SUMMARY

Injuries to the arm and shoulder in badminton are largely due to faulty technique while leg and back injuries are caused mainly by lack of strength or mobility. Increased liaison between coaches and physiotherapists in particular, will help improve performance and prevent injuries.

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SOME RISK FACTORS IN SELECTED TRACK AND FIELD EVENTS*

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Track and field athletics embraces a variety of running, jumping and throwing events. From this heterogeneous group four events have been extracted for discussion — hurdling, sprinting, broad-jumps (long and triple), and distance running. My intention is to pinpoint some risk-factors current in training and competition and describe preventive aspects of typical training regimes.

RISK FACTORS

Hurdling

- i) Bruising of the shin of the leading leg in clearance if take-off is too near the barrier.
- ii) Ankle sprain from imbalanced landing with the foot in an inverted position and inwardly rotated. Damage is usually to the lateral collateral ligament (O'Donoghue, 1962), though less frequently avulsion of the tip of the lateral malleolus is found (Miller, 1971).
- iii) Grazing of the medial aspect of the knee of the trailing leg. Some coaches employ protective pads on the hurdler's knee and ankle, though this may encourage imperfect techniques.
- iv) Tear of the adductor magnus or gracilis muscles caused by imbalanced clearance and over-stretching, resulting in landing on the leg with the thigh in forced abduction.
- v) Tear of the medial belly of the gastrocnemius muscle resulting from sudden dorsiflexion with the knee extended. This can occur when the trailing leg hits the hurdle, the leading leg is short and the foot is abruptly jammed into dorsiflexion.
- vi) Spiking wounds — mostly self-inflicted in adjusting to errors in stride pattern.

*This material was presented as a lecture/demonstration in an indoor gymnasium.

- vii) The fatigue of anaerobiosis may be a causal factor, particularly in the low hurdles race, contributing to a variety of injuries associated with errors of co-ordination.
- viii) Strain in collateral ligaments of the knee from repetitive bend-running in training for the low hurdles race.

Sprinting

- i) Joint injuries to knee, ankle and small joints of the foot.
- ii) Hamstring, thigh adductor and quadriceps muscle tears, precipitated by violent exertion mostly at the start and finish of the race. At the start the sprinter may be generating up to 6 h.p. in his desperation to accelerate (Wilkie, 1960). Impaired co-ordination near the finish produces agonist/antagonist mismatch and consequent soft-tissue injury.
- iii) Rupture of the achilles tendon resulting from the violent exertion in the initial stage of the sprint.

The Broad-jumps

- i) Hamstring muscle tears resulting from missed strides during the run-up.
- ii) Contusions involving the soft-tissue between the calcaneus and the skin from repetitive jumping. This is ameliorated with use of all-weather run-up surfaces.
- iii) Groin and lower back injuries — from imperfect landings in the sand. Lower back injuries are especially common in triple jumpers from inefficient absorption of the shock of landing at each phase.
- iv) Ankle and knee sprains on landing in the long-jump or at any phase of the triple-jump.
- v) Meniscus damage at the final phase of the triple-jump from landing heavily if the affected leg undergoes rotational torsion with the knee flexed.

Distance Running

- i) Blisters and heel contusions associated with inappropriate foot wear and high weekly training mileage.
- ii) Shin-splints or pain in the anterior tibial compartment.
- iii) Stress fracture of the lower third of the tibia is not an uncommon overuse trauma. This injury may not be apparent on initial X-ray.
- iv) Acute or chronic bursitis suggested by painful knees.
- v) Chondromalacia patellae resulting from running on a severe camber.
- vi) Plantar fasciitis found in athletes running over seventy miles a week and from over-training in spiked shoes.
- vii) Achilles tendonitis — often from abrupt introduction of fast intermittent running, particularly during the transition from cross-country or road-racing to track running. Prevention may involve running some of the 'quality' sessions in light road-racing shoes on grass, or using heel pads to attenuate the strain on the tendon.
- viii) Spiking wounds — predominant in middle rather than long-distance races. The injury is usually to the heel and can be severe.

PREVENTIVE ASPECTS

The Warm up — represents an elementary preventive measure before training and competition. It comprises:—

- i) an easy limbering-up jog practised by all athletes irrespective of event;

- ii) mobilising exercises involving the major joint-complexes of the body;
- iii) a gentle introduction to the motor-pattern of the competitive event e.g. the hurdler may clear phantom barriers or the sprinter accelerate gently from rolling starts.

In general about twenty-five minutes is occupied by warm-up prior to competition or the core of the training session (Williams, 1962). Its primary justification is in ensuring physiological and psychological preparation for the intensive work to follow. Dr. Vries (1959) found a higher incidence of muscle soreness in runners when the 100 yards sprint was not preceded by warm-up. The muscles most frequently injured during strenuous activity without preliminary warm-up are the antagonists to the strong contracting muscles (Dintiman, 1974).

Mobility Work — implicating specific joints that operate in competition at or close to the limit of their range of movement in a particular plane. These are additional to the general mobilising exercises in the warm-up. The sprinter will be particularly concerned with ankle and hip extension while the hurdler's routines will simulate his postural orientation at various stages of hurdle clearance. Restricted mobility tends to impair functional efficiency of a joint while improved mobility provides greater protection for the joint.

Strength Training — implicates improvement of the athlete's capacities to improve his tolerance of the stress to which he is subjected. The principle of overload can be exploited in a variety of procedures:

- i) Hopping drills, using one or both legs together. Where one leg only is used, the drill should be repeated on the alternate leg. Though a contra-lateral effect is found in exercising one limb, this effect is not great and the ensuing imbalance in strength predisposes to injury (Clarke, 1973). In bunny-hops with both legs used together the hips should not sink below a level where the femur is parallel to the horizontal to avoid strain on the patellar bursae.
- ii) Bounding (plyometric) routines — exaggerate the normal motion in a particular respect. Improved efficiency of elastic properties of the leg muscles is expected.
- iii) Jumping decathlons — variations of the conventional triple-jump but with additional phases employed.
- iv) Depth-jumping — a further variation of the triple-jump with intermediate phases terminating at elevation on a bench or box-top followed by a phase terminating at floor or ground level. This should improve the skill of absorbing the shock of landing and proceeding explosively to the next phase.
- v) Resistance running using a weighted jacket or a harness held with reins by a partner who provides the resistance. Other methods involve running up-hill, on snow, on sand, on ploughed land or ankle deep in water.
- vi) Weight-training — along with the ubiquitous bench-press, the squat thrust is the most practised exercise. Frequent full squats are contra-indicated because of the risk of knee-joint degeneration (Adams, 1973). Calf-raising with a bar bell on the shoulders may cause periostitis of the metatarsals if excessive weights are used. With weights similarly positioned, bench-stepping may be performed. Where the bench is too high tear of the rectus femoris may result. Heavy weight-training may precipitate haemorrhoids due to the high intra-abdominal pressures associated with lifting. Imperfect lifting techniques cause back injuries. Safety must be the primary criterion in weight-training regimes. The common occurrence of back injuries in throwers undergoing weight-training underlines the need for correct lifting procedures. Risk factors in the throwing events is however, a matter meriting separate discussion.

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THE PSYCHOLOGY OF THE INJURY-PRONE ATHLETE

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Competing in sport or the expectation of competing, by the inner conflict it creates, can induce high levels of stress in athletes. This is particularly likely amongst those who are highly driven and psychologically vulnerable. The stress-prone athlete is identified by his emotional vulnerability, easy loss of composure, negative thinking, underlain by various kinds of fears or phobias.

There is in fact evidence of a link between trait anxiety and the incidence of injury. Reilly (1975) in relating personality variables to incidence of injuries in professional soccer, found a positive relationship between apprehensiveness and the number of joint injuries per season. This was tentatively interpreted as evidence of the desirability of commitment in tackles rather than the half-heartedness one might expect from an anxiety-prone athlete.

Various kinds of injury-prone athletes can be identified, with conflict and anxiety being prominent causal factors in almost every case.

Injury Resulting from Counter-Phobia

Typical of this type is the individual who finds the aggression-loaded atmosphere of competitive sport anxiety-inducing and he attempts to counteract the anxiety by meeting it head-on, by being overtly aggressive and fearless. Many individuals in high risk sports such as downhill skiing, boxing and motor racing, are of this type.

Injury as a Sign of Masculinity

An injury-prone type who may have counter-phobic tendencies is the athlete who uses injuries as a testimony to his courage and masculinity. He lacks real confidence, needing the visible signs of battle to confirm his manhood.

Expression of masculinity is one of the motivating forces which produce the injury-prone hero. He takes a martyr's role by continuing to play despite his injury. His sacrifice is accompanied by obvious signs of distress and pain. This serves the dual function of having people admire his courage and also, giving himself a ready-made excuse in case he performs badly.

Injury Resulting from Masochism

The risk-taker may be what Karl Menninger had termed "chronically suicidal". He is possessed of masochistic tendencies as a result of inward-directed hostility, and he achieves satisfaction in injury. This hostility may result from failure to meet unrealistically high standards or may be atonement for the injury he has caused another.