope with the proliferation of jargon expressions.

Yours truly,

J. Gray, M.D.
Halifax, N.S.

Apologies for perversions of the English language that appear in the Bulletin "Prioritize and Parenting" are just two examples of transmogrification with which we have to constantly contend.

Ed.

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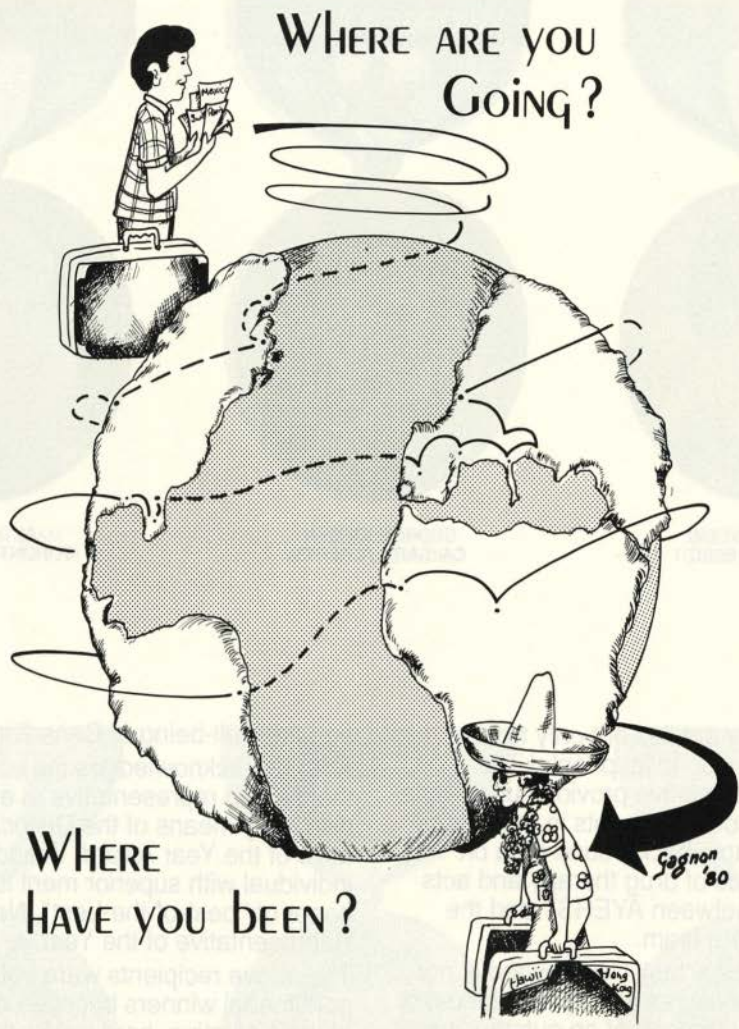
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Where Are You Going? Where Have You Been?

A. F. D'Intino*, B.Sc. and J. A. Embil**, M.D., Ph.D., F.R.C.P.(C),

Halifax, N.S.

This article presents recommendations for immunization and prophylaxis to prepare travellers for trips abroad. It also offers advice on physical examination of immigrants and travellers returning to Canada. Changing world health situation and immunization requirements may alter these guidelines. Physicians are advised to consult current publications before devising an immunization/prophylaxis schedule.



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INTRODUCTION

The increase in international travel by Canadians and the immigration to Canada by people from all over the world has emphasized the need for Canadian physicians to be aware of the various health problems these people may present. They can be divided into three groups: people who spend short periods of time in areas where health problems may differ from those in Canada; those who stay for long periods of time in areas where health hazards may be great such as members of development agencies, missionaries, or employees of the Canadian government or private firms; and immigrants to Canada who may possibly bring diseases from their native land.

This article presents general guidelines for health education of international travellers, as well as advice on physical examination of people coming to Canada from other countries.

BEFORE DEPARTURE

Immunizations

Immunizations are an important part of pretravel medical preparation. Because the body requires a certain amount of time to develop immunity after vaccination, it is important that the traveller receive his immunizations far enough ahead of his departure to develop immunity. Some certificates of vaccination do not become valid until this time period has passed.¹

Table I covers most of the immunizations and tests needed or recommended for travel. Most people will not require all the immunizations listed for in many cases, travellers may already be immunized against certain diseases and will require only booster shots.

Immunizations can be divided into two groups: those required by International Health Regulations and those which are recommended medically. Vaccinations for smallpox, yellow fever and cholera fall into the first group; those for typhoid, tetanus, poliomyelitis, diphtheria, tuberculosis, and typhus as well as hepatitis A prophylaxis are included in the second group.

Several government publications list areas where immunizations are either required or recommended.^{3,4} The Medical Services Branch of Health and Welfare Canada can also give detailed information on immunizations and International Health Regulations.

Smallpox

The basic criterion for smallpox eradication (two years without a case reported) has now been met. If endorsement of eradication is obtained from the World Health Assembly, smallpox vaccination will no longer be performed.⁵ Until then, a valid certificate of smallpox vaccination is legally required in some areas, especially in Africa, Asia, Central America and South America.

Vaccinations are valid for 3 years, beginning 8 days after a primary vaccination and on the date of a revaccination. Contraindications to the vaccine are skin disorders, altered immune states and pregnancy. The vaccine is also not recommended for children less than a year old. Entry requirements may be waived if the individual possesses a signed statement from his physician, detailing any of the above circumstances.

Yellow Fever

Travellers going to, and coming from, areas endemic for yellow fever are required to produce a valid certificate of vaccination. Yellow fever is endemic in certain countries in Africa, Central America and South America. It has also been reported recently in Trinidad.⁶

Yellow fever vaccine is only administered at certain centres in Canada.⁴ The vaccination certificate is valid for 10 years, beginning on the tenth day after first vaccination and immediately after a later one. Contraindications to the vaccine are altered immune status and egg hypersensitivity. Pregnant women should receive the vaccine only if there is a substantial risk of exposure to natural infection.⁷ Children less than a year old should not receive vaccine. Certain countries will accept a written waiver for these exceptions.

Cholera

Although many health experts feel that cholera vaccine is not very effective,⁸ certain countries require or recommend a certificate of vaccination against this disease.³

Two inoculations are needed for primary immunization. The certificate is only valid for six months; after this a booster is required every six months while the individual is at risk. Vaccination is not recommended for pregnant women.⁹

TABLE I
IMMUNIZATION AND TEST SCHEDULE FOR
INTERNATIONAL TRAVEL*

Week Number	Immunization or Test	Comment
Any time in schedule 1	Typhus	Given two doses, two weeks apart
	Smallpox	
	Polio	Booster, if previously immunized
	Typhoid	Booster, if previously immunized
	TB skin test	
	BCG	Given only if TB test is negative and only to those staying for long periods in tropical areas
2	Schick test	Immunize against Diphtheria, if test suggests
	Cholera	Booster, if previously immunized
	Tetanus	
4	Yellow Fever	
5	Cholera	
6	Typhoid	
8	TB skin test	Repeated only if BCG given
9	Immunoglobulin	

*Adapted from Seah.²

Typhoid

Typhoid is very common in the developing nations. Immunization is recommended for people visiting these areas where standards of hygiene are not high.

A primary series of typhoid immunization consists of two inoculations. For continued protection a single booster dose should be given once every three years. Typhoid vaccine should not be administered to children under two years of age, or to individuals who have allergic reactions to immunizations.

Paratyphoid A and B vaccines have not been proved effective. For this reason and because the presence of these antigens with the typhoid antigen increases the risk of undesirable reactions, the TAB vaccine is not recommended.¹⁰

Tetanus

As tetanus is very common in warm areas and travellers are less likely to seek medical attention for cuts obtained abroad, all people planning a trip outside Canada should be immunized against this disease.¹¹ Most adults have been previously immunized so usually only a single booster dose is required.

Poliomyelitis

Poliomyelitis is still a common disease in developing countries, particularly those with warm climates. Inactivated polio vaccine should be given to adults who have never been immunized.¹⁰ Adults who have previously had a full primary series need only a booster dose of oral polio vaccine. All children should have the complete series.

Contraindications to polio immunization are immunosuppressive therapy and the presence of diseases such as leukemia and lymphoma. If pregnant women are in danger of being infected, they should be immunized.

Diphtheria

Diphtheria is a definite threat to people visiting countries where vaccination against this disease has not yet been implemented. Epidemics occur sporadically in Africa, the Middle East and Southeast Asia, and anyone visiting these regions should be immunized against this disease.

A Schick test will determine immunization status if unknown. Dilute diphtheria toxoid should be administered to adults who have not been previously immunized.

Tuberculosis

Tuberculosis is highly prevalent in developing countries. While short-term visitors are not considered at high risk, those planning to stay a long time should undergo a tuberculin test. If the test is negative, a BCG vaccine can be administered. A repeat skin test should be done eight to ten weeks later to determine whether the vaccination has been successful.

There is now much controversy over the effectiveness of the BCG vaccine; the decision about its administration should be left up to the physician and the individual.

Typhus

Vaccination against typhus is recommended for people visiting rural or remote mountain areas, particularly in eastern Africa, Asia, Central America and South America.

The primary series consists of two doses, with booster doses every six to twelve months for as long as the danger of

infection exists. Individuals with egg hypersensitivity should not receive typhus vaccine.

Travel agents and other people involved in tourism often confuse typhus and typhoid. Typhus vaccination has very limited use; typhoid vaccination, however, is recommended to many international travellers.

Immune Serum Globulin (ISG)

Although immunoglobulin is not a vaccine, it has proven effective in providing protection to people exposed to infectious hepatitis A. ISG should be given to all people visiting developing countries and tropical areas where conditions of hygiene are poor. Because ISG may interfere with the response to certain vaccines, it should not be administered until at least 2 weeks after a vaccine has been given.⁷

Dosage depends on length of stay and body weight. For short-term travel (less than three months), adults who weigh more than 100 lb (45 kg) should receive 2 ml. For long-term travel (more than three months), 5 ml is the recommended dose.⁹ People who plan extended visits to these countries should have the inoculation repeated every six months.

Prophylaxis

Physicians should also advise travellers to consider malaria prophylaxis when planning a trip. Malaria is very common in parts of Africa, Mexico, Central America, South America and Asia. Recently it was also reported in Haiti in the West Indies.¹² Several publications provide information on malaria risk for various countries.⁴⁻⁹

Travellers who do not intend to spend time in an endemic area but who pass through one en route to their destination should take prophylactic measures against malaria. They are still at risk although the stopover in the endemic area may be very short.²

Of the many anti-malarial drugs available, the standard prophylactic is chloroquine phosphate (Aralen, Winthrop). The adult dose of this drug is two 250 mg tablets, taken once a week. Package inserts should be consulted for pediatric doses. **These tablets should be taken one or two weeks before entering a malarious area and continued for six weeks after leaving the area.**

In endemic areas, chloroquine sulphate (Nivaquine, May and Baker) is more readily available.

In Southeast Asia, Central America and South America, resistance has developed to chloroquine, where *Plasmodium falciparum* (Fig. 1) is prevalent. The prophylaxis recommended in these regions is a combination of sulfadoxine and pyrimethamine (Fansidar, Hoffman-LaRoche).¹³ Adult dose is one tablet a week. Each tablet contains 500 mg sulfadoxine and 25 mg pyrimethamine. This drug is contraindicated in pregnancy.

Unfortunately, Fansidar is not yet available in Canada, but is available in endemic areas. Travellers to chloroquine-resistant areas should start chloroquine prophylaxis before leaving Canada and then switch to Fansidar on arrival. Fansidar should not be taken for more than six months at a time. Long-term visitors to malaria-endemic areas should take this drug for six months, switch to chloroquine for two months, and return to Fansidar for an additional six months.¹³



FIGURE 1

Plasmodium falciparum (thin film) in peripheral blood, Giemsa stain.

Primaquine phosphate is often used to eliminate tissue forms of *Plasmodium vivax* and *P. ovale*. These extra-erythrocytic parasites are not destroyed by chloroquine and may remain latent, surfacing months or years later to cause malaria relapse. Primaquine phosphate is sometimes used with chloroquine phosphate during the final two weeks of chloroquine prophylaxis.

Routine use of primaquine phosphate has caused much controversy. Because there are adverse reactions to primaquine, this course of therapy is recommended only for heavily exposed individuals — people who have spent longer than one month in an endemic area and who have reported many mosquito bites.¹³

WHILE ABROAD

Although pretravel immunization and malaria prophylaxis are important in preventing disease, many of the common diseases acquired abroad can be avoided by exercising simple precautions and using common sense. It is the responsibility of the physician to acquaint the traveller with measures he can take to stay healthy while abroad.²

Acclimatization

Visitors to tropical countries must adapt to warm, humid climates. To prevent heat disorders, the traveller should avoid fatigue, maintain fluid and salt intake, and wear proper clothing (for example, cotton is more absorbent than synthetics and is therefore preferable).¹⁴ An effective sunscreen will help prevent sunburn. A rest after a long international flight will minimize the effect of jet lag.

Beverages

Boiling is one means of purifying water; filters are not nearly as effective. Halazone tablets or other chemicals can

also be used. Water used to make ice cubes or for brushing teeth must also be purified.

Boiled drinks such as coffee and tea are safe to drink. Capped, carbonated beverages are usually safe. Unpasteurized milk should be avoided, or boiled and then refrigerated.

Food

As a general rule, food from street vendors should be avoided. Lettuce and other salad greens pose a real problem. Green vegetables should be washed in boiling water for about thirty seconds. Fruits and vegetables which the traveller can peel himself are generally safe. All meat and fish should be thoroughly cooked.

Insects

Special measures should be taken to avoid insect bites, as many common tropical diseases are spread by insects.

Clothing which covers the arms and legs should be worn after dark, when mosquitos are present. Mosquito nets which are properly tucked in should be used at night. Spraying insecticides around living quarters and wearing insect repellent may prove helpful.

Miscellaneous

People who visit the tropics should swim only in the ocean — never in fresh water. Travellers to areas endemic for schistosomiasis may acquire this disease from swimming or bathing in fresh water. Water for washing should be chlorinated.

Walking barefoot or in sandals, especially in muddy or sandy areas, can be hazardous. Ancylostomiasis (hookworm infection) is passed by contact of skin with infected soil. Other species of *Ancylostoma*, which are passed in the feces of dogs and cats, may cause disease when they contact the skin. Appropriate footwear will reduce the incidence of these infections as well as decrease the chance of being bitten by a snake or stung by a scorpion.

Many diseases are passed to man from animals. Although it may be impossible to avoid contact with animals while travelling, extra caution should be exercised when handling them.

All these precautions should be observed for the entire period that the individual is in an area where the possibility of infection is great. Only one drink of contaminated water or one mosquito bite can cause disease.

UPON ARRIVAL IN CANADA

Until recently, physicians thought that anyone who had been to an area with low standards of hygiene and high possibilities of infection should receive a medical examination upon arrival in Canada. Currently, short-term travellers to such areas who do not experience any illness while abroad or immediately upon their return home do not require a medical check-up.¹⁵ Anyone who has been out of the country for more than six months should have a check-up. Although most immigrants are medically screened before they arrive in Canada, they may still harbour disease and should also be examined (Fig. 2 and 3).

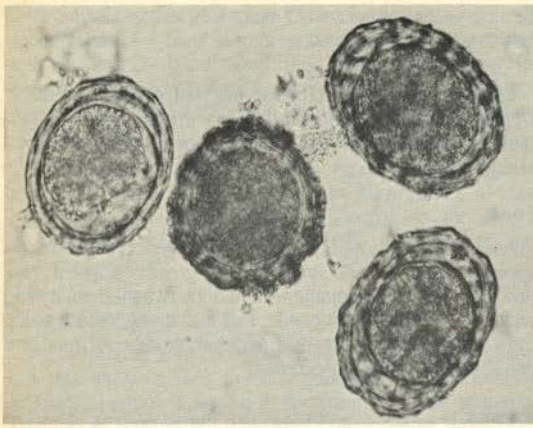


FIGURE 2

Ova of *Ascaris lumbricoides* (fertile) found in the stool of Indochinese refugee. Magnification $\times 375$.

The examination should include:

1. a detailed history of any illness
2. a physical examination with emphasis on the skin and abdomen
3. several laboratory and diagnostic procedures
 - chest roentgenogram
 - two stool tests (adequately spaced) for ova and parasites, and bacteriological culture
 - hemogram with differential white blood cell count
 - blood screening for microfilaria, trypanosomes and malaria (for people coming from an endemic area)
 - urinalysis, emphasizing sedimentation and search for *Schistosoma* ova (in people coming from an endemic area)
 - VDRL (for people with history of exposure, urethritis and skin rash)
 - SMA 12 biochemical profiles or liver function tests.

Other tests may be needed, depending upon symptoms and results of this screening procedure.

Although physicians may be inclined only to look for exotic diseases in immigrants and travellers returning to Canada, they should also be aware that these people may have acquired a disease common in Canada while abroad.

All travellers should contact their physician if symptoms develop after their initial check-up.

SUMMARY

With international travel increasing, physicians should know which procedures will adequately prepare people for travel. The associated increased risk of imported diseases points out the need to examine immigrants as well as travellers returning to Canada. "Where are you going?" and "Where have you been?" are two questions which should always be kept in mind if health problems associated with travel are to be successfully handled. □

ACKNOWLEDGEMENT

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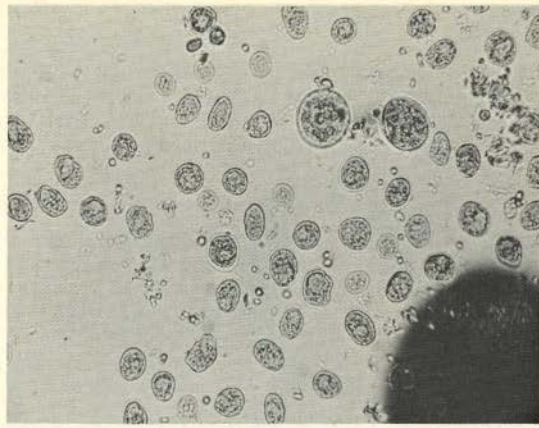


FIGURE 3

Cysts of *Entamoeba coli*, *Giardia lamblia*, *Iodamoeba bütschlii* and *Endolimax nana* found in the same Indochinese refugee. Magnification $\times 224$.

Dalhousie University's Audio Visual Department, Sir Charles Tupper Medical Building for photographs and illustrations respectively.

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The Parent as Victim

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INTRODUCTION

Archibald Maximus III lies serenely in his cradle. Even before conception, the threads of his unique web of fate have been spun. He already brings to the world his genetic endowment modified by his intrauterine environment. He has been subject to biological experiences which can significantly influence not only his reactions to those who make up his immediate world but their reactions to him. Even the name proudly chosen for him will influence his life.

Certain qualities in his relationship with his parents are unique from those of any other human relationship. He is a product of both parents and will be the heritage they leave to future generations. He is initially totally dependent on them for his welfare and (even if they consign his upbringing to others), the ultimate responsibility rests with them. He will test their successes and failures as well as those of their parents and grandparents.

Child psychiatry has changed its focus from the disease process in the individual child, to the child's interaction with his family and social environment, and the consequences of this interaction. To understand the impact a child can have on the emotional health of the parents, we must know something of what went into making their intrapsychic structure and quality of the bond they formed.

MARRIAGE AND THE FORMATION OF THE FAMILY

When two people are in love, the partnership provides such gratifications that each person feels well replenished in his quest to please the other. Successful marriages thrive on reinforcement although neither partner may be aware of this. Couples often do not know why they married and the reasons they give when asked appear rather superficial. It is probable that each person has a fantasy of an ideal self, which is found in a close relationship with another person.

The characteristics of the husband and wife may be complementary. One example is the highly strung, tense woman who marries a quiet, placid man. She may be seeking an external means to compensate for the part of her temperament she finds unacceptable.

If a child is born with the same characteristics that cause unease in the parent, he may reactivate the parent's memories of her own "bad self". This may lead to rejection of the child.

Sometimes a more mature partner acts as psychotherapist for the other, providing stability, empathy and positive regard while development takes place. When two partners have the same character deficiencies, neither may be able to help the other unless there is some compensatory support from an

outside source. A marriage can be either creative or destructive to the individuals involved, depending on the energy each has to contribute to keep it viable. Growth of the individual must accompany growth of the partnership.

Saul Brown¹ describes four steps which must be negotiated to form a viable family. Initially, each partner must establish a basic commitment to the other, one which puts the relationship before all previous ones. The couple has to create a system of mutual nurturance which can eventually be extended to the child, and which will be resilient enough to withstand stresses and conflicts. The couple has to develop a family structure which embodies sufficient security and trust to allow members to grow, become individuals and gain autonomy. As parents, the couple has to guide the children so they will be able to function socially in the community.

DEVELOPMENTAL STAGES: A SOURCE OF PARENTAL STRESS

Pregnancy can be a time of mixed emotions for the woman: happiness at fulfilling a biological destiny; reactivation of feelings of being dependent and ambivalent. The husband may feel the woman is withdrawing from him as she becomes preoccupied with the fetus growing within her. This is a stressful experience for a man who has relied heavily on his wife for his emotional needs; it is not uncommon to find histories of marital breakup, alcoholism or extramarital affairs dating from this point.

The birth of a baby means a dramatic change in the woman's lifestyle. She is tied to a schedule that interrupts any previous routine, especially if she chooses to breastfeed. The colicky baby who is never satisfied, provides little in the way of gratification. He expresses his dissatisfaction with the world and with his mother, as its focal point, shrilly and with no respect for the feelings or endurance of others. This instinctive unreasonableness can, under adverse circumstances, undermine the mature coping mechanisms of his parents and cause them to retaliate in an equally instinctive manner. The parent who has a background deprived of affection, who lives in poor social circumstances, or who does not have a loving partner, is especially vulnerable.

Even with the colicky child, however, reciprocity does occur at some point. It may be the first time the child becomes and remains quiet when picked up, or when he first focuses a smile. This reciprocity helps reinforce the parent's identification with the child, a process which began in the labour room.

Parenting graphically reawakens memories of being parented. Every person has learned firsthand what it is like to be parented but, the style used by his parents is not necessarily ideal. Some parents seek deliberately to avoid doing what was done to them, but, unless they have experienced alternative, better forms of parenting later in life, they find it difficult to alter intrinsic patterns. The history of

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parents with emotionally deprived children frequently reveals deprivation in their early years which affected subsequent interpersonal relationships. These people may learn to function adequately but when they attempt to engage in a continuing relationship, their previous deficiencies are unmasked.

THE CHILD'S DEVELOPMENT AS A CHALLENGE

Each of the child's developmental stages challenges his parents' resources. What the mother loses in the comfort of closeness as the child becomes an individual, she may gain by regarding him as a person. Or, she may try to recapture the closeness by becoming pregnant and once more having a child who needs the symbiotic tie.

The Oedipal child, with his new awareness and curiosity, can provide his parents with some fascinating insights into his fantasy world. Dreams can be blatantly revealing. A male child might say, "Mummy — I dreamt you were an airport and I was a plane flying down to land". Then, a few days later, he might offer the sequel, "Daddy and I were fighting with swords, and my sword was longer than Daddy's". The parents must be comfortable with their own sexuality and relationship or they will not be able to handle the child without rejection or tacit encouragement of sexual behaviour. Tender interchanges between father and daughter can spark jealousy or lead borderline and overtly psychotic mothers to create stories of sexual interference.

Pre-school and school serve as the child's debut into society. Here the child and his family are compared to other children and other families. The child has to learn to function separately from his mother; the mother must adjust to feeling less needed. The mother of the 5-year-old school phobic who prefaces her departure with, "Don't cry. Mummy will be back soon," suggest the child's appropriate action. She may be voicing her separation anxiety, her insecurity about her relationship with the child, and her fear of how the child will cope on his own.

At this time, the family morality is tested as the child brings home, and takes to school, acquired values. Children are sometimes trained according to the wrong standards and they then copy a family criminal pattern.

When a marriage fails and one partner leaves, the remaining parent may unconsciously encourage the child to fill the empty role in order to meet his own needs. He then may become distressed by the child's similarity to the absent partner. It is often difficult to separate genetic similarities from the role which the child has been encouraged to fill.

Sexual issues again emerge when the child reaches adolescence. The mother, who may now be menopausal, becomes aware of her husband's interest towards the daughter, no longer his little girl, soon to be a young woman. If alcoholism, mental illness, or economic deprivation are present, a weak boundary between the generations can break. The daughter may then find father in her bed; mother may refuse to believe what is happening or tacitly encourage the situation, relieved that she no longer has an obligation to fulfill. The same parent may react prudishly or in an overprotective manner toward an outside liaison. If the mother is frigid, she may be able to maintain her relationship with her daughter only as long as she considers her to be neuter. When she can no longer do so, she may aggressively attempt to squash the "dangerous" feelings her daughter

describes, while trying to protect her "vulnerable" adolescent.

The interweaving of child and parent development normally creates stress which can lead to regression or progression. In most cases, the child and parent are strong enough to adapt to each developmental change.

FACTORS IN THE CHILD CAUSING PARENTAL DISTURBANCE

From the 1920's onwards, workers began to recognize the importance of the various child temperaments. It was Chess and Thomas¹, however, who identified the variables involved. They divided children into three groups: difficult, easy, and slow-to-warm-up. They found that the "difficult" child, characterized by intense moods, predominantly negative reactions and lack of rhythmicity, was much more likely to develop a behaviour disorder than an "easy" child. They also found that parental attitudes, initially the same in all three groups, altered significantly as the child grew older. Children with intellectual or physical handicaps and even mild manifestations of the "difficult" child were most liable to develop behaviour disorders.

Dissonance Between Child and Parent

Chess and Thomas found that the evolutionary ideas of consonance and dissonance with the environment were helpful to explain disturbed behavioural functioning. The theory states that maximum growth can occur when the child's own capacities, characteristics and style of behaviour are in consonance with the demands and expectations of his environment. Stunted and distorted development results from dissonance.

The following case illustrates such a mismatch, when the needs, capabilities and expectations of the parents clashed with the characteristics of the adopted child.

CASE EXAMPLE

Luke, aged 3 years 6 months, lived with potential adoptive parents for a year. The physician, who was investigating a possible endocrine problem in the boy, became alarmed by the mother's attitude.

Mrs. A. was a beautifully groomed woman in her early 30's. She and her husband had one natural son, aged 5, described as very intelligent, articulate and well-behaved. He was close to his mother and would share her bed in his father's absence. If he was going out without her, he would ask if she would be alright. The mother stated that she hoped that the adoption would lessen the closeness to her own son.

She described her childhood as unhappy. She felt that her mother had tried to undermine her self-esteem and had resented the closeness she developed with her father. In her teens she became dependent on drugs and alcohol and managed to salvage herself by becoming involved with a fundamentalist religious group. She used this group to reintegrate herself into society and married a man of the same faith. The couple was now struggling to get ahead and the husband spent much time working away from home.

Luke was the son of parents of borderline intelligence. In the first year of his life, he was subjected to severe nutritional and emotional deprivation. He was finally removed from his parents and spent the next year being shifted between foster homes. By the age of two he had not started to talk, although

his motor milestones were only slightly delayed. He had had one epileptic seizure.

Mrs. A. described him as a "fat blob" when she first saw him. The couple had taken him home out of pity. The next year was fraught with numerous battles; the child's quest for autonomy was interpreted as a deliberate attempt to frustrate his mother. He messed with food and faeces, would not go to sleep at night, and refused to accept changes in routine. He was seen as a child having great potential who stubbornly refused to realize it. A battle of wills developed; the couple tried more and more drastic methods to make him conform. They finally deprived him of food for more than two days to make him eat solids. Mrs. A. described Luke's worker as unhelpful. Both parents refused to accept that biological and medical factors may have influenced the child's behaviour. Instead, they thought this explanation was a deliberate attempt to thwart their efforts to nurture a normal child.

Comment

This child would encounter difficulties in most homes. In this instance, just when he was exerting his powers of autonomy, Luke was placed with a mother who had fostered dependency in her first child. He was intellectually and socially mismatched with his foster parents and needed professional help to maximize his development. He evoked anger, depression and disappointment in Mrs. A.; she felt rejected by him. She angrily resented any suggestions made by professionals about managing the child and usually withdrew him from them. Her poor relationship with her mother made it difficult for the female worker to provide adequate support. Eventually, Luke was placed in another home and later developed a definite seizure disorder.

Chronic Illness

Chronic illness places great stress on parents. It has repercussions on normal family life, and tests the parents' ability to understand and manage the regressive behaviour often encountered in the child. Identification with the sick child and guilt over the illness often make it difficult for parents to be objective enough to be fully supportive to the child. The extended family may become involved. Though this usually adds support, it can also reactivate old conflicts and add to the general tension.

CASE EXAMPLE

Mark, aged 10, was admitted with severe third degree burns on his face, arms and trunk after he had thrown a match into the gas tank of an abandoned car. The first few months in hospital, he was totally helpless and extremely demanding, especially on his parents who made weekend visits to the hospital from their home 300 miles away.

The father felt increasingly responsible for the accident because he had taught Mark how to use matches and had shown him what happens when gasoline ignites. At one stage, the father became convinced the accident was a suicide attempt, perhaps triggered by guilt about a school misdemeanor and his failure to attend church the week before the accident.

The father was an agnostic; he had fallen out with his parents during his teen years. He became enraged when his mother sent the nurses a rosary and Holy water to sprinkle over Mark's bed.

Comment

There was no evidence that the father's suicide theory was correct. Mark said he had thought the tank was empty and had thrown the match to see what would happen. With discussion, the father began to realize his theory originated from his own depressed mood. He admitted he was having difficulty sleeping and had a poor appetite. Also, he was holding down a competitive job in an area of high unemployment.

The Child and the Depressed Mother

Depression is one of the most common psychiatric diagnoses in parents. The combination of puerperal depression and a vulnerable child can have profound consequences on the maternal-child interaction and on the subsequent development of the child. The condition is frequently unrecognized by the mother or her physician and may pass into the chronic state.

CASE EXAMPLE

Lucy, aged 3 years 9 months, was admitted for assessment accompanied by her petite, blonde mother. Lucy was disinterested in other children and adults. Her activities were mainly of a destructive or stereotyped self-stimulatory nature. Her vocabulary consisted of only three words. Lucy failed to acknowledge her mother in any way when she visited the ward.

Her mother, Mrs. B., had had a good pregnancy with Lucy until the seventh month. Then she gained excessive weight and became severely depressed. The depression resulted in a brief hospitalization and drug treatment. Mrs. B. attributed her depression to a move the couple had made which caused her to lose contact with friends and relatives. The family had continued to move every 6/12 after Lucy's birth.

Lucy was born by Cesarean section because of fetal distress. She was later transferred to a major neonatal unit because of respiratory distress. There, the mother was unable to visit regularly during the first three weeks of the baby's life. Lucy's motor milestones were within normal limits but at 18 months she was hyperactive and would spend most of the night playing.

Comment

After several meetings, Mrs. B. finally admitted that she had had feelings of fatigue, despair and low self-regard since her pregnancy. Somatic concomitants of depression were also present. Initially, chemotherapy was considered, however, Mrs. B.'s moods improved considerably with supportive psychotherapy and as she recognized her improved child management skills. Lucy's behaviour benefited greatly from her mother's increased confidence, but on discharge she was still considered moderately mentally retarded. The most striking change in the case was the mother's appearance on follow-up. Although she could never have been described as dull or apathetic, she now sparkled. Her dress had finishing touches indicating pride in her appearance. She was also delighted by her daughter's slow but steady progress.

Depression in the mother and behavioural aberrations in the child form a vicious downward spiral. Often the attention seeking behaviour of the child is an adaptive response to achieve stimulation. Improvement in the mother's mood does not necessarily mean she will view the child differently; it

does mean she may allow alterations in the child's behaviour which could improve the relationship.

SUMMARY

Parenting brings joys as well as sorrows. But the stresses of being a parent are all too often taken for granted. Psychiatric residents in large centers often seek personal therapy when prolonged, intensive contact with patients reveals problems within themselves. A resident can rotate to another service. A parent does not have the same opportunities. How much more sensitive we should be to the parent whose offspring forces him to face the painful, unresolved conflicts of his own childhood. □

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FRACTURES: "The Breaking of Old Traditions"

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
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An Outline of Psychiatric Care in Nova Scotia*

F. A. Dunsworth,** M.D., C.M.,

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A brief historical background: —

The original inhabitants of Nova Scotia, the redmen, were the Micmac, a branch of the Algonquin nation. They had medicine men whose main therapeutic endeavors were through strong suggestion; the finding and triumphant removal of a magic bone that somehow had been put in the sick man's body was the supposed source of whatever illness was present seemed their main therapeutic manoeuvre.^{1 2 3}

THE FIRST ONE HUNDRED YEARS OF SETTLEMENT

The first permanent European settlement in North America was in the Bay of Fundy area, the principal fortification being established at Port Royal by the French by 1604. Besieged and lost several times it finally fell in 1710 to English forces. Since the terms of the final surrender were "under full military honours" when the garrison and dependents departed, their records were probably taken with them, hence no information is locally available concerning medical care during the early French control of Acadia.

Perusal of the Jesuit Relations⁴ covering this period failed to reveal any reference to psychiatric illnesses in the soldiers or settlers in Acadia, but did reveal descriptions of psychoses among the Hurons in present day Quebec and Eastern Ontario. (It would seem the priests and missionaries in Acadia were of the Recollet Order and no records are locally available.)

Gradually over the first hundred years French speaking settlers had set up farms and villages around the Bay of Fundy. They were referred to as Acadians and, by the time of their dispersion in 1755, they numbered approximately ten thousand. About six thousand were dispersed along the Atlantic seaboard as far south as Louisiana where they came to be referred to as 'Cajuns'; the remainder scattered away from the original settlements, eventually returning to repopulate various new Acadian settlements throughout the Maritime Provinces.^{1 2}

Inquiries directed towards the Centre of Acadian Studies at Moncton, N.B. revealed that they had nothing in their Archives concerning psychiatric illnesses in these early settlers because of the nature of their dispersion.

THE EIGHTEENTH CENTURY (LOUISBOURG & HALIFAX)

The next military settlement established by the French came after the Nova Scotia mainland was ceded to Great

Britain by the Treaty of Utrecht in 1713. It was named Fortress Louisbourg and by 1730 was well established as a walled fortress city with an adequate harbour on the eastern side of Cape Breton Island. The garrison and population numbered approximately five thousand.

Inquiries concerning psychiatric facilities to the historical section of this now reconstructed fortress reveal that except for a personal communication referring to the hospitalization in the hospital of Louisbourg in 1740 at the demand of François Bigot* of a psychotically ill man and a later historical account of two suicides apparently occurring in psychotic persons, no further reports of psychiatric note could be obtained to cover this later French dominance of that part of the province.⁵

There were two sieges of Louisbourg. The first was in 1744, the troops being mostly New England militia supported by an English Fleet. After its surrender, the New Englanders thought that this French base with its threat to shipping and fishing had been eliminated but, by the Treaty of Aix-la-Chapelle in 1748, Cape Breton Island was returned to France and the rebuilding of Louisbourg was started almost immediately. The populace and governors of New England were irate and demanded the establishment of a strong British Military and Naval Bastion on the Nova Scotia mainland. Supported and organized under the patronage of the President of the Board of Trade, Lord Halifax, a garrison and over two thousand settlers were despatched in the Spring of 1749, anchored in Chebucto Harbour on June 21 and the planned City of Halifax was begun.

Starting with the planned recapture of Louisbourg which fell for the second time in 1758 and later the capture of Québec, the fortunes and failures of the City waxed and waned with peace and war. The Public Archives of Nova Scotia (P.A.N.S.) have been a rich source of information for many authors and historians and is the main source of the account which follows.

EARLY MEDICAL SERVICES FOR THE CIVILIAN POPULATION

Though there were small private hospitals from the founding of the city, probably not much better than small nursing homes, health services for the civilian population that soon numbered five thousand, evolved, an orphanage, a work house, a fever hospital, a lying-in hospital, and eventually an asylum located very near the present Halifax Memorial Library on Spring Garden Road. Incidentally this was originally called Working House Street⁶, and later as the road to Spring Gardens.

The designated area was relatively large, stretching from Spring Garden Road to the Artillery Park — South Barracks

*This paper is based on a presentation given to the Atlantic Provinces Psychiatric Association Convention, Charlottetown, P.E.I., October 19, 1979.

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*Commissaire — ordonnateur of Louisbourg, 1739-1748, when he became Intendant of Canada (Québec)

lot and from Grafton Street to Queen Street. It also enclosed a farm and a graveyard, so the group of building that were gradually built were probably clustered near Doyle Street.*

The original building for the insane was apparently shared indiscriminately with this mixed patient population of orphans, fever victims, a hospital for seamen, and paupers. It was established in 1758, built of stone, 60 feet long, 20 feet wide, and twelve feet high. Another building was added the following year and in 1812 a new wing was added. It was at the latter date that the first reference appears that the facility was "for the care of lunatic persons from different parts of the Province."⁶ Until then the only population referred to was from within the City proper.

From time to time, almost invariably associated with epidemics brought to the port city by ships carrying infected crews or passengers, fever hospitals would be established in various areas, an early one being in the Melville Cove district. These were primarily emergency measures, usually commandeered existing structures used in an ad hoc manner.²

As far as care for the insane, until the late 1850s when the Nova Scotia Hospital was built, the mentally ill were housed in woefully inadequate structures of the Working House buildings.

THE ADVANCES IN THE 1850s

The thunderings of Joseph Howe in his newspaper the "Nova Scotian", as quoted by Saunders⁷ seem to reflect accurately the common concerns held by the general population and the medical profession in the first half of the nineteenth century, concerning the woeful state of general health care. A somewhat confusing pattern of health care had been evolved. Funded by customs duties originally on alcoholic spirits, an organization named the Commissioners of the Poor was appointed. In the early city there were many poor persons and orphans, since many of the early settlers were the sweepings of the towns and cities of England and often in the arduous sea journey parents would die, leaving many unattended children. The Working House and its related buildings seemed the only place for them and they came under the supervisor of these Commissioners.

An illustration of the poor conditions is depicted in Willam Draper's account⁶: "there were 298 persons in the poor house and every room from cellar to garret was filled to excess and very unhealthy . . . In one garret of the room for lunatics for an average of twenty patients there were eighteen beds, nearly in contact in which forty-seven persons were nightly crowded. The building served not only for the indigents and aged but also as a general hospital, a lunatic asylum, and orphan home, a sailor's hospital, and a lying-in hospital."

Arrayed against these criticisms was the Family Compact of the ruling Establishment in Halifax. Howe apparently provoked their wrath with his editorials and thus was tried but acquitted of libel in 1835. On acquittal, he resumed his attacks and some of his main targets were various appointees including the magistrates and, of special interest in the context of this paper, the Commissioners of the Poor. It is interesting to note that by 1844 the physicians in Halifax

had formed the Halifax Medical Society as a branch of the British Medical Association. It thus predated The Medical Society of Nova Scotia by nine years.

The Halifax medical community continued to petition against an appointment system that kept this working house-hospital complex under the control of four generations of physicians from the same family. A medical college was continually sought by provincial physicians but beyond a visiting dispensary in central Halifax or an informal apprenticeship system there were no training facilities for physicians in the province. The beds at the working house-hospital were obviously closely controlled and local physicians were excluded from attempting to minister to the sick. There were no Nova Scotian standards for a person to justify himself to be a physician. Naturally in such a situation, criticism of the lack of standards for a medical licence were justified, especially since neighbouring New Brunswick, thanks to the influx of United Empire Loyalists had set and been enforcing standards for medical registration for many years.^{7 8}

Historically, many Nova Scotia physicians were descended from the same Loyalist stock that came to the province in the late 1700's and over so many years were indignant that they were blocked from having even primitive hospital facilities, and were thus prevented from establishing medical training facilities.

Support for these criticisms of poor health care and lack of physician training gradually strengthened and the Mayor of Halifax, Hon. Hugh Bell, donated his salary for the establishment of hospitals (general as well as mental) and, aided by other private and public subscriptions, approached the Legislature to establish the Provincial Hospital for the Insane. This was founded in 1858 and the building completed at Mount Hope in the Woodside area of Dartmouth in 1859.

Within a few years a hospital building, later to be named the Victoria General to honour Queen Victoria's Golden Jubilee, was also opened on the present site on what was then known as the South Commons at South Street on Tower Road.

TWO SYSTEMS OF PSYCHIATRIC CARE

The historical accounts available indicate a peculiar but unfortunately familiar dichotomy concerning the care of the mentally ill. On the Dartmouth side on a beautiful site, chosen by the American philanthropist Dorothea Dix, was a large well-designed mental hospital. Its objective was treatment based on kindness and respect, "moral treatment". It drew patients from all over the province whereas in the Halifax area, especially the Working House population, i.e. "the asylum population", and especially of those unlikely to benefit from active treatment there remained a significant number.

Even in 1843 the Poores' Asylum, still at the Working House site, contained 35 lunatics (20 male, 13 female, and 2 children),^{1/8} the total population of the Poor House.⁷ Now occurred a transition from the Poores' Asylum to a new elaborate building — "the Poor House" on the Corner of South and Robie Street built in 1867. From an architectural sketch available this was a magnificent structure five stories high, the highest building in the city. However, there seem to be few details available outlining the professional standards, staffing and care. This building was originally designed for a

*For convenience streets will be designated by their present names. For historical accuracy see the pictorial blueprint entitled "Old Halifax 1749-1830" compiled and drawn by George T. Bates.

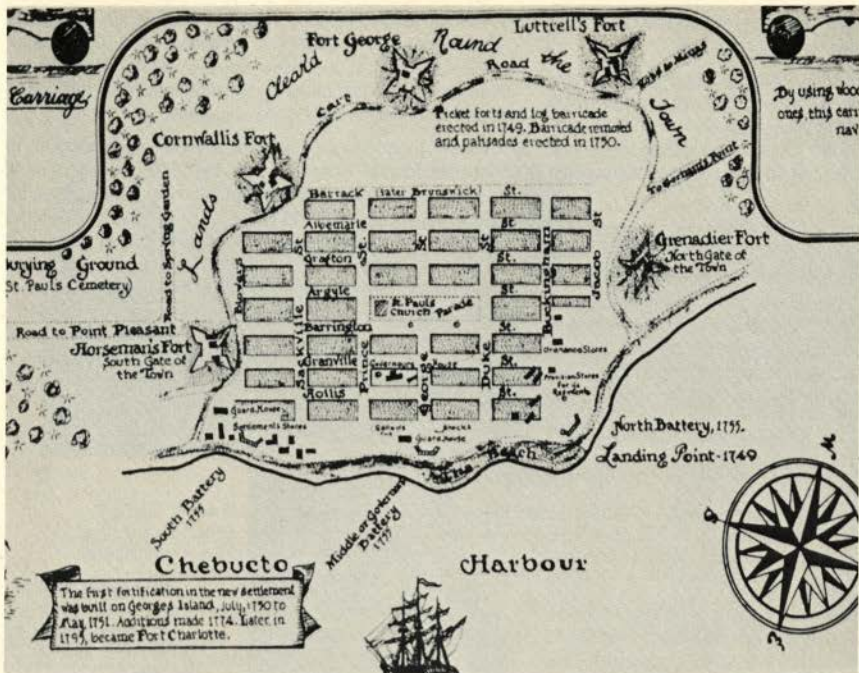


FIGURE 1

The original plan of Halifax — the city expanded slightly south but especially north towards H. M. Dockyards (Drawn by George T. Bates) The working house buildings were gradually built south and slightly west of "Cornwallis Fort".

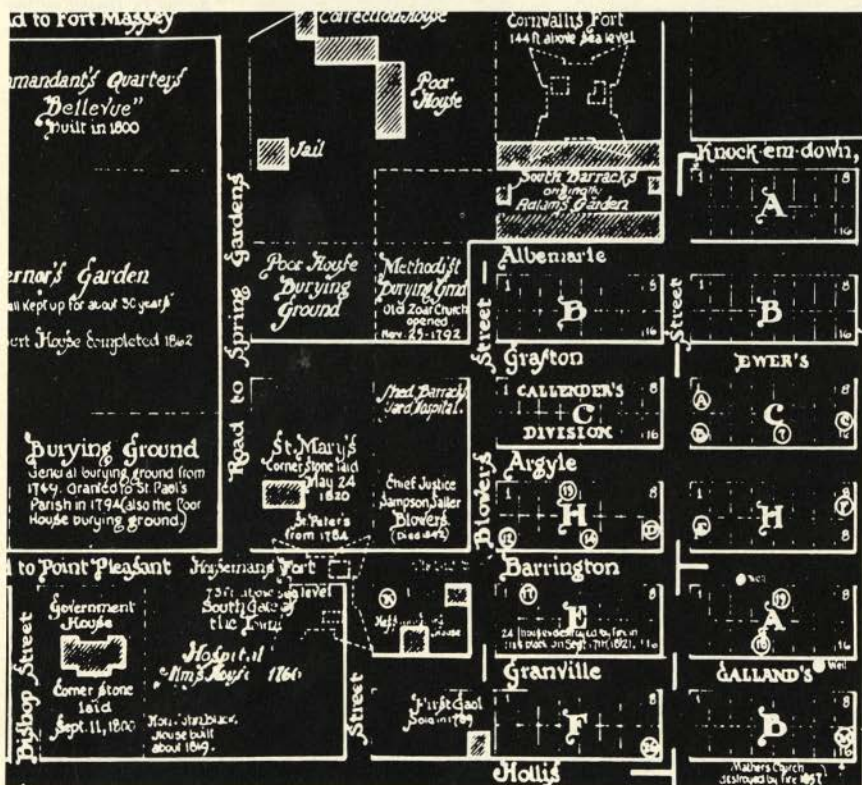


FIGURE 2

A more detailed plan of Halifax, probably from 1780 onwards. A "private hospital" started in 1760, is shown just north of Government House.

The "working house" area is shown in the top of the photograph. (Drawn by George T. Bates)

thousand patients but since one wing was eventually omitted the bed allotment was lowered to six hundred.⁶

The fire that nearly completely destroyed the Poors' Asylum in 1882 with its tragic loss of 31 lives, led to serious public questions; the indignation was bitter when it was learned that those lost were found to be locked in various nearly inaccessible wards, and that the care and supervision was woefully inadequate.

Perhaps however, the official attitudes towards the mentally ill may be assumed when it was learned from the records of the Nova Scotia Department of Health⁶ that until the Poors' Asylum was repaired and rebuilt, the inmates were housed in the old Provincial Penitentiary at the south end of Francklyn Street! (The former prisoners at the Penitentiary had only recently been transferred to the newly opened Maritime Penitentiary at Dorechester, N.B. or to Rockhead (Halifax Prison).)

advantage of such local hospitals for what we now refer to as rehabilitation was emphasized. Apparently the plan was for initial treatment at the Nova Scotia Hospital. If continued treatment or gradual rehabilitation was indicated, this would be carried out in the local mental hospitals.

These recommendations led to the establishment of Municipal Mental Hospitals and, by 1890, eleven were in existence in various areas throughout the province. Alas, for all the plans and hopes, because in most Municipalities the elected representatives soon started to pinch pennies so that by the early part of this century many of the Municipal facilities had gravely deteriorated. In the Dawson report of 1944,⁶ many were labelled as "unfit for human habitation". Another tragic example of how a planned progressive program could be subverted and become a destructive degrading process! Almost all these municipal facilities have been gradually closed or their functions changed.



FIGURE 3

The Poors Asylum —
Reproduction courtesy of
the Public Archives of Nova
Scotia, from a photograph
presented by Mrs. J. V.
Calver.

Architect's Design for the
Poors' Asylum, Halifax,
N.S. South Street, corner
of Robie St. Drawn about
1875. The central section
was nearly completely
destroyed by fire in 1882. The
patients lost in the fire were
apparently housed in the
upper wards in the central
section.

Meanwhile the annual reports of the Superintendents of the Nova Scotia Hospital (the modern name) indicated successes and failures. Despite a great deal of criticism for their failures by the legislators, who constantly withheld greatly needed funds, the Superintendents revealed many ideas and concepts that seem to have been newly discovered one hundred years later! These ideas included respect for the individual, occupational and recreational therapy, intellectual stimulation from well stocked libraries, musical programs, etc. There was also strong support locally and visits by prominent dignitaries.⁶

From the recommendations of several superintendents we learn that by the 1880s plans were being considered for the establishment of regional mental hospitals. These were to be established so that the patients could be treated near to their homes, their families and their occupations. Thus they would not be dislocated from their familiar environments. The

THE PAST THIRTY YEARS

Fortunately brighter days appeared after World War II. It reemphasized the need forgotten after World War I, for improving the state of psychiatric care. Psychiatric casualties in World War II equalled all other casualties combined and showed a dearth of physicians and allied professionals with psychiatric training and experience. Fortunately, the physicians rapidly recruited into the Armed Forces Psychiatric Services seriously questioned the civilian pattern of segregating the psychiatric from the physically ill, and took their attitudes back with them after demobilization.

Supported by Federal grants for teaching and training and tardily embraced by the medical schools, the establishment of psychiatric units in general hospitals blossomed and the generally neglected psychiatric facilities were upgraded. Not only was there a nearly complete revolution in the concept

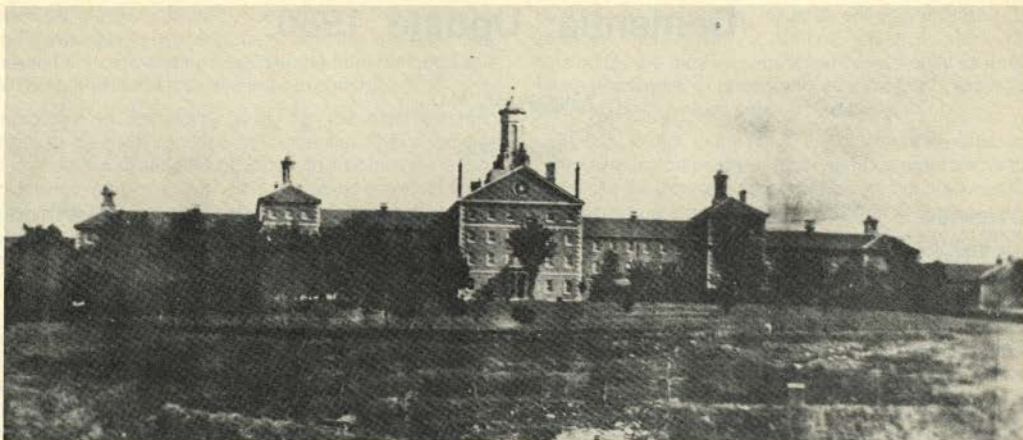


FIGURE 4

The Nova Scotia Hospital reproduction, probably dating back to the 1890s. The hospital, built of stone and brick, faces south westerly, overlooking Halifax Harbour from the Dartmouth side. It was built on a modified Kirkbride design with central administrative building and a series of stepped back wards. The female wards were to the left of the central building, the male to the right. (Courtesy Dept. of Mental Health, Dept. of Health, Province of Nova Scotia.)

and functions of mental hospitals but relatively new child and adult out-patient services became widely accepted, and Psychiatry and psychiatrists were actively involved in all aspects of medicine. It seemed that at long last Psychiatry had rejoined the main stream of Medicine — the psyche had been reunited with the soma! These halcyon days seemed bright with promise and fortunately have not been completely lost but they seem to have become somewhat tarnished in recent years.

CURRENT CONCERNS

In 1979 two interesting developments have appeared in the mental health field in this province. Only time will tell the results of these changes but certain critical comments have to be offered for consideration of the possible outcomes that will affect the medical attitudes and especially the status of care for the psychiatrically ill person.

The first reservation concerns the changes in mental health legislation here in Nova Scotia but also in many provinces, in the United States and in Great Britain. The general approaches are to be commended; e.g. the planned emphasis to markedly increase voluntary admissions. But what of those patients too ill to qualify for or accept voluntary admissions? The possible danger would be the overemphasis on the concept of dangerousness, which is one of the criteria for involuntary observation and evaluation. What is to be feared is that an emphasis could be on the legalistic over-interpretation of dangerousness. This has already been reported to be happening in other Canadian provinces with similar legislation and the main focus of physicians, namely the need for patient treatment, may be lost.⁹

The other concern is the announcement of a hospital complex to be erected on the Camp Hill site in Halifax. The plans call for psychiatric services to be centred at the Abbie Lane Hospital and there will no longer be a psychiatric unit as an integral part of the Halifax Infirmary, the designated general hospital of the proposed complex. The danger is that once more a segregation of psychiatric from general hospital patients and a separation of the medical staffs also. That

separate can never be equal is a well recognized principle and unless careful planning for fully integrating staff, services and standards are met, the underlying discrimination against psychiatric illnesses may reemerge. The progress made in the past thirty years of integrating psychiatric services into the general patterns of medicine may be lost.

The value of history is what can be learned from its mistakes. Since repeatedly we have noted the clear destructive influence of separation of psychiatric patients from medicine the terror of repeating past mistakes of this pattern must be faced squarely and regressive patterns be avoided at all costs. Otherwise we may fall into Hegel's pessimistic pronouncement that what we learn from History is that we learn nothing from History. □

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Dementia: Update 1980

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AN OVERVIEW

To say that 4% of our population over 65 are severely demented, and that 11% are mildly so, does not really give a clear picture of the ravages of this devastating problem. One must recall that to be old in Western Society is to be devalued, since efficiency, productivity and sexual attractiveness form our cornerstone values. Thus a person who is both old and demented, especially when the extended family system hardly exists, is generally considered a complete 'non-value', although polite conversation would not permit such a bald statement.

Geriatrics and the dementia problem are closely related, since the largest proportion of the demented are elderly. Partly due to our own fear of aging, few physicians can be induced to work with the elderly. While 10% of psychiatrists work with children, only 0.5% specialize in geriatric patients. There may be some wry truth in the West Virginia lunch counter sign:—

"Don't criticize our coffee.

You may be old and weak yourself someday!"

Some evidence indicates that overlearning — keeping acquired skills active — tends to prevent dementing. Likewise higher intelligence appears to allow a functioning reserve not possessed by the lower I.Q. individual.

Since dementia is a mosaic of central nervous system pathology (histological and enzymatic), emotional reaction, and situational-cultural-community involvement, any concise definition becomes difficult. Intellectual dysfunction seems a reasonable and simple definition. The older classification of presenile and senile dementias is being replaced by specific entities i.e. Alzheimer's, multiple infarct, "slow virus", and other dementias. A clearer classification is cortical (99% Alzheimer's) and sub-cortical.

SYMPTOMOLOGY

The relatives of the person may notice his forgetfulness, and he may become "careless" at business. The patient may become more dependant on his family for assistance. There is decreased ability for abstract thought, and possibly a decline in personal hygiene.

It is valuable to note that during this early phase, which may continue for years, both physician and family may experience a great deal of frustration. The awareness of "something going wrong" has not yet been clarified with a clear diagnosis. The physician may attempt to treat vague symptoms, while family and associates are liable to be drawn in as surrogate memories.

The case becomes clearer as he begins to forget current events. Inhibitions may loosen — the previously proper matron's language may become ripe and crude. Confusion is marked, and he may become incapable of sustained

conversation. A sleeplessness associated with nocturnal wandering may worry the family. Incontinence becomes a recurring unpleasantness. Finally comprehension of simple commands is lost, and a "vegetable state" ensues.

PATHOLOGY

Neurofibrillary tangles were discovered by Alzheimer in 1907 and senile plaques by Sumchowitz in 1911. These remain the two histological elements probably most closely allied with true dementia. Most feel a third common factor, granule-vascular degeneration is less closely related. However these three elements are irregularly scattered throughout the brain and their locations cannot be clearly associated with the clinical pathology. These elements are uncommon before age 55, but will be present to some extent in 90% of the brains by age 90. They appear to represent different degenerative changes.

Multiple small infarcts, always bilateral, account for 10%-15% of dementias.

"Slow virus" inoculation is thought to be the cause in one type of Creutzfeldt-Jacob disease, Vilyuisk disease (the Siberian Yakut tribe) and Kuru in the New Guinea hills all rare and rapidly fatal dementias. This follows discovery of the sheep-to-sheep viral transmission of the disease scrapie. Davis and Maloney noted a cholinergic system failure in the brains of Alzheimers patients in 1976, i.e., with advancing age choline acetyltransferase, the index for acetylcholine activity, decreases. It is also known that with age both norepinephrine and 5-hydroxy tryptophane increase in the hemispheres, but decrease in the cerebellum. The interesting question is whether this is the result of neuronal activity (the traditional concept), or whether the glial system (traditionally considered only a support system) may in fact possess enzymatic activity.

It is clear that as yet we have only a few clues as to the cause of true dementia, of which Alzheimers disease is by far the most common.

DIAGNOSIS

The diagnosis should be made with reticence, since vast damage will occur to the patient and his family, if the diagnosis is in fact incorrect. Various studies have shown that in 25-30% of cases the diagnosis of dementia was wrong.

The C.A.T. scan has revolutionized the diagnostic field. Psychological testing can help greatly, especially in differentiating organic disease from depression, the most common misdiagnosis. Basic laboratory studies frequently help.

A new simple office test called FACT appears highly reliable. The patient is asked to name ten fruits, ten animals, ten colors and ten towns. A score of less than 18 out of 40 indicates possible dementia.

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The most gratifying aspect of dementia for the clinician is to find a treatable cause, and many treatable diseases may be missed if a consistently negative and fatalistic attitude is taken blanket-wise towards dementia in general.

Depression in the elderly is by far the most common problem to be misdiagnosed as dementia. These patients tend to show significant affect change, to lose interest in their surroundings, and frequently show a marked paranoid flavor to their thinking. Psychological testing can be extremely helpful here.

Closely allied to depression, and often intermingled with it, is pseudo-dementia. This is a personal reaction to life stresses, and quite understandable since life stresses tend to be so much greater as age progresses. A man may be overwhelmed by his meager fixed income status in an era of rising costs, with an aged, infirmed wife, and with an old house demanding increasing repair bills. If he cannot cope, confusion, sleeplessness, ruminatory thinking, agitated depression and ultimately ominous suicidal intent may emerge. (Statistics show a surprisingly high suicide rate in elderly males and females, and suicide attempts in this age group have a high "success" rate.) It is easy to see that time, care and humane probing concern might intercept this downhill spiral. The physician working in this milieu needs to be part psychiatrist, part social worker and part internist in his approach, as well as having contact with community-based experts who can assist him to unravel such problems.

A broad range of treatable diseases exists. Infections may appear as confusion only, without any febrile response in the aged (note the rapidity of onset). The syphilitic reaction of general paresis of the insane (G.P.I.) is rarely seen now, but if present 90% will show Argyll-Robertson pupils. Space occupying lesions, especially frontal lobe tumors and metastases, may be present (C.A.T. scan). Hyperthyroid or hypothyroid ("myxedema madness") may be present. T₄, T₃ and T.S.H. studies are virtually always diagnostic of hypothyroidism but are not necessarily definitive in hyperthyroidism. Pernicious anaemia ("Megaloblastic madness") should be considered. Prescribed or "over the counter" drugs may be incriminated (watch bromine and barbiturates), especially when renal function in the elderly kidney is almost invariably compromised. Hypernatremia and hyponatremia may be the problem (Be careful of diuretics, especially "standard doses" in the elderly). Hypercalcemia can appear as confusion alone — one thinks of carcinoma, multiple myeloma and Paget's disease of bone. Communicating hydrocephalus is rare, but there has been recent renewed interest in this possibility. Finally, the Diogenes Syndrome — usually an elderly person living reclusively, often in dirt and squalor, frequently causing the neighbours no end of consternation, but having decided on this bizarre life style rationally and not showing intellectual dysfunction when one takes the time to talk with him — is another situation that may readily be misdiagnosed as dementia.

TREATMENT

When the treatable list has been exhausted, can anything be done? Frequently, quite a lot. Support of relatives is extremely important, both to facilitate their acceptance of this harsh blow as well as to enlist their invaluable, continuing care and concern of the patient. Conservation of the elements of personality that remain, as well as good general

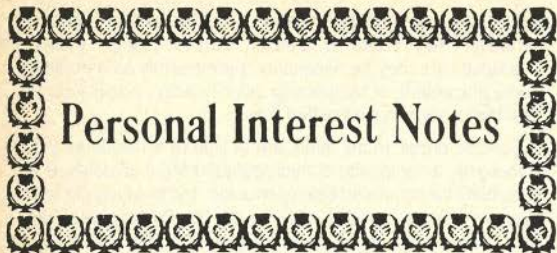
health, i.e. combating minimal congestive heart failure carefully, may make a difficult situation much easier. Custodial care may be necessary, permanently as a nursing home placement, or temporarily as a "holiday" admission, to give the family a much needed break.

Specific drugs, in my mind, are of little or no value as yet. Hydergine, a composite of hydrogenated ergot alkaloids, is a possibility for increased brain perfusion, but bradycardia and hypotension are possible adverse effects. Cyclopsalmol has been attempted as a vasodilator. Recently, since the knowledge of acetylcholine depression as a possible factor in dementia, physostigmine, lecithin and liquid choline have been mentioned. The former, the most likely to be helpful, can only be given I.M. or I.V. and has a very short half-life. Symptomatic drugs, used cautiously, may offer help. The use of haloperidol (Haldol) may be helpful and is available in a tasteless liquid drop form, easy to disguise if the patient is antagonistic to medication. It is purported that hypotensive episodes are less frequent than with phenothiazines. Antidepressants are often helpful in small doses in the elderly depressed. Hypnotics should be used with care, since a "sleepy fall" may lead to fractured bones.

Probably the best medicine is tender, loving care, ("T.L.C.") so often heard mentioned in a somewhat disparaging manner. Many of these patients are quite paranoid and need to be asked gently rather than commanded. Diversion, i.e. giving an elderly demented housewife a broom to go through the motions with, can turn a combative patient into an inoffensive one, at least temporarily. Impatience towards them only appears to worsen their general disposition. It must always be remembered that they are usually malleable, at least in some areas. One specific incident tells of an elderly man who came out of a geriatric ward to a nursing home. He was felt to need a geriatric chair enclosure for his flailing and combative nature, as well as for self-protection. When he was finally allowed "out" for a short period, just to see how he would do, his antagonism decreased noticeably. With the frustration he felt to the geriatric chair removed, he became cooperative, only mildly demented, and quite capable of going home to his family at weekends! Under-estimation of capabilities may be our hang-up, not that of the demented patient! □

SUGGESTED READING

- Steel, K. *et al*: Diagnosing Dementia and its Treatable Causes, *Geriatrics*, **34**(3): 79-83, 1979 (excellent clinical review).
- Vincent M.O.: Physicians after 65, *Can. Med. Assoc. J.* **120**: 998-1001, 1979 (pertinent to us).
- Clinicopathologic Case Study, Dementia and the Problems of Aging, *Am. J. Med.* **67**: 307-16, 1979 (helpful personal insights).
- Perry E.R. *et al*: Correlation of cholinergic abnormalities with senile Plaques and Mental Test Scores in Senile Dementia, *Br. J. Med* **2**: 1457-9, 1978 (Cholinergic details).
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Personal Interest Notes

Dr. Benson Auld has been elected president of the Asthma Society of Nova Scotia. This newly formed organization is attempting to raise \$100,000 to help asthma sufferers. Mechanical equipment, drugs, education programmes, seminars and a summer camp for asthmatics are among the items that need sponsoring.

Dr. William Stanish accepted a cheque for \$5,000 from Moosehead Breweries to assist in the work of the Dalhousie Sports Medicine Clinic. This clinic is now playing a major role in the prevention, treatment and investigation of sports injuries and athletic activities.

Dr. C. M. Harlow has been named honorary life member of the Canadian Cancer Society. He has been associated with this organization since 1952 and is a retired professor of pathology at Dalhousie University. He believes many cancer-related deaths could be avoided if doctors applied what they already know to make early diagnosis and treatment available for all suspects.

Dr. H. A. Robertson, pharmacologist in the Department of medicine has received a \$20,000 research grant from the Guggenheim Foundation to study the neurochemical basis of emotional behavior in animals.

Dr. Eldon L. Eagles (MD Dalhousie, 1936) has retired from the post of deputy director for Communicative Disorders, National Institute Neurological and Communicative Disorders and Stroke, Bethesda, Maryland, USA. Dr Eagles began his career as a general practitioner in Port Maitland and was medical health officer in Nova Scotia for 15 years prior to going to the John Hopkins University School of Hygiene and Public Health as a research fellow, 1956-57.

Dr. Arthur H. Shears has been appointed head of the newly formed division of Physical Medicine and Rehabilitation in the Department of Medicine, and Psychiatrist-in-Chief of the Nova Scotia Rehabilitation Centre in Halifax. Dr. Shears has been a leader in rehabilitative medicine in the Maritimes since he became the first medical director of the Nova Scotia Rehabilitation Centre in 1956.

Dr. G. A. Klassen, Professor and Head of the Department of Physiology and Biophysics in the Faculty of Medicine, Dalhousie University, spent a week in late March in London, England, where he was guest speaker at a week-long course in cardiology, at Hammersmith Hospital. While in London, Dr. Klassen was invited to speak later this year at an international conference on cardiology, to be held in Rome.

Dr. Jaun Embil, professor of microbiology, Faculty of Medicine, Dalhousie University, is a research millionaire.

Last month, Health and Welfare Canada awarded him a grant of \$80,000 to study the incidence of *Chlamydia trachomatis*.

Dr. Embil has received a total of \$1,033,273.12 in research grants during the past 15 years. Most of the money has been ploughed directly into the Maritime economy, in wages for laboratory technicians, nurses, equipment and laboratory animals.

His research has been in the fields of cancer, mental retardation, infectious hepatitis, trichinosis, birth defects, herpes, parasitic infections, aphthous ulceration, kidney anomalies, misuse of drugs, meningitis, sexually transmitted diseases, mycoplasma pneumonia, and the microbiology and histology of Fallopian tubes in women using intra-uterine devices.

Dr. C. E. van Rooyen was recently recognized by the *Journal of Infectious Diseases* and the Infectious Diseases Society of America in appreciation of his services while a Member of the Editorial Board during the period 1969-1972.

OBITUARIES

Dr. David Rubenstein died suddenly on February 4, 1980. He had an international reputation for his work on lipid metabolism. A graduate of McGill University, he was a member of the American Society of Biological Chemists, the Canadian Biochemical Society and numerous other organizations. He was an associate editor of the Canadian Journal of Biochemistry from 1972-1976 and served on the Medical Research Council of Canada. An outstanding scientist, his loss is mourned by Dalhousie University. We send our sympathy to his wife and children.

Dr. J. Carson Murray (72) of Springhill, N.S. died in the Halifax Infirmary, Halifax on March 30, 1980. Born in Tatamagouche, N.S., he graduated from Dalhousie University Medical School in 1932. He practised in Springhill for 45 years and was honored by the town in 1977. He was recently made a Senior Member of The Canadian Medical Association. He is survived by his wife Marion, one daughter and five sons. To his wife and family the Society offers sincere sympathy.

Dr. Gerald J. LeBrun (68) of Bedford, N.S. died at home on March 29, 1980. Born in Grand Etand, Cape Breton, he graduated from Dalhousie Medical School in 1937. He received his certification in General Surgery from the Royal College of Physicians in 1952 and his Fellowship in 1972. He is survived by his wife Barbara, a daughter and a son, to whom we extend our sympathy.

NEW MEMBERS

The Physicians listed below have joined The Medical Society of Nova Scotia between January 1, 1980 and March 31, 1980. A most cordial welcome is extended by the Society.

Dr. Richard J. Bedard	New Glasgow
Dr. George E. Boyd	Sydney
Dr. Joe J. R. Clarke	Halifax
Dr. Thomas C. Davies	Sydney
Dr. Yasmine David	Dartmouth
Dr. Iain G. Dommissie	Sydney
Dr. Rex S. Dunn	Sydney
Dr. Angus J. Gardner	Sydney
Dr. Richard Howard	Halifax
Dr. George P. Konok	Halifax
Dr. Raymond P. LeBlanc	Halifax
Dr. Ruth C. LeLacheur	Middleton
Dr. Ian R. R. Morris	Halifax
Dr. Maurice E. Myers	Advocate Harbour
Dr. Donald G. MacDonald	Halifax
Dr. Robert H. McLean	Halifax
Dr. Laurie K. McNeil	Halifax
Dr. Jaywant Patel	Halifax
Dr. Peter G. Phillips	Bridgetown
Dr. Alan D. Thomson	Halifax
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