

Sports Medicine 10 (1): 1-8, 1990
0112-1642/90/0007-0001/\$04.00/0
© ADIS Press Limited
All rights reserved.
SPORT 283a

Running Shoes Their Relationship to Running Injuries

Stephen D. Cook, Mark R. Brinker and Mahlon Poche

Tulane University School of Medicine, Department of Orthopaedic Surgery,
New Orleans, Louisiana, USA

It has been estimated that 25 to 40 million Americans participate in some form of running (Gudas 1980; Stanish 1984) and that between 50 and 70% of them will suffer some type of running-related injury requiring medical treatment (Gudas 1980). Most injuries occur in the lower extremity, with the knee being the most common site of injury (Detmer 1980; Gudas 1980; James et al. 1978; Newell & Bramwell 1984; Nutig 1981; Stanish 1984). Approximately 60% of running injuries result from training errors which include: rapid mileage increase, excessive interval training, excessive 'speed work' on hills, running on poor surfaces, poor flexibility training, ignoring a previous injury, failure to recognise physical limitations secondary to a biomechanical problem, excessive toe running, and old, worn or improper footwear (Johnson 1983). This review will focus on the mechanisms of injury with an emphasis on the effect of footwear.

There are hundreds of models of running shoes available from dozens of manufacturers. A good running shoe must provide cushioning, support, and stability, yet maintain a reasonable degree of flexibility (Drez 1980). A poorly designed or ill-fitting shoe can be an underlying factor in overuse injuries. The understanding that poor shoes may contribute to running-related injuries has led manufacturers to design shoes with added stability and motion control through the use of various com-

ponents. These include last (upper shoe) design, heel counters, lacing systems, fibreglass midsole plates, and the use of combinations of materials of varying density in the midsole of the shoe (Radin et al. 1982). Thus, according to Stanish (1984), an athlete should always bring his/her footwear to a physician at the time of physical assessment to enable the physician to make a diagnosis or prescribe an appropriate orthotic device.

1. Epidemiology

The number of running injuries in a population at a given point in time (prevalence) is directly related to the number of new injuries (incidence) [Powell et al. 1986]. Kaplan et al. (1982) observed that the incidence of annual running injuries per 100 runners increased linearly with increasing distance run per week. This work supports that of Pollock et al. (1977), who earlier concluded that the frequency and duration of training are related to the likelihood of injury.

Training errors contribute to acute and chronic musculoskeletal pain and disability of runners, as well as metabolic abnormalities such as anaemia, amenorrhoea, and hyperthermia. Other causes of running injuries include hazards such as dog bites and collisions with vehicles (Kaplan et al. 1982). These, of course, cannot always be controlled by the runner.