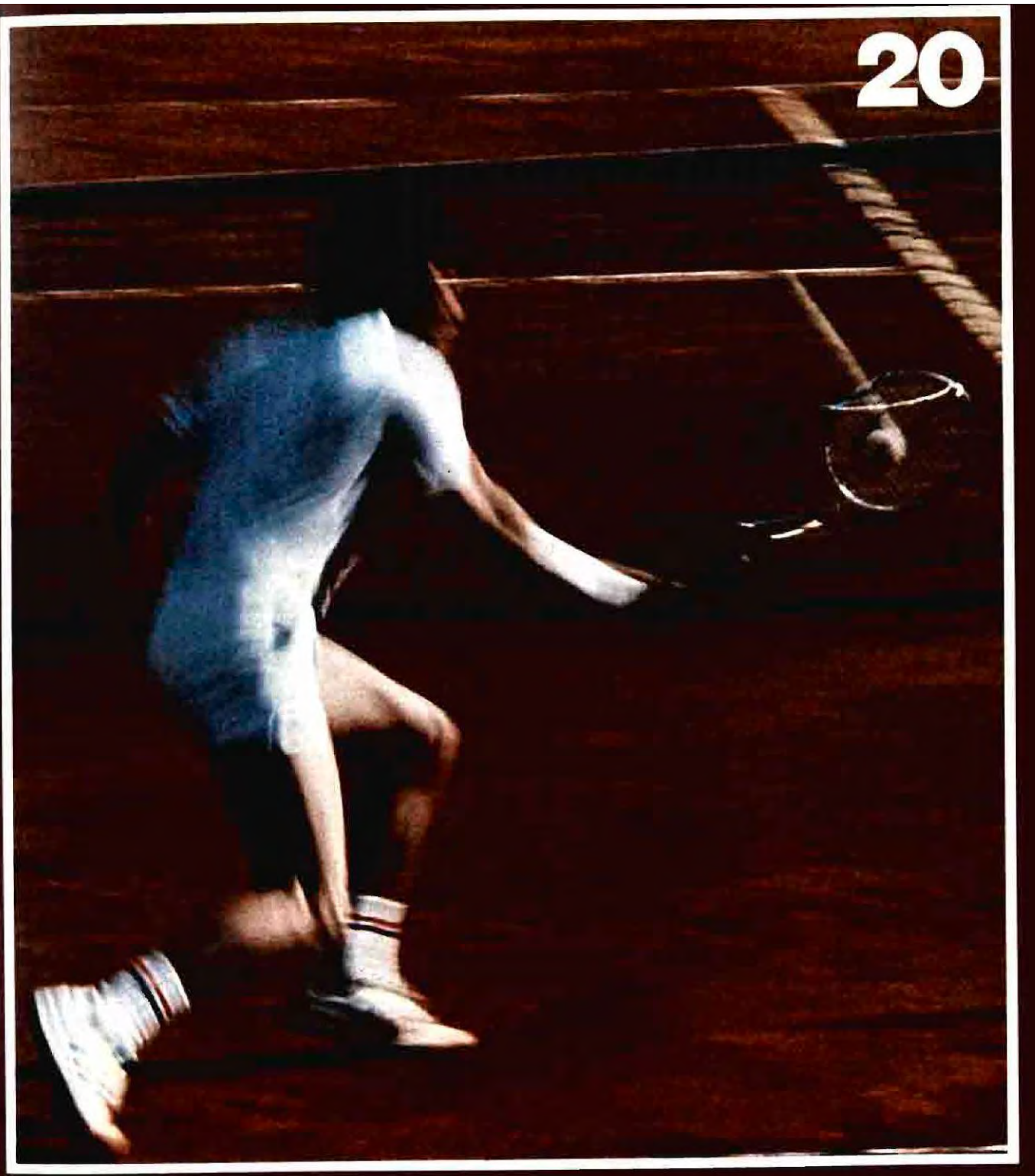
September 1983

SA Sports Medicine
SA Sportgeneeskunde



Special Features:
Tennis Injuries
Prevention of Heat Injuries

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Editorial Content

September 1983

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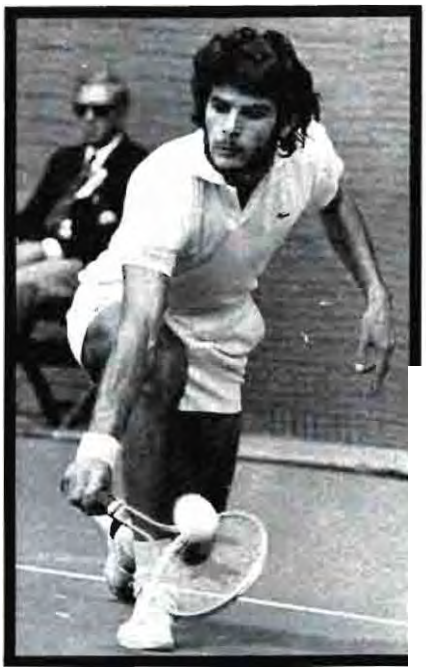


Common Tennis Injuries

Dr Louis L. Sirkin
Radiologist,
Military No 1 Hospital

Tennis enthusiasts, regular players, not so regular players, and older Moms and Dads, are all on the courts trying to emulate the greats at Wimbledon and those at the more recent 1-Million Dollar Tournament at Sun City. This will bring about an increase in tennis injuries to your consulting rooms or to the various sports injury ciinics.

Many of the tennis injuries are predictable and some are even preventable.

Subunqual Haematoma

The foot for example is a part where a lot can be done to avoid damage by the use of sensi ble footwear. If the player wears poorly fitting shoes the foot tends to slip forward in them or if too tight, the toes will bear the brunt of the stress. This will tend to push the toenails in and thus cause a subunqual haematoma. This may need to be treated as an emergency later that evening when the pressure under the nail builds up. This can be done very easily with the use of an 18 gauge injection needle, gently twirled between the index finger and thumb, with gentle downward pressure on the nail. As the blood squirts out a great amount of relief is felt immediately and you have a very satisfied customer. Do not use an opened out red hot paper clip to make the hole, as this not only frightens the tennis player, but also your popularity stakes will drop considerably, as this is a good tale for a bar or cocktail party, and it is very painful once the nail has been burnt through.

Tendo-calcaneus Tendinitis (Achilles Tendinitis)

Many modern sports shoes have a raised firm tab at the back of the heel. When the foot is plantar flexed this can dig into the tendo-calcanous, causing painful tendinitis. A very hard heel tab will cause noticeable pain rather quickly but a softer back shoe may cause only minor damage at first, but this will become cumulatively disabling. The simple solution of cutting down the tab at the back of the shoe is often overlooked.

Ankle Injury

The lateral ligament of the ankle is very often strained. After-care is terribly important. The player with ankle ligament *strain* who continues playing in pain is probably better off in the long run than the player who comes off immediately and gets put into a p.o.p. cast. Treatment should consist of rest, ice, and *early mobilisation.* Once the acute pain has subsided the ankle must be mobilised, using a "wobble board" This can be made very easy, using a flat piece of board (your wife's favourite breadboard), about 45 cms in width, with half of a "rolling pin" (again from the kitchen) i.e. cut in half longitudinally and the flat surface attached to the board. This gives a flat upper surface to stand on, and the lower surface will rotate on the round surface of the rolling pin on the floor.

When the lateral ligament is strained, the proprioceptive fibres are torn. When the ankle recovers the proprioceptive fibres remain damaged and one loses the perception of "where the ankle is", when busy with a game and concentrating on trying to get to the ball and hitting a good return. The wobble board is thus used to re-educate the proprioceptive fibres of the ankle.

You gradually improve your balance until you can stand on one foot on the wobble board, balance, throw a tennis ball against the wall and catch it again. Until you can do this, the ankle will always feel weak and "strange" If this is not done during the recuperative period, your ankle will not recover properly

Tennis Elbow

A very common problem encountered in tennis players is lateral humeral epicondylitis or "tennis elbow" It is related to age, frequency of play and is usually due to an improper backhand. The less common medial epicondylitis is associated with the overhead serve or overuse and is more frequent in advanced players

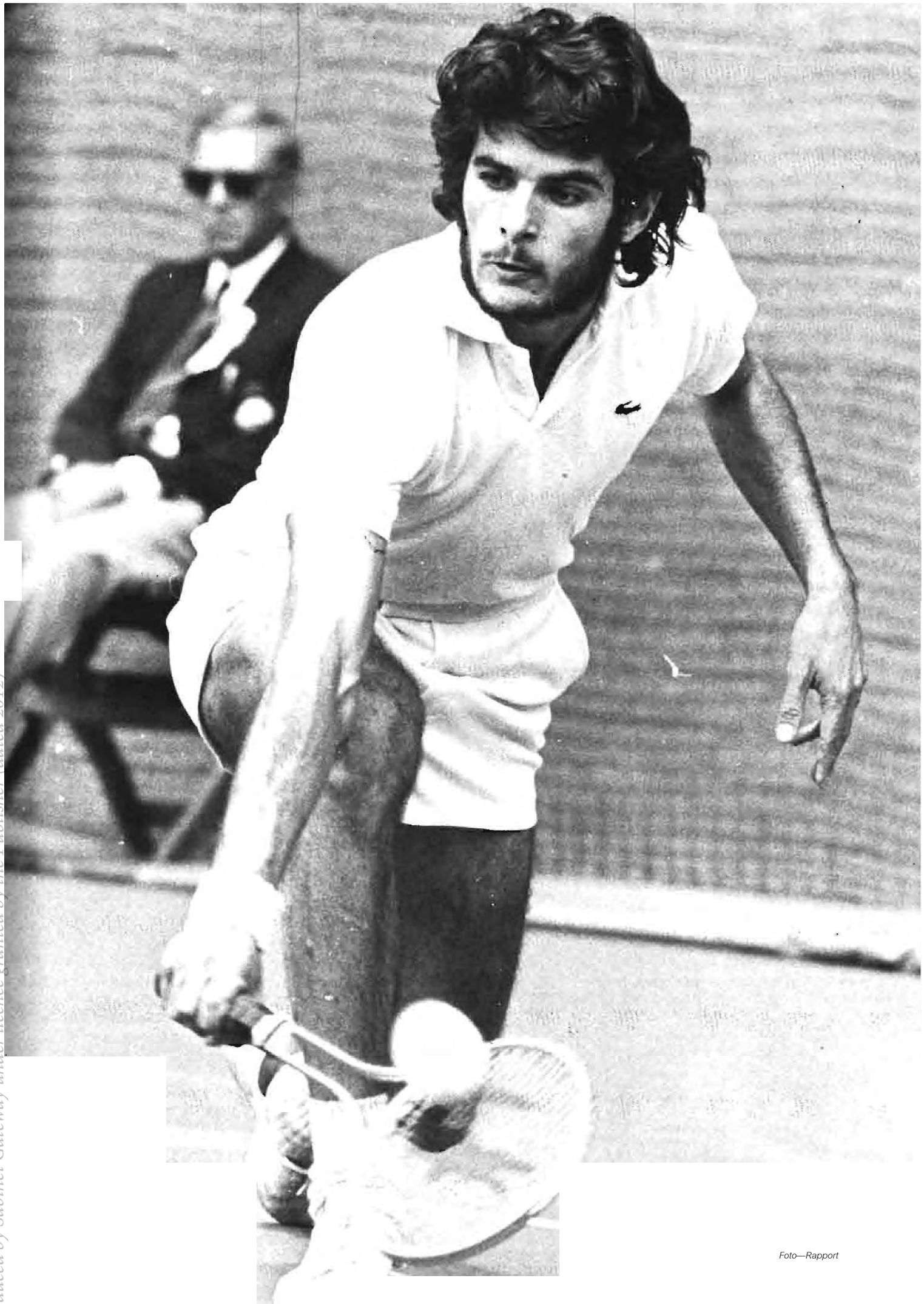
The pathological anatomy appears to be the development of microscopic tears in the common extensor tendon, most commonly the extensor carpi radialis brevis and less frequently the extensor digitorum or extensor carpi radialis longus. A chronic inflammatory response then develops with these micro tears which resemble granulation tissue and exacerbates tissue separation if not successfully treated.

The diagnosis is usually made by the complaint of pain over the lateral epicondyle which is also locally tender to palpation. The pain is intensified by extension of the wrist against resistance. Passive stretching of the extensor muscle origin is an important diagnostic test and is accomplished by forced pronation of the forearm with flexion of the wrist There are no pertinent laboratory or X-ray findings.

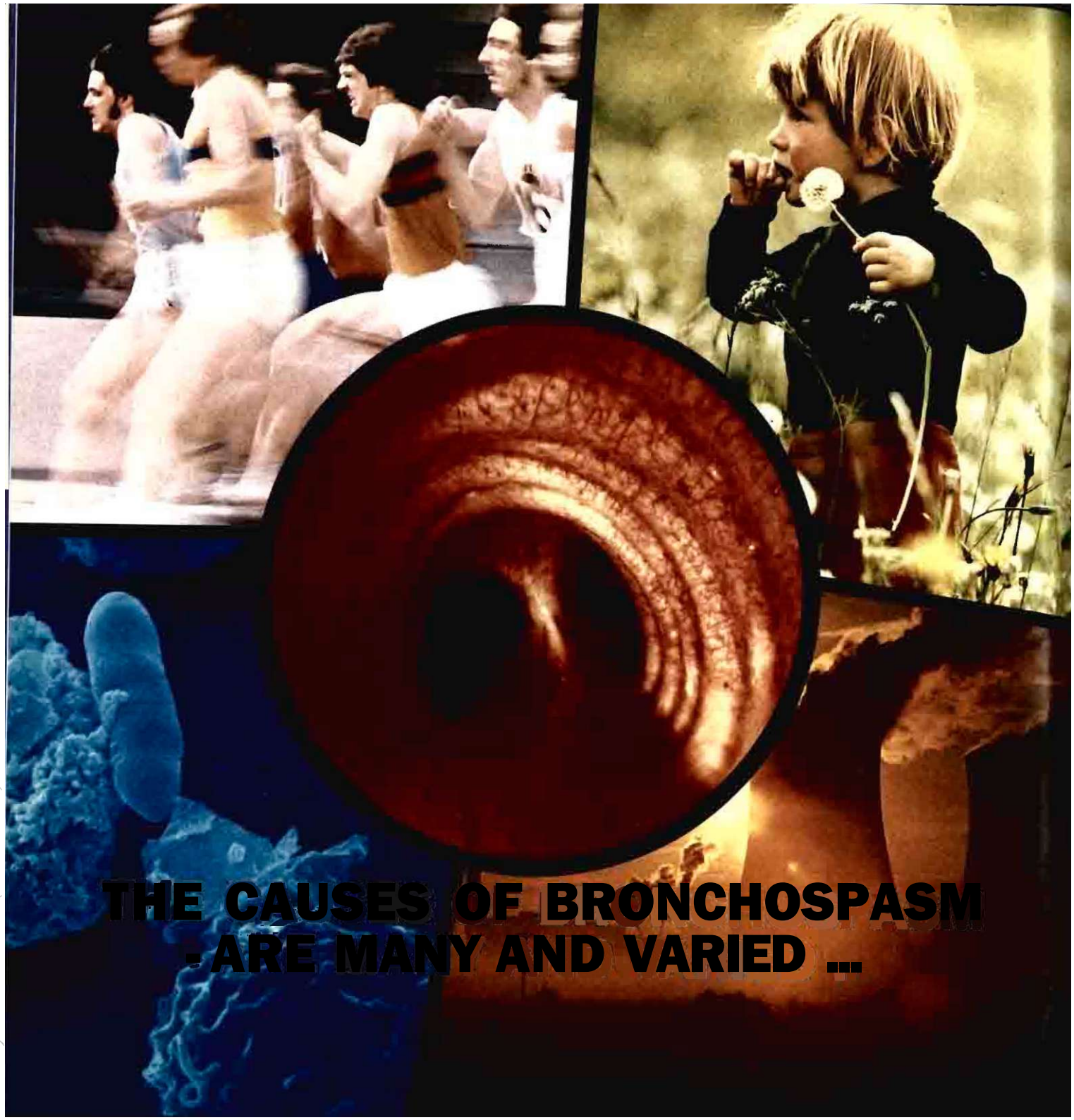
Treatment of the acute tennis elbow is more successful than that of the chronic condition. Activities that cause pain should be avoided and the arm rested *Complete immobilisation should be avoided* as this leads to muscle atrophy. Stretching exercises are very important in the acute and chronic condition, as well as in the prevention

Ice is applied for half an hour after athletic activities and up to several hours a day depending on the severity of the pain and local symptoms. Non-steroidal anti-inflammatory agents are helpful in reducing local symptoms; however, they do not promote the healing process. Cortisone injections should be reserved for refractory cases and should be used judiciously. Multiple injections can lead to tendon atrophy and rupture. The tendon should not be injected directly, rather, the triangular recess below the origin of the extensor carpi radialis brevis should be infiltrated with local anaesthetic and hydrocortisone.

Healing iscomplete when there is no residual pain with full return of motion, strength and endurance.



Foto—Rapport



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Recreational athletes should then be placed on a regimen of isometric and isotonic exercises of the muscle groups of the entire arm.

Prevention of tennis elbow before it occurs or after it has healed, requires avoiding the overload forces that cause the condition, primarily due to improper tennis stroke. The improper executed stroke is characterised by the "leading elbow". The powerful racket acceleration supplied through sudden extension of the elbow often accompanied by a snapping wrist (The two handed backhand may prevent a lateral epicondylitis).

Improper equipment is also important in producing overload patterns. Rackets should be light, (340.5 gms or 12 ounces) grips not too thick and string tension moderate (121 pounds or 55 kilos). A counterforce brace around the proximal forearm, which is conically shaped to reduce muscular overload forces to the lateral epicondyle, may be effective.

Tennis Shoulder

Athletes involved in sporting activities requiring repetitive overhead use of the arm, develop a painful shoulder. The serve and overhead shots in tennis may be responsible for impingement in the vulnerable, arascular region of the supraspinatus and biceps tendons. The functional arc of elevation of the shoulder is forward, and impingement occurs as the greater humeral tubercle abuts against the anterior edge of the acromion and the coracoacromial ligament. Arterial studies have demonstrated a constant area of avascularity in the supraspinatus tendon and a similar zone in the intracapsular portion of the long head of the biceps tendon. Chronic irritation in this region leads to an inflammatory response manifested as tendinitis. With repeated trauma over time, micro tears, partial-thickness rotator cuff tears, and degenerative osteophyte changes of the anterior margin of the acromion result. The pathology of impingement has been classified into three stages. Stage I — oedema and haemorrhage; Stage II — fibrosis and tendinitis; and Stage III — tendon degeneration, bony changes and tendon ruptures.

Treatment for the young athlete with pain after activity should include icing of the shoulder for at least 10 minutes after each workout. To decrease the inflammatory reaction, ultrasound and anti-inflammatory agents can be helpful. Transcutaneous nerve stimulation may be successful. The use of steroids is controversial. Surgical release of coraco-accomial ligament may be considered in Stage II lesions refractory to conservative treatment. In Stage III lesions, pain present for more than one hour may be an indication for anterior acromioplasty with exploration of the rotator cuff. Certainly in rotator cuff tears, anterior acromioplasty and repair of the cuff will prevent recurrence and improve function.

To prevent the problem, all athletes should perform careful warm-up exercises. Tennis players can be advised to use isokinetic equipment to build up strength, and endurance. If the impingement syndrome becomes a problem the player may modify his or her technique by softening the serve and/or rotating the body so as to avoid impingement.

Tendo-Calcaneus (Achilles) Tendon Rupture

The actual pathogenesis of the tendo calcaneus tendon rupture is open to debate. The tendon usually ruptures 2-6 cms proximal to itscalcaveal insertion with a sudden muscular contraction or direct blow to the tendon. The classic findings of a tendo-calcaneus rupture are a palpable gap in the back of the ankle, calf swelling, ecchynrosisand a positive Thompson test. This test is performed with the patient prone and the feet hanging over the edge of the examing table. The calf muscle is then squeezed in its middle 1/3 below the area of widest girth. The normal reaction is plantar flexion of the foot. When there is no plantar movement the test is positive.

Non surgical treatment of ruptured tendo-calcaneus consists of applying a p.o. p. cast with the foot in extreme equinus for 8 weeks and then the foot in neutral position for a further 2 weeks in p.o. p. After the cast is removed the patient uses a 1" heel elevation for a further 4 weeks. Functional results with non surgical treatment are satisfactory but there is an incidence of recurrence. Surgical treatment is also followed by immobilisation in a cast for 8 weeks, elevated heel for a further 3 months, followed by a course of resistance exercises to strengthen the muscles. Surgical functional results are reportedly superior with improved strength and endurance compared to those treated non surgically. Surgery should be recommended for more active patients.

Prevention consists primarily of appropriate conditioning, strengthening, and stretching exercises.

Adequate treatment for the acute injuries with explicit instructions to the player, and continual follow up, will obviate the development of a chronic condition which is usually more refractory and much more difficult to treat.

Adequate stretching and warm up exercises should be done routinely by any participant at any level at all times.

References

1. Priest JD, Braden V, Gerbeuch SG. *An Analysis of players with and without par.* Phys. Sports Med. 8:81, 1980.
2. Nirsch PP, Sobel J: *Conservative treatment of tennis elbow.* Phys. Sports Med. 9:42, 1981.
3. Rathbon JB, McNail I. *The microvascular pattern of rotator cuff: J* Bone and joint surg. 52B: 540,1970.
4. Fox, Edward L, Sports Physiology 1979.

Prepared by the Medical Committee of the South African Amateur Athletic Union.

Prevention of Heat Injuries During Distance Running

The purpose of this statement is to alert organisers of cross-country, road and long distance running races of the procedures they will be expected to follow in order to reduce the likelihood that heat injury (heat exhaustion or heatstroke) will occur during these races and to lay down specific guidelines for the treatment of runners with heat injury. It should be noted that these guidelines are not foolproof. Despite each race organizer instituting the recommended advice, certain predisposed individuals may, for reasons that are not at present clear, still be at risk of heat injury despite carrying out all the advice included here.

Based on current research findings (1-3), the following recommendations are made:

1. Distance races greater than 10 km should not be conducted when the wet bulb globe temperature exceeds 28 degrees Celsius. (Wet bulb globe temperature = 0,7 wet bulb temperature + 0,2 globe temperature 10,1 dry bulb temperature). Suitable apparatus for measuring the wet bulb globe temperature has only recently become available but has not yet been tested in the field. The Medical Sub-committee of the S.A.A.A.U- is currently testing such equipment. Should this equipment prove effective, provincial running bodies should make it their responsibility to purchase such apparatus and make it available to race organisers. Until such time as such equipment becomes available, races longer than 5 km should not be held if the dry bulb temperature exceeds 27 °C, (Note: The dry bulb temperature is the temperature broadcast each day on radio and television).

2. During periods of the year when daylight dry bulb temperature often exceeds 25 °C, distance races should be conducted before 8 am and after 4.30 pm. This essentially means that all South African Road and Cross-Country Races that are scheduled between September and April should be run either in the early morning or in the late afternoon.

3. It is the responsibility of the race sponsor and organiser to provide drinking/sponging stations at least every 3-4 km intervals for **all** races regardless of distance. It should be noted that the 1981 South African Cross-Country Championships produced the highest incidence of heatstroke ever recorded in a single race, despite the fact that the longest event was only 12 km (3).

4. Runners should be encouraged to drink approximately 150-200 ml of fluid every 10 to 15 minutes during competition and to consume approximately 400-500 ml of cold water shortly before competition. However, even regular and adequate drinking will not necessarily prevent injury, at least in races of up to 10 km. (1). The water should be served cold and facilities should be provided to keep the water ice-cold for the entire duration of the race.

5. Runners should "sponge[1] frequently. Water applied to the skin in this manner acts as "artificial sweat" and aids the body's cooling system. In one study, runners who suffered heat injury in a 10 km race had used sponging facilities much less frequently than those who completed the race safely (1). Again, the water must be kept ice-cold for the duration of the race.

6. The practise of salt tablet supplementation during running is unnecessary and can lead to dehydration

7. The runners most likely to develop heat injury are those who:
(1) are overweight.
(2) are inadequately trained.
(3) are unacclimatized to running in the heat.
(4) overestimate their running ability and who therefore attempt to run too fast during the race.
(5) have suffered heat injury before (1,3) and may have a specific intolerance for exercise in the heat. Such intolerance may be in-born (hereditary) and, for this reason, persons who have suffered heat injury during running should, in their own interests, be examined by a suitably-qualified medical doctor before they resume long-distance running.
(6) are taller than 1,79 metres. Tallness is an important risk factor for heat injury during racing and is independent of other factors such as frequency of sponging, fluid intake, racing too fast, body weight, body build , or the ratio of the body surface area to body weight (1). Thus tall people are at increased risk of heat injury even

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if they drink and sponge regularly, and do not race beyond their capabilities.

It should be noted however that even elite, highly-trained athletes can suffer heat-injury if forced to race under unfavourable environmental conditions (3).

8. Responsible and informed personnel should supervise drinking stations. They should have the right to remove from the race, any runners who exhibit clear signs of heat exhaustion or impending heat stroke.

9. Runners, the public and race officials should be instructed how to recognise the following warning symptoms that may precede heat injury: Mental confusion, irritability, aggressiveness or an impaired level of consciousness, headache, a feeling of being very hot, or a hot dry skin. Athletes should be educated to stop running immediately any of these symptoms develop. Unfortunately the majority of runners who develop heat injury will have either none or only one of the above warning symptoms (1).

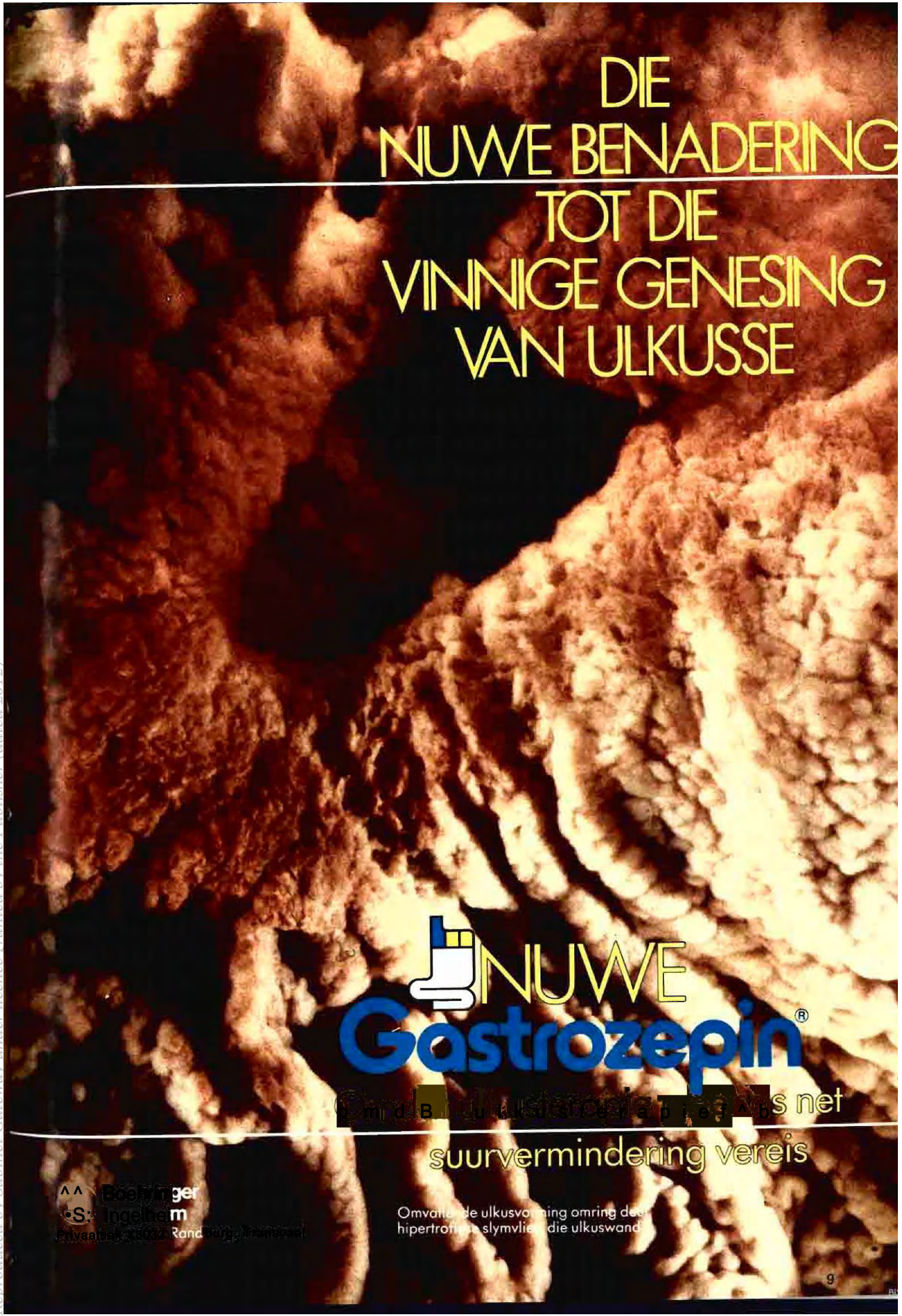
10. Suitably-qualified personnel should be present at all races in which there is a substantial risk that cases of heat injury will occur. Such personnel must have free access to a basic medical kit for the immediate treatment of heat injury. The kit should ideally include the following: 3 rectal thermometers; 10 litres of intravenous fluids (Dextrose/Saline, 1/2 N Saline plus giving sets) per 1 000 runners in a standard marathon race (less for shorter races, twice as much for ultra-marathon races); intravenous glucose injections (5 per 1 000 marathon runners, less for shorter races); sticky plaster and scissors; "Instant Ice" packs (35 large packs per 1 000 marathon runners); 2 large battery-operated fans; assorted needles and syringes. In addition, the doctor-in-charge should have rapid access to intravenous medication (diazepam) for the treatment of heat-related convulsions. We suggest that a copy of these guidelines should be stored with the medical kit for immediate access in the case of heat injury.

11. Any previously-healthy athlete who collapses and who shows a marked alteration in his mental functioning, but who has a measureable pulsebeat, should be diagnosed and treated immediately for heatstroke. The rectal temperature should be measured and if it is 41 °C or more, the diagnosis of heatstroke is confirmed. Immediate priorities are:

(i) COOL THE ATHLETE AS RAPIDLY AS POSSIBLE, and

(ii) CALL FOR MEDICAL ASSISTANCE.

Remove the athlete's excess clothing and place him/her



in a shady, preferably draughty area. Place icepacks around the neck, under the armpits and in the groin. Fan the athlete either with an electric fan or with a towel. If a fan is not available spray with a garden hose or place the athlete in a cold shower. U nder medical supervision, fluids should be given. If the athlete is convulsing he should be given the appropriate drugs by a doctor. Monitor the rectal temperature until it falls to 38 °C, at which temperature, active cooling can be stopped but careful observation of the rectal temperature must continue. The doctor should then decide whether the athlete can be allowed to go home under supervision or be sent to hospital for observation. Athletes who are sent home should be told that unless they pass urine within 6-12 hours after the race, they should seek medical attention

Suitable vehicle(s) should be on standby to transport seriously-ill athletes to the nearest hospital.

12. All races should end in open well-exposed areas so that athletes who collapse near the finish of the race can be easily spotted.

It is strongly recommended that road race organisers adhere strictly to these medical guidelines. Failure to do so may jeopardize the lives and future health of competitors.

References

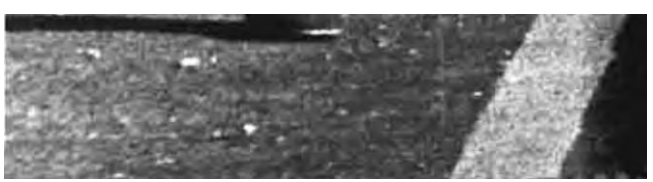
1 England AC, Fraser DW. Hightower AW, et al. *Preventing Severe Heat Injury in Runners:* Suggestions from the 1979 Peach Tree Road Race Experience. Annals of Internal Medicine 1982; 97 196-201.

2 American College of Sports Medicine. *Position statement on prevention of heat injuries during distance running* Medicine and Science in Sports 1975; 7: VII-IX.

3 Noakes T.D. *Heatstroke during the 1981 National Cross-Country Running Championships.* South African Medical Journal 1981; 61; 145.

ADDENDUM:

The system for the measurement of Wet Bulb Globe Temperature tnat is currently being evaluated is the "Temp-stress" — Heat Stress Monitor, manufactured by Scitec Isoptics, Sandton City, Transvaal.



Suid-Afrikaanse Sport Mediese \ferenig ng

South African Sports Medicine Association

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update in Sports Medicine

The arrival of Sports Medicine in South Africa only occurred in 1977, with the advent of the first National Conference on Sports Medicine which was held at the University of the Witwatersrand in October of that year. Notable overseas authorities on the treatment of injuries and conditions experienced by sportsmen, were present which added to its significance.

Medical practitioners and academics with an active interest in the medical well-being of sportsmen were identified from this, which eventually resulted in the formation of the South African Sports Medicine Association by a group of interested doctors in January 1983.

In February 1983, the Sports Traumatology Congress was held at the University of Witwatersrand. The diagnosis and treatment of injuries to all body regions were discussed with doctors and physiotherapists including members of the S.A. Sports Medicine Editorial Board participating by delivering papers.

The members of the SA Sports Medicine Association appointed a steering committee to draw up a constitution which was submitted to the Medical Association of South Africa to get the approval and acceptance to affiliate itself to MASA.

The members of the steering committee are Dr I Cohen, Dr N Gordon, Mr C Noble and Dr L Sirkin from Johannesburg, and Brig. E Hugo and Col. D Myburgh from Pretoria.

The first executive committee of the SASMA will be announced in September.

Any medical practitioner with an interest in sports medicine who is either a full or affiliated member of SASMA was eligible for nomination.

A list of the nominated members as well as their curriculum vitae has been sent to SASMA members.

A treasurer and secretary will be elected by the newly formed Executive Committee itself.

The types of membership include:

Full membership for general practitioners who are members of MASA;

Affiliated membership for medical practitioners and persons who have made valuable contributions to the advancement of sports medicine in the opinion of the Executive Committee;

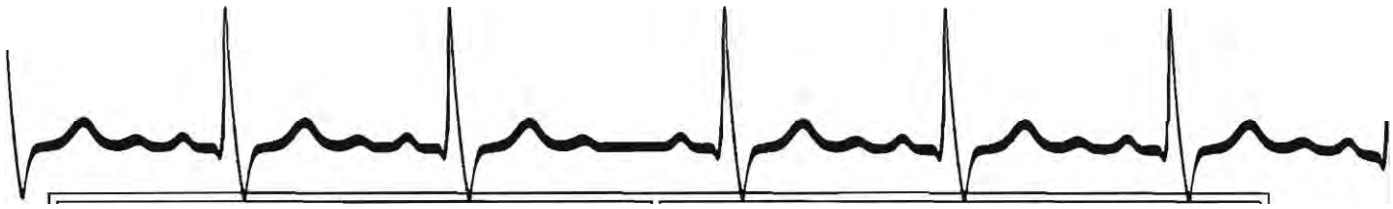
Life membership for retired full members.

The SA Sports Medicine Association already boasts more than 80 Foundation members.

As part of their objective to promote continuing medical education in the field of sports medicine, the newly formed Association will hold regular monthly meetings where lectures on various topics of sports medicine interest will be given.

SASMA New Objectives

The South African Sports Medicine Association (SASMA) has been officially formed and accepted by the Medical Association of South Africa as a subgroup. The aim and objective of the SASMA is to advance the science and art of sports medicine. Research, teaching and education will play a big role, and the association will promote knowledge of the prevention and treatment of sports injuries. Regular meetings and congresses will be held and SA Sports Medicine will inform members of the latest in sports medicine in this country and abroad. The



association will establish and maintain co-operation between the medical and other sciences concerned with sports medicine. Besides the main body, subgroups will be formed in the various areas to organise matters and hold regular meetings locally.
Full membership of the SASMA may be granted to any full member of the MASA, provided he or she is a registered medical practitioner residing in the RSA and has a special interest in sports medicine. The subscription fee is R20. Affiliated members may be elected from other medical practitioners or eminent persons in the field of science who have made a valuable contribution to the advancement of sports medicine, and student members may be elected in their clinical years.
The Steering Committee (in alphabetical order) is as follows: Ivan Cohen, Neil Gordon, Etienne P Hugo, D P (Van) Myburgh, Clive Noble, and Louis L Sirkin. The President and the Executive Committee will be elected in September.
Further information is available from Louis Sirkin, SASMA, 8 Malopo Road, Emmarentia, Johannesburg, 2195.

SASMV Die Doelstellings

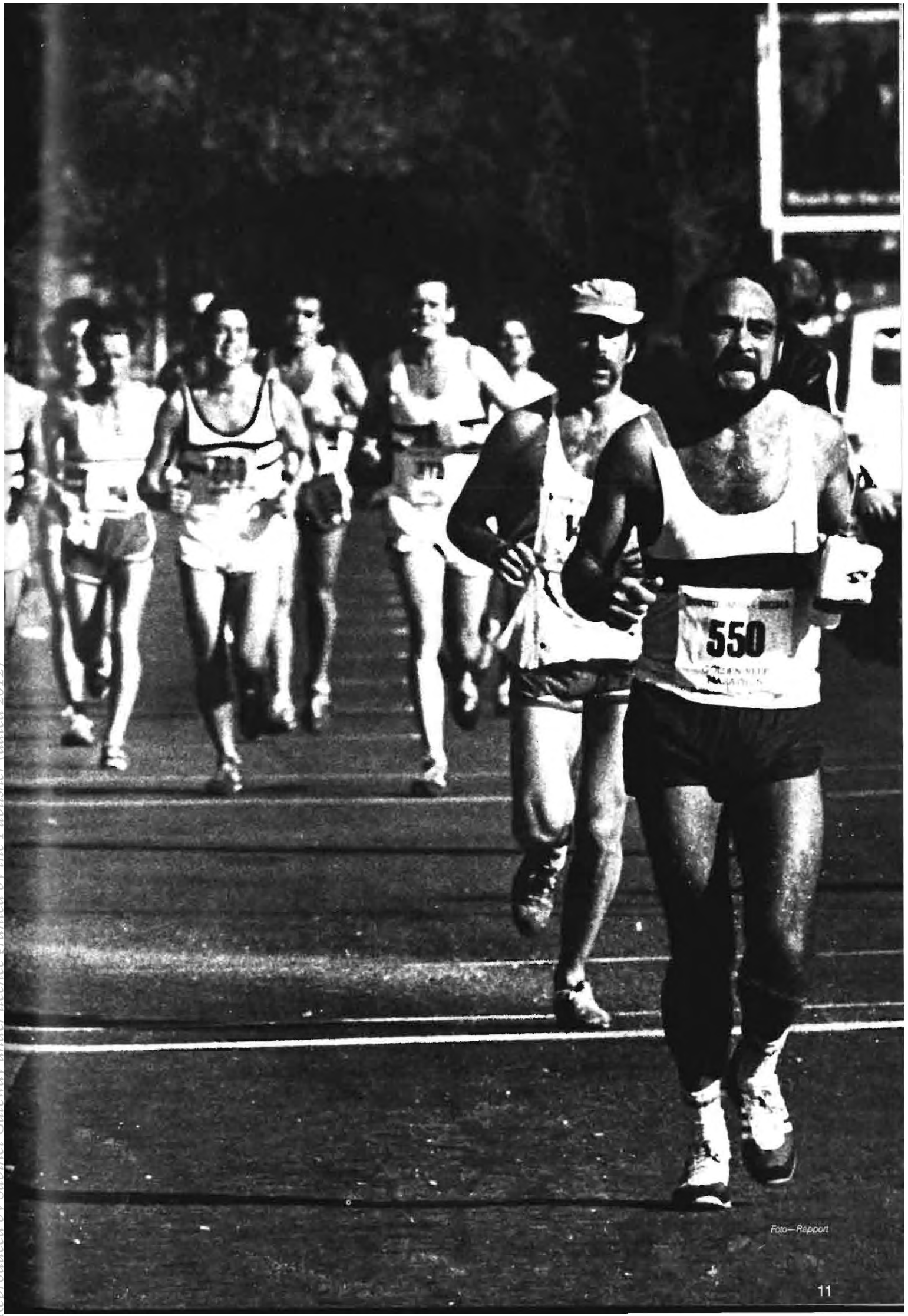
Die Suid-Afrikaanse Sportmediese Vereniging (SASMV) is amptelik gestig en is deur die Mediese Vereniging van Suid-Afrika as n subgroep aanvaar.
Die oogmerke en doelwitte van die vereniging is om die wetenskap en kuns van sportgeneeskunde te bevorder. Navorsing, onderrig en opvoeding sal 'n groot rol speel en die vereniging sal kennis van die voorkoming en behandeling van sportbeserings bevorder. Gereelde vergaderings en kongresse sal gehou word en SA Sportgeneeskunde sal lede gereeld in kennis stel van die jongste verwikkelinge op die gebied van sportgeneeskunde plaaslik en in die buiteland. Die vereniging sal samewerking tussen die mediese en ander wetenskappe wat met sportgeneeskunde behep is, tot stand bring en in stand hou. Benewens die hoofliggaam van die vereniging sal daar in verskillende streke subgroepe gevorm word om sake te organiseer en om gereelde vergaderings in daardie gebiede te hou.
Voile lidmaatskap van die SASMV sal toegeken word aan enige voile lede van die MVSA op voorwaarde dat hy of sy 'n geregistreerde mediese praktisyn is wat in die Republiek van Suid-Afrika woon en 'n spesiale belangstelling in sportgeneeskunde het. Die inskrywingsgeld is R20. Geaffilieerde lede kan verkies word uit ander mediese praktisyns of vooraanstaande persone op die gebied van wetenskap wat 'n waardevolle bydrae tot die bevordering van sportgeneeskunde gemaak het. Studentelede kan verkies word in hulle kliniese jare.
Die stigtingskomitee (in alfabetiese volgorde) is as volg: Ivan Cohen, Neil Gordon, Etienne P Hugo, D P (Van) Myburgh, Clive Noble en Louis L Sirkin. Die voorsitter en uitvoerende komitee sal in September verkies word.
Verdere inligting kan verkry word van dr Louis Sirkin, SASMV, Malopoweg 8, Emmarentia, Johannesburg, 2195.

Sports Medicine Symposium

The elected President and Executive Committee of the SA Sports Medicine Association will be announced during a Sports Medicine Symposium which will be held in Johannesburg and Pretoria in September.
The objectives of the 2 symposium meetings are to assist the newly formed SA Sports Medicine Association in their aim of encouraging greater awareness in this field of sports medicine.

Topics to be discussed at the meetings will be of practical interest to the doctor in general practice. One of the major objectives of the meetings is to encourage audience participation with adequate time for discussion and questions.
A panel of eminent speakers will discuss the following topics: "Tendon Injuries in Sportsmen", "Steroids in Sports Medicine" and "Athletes Heart Syndrome". Dr L Sirkin will preside as Chairman and speakers will include Dr C Noble, Prof R van Rooyen and Dr R Morris.

The first meeting will be held in Johannesburg on the 19th September at the Johannesburg Country Club. The Pretoria meeting will be held on the 21st September at the Boulevard Hotel. The meetings will be sponsored by R *& C* Pharmaceuticals.
Persons interested in attending these meetings can contact Ms J Timson at telephone 783-4488/9.



Foto—Rapport

Physiological Categories of Overtraining

M.C.Siff.
B.Sc. Hons., M.Sc. (Wits).
Department of Orthopaedic Surgery, University of the Witwatersrand.

The common belief of "the more training the better" was bred in ancient Sparta and fostered by generations of military instructors. This unfortunate principle continues to be imposed on numerous sportsmen and soldiers, since its proponents maintain dogmatically that the optimum training load is the maximum training load a person can endure.

Many of the more enlightened coaches and instructors have criticised this archaic system and have modified it to be somewhat more sensible. They consider that " the more training the better" system is still a sound one, provided that a person commences training at low intensity and continually increases intensity and duration within his limits of endurance and the time available. Their new package includesa few stretching exercises, as they believe that the main cause of training injuries is lack of suppleness. They, together with several medical experts, assert that there is no such condition as overtraining and that the term 'overtraining injury' more precisely should be applied to damage caused by lack of suppleness, poor footwear, faulty technique, heat fatigue and so on.

The fact remains that the equivalent of overtraining and overtraining injuries is well known in physics and engineering. The frequent application of moderate stress or the occasional application of intense stress to a machine or structure can cause metal fatigue, structural failure or general breakdown of some or many of the components of a system. This is the reason that all cars and other machines require regular maintenance. The human body, however, performs a great deal, but not all, of its own maintenance and repair Small injuries are accompanied by the usual internal bleeding and the formation of scarred tissue, which eventually restores most or all of the original functioning of the damaged part. Larger injuries often require surgical intervention, but whatever the extent of the injury, it is clear that structural weakening or failure of an engineering system has its parallel in the human body, whether it be called 'overtraining injury', 'overuse injury' or something else.

Both exhaustion and overtraining are the consequence of im balance between stress and adaptability of the organism. Any imbalance causes the body's protective (or homeostatic) mechanisms to decrease stress or enforce short or long-term rest to prevent further damage. Exhaustion is the result of short-term imbalance, whereas overtraining is the result of imbalance accumulated over a prolonged period.

The insidious road to overtraining is signposted, not always very clearly, by residual fatigue or soreness, nagging injuries, loss of motivation, staleness or lack of progress in performance. It is vital that all such symptoms be recognized by the sportsman and his coach, for the popular practice of forcing oneself through these negative phases can lead to acute or chronic injury.

Overtraining is a specific type of physical and psychological stress and an appreciation of the mechanisms underlying human stress is essential to understand overtraining. Some of the early pioneering work on stress was done by Hans Selye, who defined stress to be ". . . essentially the wear and tear in the body caused by life at any one time" He maintained that stress draws on the adaptation energy or vitality of the body, this energy being stored in two forms: ". . . the superficial kind, which is ready to use; and the deeper kind, which acts as a sort of frozen reserve. When superficial adaptation energy is exhausted through exertion, it can slowly be restored from a deeper store du ring rest. This gives certain plasticity to our resistance. It also protects us from wasting adaptation energy too lavishly in certain foolish moments, because acute fatigue automatically stops us" (1).

At a muscular level, Selye's theory is substantiated by the finding that different types of muscle fibre are recruited by different types of exercise. Sustained exercise such as distance running utilizes slow-twitch (ST) muscle-fibres, whereas brief, intense exercise such as weightlifting or sprinting recruits fast-twitch (FT) fibres. In general prolonged exercise depletes ST fibres of their glycogen and when this supply is exhausted, the FT fibres are recruited until their glycogen is depleted. At this point of exhaustion, no glycogen remains in either fibre type, and the path to overtraining may well be laid at this point.

There are two types of overtraining — general and local. General overtraining affects the whole body and results in stagnation or decrease in physical perfor-

Photo—Citizen

mance, whereas local overtraining affects a specific part of the body.

Adaptation to physical, psychological or environmental stress depends on the inextricable links between the central nervous system (the fast control system of the body) and the endocrine system (the slow control system of the body) (Fig 1).

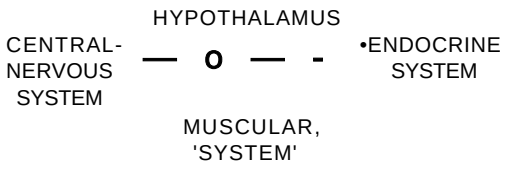


Figure 1 Some of the control systems involved with bodily movement.

Any change in the central nervous system and the endocrine system can affect performance in the muscular system (3).

The endocrine system, in particular, controls an intricate group of glands whose hormones are vital to all aspects of human life.

For instance, the adrenal glands selectively prepare the skeletal muscles for physical activity in the face of stress. The hormone thyroxine, secreted by the thyroid gland, not only increases the rate at which cells burn their fuel (glucose), but is also involved in various anti-stress responses, including demands for extra energy. Human growth hormone (HGH), secreted by the pituitary gland in the brain, plays an essential role in general growth and in the elevation of blood-glucose. Insulin, secreted by the pancreas, is concerned with the metabolism of glucose, and the sex hormones, such as testosterone, influence sexual behaviour and muscular growth in the male (5).

This central role played by certain hormones in the occurrence and management of stress reveals that it is logical to associate general overtraining, a stress-related phenomenon, with some disturbance in the endocrine system.

On this basis, researchers have identified at least two types of overtraining (4):

A —_ overtraining (Addisonic overtraining), named after Addison's disease, which is associated with diminished activity of the adrenal glands. This category of overtraining affects predominantly the parasympathetic pathways of the autonomic nervous system and is difficult to detect early due to the absence of any dramatic symptoms. Suspicion that something is amiss may be aroused by the occurrence of stagnation or worsening of the sportsman's performance.

B_ — overtraining (Basedowic overtraining), named after Basedow's disease, which is associated with thyroid hyperactivity. This particular category of overtraining affects predominantly the sympathetic pathways of the autonomic nervous system and, as the classical type of overtraining with its abundance of symptoms, is easy to diagnose.

The two types of overtraining are compared in Table 1.

Table 1 Symptomatic comparison of A- and B-types of general overtraining.

Variables	A-cvertraming	8'Overlraining
l blooa pressure	diastolic pressure increase slighi increase looker 100mm Hg. during & aller physcal slress	
2 coordination	impaired	impaireo. witn increased reaction lime
3 bcdy mass	normal	decreased
4. endurance	slight increase in tiredness	tendency to tire easily
5. sleep requirements	no increase	increase
6. resting pulse	low	elevated
7 body temperature	normal	slightly increased
8 appetite	normal	reduced
9 metabolism	normal	altered, with increased tendency to sweat: abnormally increased respiration rate under stress
10. general muscle soreness	linle or none	mild to pronounced. with tendency to muscular stiffness or pain
11. general resistance	normal	tendency to headaches. colds fever bi sters; prolonged recuperation
12,. recovery time	normal or slightly increased	increased
13 psychological changes	none, other than slight loss in motivation	nervousness, poor motivation, inner unease eventual depression

?A

The sportsman can go a long way towards avoiding overtraining and minimizing the incidence of overtraining injuries if he:

1 plans his training carefully and records the exact intensity, duration and frequency of his training load. In the case of weightlifting, he should register the exercise, load used, number of sets and repetitions. There should be an alternation of light, medium and heavy days and an avoidance of too frequent maximum attempts or too many repetitions. He should not tram with heavy weights just to impress spectators in the gym. In addition he should have adequate recuperation periods between lifts and between workouts

2. uses Table 1 above to keep a check on the possible occurrence of any of the warning signs of general overtraining and modifies his training schedule accordingly

3. takes note of lingering muscle or other soft tissue soreness or stiffness. Persistent disregard for these symptoms and inadequate periods of rest for individual muscle groups may lead to injury

4. provides sufficient variety and interest in his training schedule

5. maintains a flexible mental attitude. Stubborn dedication to a strict training routine or unwillingness to heed advice readily predisposes one to overtrain. No training schedule can be designed to anticipate the many variables one will encounter

6. ensures that imperfect technique is not placing undue stress on any particular part of the body

7. has adequate rest and sleep, and an occasional change of environment

8. maintains a good, varied diet and avoids drugs including steroids, tobacco, tranquilizers and alcohol. Stressful situations may necessitate an increased intake of vitamin B complex and vitamin C

9. avoids over-reaction to stressful situations in daily life and in training. Relaxation, massage and meditation techniques can be useful in minimizing the harmful effects of stress

10. maintains an harmonious relationship between himself and his coach and training partners

11 has regular sports-medical supervision

12. takes an occasional complete break from his competitive sport.

It is appropriate to conclude with another Selye quotation "The goal is certainly not to avoid stress — stress is part of life. It is a natural byproduct of all our activities. . Butinordertoexpressyourselffully.youmust first find your optimum stress level and then use your adaptation energy at a rate and in a direction adjusted to the innate structure of your mind and body It is not easy. It takes much practice and almost constant self-analysis" (1)

References

1. Selye. H *The Stress of Lite* 1956
2 . Selye. H *Stress without Disease* 1975
3. Siff, M C Psychological Aspects ol Weightlifting *Scientific Bulletin* June 1981
4 Kristensen, J E The problematic effects of over-training *International Olympic Lifter.* Vol. 4, No. 2, 1977: 8-9
5. Lewin, R *Hormones: Chemical Communicators* 1972

Book Review

by I D. NoakesM.B. Ch. B„ M.D.

The Injured Athlete

EditedbyDNKululand.J.P.LippincottCo., Philadelphia, 1982.

This book is divided roughly into two halves, the first of which deals with certain physiological and medical aspects of sport including pre-participation evaluation, nutrition, drugs, fitness evaluation including cardiovascular testing, training techniques for both dyanamic and static (weight-lifting) exercise, warming-up, the role of the athletic trainer particularly in rehabilitation, and the psychological care of the injured athlete. The second half of the book deals with the common sporting injuries to the six major anatomical regions — the head, face and neck; the shoulder; the elbow, wrist and hand; the torso, hip and thigh; the knee; and the leg, ankle and foot. In addition, there are some useful appendices including, in particular, all the current position statements of the American College of Sports Medicine.

The strength of the book lies in its presentation of the sporting injuries, and it is this section that sets it aside from other books in this field. Each anatomical area is covered in excellent detail and is complimented with exceptionally good and appropriate line drawings and photographs. The information is, for the most part, extremely current and is a pleasure to read.

By contrast, the first part of the book is not of the same standard largely due to an inappropriate choice of material and poor compilation. This section would have been better if attention was focused solely on injury prevention and rehabilitation with removal of all material not directly relevant to that topic. One has the impression that the editor was casting around for some chaptertofill up his book, and in so doing lost sight of the real direction of the book.

This criticism aside, the book is nevertheless highly recommended as a basic text for, in particular, physiotherapists, physical educationists, sports scientists, medical students and medical practitioners interested or involved in the care and prevention of athletic injury. Whilst orthopaedic surgeons may find much of interest in the book, the text is not principally designed for specialists in that field.

Sports Medicine,Sports Science. Bridging the Gap.

Edited by R. C. Gantu MD and W. J. Gillespie Ed. D. Published by the Collamore Press, Lexington Massachussets, 1982.

The title of this book is somewhat misleading as the book is really a collection of 19 papers presented at the Annual Meeting of the New England chapter of the American College of Sports Medicine in 1981. The book is certainly not a definitive bridge between sport science and medicine. Rather it provides some interesting, albeit incomplete, scaffolding.

The book is divided into 7 sections which deal successively with Psychology and Sports (3 articles), Biomechanics (2 articles), Female athletes (3 articles), Alpine skiing (1 article), Sports Nutrition (1 article), Dance (3 articles) and Cardiac Rehabilitation (6 articles). Articles that may be of interest to South African readers of sports medicine include reviews of psychological changes with running (Sachs and Vaughan), a review of psychological factors predicting adherence in exercise programs (Sonstroem), the biomechanical results of differences in body size and their effects on running shoe design (Fredericks), another review of menstrual dysfunction in athletes (Bullen), one of the most practical articles on sports nutrition that I have read (Clark), articles on common foot and ankle ballet injuries (Robinson) and their prevention (Micheli) and rehabilitation (Walaszek). The six articles on cardiac rehabilitation do not add materially to a wealth of information available elsewhere on this topic.

In summary, although the book is not without merit, it is difficult to understand the rationale behind its publication as it is rather too diverse, brief and incomplete to be really satisfying for the general reader.

World Round-up

Benefits of Aerobic Exercise

Preliminary results of a two year American study show that 20 minutes of aerobic exercise at least three times a week helps offset the negative effects of oral contraceptives by raising high-density lipoprotein cholesterol levels.

The study was conducted at the Stanford University Medical Centre in California.

For two years data has been collected on 100 women between the ages of 21 and 35 to determine if exercise mediates the physiological effects of oral contraceptives.

Both groups were also categorised according to whether the subjects were sedentary or whether they engaged in at least three hours of aerobic exercise per week. Smokers were excluded as test subjects.

"Previous studies have shown that oral contraceptives increase serum triglyceride and decrease HDL levels, and we know that high levels of HDL are associated with a reduced risk of coronary heart disease", said Mr Dan Merians, a research assistant in the programme. "We also know that male subjects show reduced triglyceride and increased HDL levels when they exercise. In our study we have found there is a similar response in women who exercise. But we want to know whether exercise produces different effects in women who take oral contraceptives and in those who do not".

Merians said that while exercise appeared to increase HDL and decrease triglyceride levels in women, it failed to offset completely the effects of oral contraceptives.

"It seems that oral contraceptives have a more profound effect on HDL levels", he added.

Data from the study is to be further analysed.

Abuse of Drugs in Sports

It is shocking to many that athletes will use medicinal drugs with the objective of improving performances says Dr Allen J Ryan, Editor-in-Chief of 'The Physician and Sportsmedicine" (April 1982; Vol. 10; No. 4:50).

In an editorial he writes that in an (American) society that uses an incalculable number and variety of drugs for recreational and medicinal purposes, it should not be surprising that athletes do the same.

Dr Ryan points out that certain observers seem to be disturbed when some athletes use mind-altering drugs for social and recreational purposes, even when it is done to excess.

"Most athletes who take drugs to improve performance are probably intelligent enough to know that the drugs will not help them directly. They know that there is no drug that can convert a poor or mediocre athlete into a good one. They are looking for an 'edge', and this may be achieved in several indirect ways", he states.

"If an athlete is known to be taking a drug considered by others to be potent, it may give him a psychological advantage. If its use can alter his mental attitude towards his competition, either by reinforcing his belief in himself or by affecting his brain, it may be advantageous or disadvantageous; he hopes the former."

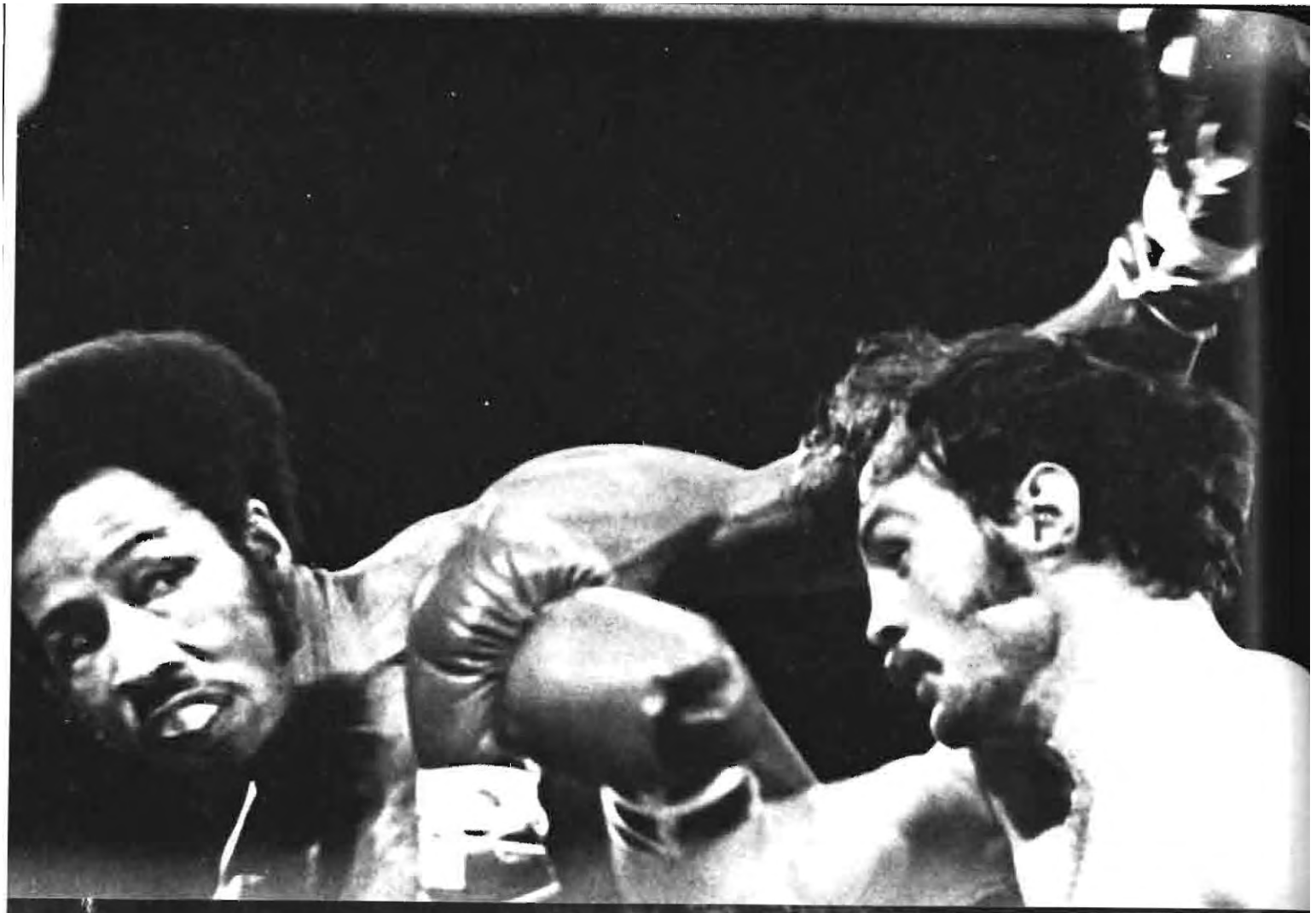
The author says that education of athletes to prevent them from starting drug abuse or to reclaim them from it has probably been successful to some degree.

"It is impossible to measure the effects exactly, but without drug education the situation would probably be much worse. Lists of banned drugs, rules against their use, and disqualifications appear to have been less successful. They tend to stimulate athletes to find ways to ignore or evade the restrictions.

"Effective drug testing is difficult, expensive, and a burden to everybody, yet athletes who have been caught and disqualified for periods up to a lifetime have often been reinstated several years later.

Dr Ryan concludes: "The overuse and abuse of drugs in society in general, as well as in sports, appears to run in long cycles. As it becomes worse, the advantages to the athlete who is drug free become more apparent, and the trend changes direction.

"Education must continue and should be increased. An increase in prohibitions, testing, and disqualifications will tend more to perpetuate the present trend than to reverse it. Although it may be stubbornly resisted or concealed for a time, the truth that drugs don't help athletes and can hurt them will out in the end."



Foto—Rapport

Boks: al hoe meer kommer

Kritiek van mediese kant teen boks omdat die sport na bewering 'n gevaar vir die gesondheid en selfs vir die lewe van die bokser inhou, het die afgelope jaar skerp toegeneem.

Die mediese verenigings van Amerika en Australie het onlangs amptelike verklarings in hierdie verband gedoen wat in Oktober vanjaar saam met ander getuienis in Venesie voor die Mediese Vereniging van die Wereld sal dien.

Hoewel party geneeshere ten gunste daarvan is dat beroepsboks heeltemal verbied moet word, (soos die Sweedse geneeshere) vra die meeste geneeshere net strenger beheer van die sport om akute en chroniese beserings te verminder.

Mediese liggame soos die Amerikaanse Mediese Vereniging besef dat die kanse maar skraal is dat boks as sport verbied sal word aangesien daar wel bewyse bestaan dat boks — wat noodlottige ongelukke betref — geensins gevaarliker is as baie ander sportsoorte wat deur die publiek aanvaar word nie.

Die vraag is dan waarom maak medici so 'n groot bohaai oor die gevaar wat boks inhou? Die rede is dat al hoe meer bewyse aan die lig kom van chroniese breinskade by boksers wat baie veg.

Die bewyse is verkry met behulp van moderne sensitiewe tegnieke vir die opsporing van breinskade, se dr L Anset in die Mediese Rubriek van Die Burger (25 April 1983). Tegnieke soos gerekenariseerde tomografie wat gedetailleerde beelde van breindele kan gee sonder dat pasiente ontrief word.

Gerekenariseerde tomografie kan abnormaliteite opspoor wat in 'n gewone neurologiese ondersoek nie ontdek sal word nie en wat selfs nie deur elektroensefalografie (EEG) in die breingolwe gevind sal word nie.

"Twee ondersoeke wat onderskeidelik verlede jaar en vanjaar uitgevoer is, het verontrustende bevindinge aan die lig gebring. Ten eerste die van die Finse dokter Kaste en sy kollegas wat veertien nasionale bokskampioene van Finland bestudeer het en wie se mediese geskiedenis geen ander rede vir breinbeserings bevat het afgesien van hul boksloopbaan nie," skryf dr Anset.

Gerekenariseerde tomografiese bewyse is deur Kaste gevind van breinbeserings by vier uit ses beroepsboksers en een uit agt amateurboksers. "Daarby het twee van die beroepboksers en agt amateurs EEG-abnormaliteite getoon wat op breinbeserings kon dui".

Hierdie ondersoek en ander wat onlangs gedoen is, dui daarop dat boks deesdae maar nog net so gevaarlik is soos in die "ou dae". Geoordeel na 'n paar onlangse gevegte in Amerika, soos die slagting tussen Larry Holmes en Randall Cobb, lyk dit of daar nie genoegsame beheer uitgeoefen word nie.

In 'n onlangse hoofartikel in die Journal of the American Medical Association se dr Lundberg die prys wat betaal word vir rykdom en roem in die bokswereld kan in die geval van suksesvolle boksers maar ook in die van amateurboksers chroniese breinskade wees.

Die Amerikaanse Mediese Vereniging doen sekere aanbevelings om die nadelige gevolge van boks te verlig. In die artikel word die voorstel gedoen dat die name van alle beroepsboksers op 'n nasionale gerekenariseerde register geplaas moet word, dat regulasies betreffende fisieke ondersoeke van boksers strenger gemaak moet word en dat die krytdokter ook die gesag moet he om 'n geveg te beeindig.

New Sports Centre at Wits

It is generally acknowledged that the key to success in sport is physical fitness. Physical and psychological preparation for sporting activities has become more scientific in line with the advances in knowledge of body systems and functions under stress conditions. This knowledge applies likewise to a better understanding of the factors contributing to coronary artery disease and its treatment.

Sport plays a large role in the social and economic life of the South African community, so does an abnormally high incidence of coronary artery disease.

There is therefore a great need for research in the areas of sports medicine and exercise physiology. To be able to co-ordinate the knowledge and expertise presently available in the disciplines relating to these areas, a Centre for Sport and Exercise Physiology is being established at the University of the Witwatrsrand Medical School.

The Centre will contain all the equipment necessary to carry out a full repertoire of cardiovascular, respiratory and metabolic measurements on exercising humans.