2017

The Effectiveness of "Stepping On" in Reducing Fall Risk in the Elderly Using the 30-Second Chair Stand Test

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THE EFFECTIVENESS OF "STEPPING ON" IN REDUCING FALL RISK IN THE ELDERLY USING THE 30-SECOND CHAIR STAND TEST

By

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Bachelor of General Studies, 2015

University of North Dakota

A Scholarly Project submitted to the graduate faculty

of the Department of Physical Therapy

at the University of North Dakota

in partial fulfillment of the degree of

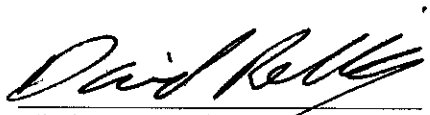
Doctor of Physical Therapy

Grand Forks, North Dakota

May 2017

This Scholarly Project, submitted by Brianna Albrecht in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

Graduate Advisor



Chairperson, Physical Therapy

PERMISSION

Title The Effectiveness of "Stepping On" in Reducing Fall Risk in the Elderly Using the 30-Second Chair Stand Test

Department Physical Therapy

Degree Doctor of Physical Therapy

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Signature Brianna E. Albrecht

Date 10/5/2014

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGRUES

Figure

ACKNOWLEGDMENTS

I would like to thank Meridee Danks, PT, DPT, for her sharing her knowledge and experience with us throughout this project. She is truly a gift to the older population. I would also like to thank my classmates with whom I collaborated on this research study. Lastly, I would like to thank the participants and community leaders of *Stepping On.*

ABSTRACT

Background: One-third of all adults over the age of 65 years of age falls each year. Falls cost patients financially, physically, and emotionally. Balance and strength deficits contribute to increasing an individual's fall risk. Studies have shown the efficiency of community-based exercise and education programs on reducing the risk of falling.

Objective: The purpose of this study was to determine whether participants in *Stepping On* experienced an improvement in balance and confidence following completion of the program. The study also evaluated the correlation between self-perceived risk of falling on the CDC Fall Risk Survey and their actual risk of falling determined by comparing their score on the 30-Second Chair Stand Test (30sCST) to age-related normative data.

Methods: Three participants were recruited from a local *Stepping On* program. Baseline date was received through a series of surveys and questionnaires collected during Weeks 1 and 7. Balance assessments (30sCST, Timed Up and Go Test, the 4-Stage Balance Test, and the Activities-Specific Balance Confidence Scale) were also performed during the Week 1 and Week 7 sessions.

Results: Participants' scores on the 30-Second Chair Stand Test will be compared to normative data provided by the CDC. The CDC Fall Risk Survey will be scored and compared to a score determined by the CDC to indicate risk of falling.

Conclusion: The 30-Second Chair Stand Test is a quick, easy, and effective method to measure an older person's risk of falling. The CDC Fall Risk Survey combines

participant confidence and functional activity and is a valuable tool to assess risk of falling.

CHAPTER I

INTRODUCTION

Falls are a common complication as people grow older. As many as one-third of community-residing people over the age of 65 fall each year.[1] That number grows to 60% once a person begins living in a nursing home or assisted living facility. Falling can cause pain, fractures, soft tissue injuries, and functional limitations. It can also cause feelings of helplessness, depression, and loss of confidence in those who have fallen.[2] These falls cost patients and third-party payers $19.2 billion per year.[3] Risk factors have been categorized into intrinsic and environmental.[1] Intrinsic factors include age, female gender, and the presence of balance disorders, while environmental, also referred to as extrinsic factors, include living in a nursing home, leading a sedentary lifestyle, and malnutrition. As the population in the United States grows older, a need for proactive prevention programs has been identified.[4]

The Center for Disease Control (CDC) provides suggestions for older adults to select a falls prevention program. These suggestions include *Stepping On* and *Otago Exercise Program*.[5] *Stepping On* is a falls-prevention program for community-residing older adults designed to decrease a person's risk of falling and increase their confidence in safe mobility. This evidence-based program was developed in Australia and adapted for use in the United States.[6] Using a multifactorial approach, *Stepping On* addresses

lower extremity strength and balance, environmental safety, medication and vision awareness, and ways to adjust behavior to improve overall safety.[5]

A randomized control trial studying the efficacy of the *Stepping On* program was conducted and published in 2004.[2] Participants (n=310) ages 70 and older with a mean age of 78.3 who had a recent fall or who were concerned about falling were enrolled in the study. They participated in the 7-week long program and were followed for a total of 14 months. Following the study, the intervention group had a 31% decrease in the incidence of falls. Also, participants reported maintaining confidence in their ability to avoid falling, while the control group experienced a decrease in confidence.

Because of its proven effectiveness and use of both exercise and education, *Stepping On* is becoming a widely used and well known. According to the Wisconsin Institute for Healthy Aging (WIHA), *Stepping On* programs are offered in 19 states.[6] In 2012, the North Dakota Department of Health indicated that Stepping On is being offered at 8 sites around the state.[7]

Participants enrolled in *Stepping On* attend seven 2-hour sessions during consecutive weeks along with a follow-up visit after 3 months.[8] An optional home visit during the eighth week is also offered. Groups are limited to 20 participants who are at least 65 years old, who are community-dwelling, and who have fallen or who are concerned about falling. Education includes the following topics: home and outside hazards, visual problems, effects of medication, bone health, footwear, safety, effective mobility, and sleep. Exercises focusing on strength and balance are also provided along with education about appropriate progression of the exercises.

The incorporation of exercise has been shown to decrease the risk of falls in the elderly population.[9] Specifically, exercise programs that include exercises which challenge a person's balance have been shown to be especially effective. *Stepping On* has developed a set of eight exercises which are provided to participants during the first session and reviewed during each of the subsequent sessions. Four of the exercises are intended for strengthening: side-hip-strengthening, front-knee-strengthening, heel raises, and toe raises (See Appendix A for the *Stepping On* exercise program). Participants are instructed to perform these exercises three times per week. The other four exercises, to be performed daily, are aimed at improving balance: sit-to-stand, sideways walking, heel-toe (tandem) standing, and heel-toe (tandem) walking. A physical therapist is brought in as an "expert" during the first, second, and sixth sessions and provides additional education regarding progressions and modifications of the exercises as necessary. Physical therapists also have a role in determining participants' change in strength and balance using evidence-based assessment skills along with monitoring for the presence of orthostatic hypotension by measuring blood pressure. The CDC recommends using functional tests including the Timed Up and Go (TUG) Test, the 4-Stage Balance Test (FSBT), and the 30-Second Chair Stand Test (30sCST) to monitor change and determine fall risk in patients.

The 30-Second Chair Stand Test, which measures the number of times participants can rise from a chair in 30-seconds, is a simple and quick tool requiring minimal equipment making it practical for frequent clinical use.[10] A person's ability to complete the most vital daily activities such as toileting, requires the ability to safely complete a sit-to-stand transfer.[11] This test, similar to the Five-Times-Sit-To-Stand Test

(FTSST) which was studied by Whitney et al[12] in 2005, has been shown to measure postural control, lower extremity strength and proprioception. Scores on the FTSST and 30sCST correlate with gait speed, level of disability, and diagnosis of frailty.[13]

The purpose of this study is to determine if an elderly person's participation in Stepping On reduces his or her risk of falling using the 30-Second Chair Stand Test to measure change. Additionally, this study will look at the correlation between the 30sCST and the CDC Fall Risk Survey. The Timed Up and Go Test, the 4-Stage Balance Test, the Activities-Specific Balance Confidence Scale, and the 30sCST will be performed during the first and last of the 7 sessions of *Stepping On.*

CHAPTER II

METHODOLOGY

The University of North Dakota's Department of Physical Therapy received permission to complete balance assessments with and administer surveys to *Stepping On* participants from the Institutional Review Board (IRB-201209-047) (See Appendix B for IRB). Participants were recruited from a local *Stepping On* program.

Subjects

Three participants, two females and one male with a mean age of 87.67 years, provided consent to be included in this study (Refer to Appendix C for Subject Consent Forms). Table 1 displays the characteristics of each participant at Week 1. In the past year, Participant 1 reported one fall related to stepping out of the shower, Participant 2 reported one fall related to ice outdoors, while Participant 3 had 5-6 recent falls with unknown mechanisms. All of the participants met the criteria for participating in *Stepping On*.

Two of the participants reported co-morbidities during Week 1. Subject 2 reported a history of a stroke about 20 years ago with mild left sided weakness. Subject 3 was involved in a motor vehicle accident which resulted in both knees impacting the dashboard causing continued knee pain and balance difficulties. Subject 1 reported that she had undergone a total knee replacement during a subsequent session. Each participant rated their level of activity at "minimally active" and reported that they did not perform

regular exercise. Subjects 1 and 2 lived in accessible housing. None of the participants required the use of an assistive device for ambulation.

Table 1: Participant Demographics at Week 1 of *Stepping On*

	Subject #1	Subject #2	Subject #3
Age	89	93	81
Gender	Female	Male	Female
Fall History	Yes, x 2	Yes, x 1	Yes, x 5-6
Past Medical History	None	Mild stroke w/ L sided weakness 20 years prior	Knee pain from past car accident, balance/walking difficulties
Vision Impairments	Yes	Yes – glasses	Yes – glasses, L macular degeneration
Self Rated Activity Level (Inactive/Min/ Mod/Highly active)	Minimally Active	Minimally Active	Minimally Active

Instrumentation

The 30-Second Chair Stand Test was chosen to test dynamic balance and functional leg strength of Stepping On participants. Figure 1 illustrates the proper progression from the seated position to fully erect. The 30sCST has an excellent test-retest reliability of .89 and a validity of .87.[15] Alfonso-Rosa et al[16] reported a minimal detectable change (MDC) for the 30sCST of 3.3 repetitions. They also found an inter-rater reliability of .95 and an intra-rater reliability of .93.

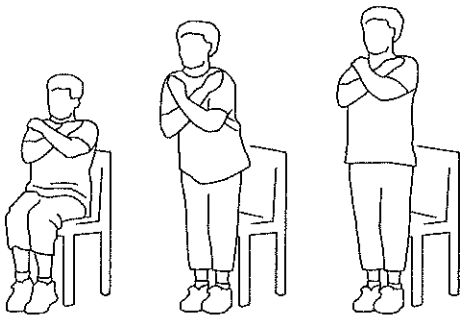


Figure 1: 30-second Chair Stand Test Illustration[5]

Procedures were practiced on older community people as a part of an instrumentation course prior to completion of the study on older community people. Results were compared with other members of the class to ensure adequate proficiency with administering and scoring test.

Procedure

During the first week individuals completed a Demographic Questionnaire and the CDC Fall Risk Survey which addresses past falls, functional activities, and medications. The Activities-specific Balance Confidence (ABC) Scale (See Appendix D for questionnaires, surveys, and ABC forms) was also completed during Week 1. Three balance assessments were administered to participants in a random order during Week 1: 30sCST, Timed Up and Go (TUG), and modified 4-Stage Balance Test (FSBT). The Week 7 *Stepping On* Survey, ABC, and the three balance assessments were administered again during Week 7.

Participants were fitted with a gait belt for safety purposes. Using guidelines provided by the CDC, the seat height of the chair was 17 inches.[5] The chair was slightly padded and did not have arms. For support, it was positioned with the back in contact with a wall. Each participant received the same directions and was allowed one practice sit-to-stand. The subject was instructed to sit in the middle of the chair, feet flat on the floor, with arms folded across their chest. They must come to a complete stand and a fully sit in order for each repetition to be counted. Time begins when the examiner says "Go," and stops after 30 seconds. The number of repetitions completed within the allotted time are counted; if the subject is over half-way standing at the 30-second mark that repetition is included. If the participant required the use of their upper extremities to

assist with the motion, the attempt was not counted; however, in order to be able to show change from the beginning of the program to the end, the attempt would be counted and noted to have been modified by use of their arms. One trial was allowed for each participant.

Data Analysis

Data provided by the CDC in the following table indicates normative scores for men and women (see Table 2).[5] Individuals are considered to be at risk of falling if they score less than the score listed in the table. Each participant's change from the initial session to the final session will be determined by calculating the difference between scores during Week 1 and Week 7 and comparing those scores to age-related normative data.

Table 2. Normative Data for the 30sCST from the CDC[5]

Age	Men	Women
65-69	< 12	< 11
70-74	< 12	< 10
75-79	< 11	< 10
80-84	< 10	< 9
85-89	< 8	< 8
90-94	< 7	< 4

CHAPTER 3

RESULTS

Three participants were tested during Week 1. Their results along with age-related norms provided by the CDC are shown in Table 3. Based on their performance on the 30sCST, Subject 3 was assessed to be at a fall risk. None of the participants required the use of their arms to assist them when coming to a standing position. With the loss of Subject 3 who decided to withdraw from the program due to concerns about knee pain, only two participants were tested during Week 7. The remaining two participants were not considered a falls risk according to his or her score on the 30sCST upon completion of the *Stepping On* program during Week 7 testing.

Table 3. Participant Results on the 30sCST Week 1 and Week 7 Compared to Age Norms

Participant	**Gender**	**Age**	**Normative data for age & gender**	**Week 1 (Reps)**	**Week 7 (Reps)**
1	F	89	≥ 8	8	8
2	M	93	≥ 7	9	9
3	F	81	≥ 9	7	N/A

Subject 3 was two repetitions away from meeting the age-related norm for her age. She related that the sit-to-stand motion aggravated the pain in her knees, which could have affected her score on this test. Subjects 1 and 2 achieved normative range for their age and had the same number of repetitions during Week 1 and Week 7. Neither participant met the MDC (3.3 repetitions).

Both of the remaining participants reported completing the home exercises "faithfully" throughout the program on the Week 7 *Stepping On* Survey. Subject 1 required modification by reducing weight with the front-knee-strengthening exercise due to increasing knee pain during Week 5. Subject 2 experienced difficulty with the heel-toe (tandem) stance, which was modified by shifting his front foot laterally 1-2 inches to increase his base of support and accommodate his abilities.

On the CDC Fall Risk Survey completed during Week 1, a score of "4" or greater indicates that the person is at a risk of falling.[5] Subject 1 and Subject 2 each scored "5" on the CDC survey, while Subject 3 scored "10" placing all participants at a risk for falling.

CHAPTER IV

DISCUSSION

Each participant, excluding the woman who dropped out, attended all seven sessions. The two remaining participants reported being compliant with performing balance and strengthening exercises, only missing time when they had company visiting. They seemed motivated to learn and looked forward to improving their balance.

Although the participants in this study did not show improvement on the 30sCST from the first to the last sessions, they achieved the same score on the test showing they maintained the lower extremity strength and balance previously demonstrated. The remaining participants had a much higher average age (90.5 years old at Week 7) than those studied by Clemson et al (mean age of 78.3 years old). This could explain the reason these participants did not respond similarly to the program.

The three tests requiring physical activity were performed in a random order so each participant completed the 30sCST at a different time of the sequence. A person would be expected to perform better on the tests they performed first versus the last one completed. Adjustments of scoring for fatigue should be considered in the future.

Each participant in this study has at least one co-morbidity, the male suffered a stroke in the past while the woman has a history of a total knee replacement, which also could affect their ability to perform well on each of the tests and show improvement in their balance. Because of these pathologies, both people required modifications with their

exercises due to an inability to perform the exercises as prescribed. This could also negatively affect their outcomes throughout the *Stepping On* program.

Although two of the participants were not considered to be at a fall risk based on their results on the 30sCST, they were a fall risk according to their score on the CDC Fall Risk Survey. The CDC survey is valuable because it incorporates dynamic functional tasks such as stepping onto a curb and rushing to the toilet; however, that difference could account for the discrepancy between the two assessments. Because the survey is subjective, participants' confidence could affect their scores on this test as well.

According to information from Sherrington et al,[9] evidence shows that an exercise program is most effective if it runs for the equivalent of twice per week for at least 25 weeks. The authors also indicate a portion of the program should be "devoted to exercises and activities to improve balance" in order to reduce risk of falling. While *Stepping On* does include exercises devoted to improving balance, it falls short on the time recommended in Sherrington's study. If the participants complete their balance exercises daily and strengthening exercises three times per week as prescribed, they spend an estimated three hours doing these activities each week for seven weeks. Without any additional exercises to supplement the ones provided by *Stepping On*, the participants are not achieving the necessary amount of exercise to affect change in their risk of falling. Therefore, participants should be encouraged to seek other opportunities beyond *Stepping On* for continued exercise. Suggestions such as the SilverSneakers and Bone Builders programs were given to participants.

Stepping On has been proven to be effective in reducing the risk of falls among the elderly population.[2] The use of a multifactorial approach, combining education and

exercise, to address falls prevention is an effective method to increase confidence and decrease risk of falling.[4] The 30-second Chair Stand Test is an effective, quick, and easy method to assess for risk of falling and monitor for change made by participating in the *Stepping On* program. More research is necessary for the effects of the program on people over 80 years old and those with significant past medical histories. Further research should also be completed comparing the 30sCST, the FTSTS Test, the FSBT, the TUG Test, and the ABC.

Participants will be invited to attend a meeting and complete a survey three months following completion of the program. This study was completed prior to this time, therefore those results could not be included. The participants' answers on this survey would be beneficial to reveal their continued activity level and the occurrence of falls.

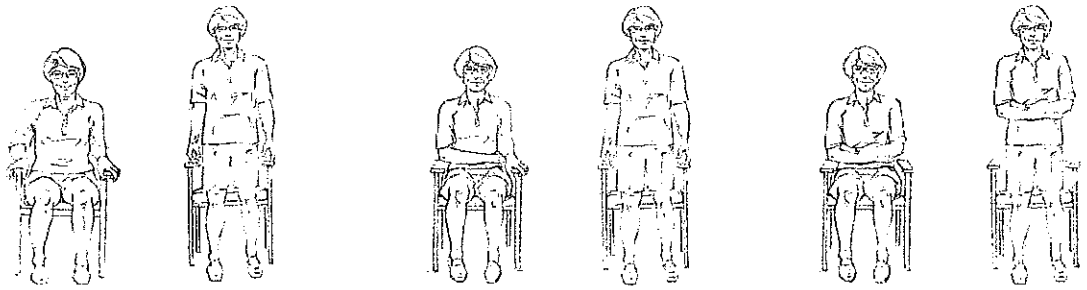
APPENDIX A

Exercises at a glance

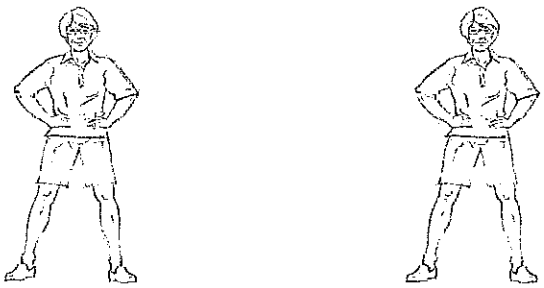
BALANCE EXERCISES

For more specific instructions on advancing each exercise, refer back to the manual.

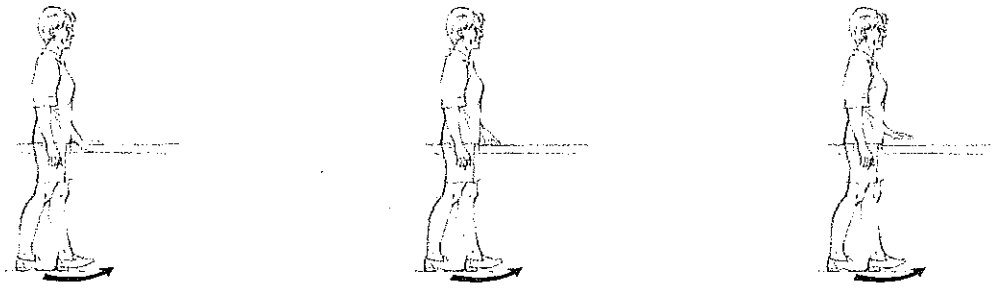
Sit-to-stand



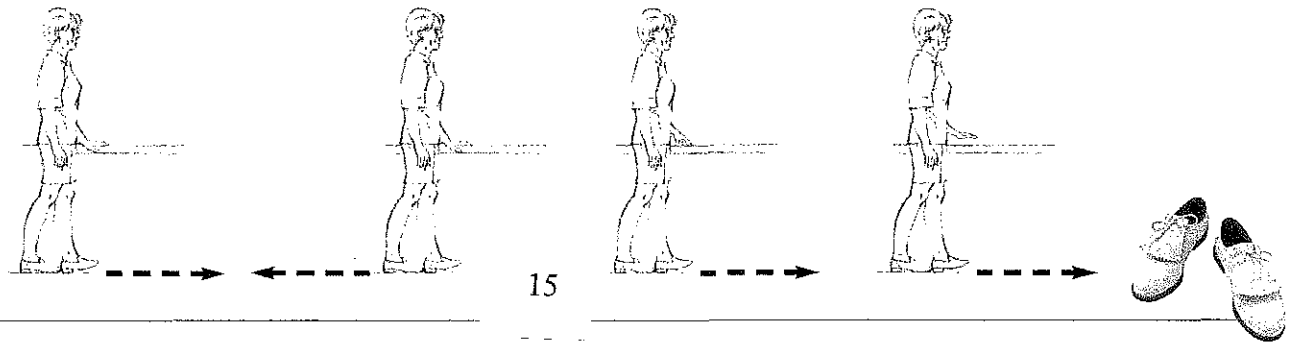
Sideways walking



Heel-toe (tandem) standing



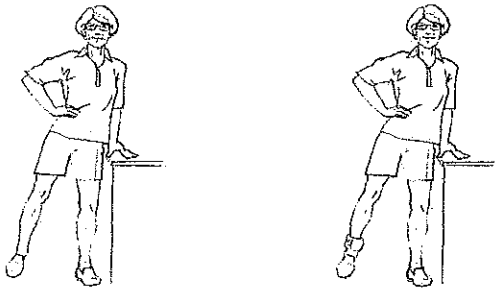
Heel-toe (tandem) walking



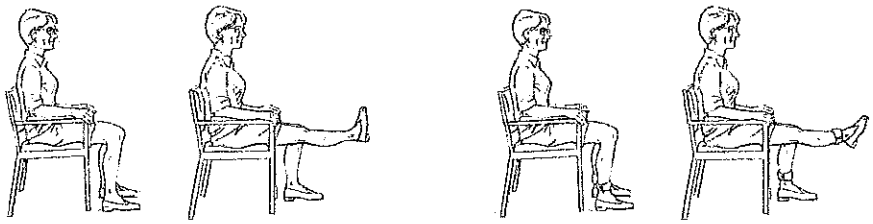
Strength Exercises

For more specific instructions on advancing each exercise, refer back to the manual.

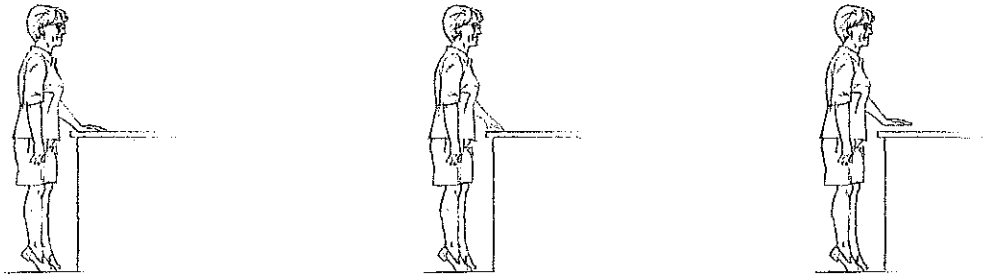
Side-hip-strengthening



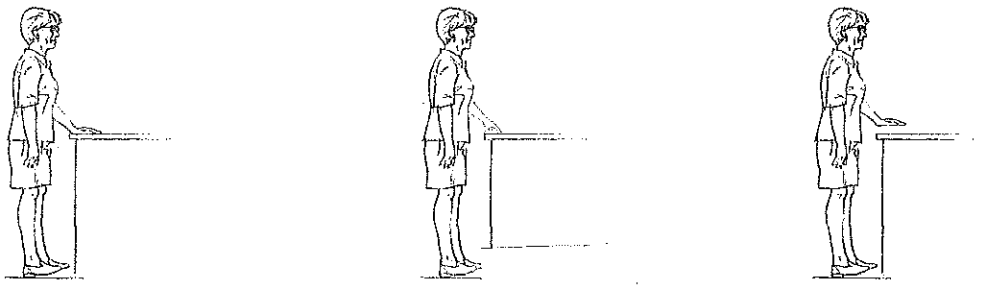
Front-knee-strengthening



Heel raises



Toe raises



APPENDIX B

Research Project Review and Progress Report
University of North Dakota Institutional Review Board

DATE: 2/26/2016 **DEPARTMENT:** Physical Therapy

PRINCIPAL INVESTIGATOR: Danks, Meridee; Johnson, Beverly

PROJECT TITLE: The Effectiveness of the "Stepping On" Program for Reducing the Incidence of Falls in the Elderly

PROPOSAL NUMBER: IRB-201209-047

IF MEDICAL COMPONENT, PLEASE GIVE PHYSICIAN'S NAME:

IRB USE ONLY

☐ FULL BOARD REVIEW REQUIRED, EVEN THOUGH ORIGINAL APPROVAL WAS EXPEDITED

☑ CONTINUED APPROVAL, "EXPEDITED" CATEGORY 4, 7

☑ NEXT REVIEW REQUIRED BEFORE: APR 1 2017

☐ CONTINUED APPROVAL, BASED ON FULL BOARD REVIEW

☐ NEXT REVIEW REQUIRED BEFORE: _____

☐ SUSPEND APPROVAL, PENDING INVESTIGATION

☐ APPROVAL TERMINATED

COMMENTS OF REVIEWER: _____

Signature of Chair/Vice Chair or Designee: [signature]

cc: Chair, Physical Therapy Approval Date: 4.5.16

1. Is project complete? Yes ☐ No ☒

2. Is project ongoing? Yes ☒ No ☐

If No, explain below and indicate if continued approval and continuing review is desired.

3. How many subjects have been enrolled in the research project?

14 since the date of last approval, and

34 since the initial approval

4. Is the research permanently closed to the enrollment of new subjects? Yes ☐ No ☒

Have all subjects completed all research-related interventions? Yes ☐ No ☒

Does the research remain active only for long-term follow-up of subjects? Yes ☐ No ☒

5. Is data analysis complete? Yes ☐ No ☒

*** If the research is permanently closed to the enrollment of new subjects, all subjects have completed all research-related interventions, the research does not need to remain active for long-term follow-up of subjects, and all data analysis is complete, please sign here that you would like the IRB to terminate approval for this project, and finish filling out the rest of this form.

Please terminate IRB approval for this research project _____ _____

Signature of Principal Investigator Date

APPENDIX C

INFORMED CONSENT

TITLE:	**The Effectiveness of the "Stepping On" Program for Reducing the Incidence of Falls in the Elderly**
PROJECT DIRECTOR:	**Meridee Danks and Beverly Johnson**
PHONE #	**701-777-2831**
DEPARTMENT:	**Physical Therapy**

STATEMENT OF RESEARCH

A person who is to participate in the research must give his or her informed consent to such participation. This consent must be based on an understanding of the nature and risks of the research. This document provides information that is important for this understanding. Research projects include only subjects who choose to take part. Please take your time in making your decision as to whether to participate. If you have questions at any time, please ask.

WHAT IS THE PURPOSE OF THIS STUDY?

You are invited to be in a research study that will look at the effectiveness of education and exercise in reducing falls. You have been identified as a possible subject as you are presently participating in the "Stepping On" program. The purpose of this research study is to test whether the Stepping On program is effective in reducing falls in older people living at home. Participants need to be 65 or older, live in on their own, and be able to walk independently in the community.

HOW MANY PEOPLE WILL PARTICIPATE?

Approximately 10-12 people at each site will take part in this study being performed by University of North Dakota Department of Physical Therapy.

HOW LONG WILL I BE IN THIS STUDY?

Your participation in the study will last the same length of time you will be in the Stepping On program (7 weeks with a 3 & 6-month follow-up). The assessment times will be at the same days as when you will be attending your Stepping On program. Each visit will take about *20* minutes during the Day 1, Day 7, 3-month & 6-month recheck of the Stepping On program.

Date_____
Subject Initials: _____

WHAT WILL HAPPEN DURING THIS STUDY?

Assessments will occur at Week 1 and 7 sessions and then at 3 month booster session and at 6 month recheck at the same site. Assessment will include the following:

1. Baseline Questionnaire and Fall Risk Survey - are filled out as part of the Stepping On program. Questionnaire is to gather demographic, mobility and fall information. You are free to skip any questions that you prefer not to answer. Time to complete is ~10 minutes.

Additional test performed (beyond Stepping On gathered information), include:

2. Activities-specific Balance Confidence (ABC) Scale - subject rates level of confidence in doing everyday activities with out falling using a 0 – 100% scale (0 = no confidence to 100 = completely confident). Total score is sum of 16 individual activity scores, which is than averaged, the higher the score the less concerns the subject has about falling. Time to complete is less than 5 minutes.

3. Sit to Stand Test (STS) - the subject will be asked to go from a sit to stand for 30 seconds. The number of repetitions will be completed in 30 sec and the length of time to complete the first 5 sit to stands will be recorded. This is an objective measurement of strength and balance. Time to complete ~ 3 minutes.

4. Timed Up and Go Test (TUG) - the test requires that subjects stand up from a chair, walk 10 ft, turn around, and return. The time to complete the activity is recorded. A second trial will be performed with the subject perfoming a cognitive task (i.e. subtracting by 3s or spelling words) while walking. A safety belt will be used when performing the assessment. Time to complete is 1 minute. This is an objective measure of balance in an activity of daily function. If available, the GAITRite electronic walkway may be used to allow the researchers to gather greater data on subjects walking parameters during the 10 meter walk.

5. Four-Test Balance Scale – This is a four part balance test, each part progressively challenges a person balance. The subject first will try to balance for 10 seconds with feet together, then with feet together but one slightly ahead of the other, progressing to one foot in front of the other (heel-toe) and lastly, the subject stands on one leg for up to 30 seconds with eyes open. If subject is unable to stand for the alotted time for any part the test will be stopped. A safety belt will be used during this assessment. Time to complete is 3-5 minutes. This is an objective measure of balance and strength.

6. Fall and Activity Survey and Stepping On Participation Evaluation - each subject will be given the 2 survey's following the completion of Stepping On session at Week 7, at 3-month Booster session and at the 6 months recheck to record any falls that have occurred and to monitor follow through of assigned strength and balance exercises. Fall is defined as an event that results in a person unintentionally coming to rest on the ground, floor, or

Date_____
Subject Initials: _____

other lower level. (Buchner) If a subject is unable to attend the Booster session and/or at the 6-month recheck they will be contacted by phone or mail in regards to the survey.

WHAT ARE THE RISKS OF THE STUDY?

There may be some risk from being in this study, mainly with the potential to lose your balance. This risk will be minimized by use of safety precautions. For each physical balance assessment a safety belt and spotter will be used to prevent any falls. You can decide not to perform any assessment that you do not feel comfortable/safe performing.

WHAT ARE THE BENEFITS OF THIS STUDY?

You benefit personally from being in this study. However, we hope that, in the future, other people might benefit from this study because it may help identify benefits of prevention education and exercise on falls in the elderly population. You may benefit by knowing your balance strengths and weakness that will be identified by the assessment scores.

ALTERNATIVES TO PARTICIPATING IN THIS STUDY

You can decide to participant only in the Stepping On program and not in the research study.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

You will not have any costs for being in this research study. Nor will you be paid for being in this research study.

WHO IS FUNDING THE STUDY?

The University of North Dakota and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

CONFIDENTIALITY

The records of this study will be kept private to the extent permitted by law. In any report about this study that might be published, you will not be identified. Your study record may be reviewed by Government agencies, the UND Research Development and Compliance office, and the University of North Dakota Institutional Review Board Any information that is obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of assigning you an identification number that will be used instead of your name on any data that is kept. Your signed consent form and your data will be stored separately in a locked room. Only the researchers will have access to any identifiable information. If we write a report or article about

Date_____
Subject Initials: _____

this study, we will describe the study results in a summarized manner so that you cannot be identified.

IS THIS STUDY VOLUNTARY?

Your participation is voluntary. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled. Your decision whether or not to participate will not affect your current or future relations with the University of North Dakota or the Stepping On program

CONTACTS AND QUESTIONS?

The researchers conducting this study are Meridee Danks and Beverly Johnson. You may ask any questions you have now. If you later have questions, concerns, or complaints about the research please contact **Meridee Danks or Beverly Johnson at 701-777-2831** during the day.

If you have questions regarding your rights as a research subject, or if you have any concerns or complaints about the research, you may contact the **University of North Dakota Institutional Review Board at (701) 777-4279**. Please call this number if you cannot reach research staff, or you wish to talk with someone else.

Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

Subjects Name: (Print) _____

_____ _____

Signature of Subject Date

I have discussed the above points with the subject or, where appropriate, with the subject's legally authorized representative.

_____ _____

Signature of Person Who Obtained Consent Date

Approval Date: MAY 11 2015
Expiration Date: MAY 10 2016
University of North Dakota IRB

Date_____
Subject Initials: _____

APPENDIX D

Stepping On Baseline Questionnaire – Week 1

Yes or No Do you have any vision impairments? (glasses, macular degeneration, glaucoma, etc.)

*If yes, what kind?

Yes or No Have you had any surgeries in the last year? (hip, knee, etc.)

*If yes, what kind?

Yes or No Have you had any major health issues in the past year?

*If yes, briefly describe.

Yes or No Do you have difficulty with walking or balance?

Yes or No Do you exercise regularly (3x/week or more)?

*If yes, what type of exercise & how often do you perform it?

*How would you rate your level of physical activity on a typical day? (circle one)

Inactive Minimally Active Moderately Active Highly Active

Stepping On – Week 1
Fall Risk Checklist (CDC)

Name _____ Age _____ Date _____

Please Circle **"Yes" or "No"** for each statement below. **( )** indicates # of points .

Yes (**2**) or No (0) I have fallen in the past year. If yes, how many times? _____

Yes (**2**) or No (0) I use or have been advised to use a cane or walker to get around safely.
*If yes, what assistive device do you use most often?

Yes (1) or No (0) Sometimes I feel unsteady when I am walking.

Yes (1) or No (0) I steady myself by holding onto furniture when walking at home.

Yes (1) or No (0) I am worried about falling.

Yes (1) or No (0) I need to push with my hands to stand up from a chair.

Yes (1) or No (0) I have some trouble stepping up onto a curb.

Yes (1) or No (0) I often have to rush to the toilet.

Yes (1) or No (0) I have lost some feeling in my feet.

Yes (1) or No (0) I take medicine that sometimes makes me feel light-headed or more tired than usual.
*How many prescription medicines do you take per day? ____

Yes (1) or No (0) I take medicine to help me sleep or improve my mood.

Yes (1) or No (0) I often feel sad or depressed.

TOTAL _____ Add up the number of points for each "yes" answer. *If you scored 4 points or more, you may be at risk for falling.*

Date _____ Name _____

Stepping On Survey – Week 7

1. Do you feel your balance and confidence have improved while performing daily activities as a result of participating in the Stepping On Program?

   Balance Yes _____ No _____

   Confidence Yes _____ No _____

   If yes, what information helped you the most?

2. A fall is any event that led to an unplanned, unexpected contact with a supporting surface such as the floor. Have you fallen since starting the Stepping On Program?

   Yes _____ No_____ If yes, how many falls since the program began: _____

   Describe the cause of fall(s) and any injuries that occurred:

3. How would you rate your present level of daily physical activity? (circle one)

   Inactive/Low **Moderate** **High**

   If your physical activity is limited, what do you think is the major reason?

4. Have you performed the Stepping On exercises faithfully?

   Yes___No___

   If no, what has kept you from performing the exercises as per the recommended amount of times?

If yes, record on the chart below how often each week you perform the Stepping On exercises, the number of repetitions you do of each exercise, and the amount of weight you use with the strength exercises?

Balance Exercises:

	# times/week	# of repetitions
Sit-to-Stand		
Sideways Walking		
Heel-toe standing		
Heel-toe walking		

Strength Exercises:

	# times/week	# of reps & weight
Side-hip-strengthening		
Knee-strengthening		
Heel raises		
Toe raises		

5. Do you have any difficulties performing the above exercises?

Yes _____ No _____ If yes, describe what difficulties you are having?

6. Had you been actively exercising at home prior to the Stepping On program?

Yes ____ No ____ If yes, what type of exercise did this include?

How frequently do you perform these? _____

7. Do you participate in community exercise groups (other than Stepping On program)?

Yes ____ No ____ If yes, what group and/or type of exercise?

How often do you attend? _____

Date _____ ID # _____

Stepping On Survey – 3 months after

1. Do you feel your balance and confidence have improved while performing daily activities as a result of participating in the Stepping On Program?

   Balance Yes___ No___

   Confidence Yes___ No___ If yes, what strategies have helped you?

2. Do you feel that the Stepping On Program has helped you?

   Yes___ No___ If yes, how has it helped you?

3. Have you had any falls since completing the Stepping On Program?

   Yes___ No___ If yes, how many falls:_____
   What was the cause(s) of the fall(s)?

4. How often do you perform the Stepping On exercises usually? (Circle below)

   Strength: ≥3x/week 2x/week 1x/week < than 1x/week Not at all

   Balance: ≥3x/week 2x/week 1x/week < than 1x/week Not at all

   If you have not been doing the exercises regularly, what has kept you from doing so?

5. Have you joined or continued any community exercise groups since the Program?

   Yes___ No___ If yes, what group?

Name _____

The Activities-specific Balance Confidence (ABC) Scale*

For each of the following activities, please indicate your level of self-confidence by circling a corresponding number from the following rating scale:

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

"How confident are you that you will not lose your balance or become unsteady when you..."

1. ...walk around the house?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

2. ...walk up or down stairs?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

3. ...bend over and pick up a slipper from the front of a closet floor?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

4. ...reach for a small can off a shelf at eye level?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

5. ...stand on your tiptoes and reach for something above your head?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

6. ...stand on a chair and reach for something?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

7. ...sweep the floor?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

See pg 2 →

8. ...walk outside the house to a car parked in the driveway?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

9. ...get into or out of a car?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

10. ...walk across a parking lot to the mall?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

11. ...walk up or down a ramp?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

12. ...walk in a crowded mall where people rapidly walk past you?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

13. ...are bumped into by people as you walk through the mall?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

14. ... step onto or off an escalator while you are holding onto a railing?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

15. ... step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

16. ...walk outside on icy sidewalks?

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

*Powell, LE & Myers AM. The Activities-specific Balance Confidence (ABC) Scale. *J Gerontol Med Sci* 1995; 50(1): M28-34

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