The Effectiveness of Custom-made Orthotics in a Standing Work Environment

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INTRODUCTION

Extended standing on hard surfaces has been related to many physical ailments including venous insufficiency, cumulative stress trauma, and complications with pregnancy. Although some published studies exist regarding orthotics use in work settings, no specific studies were found that addressed orthotics use with workers who worked continuously on concrete surfaces. The current study was designed to look at such workers working in warehouses at 3 companies.

MATERIALS AND METHODS

This study was funded by Foot Levelers Inc. Workers working in shipping, receiving or assembly departments of three companies in the same city and working primarily on concrete floors were recruited to test flexible Spinal Pelvic Stabilizer (SPS) orthotics manufactured by Foot Levelers Inc. Orthotics were provided without charge and without other inducement on condition that each worker completed pre- about three-week post-initiation of orthotics questionnaires. Inclusion criteria were: ambulatory and majority of work done standing on concrete surfaces. Exclusion criteria included: currently wearing other custom-made orthotics, inability to understand/comply with orthotic use instructions, inability to read at a 6th grade level (needed to complete questionnaires) and inability to complete the study protocol. Pre- and post-study questionnaires used were designed by Dennis Nosco, PhD and Rodger Tepe, PhD at Logan College. Oral consent was obtained from all study subjects.
Inputted questionnaire data was analyzed by SPSS 10.0. Frequencies, descriptives and inter-variable comparison statistical methods were applied. Stratification of selected continuous variables such as age and days wearing orthotics was also done. Statistical significance was set at $p \leq 0.05$.

RESULTS

Frequencies and Descriptives: Seventy of 80 study participants wore orthotics for >10 days and 4 of those 70 did not complete post-study questionnaires for unknown reasons resulting in complete data sets for 66 workers.
Study populations were: 51.5% male, 85% Caucasian and 77% with recent foot pain. Mean work-time wearing orthotics was 10±2 hours/day. Gender means were: age: males:37.5±10.2, females: 43.3±10.7 years; height: males:1.80±0.09, females 1.65±0.07 m; weight: males:96.4±28.1, females:76.8±16.8 kg. Mean time wearing orthotics was 20.1±5.3 days.
Five efficacy-indicating questions containing VAS scales measured perceived pain (a)before and (b)after work and (c)during exercise. How much pain limited activity and overall satisfaction with orthotics (post-study questionnaire only) were also queried. Fractional changes ("+"= improvement, "-" = worsening), after orthotics use were: +0.045±0.164 (before-work pain), +0.163±0.273 (after-work pain), +0.122±0.250 (exercise pain), +0.124±0.248 (activity-limiting pain). Overall satisfaction with orthotics was 0.579±0.300 (out of 1.00).
Comparison of efficacy-indicating values was done with gender, foot pain sometime in the last year, stratified days wearing the orthotics (>16, 16-20, >20 days) and stratified age (under 30, under 40, under 50, over 50 years old). Those analyses showed that, after wearing the orthotics for greater than 10 days: all sub-groups showed improvement in all categories after orthotics use. Significant inter-group differences included: more after-work comfort for females, less before-work pain in workers over 30 years old, most improvement noted in first 15 days of wear and more positive responses from workers with recent foot pain history.

DISCUSSION

Using five VAS categories, the short-term study data presented in this paper show a positive worker response on their pain levels after using custom-made, flexible orthotics on concrete floors. The power of this data was lessened somewhat by the variability in the responses potentially due to uncontrolled variables (e.g., inexperienced researchers who might bias the study results and less-than-optimal inclusion and exclusion criteria) and range of time wearing the study orthotics (10-26 days).
While the results of this study are extremely promising it is possible that more tightly-controlled study periods and variables and even longer-term studies with endpoints such as loss-time at work, less reliance on NSAIDS or greater physical might result in even more positive and meaningful results. Better compliance with study requirements is also needed, as in this study and, in fact, made it impossible to extend the study results to 6 months. This compliance could be best achieved by careful study subject followup to insure that compliance.

CONCLUSIONS

This worker self-report study shows that custom-made, flexible orthotics provided increased comfort to workers whose main job responsibilities are accomplished while standing on concrete floors. Future short-term studies using better time-point standardization and, long-term studies measuring other, quantitative variables might give better indication of benefits gained from wearing custom-made, flexible orthotics in this work setting.

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