ORIGINAL ARTICLES

CHIROPRACTIC ADJUSTMENTS AND ORTHOTICS REDUCED SYMPTOMS FOR STANDING WORKERS

JOHN ZHANG, PHD, MD[a]

[a]Logan College of Chiropractic, Chesterfield, MO.
Submit requests for reprints to: John Zhang, PhD, MD, Logan College of Chiropractic, 1851 Schoettler Road, Chesterfield, MO 63017.
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ABSTRACT

Objective: This controlled study was designed to explore the effectiveness of foot orthotics in solving problems of the feet and other parts of the lower extremities and to reduce low back pain.

Methods: Thirty-two subjects (24 males) were recruited and randomly assigned into 3 study groups. There were 10 subjects in the chiropractic care plus orthotics group, 14 subjects in the orthotics group, and 8 in the control group. All subjects filled out a patient information sheet and pre-screening foot pain questionnaire. Foot orthotics information was collected and the data was sent to Foot Levelers, Inc. for orthotic fabrication. Chiropractic treatment was performed using Activator Technique. In-home exercise was prescribed to subjects receiving orthotics and chiropractic care.

Results: The control group did not experience much change during the testing period. The orthotics group showed improvement in symptoms ($P = 0.053$), activities of daily living ($P = 0.058$), sport and recreation ($P = 0.186$) and quality of life ($P = 0.085$). While trends were apparent, the improvements did not reach statistically significant levels. In contrast, there was no trend with pain ($P = 0.492$). The orthotics plus chiropractic group showed improvement in the four conditions over the study period. Greater improvement was seen in quality of life ($P < 0.05$), symptoms ($P < 0.05$) and activities of daily living ($P < 0.05$), which were statistically significant. Improvement was also seen in sports and recreation but it did not reach statistical significant level ($P = 0.097$).

Conclusion: This study showed that a combination of chiropractic care and orthotics improved symptoms, activities of daily living, sport and recreation and quality of life in workers whose job requires them to stand at least 6 hours daily. (J Chiropr Med 2005;4:177–181)

Key Indexing Terms: Chiropractic; Orthotic Devices

INTRODUCTION

Foot pain and discomfort due to weight bearing are common in workers whose jobs require them to stand many hours a day on their feet.[1] It has been reported that approximately three-fourths of Americans experience foot problems in their life.[2] Foot pain and discomfort often lead to other complications above the level of the foot. The most common problems associated with foot pain and discomfort are ankle, leg, knee, hip and spinal disorders in people who spend many hours standing.[3,4] Foot orthotics have been used as a non-invasive treatment for conditions involving the feet and other parts of the lower extremities. Many researchers believe that foot orthotics are effective in solving problems of the feet, other parts of the lower extremities, and in relieving low back pain.[5] A study of postal workers performed by Carley[6] revealed a 67% reduction in foot, knee, or back pain as measured by the Borg scale. Sobel et al[7] reported in a foot orthotics survey of 122 policemen, that 68% of subjects had decreased foot discomfort but had no improvement in back or leg discomfort. However, these studies on foot orthotics remain inconclusive because they lack controls. Furthermore, different patient conditions, orthotics casting, and outcome assessments also make the effectiveness of these studies difficult to evaluate.[8] Therefore, a newly designed study with controls is necessary to determine the effectiveness of orthotics.

Chiropractic care, as the largest non-drug, non-surgery, non-invasive and holistic health care profession, has demonstrated to be an effective and safe

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method to treat neuromusculoskeletal and visceral problems.[9] More chiropractors are using foot orthotics as part of their practice. However, there are no studies examining the combination of chiropractic care and orthotics for relieving foot and foot-associated pain and discomfort.

The specific aim of the study was to use a controlled condition to explore the effectiveness of foot orthotics and chiropractic care on pain, discomfort and quality of life in subjects whose jobs require them to stand at least 6 hours a day.

METHODS

Participants

Thirty-two subjects whose jobs require them to stand at least 6 hours during the day, and who reported foot problems, were recruited in the study. A pre-screening survey was performed to select the proper subjects and to collect the patient's medical histories and information regarding daily living.

Inclusion Criteria

The subjects were required to have spent at least 6 hours per day standing or walking on a hard surface with discomfort or complains (eg, pain, fatigue, tingling, weakness, etc.) in the lower extremities, spine and/or foot. Subjects signed an informed consent and followed the instructions of the research project.

Exclusion Criteria

A pre-screening foot pain questionnaire developed by the research department was used for patient pre-screening. Subjects under medical treatment, surgery or trauma within the past 6 months or other pathology with contraindications to foot orthotics and/or chiropractic adjustments were excluded.

Research Procedures

The subjects signed an informed consent form before participating in the study. They filled out a patient information sheet, and pre-screening foot pain questionnaire to ensure that the subjects met the inclusion criteria. A foot exam was performed. Subjects were randomly divided to three groups: orthotics, orthotics plus chiropractic care and control. Subjects in the control group did not receive orthotics or chiropractic care until the end of the study.

For the foot orthotics fabrication, the study used a computerized F-Scan provided by Foot Levelers, Inc (Roanoke, VA) to record and analyze the foot data. Based on the data collected, the custom orthotics information was obtained and the data was sent to Foot Levelers Inc. for fabrication.

The project started the first day the subject used the orthotics. Subjects were required to answer the post-orthotics foot pain questionnaire and the specific regional survey for feet and ankles once every 2 weeks, for a 6-week period. All subjects were instructed to wear the orthotics 2 hours a day for the first 2–3 days to break them in and then 4–6 hours a day during the study period.

The chiropractic adjustment was performed in the outpatient clinic following the clinic regulations using the Activator Technique. Lower extremity muscle release technique was used for muscle rehabilitation for subjects in the chiropractic care plus orthotics group.

In-home exercise was prescribed to the subjects receiving orthotics and chiropractic care. Subjects were taught to point both big toes toward the wall without any rotation, and to hold this stretch for at least 30 seconds. This exercise only stretches the muscle, not the tendon. All subjects in this group were instructed to perform the exercise 5 times a day.[10]

Data Treatment and Analysis

Foot and Ankle Outcome Scores (FAOS) were used for the specific region surveyed. FAOS was developed to assess the patients' opinions about a variety of foot and ankle-related problems. FAOS consists of 5 subscales: pain, symptoms, activities of daily living (ADL), function in sports and recreation, and foot and ankle-related quality of life (QOL). Standardized answer options are given (5 Likert boxes) and each question gets a score from 0 to 4. A normalized score (100 indicating no symptoms and 0 indicating severe symptoms) is calculated for each subscale. The results are plotted as an outcome profile. FAOS is patient-administered and user friendly, taking approximately 10 minutes to complete. Student's t-test was used to assess the differences in pain, symptoms, activities of daily living, sport and recreation

and quality of life before and after the treatment period. Significance was determined at $p \leq 0.05$. SPSS 11.5 (SPSS Corp, Chicago, IL) statistical software was used for the data analysis.

RESULTS

Thirty-two subjects (24 male) were recruited and randomly assigned to the three study groups. There were 10 subjects in the chiropractic care plus orthotics group with an average age of 53 ± 9 yr. There were 14 subjects in the orthotics group with an average age of 47 ± 11 yr. In the control group, a total of 8 subjects were recruited with an average age of 46 ± 7 yr.

Figure 1 shows that the control group did not experience much change during the testing period. The only change in the trend among the 5 items was the QOL that showed slight improvement over the testing period. The orthotics group showed improvement in symptoms (P = 0.053), ADL (P = 0.058), sport and recreation (P = 0.186) and QOL (P = 0.085) (Fig 2). While trends were apparent, the improvements did not reach statistically significant levels. In contrast, there was no trend with pain (P = 0.492). The reported pain level was not high at the beginning of the study, therefore a reduction of pain was difficult to assess in this study. The improvements observed lasted the 6-week testing period.

The orthotics plus chiropractic group showed improvement in four conditions over the study period. Again, the exception was pain (Fig 3). Greater improvement was seen in the QOL (P < 0.05), symptoms (P < 0.05) and ADL (P < 0.05), which were statistically significant. Improvement was also seen in sports and recreation but it did not reach statistical significance (P = 0.097). Again, the reported pain reading was not high at the beginning of the study; therefore, no significant pain reduction was observed (P > 0.05) (Fig 3).

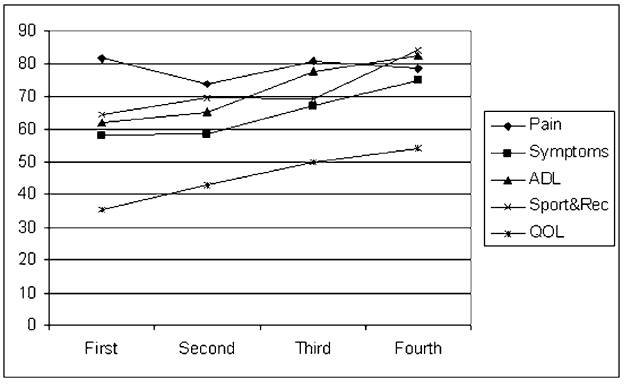

Figure 1. Results of FAOS for the control group.

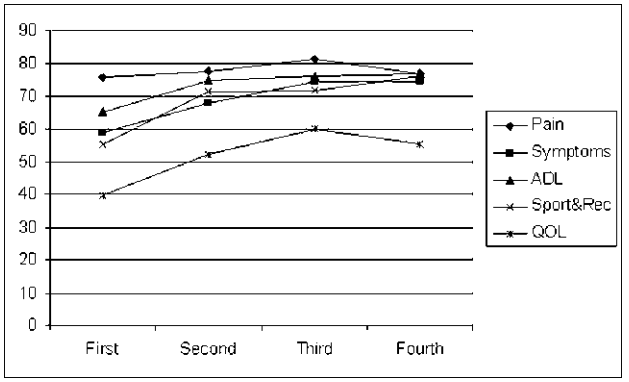

Figure 2. Results of the FAOS for the orthotics group.

DISCUSSION

The aim of this study was to evaluate the effectiveness of chiropractic care and orthotics on reducing the discomfort of prolonged standing during the job. The results of the study supported the hypothesis that chiropractic care and orthotics are beneficial in reducing discomfort in workers who are required to stand for long periods of time. The more significant results were seen with the orthotics plus chiropractic care group that had consistent improvement over the entire 6 weeks treatment period in symptoms, sports and recreation, ADL and QOL. This finding is consistent with a study of 465 podiatric patients reporting various maladies; 62% reported complete resolution after orthotics treatment, whereas an additional 33% gained partial resolution of their chief complaint as measured after 14 weeks of follow-

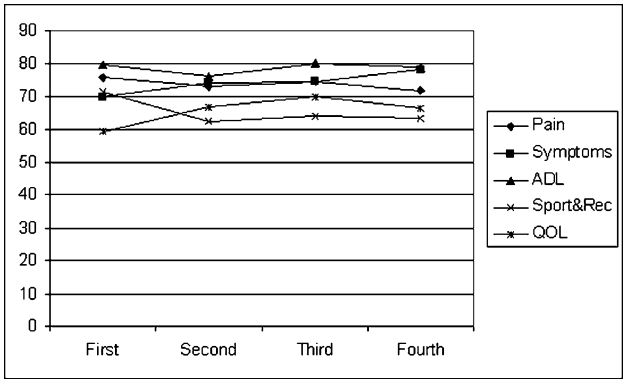

Figure 3. Results of the FAOS for the orthotics plus chiropractic group.

up.[11] Similar findings were reported in a retrospective study with both soft temporary orthotics and permanent rigid orthotics where 96% of patients experienced pain relief and 70% were able to return to previous activity levels.[12]

Significant pain reduction was not observed in our study. It was reasoned that this lack of reduction was due to the fact that few patients reported pain at the onset of the study. It was postulated that pain could be reduced if the subjects' main complaint was pain as reported by other studies.[5,13] This is supported by one case where a 33% reduction in foot pain was observed.

The reduction of discomfort in the orthotics only group was not as significant as in the orthotics plus chiropractic group. One major difference was that the orthotics only group did not show strong improvement over the 6-week study period, whereas the orthotics plus chiropractic group showed consistent improvement over time. It is not clear why adding chiropractic care causes such consistent improvement. However, we hypothesize that chiropractic adjustments to the lower extremity and spine function synergistically or complimentary the orthotics,[6] because chiropractic care improves joint mobility and muscle tension which shorten the break-in time for using orthotics. On the other hand, foot orthotics may also play an important role in maintaining the outcome of chiropractic care by supporting appropriate body mechanics.

One study by Stude and Brink[14] supported the idea that foot orthotics enhance balance, performance and reduce fatigue. Stude and Brink examined the effects of Foot Levelers orthotics devices on the static balance abilities of 12 experienced golfers while they participated in 9 holes of simulated golf.[14] Kuhn et al[15] reported that custom-fitted orthotics fortify the 3 major arches of the foot (medial longitudinal, lateral longitudinal, and transverse). They found that the Foot Levelers orthotics use materials of greater density to provide firm support in each arch. The study used the orthotics over a 6-week period, which resulted in a reduction of fatigue that permitted the golfers to gain a 7% mean increase in club-head velocity. They concluded that the use of custom-fitted flexible orthotics could offer a range of benefits.[14]

The mechanism of improvement of symptoms and functions of workers after using orthotics and receiving chiropractic adjustments was not well understood and needs further research. Studies have suggested that foot orthotics could improve gait patterns. A 1990 study found that 77% of patients demonstrated 50% to 100% improvement over a 2-year follow-up period when custom-made foot orthotics were used to correct subtle aberrations in their gait.[16] In 1993, a study described the biomechanical relationship between gait and lumbar stress.[17] It was observed by Dananberg and Guiliano[5] that patients using custom-made foot orthotics experienced twice the improvement in low-back pain compared with subjects using a traditional back-pain treatment. Despite the findings of beneficial effects of foot orthotics with a number of maladies, a critical review by Ball and Afheldt[18] states there is a need for more complete theoretical understanding of the mechanisms of foot orthotics.

There are limitations to our study. One of the limitations is the 6-week study period that may not long enough to observe significant changes. It appeared that the 6-week study period provided enough time for the orthotics plus chiropractic group to show statistically significant improvements but this time period may have been too short for the improvements seen with the orthotics group. Another limitation is the consistency of use of the orthotics by the subjects. The researchers instructed the subjects to wear the orthotics during the study period on a daily basis except when experienced discomfort. However, it might have happened that some subjects did not follow the instructions while they were away from the research facility. These limitations will be addressed in future research studies using the foot orthotics.

CONCLUSIONS

This study showed that a combination of chiropractic care and orthotics improved symptoms, ADLs, sport and recreation and QOL in workers whose job require them to stand 6 hours daily.

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