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# THE NOVA SCOTIA MEDICAL BULLETIN




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# Medicine and Sport

## Ecstasy Versus Agony

Canada has hosted two of the world's most prestigious events in the history of Sport. The 1976 Olympic Games in Montreal and the Olympiad for the Disabled in Toronto. Enormous funds of energy, money and political pressure have been spent to make the Olympic Games the most spectacular display in the history of Sport.

Each competing athlete represented the successful exclusion of other rival competitors. Thousands of hours of endeavour were expended on behalf of the athlete. Trainers, supporters and organizers were dedicated to make the competition the best physiological and psychological weapon in a particular sport. Amongst the benefits of sport are the sheer ecstasy of winning and joy of performing with the perfect human machine. The pleasure of millions participating in this process has become possible because of unprecedented commercial and political enterprise. Enormous pressures put on each athlete epitomise the problems sport produces in the amateur world.

Many of the diseases and disabilities which plague the athlete are unique to that individual, to the sport and event in which he or she competes. The correct diagnosis and treatment depends upon the precise knowledge and accumulation of data from all those concerned. The Canadian Academy of Sports Medicine is an active organization which is dedicated to this purpose. University Health Services, general practitioners, specialists and trainers, can all co-operate to treat or prevent the sportsman's disorders and by so doing, they can achieve far more than any individual practitioner alone.

The Bulletin is proud to present important contributions, some of which were delivered at the Nova Scotia Chapter of CASM, which was held in Halifax this spring. An important editorial by Professor Ellis, Director of Dalhousie University, Physical Education Department, explains the attitude of the University to the forthcoming developments in athletics.

The Olympiad for the disabled was no less an important event than the Montreal Spectacle. It brought nearly two thousand superb athletics — blind, amputees and spinal lesion victims — from all over the world to compete in an event equivalent to the Olympic Games.

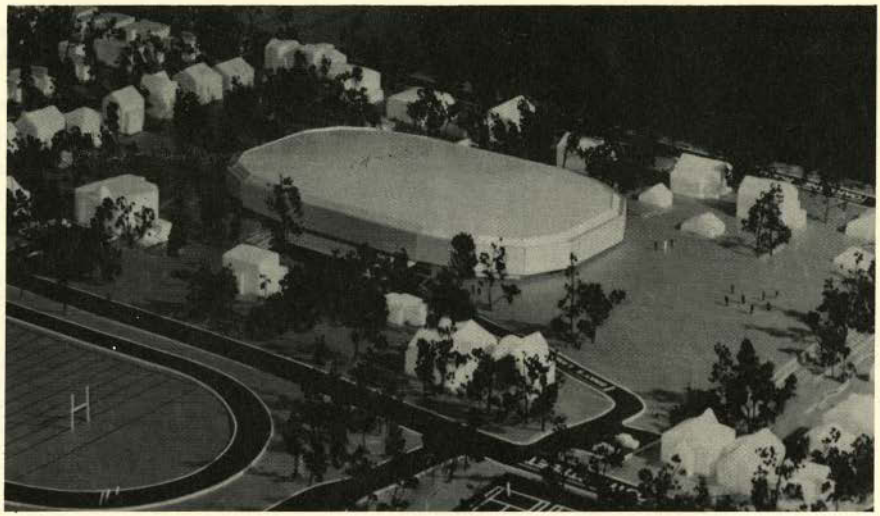
It was Sir Ludwig Gultmans' ambition that these Games should be held in the same arena as the Olympics for the able-bodied but this was not possible. Fortunately for Canada, the Organizing Committee under the Chairmanship of Dr. Bob Jackson, found an alternative site. With a budget of two million dollars and without direct Federal aid (because of the South African participation), Canada hosted the largest International sports gathering for the disabled ever held.

It is hoped these events will help the development of sports for the disabled throughout Canada including the Metro Sports and Conference Center here in Halifax.

Whether you are a spectator sportsman or an active participant, we trust the contributions in the Journal will stir you into activity. Perhaps they will help in the co-operation, understanding and care of the athlete, whatever his or her ailment, disability or ultimate ambition.

"PER ARDUA AD ASTRA". B.J.S.G.

# Building for a Healthy Community



Our massive thrust to affluence in a world dominated by industrial technology has lead to major improvements in our health and quality of life. The dark concomitants of this process are only lately beginning to emerge. There are subtle costs that result from our being equipped with bodies designed by evolutionary processes for an active life in a world without pollutants, too much food and stress. These kinds of costs were simply and directly identified in the White Paper, *A New Perspective on the Health of Canadians.*

This White Paper called for the recognition that prevention should rank more highly than it has done in the past, and that we should recognize the fact that the life-style of Canadians is a major cause of our disease. Self-imposed risks, voluntary ingestion of chemicals, over-eating, and underexercising were all fingered as contributors. All involve ignoring long term risks in the search for short-term gains. The next major step in Health Care, the White Paper claims, will come from influencing the myriad individual decisions by individuals to behave in a way that minimizes health hazards.

Changing life habits will be difficult but there are signs that some progress is being made. Witness the resistance of non-smokers to their being forced to breathe other's tobacco smoke, and the number of joggers in the streets.

This awakening of public interest in life-style management comes at a convenient time for Dalhousie University as it struggles to provide adequate recreation, physical education and athletic facilities on its campus. Physical educators and recreators have always pleaded their case for better facilities on the grounds of immediate benefits to the participants' quality of life and the longer run benefits of a healthy life-style. It is fortunate that both arguments are now more convincing than ever.

Interest in a university life with a balance between studies and activities is burgeoning. It is a healthy development. Academic standards are rising, the stress of competition in the academic aspects of the University are increasing, but so is the interest in the associated cultural life. In the area of campus recreation the growth in interest in doing active things shows itself in the participation statistics. In the last three years, the number of individual students served by the School of Physical Education's Recreation programmes have grown from 1,000 to 3,500, with forty-five percent of students joining in some organized activity. The number of participations jumped in a year from 7,200 to 11,200. The message that there are benefits in participating in a variety of activities, some of which exercise the whole person, seems to have been received on campus.

The Physical Education, Recreation and Sports Complex soon to be built by Dalhousie will be designed to service the activity needs of the University community and to help in the supply for the citizens of the province. The building is in effect a large open plan activity centre in which participation will be emphasized. It will complement the downtown Metro Centre which makes little provision for participation.

The University will bring to Nova Scotia another centre of the same calibre as the Dal Arts Centre. It is intended to mount the same kinds of complementary community service programmes from that centre. In the same way that the Arts Centre has contributed to the life of the area, so will the new centre.

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# The Function of a Sports Medicine Clinic

Lyle J. Micheli,* M.D.,
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A steady trend in the past twenty-five years in North America has been the increased time devoted to recreational activities by many elements of society. Simultaneously, organized competitive athletics have expanded at all levels of ability to involve an increasing number of individuals of all ages and both sexes. This trend is most evident at the level of professional athletics, where professional baseball, basketball, gridiron football and hockey continue to expand despite intermittent predictions of their demise as a force in professional entertainment. In addition, the introduction of organized youth programs in hockey, including both the squirt and pee wee hockey leagues, little league baseball, junior league and Pop Warner football, and youth soccer, has been remarkable. Ten years ago soccer was a relatively unusual sport played mostly by recent immigrants to the Boston area. In 1976, the Bay Area Youth Soccer League will field 357 teams with over 7000 participants from the age of 10 through 18, with most communities in the greater Boston area fielding one or more teams.

In addition, the number of female participants in organized competitive athletics has grown significantly. Federal legislation directs that there be equal opportunity for members of both sexes to educational opportunities at the primary and secondary school level, and this has been interpreted to include equal participation in athletic activities. Further, the modern womens rights movement has included active athletic participation of women on an equal level with men as one of its prime objectives. As the number of participants in organized competitive athletics has increased, so has the number of casualities and injuries. It was estimated by the Consumer Products Safety Commission that in 1975 over 370,000 high school players were seen in Emergency Rooms in the United States because of gridiron football injuries. Young women are arriving at medical facilities in increasing numbers with athletic injuries, and younger and younger children risk athletic injuries by participating in organized competitive athletics.

These developments have offered both a unique opportunity and a special challenge to the medical community. As recreational and athletic activities become increasingly organized, preventing injuries or at the very least reducing their severity, is a real possibility. In addition, careful epidemiologic studies of the mechanisms of these injuries by the pooling of injury data and the evaluation of particular types of equipment used in the performance of these sports is greatly facilitated.

In the past, sports medicine has been a discipline practiced by a relatively small number of physicians, primarily orthopaedic and general surgeons who were concerned with relatively severe injuries sustained by participants in the collison sports such as hockey, football, lacrosse and rugby. In Europe, the sports physician has been much more involved with the physiology of exercise and in particular the response of the body to the stresses of endurance sports, such as distance running or cross-country skiing. It has become increasingly evident that the physician or group of physicians which directs its attention to the care of the athlete in today's varied sports environment must be knowledgeable and able to provide adequate care in both of these spheres.

These trends in sports and an interest in obtaining data on the nature of athletic injuries were the incentive for the formation of a sports medicine clinic at Harvard. An area of particular concern was the injuries sustained by elementary and secondary school participants. These athletes sometimes get inconsistent level of care, and we know little about the type and severity of injuries sustained by these younger athletes. Facilities were available at the Children's Hospital Medical Center, the pediatric division of the Harvard University Medical School. Therefore, in September of 1974 the Sports Medicine Division of the Children's Hospital Medical Center was begun in order to treat injuries associated with organized competitive athletics and to study the mechanism and prevention of these injuries. In just one-and-a-half years of existence, this clinic has already begun to make a significant impact in the study of these injuries, and the growth in its activity has been dramatic. In March of 1975, twenty-two patients were seen by members of the Division, while in March of 1976, one-hundred and forty-seven patients were evaluated and treated by the Division of Sports Medicine at Children's Hospital. The opportunity to assess the function which this clinic serves and the advantages which such an organized approach to the study of sports injuries offers to any medical community is welcome.

## HEALTH SERVICES

In this first year-and-a-half of activity we have answered some of our own questions concerning sports medicine and the sports medicine patient. Are sports medicine patients unique? Are the injuries sustained by athletes unique in any way? We have found that sports medicine patients are by and large highly motivated, dedicated individuals, who desire detailed explanations of treatment and, especially, prognosis. The injuries which they sustain are unique in so far as they present a special opportunity for prevention or alteration by the physician. In addition, we have seen a number of specific athletic injuries, rare in the general population, that require specific treatment. Long distance runners, for example, develop a variant of chondromalacia of the patella, known in their parlance as "runner's knee". This condition, which can add all important seconds and minutes to their running time, can be effectively treated by the careful use of orthotic devices in the runner's shoes.

Another example of an injury which is found in the athletic community is the snapping hip of the ballet dancer or gymnast. Excessive abduction of the hip can cause the glenoid labrum to become partially detached, similar to the internal derangements of the knee seen with meniscus injuries. In the realm of the competitive wrestler, there is an endemic disease known as Herpes gladiatorum, spread from

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wrestler to wrestler in the course of contact — head to head, and manifested as an outbreak of herpes about the eyebrows and forehead. It can frequently eliminate a wrestler from competition. In addition, erroneous diagnosis of this disease can result in dangerous treatment with corticosteriod ointments, with permanent injury possible if the herpes infection spreads to the eyes themselves.

At the present time, our Sports Medicine Clinic at the Children's Hospital Medical Center in Boston is performing five different functions. The first includes the diagnosis and treatment of the injuries sustained by athletes, with particular care directed to the management of the skeletally immature athlete.

Injuries to the growing bones and the subsequent possibility of permanent growth injury is a major danger to the child. It is known that at certain ages in adolescence the collateral ligaments of some joints (including the knee) are actually stronger than the growth plate of the associated bone. An injury to a joint in this age group may actually be an injury to the growth plate at the end of the bone rather than to the joint itself. A "sprained ankle" in the young athlete actually may be a growth plate injury to the bones about the ankle and growth arrest or deformity occuring at the joint may follow.

Another example of a specific sports related disease in the child is "little league elbow", a compression injury of the lateral compartment of the elbow and distraction injury to the medial aspect of the elbow associated with the severe valgus strain of the elbow in the act of throwing. This disease can then take two forms: avulsion fractures of the medial condyle of the elbow, or osteochondritic fractures of the lateral compartment with subsequent formation of significant loose bodies of often quite surprising size. Every young athlete who is involved in a throwing sport who complains of elbow soreness or shoulder soreness must be carefully evaluated for this problem.

## RESEARCH ACTIVITIES

The second major function of our sports medicine clinic is research: into the mechanisms of sports injuries; the techniques of rehabilitation and treatment; and the physiology of both exercise and conditioning. Our ability to evaluate trends in injury occurrence has been augmented by our enrollment in the National Athletic Injury Reporting System, located at Penn. State University. The recording system enables participating sports medicine clinics across the United States to pool their data on sports injuries. As a result, a participating sports medicine clinic can gather information concerning injuries related to a specific sport, type of athlete, or athletic equipment.

Concern about protective equipment has received recent dramatic attention; a number of studies have shown that the "protective" equipment in gridiron football is often associated with a high rate of injury. By contrast, in rugby football where rigid protective equipment is specifically prohibited, the rate of certain injuries (such as knee injuries) is significantly lower. Three different agencies have been active in the evaluation of protective equipment and product-related injuries in the sporting field: The American Society for Testing Materials, the Consumer Product Safety Commission and the NOCSAE. Through computer based sources, such as the National Athletic Injury Reporting System, important information can be obtained concerning the relationship between a specific piece of protective equipment or product and the relative rate of injury associated with the use of that product.

Another research project of our sports medicine clinic is utilizing the techniques of the Harvard-MIT laboratory to investigate the biomechanics of runner's gait and our ability to affect gait patterns with orthotic devices applied to the shoes or feet. In addition, a separate research project is underway which is testing the ability of specific sports to develop both muscle strength and flexibility while athletes are participating only in that sport without the adjunctive use of flexibility or strengthening exercises. This project was undertaken to test the common hypothesis that participation in a sport alone, without the adjunctive use of exercises and training techniques, is sufficient to develop proper levels of muscle flexibility and strength for that sport over the course of a sports season. The information gained from these and other studies will have wide applicability not only to athletic endeavors but to injuries sustained by individuals in all walks of life.

## TEACHING ACTIVITIES

A third and very important function of our sports medicine clinic is that of teaching individuals involved at the primary level of athletic care — coaches, trainers, and team physicians. During the month of April, 1976, nine different lectures were delivered by staff members of our sports medicine clinic. "Hamstring Injuries," "Injuries to the Throwing Arm in Sports," "Muscle and Tendon Injuries to the Lower Extremity," and "Orthotic Foot Control and Lower Extremity Overuse Syndromes," were some of the topics covered. The interest of the coaches, trainers, and team doctors and their enthusiasm to learn about sports injuries and their prevention, is indeed impressive.

## INFORMATION SERVICES

The fourth function of our sports medicine clinic is to serve as a source of information on sports injuries to the general community. Requests for information on the relative danger to women of participating in contact sports, on the use of trampolines in secondary school training programs, on types or makes of protective equipment, and many others come into our clinic from the general public and concerned school officials. We have found these enquiries stimulating, and the occasional need to take an official stand on a controversial sports topic challenging.

## COUNSELLING SERVICES

Finally, an unanticipated but major function of our sports medicine clinic has been to provide perspective to young athletes and their families. A young athlete whose ambitions are not well matched with his physical makeup or abilities, seems to accept advice from a sports physician more readily than from parents or sports officials. It is becoming increasingly evident, for example, that the loose jointed young male is at a high risk of injury when participating in the heavy contact sports, such as football or hockey. Wherever possible, we counsel these young men to consider tennis, or other noncontact sports for physical activity. Well-intentioned but aggressive parents can often exert excessive pressures upon a child athlete, curtailing the child's enjoyment of a sporting activity and impairing his ability to recover satisfactorily from an injury. The sports physician has a unique opportunity to point out to the parents the dangers of too

much pressure on a young boy or girl and the need for simple recreation in the early stages of any child's sporting endeavors. He can also counsel the injured young athlete concerning the relative importance of sports in his life, and point out the need for full recovery before resuming full participation.

**SUMMARY**

The Sports Medicine Clinic at the Boston Children's Hospital is currently serving a number of different functions to the medical community and the young athletes of the Boston area. The formation of similar centralized sports medicine facilities in other cities in North America most probably bespeaks similar medical needs in these areas. The opportunity for co-ordinated investigations between these sports medicine facilities is promising, and the structuring of such coordinated research ventures will be one of the additional tasks to be accomplished in this evolving discipline. □



## KEEP FIT FOR FUN

Sports are good fun — they're also good for you. But no matter which sport you choose, safety, medical and physical-fitness authorities all agree that you should get into good condition first.

Calisthenics and cardiovascular exercises such as jogging and bicycling can forestall strain on the muscles — including the heart — and can lower the risk of an accident.

In other words, you don't play sports to get in shape; you get in shape to play sports. And regardless of your conditioning, age and ability, always warm up and take it easy in the beginning. The pros do and they aren't exactly Weekend Athletes!

Another tip: lessons from a qualified instructor and good equipment, properly fitted, will pay you and your family rich dividends in both fun and safety.

**ROUGH STUFF FOR KIDS**

If your child is under 14 years of age and wants to go out for organized sports, especially "collison" sports, heed this unanimous advice from sports-medicine experts:

Insist on a medical examination by your family doctor, pediatrician or school physician. He can determine whether your child is old enough for contact sports with the help of a sexual maturity test of bone x-rays.

Careful grouping of competitors by weight, size, skill and physical maturity is important. Remember that chronological age and school grade level are meaningless. When a 150-pound 13-year-old collides with a 90-pound 13-year-old, you've got problems!

Make sure there's a physician present or readily available during games and practices. Only he should decide if a child is ready to play after an injury or illness.

See that your child receives competent coaching, adequate conditioning and good equipment, properly fitted.

Finally, do what you can to avoid an overemphasis on winning. As a pediatrician once remarked: "Parents should remember boys are not little men. They can't take adult pressures, mentally or physically.

# A Look at Amateur Boxing

J.A. Smith*, M.D.,
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## INTRODUCTION

Traditionally, Nova Scotia has enjoyed an active role in Canadian and World boxing circles. Currently, we are witnessing an ever increasing amount of activity at the amateur boxing level. This has resulted from increasing support of government, business institutions and recreational groups and has developed a responsible level of coaching, refereeing, judging and medical support.

Speaking personally, as a physician, my involvement in amateur boxing stems from an interest in programmes of recreation for youth. I have been impressed that a properly organized and responsibily run boxing programme is necessary for the achievement of goals expected from any recreational support.

## OFFICIALS AND RULES

The boxer must develop his skills in accord with the rules of the sport. It is too difficult to unlearn skill and rule deficiencies at a time when the athlete will be at a decided disadvantage due to an improper performance.

The authority of the officials must be clearly known and recognized, as the role of the officials in preventing injury is paramount. This involves the understanding and development of rules and safety, the enforcement of these rules (with periodic review), and revision of them.

The world governing body of Amateur Boxing is A.I.B.A. The Canadian Amateur Boxing Association (C.A.B.A.) holds the international franchise; that is, all bouts must be approved by their organization to achieve international recognition.

In Nova Scotia, there is a provincial branch of C.A.B.A. with an executive and board of directors. Amateur bouts must be sanctioned by them and performance of officials is their responsibility.

The technical people (referees and judges) have their own organization within C.A.B.A. The coaches register with C.A.B.A. and must belong to the Coaching Association of Canada (this includes coaches of all sports). There is currently an accredition programme for coaches. This leads through different levels, based on achievement through coaching clinics and leading up to National Coach designation. The various boxing clubs must register with C.A.B.A. As an athlete proceeds through his level of competition, so will the various officials and support members of the team.

As a physician, one cannot overemphasize the importance of having a responsible governing body. Through this body, in association with other groups and organizations, there evolves a level of expertise among all involved; an expertise that all amateur sports so rightly deserve and must receive if we are to achieve the real goals of our recreational sports.

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Dangerous? Not as much as you might think. Strict medical and officiating requirements place Canada's amateur boxers in the lowest insurance premium bracket among amateur sports. The Canadian Amateur Boxing Association reports the sport here has never had a fatality.

## THE ROLE OF THE PHYSICIAN

I feel that the practising physician has a responsibility to be actively interested in all aspects of his community. I also believe that one of the priorities of that community should be programmes offered to youth. These will vary from community to community as they relate to facilities, interests of youth and availability of support personnel to manage a viable organization. In many areas boxing can meet these criteria.

The actual bout itself is a small part of a boxing programme. I have had the opportunity to observe the development of many youngsters in boxing programmes over the last several years. I have been pleased to note their commitment, discipline and dedication within these programmes.

"Physical fitness is a product of many elements such as strength, endurance, skill and so on. It must be remembered, however, that physical is only one component of total fitness of the individual which also includes mental fitness, social fitness, and emotional fitness. Total fitness is really a capacity for living."[1] This should be the goal for any sports programme.

As in any amateur sport, I feel the role of the physician in boxing programmes is a matter of availability. The C.A.B.A. rules are laid down as they relate to the duties of the physician. This involves the screening of participants, attendance and responsibilities at bouts, and plans for the follow-up care of all injuries.

We as physicians must make ourselves available to all amateur sports. I hear the answers one gets to this request; but we do have special talents that are required and I feel they have a right to expect us to be involved. The physician must coordinate other members of the boxing team as they relate to matters of health of the athlete. He must be knowledgeable of the rules and be prepared to act on them.

In boxing, the physician may stop the bout at any time but can only enter the ring on the request of the referee who is the ultimate authority. It would be extremely unusual that a referee would not heed the advice of the physician. The bout must be stopped at early signs of disorientation, hypotonic state or helplessness, as this may lead to "groggy state" or concussion.

All amateur boxers in Nova Scotia must receive an initial examination by their own physician. This is recorded on a card that the athlete keeps with him. Conditions such as epilepsy, poor vision, single organs, etc., are not acceptable for boxing.

The boxer further undergoes an examination prior to each bout. This puts emphasis on acute illnesses, (e.g. infectious mononucleosis with a large soft spleen; influenza; streptococcal infections and previous lacerations that may still be unhealed); and conditions not previously recognized (e.g. hypertension, heart murmurs, renal disease, hernia, ruptured ear drums, etc.). The boxer should be examined alone in a room that has a bench for examination lying down. Any significant medical history must be recorded on the boxer's medical card.

In severe or chronic injuries, the physician should know the best manner in which to handle the situation. A specialist with a special interest in sports injuries is helpful in managing the "whole" athlete. The athlete will likely have his own physician and this relationship must be respected. A plan for follow-up must be clear and understood by the athlete and physicians involved in the rehabilitative phase of an injury.

## FACILITIES

Perhaps the reason for the popularity of boxing in Nova Scotia (other than our desire to enjoy an occasional altercation, settled in a definitive manner) has arisen from our lack of expensive facilities. However, I believe that sports in general, those that benefit a large number of participants at all levels of development, do not require expensive, elaborate facilities.

We underuse the available facilities that we do have in our communities. Amateur boxing programmes can be run in schools, church halls, firehalls, etc. The boys themselves can be involved in maintaining the ring and other equipment. Many areas, especially less well appointed parts of our communities, find that a boxing programme has appeal to the youth and that facilities are already available for the activity.

## EQUIPMENT

In boxing the development of sports skills that involve both offensive and defensive manoeuvers, along with adequate physical and emotional conditioning, is the main factor in prevention of injuries. The unskilled will not be protected by any measure of adequate equipment, whether it is football, lacrosse or scuba diving.

Each sport has its specific, and even unique, hazards and requirements. Protective equipment is designed according to the nature of the sport. Maximum protection is not guaranteed the athlete by equipment alone. His physical condition is of extreme importance in preventing injury. Coaching techniques offer a wide range of variables, which may influence the occurance of injury."[1]

**(a) Headgear** — designed to prevent facial lacerations and contusions of the ear cartilage. The padding is heavy about the ears and extends over the temples and forehead. It may extend over the chin. It is made of leather and padding may be plastic foam, latex foam, hair or combination. Liquid or air filled headgear may evolve that will change the distribution of force and absorbtion of energy.

It is not clear that headgear offers any great amount of support to prevent head injuries, but it does reduce knockouts and lacerations. This makes it even more important that in boxing, as in football and hockey, new types of headgear are developed.

**(b) Mouthpiece** — may be single or double and made of plastic or latex rubber. It diverts part of the force of the blows landing on the jaw from vital structures of the brain. Gums and teeth are protected. Fractured jaws are rare in boxing.

**(c) Hand bandaging** — combination of gauze and tape to make hand rigid and support the metacarpals especially.

**(d) Gloves** — actually a mitten. Surface is leather and padding plastic or latex with possibly hair added. Designed to protect the hand. Gloves are 10 oz. in Canada but 8 oz. in Olympic events.

**(e) Supporter** — a wider waist band than usual with a plastic on aluminum cup.

**(f) Shoes** — nonskid soles, high top and laces to toe.

**(g) The Ring** — padded posts and "ropes" (often cables). Canvas floor with padding underneath. Padding is important as most severe head injuries result from a fall on the back of the head. "There is no record of a man being killed where appropriate floor matting is used".[2]

The search goes on in boxing, as in other major sports, for satisfactory equipment. This development should come from the governing bodies and not just from the sports equipment manufacturing firms. Through the development of parallel expertise in all fields of coaching, officials and attending physicians, the evolvement of proper equipment will coincide with regulations, physician skills and an awareness of the well being of all athletes, including boxers.

## INJURIES — WHAT REALLY HAPPENS IN BOXING?

"Injuries are not only less frequent but less serious than in most major sports." In amateur boxing, the emphasis is on skill and points rather than knockouts.

"Boxing, in my judgement, has become popular again because dedicated coaches, trainers, officials, administrators and, yes, physicians, have stressed the development of boxing skills designed to outscore an opponent rather than try for a knockout.

"In 1962, when the drive to ban boxing was reaching its height, there were four ring deaths, two fewer than were recorded in such a supposedly safe sport as track and field.

"Finally, in all the history of international games, where the world's best amateurs compete, never has a boxing death occurred. In the 1960 Olympics in Rome, there were two

deaths: a cyclist and a hockey player . . . 305 boxers competed in 301 bouts."[3]

The prevention of injuries, as in any sport, depends on proper screening of participants and the learning of skills with responsible coaching, refereeing and governing bodies. We have seen the sad results when these are missing, e.g. eye injuries in hockey from high sticks; deaths from scuba diving etc.

In amateur boxing, with the objective being to score points, the emphasis does not have to depend on blows to the head. In some countries if a participant knocks out his opponent, he loses the bout!!

"In boxing, striking one's opponent is in the rules but at least the contestants can defend themselves, while in other games the assaults are quite unexpected."[4] Injuries to the face and head are of the most concern in boxing. We hear much discussion about head injuries in boxing with resulting brain damage.

"The Punch-Drunk Syndrome is almost non-existent in amateur boxers, but found in some professionals of the 'slugger' variety."[5]

"Is the Punch-Drunk Syndrome a disappearing disease? The conditions under which people used to box are quite different from the conditions . . . now, and it may well be that we shall see fewer and fewer of these cases *but* we cannot be sure."[2] ". . . . comes on late in life, often after the boxer's career is over, and it might not be due to the boxing itself but to the other risks to the boxers life."[2] ". . . . it is much more commonly seen in second raters who make up for lack of skills by aggressiveness and a tendency to 'slug it out'."[2]

Strict enforcement of the rules will prevent severe injuries and most likely the Punch-Drunk Syndrome. These include the mandatory standing eight count; no "saved by the bell" rule; three knockdowns in one round and the boxer is out; no boxing for 30 days after a knockout, 60 days after the second, one year after the third, and in all probability, the discontinuance of boxing entirely.

Seniors box three three-minute rounds or five two-minute rounds; novices three two-minute rounds, and juniors three one-and-one-half minute rounds.

A *laceration* of any kind results in stopping the bout and should be sutured in a medically clean environment.

The most common injury is simple *nose bleeding*. This is usually stopped with simple measures. Deviated septum and fractured nasal bones are much more unusual.

*Concussion* is of main concern. This may occur from blows direct to the jaw, accumulation of blows to the cranium or by the head striking the floor. Unconsciousness may be caused by a blow to the carotid sinus (neck), over the heart, or to the solar plexus. Loss of memory, even for short periods, should be considered a concussion and simple questioning will evaluate. This may come on gradually and not be apparent initially. The clinical examination, done serially, is the best tool. The E.E.G. is not a useful guide. If a fracture is suspected, the boxer must be immediately transported to a hospital. The Post-Concussion Syndrome of headache, memory problem, initiability and fatiguability must be watched for.

The exact mechanism of the knockout is not known but probably involves a diffuse loading to the brain with trauma to the soft tissue, plus sensory overload, that inhibits the brain. The blow results in a fall toward the blow with a reflex spasm.

"There are about 1% of knockouts in the course of a tournament."[4]

The most common *fracture* is the first metacarpal. The Bennetts type fracture involves a true fracture — dislocation of the first carpo-metacarpal joint. The fragments should be reduced by manipulation and transfixed by a Kirschner wire and cast applied. Proper follow-up and rehabilitation is important. Fractures of other bones are unusual with surprisingly few involving the hands despite their frequent use. Proper techniques are important in avoiding these fractures.

In *maxilla-facial injuries* many are the result of the opponent's head.

*Sprains* should be treated with ice, elevation and rest. Later hot packs, massage and exercises to reduce fibrosis, adhesions and stiffness. These are usually wrist, elbows or shoulder. Lower limb injuries, including sprains, are extremely rare.

*Cauliflower ears* (rare in amateur boxing) are the result of a hematoma organizing into plaque formation within the cartilage.

*Eye injuries* are rare with occasionally a detached retina. They are usually the result of illegal thumbing manouevers.

*Genital injuries* are not common and are the result of low blows.

Ruptured viscus does not occur, but a ruptured spleen in a boxer with infectious mononuclesis has occurred.

The *kidney* is the most common injured abdominal organ in sports (of particular interest is the "athletes kidney"). This results from stress and strenuous activity (most important); crouching forward, and traumatic force. It is seen in sports such as football, boxing, rugger and even in ballet. It may result from falls. Red and white cells with protein and casts can be detected in the urine.

Morphologically the kidney will show zones of hemmorrhage, "cicatrical proliferation", and inflammatory cell inflitration. The calyces and pelvis may be distorted. The physician must be aware of this condition and be alerted to it.

As a general rule, an athlete with one eye, lung, kidney or testicle should not box or engage in any contact sports. Epilepsy, diabetes and poor vision are other obvious disqualifications for the sport.

## CONCLUSION

Amateur boxing has been looked at from the social and sports aspect. The role of the physician has been reviewed. The emphasis on proper facilities, equipment and the learning of skills were noted. The constant adherence to, and revision of rules of the sport was noted as they relate to a responsible governing body, with competent official and technical personnel. The injuries of boxing were compared with other contact sports and hopefully placed in their proper perspective. □

References and Addendum on page 145.

## A LOOK AT AMATEUR BOXING

Continued from page 144.

**Acknowledgement**

I would like to add a special thanks to Mrs. Joan Montgomery for her assistance in preparation of this paper.

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### Addendum

Since initially writing this article, most of us have had the opportunity to observe, by T.V., a very competent, well managed, and skillful light-welter weight boxer from Halifax compete in the 1976 Olympics. Chris Clarke demonstrates to me many of the positive factors which I have attempted to discuss in this article.

I have had the opportunity to follow Chris from the start of his boxing career. I have observed his development as a skilled athlete and have been impressed with his discipline and devotion to his chosen sport.

We were all disappointed for Chris that he did not return with a medal. The reason that he did not, in my opinion, is because of some of the reasons that I have tried to outline in my article; that is, inadequate officials. That Chris was being butted by his opponent was obvious. When this eventually resulted in a laceration the bout was stopped and awarded to his opponent, (29 seconds from Chris obviously winning the match.)

The fact that the referee was later disciplined does little for a medal that was richly deserved by a young athlete. He had done his homework and his trainer gave consistent support. All involved were let down by an official that allowed political implications to enter into his decision making, or had not developed his skills at the rate of other members of the team.

J. A. Smith, M.D.

# The Role of the Physiotherapist in Athletics

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In an era when Canadians are beginning to get away from being 'armchair quarterbacks' and are participating in increasing numbers in sport and recreational activities, there is a greater need for qualified people to prevent injuries occurring from the activity or to treat any injuries which may have resulted from the activity. The physiotherapist is a person who could fill this role very well. In conjunction with the sportsminded physician, who makes the diagnosis of the injury and the coach or physical educator who teaches the activity or sport, the physiotherapist, because of his training, can play a very active and positive role if he or she so desires.

All basic physiotherapy programs in Canada teach methods of assessment and treatment of musculo-skeletal disorders, the use of therapeutic modalities and exercise regimens to provide a good strong basis for the treatment of sports injuries. Although in the past, sports medicine has been absent from the curricula of many Canadian schools, the trend is changing as physiotherapists start to develop specialized areas of expertise. For example, the program at the University of Alberta offers sports therapy to fourth year physiotherapy students along with courses in physiology of exercise, biomechanics, mobilization techniques, and physiological test and measurement. As well, options offered by other faculties in such areas as nutrition, training and conditioning, and pharmacology may be taken to add to the therapists basic knowledge. These types of courses enable the therapist to relate to the physician, the coach, and the most important of all, the athlete in a much better fashion and for the betterment of all concerned.

Everyone is aware, or is at least becoming aware of the need for such a treatment specialist in athletics. How often have athletes heard the expression "stay off it for a week or two and it will get better". For the average citizen, this is sufficient advice; for the more dedicated athlete, this is not sufficient. Most physicians and physiotherapists interested in the area know that such advice will only lead to frustration and resentment on the part of the athlete and that he will often turn to some less qualified but more sympathetic person for counselling. If he finds that this treatment advice does not work, then he will return to the qualified, but seemingly unsympathetic person for further treatment. By this time, the condition is usually chronic and will require several more weeks of treatment by which time the athlete has often lost a season of competition[3]. The initial advice is not really anyone's fault, it is just due to a misunderstanding of an athlete's special needs with regard to time restraints, and the forces and stresses involved in one's sport.

Although rest may be part of a sensible treatment, it should only be advised after careful assessment of the injury. If the part must be rested, other forms of activity may be given to keep the athlete busy and maintain his fitness level. For example, if a track athlete has sprained an ankle and should not do any running, or must limit his running, have the athlete go swimming. This will keep the weight off the limb but still maintains one's cardiovascular fitness and keep up the strength in one's legs.

The specialized training of the therapist is also developing in the school system. For example, at the University of Alberta, several students after completing degrees in other disciplines such as physical education, education and science have been accepted into physiotherapy. In talking to these students, they express the desire to get into or to return to the school system as teachers, using part of their time as athletic therapists to treat sports injuries. Initially the treatment would be as a first aid measure and then after the condition has been diagnosed by a physician, the injury would be treated as any physiotherapist would treat the injury, again keeping in mind the special needs of the athlete. The number of people in this area is admittedly small but it does show that there are many areas where physiotherapists may provide a valuable and specialized service.

In the last few years, several sports clinics have evolved across the country. In some cases these are private physiotherapy practices which deal specifically with athletes, while others are clinics sponsored by sports federations. For example, the Manitoba Sports Federation sponsors, with the help of the provincial government, a sports injury center which is located in the Pan-Am pool in Winnipeg and is accessible to almost all of the 180,000 athletes in Manitoba.

Finally, there is the hospital based clinic which has several advantages. As well as having easier availability of specialist physicians, it also has easier access to such facilities as x-ray laboratories, examination rooms and plaster rooms.[2]. Also, immediate referral back to the physician can be accomplished easily if the therapist has any suspicions about the condition and its treatment[4]. Another advantage is that it would allow physiotherapy students to do intern placements in such a clinic if they wished.

Regardless of the type of sports clinic, the sports therapist must realize that the position he or she is undertaking does not adhere to regular hours of eight to four daily. Anyone who has been involved in athletics in this role realizes that the hours are irregular and long and that the busiest times are the times when other people have leisure time to take part in sports. Thus, the busiest times are the afternoons, evenings and weekends and to operate effectively, the therapist and any sports clinic must be available during these times.

As well, to be effective any clinic must have a close liason between the physiotherapist and the physician. The sooner the diagnosis can be made by the physician, and the sooner the treatment begun by the physiotherapist, the quicker the athlete will be healthy and back at his sport.

In the treatment of athletic injuries, the physiotherapist plays a very valuable role. If the therapist is available at the time of the injury, he can apply first aid measures which often help to make the physician's diagnosis later on much easier. With the development of sports clinics across the country, early diagnosis by the physician and early treatment of the injury by the therapist becomes a reality. For the athlete, this

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timing is critical. It will decrease the time he is away from the sport and will get him back into competition much sooner. It also makes the therapist's job easier as formation of adhesions can be prevented by maintaining mobility in the joints instead of having to restore it and strength can be maintained in the muscles instead of having to restoring it. Because of his special training, the therapist is usually more cautious in looking at conditions and will send the athlete to a physician before the unqualified person would. This is a case of the more one learns, the more conservative one becomes. In the long run this is much better for the athlete.

Also, the physiotherapist must sometimes act as the athlete's conscience. Often for the athlete, the future is now and he has little regard for what his present actions may result in sometime in the future. One athletic therapist suggests stealing a necessary piece of equipment such as the football player's helmet so that the athlete can not sneak back on to the field when the medical staff is not looking. Although the athlete and coach may pressure him, the therapist must think about what is best for the athlete both now and in the future. Of course, if a physician is available then this task falls on his shoulders. One must resist the temptation to tell the athlete to "run it out". This too will lead to mistrust if the injury turns out to be a serious one.

Having said this, it must be remembered that athletes are often very difficult to treat, especially the top class athlete. Since he gives 100% in his sport, the athlete will often complain about the smallest things that may affect his performance. If one is not careful, one may class these people as hypochondriacs, and start ignoring them. One must realize that these people, because of their dedication, may require more sympathetic understanding than the average individual[12].

It is also important in treating the athlete that he be given precise instructions as to what he can do and what he can not do. Telling an athlete to "take it easy for a few days" can mean many different things. A distance runner may take it easy by running five miles instead of his normal ten or fifteen miles per day when in actual fact what one wanted was for him only to do light jogging once around the track. This points out the fact that the therapist should have a knowledge of the sport he is dealing with.

The author has found that if one takes the time initially to explain what it is that one is trying to accomplish by one's treatment and to explain the anatomy of the area, the athlete will be much more receptive to the treatment even if he does not understand the medical jargon. The therapist should be very careful in what he tells the athlete about his training. Few, if any, therapists are really knowledgeable about the training methods of a sport and to indicate or seem to indicate that one has expertise in an area when one does not, can only lead to misunderstanding, mistrust and antagonism on the part of the coach, the physician, the therapist, and the athlete.

In summary, the author feels that physical therapists have a great deal to offer to athletics in the form of his or her expertise in the treatment of athletic injuries. By working in close harmony with the coach, physical educator, and physician, the physical therapist can, by basic treatment and rehabilitation knowledge coupled with expertise in working with athletes, provide a valuable service which is not normally available to the athletes. □

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# Disorders of the Knee in Athletics

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## INTRODUCTION

Not so many years ago, the duration of the professional athletes' career who was participating in the so-called "contact sports", was determined by only the natural process of aging. Football and hockey greats such as Gordie Howe were frequently able to predict their destiny in terms of physical health.

In the past few years, the scene has been altered dramatically. We now are confronted with physiologically young athletes, who have had careers threatened or terminated prematurely by injuries. Fatal and paralyzing insults to the central nervous system frighten all citizens. Trauma of this nature has gained much press internationally; however, athletic injuries to the knee joint remain the prime culprit in athletic morbidity.

Severe knee injuries commonly resulting from compression and rotation forces encountered in Canadian Football.

With the gigantic sports spectacle recently becoming commonplace, much interest has arisen in sports medicine and sports science. Initially, refinement of knowledge of athletic injuries was promoted by the owners and promoters of major athletic teams who were primarily interested in returning their injured super-stars to physical action as quickly as possible. Frequently, there was and still exists complete disregard for the natural biological and physiological laws of human body repair. Interest in sports medicine continues to boom. Many physicians and surgeons have achieved significant notoriety secondary to their association with professional teams and star athletes. Clinics structured specifically to treat sports injuries have become common, particularly in Canada and the United States. The fundamental philosophy of these clinics is that sports injuries differ in nature from the conventional civilian injury.

Throughout the evolution of sports medicine clinics, publications and the international meetings, disorders of the knee have remained the corner stone of controversy.

A great deal of clouded thinking still persists in regard to the knee in health and disease. This discourse offers a simple approach to knee disorders based on current medical literature and personal experience, and offers diagnostic aids to provide more precision in the diagnosis of disorders of the knee. Finally, the principles of contemporary management of knee disorders are mentioned.

Twisting injuries of the knee are common in Soccer and result in meniscal tears.

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## ANATOMY

To appreciate adequately the complexity of knee injuries and appropriate therapy, it is mandatory to have a fundamental knowledge of knee anatomy.

The knee achieves its dynamic stabilization from the surrounding musculature. The quadriceps constitute the anterior muscle mass fundamental to the stance phase of gait, walking or running. The complimentary antagonists are the hamstring muscles which are long and unipennate strands extending from the ischial tuberosity distally to multiple insertions. The semitendonosus constitutes a portion of the pes anserinus and, in concert with the the sartorious and gracilus effect powerful internal rotation of the tibia on the femur.

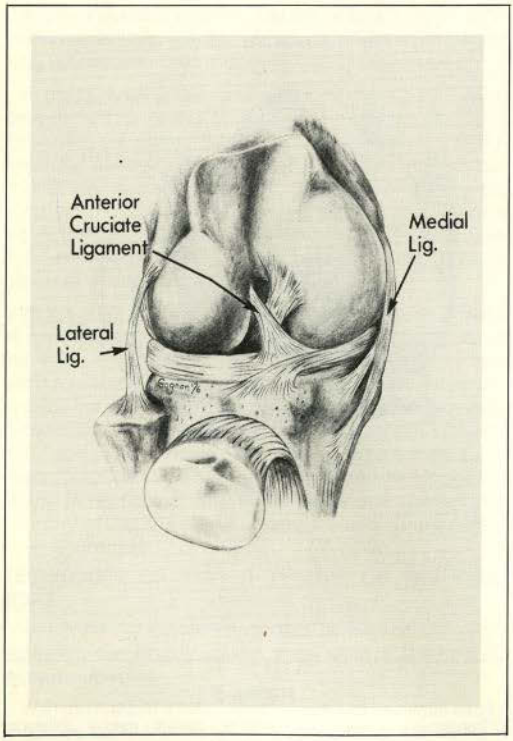


**FIGURE 1**

To show the cruciate and collateral ligaments on which the stability of the knee depends.

The semimembranosus inserts in a fan shaped fashion to provide the structural support to the posterior and posterior medial aspect of the knee capsule. It is suggested that the semimembranosus has five major reflections, the most important being the direct head passing on the posterior medial aspect of the knee, the posterior oblique ligament and posterior popliteal ligament. The reflection of the semimembranosus is intimately attached to the posterior meniscus and, on knee flexion allows the medial meniscus to retreat posteriorly.

The biceps femoris transverses laterally from the ischial tuberosity to support the lateral aspect of the knee as it inserts primarily into the proximal fibula. Fundamentally, it provides a support against excessive varus of the knee. The ilio-tibial tract descends distally to insert on the lateral flare of the tibia and this tract effects an external rotatory force to the tibia. The ilio-tibial tract migrates posteriorly in flexion and anteriorly in extension.

The popliteus provides tendinous slips to the lateral femoral condyle, the posterior aspect of the fibula head and the posterior horn of the meniscus. The conjoint linkage of these tendinous bands is called the arcuate ligament. The popliteus functions as an internal rotator of the tibia and holds the posterior horn of the lateral meniscus back on flexion of the knee.

### Knee Stability

The static, motionless stability of the knee joint is provided by the ligaments, the joint surfaces which are congruent, and the meniscii. Major attention will be directed to the ligamentous structures.

The medial complex which extends to the posterior cruciate ligament is constituted by the deep capsule which is attached to the femoral and tibial surfaces with the medial meniscus intimately attached, and the overlying medial collateral ligament which expands distally from its femoral origin to insert beneath the pes anserinus. These two minimally expansile ligaments blend posteriorly to form a conjoint ligament integrated with the reflection of the semimembranosus tendon.

The lateral complex is composed of a loose *lateral collateral ligament* with femoral and tibial attachments and form a static structural support for the ilio-tibial tract, the biceps femoris and popliteus.

Within the joint, the *anterior cruciate* expands from a fan-shaped origin on the lateral femoral condyle to insert in a band shaped fashion on the tibial surface. Functionally, it has been proposed that due to the fan shaped insertion of the anterior cruciate ligament, that fibers are intrinsically rigid at all times throughout all degrees of motion.

The *posterior cruciate ligament* anatomically passes from the medial femoral condyle to a lateral insertion on the tibial plateau. Functionally, the posterior cruciate ligament remains taut in all extremes of motion and thus, has been called, "boss" liagment of the knee. This suggests that rotation of the knee takes place about the posterior cruciate ligament.

The knee joint in the normal state, without pathology of the static ligamentous supports, is said to be "stable". The stable knee in motion, is a harmonious movement at the tibio-femoral interface augmented by the dynamic muscle masses and, most important, the static ligamentous structures.

As flexion of the knee occurs, the tibia internally rotates on the femur, the meniscii glide posteriorly, due to the attachments to the posterior capsule, the medial and lateral collateral ligaments migrate posteriorly and slacken, while the cruciate ligaments alter their shape.

With knee extension, the tibia externally rotates on the femur, the meniscii move forward, the collateral ligaments move anteriorly to become taut and the cruciate ligaments again alter their fan-shaped appearance.

The axis of rotation of the knee is located on the medial aspect of the tibial spine and tends to migrate in a semi-lunar fashion.

It can be readily appreciated that if a single component of the ligamentous "cuff" of the knee joint is injured, the centre of rotation will shift. Joint congruency is then altered, the ligamentous supports are called upon to perform new tasks and the knee joint is rendered "unstable", the demise of the competitive athlete.

## MECHANISM OF INJURY

When treating injuries of the musculoskeletal system, it is becoming increasingly important to analyse the mechanism of injury. This critical analysis lends itself to greater precision in diagnosis and therapy with injuries of the locomotor system.

### Injuries of the Medial Side

The medial liagmentous complex is most frequently insulted by stresses applied to the knee joint in a flexed and externally rotated plane. The laboratory work of Dr. J. C. Kennedy has corroborated our clinical observations that with stress of this nature, an initial disruption of the deep capsule followed by the superficial medial collateral ligament occurs. This is rapidly followed by a disruption of the anterior cruciate ligament and not infrequently, the medial meniscus. The patellar retinaculum may also be disrupted with evidence of acute dislocation of the patella which may or may not have relocated at the time of appraisal.

### Injuries of the Lateral Side

Forces applied to the knee joint driving the joint to a varus attitude, triggers the disruption of the lateral complex. If the knee is in extension, at the moment of insult, it is not uncommon that a sprain of the posterior capsule also occurs.

### Cruciate Injuries

The mechanism of injuries to the cruciate ligaments remains somewhat controversial. It has frequently been stated that an isolated tear of the anterior cruciate ligament can occur, but not all clinicians agree to this point. It has been proposed that a forced internal rotation of the tibia on the femur, while the knee is in a completely extended position, yields an isolated tear of the anterior cruciate. The posterior cruciate is disrupted when the tibia is driven posteriorly on the completely extended leg. It is most important to emphasize that the anterior cruciate ligament is most frequently disrupted in association with injuries to the medial complex and that posterior cruciate injuries occur when the knee is insulted in the extended attitude.

## CLASSIFICATION OF LIGAMENT INJURIES

### Grade One Sprain

A grade one ligamentous insult implies that the ligament has been stretched to the limits of its plasticity without actual disruption of any portion of the ligament proper. Microscopically, this is associated with hemorrhage, and with subsequent hematoma formation, but the integrity of the fibrous components of the ligament remain.

### Grade Two Sprain

Sprain of a ligamentous structure is classified as grade two when the stress to the soft tissue structure has been sufficient to disrupt a portion of the ligaments. Significant hemorrhage with hematoma formation occurs with inflammatory cell infiltrate and ultimately with repair of the fibrous component of the ligament. The ligamentous complex still retains structural strength because some of the fibrous elements are intact.

### Grade Three Sprain

When the stress applied to the ligamentous structure is of sufficient magnitude to disrupt the ligament completely, this is called a grade three sprain. Hematoma extravasation is common with complete instability of the joint secondary to the break-down in the ligamentous strut.

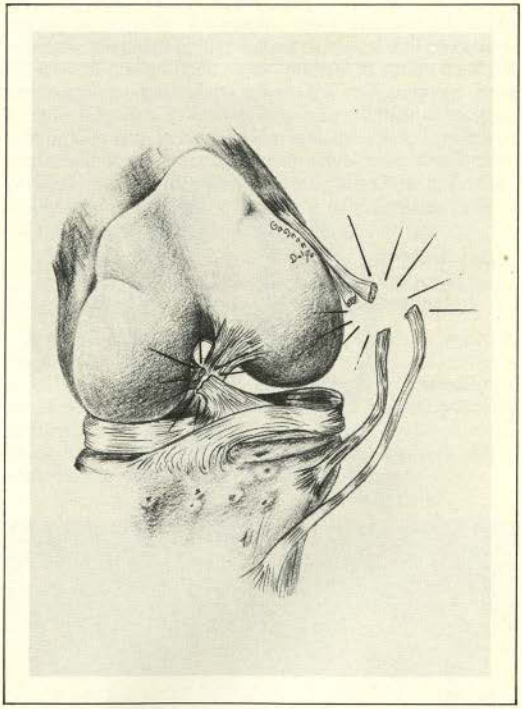

**FIGURE 2**

O'Donaghue's Triad.[1] The anterior cuciate medial collaterial ligaments and medical meniscus are all torn.

## CLINICAL PRESENTATION

The value of the examination of the knee joint cannot be over-emphasized. The history is vitally important in terms of determining how the patient was hurt and of course, eliciting any history as to a previous injury to the same joint. It is vitally important to know the magnitude of the stress applied to the joint. A history of locking of the knee or frank "giving-way" of the knee most frequently suggests an internal derangement.

There is a certain premium placed on examining the athlete as efficiently and rapidly as possible after the initial insult. In my experience, this is extremely difficult to do on the side-lines of a football field or in a hockey arena and is best carried out in a training facility when the patient is more

completely relaxed and the doctor has better facilities for a more astute appraisal.

It is the responsibility of the examining physician to encourage complete cooperation and relaxation from the patient and to make sure that the patient is sufficiently unclothed to see the more proximal and distal joints of the extremity.

Physical examination of the mild (grade one) sprain reveals significant tenderness over the ligamentous structure coupled with mild hematoma and ecchymosis. The joint on stressing is stable, however, pain is exacerbated when the insulted ligament is indeed, stressed. There is little or no pain on passive range of motion of the joint. There is no frank effusion and there is no instability.

Moderate sprain (grade two) reveals significant pain on palpation of the origin or insertion of the ligament as well as a marked degree of ecchymosis over the ligament proper. There is a palpable effusion, and the patient is significantly more disabled than with the mild sprain. However, on precise local examination, there is no evidence of joint instability.

A grade three sprain is clinically manifested by severe disability with a history of the knee being "unstable" and frequently, the patient feels that he has no control of the extremity. There is often no palpable joint hemarthrosis due to the fact that with complete disruption of the medial complex, the blood was extravasated from the joint. There is significant periarticular swelling. The patient has less pain than with a grade one or grade two sprain, and there is abnormal motion on stressing of the joint.

At this point, it is imperative to emphasize the importance of adequate stress X-rays. Some major centres commend the value of performing stress X-rays on the knee joint without sedation. In my experience, it is frequently necessary to place the patient under general anaesthetic to adequately demonstrate ligamentous instability. Perhaps with intravenous muscle relaxants, the same effect may be achieved and stress X-rays can be adequately performed in the emergency facility. Most important, it is recommended that a patient with an injury of the knee have adequate stress X-rays before being discharged.

## TECHNIQUES OF STRESS TESTING OF THE KNEE JOINT

The following maneuvers should be carried out when examining the acutely injured knee when a ligamentous injury is suspected.

With the knee in a fully extended position, a valgus stress should be applied to the knee. If one is able to appreciate a clinical and radiological looseness of the knee joint, there has been a combined disruption of the medial collateral ligament as well as the posterior capsular structures. Likewise, if a varus stress is placed to the knee joint in the fully extended position and an opening of the knee joint is appreciated, then, there has been a combined injury of the lateral ligamentous structures as well as the posterior capsule.

When the knee is placed in thirty degrees of flexion, the posterior capsule is relaxed and with a valgus stress, one is able to appraise the medial collateral ligament. If one is able to appreciate an opening of the medial joint surfaces in this attitude, then disruption of the medial collateral ligament has occurred and one only has to fully extend the knee and apply the same force to determine if the posterior capsule is also torn. Similarly, if the knee is flexed to thirty degrees and a varus stress is applied to the knee, one is able to appraise the integrity of the lateral collateral ligament, however this remains controversial. If opening occurs, then a disruption of the lateral ligament has no doubt happened and by pulling the knee in a fully extended position, the integrity of the posterior capsule again can be appraised.

The anterior drawer sign has been the source of great controversy in the contemporary literature, however, several reputable centres continue to support the concept that a positive anterior drawer sign, which is elicited by pulling the tibia forward on the femur while the knee is in ninety degrees of flexion, is a manifestation of a disruption of the anterior cruciate ligament. Likewise, when a posterior pressure is placed on the tibia allowing it to sublux posteriorly on the femur while the knee is in a flexed position, this demonstrates a disruption of the posterior cruciate ligament.

With precision, one is able to interpret an inequality in the movement of the medial tibial plateau in contrast to the lateral tibial plateau. That is to say, that when performing the anterior drawer sign, the lateral tibial surface moves further forward than the medial tibial surface, then a posterior lateral rotatory instability is said to exist. Likewise, when the medial tibial plateau moves further forward than the lateral tibial plateau on an anterior drawer stress test, it has been suggested that rotatory instability secondary to disruption of the posterior medial complex exist.

There remains a great deal of confusion in terms of clinical signs of rotatory instability and at this time, it is sufficient to be aware of the fact that instabilities of the knee about the vertical axis do indeed exist.

## MANAGEMENT OF LIGAMENT INJURIES

### Diagnosis

Clearly, the premium in the management of ligament injuries is in distinguishing the unstable joint from the stable knee. It is equally as important to be aware of the potentially unstable knee in order to introduce a therapeutic program in which protection of the moderately injured ligament is the order. Frequently, with my undergraduate medical students, I indicate that caution should be exercised in the clinical evaluation of the injured knee joint and that to over-treat the injured ligament when in doubt has certain merit.

The individual evaluating the injured knee joint and attempting to ascertain the degree of pathology whether a trainer, family practitioner, or an orthopaedic consultant, must be able to recognize the magnitude of the injury and introduce a therapeutic program based on sound knowledge of the biology of repair. If the individual conducting the examination does not feel himself or herself capable of making such a decision, then he must readily refer to sombody who is skilled in a clinical appreciation of ligamentous injuries.

As mentioned previously, it is important to recognize the type of ligamentous injury that has taken place in terms of the anatomical location, and it is equally important to recognize the degree of sprain that has occurred. Use of general anaesthetic offers a tool for evaluation of the acute ligamentous injury which must be exploited when in doubt.

### Treatment

When the problem is accurately identified, then the treatment program must be followed with accuracy and precision.

Fundamentally, there are two alternatives in terms of the management of injured ligaments. The first alternative is to do nothing. This is not necessarily based on ignorance, but the solid consideration and conclusion that the joint itself is stable and does not require a structured program of protection for the process of biological repair. The second major alternative is to do something for the injured ligament. The individual has the choice of treating the injured joint non-surgically or surgically. By employing a proper physical examination, conclusions are obvious.

For a grade one injury with structural integrity of the ligament intact, one is justified in allowing the patient a protected weight bearing program until comfortable. It is frequently necessary to make a decision as to whether an athlete should return to action with a grade one injury. The decision rests with the individual team leader. It is my practice to introduce ice therapy with a compression bandage for a 48 hour period and cautiously return the player to full action after ten days of graduated activity.

A grade two sprain indicates that there has been pathological disruption of part of the ligamentous complex. Although stable when examined in ideal circumstances, it is mandatory that a program be introduced to protect the injured ligament for a six to eight week period, which is the necessary time for biological repair for the fibrous elements to occur. It is extremely precarious and in some instances, malpractice, to allow the youngster to return to action when a grade two injury is suspected. With a medial complex grade two sprain, it is ideal to splint the ligament in a position in which the ligament is lax (i.e., sixty degrees of flexion, with minimal internal rotation for medial collateral ligaments).

A grade three injury indicates that there has been a complete disruption of the ligamentous complex, and this is clearly unstable. Although few centres tend to treat a complete disruption of the medial collateral ligament with plaster casting over a six to eight week period, it has been my experience that restoration of the anatomy with immediate surgery has yielded excellent results.

A premium is placed on recognizing the complete pathology that exists within a joint for it is not uncommon to have ligaments, remote from the obvious injury to be injured also, such as a peripheral tear of the medial meniscus or posterior capsule with medial ligament injuries. It is equally important to recognize any concomitant disruption of the cruciate ligaments.

The complement of operations available to restore ligamentous integrity are multiple. Suffice it to say that the extra-articular reconstructions to date have demonstrated greater promise than intra-articular reconstruction of the ligaments, particularly, in the sub-acute and chronic period.

## CONCLUSION

The knee remains fundamentally the headache of the physician concerned with athletes. The accurate diagnosis of the magnitude and nature of the injury is exceedingly exacting however, with pains taking effort and employing contemporary diagnostic techniques, greater precision will result. □

**Acknowledgements**

With thanks to Dalhousie University School of Physical Education for photographs and the Audio Visual Department for Figures 1 and 2.

**Reference**

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# Recognition and Early Treatment of Diving Injuries

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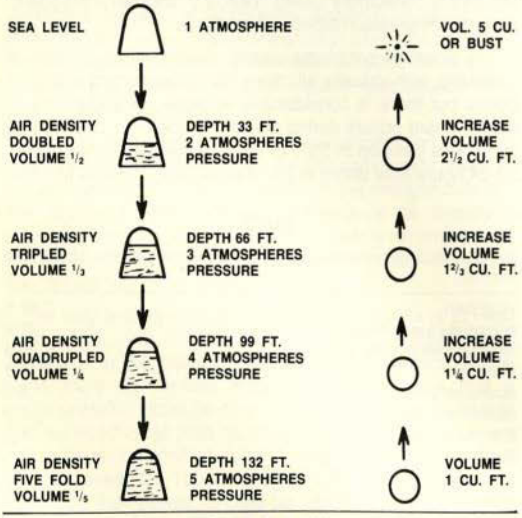
*Halifax, N.S.*

Sport diving is an increasingly popular activity throughout Nova Scotia. Estimates suggest that there are 6000 divers in the province, 50% of whom dive on a regular basis. Although the sport is generally safe, it can lead to a number of medical problems, some extremely serious. It is therefore important that general practitioners who may have to deal with them be aware of their symptoms and treatment. With some injuries, an incorrect diagnosis may lead to permanent disability or even death.

Several injuries are associated with changing environmental pressure during descent and ascent through water. For every 33 feet of depth, a diver adds a pressure equal to normal atmospheric pressure at sea level. Body tissues are incompressible and therefore not adversely affected by increasing pressure, but in body air spaces (paranasal sinus, middle ear, lung) the contained air decreases in volume under pressure. Air must enter these spaces to maintain volume at new pressures or a pressure gradient will be established, leading to fluid transudation or hemorrhage into the spaces to decrease the volume available air must fill, thus equalizing pressure. The increasing ambient pressure causes a proportional increase in the partial pressure of each of the gases contained in the breathing mixture, and establishes a new equilibrium of dissolved gases in body tissue (more nitrogen and oxygen being dissolved).




**BOYLE'S LAW**

## INJURIES OF DESCENT

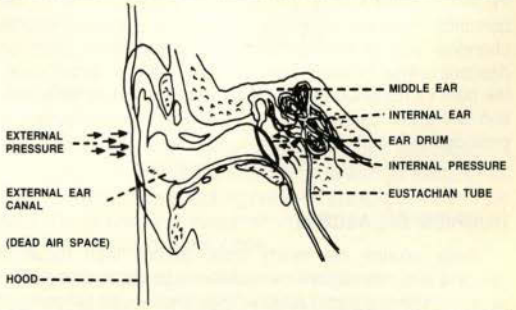
Sinus, external ear, middle ear, facial and dental barotrauma are commonly seen in sport divers. Such injuries present little difficulty in either diagnosis or treatment, providing the possibility of more serious injuries is ruled out. Decompression sickness (bends), air embolism, pneumothorax and pneumomediastinum are less frequent but they can be debilitating and lethal (especially air embolism), and therefore must be considered by a physician examining a diving injury. This is particularly important when the patient is either unconscious or is a novice diver who may not recognize his problem. Oxygen poisoning can occur, but is rare outside commercial or military diving.

### Sinus Barotrauma

Barotrauma results from an inability to equalize pressure between a closed air space and the external water pressure, and causes a differential pressure across membrane lined air cavities. The sinus ostium is blocked, mucosal congestion and hemorrhage occur on descent, and mucus and blood are expelled on ascent. The symptoms experienced are increasing sinus pain on descent and decreasing pain on ascent with bloody, mucous discharge from the nose or expectoration. Decongestants should be administered to enhance drainage along with antibiotics if a secondary infection is present. Diving should be avoided until the condition has cleared.

### External Ear Barotrauma

This occurs when water is prevented from entering the external canals by a tight fitting hood, cerumen or ear plugs. The tympanic membrane bulges outward and hemorrhage and congestion of the external canal fill the diminishing air space. The diver will experience pain on descent that is relieved by ascent. He may have difficulty "clearing his ears" (Valsalva's manoeuvre), and his tympanic membrane may rupture. The examining physician should look for submucous petechial hemorrhage in the external canal walls; blood blisters or frank blood in the external canal; and out-bulging of the tympanic membrane with or without injection, congestion or rupture. If no rupture occurs, there is no treatment needed, apart from a sterile cotton plug, but the patient should be rechecked for infection. Diving should be avoided until the damage clears. If rupture has occurred, all substances, including water and medications, should be kept out of the ear. The patient should be rechecked for infection and advised not to dive for at least two weeks ie, until the drum is well healed. Patients with serious rupture should be referred to a specialist.




**EXTERNAL EAR SQUEEZE**

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### Middle Ear Barotrauma

Middle ear barotrauma is the most common medical problem resulting from diving, and the likelihood is greater in individuals with upper respiratory infection. It is caused by diving with blocked eustachian tubes that prevent equalization of pressure in the middle ear during descent. The diver experiences pain or "fullness" in the ears on descent that is relieved by ascent or tympanic membrane rupture. Rupture of the ear drum leads to profound caloric stimulation of the inner ear with severe vertigo, disorientation, nausea and vomiting. These symptoms disappear within minutes as the water which has entered the middle ear is warmed.

The physician can assess the severity of the rupture by the appearance of the ear drum on otoscopic examination but he must remember that the whole middle ear cavity is involved. Severity is graded by the following signs: grade 1, eardrum injection peripherally and along the handle of the malleus; grade 2, tympanic membrane totally congested; grade 3, bleeding into the drum; grade 4, blood in the middle ear that is visible behind the drum with or without ear drum rupture; grade 5, middle ear full of blood with or without drum rupture.

Grades 1 and 2 require no specific treatment except prevention of diving until the ear drums are clear and the Valsalva manoeuvre is performed easily. A vasoconstrictor nasal spray may be used. It should be noted that grades 1-3 without a history of diving indicate severe middle ear infection for which the treatment is antibiotics; this is not the case with the diver. Patients with grades 3-5 ruptures should be given antibiotics to prevent middle ear contamination or clear pre-existing infection. Decongestants should be used to facilitate middle ear drainage.

### Facial Barotrauma

This is caused by failure, during descent, to exhale through the nose to compensate for the decreasing air space between the face and the face plate or by wearing goggles that have no communication between their air spaces and the nose. The diver experiences a feeling of suction on his face that increases to pain and a squeezing sensation. Symptoms are facial edema (especially infraorbital); retrobulbar hemorrhage or edema; facial purpuric hemorrhage; conjunctival hemorrhage and late, generalized facial bruising. Ice should be applied to bruised areas, and sedatives and analgesics administered as required. The examining physician should look for possible internal eye damage.

### Dental Barotrauma

Air spaces in the roots of infected teeth or under loose or incorrectly fitted fillings, and eroded fillings give rise to this condition because they are subject to pressure/volume changes with ascent/descent. The diver feels pain on descent unless blood fills the space quickly, in which case, the pain increases on ascent with gas expansion. Examination will show carious teeth which may have imploded or exploded with sufficient gas volume change. Analgesics and dental repair are the recommended treatment.

## INJURIES OF ASCENT

These injuries are much more serious than those of descent and may require immediate diagnosis and treatment to prevent permanent disability. They are caused by too rapid ascent either without exhaling to allow for gas expansion, thus preventing air space distention and rupture, or without allowing for re-equilbration of dissolved gases in body tissues that result from prolonged exposure to increased partial pressures of gases in the breathing mixture.

### Decompression Sickness (bends, Caisson disease)

This occurs on descent when partial pressures of inhaled gases increase with increased ambient pressure. The increased partial pressure of nitrogen causes a shift in the equilibrium of inspired air, blood and tissue nitrogen levels, thus increasing the amount of nitrogen in solution in the body.

The amount of dissolved $N_2$, in the various tissues is proportional to the $pN_2$, differing nitrogen solubilities and vascularity of each. Adipose tissue with its high solubility and low vascularity tends to retain nitrogen more than other tissues; nervous tissue exhibits the same characteristics. Even if a new equilibrium is not achieved, some nitrogen is added to the body; if this excess nitrogen is not removed during ascent, damage may occur. If the ascent is too rapid to allow for the normal reabsorption of this gas from tissues, and its transport and release by the lungs, it will come out of solution and form bubbles in the body tissues and fluids. Once bubbles have formed, they increase in size with further ascent. To avoid bubble formation, adequate time must be allowed on ascent to remove the excess $N_2$ through the lungs. The deeper (greater than 33 feet) and the longer the dive, the more time must be spent waiting at intermediate depths during ascent for the gas to be released from the body. The pathophysiology of decompression sickness is a complex phenomenon. Nitrogen bubbles appear in tissues and blood, vascular occlusion occurs, lipid emboli form, and platelet aggregates — all contributing to the variety of symptoms collectively called "bends", "chokes", "staggers" and "decompression sickness" by divers.

The onset of symptoms usually occurs within minutes of surfacing, with virtually all cases (93%) presenting within 12 hours, but there is considerable variation. In about 10% of cases, onset occurs during diving. By one hour after diving, symptoms develop in 55% of cases. However, onset occurs 12-24 hours after diving in 2% of cases, and still later in 0.5%.

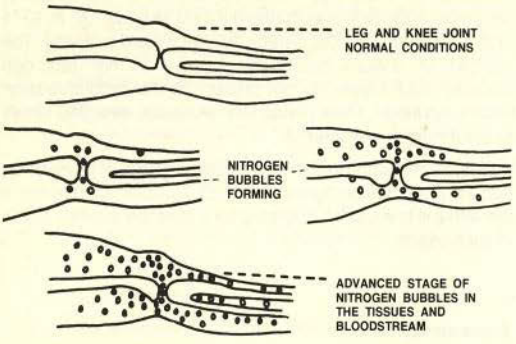
**TABLE I**

Symptoms of decompression sickness and percentage of patients affected.

| | |
|---|---|
| local pain | 91.8 |
| numbness/parasthesia | 21.2 |
| muscular weakness | 20.6 |
| skin rash | 14.8 |
| dizziness/vertigo | 8.5 |
| nausea/vomiting | 7.9 |
| disturbed vision | 6.8 |
| paralysis | 6.1 |
| headache | 3.2 |
| extreme fatigue and pain | 1.5 |
| shortness of breath | 1.5 |
| collapse and unconsciousness | 0.5 |

The type (see Table I) and severity of symptoms vary greatly. The most frequent complaint is local pain around a large joint, the knee and elbow, for example. Pruritus with or without mottling, especially around the hands, wrists and ears, may precede more serious symptoms or may be the only manifestation. Pain is described as deep and boring, "felt in bone not joint"; it begins as a dull ache, increases in

intensity and is then characterized by extreme exacerbations above a background dull ache. Such pain is usually located in the shoulder and knee; it is not aggravated by movement but may be transiently relieved by tight wrapping or vigorous massage.




**NITROGEN BUBBLES AS A CAUSE OF BENDS**

When presenting symptoms are nausea, vomiting, diarrhea and cramps; spinal cord involvement (paresis, paralysis, parasthesias) frequently follow. The central nervous system is sometimes involved as indicated by symptoms that mimic any type or location of cerebrovascular accident due to vascular occlusion by nitrogen bubble emboli. Any neurological findings in a post-dive examination suggest CNS injury and the need for rapid treatment.

Dyspnea with chest pain increased by respiration, and cough precipitated by cigarette smoke, may indicate a significant degree of pulmonary vascular occlusion by emboli. A diver who is normally a smoker who does not light a cigarette soon after leaving the water because he does not "feel like it" should receive careful examination and observation for 12 hours.

The only definitive treatment for decompression sickness is recompression followed by slow decompression. Recompression alleviates symptoms by dissolving nitrogen bubbles. The degree of residual damage depends on the severity of the presenting symptoms and the time before recompression starts. Any CNS damage can lead to permanent disability if appropriate treatment is not given.

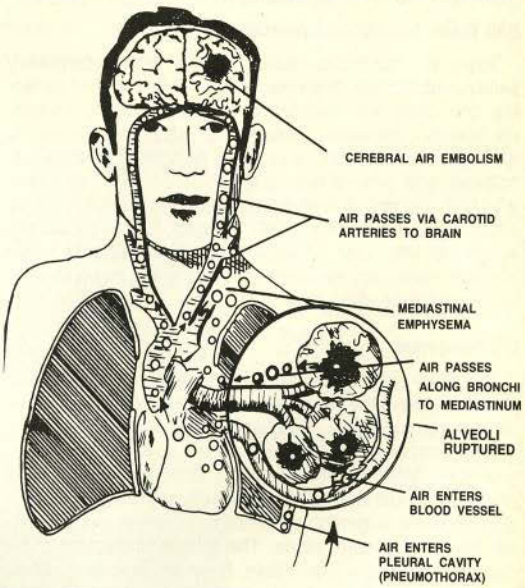
The only recompression facility in Nova Scotia is at Fleet Diving Unit (A), CFB-Shearwater, but a patient from elsewhere in the province who requires treatment can be flown there by Air-Sea Rescue. It is essential that a decompression victim lie down immediately on his right side with his head lower than his body. He should be kept warm and in the same position during transportation, and extreme speed is essential. Thus, any patient a physician considers may have the "bends" should be taken immediately to the recompression facility. Telephone consultation is available to physicians 24 hours a day from CFB-Shearwater. The physician should dial 463-5111 and ask the operator for the Diving Unit.

### Air Embolism

This is caused by ascent with the glottis closed; i.e., failure to exhale throughout the ascent; gas in the lung expands and overdistends the alveoli and pulmonary vasculature, with subsequent tearing of lung parenchyma and escape of air into the pulmonary venous system. Any cause of airway obstruction that traps air will allow alveolar distention and rupture on ascent. Air embolism can occur in ascents of less than 12 feet; it is an *extreme emergency* requiring immediate recompression. Death results from cerebral or coronary occlusion by air bubbles.

The victim of air embolism is unconscious either at surfacing or within 1-2 minutes. Neurological disturbances (paralysis, paresis, vertigo, confusion, convulsion, etc.) may be present before loss of consciousness. Cardiac-type chest pain occurs with ECG abnormalities, e.g. ischemia, arrythmia, failure patterns. Bubbles occur in retinal vessels along with skin marbling and bloody, frothy sputum. Mediastinal or subcutaneous emphysema may be present, or either simple or tension pneumothorax. A pneumothorax must be ruled out or treated before air lift of the patient can be attempted.

The only treatment is immediate recompression. The danger of death or permanent disability increases proportionally with the length of time that elapses before recompression is begun. Cardio-plumonary assistance and oxygen administration are all that can be done during transport. The patient must be kept lying down on his right side with his legs elevated and his head lower than his body.




**AIR EMBOLISM**

### Mediastinal/Subcutaneous Emphysema and Pneumothorax

The cause is the same as that for air embolism — overdistention and rupture of lung tissue with air escape into the mediastinum and tracking between fascial planes into the neck. These problems frequently occur in conjunction with air embolism but may appear alone.

The symptoms of mediastinal emphysema are those of cardiac failure — retrosternal pain, and in severe cases, dyspnea and faintness due to compression of the heart and

great vessels along with dysphagia and a feeling of "fullness" in the neck. The examining physician should look for central and peripheral cyanosis, dyspnea and shock.

Subcutaneous emphysema is usually asymptomatic. However, the physician should look for swelling and distension of the neck and supraclavicular regions with crepitation with palpatation, voice change and dysphagia.

Treatment of mediastinal/subcutaneous emphysema without air embolism does not require recompression. Treatment is symptomatic but should be administered near a recompression facility since, in the case of respiratory or cardiac failure, recompression may be required.

Pneumothorax causes sharp chest pain that is increased by inspiration, and dyspnea. Tension pneumothorax is accompanied by severe dyspenea and frequently by unconsciousness. Examination will show hyperresonance; mediastinal shift; dyspnea; evidence of chest pain; cyanosis and rapid, shallow respirations. The patient should be treated with air aspiration with a chest tube and water seal. In an emergency with tension pneumothorax, a condom slit at the end and firmly tied to a needle will function satisfactorily as a one-way valve and allow lung re-expansion.

## INJURIES DURING SUBMERSION

### Salt Water Aspiration Syndrome

There are numerous causes for this: faulty equipment, panic, overexertion, dyspnea. Within 1-2 hours after surfacing, the diver will experience dyspnea, cough, sputum, retrosternal inspiratory discomfort, shivering, anorexia, nausea, vomiting, hot and cold sensations, headache, malaise, and generalized myalgia. Crepitations will occur with both low and high pitched rhonchi. Temperature will be about 40°C and pulse 100+. Treatment is expectant; symptoms will clear within 6 hours normally and rarely requires more than 24 hours. Bed rest is recommended an $O_2$ for respiratory difficulties.

### CO Poisoning

The usual cause is contamination of the breathing mixture by exhaust from the compressor filling the tanks and the use of improper lubricants. Frequently there are no symptoms and unconsciousness can occur without warning. Headache, dizziness, confusion, nausea and vomiting may occur. The physician should look for abnormal redness of lips, nails and skin; impaired judgment; and unconsciousness and respiratory failure in severe cases. The patient should be given oxygen, or if that is unavailable, fresh air. In severe cases, hyperbaric oxygen may be life-saving. The patient should be treated in a recompression chamber.

## SUMMARY

This paper has dealt with the injuries most frequently resulting from sport scuba diving. There are also more common problems: cuts, strains, muscle tears, exhaustion, hyperventilation. Of greatest importance, however, is the recognition of decompression sickness and air embolism because they require immediate recompression. Whenever decompression sickness or air embolism is suspected, the patient should be transported by the fastest possible means to the nearest recompression centre. The rule to follow is: when in doubt, treat by recompression.

The hazards of sport diving can be great. Yet, in 1973, only 3 deaths were reported, 2 by drowning (1 due to panic, the other to exhaustion) and one by coronary thrombo-embolism after the diver had left the water. Only one case of mediastinal emphysema was reported; recovery was uncomplicated. There have been no verified civilian cases of decompression sickness during the past year (1973). In 1971 and 1972, there were no deaths directly related to diving. The number of civilian barorauma injuries is not recorded because such cases do not present to the recompression facility. However, Fleet Diving Unit (A) treats over 300 cases of barotrauma each year.

Despite the small incidence of diving injuries, it is essential that the physician be aware of potential problems since some are lethal. He must be prepared for extremely prompt action in such cases. □

**Acknowledgements**

With thanks to Mr. Peter Golding of The Nova Scotia Under Water Council for his expert technical assistance and Miss Elizabeth Shapter for her editorial assistance in preparation of this paper.

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## GUIDELINES FOR AUTHORS

Reference to these guidelines and recent issues of the Bulletin will help authors in preparation of their papers. Send the original typed copy to the Editor and keep a carbon copy.

The entire manuscript (including references and tables) should be typed double-spaced, with a generous margin on the left, on only one side of the pages. Do not underline unless the type is to be set in italics. Standard abbreviations (**e.g.,** hr, mg, ml) are acceptable without definition; less-common abbreviations should be written in full the first time they are used. Give generic as well as proprietary names and the manufacturer's name for drugs.

**References.** Identify references by numbers within the text, and list them in numerical order on a separate sheet [see (f)].

**Figures.** Provide an unmounted glossy print of each, clearly marked on the back with a SOFT marker, indicating top, figure no., and author's name. Show scale when relevant. Do not write legends on them [see (h)].

The usual framework of a paper is as given in (a) to (h) below, starting each section on a new page and numbering pages consecutively to the end of (h).

a) Front page, showing title, author(s) and degrees, whether the author is in family practice or the institution where the work was done, and address for correspondence.

b) Brief summary.

c) Introduction.

d) Materials and methods, then Results; **or** Case report.

e) Discussion.

f) References.
Examples: **Journal papers** — EBBERT, A., Jr. Two-way radio in medical education. J. Med. Educ. 38: 319-28, 1963. **Books** — MAJOR, R. H., and OELP, M. H. Physical Diagnosis, 6th ed. Philadelphia, Saunders, 1962, p. 51. **Contributions in books** — Voheer, H. Disorders of uterine function during pregnancy, labor, and puerperium. **In:** Pathophysiology of Gestation, ed. by N.S. Assali. New York, Academic Press, 1972, vol. 1, pp. 145-268.

g) Tables (each, including heading and footnotes, on a separate page).

h) Figure legends (all listed on one page); state magnification of photomicrographs.

# Games for the Physically Disabled

## An Outstanding Stimulus for Rehabilitation

B. J. S. Grogono, *M.B., B.S., F.R.C.S.(C), F.A.C.S.,
*Halifax, N.S.*

*"When people first see me in a wheelchair, they expect me to fall out, throw up, or babble incoherently. They're amazed when I do none of these things." Doug Mowatt*[1]

Recreation need not be confined to the able bodied. Almost anyone, whatever their disability, can participate in competitive sport or leisurely past time, and add to their enjoyment of life. It is a matter of organization, funding and designing the sport appropriate to the individual.

This year in Canada we were able to see how far organized games have developed for three major disabilities — the blind, amputees and the paralysed. It is ten years since Canada sent a disabled athlete to an international competition.[2] In 1966, Ben Reimer, a young paraplegic accompanied by Cyril Barrington, physical therapy instructor, left Winnipeg to compete in the Commonwealth Wheelchair Games in Jamaica. Our lone athlete returned with a bronze medal for the Javelin. This sparked enough interest to support the Paraplegic Games (Pan Am) which were held in Winnipeg in 1967. These games were initiated at an historic meeting between Dr. Leslie Truelove, Medical Director of the Rehabilitation Hospital; Tony Mann, Executive Director of the Canadian Paraplegic Association; and Max Avren of the Pan Am Games on June 6, 1966. A dedicated group of handicapped workers under the chairmanship of Alan Simpson (himself severely paralysed from polio) organized the games which were an outstanding success. It was the founding of the Canadian Wheelchair Sports Association with Bob Jackson as chairman that truly established Canada as a significant contributor to the field of sports for the disabled.

### ORGANIZATIONS FOR DISABLED SPORTS

#### 1. The International Stoke Mandeville Federation

This organization under the chairmanship of its founder, Sir Ludwig Guttman is responsible for the International Stoke Mandeville Games for the Paralysed.[3] The games are held each year in England and every four years as an Olympic event (Tokyo, Israel, Heidelburg and Canada.) Canadian teams originally went from Montreal to participate in these games in the 1950's.

#### 2. International Sports Organizations for the Disabled (I.S.O.D.)

This is responsible for sports for amputees and blind.

#### 3. Organizing Committee of the 1976 Olympiad for the Disabled, Chairman Dr. Bob Jackson

This was responsible for the Toronto Olympiad. Executive Director was D. Loiselle who spent over a year organizing the games.

#### 4. Canadian Wheelchair Sports Organization, Chairman Roger Mondor

This is responsible for sports and recreation for the paralysed in Canada. It has organized annual games in Vancouver, Calgary, Winnipeg, Hamilton, Montreal and Cambridge, Ontario. Nearly all provincial clubs for wheelchair sports are associated, including our own "Flying Wheels". The association combines with the Blind and Amputee associations to help Canada foster sports for the physically disabled.

#### 5. Pan American Games Organization

Canada has become a key member of this group and has given leadership in all games held since 1967. Memorable events have occurred in Argentina, Mexico, Peru and Jamaica. Annual games are held every two years.

### New Developments

The blind and amputee sports events held this year have had the stimulating effect similar to what which occurred in Winnipeg in 1967. Organizations capable of developing sports for the blind and amputees in Canada are being formed. War Amps have been very active in promoting helping amputee sports both at Cambridge and Toronto. A Civilian Amputee organization is now being formed.

### 1976 A Year to Remember

Two outstanding events occurred this year for handicapped athletes. The 1976 Games for the Physically Disabled held in Cambridge, Ontario an all Canadian affair and the 1976 Olympiad for the Disabled an International occasion. The Cambridge games were a more intimate but extremely enthusiastic personal affair and combined for the first time the sports of the three disabilities in Canada. The budget was approximately $183,000.

The Torontolympiad was extremely ambitious, but an outstanding success with 47 nations competing in these sports for the handicapped. The budget was approximately two million dollars. An interesting comparison is the gargantuan Olympics for the able bodied in Montreal with a budget of a billion dollars.

### Games for the Disabled

Many sports are continually being tried by the handicapped people. Those used in our National and International events have fully recognized rules standards, and records (Canadian Wheelchair Sports Rules differ significantly from the International Stoke Mandeville rules in certain areas).

*Chief of Orthopaedics, The Halifax Infirmary, Halifax, N.S. Medical Director, C.W.S.A.

**FIGURE 1**

Drs. Lush and Reid from Newfoundland examine triceps power.

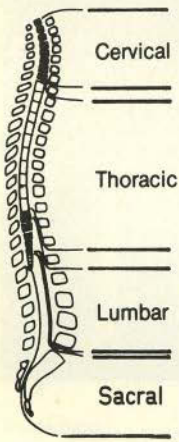
## CLASSIFICATION

### 1. Wheelchair Athletes

The Canadian, Pan Am and International systems are now almost identical except in points for Class V and VI and the fact that amputees can compete in wheelchairs in the Canadian and Pan Am Games.

**TABLE I**

**Classification by Location of Spinal Injury**




1A—upper cervical lesions with triceps not functional against gravity
1B—lower cervical lesions with good triceps but no finger flexors and extensors of functional value
1C—lower cervical lesions with good triceps and strong finger flexors and extensors
2 —Below T1 to T5, no balance when sitting
3 —Below T5 to T10, balance when sitting
4 —Below T10 to L3
5 —Below L3 to S2
6 —Swimming only, minimal disability

Prosthesis should be removed.
Arthrodesis score no points on affected joint.
If belts are medically required for safety, this should be put on chart.

### 2. Amputee Atheletes

There are twelve classifications. Partial hand and foot amputations are not considered major amputations. Prosthesis must be removed. No consideration is given to nerve injuries or orthopaedic conditions.

**TABLE II**

**INTERNATIONAL SPORTS ORGANIZATION FOR DISABLED**

**Abbreviations**

| | | | |
|---|---|---|---|
| BK | — below knee | BE | — below elbow |
| AK | — above knee | AE | — above elbow |

PIROGOFFS — amp of ankle joint

**UPPER OR LOWER LIMB**

| | |
|---|---|
| CLASS C | single BK<br>Single Pirogoffs (no field events)<br>single BK + forepart foot<br>Forepart of Foot + Pirogoffs |
| CLASS C 1 | Double BK<br>Double Pirogoffs<br>Single BK + Pirogoffs |
| CLASS D | single ak<br>single AK + Pirogoffs<br>single AK + forepart foot<br>single AK + single BK |
| CLASS D1 | Double AK |
| CLASS E | single BE<br>single BE + forepart foot<br>single BE + pirogoff |
| CLASS E1 | Double BE<br>BE + AE |
| CLASS F | Single AE<br>single AE + forepart foot<br>single AE + Pirogoff |
| CLASS F1 | Double AE |

**UPPER AND LOWER LIMB**

| | |
|---|---|
| CLASS I1 | BK + BE |
| CLASS 12 | BK + AE |
| CLASS J | AK + BE |
| CLASS J1 | AK+ AE |

**WEIGHT LIFTING**

Athletes lift weight from horizontal bed (adjustable) while prone.

Featherweight — 57 Kg.
Light Weight — 65 Kg.
Middle Weight — 75 Kg.
Light Heavy Weight 85 KG.
Heavy Weight — 85 Kg.

**Danger**
Protect against uneven lift.
Check cardiac condition

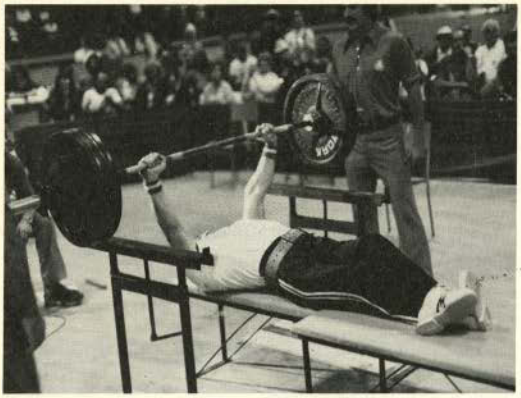


**FIGURE 2**

Weightlifting. Eddie Coyle, U.S.A., on his way to a world record 177.5 Kg. (Light Heavy Weight)

### 3. Blind Athletes

A. Totally blind
B. Partially blind (less than 1/20)

The blind should be examined by an ophthamologist who examines the eyes thoroughly, tests reflexes, eye movements, light preception, preception of digits and performs Snellen test as necessary.

## WHEELCHAIR ATHLETES — PARALYSED COMPETITORS

### *Swimming*

This takes a lot of training and courage, particularly for a tetraplegic. We are fortunate in having excellent coaches such as Stan Strong in Vancouver, who is a pioneer in this field.

Facilities — Assistance to help athletes into pool, catheters and appliances need attention, bedsores should be healed, pool is marked off in lanes. Electronic timing is used for International events.

**Styles**

Butterfly, Backstroke, Breastroke, Freestyle Distances:

| | |
|---|---|
| 25 Meters | 1A, B, C, and Class IV |
| 50 Meters | Class III and IV |
| 100 Meters | Class V and VI |

Note: Class VI can do kick turn
Class V can use legs
Class IV cannot use legs for propulsion.

Classification problems — Some athletes develop reflex pattern which is difficult to distinguish from voluntary movement.

Standards — There are outstanding swimmers of all classes. Note times of Class V and VI and IB and C do not differ.

*Danger — Watch a tetraplegic who may get tired and tend to sink.*

### *Team Sport*

Amputees can compete in International Wheelchair Games in Class IV, V and VI. Swimming remains a superb method of conditioning for paralysed athletes. It gives him stamina and confidence even if he requires a lot of encouragement in the early stages.

### *Track*

Athletes learn to use their wheelchair as an integral part of their personality. Practice leads to incredible precision, control and maneuverability. Chief events are:

| | | |
|---|---|---|
| **Mens** | 60 Meter dash | Classes IA, B,C |
| | 100 Meter dash | Classes II, III IV |
| | 200 to 400 Meter dash | |
| | 800 to 1500 Meter dash | Classes IV, V |
| **Womens** | 60 Meter dash | All Classes |
| | Relay races 40 meters × 4 | |
| | 60 meters × 4 | |

Facilities — A good surface and hard track is necessary. Rain does not prevent the keen athlete from competing.

*Danger — In long distances an athlete may become extremely fatigued. Spasticity can throw an athlete out of a chair.*

### *Field Events*

Wheelchairs are held by a holding device sometimes human and sometimes metal. There are separate events for all classifications.

**FIGURE 3**

Club throwing requires balance, co-ordination and arm control.

### *The Club*

This is extremely good for tetraplegics who can manage to grasp the club between their fingers.

*Danger — Special precautions should be taken as spectators can receive an unexpected blow if the throw flies off at an unusual angle.*

### *Precision Javelin*

The athlete shoots at a target and scores appropriately. A good sport for all.

### *Shotput, Javelin and Discus*

This is carried out from a wheelchair and requires arm, shoulder, and body coordination. Improvements in techniques have led to remarkable performances even in the tetraplegic class.

### *Rifle Shooting*

Competitions are held under the rules of the international shooting union, using small bore I.S.U. rifle. All shooting is from the chair in three positions; prone with both elbows resting on chair arm, kneeling with one elbow on chair or lap board and standing with neither so supported. Tetraplegics are allowed to use safety straps.

*Danger — All shooting must be under close supervision. Ears should be protected by muffs or plugs.*

### *Archery*

This is one of the best physiological stimuli for coordination of the upper limbs. All archers shoot from a wheelchair with feet on both footrests. The tetraplegic use a wide variety of devices to assist their grip. F.I.T.A. rules apply. Archers shoot six sighter arrows and 36 arrows at distances from 30-70 meters for women and 30-90 meters for men.

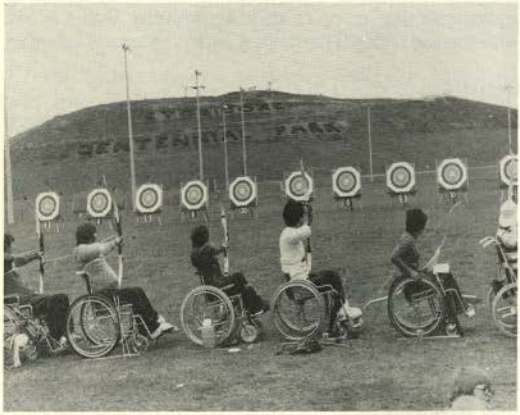


**FIGURE 4**

Archers shoot against the slopes of Etobicoke.

### *Darchery*

This combines archery with darts. Resembling a dart board the target is usually 301 points.

### *Pentathlon*

Only a few athletes can compete in this test of endurance and all round ability. Swimming, javelin, shotput, wheelchair dash and archery are included. Canadian Eugene Reimer won fame in this field in Class IV. Nova Scotia's Diane Crowe, now living in Alberta, won a Bronze Medal at the Toronto Olympiad.

*Danger — Athletes in Pentathlon event must be fully examined before competing.*

### *Snooker and Table Tennis*

Though requiring less power these sports are some of the most skillful and enjoyable.

### *Lawn Bowling*

This sport has not been available for wheelchair athletes in Canada but is excessively practised in England. It is played according to International Lawn Bowling Association rules. Facilities required are indoor and outdoor arrangements for wheelchairs.

### *Team Events*

1. *Relay races-swimming and track.*

2. *Volleyball* — This is gaining popularity and allows a mixed team of different classifications to compete.

3. *Basketball* — This is the most spectacular of all wheelchair sports; probably a bigger spectacle than standard basketball. Points are allowed for each classification, maximum being twelve points on the floor. The player may take only two pushes on his wheels and must pass or dribble. The Nova Scotia basketball team won a Silver Medal in the National games.

## AMPUTEE ATHLETES

### *Swimming*

These are run similiarly to the sports for paralysed.

### *Track*

Individual races for men and women in 100 and 1500 meters. Below knee and above knee amputees compete with their prosthesis.

*Danger — Occassional falls by an inexperienced athlete. Unsatisfactory prosthesis.*

### *Field*

Discus, shotput, javelin are thrown on a clearly marked circle. Precision javelin is thrown from standing position.

### *High Jump and Long Jump*

These are performed either from a running or a standing start.

### *Lawn Bowling*

Proved to be an excellent event for all ages. In International events, each country is allowed two women and two men in the singles and one pair team per class.

**FIGURE 5**

Arnie Bolt takes off for a world record long jump for amputees Class C.

***Pentathlon***

Each athlete competes in five events taken from shotput, discus, rifle shooting, swimming, long jump, precision javelin, slalem and football kicking.

***Tennis and Rifle Shooting***

These are run similarly to the wheelchair competitions.

***Football Kicking***

Each competitor is allowed six kicks and a point system is used to measure distance and accuracy.

**BLIND ATHLETES**

Events are run in two classes, A and B.

***Swimming***

The blind competitor gets his direction by instruction, by the lay markers, by touch on the head or back as he turns and finishes. Butterfly, backstroke, breast and free style are used and there are individual medley and team medley events in laps of 100 meters.

***Track***

Group A, 60 meter race. The athlete is guided by his coaches directions and megaphone in front or behind. Sometimes a coach runs along with the competitor.

Group B, a hundred meter run and 1500 meter walk. Competitors run individually against the clock in Class A. In our National games, partially sighted and sighted combined to compete in a tandem race.

**FIGURE 6**

Blind running. The athlete is directed from both ends of the track.

***Goalball***

This is a unique sport for the blind who recognize position of the ball by listening to the sound of a bell enclosed inside. Three members of each team block the ball from entering their goal as it is rolled by their competitors.

***Lawn Bowling***

Each competitor is assisted by two sighted persons. The helper stands by the jack and directs while the marker stands behind the jack. The helper gives the position of the bowl by using a clock face. "She is a meter short at eight o'clock."

**FIGURE 7**

A blind athlete hurls his javelin.

***Field***

Shotput, discus, javelin, high jump, long jump are all excellent competitions. The competitor is lead to the circle and feels the marker from which he throws. In high jump contestants use run up or standing positions. Group A use standing and Group B the running jump.

***Pentathlon***

Group A includes shotput, discus, long jump, 60 meter run and 100 meter swim free style. Group B includes the shot put, discus, longjump, 100 meter run and 100 meter swim free style.

**THE CAMBRIDGE GAMES**

Organized by seventeen member council, with David Risdale as Chairman, these games were held on June 20-27. Some 200 wheelchair, amputee and blind athletes participated in the first National games in which these three major disabilities were competing. Athletes and staff were housed at Guelph University and had to be bused twenty miles to their separate sites for the games; rifle shooting, archery and swimming were all held at different venues. The mixing of different disabilities brought an intense reappraisal of each athletes problems. Tremendous support was given by hundreds of volunteers and intense interest aroused in the local community. The Ontario Government, the Municipality of Cambridge with the Mayor and numerous committee members all giving unceasing support.

**Classification**

All athletes were examined and classified by a four member medical team together with physiotherapists who had become familiar with International Stoke Mandeville System. Thanks to the air strike everyone arrived a day early and we were able to complete the entire examination of some 200 athletes in a fourteen hour session before the games began.

**Difficulties and Protests**

Borderline classifications were examined by two doctors, nine athletes were reviewed and three needed careful discussion. One, a young girl with spinal bifida was reclassed from Class III to Class IV. A young man with flagilas ossium

with short legs and no gross neurological level was allowed to participate but considered ineligible for the International Games. A man who had a fractured pelvis and sciatic nerve lesions was also considered ineligible for International events.

### Medical Care

Most of the athletes were healthy and self-sufficient. Our medical orderly helped tetraplegics and others who needed catheter and suppository care. The Medical Committee provided a flexible organization for the care of all athletes, coaches and participants.

Medical centers were based at the games site and the university; with emergency hospital facilities. Our Canadian medical doctors provided round the clock service on a rotation basis. Interesting problems were: a case of diabetic coma; acute glaucoma, requiring ophthamological care; acute urethritis; medical technical problems, such as can an athlete use a strap for weight lifting, EKG's, are they necessary?

Volunteer nurses as well as St. John's Ambulance provided an excellent first aid service. Medications were obtained for many common aliments and a rest area provided for exhausted contestants.

### Home by Hercules

Nova Scotia's athletes performed well. Our basketball team was defeated by British Columbia, but won the Silver Medal.

Our return trip to Halifax culminated an unusual journey by Hercules Aircraft. This proved an ideal vehicle for wheelchairs.

## TORONTO OLYMPIAD

This was the biggest event ever staged for physically disabled. Some 1700 athletes-1000 paralysed, 400 amputees, 300 blind and numerous staff and coaches participated.

### Countries and Politics

Canada is bound by an agreement not to provide any support for games in which South Africans participated. Sir Ludwig Guttman and Bob Jackson and the organizing committees considered the South Africa Team was integrated between black and white sportsmen and allowed South Africa to compete. Consequences were complicated. Jamaica, Hungary and Poland had to withdraw, the Canadian Government could not therefore give the one-half million dollar grant directly to this sports organization.

The spirit of the games triumphed over political barriers: An English doctor looked after the Irish, Egyptian rifle shooters shot beside Israelis, and even South African taboos were broken. I attended a white South African who was having an epileptic fit in the same washroom with two black South Africans.

### International Classification

This was performed in the tent as soon as the athletes came off their planes. Some were extremely tired and to add to our difficulities, torrential rain leaked through many holes in the tent.

The Canadian team of doctors took a lions share of this task which was also born by members of the International Stoke Mandeville Committee.

Physiotherapists were well prepared and worked in teams with doctors through many long sessions.

Symmetrical lesions, borderline lesions, those with poor proximal and good distal musculature and those with good lower but poor upper limbs, were difficult to classify fairly.

An American swimmer was examined in the pool to determine whether she had voluntary or involuntary leg movement.

Much commotion occurred when a Canadian athlete indicated to the Toronto Globe and Mail that it was easy to fool the doctors. A special tribunal under Sir Ludwig Guttman heard his case. His classification was confirmed and he was reprimanded for behaviour contrary to the athletes oath.

Problems or protests had to be heard within 24 hours. Heated disputes led to plans for a more detailed rule here.

### Opening Ceremonies

Some 20,000 spectators watched the opening ceremony held at the Woodbine Racetrack. Colorful displays by The Royal Canadian Band and Indian Dancers preceded the opening remarks by Lieutenant Governor Pauline MacGibbon. Some 47 nations paraded in front of the stands with Sir Ludwig Guttman and Bob Jackson and Dick Loiselle presiding as fireworks blazed a message of good luck.

### Etobicoke Events

The 250 acre site provided superb facilities for the games and an Olympic-sized pool had just been completed. Track and field were run under excellent conditions, basketball in a vast gymnasium; archery took place against the dump which is used as a ski slope in winter. Facilities such as restaurants banks, post offices and wheelchair repairs centers were always accessible.

Arnie Bolt set a world record high jump of 6′ 1¾″. His leg was amputated by a grain auger when he was three years old. In heavy weight lifting, Brown of U.S.A. lifted 525 pounds. Light heavy weight Eddie Coyle had no difficulty with 396 pounds which represents a power/weight ration of 2.7. Lyons of Canada who lifted 300 pounds has a little way to go to reach this standard.

**FIGURE 8**

Arnie Bolt shows how to clear 6 feet with one good leg.

A field hospital was established at Etobicoke. It provided first aid, Emergency Care and a rest centre. A wide variety of conditions were treated by a large team of doctors from Toronto. Medical centres were also provided at York University and the University of Toronto. These were staffed by volunteer nurses, Ontario doctors and members of the Canadian Medical Team. Volunteers and Hostesses in bright uniforms assisted everywhere.

### Closing Ceremonies

The Canadian team won some 86 medals. We cheered our Chief de Mission, Merv Olveson and team manager Bob Stedward as we stood beneath the flags of the 47 participating countries. Musicians, athletes, coaches, staff, visitors and volunteers joined in a remarkable celebration. Festivities continued through the night to make this the most important and animated part of the entire festival. Nation shared with nation an understanding of the true value of friendship, sport and sportsmanship.

### Additional Sports

Besides those sports recognized by International contests, enthusiasts have developed unusual sports. Riding for the disabled, particularly suitable for cerebral palsy victims, hemiplegia and amputees. Riding schools have started in Canada and a good demonstration was given in Etobicoke. In Europe, riding for the disabled is fully established.

Skiing for amputees and blind are well organized. Scuba diving has been practiced. Sailing and canoeing are also undertaken. Golf for the blind is a well recognized pastime. If you wish to adapt a sport for the severely handicapped; such as, muscular dystrophy, read "Games, Sports and Exercises for the Physically Handicapped".

**FIGURE 9**

This thalidomide girl has gained excellent balance from riding.

### Medical Research — Things to Dream About

These games brought together a gigantic collection of clinical problems and human experience. Only a fraction of this combined knowledge has been tapped. The International Society for Paraplegia held an important scientific meeting at Lyndhurst Lodge during the games, but it was difficult to attend both functions.

A glimpse of the world's distribution of handicaps was gleaned during the medical classification. Egyptians suffered from amputations and blindness, the result of three wars. The Irish have had an athlete with Pott's paraplegia. The Brazilians had numerous polio problems with many extensive deformities. Spinal deformities were common and many athletes had operative scars. Americans tended to have sophistcated operations. A New Zealander had an excellent correction of a curve. Statistical analysis of classes, medical conditions and complications should be part of our medical data.

A wide variety of amputations and prostheses were available yet we did not make any systematic analysis or comparison. Classification of athletes remained an art, yet it might be possible to refine methods of using cortical evoked potentials or more accurate muscle tests.

### Things Well Planned

Professor Wicks of MacMaster University carried out a detailed exercise performance tests on tetraplegics and paraplegic athletes. Using specially designed apparatus he measured the energy expenditure during crank and wheel-chair ergometry. He tested athletes who volunteered their maximum effort after they completed their event. These represent the most sophisticated tests yet carried out on this special highly trained individual, the wheelchair athlete.

## CONCLUSION

In the past ten years, Canada has progressed a long way in the organization and provision of sports and recreation for the handicapped. The blind and amputees are now developing their own organizations which will allow ideas to flourish.

Olympic and National games have brought a general recognition of the fantastic capacity and adaptation of the handicapped to overcome their disability and contribute their share to the world's resources.

Much work remains ahead to make appropriate sports and recreation available to anyone who needs them. □

#### Acknowledgement

Thanks to Dalhousie University Audio Visual Department for photographic work.

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# Influenza

## Background of Recent Developments

K. R. Rozee*, M.Sc., Ph.D., Dip. Bact.,

*Halifax, N.S.*

Although Influenza as an identifiable disease has a history of many centuries, the modern story begins with Pfeiffer during the pandemic of 1890, (*Dtsch. Med. Wschr.* **18:** 28, 1892). He isolated a Gram negative organism, **Haemophilus influenzae,** from cases of Influenza and erroneously attributed the disease to this organism, hence, the name.

Despite a considerable laboratory effort expended during the 1918 pandemic and the claims of some bacteriologists that the etiolgic agent was a virus, the issue of cause remained in doubt until 1931. At that time Shope (*J. Exp. Med.* **54:** 349, 1931) obtained convincing evidence that an Influenza of swine, very similar in clinical appearance to that of man, was caused by a filterable virus and that the presence of a swine strain of Haemophilus bacterium was necessary to develop the complete clinical picture.

This evidence was so reminiscent of the 1918 human situation that shortly in 1933, Smith, Andrews and Laidlow transmitted a filterable virus from human cases of Influenza to ferrets (*Lancet,* **1:**66 1933). In addition, serum from humans recovered from Influenza was shown to render this virus filtrate non-infectious. Once it was shown that the swine virus could also infect ferrets, tests for the effectiveness of Influenza convalescent serum showed the swine virus and the human virus were antigenically different agents.

By 1941 Burnet had grown Influenza virus in the hen's embryonated egg and evolved the egg technology used today (*Med. J. Aust.* **2:** 687, 1935); Francis had isolated the first of the B group of Influenza viruses (*Science,* **91:** 405, 1940), and Hirst (*Science,* **94:** 22, 1941), McClelland and Hare (*Can. J. Pub. Health,* **32:** 530, 1941) had discovered Influenza hemagglutination. These discoveries provided the essential laboratory tools for all of the epidemiologic investigations to follow.

An understanding of three major characteristics of Influenza A virus will enable us to evaluate recent developments. First is its capacity to mutate and, in response to the selection pressure of a common immunity in its human host, to produce an antigenic type which is unaffected by previously established immunity. In this way a succession of new antigenic types appear to which man is susceptible and which produce small or large epidemics as a consequence.

The second characteristic helps to explain the long association that Influenza A has had with secondary bacterial pneumonias. Recently Larson and Blades (*Lancet,* **1:**283, 1976) have shown that the intrinsic immunity against bacterial infections provided by cell mediated mechanisms is significantly inhibited during an Influenza infection.

The virulence of the 1918 pandemic is now more understandable. Not only did this virus cause a primary infection, it also enhanced the possibility of bacterial pneumonia by inhibiting cell-mediated immunity. Considering that the Staphylococcus was the organism incriminated in most of these pneumonias, it proved highly fatal in the absence of antibiotics and in patients already compromised by virus infected lungs.

The third characteristic which should concern us here is the susceptibility of this virus to the antiviral effects of Symmetrel (amantadine), a drug usually used in Parkinson's disease. What is not generally appreciated is the very impressive results this drug has produced in clinical trials everywhere in the world except the U.S.A. There, for reasons seemingly unrelated to health matters, it has not been licensed (*Science,* **192:** 130, 1976).

Now, how are these characteristics useful in understanding our current situation *vis-à-vis* "swine flu"? To begin, there is absolutely no way that we can predict with certainty that the next mutant epidemic influenza strain to appear will be a "swine" variant. Any prediction of this sort is not scientifically based, but is really guessing. The swine variant has been with us for decades as sporadic infections and is not infrequently isolated. Indeed, most individuals over 50 years of age have antibodies to the "A/Swine" virus and are immune.

Using whatever evidence we have, and this is meagre, it is much more likely that the next epidemic flu virus will be A/Victoria. In fact, not only is this guess more likely but recent isolates such as A/Victoria appear more virulent than A/Swine strains. In addition, the availability of antibiotics to combat secondary bacterial pneumonias, the cause of most deaths in 1917-18, makes the reoccurance of a similar epidemic unlikely. Similarly there is no reason why amantidine could not be used for its antiviral properties.

Why then, was such an interest in a 1976 isolation of a virus that had been isolated previously, but ignored? The other recent isolation of this virus, in a case of Hodgkin's Disease in 1974 (A/Mayo) in a farm child, were in situations which would excite only medical interest. The 1976 isolate (A/New Jersey) killed a healthy young soldier at Fort Dix and caused some 500 military cases. It **did not** spread to the surrounding community. The spectre of the 1918 pandemic was raised despite the advice of medical scientists including two Nobel prize winners. A large amount of publicity, natural during a presidential election year, then attended the announcement of a $140-million vaccine programme for the U.S.A. This program recently has been interrupted because of the insistence of the vaccine industry that the U.S. Government provide insurance to the industry against suits for vaccine reactions. Congress has only reluctantly passed President Ford's bill to provide this insurance.

Is the programme warranted? Advocates of vaccination will point to the 20 million that died during the 1918 epidemic and the need to decide now on a vaccination programme because of the need for lead-time required for vaccine production. Others who object to this haste are supported in their objection by the facts alluded to above.

*Professor and Head, Department of Microbiology, Dalhousie University, Halifax, N.S.

If one were to judge on scientific merit alone, the absence of any means of predicting how influenza will vary, the availability of excellent antibiotics to successfully treat bacterial pneumonia, the positive immune status of our population over 50 years of age and finally the availability of a proven antiviral drug, the case for vaccination would surely be lost.

To conclude, a quote from *Pediatric Alert,* 8 July, 1976, is appropriate "As Pediatricians we are temporarily off the hook. Although we find it difficult to fault the concern ..... we suspect that the net result will be the vaccination of high risk individuals (in all age ranges) as has been the case in the past". □

## BOOK REVIEW

### Immunological Tolerance. British Medical Bulletin, Vol. 32, May, 1976.

This is a comprehensive review of the topic by recognized experts in the field. The subject dealt with is that mysterious biological force that suppresses immune responses in a selective or specific manner. The relationship of tolerance with transplantation, tumor growth, autoimmunity and parasitic infections complements more detailed consideration of underlying cellular mechanisms. The importance of the subject to the biologist lies in the probability that these immunological events reflect general principles of cell regulation. Its importance to the clinician lies in the prospects that better understanding of tolerance will lead to specific methods of manipulating immune responses in preventing and treating human disease.

In large measure, these reviews attempt to interpret a multitude of biological observations. In spite of a glossary of terms which is appended, this makes for difficult reading, and most of the articles are not recommended for general medical readers. An exception should be made for an excellent introduction and summary by Doctor J. H. Humphrey and also a straightforward review of immunological rejection of tumors by R. W. Baldwin and R. A. Robins.

On the other hand, these review articles are highly recommended for those with a special interest in immunology, cell biology, or in the clinical disciplines of transplantation, oncology, and autoimmunity. They are authoritative, well referenced, and current, with references to work not yet in press, as well as recent publications. It delineates the state of the art at this time. However, it is a 1976 portrait of a moving scene. The concepts developed here undoubtedly will become modified as the basic molecular mechanisms responsible for cellular activity come into focus.

J. M. MacSween, M.D., F.R.C.P.(C.),
Dept of Medicine,
Camp Hill Hospital, Halifax, N.S.

Readers of the *Nova Scotia Medical Bulletin* with back files or single issues of either *Tupper Times* or *the Vox Medica,* two Dalhousie medical student publications, could greatly assist the W. K. Kellogg Health Sciences Library by donating issues of these newspapers to the library, in order to complete holdings of each title. Contact:

Special Collections Librarian
W. K. Kellogg Health Sciences Library
Sir Charles Tupper Building
Dalhousie University
Halifax, N.S. B3H 4H7

or call 424-3740 any week day between 9 and 5.

**DOCTORS**

The Medical Society suggests that you make the *Bulletin* available to your patients in your waiting room.

**SENIOR PUBLIC HEALTH POSITIONS**

The Nova Scotia Department of Public Health requires an ADMINISTRATOR, Child and Maternal Health and Communicable Diseases and several HEALTH UNIT DIRECTORS for various regions of the Province.

The Administrator, Child and Maternal Health and Communicable Diseases, is a senior position with responsibilities for program planning and administration throughout the Province.

The Health Unit Director's responsibilities will include medical aspects of a comprehensive program in Community Health.

Successful applicants must be licensed to practice medicine in Nova Scotia and will have post graduate training in Community Health and Epidemiology. Post graduate training, if required, may be provided to suitable candidates.

Salary will be commensurate with qualifications.

APPLY TO: Civil Service Commission,
Province of Nova Scotia,
P.O. Box 943,
Halifax, Nova Scotia.

# An Appreciation

## DR. PAUL CUDMORE

Paul Cudmore became a member of the Medical Society of Nova Scotia in 1964 when he arrived in Halifax from Charlottetown at age 32 to start his third professional career: as a medical educator at Dalhousie University. Little more than a decade later his contributions in this field were limited by a prolonged illness to which he finally succumbed on 29 August 1976.

Paul Cudmore's background equipped him ideally to become a pioneer in, first, continuing medical education and, later, general medical education. During his relatively brief period in the Faculty of Medicine, he was involved for the first two years in Dalhousie's Student Health Service and the Division of Continuing Medical Education, substantially expanding the role of both these services. In the latter field he became widely known to the profession for his dedication to meeting the need of physicians to keep up-to-date. He refined the quality of course-offerings by inspiring all with whom he worked to greater levels of achievement. He developed Clinical Traineeships to the point where they became a model for educators throughout North American medicine.

In 1966 he resigned from Student Health to devote himself full-time to medical education. During a year at the University of Illinois (1966-67) he pioneered evaluation techniques in office practice and developed broad skills that led, after his return to Dalhousie, to his appointment as Assistant Dean with responsibility for curriculum, evaluation, medical teacher training, research in medical education, in addition to his continuing and expanding commitment in Continuing Medical Education. By 1973 he was Associate Dean with heavy responsibilities in the Faculty, in the field throughout the Maritimes and, with recognition and involvement in his specialty, throughout Canada and the United States.

The most striking feature of Paul's life, however, was not these impressive professional achievements but rather his ability to assist others through his example to the realization of their own potential. A brief review of other aspects of his activities helps in understanding his remarkable powers of leadership and the tremendous contribution he made.

Born in Charlottetown, he early developed a strong sense of the role of family and church in society. After initial schooling on Prince Edward Island, he went to Montreal where he received his Associate in Music degree from McGill University. He returned to pre-medical training at Prince of Wales College, Charlottetown, while simultaneously pursuing his profession of music as church organist and choir leader at Trinity United Church and St. Paul's Anglican Church. In 1954 he married Jean Davison, a nurse from Kensington, Prince Edward Island, and commenced the study of Medicine at Dalhousie where he graduated in 1959. During this period he continued his involvement in music through an association with Fort Massey United Church, Halifax.

Returning to Charlottetown, Dr. Cudmore entered general practice. He was tireless in his continuing pursuit of knowledge and in the development of more efficient methods of health-care delivery. In addition to church and musical activities, he contributed to the community locally through the Y's Men's Club and to the Boy Scouts throughout Prince Edward Island as Provincial Commissioner.

After appointment to the Faculty of Medicine, despite the heavy pressures of his academic responsibilities, Paul continued his associations with music as a member of the Royal Canadian College of Organists. He was also a member of the choir and relief organist at Fort Massey United Church. His commitment to Scouting was substantial — as a member of the provincial executive and as a director of Operation Alert, a major annual Scouting activity.

As an elder of Fort Massey United Church, as Superintendent of the Sunday School, as Chairman of the Christian Education Committee, as Chairman of the Board of Managers, Paul gave of himself without stint and inspired others by his example of cheerful service. Religion was central to his life and his living, and his faith was reflected above all in his devotion to family, as also in his constant striving for excellence.

Only such a dedicated individual could have contributed so significantly to Nova Scotia and its medical profession in the timeframe of little more than a decade. □

L.C.S.

# Personal Interest Notes

## NOTES ON ADMISSIONS TO DALHOUSIE MEDICAL SCHOOL

There were 405 applications to the Faculty of Medicine for admission in September 1976. 242 of these were from the Maritimes and this is slightly under the average of the last five years. The 163 from outside the Maritimes is about half of the usual number — this was probably related to the postal strike which occurred at the time candidates were applying.

The full quota of 96 students were accepted: 55 from Nova Scotia, 26 from New Brunswick, seven from Prince Edward Island and eight from elsewhere.

67 had bachelor's degrees or higher and 29 had no degree. Only three students had academic averages below 80 per cent for the two years preceding their entry.

Of the 44 children of Maritime physicians (five deceased), 20 were accepted.

Five male and two female students were married at the time of admission.

Average Medical College Admission Test performance of the total group was well above the 50th percentile.

It is noteworthy that the prediction that an increased number of female candidates would be accepted was not borne out. This class has 22 women and their average age is 21. The average age of the 74 men is 21.5.

J. F. Nicholson, M.D.
Assistant Dean
Student Affairs & Admissions

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**The Dalhousie Medical Students' Society** has completed its week of indoctrination for the entering First Year class. Shades of years gone by — no hazing, no "initiation" but a genuine effort to orient the new meds beginning with a coffee party on Sunday, 5 September through a brewery tour on Saturday, 11 September.

**Dean Donald Hatcher** held a highly successful reception for the new students on Wednesday evening, 8 September. The many Faculty members who attended were impressed with the maturity and social graces of these young people.

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**Dr. S. C. Robinson (Robbie)** has completed his film *Pregnancy & Childbirth* which has had very successful reviews. He will be able to introduce this film to the various centers he will be visiting during his Sabbatical. He plans to study at centers in the United Kingdom, Australia, New Zealand and Japan before returning home in May 1977.

*The Bulletin* is pleased to welcome **Dr. Robert (Bob) George Wilson** to the position of Secretary General of The Canadian Medical Association. He will bring to the C.M.A. a wealth of experience from general practice, teaching primary health care at U.B.C. and a long interest and experience in organized medicine. He has participated in a wide variety of local, provincial, national and international bodies and has been an executive of many committees.

We wish him well and look forward to "doing business" with him.

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## OBITUARIES

**Dr. D. Paul Cudmore,** (44) of Halifax died Sunday August 29, 1976 at the Victoria General Hospital after a lengthy illness. He graduated from Dalhousie Medical School in 1959 and later trained in medical education research at the University of Illinois. He became Assistant Dean of Medicine at Dalhousie University in 1970 and Associate Dean in 1973. Our sincere sympathy is offered to his family.

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**Dr. Syed Hasan,** (57) of Bridgewater, N.S. died July 31, 1976 in Dawson Memorial Hospital. He graduated in medicine from University in Mysore, India and took Post-graduate training in Ophthalmology in England and the U.S.A. Our sincere sympathy is offered to his family.

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**Dr. Lewis M. Morton,** (87), died August 1, 1976 in Yarmouth Regional Hospital. A graduate of Dalhousie Medical School, he practiced in Tusket and Yarmouth after returning from service in the Royal Canadian Army Medical Corps during the First World War. He was a past president of the Medical Society of Nova Scotia and the sympathy of the Society is extended to his family.

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**Dr. Edith Kovacs,** (53) of Dartmouth died Wednesday August 11, 1976 at the Halifax Infirmary after a long illness. She graduated with distinction from medical school at the University of Budapest. She completed her medical education at Dalhousie University receiving her MD in 1962. The sympathy of the Society is extended to her husband Dr. L.L. Kovacs and her daughter and son. □

**THE MEDICAL SOCIETY OF NOVA SCOTIA**

123rd Annual Meeting

Lord Nelson Hotel
Halifax

November 19-20, 1976

Program details to follow via Presidents' Newsletter

# NEW MEMBERS

The Physicians listed below have joined The Medical Society of Nova Scotia between June 1, 1976 and Sept. 30, 1976. A most cordial welcome is extended by the Society.

| | |
|---|---|
| Dr. Douglas L. Allen | Elmsdale, N.S. |
| Dr. Michael Allen | Sherbrooke, N.S. |
| Dr. John F. Archibald | Guysborough, N.S. |
| Dr. David H. Barss | Bridgewater, N.S. |
| Dr. Robert E. Cohen | Sydney, N.S. |
| Dr. James A. Doane | Bridgetown, N.S. |
| Dr. Anita A. Foley | Guysborough, N.S. |
| Dr. Eileen M. Foley | Elmsdale, N.S. |
| Dr. J. Donald Hatcher | Halifax, N.S. |
| Dr. Charles H. Hines | Cheverie, N.S. |
| Dr. Michael S. C. Ho | Halifax, N.S. |
| Dr. Kathleen M. H. Landymore | West Lawrencetown, Halifax. Co., N.S. |
| Dr. Shelagh Leahey | Yarmouth, N.S. |
| Dr. K. Louise MacLean | Montreal, Que. |
| Dr. Peter G. Phillips | Bridgetown, N.S. |
| Dr. Parthasarthy Punna | Halifax, N.S. |
| Dr. David M. Rippey | Springhill, N.S. |
| Dr. Gerald H. Schaller | Manitoba |
| Dr. John B. McG. Shaw | Halifax, N.S. |
| Dr. Robert Stokes | Whycocomagh, N.S. |
| Dr. Catharina A. L. Young | Pictou, N.S. |
| Dr. Arthur W. Zilbert | Sydney, N.S. |

Are you one of those motorists who feels seat belts aren't worthwhile because they rumple your clothes? Your Nova Scotia Highway Safety Council says they don't if properly fastened. Even if they did the Council says, wrinkles are easier to get rid of than bloodstains.

**ADVERTISERS' INDEX**