



AOTA Critically Appraised Papers Series

Evidence Exchange

**A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

CRITICALLY APPRAISED PAPER (CAP)

Focused Question

What is the effect of self-administered physical rehabilitation with ergonomic intervention on pain and functional performance for people with nonspecific/Type II work-related upper-limb disorder?

Povlsen, B. (2012). Physical rehabilitation with ergonomic intervention of currently working keyboard operators with nonspecific/Type II work-related upper limb disorder: A prospective study. *Archives of Physical Medicine and Rehabilitation*, 93(4), 78–81.
<http://dx.doi.org/10.1016/j.apmr.2011.05.023>

CLINICAL BOTTOM LINE:

This study shows that individualized self-administered stretching and strengthening exercises, in combination with therapist-directed exercise training and ergonomic workplace improvements, result in decreased pain for people with nonspecific/Type II work-related upper-limb disorder (WRULD). Given this result, it appears that occupational therapy practitioners who work with this population may be able to successfully provide interventions to reduce pain. The details of the individualized physical rehabilitation program were not discussed within the article; however, the author refers to a previously published journal article that describes the program. With more information, occupational therapy program developers may be able to utilize this model of intervention. However, caution must be considered when using this study as sole source of evidence for program development due to study limitations, including a small test group, no control group, and high attrition.

RESEARCH OBJECTIVE(S)

To evaluate the effect of a physical training program in combination with ergonomic changes for a group of keyboard operators with WRULD.

DESIGN TYPE AND LEVEL OF EVIDENCE:

Level III

Nonrandomized, prospective study, pretest/posttest design.
 The “pain-free” group served as a basis of comparison and did not receive intervention.
 The experimental group received intervention as well as pretests and posttests.

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic?

YES NO Previous research has shown that improvements following this type of intervention are limited for people with a diagnosis of WRULD, especially when symptoms have already developed. Therefore, it is important to have a control group that has the same level of symptoms as the experimental group to draw appropriate statistical comparisons.

SAMPLE SELECTION

How were subjects selected to participate?

Subjects were selected from a group of patients who were referred to a center specializing in hand and upper-limb problems.

Inclusion Criteria

Subjects must have a diagnosis of nonspecific/Type II WRULD affecting the hand and/or forearm, reporting pain lasting at least 3 months. Subjects must also be currently working as keyboard operators.

Exclusion Criteria

Patients diagnosed with specific/Type I WRULD (e.g., carpal tunnel syndrome, trigger digit, de Quervain, epicondylitis, hypermobility, fibromyalgia, nerve entrapments, osteoarthritis, hormonal abnormalities, biochemical confirmation of autoimmune inflammatory conditions) were excluded. Patients who did not complete the follow-up typing test, who were not working during the full study period, or who reported a 5 or more on the “rest pain” visual analog scale (VAS) during the typing test were also excluded.

SAMPLE CHARACTERISTICS

N = 23

% Dropouts

#/ (%) Male #/ (%) Female

Ethnicity

Disease/disability diagnosis

Check appropriate group:

<20/study group	20–50/study group <input checked="" type="checkbox"/>	51–100/study group	101–149/study group	150–200/study group
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INTERVENTION(S) AND CONTROL GROUPS

Group 1

Brief Description	Experimental group ($N = 17$, with diagnosis) received self-administered physical rehabilitation incorporated into the workday, following training in stretching and strengthening exercises by a specialized occupational therapist. Participants were also encouraged to seek ergonomic workplace modifications from their employers during the intervention.
Setting	Hospital department.
Who Delivered?	An occupational therapist with a specialization in hand and upper-limb disorders trained participants in stretching and strengthening. Study participants self-administered the rehabilitation program following occupational therapy consultation and maintenance sessions.
Frequency?	Training by the occupational therapist occurred 4 times during the study. Participants self-administered exercises at their workstations several times per day.
Duration?	3–6 months

Group 2

Brief Description	Comparison group ($N = 6$) consisted of “pain-free” individuals from the same workplace as the patients with WRULD. They were not used as a control group because they did not receive intervention following the pretest and did not participate in the posttest. Data from this group was used for comparison purposes only.
Setting	N/A (no intervention received)
Who Delivered?	N/A
Frequency?	N/A
Duration?	N/A

Intervention Biases: Circle yes or no and explain, if needed.

Contamination

YES/NO

Co-intervention

YES/NO

Timing

YES/NO Inclusion criteria required that participants must have continuous pain for at least 3 months prior to intervention; thus, natural recovery of pain symptoms during the course of the study would be an unlikely timing bias.

Site

YES/NO

Use of different therapists to provide intervention

YES NO

MEASURES AND OUTCOMES

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article--yes/no/NR [not reported]), and how frequently the measure was used.

Visual analog scale (VAS); measures resting pain (0–10, 10 is worst pain); NR; pre- and post-intervention. Posttest was given 3 to 6 months after the rehabilitation program had started.

Typing speed (words per minute); NR; twice. Posttest was given 3 to 6 months after the rehabilitation program had started.

Endurance (up to 30 minutes); NR; twice. Posttest was given 3 to 6 months after the rehabilitation program had started.

Measurement Biases

Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

YES NO

It is unclear whether the evaluators also administered the rehabilitation intervention. If they did, they would be aware of treatment status because only the experimental group received the intervention and completed the posttest.

Recall or memory bias. *Circle yes or no, and if yes, explain.*

YES NO

Others (list and explain):

RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ($p < 0.05$).

Include effect size if reported.

The pretest and posttest results of the 3 pain and typing tests were reported as means and standard deviations. Pain levels following rehabilitation, as measured before and after the typing test, decreased by almost half, yielding a statistically significant result. Pain was rated 1.5 ± 1.37 (pretest) and 0.64 ± 1.05 (posttest) prior to intervention, and 4 ± 1.4 (pretest) and 2 ± 1.95 (posttest) after intervention. Typing endurance (23.86 ± 8.52 pre-test, 28.65 ± 3.1 posttest) and speed (25.88 ± 8.15 pretest, 29.82 ± 10.53 posttest) also increased at a statistically significant rate following intervention. The “pain-free” comparison group was not included in any statistical analysis

Was this study adequately powered (large enough to show a difference)? *Circle yes or no, and if no, explain.*

YES NO Very small N ($N = 23$). Author notes high dropout rate and need for future randomized controlled trial.

Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

YES NO

Were statistics appropriately reported (in written or table format)? *Circle yes or no, and if no, explain.*

YES NO

CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

The findings of this study point to moderate effectiveness of self-administered rehabilitation with ergonomic intervention to reduce the symptoms of WRULD) The experimental group reported a significant decrease of pain; thus, physical rehabilitation and ergonomic intervention can reduce pain for working people with Type II WRULD. The author stated that the participants who dropped out of the study, 58% of the initial test group, reported relief from pain symptoms as their reason for not completing the follow-up test. The author suggests that this reason for dropout indicates the success of the intervention. However, occupational therapy program developers should note that further study with a larger test group and the addition of a control group is needed if this evidence is to provide a sound basis for program development.

This work was completed in November 2012 by Andrea Webber, OT student, St. Louis University, and Rebecca M. Aldrich, PhD, OTR/L, Assistant Professor, St. Louis University.

AOTA has determined that this CAP has met AOTA-established criteria and guidelines for research design, format, and structure. The CAP has been peer reviewed by CAP reviewers who are selected and trained by AOTA. However, the vigorous peer review process is conducted independently of the AOTA review and editorial processes.

For more information about the Evidence Exchange, e-mail evidenceexchange@aota.org

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