



Workplace Safety and Insurance
Appeals Tribunal

Tribunal d'appel de la sécurité professionnelle
et de l'assurance contre les accidents du travail

Pes Planus [Flat Foot]

Discussion paper prepared for

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Dr. Hunter graduated from the University College Hospital in London, England in 1960. He did post-graduate training in London, Birmingham, Jamaica and Oxford, England from 1960 to 1969. He was granted his fellowship in Surgery in England in 1964, and in Orthopaedic Surgery in Canada in 1970. He joined the faculty at the University of Toronto in 1976 and holds the rank of Emeritus Professor in the Division of Orthopaedics. His clinical and research interests are in Orthopaedic Surgery and he has published widely in that area, including articles regarding the foot and the diabetic foot. He has held a number of positions, and is presently an honorary consultant in Orthopaedic Surgery at Sunnybrook, and Orthopaedic and Arthritis Sciences Centre in Toronto. Dr Hunter was the Medical Counselor in Orthopaedics at the Tribunal from 1999 to 2002.

WSIAT literature search reviewed by Dr. M. Tile in 2010, who is of the opinion that this paper still provides a balanced overview of the medical knowledge in this area.

This medical discussion paper will be useful to those seeking general information about the medical issue involved. It is intended to provide a broad and general overview of a medical topic that is frequently considered in Tribunal appeals.

Each medical discussion paper is written by a recognized expert in the field, who has been recommended by the Tribunal's medical counsellors. Each author is asked to present a balanced view of the current medical knowledge on the topic. Discussion papers are not peer reviewed. They are written to be understood by lay individuals.

Discussion papers do not necessarily represent the views of the Tribunal. A vice-chair or panel may consider and rely on the medical information provided in the discussion paper, but the Tribunal is not bound by an opinion expressed in a discussion paper in any particular case. Every Tribunal decision must be based on the facts of the particular appeal. Tribunal adjudicators recognize that it is always open to the parties to an appeal to rely on or to distinguish a medical discussion paper, and to challenge it with alternative evidence: see *Kamara v. Ontario (Workplace Safety and Insurance Appeals Tribunal)* [2009] O.J. No. 2080 (Ont Div Court).

PES PLANUS OR FLAT FOOT

Most children are born with flat feet, and in the first decade of life, most children develop a normal arch in the foot, when they start to walk. Only if the deformity persists or presents in adolescence or adulthood, as a result of trauma, is it considered abnormal. The term “flat foot” implies that the longitudinal arch of the foot has collapsed, so that on standing, the medial border of the foot almost touches the ground - it is usually bilateral but if unilateral, it usually indicates abnormal bone and joint pathology in the abnormal foot (either congenital or acquired).

The use of shoe modifications and inserts in the development of the longitudinal arch of the foot are not effective, and are unnecessary, because there is a normal spontaneous improvement in the development of the longitudinal arch, in children, during the first decade of life.

Classification of Flat Foot (Children)

1. Congenital i.e. born with deformity. It is universal in the first two years of life and the foot is flexible. It is usually asymptomatic, but if symptomatic and the foot is rigid it may be secondary to tarsal coalition, accessory navicular bone, vertical talus, tight heel cord or cerebral palsy.
2. Peroneal spastic flat foot is associated with pain in children and young adults, is usually associated with a congenital coalition (bone or cartilage) of the bones of the hindfoot, i.e. calcaneo-navicular and talo-calcaneal coalition. If painful and diagnosed early in childhood, excision of the abnormal bony bar may relieve pain and restore mobility. In adults, if pain is associated with degenerative joint changes, surgical fusion of the affected joints may be advised.

Acquired Flat Foot (Adults)

These diseases must be excluded:

1. Trauma - fractures of the talus, os calcis or mid foot resulting in post traumatic osteo-arthritis of the hind foot or mid foot.
2. Rupture or stretching of the tibialis posterior tendon.
3. Rheumatoid arthritis.

4. Diabetes - Charcot neuropathic foot.

5. Neuromuscular disease eg. Polio.

In adults, “the flexible flat foot may be regarded as the normal contour of a strong and stable foot, rather than the result of weakness in foot structure or weakness of the muscles which motivate the foot” (Harris and Beath, 1948 Journal of Bone and Joint Surgery, 30A 116-140). The authors went on to state that a flexible flat foot, in adults, is of little consequence as a cause of disability.

There are no universally accepted clinical or radiographic definitions of the normal range of height of the longitudinal arch. The point at which a low normal arch becomes a flat foot is, therefore, unknown. A myth exists that people with flat feet will have difficulty at work or when involved in recreational activities.

During World War II, thousands of men were rejected from military service, because they had asymptomatic flat feet. Athletes are not impeded by this condition. Perhaps one in one thousand adults with flat feet will have pain from the condition.

Long term studies, in children with flexible flat feet, suggest that the natural history would indicate a good prognosis without treatment, for most patients. Long term studies indicate that flexible flat foot, in children and adults, is a physiological variant and like any other variant may occasionally cause disability.

Harris and Beath found flat foot deformity in approximately 23 percent of 3,619 patients whom they examined. Two thirds of these adult patients showed no disability. Approximately 25 percent of those patients with flat feet had a contracture of the Achilles’ tendon with good mobility of the hind foot complex. A rigid flat foot, characterized by restricted subtalar movement, ie. lack of inversion and eversion was associated with congenital abnormalities of the bone, ie. calcaneo-navicular fusion or talo-calaneal fusion and caused pain and disability in only one out of four patients in this small special group of patients with flat feet.

Flat Foot (Pes Planus) in Adults

There is no known standard by which the longitudinal arch may be considered flat, normal or high. Most statements are made after clinical observation of the patient when standing or walking, and are only rarely supplemented by radiological studies or by the use of machines (pedo-barographic studies) to measure weight distribution or pressure on the sole of the foot. It is important to remember that many people with so called “normal arches” experience pain in the foot on weightbearing, and also that many flat footed individuals remain asymptomatic during their lifetime.

In adults, treatment is not needed unless symptoms of tiredness are present. Adults with flat feet or indeed with normal arches of the foot, may develop a nagging discomfort in the feet after standing or walking a long time. These adults are sometimes helped by an arch support, but advice about standard foot wear, weight reduction, the use of running shoes and work boots (with or without arch supports) is usually just as effective. Arch supports tend to be overprescribed and are very expensive.

Foot exercises will do nothing to correct the deformity, or alleviate symptoms of tiredness in the foot. In adults with flat feet, most patients are free from pain and their minor physiological variant, ie. flat feet does not interfere with work, sports or recreational activities. However, some patients with flat feet do complain that after standing or walking on a concrete surface (work place) that their feet hurt, and this probably implies a foot strain, which is the result of a subacute or chronic strain of the ligaments of the foot and does not relate to an acute traumatic injury. Foot strain may be caused in a normal foot, by excessive standing or walking (army recruits). The main symptoms are prolonged aching in the foot, which is worse on standing and walking.

It is important to exclude peripheral vascular disease, degenerative disc disease of the lumbar spine, arthritis of the foot in adults or neuro-muscular disease, before attributing these symptoms to simple foot strain. In later life, pain may arise from arthritis of the hind foot or mid foot, consequent upon prolonged malalignment of these joints. Treatment may include alteration of work with reduced time in standing or walking and modification of lifestyle, including conversion to a desk job rather than a labourer type of job. Arch supports may help, but in general advice about appropriate foot wear and weight reduction are appropriate.

Occasionally, the patient will give a history of change in work habit, such as increased walking or standing for long periods of time on a hard floor, or possibly having sustained a mild or moderate injury to the foot. As a result of foot discomfort, the patient may start to walk in an abnormal manner, which will secondarily cause a strain on other areas of the foot. This type of problem can occur in a normal foot as well as in a flat foot, although the "flat foot" seems to be somewhat more prone to becoming symptomatic, after a change in work habits. In adults, treatment is not needed unless symptoms of tiredness are present. Arch supports may afford temporary relief. If successful, they need to be replaced every two or three years, and should be combined with advice about sensible foot wear and weight reduction.

If the symptoms of long established flat feet in adults are related to superimposed arthritis of the hind foot or mid foot, surgical procedures such as an osteotomy to correct the deformity or surgical fusion of the hind foot or

mid foot, are sometimes advised. Please remember that hind foot and mid foot surgical procedures place increased stress on the ankle joint over the years ahead.

In summary, I have tried to point out that the majority of children are born with a flexible flat foot. During the first decade of life, most people develop a longitudinal arch of the foot, but as ageing occurs, a mobile normal arched foot may become flat footed with ligamentous laxity. It is important to remember that a mobile flat foot will never become rigid unless there have been secondary causes such as trauma or arthritis. Similarly, a rigid flat foot will never become flexible, in time or after treatment.

There probably is a reasonable appeal when the worker claims that working or walking on hard surfaces causes their pre-existing flat foot to become painful. It should be stressed that many people with pre-existing flat feet never have pain in their foot, and that people with normal arches in their foot also develop pain if they have to wear work boots or work and walk on hard surfaces.

I have tried to explain Pes Planus, ie. a flat foot. This is a clinical observation, and not usually supported by complicated and expensive radiographic and pedo-barographic studies. It is a simple clinical observation that the physician makes when he or she examines the patient on standing and walking. The normal cause of Pes Planus or flat foot is that it is a physiological variant, and only rarely causes problems in later life.

I have tried to point out the known acquired causes for this condition, such as trauma to the bones, rupture of the tendons of the foot, or arthritis of the foot.

I think that there is some evidence that this condition is hereditary, and many patients, that I have seen, present with their children, and their concerns for their flat feet, indicate that the parents and grandparents, of this child, have flat feet. The only significant factors, which can affect the course of this condition is if the patient develops arthritis in the hind foot, has a rupture of the tibialis posterior tendon or if it is a result of a fracture of the hind foot or mid foot, ie. os calcis, talus and mid foot fractures.

I do not think that there is any medical evidence which would indicate that prolonged walking or standing, on hard surfaces, contributes to the development of pes planus. As pointed out earlier, it may cause symptoms in patients with flat feet. It may cause symptoms in patients with normal arches in the foot. There seems to be a suggestion that patients with flat feet, rather than those with normal arches of the foot, are more prone to pain in the foot, following prolonged walking or standing on hard surfaces. There is no scientific evidence to support this suggestion.

This condition can certainly develop after trauma, ie. fractures of the os calcis, talus or mid foot. There is usually a significant injury of the foot to cause an acquired flat foot. An acquired flat foot can also occur as a result of rupture or stretching of the tibialis posterior tendon, or as a result of disease such as polio or diabetes, but this usually cannot be related to any specific injury.