AOTA Critically Appraised Topics and Papers Series

Driving and Community Mobility for Older Adults

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

CRITICALLY APPRAISED PAPER (CAP)

Focused Question

What is the evidence for the effect of interventions to address cognitive and visual function, motor function, driving skills intervention, self-regulation/self-awareness, and the role of passengers and family involvement in the driving ability, performance, and safety of the older adult? Intervention approaches include adaptation, remediation, prevention, and maintenance.

Ostrow, A. C., Shafron, P., & McPherson, K. (1992). The effects of a joint range-of-motion physical fitness training program on the automatic driving skills of older adults. *Journal of Safety Research*, *23*, 207–219.

PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)

State the problem the authors are investigating in this study.

Older drivers experience decreased head and neck mobility with advancing age. More restricted range of motion may impede the older driver's ability to complete tasks such as scanning to the rear, backing, and turning the head to observe blind spots.

RESEARCH OBJECTIVE(S)

List study objectives.

What are the effects of participation in an 8-week range-of-motion exercise training program on improving joint flexibility and driving skills (requiring adequate range of motion) among older adults?

DESIGN TYPE:

Randomized Controlled Trial

Level of Evidence:

I

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes	✓
No	

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

Convenience—volunteers

Inclusion Criteria

Older drivers who received approval from their physician to participate

Exclusion Criteria

NR

NR = Not reported.

Sample Selection Biases: *If yes, explain.*

Volunteers/Referrals

Yes	
No	✓

Attention

Yes	
No	✓

Others (list and explain):

SAMPLE CHARACTERISTICS

N = 32

% Dropouts	6		
#/(%) Male	4	#/(%) Female	12
Ethnicity	NR		
Disease/disability diagnosis	N/A		

Check appropriate group:

<20/study group ✓	20–50/study group	51–100/study group	101–149/study group	150–200/study group

Sample Characteristics Bias: *If no, explain.*

If there is more than one study group, was there a similarity between the groups?

Yes	✓
No	

Were the reasons for the dropouts reported?

Yes	✓ Two could not complete because of illness, 2 did not complete requirements for testing, 1 had heart surgery, and 1 lost interest in testing.
No	

INTERVENTION(S)—Included are only those interventions relevant to answering the evidence-based question.

Add groups if necessary.

Group 1

Brief Description	8-week range-of-motion exercise training program consisting of static-type upper body training and stretching exercises adapted specifically to meet the requirements of designated driving skills. Exercises were designed to be practiced at home. Experimental group kept a daily log on compliance with exercise and frequency and extent of driving.
Setting	NR
Who Delivered?	Licensed physical therapist
Frequency?	Once per week
Duration?	8 weeks

Group 2

Brief Description	None during study period, but in-car instruction after time period of intervention in order to encourage participation
Setting	N/A
Who Delivered?	
Frequency?	Daily
Duration?	N/A

Intervention Biases: *Explain, if needed.*

Contamination

Yes ☐

No ✓

Co-intervention

Yes ☐

No ✓

Timing

Yes ☐

No ✓

Site

Yes ☐

No ✓

Use of different therapists to provide intervention

Yes ☐

No ☐

NR ✓ Attention bias—Experimental group received more attention from experimenters than control group.

MEASURES AND OUTCOMES—Included are measures relevant to answering the focused question.

Name of measure:

Range of motion tests

Outcome(s) measured (what was measured?):

Range of motion of chin, neck, side bends, trunk rotation, shoulder flexion

Is the measure reliable (as reported in article)?

Yes	✓
No	
NR	

Is the measure valid (as reported in article)?

Yes	
No	
NR	✓

How frequently was the measure used for each group in the study?

First, 8th, and 11th week

<u>Measurement Biases</u>

Were the evaluators blinded to treatment status? *If no, explain*.

Yes	
No	
NR	✓

Recall or memory bias? *If yes, explain*.

Yes	
No	✓

Others (list and explain):

Name of measure:

Automobile Driver On-Road Performance Test (ADOPT)

Outcome(s) measured (what was measured?):

Handling time, handling direction, handling strikes, handling position, straight-line backing, straight backing time, handling (composite score), safe practices, and observing.

Is the measure reliable (as reported in article)?

Yes	✓
No	
NR	

Is the measure valid (as reported in article)?

Yes	✓
No	
NR	

How frequently was the measure used for each group in the study?

First, 8th, and 11th week of program

<u>Measurement Biases</u>

Were the evaluators blinded to treatment status? *If no, explain*.

Yes	
No	
NR	✓

Recall or memory bias? *If yes, explain*.

Yes	
No	✓

Others (list and explain):

Name of measure:

Behavioral Recording Log

Outcome(s) measured (what was measured?):

Drivers in the experimental group reported whether or not they drove an automobile, the number of miles driven, and whether or not they practiced the flexibility exercises.

Is the measure reliable (as reported in article)?

Yes	
No	
NR	✓

Is the measure valid (as reported in article)?

Yes	
No	
NR	✓

How frequently was the measure used for each group in the study?

Daily

<u>Measurement Biases</u>

Were the evaluators blinded to treatment status? *If no, explain*.

Yes	
No	
NR	✓

Recall or memory bias? *If yes, explain*.

Yes	
No	✓

Others (list and explain):

Limitations (appropriateness of outcomes and measures) *If no, explain*.

Did the measures adequately measure the outcome(s)?

Yes	✓
No	

RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ($p < 0.05$).
Include effect size if reported.

Using ANOVAs with repeated measures, participants in the experimental group improved on trunk rotation to the right, and shoulder flexibility. Participants in the experimental group were significantly more likely to have improved on handling position and observing, as tested by ADOPT. There was no statistically significant difference between groups in terms of changes in the average number of days driven per week or average number of miles driven per week.

Was this study adequately powered (large enough to show a difference)? *If no, explain*.

Yes	✓
No	

Were appropriate analytic methods used? *If no, explain*.

Yes	✓
No	

Were statistics appropriately reported (in written or table format)? *If no, explain*.

Yes	✓
No	

CONCLUSIONS

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

An 8-week range-of-motion exercise training program was successful in improving subject shoulder flexibility and trunk rotation, which then improved driving scores on a road test.

Were the conclusions appropriate for the Study Design (Level of Evidence)? *If no, explain*.

Yes ✓

No

Were the conclusions appropriate for the statistical results? *If no, explain*.

Yes ✓

No

Were the conclusions appropriate given the study limitation and biases? *If no, explain*.

Yes ✓

No

IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development, and other implications of the study findings as they relate to the focused question.

Since older drivers have more accidents proceeding through intersections and merging into traffic, the idea of improving the skill of observing to the side is a worthy research endeavor. It may decrease these types of accidents. Increasing shoulder, neck, and trunk mobility is under the treatment goals of occupational therapy. Improving these attributes may begin the process of better visual search, which could lead to better attention, information-processing speed, and reaction time. This improvement would especially be true of patients with arthritis. The importance of this study is not the finding that participants drove about the same number of miles or days per week, but that they were driving more safely. Typically, older adults have consistent uses of their automobiles because their schedules are routine. A change in the frequency of use would not be expected.

This work is based on the evidence-based literature review completed by Linda Hunt, PhD OTR.

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.

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