

**OUTCOMES MEASUREMENT:  
PLANTAR FASCIITIS AND CUSTOM FOOT ORTHOSES**

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**INTRODUCTION**

Anyone involved with foot health care deals with plantar fasciitis. It is one of the most common foot problems we work with at the University of Michigan Orthotics and Prosthetics Center. The associated pain often has a very significant impact on peoples' activities and lifestyle.

Foot orthoses have been successfully used as a treatment for plantar fasciitis. In May 1996 an outcomes measurement survey was begun to document the results in using custom foot orthoses made from dense foam materials as a treatment tool. Patients having a diagnosis of plantar fasciitis and a prescription for foot orthoses are asked to fill out a questionnaire at their initial visit. Individuals with broader medical problems such as fibromyalgia, peripheral neuropathy, post-polio syndrome, etc., are not included in the survey. The individual is evaluated and custom orthoses are designed and fit within the following two weeks. The specific design of the orthoses is based on a biomechanical evaluation, of the patient and they are fabricated using the AMFIT system. Two weeks later, the patient is seen for a follow-up visit and adjustments are made if needed. One month after the fitting appointment, a second questionnaire is mailed to the patient's home which is completed and returned to the U of M Orthotics and Prosthetics Center where results are tabulated. At this time, it is expected that the survey will be continued indefinitely.

The survey gathers data in the following categories and information gathered on the two questionnaire forms is compared.

- The nature and location of the pain
- Level of pain on a scale of 1 to 10
- Effect of pain on various activities
- Medical specialties tried for relief
- Devices tried for relief
- Medications used
- Adjustment and wearing times
- Height and weight

**OVERVIEW**

At this writing, 101 individuals have been asked to participate in the survey and 73, (52 females and 21 males) have completed both of the questionnaires. 78% (57) present with pain in the bottom of the heel, 79% (58) state it is most painful early in the morning or after being seated and then rising, and 32% (23) experience bilateral pain.

**DURATION OF PAIN**

All except one of the respondents had been symptomatic for over one month.

- |                                     |          |
|-------------------------------------|----------|
| • Less than one month with symptoms | 1% (1)   |
| • From 1 to 6 months                | 37% (27) |
| • From 6 to 12 months               | 27% (20) |
| • Over 12 months                    | 34% (25) |

**CHANGE IN PAIN LEVEL**

On a scale of 1 to 10 (where 1=slight and 10=severe) the average pain level for the 73 respondents at the beginning of the treatment was 6.28 and after wearing the custom orthoses for one month, was reduced to an average of 3.14 representing a 50% reduction in pain.

- 84% (61) reported some reduction in pain
- 12% (9) reported no change
- 4% (3) reported an increase in pain

42% (31) of respondents reported pain levels reduced to 2 or lower after wearing the orthoses for one month. 14% (10) had pain levels reduced to 0. Coincidentally, 15% (11) of the group reported relief from other symptoms, including ankle, knee, hip, and low back pain. The following chart reflects pain levels before and after using orthoses.

(insert chart)

## ACTIVITIES

Pain levels are very subjective, so other information was also collected to help clarify the effectiveness of the orthoses. Individuals were also asked if their pain affected their work, exercise program, athletic activities, or daily routine. The data reflects the very significant impact that plantar fasciitis has on an individual's life.

- 23% (17) lost time at work
- 79% (58) decrease in exercise program
- 64% (47) decrease in athletic program
- 67% (48) difficulty with the daily routine of life

After wearing the custom orthoses for one month, there were very significant improvements made in these same areas. 85% (62) reported improvements in one or more of the four activity categories.

- 30% (22) increase in time at work
- 66% (48) increase in exercise program
- 53% (39) increase in athletic program
- 77% (56) easier daily routine

All seventeen (17) people who had experienced lost time at work reported an increase in that area, while two (2) of those who reported no improvement in pain levels now report lost time at work.

## ORAL MEDICATIONS

Significant reductions in the use of pain medications were also noted. 63% (46) of the group were using oral medications before receiving their foot orthoses and 22% (16) were using them one month afterwards.

## OVER THE COUNTER DEVICES

Most of the group surveyed had tried some type of over-the-counter (OTC) device before using custom foot orthoses. 92% (67) had tried at least one (1) item, while 37% (27) had tried three (3) or more items in their search for relief. There is a direct correlation between the length of time the pain persists and the number of devices tried for relief. The following table reflects numbers of certain types of over-the-counter items being used by individuals before and after receiving their custom orthoses.

DEVICE	BEFORE	AFTER
Heel pads	49% (36)	7% (5)
Heel cups	33% (24)	1% (1)
OTC Foot orthoses	48% (35)	5% (4)
Night splints	5% (4)	4% (3)
Different shoes	67% (49)	NA

Three people commented they still use their over-the-counter devices on occasion because the custom orthoses do not fit in all their shoes. In general, there is a large decrease in the number of OTC devices used once custom orthoses are provided. The following chart illustrates the numbers in the previous table.

(insert chart)

#### MEDICAL SPECIALTIES

The following table lists various medical specialties and how many of the group have used their services for relief of pain both before and after receiving custom orthoses. 19% (14) have tried three (3) or more different specialties. As with OTC devices, there is a direct correlation between the length of time the pain persists and the number of medical specialties tried for relief. It should be noted that because custom foot orthoses are a prescription item, there will be at least one doctor's office visit associated with every individual in the group.

SPECIALTY	BEFORE	AFTER
Family physician	70% (51)	18% (13)
Orthopedic physician	8% (6)	7% (5)
Podiatrist	15% (11)	5% (4)
PM&R physician	29% (21)	7% (5)
Other	5% (4)	0% (0)

#### DURATION OF PAIN AND PAIN REDUCTION

The following table reflects average pain levels before and after wearing custom orthoses. Individuals are grouped based on the length of time the individual was experiencing symptoms.

SYMPTOMATIC	BEFORE	AFTER	% DROP
0 to 1 month (1)	8.00	4.00	50%
1 to 6 months (27)	6.26	3.05	51%
6 to 12 months (20)	5.70	2.85	50%
Over 12 months (25)	5.80	3.66	37%

The average pain reduction for each of the first groups was similar to the group at large. The group which had pain over twelve months only experienced an average pain reduction of 37%. This group, however, contains seven (7) of the twelve (12) individuals who indicated no pain reduction or a pain increase. If these individuals are removed from the group, the pain levels and drop in pain are very consistent with the group at large.

#### WEIGHT AND PAIN REDUCTION

The height and weight tables from the Metropolitan Life Insurance Co. were used as guidelines in determining who was overweight. The maximum healthy weight for a large frame individual of a particular height was used as a starting point. Ten pounds was added to this figure and anyone over that weight was categorized as overweight. 52% (38) of the respondents were overweight

according to this reference. The following table represents pain levels before and after wearing custom orthoses.

WEIGHT	BEFORE	AFTER	% DROP
Overweight (38)	6.47	3.30	49%
Norman (35)	6.07	3.13	48%

Although the overweight group indicated slightly higher pain levels both before and after using the custom orthoses, the figures are generally very consistent with the overall group. Within this particular group, being overweight did not seem to adversely affect the outcome. Six (6) of the ten (10) individuals reporting complete elimination of pain were overweight.

#### ADJUSTMENT TIMES

Adjustment time appears to be rapid. 26% (19) of the group stated that they adjusted to the orthoses within the first day, and 62% (42) reported wearing their orthoses full time in one week or less. Six individuals stated they were not adjusting to the orthoses.

#### OVER-THE-COUNTER DEVICES FIRST VS. CUSTOM ONLY

92% (67) of the group had tried OTC devices before being fit with custom orthoses. The remaining 8% (6) had only used the custom orthoses. Of this group of six (6), four (4) had been symptomatic for one to six months. One individual had symptoms for six to twelve months, and one for over twelve months. Again, the table represents pain levels before and after using custom orthoses.

GROUP	BEFORE	AFTER	% DROP
OTC then custom (67)	6.38	3.33	48%
Custom only	5.16	2.00	67%

#### NO CHANGE OR INCREASE IN PAIN

12% (9) reported no change in pain levels and 4% (3) reported an increase in pain after wearing custom orthoses for one month. Although pain levels alone show no improvement in this group, there are other points to consider.

- 10 people reported improvements in one or more of the four activity categories
- 9 expressed greater ease in the daily routine of life
- 7 increased their exercise programs
- 5 increased athletic activities
- 4 stopped using oral medications
- All three who reported an increase in pain also reported increases in exercise and greater ease with the daily routine of life
- 2 reported no benefit in any category whatsoever and neither is wearing their custom orthoses

#### SUMMARY AND CONCLUSIONS

This survey examines the benefit of custom foot orthoses made from dense foam materials in the treatment of plantar fasciitis. To date, seventy-three (73) individuals have participated in the survey and provided information on their condition before and one-month after receiving the orthoses. Pain was subjectively rated on a scale of 1 to 10 and various information was collected on what avenues had been tried for relief.

The custom orthoses appear to be very effective in reducing pain associated with plantar fasciitis. Within the first month of use, 84% (61) reported reduction of pain and half of these, (31) reported pain reduced to a level of 2 or less. The average pain reduction for the entire group was 50% within the first month and 15% (11) also reported elimination of pain in other areas as an additional benefit.

With pain reduction comes return to normal activities. The data indicates the significant impact plantar fasciitis has on lifestyle and the equally significant impact produced by effective treatment. 85% (62) indicated improvements in their various activities including ten (10) of the twelve (12) individuals who stated their pain stayed the same or increased. Pain reduction also reduces the need for oral medications as shown by the fact that only one-third of those originally using oral medications continued to use them after wearing custom orthoses for one month.

While over-the-counter devices may bring relief to many, the particular group surveyed had not benefited sufficiently from the devices they had tried to end their search for pain relief. 92% (67) of the group had tried at least one such item. As pain continues, costs continue to rise in the form of additional devices, medications, and visits to doctors' offices. As stated previously, there is a direct relationship between the duration of pain and the number of devices and medical specialties tried for relief. If a particular device is not providing on-going relief, it seems reasonable to consider custom orthoses sooner rather than later.

The group which had been symptomatic for over a year had a lower drop in pain than the group at large (37% reduction and 50% reduction respectively). This is likely due to the fact that seven (7) of the twelve (12) with no improvement in pain levels were included in this group. Without this group of seven, the others indicated starting and ending pain levels very similar to the larger group. In this instance, the length of time an individual was symptomatic did not adversely affect the prospects of reducing pain. Similarly, being overweight did not adversely affect pain reduction. Slightly more than one-half of the people were overweight, but pain reduction was surprisingly close to those of normal weight.

Individuals adjusted rapidly to the particular orthoses used in this study. This is likely due to the particular materials used and the fact that the orthoses were designed specifically for the individual patient's needs. Overall, custom orthoses made from dense foam materials appear to be very effective in reducing pain related to plantar fasciitis and returning people to their normal daily activities.