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Collapse of the Transverse Arch in Athletics

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This particular abnormality concerns the transverse or metatarsal arch. This arch is directly posterior to the base of the toes, and is formed by the five heads of the metatarsals with their ligaments and muscles.

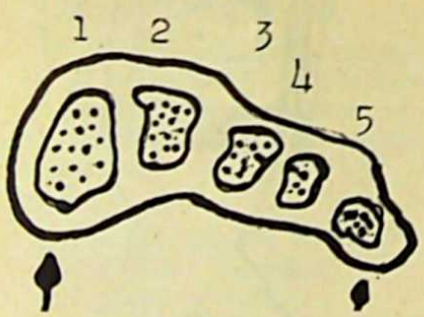


Fig. #1 — The transverse section through the metatarsal bones showing the presence of a transverse arch. (Arrows indicate pressure points of normal arch.)

The function of the transverse arch is to relieve shock to the spine, give stability in walking and running, and spring to the step.

When the foot is at rest or with the toes in plantarflexion the arch is quite evident. Once pressure of the body weight is applied as in standing there is a slight obliteration.

CAUSE

The general cause of this deformity is the continual wearing of illfitting footwear, prolonged standing or walking on a hard surface, and until the almost nonrepairable damage has been done the injured is not cognizant to the fact that the transverse arch has become weakened or collapsed.

In athletics there are numerous causes that contribute to this foot condition. A continual pounding on a hard surface with illfitting footwear being the prime factor. This may be a cause of shin splints.

The strain begins at the plantar surface of the heads of the 1st and 5th metatarsals (Fig. #1). As the strain increases, the ligaments and muscles become strained and relaxed and transfers the strain to the adjoining three middle heads of the metatarsals and their corresponding attachments of ligaments and muscles which form the top of the arch (Fig. #1) causing them to sink towards the plantar surface of the foot. By this collapse the pressure is transferred from the 1st and 5th (Fig. #1) to the 2nd, 3rd and 4th metatarsal heads (Fig. #2).

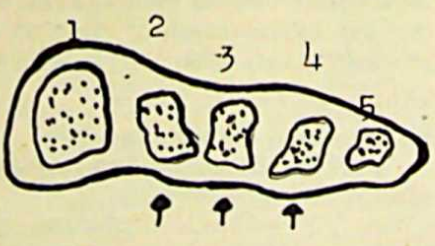
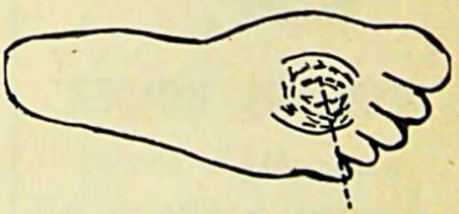


Fig. #2 — Collapsed transverse arch, showing transferred pressure to the middle three metatarsal heads.

EFFECTS

Because of the pressure exerted on the middle three metatarsal heads, a plantar callous may form under the lowest metatarsal head. These callouses are



circumscribed patches of hard, thick skin caused by intermittent pressure. The callous is a protective mechanism against excessive pressure. The condition is an effect and by correcting the cause you will in turn correct the effect. (Fig. #3).

To alleviate the pain the patient may start walking or running unnaturally, putting undue strain on the longitudinal arch, ankle, fore leg, knee, thigh, hip, sacro-illiac, and the spinal column; which can cause an untold number of ailments.

SYMPTOMS

The symptoms are easily recognized.

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EDITOR'S NOTE: Trainer Fritz Lutz of the University of North Carolina. Here is one of the nation's great athletic team trainers with many years experience. Lutz is a key figure in the National Athletic Trainers Association . . . heading several committees and is a tireless worker for this grand group of trainers. Throughout the year, Lutz conducts many clinics and is always bringing training information and techniques to the high school coaches in his section. A grand trainer to have in and on your clinic platform.

A marked depression posterior to the toes on the dorsum on top of the foot, the extensor tendons are taut and clearly visible.

By exerting pressure to the head of the lowest metatarsals from the plantar surface upwards you will notice the pain it causes by watching the patient's face. Also on placing the shoes side by side and viewing them laterally you will observe that the front or toe portion of the shoe will be slightly turned upward.

TREATMENT

The treatment should be discussed in three phases. Prevention, correction, physical therapy, both active and passive.

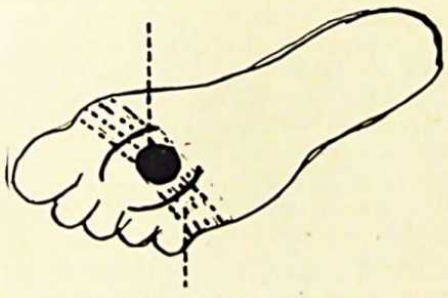
PREVENTION

The preventive measures are few and simple. Careful supervision of the fitting of all athletic footwear, and a constant vigilance to the athlete, his feet and his shoes.

CORRECTION

There are numerous approved corrective measures for the correction of the collapsed transverse arch. We will discuss the methods that have proved successful for us. These measures include the metatarsal arch support, physical therapy, corrective footwear, and corrective walking.

Metatarsal arch supports can be either bought or made by the individual. They can be made of a number of soft materials, white felt has been very beneficial to our method. The theory of these pads is to relieve pressure to the metatarsal heads. It is always placed directly behind the pain-



Felt pad directly posterior of pressure point. Then tape.

ful area, never put the pad directly on top of the area, as this will exert more pressure. However, this is only a temporary measure and will not correct the deformity.

Physical therapy in addition to the arch support should be a must. Heat, massage, manipulation of the foot proper and exercises active and passive are quite beneficial. Often the callouses are pared to relieve pressure, but this is only temporary relief and will form again quickly.

Exercises designed to rehabilitate this transverse arch, stresses the ankle, instep and toes. We use the picking up of regular size marbles with the toes, one marble at a time is lifted with the toes, carried through the air to a point approximately three feet laterally to the body.

The towel exercise is a more strenuous one. The towel is placed flatly on the floor, the patient sits on a chair (to take body weight off of arch) with the toes at the edge of the towel he will endeavor to pull the entire towel a few inches at a time past his heels.

The rolling of the plantar surface of the foot over a rolling pin or bottle is another beneficial exercise. Golf balls are used by some trainers and may help, however, we think that the rolling pin or bottle covers more of the plantar surface and gives better results.