

A RECOMMENDED METHOD FOR MANAGEMENT OF FOOT PAIN USING CUSTOM-MADE INSOLES

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The foot is a complex organ, which is required to be stable for supporting body weight, resilient for walking, and mobile for accommodating the variations in surfaces which it encounters.^{1,2} In a normal foot, the pressure is distributed so that there is no extra stress placed on any part. Foot pain is a common problem seen in orthopedic clinics.³⁻⁸ In the Foot Clinic at King Khalid University Hospital, most cases of foot pain are treated by custom-made insoles. We evaluate individual cases with a podoscope, a useful device for detecting foot abnormality during weight-bearing.¹⁰ This has been shown to be useful in the evaluation, treatment and follow-up of various foot conditions.¹¹

The aim of this study is to present our method of treating different foot problems, which is based on trials of correction of foot deformities by the orthopedic surgeon in the clinic.

Materials and Methods

A prospective study was done involving all patients who presented at the podology clinic complaining of foot pain between August 1994 and August 1995, and for whom unilateral or bilateral shoe inserts were prescribed. Patients with recent injuries and postoperative cases were excluded. A full history of each patient was obtained, followed by a careful biomechanical examination of the foot by the same doctor. All joints and segments of the foot were assessed. The methods used included: 1) complete critical and podoscopic examination to evaluate and understand the problem; 2) trial and correction on the podoscope using different wedges and supports of different thickness, shape and rigidity, guided by the patient's impression or feeling; and 3) clear and precise prescription written on a special form (showing the topography of both feet on which the clinician can draw the measurement of the recommended insole) sent to the orthotics technician

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TABLE 1. *Functional criteria of assessment after use of custom-made insoles (modified from Roberts et al.⁹).*

Score	Pain	Swelling	Gait	Functional activity	Objective opinion
5	None	None	Normal	No restriction	Delighted
3	Minimal	Recurrent after heavy activity	Abnormality only felt by the patient	Recreational restriction only	Satisfied
1	Moderate	Recurrent after light activity	Abnormality detected by others	Partial disability	Accepting
0	Severe	Persistent	Same as before treatment	Total disability	Unhappy

Mean score: >4.5=excellent; 2.5-4.5=good; <2.5=poor.

for the manufacture of the insole. The aim was to obtain the most effective mechanical correction during the two critical phases of heel strike and toe-off.

The trial correction began by correcting the hind foot first, because most forefoot problems are secondary to hind foot disorders.⁸ When the hind foot correction was achieved, as seen on the podoscope, the forefoot deformity followed, and usually corrected spontaneously. However, the hind foot wedge was better counterbalanced by a small forefoot wedge to make the patient more comfortable.

When manufacturing the custom-made insoles, the use of rigid materials was avoided. Semi-rigid materials (cork) and soft materials (olastazort) were usually used.

Follow-up of each patient was maintained for at least the next three months. The results of treatment were recorded according to the criteria shown in Table 1.

Results

During the period of study, 238 painful feet in 155 patients were treated using custom-made insoles. There were 76 male and 79 female patients, with ages ranging from 8 to 63 years (an average of 32 years). All patients presented with unilateral or bilateral foot pain. One or more other complaints were present in 34 patients. Swelling was present in 13 patients, callosity in 22 and severe gait disturbance in 7. The duration of patients'

complaints ranged from one month to fifteen years (an average of three years). The presence of more than one deformity in the same foot was considered to be one pathology. Table 2 shows the different foot problems treated during our study.

At the final follow-up, 214 feet in 140 patients were reviewed between 3 to 12 months after treatment with custom-made foot insoles. All patients with bilateral foot complaints had the same result in both feet. In the final results, 162 feet (76%) in 99 patients were graded excellent, 38 feet (18%) in 29 patients were graded good, and 14 feet (6%) in 12 patients were graded poor.

Discussion

Foot pain is a common problem affecting all age groups, particularly adolescents and adults.¹ As expected, pain was the main presenting symptom in our patients. The majority of cases do not require surgical treatment. It sounds logical to treat mechanical foot problems by mechanical means. The use of appropriate shoes in conjunction with shoe inserts, clearly prescribed according to proper principles, and after careful biomechanical examination, are essential prerequisites in any effective treatment program for foot pain.^{8,12-14} These proved to yield good results in our study.

In the biomechanical examination, the foot is examined in the light of knowledge of basic physiology and biomechanics of the foot during weight bearing and walking. This may show deformity in an apparently normal foot. The deformities can be controlled by appropriate inserts.^{4,7} The podoscope (planterscope) is an excellent tool, providing better access to the foot during weight bearing, and helping in the trial of correction by placing the different wedges in the appropriate places. The use of shoe inserts in the treatment of foot pain, as advocated by Leber and Eranski,¹⁵ Brodsky et al.,¹² and Janisse,¹³ has the advantage of relieving areas of excessive plantar pressure by evenly distributing pressure, restoring the physiological gait and reducing the stretching forces on muscle and ligament attachments. It also helps in stabilizing, supporting and limiting the motion of joints through the use of more supportive materials. Whenever shoe inserts are indicated, we prefer the use of custom-made insoles, because they provide different supports for each foot when deformities are asymmetrical, and supports can be added or eliminated as necessary, according to the pathology.

Many authors stress the role the orthotic technician or pedorthist plays in the treatment of foot pain,¹³⁻¹⁵ assuming that they can provide the necessary shoes and shoe modifications, instruct the patient in all aspects of foot-

TABLE 2. Deformities and pathologies treated.

Classification	Pathology*	No. of feet
Idiopathic deformity, 126 patients (82%)	Flat foot (complete with collapse);	66
	pes cavus;	49
	forefoot pronation;	48
	forefoot supination;	12
	hindfoot valgus;	25
	hindfoot varus;	44
	claw toes;	7
	insufficient first ray;	13
	splayed foot	32
	Secondary deformity, 13 patients (8%)	Post-traumatic;
Post-infection;		2
Post-burn;		1
Neuromuscular problem		7
Pathology other than deformity (primary or secondary to a deformity), 16 patients (10%)	Painful accessory navicular;	5
	tibialis posterior tendonitis;	3
	Sever's disease;	4
	Achilles tendonitis;	15
	peroneal tendonitis	3

*More than one deformity or pathology may be present in the same foot.

TABLE 3. Extent of outcome related to the pathology.

Classification	Number of feet			
	Excellent	Good	Poor	
Idiopathic deformity, 112 patients	174	130	33	11
Secondary deformity, 13 patients	16	13	2	1
Pathology other than deformity (primary or secondary to a deformity), 15 patients (10%)	24	19	3	2

wear, and assist in follow-up care. Our opinion is different, in that we strongly believe that the treating doctor must be actively involved personally in the evaluation of the foot disorder. He should be performing trials of correction using the podoscope, clearly prescribing the measurements of custom-made insoles on a special form, instructing patients regarding shoe selection based on foot type and activity and the reason for modification, and supervising any readjustment during follow-up care. We also recommend the presence of a well-trained pedorthist in continuous communication with the treating doctor to work as a team.

The patient's co-operation during examination and trials of correction is essential to avoid any pitfalls when using insoles. This was mentioned by others,^{6,7,13,15} and was proved in our study.

Paying particular attention when examining the foot and thinking about mechanical measures to treat mechanical problems will solve a lot of foot problems seen frequently in the orthopedic clinic. Biomechanical examination of a painful foot combined with evaluation on the podoscope is mandatory before any prescription of custom-made insoles.

The agreed-upon correction of a foot disorder must be tried by the treating doctor using different types of wedges and supports, and the patient must feel the improvement, otherwise the correction must be changed. Using a special form for the prescription, with precise drawings and measurements of the inserts, helps the orthotic technician to interpret these prescriptions into successful custom-made insoles.

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