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Comparing the Effectiveness of Activity-Based Interventions and Rote Exercises in Skilled Nursing Facilities

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This evidence project, submitted by

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Key words: activity-based, rote exercise, skilled nursing facilities

Abstract

Joette Jindra, OTR/L and director of rehabilitation at ManorCare in Tacoma, WA was interested in learning what type of interventions should be utilized by the therapists on her team. Therefore, the purpose of this critically appraised topic (CAT) was to examine the current literature on the effectiveness of activity-based intervention (meaningful or nonmeaningful) and rote exercise for improving physical performance outcomes in patients residing in skilled nursing facilities (SNF). The student researchers examined the literature on articles comparing the outcomes of activity-based interventions to those of rote exercise. Articles describing the outcomes of the two interventions independently were also examined. A total of 36 peer-reviewed articles were reviewed. Both activity-based interventions and rote exercise were shown to be effective in improving physical performance outcomes of clients in inpatient facilities. However, when directly comparing the two types of intervention, activity-based interventions were consistently found to be more beneficial than rote exercise for clients receiving therapy services in residential and inpatient facilities. These findings can help therapists make informed decisions to use activity-based interventions during their treatment session to increase client outcomes.

With these findings, the student researchers provided an in-service presentation and pre- and post-survey to the occupational therapy team at ManorCare. The results of the pre- and post-surveys were used to measure the knowledge translation. It is recommended that Jindra and her team continue to advocate and utilize activity-based interventions at ManorCare.

Executive Summary

Student researchers collaborated with the practicing clinician to develop a CAT to examine the existing evidence to address her question: Is activity-based intervention (meaningful or nonmeaningful) or rote exercise intervention more effective for improving physical performance outcomes in patients residing in SNFs?

Six databases (PubMed, CINAHL, Google Scholar, National Rehabilitation Information Center (NARIC), ProQuest Central, and OT Search) were queried using the key terms "activity-based," "rote exercise," "skilled nursing facility," and their associated synonyms. First, all three key terms were searched together to find articles directly comparing activity-based interventions to rote exercise. Articles were considered if the outcomes were physical performance measures. To find additional articles, each intervention type was searched individually with the "SNF" key terms. Articles in these searches were selected if the physical performance outcomes were similar to those found in the articles directly comparing the two types of interventions. The student researchers assessed 3,691 articles for inclusion by reviewing the titles and abstracts. A total of 31 articles met the inclusion criteria with five additional articles found using citation tracking and reference checking. The AOTA levels are as follows: 22 articles with level I, three articles with level II, nine articles with level III, one article with level IV and one article with level V.

Of the 36 articles reviewed, 15 articles directly compared activity-based intervention and rote exercise, 12 examined rote exercise alone, and nine examined activity-based interventions alone. Both rote exercise and activity-based interventions improved physical performance outcomes. However, when the interventions were directly compared, there was thin but consistent evidence that activity-based interventions are more beneficial than rote exercise for

improving physical performance outcomes in patients receiving therapy services in residential and inpatient facilities.

While the research comparing activity-based interventions to rote exercise is limited, especially in SNF settings, the literature that does exist supports the use of activity-based interventions and indicates to rehabilitation teams that activity-based interventions should have a primary role in therapy sessions in order to maximize functional performance. Therefore, occupational therapists should apply their knowledge on the increased benefits of activity-based interventions compared to rote exercise interventions to inform their decisions on interventions used during therapy. It is also recommended that additional research be conducted on activity-based interventions and comparing activity-based interventions to rote exercise specifically in SNFs, along with residential and inpatient rehabilitative settings.

Our knowledge translation activity consisted of an interactive in-service PowerPoint presentation for the occupational therapists and occupational therapy assistants at ManorCare in Tacoma. A pre- and post-survey was given to all attendees to gather data on knowledge translation. The survey results suggested that knowledge translation was successful with responses on the survey indicating an increase in understanding of what constitutes activity-based interventions. Fully 100% of attendees indicated that the in-service was helpful and 88% said that the material presented would influence their decision making regarding intervention selection.

Final CAT Paper

Focused Question:

Is activity-based intervention (meaningful or nonmeaningful) or rote exercise intervention more effective for improving physical performance outcomes in patients residing in skilled nursing facilities (SNF)?

Collaborating Occupational Therapy Practitioner:

Joette Jindra, OTR/L

Prepared By:

Loren Burnett, Kelsey Tasoe, and Kirsten Woodard

Chair:

Kirsten Wilbur, Ed.D., OTR/L

Course Mentor:

George Tomlin, PhD, OTR/L, FAOTA

Date Review Completed:

November 10, 2017

Clinical Scenario:

A director of rehabilitation is wondering if activity-based interventions are more effective than rote exercise interventions for improving physical performance outcomes of residents in the SNF.

Review Process

Procedures for the selection and appraisal of articles

Inclusion Criteria:

Any articles that address activity-based and rote exercise, SNF, nursing homes, assisted living, rehabilitation, group and individual therapy, geriatric and adult patients, activities of daily living (ADL), instrumental activities of daily living (IADL), task performance, stroke, hemiplegia, and

any other SNF related diagnosis. Articles written after 1980 will be included in our search, because the majority of initial literature found was published in the mid-1980s.

Exclusion Criteria:

Any articles that include studies with young adult/college students, pediatric, burn, outpatient rehabilitation, home health, community health, hand therapy, mental health, and acute rehabilitation patients.

Search Strategy

Categories	Key Search Terms
Patient/Client Population	Patients at a SNF with a variety of diagnoses, ages, gender, and races
Intervention (Assessment)	Activity-based intervention
Comparison	Rote exercise intervention
Outcomes	Performance measures including exercise repetition, smoothness of reach movement, displacement, force, speed, vertical distance, frequency, duration of repetitions, frequency of discontinuities, time in standing, accuracy, distance, range of motion (ROM), balance, and ADL/IADL or any other functional measures

Databases and Sites Searched
PubMed
CINAHL
Google Scholar

National Rehabilitation Information Center (NARIC)
ProQuest Central
OT Search
Citation tracker and Reference checking

Quality Control/Review Process:

The final research question was developed through information provided by Jindra on the goals and values of the facility. Meetings with Professors George Tomlin and Kirsten Wilbur assisted the researchers in developing a final research question that would focus on the facility in question. Two unforeseen problems were not enough current research existing on the direct comparison of activity-based and rote exercise interventions and limited research in skilled nursing facility settings. To combat this, the search strategy was widened to include articles that studied the effects of activity-based and rote exercise interventions individually on the specified populations. We also incorporated more settings by including nursing homes, long term care facilities, and inpatient rehabilitation. In addition, our first "SNF" key terms included the setting "hospital." This term was later removed from the key terms list, as it would include hundreds of article hits on settings that did not pertain to the facility in question. The term might be revisited at a later date as the articles may be indirectly related to our topic.

Our review process consisted of six different databases, using key terms for "SNF," "rote exercise," and "activity-based." The researchers focused their searches around three main tactics, which was to first search all three of the key terms together, then to search just for the "rote exercise" key terms and the "SNF" key terms, last to search just for the "activity-based" key terms and the "SNF" key terms. Several studies used the terms "meaningful" and "nonmeaningful" to describe activities, which we considered to be an important aspect to include in our research question. We thought that meaningful activities may be more motivating than nonmeaningful activities and thus result in improved outcomes. Therefore, we included these articles as a

subcategory under activity-based interventions. Using the specified key terms in each database, 3,691 article titles and abstracts were reviewed by the three researchers. Of the 3,691 articles reviewed, 36 were saved to be included in the CAT. Frequent reasons articles were excluded were if the intervention was in the community or an acute rehabilitation setting, if the setting was not clarified, if the participants were from multiple settings, if the treatment group and control group received the same type of intervention at varying levels (i.e. control received exercises, treatment group received intense exercise), if the treatment contained both rote exercise and activity-based interventions without clarifying the amounts of each, or if the intervention was not adequately defined to categorize as rote exercise or activity-based. Duplicated articles were only counted once for "articles kept." Professors George Tomlin and Kirsten Wilbur along with library liaison Elliott Gandour-Rood assisted in this review process.

Results of Search

Table 1. Key Terms

Key Terms	**Synonyms**
Activity-Based	"added purpose activity" OR "added purpose exercise" OR "added purpose occupations" OR "occupationally embedded exercise" OR "occupation-based activity" OR "occupation-based exercise" OR "purpos* activity" OR "purpos* exercise" OR "task oriented" OR "functional activity" OR "functional exercise" OR "goal-directed action" OR "meaningful activity" OR "materials-based occupation" OR "activity-based exercise" OR "activity-based treatment" OR "activity-based intervention"
Rote Exercise	"rote exercise" OR "biomechanical exercise" OR "non-purposeful activity" OR "non-purposeful exercise" OR "nonpurposeful activity" OR "nonpurposeful exercise" OR "general exercise" OR "resistance training" OR "strength training" OR "preparatory methods" OR "physical activity" OR "single purpose exercise" OR "exercise therapy"

Skilled Nursing Facility	"skilled nursing facilit*" OR "residential care facilit*" OR "assisted living facilit*" OR "nursing home" OR "care home environment*" OR "residential care home" OR "nursing facilit*" or "residential care nursing home facilit*" OR "post-acute inpatient rehab* facilit*" OR "inpatient rehab*"

Table 2. Search Strategy of databases.

Search #	**Search Terms**	**Date**	**Search Engine**	**# of hits**	**# excluded**	**# kept**
1	"activity-based" key terms, "rote exercise" key terms, "SNF" key terms	10/9/2017	CINAHL	21	17	4
2	"rote exercise" key terms, "SNF" key terms	10/9/2017	CINAHL	371	365	6
3	"activity-based" key terms, "SNF" key terms	10/10/2017	CINAHL	79	74	5
4	"activity-based" key terms, "rote exercise" key terms, "SNF" key terms, "therapy"	10/10/2017	PubMed	241	240	1
5	"activity-based" key terms, "SNF" key terms, "therapy OR intervention OR treatment"	10/10/2017	PubMed	371	369	2
6	"rote" key terms, "SNF" key terms, "therapy," "therapy OR intervention OR treatment"	10/11/2017	PubMed	452	451	1
7	"activity-based" key terms in abstract, "rote exercise" key terms in abstract, "SNF" key terms w/o hospital, "therapy"	10/12/17	Proquest Central	9	6	3
8	"activity-based" key terms in abstract, "SNF" key terms w/o hospital, "therapy"	10/12/17	Proquest Central	87	86	1

9	“rote exercise” OR “single purpose exercise” AND “activity-based exercise” OR “task oriented” AND “nursing home” OR "skilled nursing facility”	10/12/17	Google Scholar	23	23	0
10	“rote exercise” OR “non-purposeful activity” AND “occupation-based activity” OR “added purpose activity” AND “nursing home” OR "inpatient rehab*”	10/12/17	Google Scholar	20	18	2
11	“nonpurposeful exercise” OR “general exercise” AND “goal-directed action” OR “meaningful activity” AND “residential care facility*” OR “assisted living facility*”	10/12/17	Google Scholar	2	2	0
12	“nonpurposeful exercise” OR “general exercise” AND “goal-directed action” OR “meaningful activity” AND “nursing home” OR "inpatient rehab*”	10/12/17	Google Scholar	9	9	0
13	“biomechanical exercise” OR “resistance training” AND “added purpose exercise” OR “occupationally embedded exercise” AND “nursing home” OR "inpatient rehab*”	10/12/17	Google Scholar	6	6	0
14	“strength training” OR “preparatory methods” OR “Rote exercise” AND “added purpose occupations” OR “occupation-based exercise” AND “nursing home” OR "inpatient rehab*”	10/12/17	Google Scholar	48	48	0
15	“single purpose exercise” OR “nonpurposeful exercise” AND “added purpose exercise” OR “purpos* exercise” OR “task oriented” AND “nursing home” OR "inpatient rehab*” OR “residential care facilit*”	10/12/17	Google Scholar	1	1	0
16	“physical activity” AND “goal-directed action” OR “meaningful activity” AND “skilled nursing facility*” OR “inpatient rehab*” AND “therapy”	10/12/17	Google Scholar	49	49	0
17	“rote exercise” OR “non-purposeful activity” AND “occupation-based activity” OR “added purpose activity” AND “nursing home”	10/12/17	OT Search	24	24	0

18	“biomechanical exercise” OR “resistance training” AND “added purpose exercise” OR “occupationally embedded exercise” AND “nursing home” OR "inpatient rehab*”	10/12/17	OT Search	102	102	0
19	“nonpurposeful exercise” OR “general exercise” AND “goal-directed action” OR “meaningful activity” AND “residential care facility*” OR “assisted living facility*”	10/12/17	OT Search	11	11	0
20	“physical activity” AND “goal-directed action” OR “meaningful activity” AND “skilled nursing facilit*” OR “nursing home”	10/12/17	OT Search	215	214	1
21	“rote exercise” OR “non-purposeful activity” OR “nonpurposeful exercise” OR “general exercise” AND “skilled nursing facility” OR “nursing home”	10/12/17	OT Search	234	234	0
22	“added purpose activity” OR “Added purpose exercise” OR “added purpose occupations” AND “skilled nursing facility” OR “nursing home” OR “assisted living facility” OR “residential care facility”	10/12/17	OT Search	243	243	0
23	“purposeful activity” OR “occupation-based activity” OR “task oriented” AND “skilled nursing facility” OR “nursing home” OR “assisted living facility” OR “residential care facility”	10/12/17	OT Search	296	295	1
25	“activity-based” key terms, “rote exercise” key terms, “SNF” key terms w/o hospital, “therapy,” scholarly articles only	10/12/17	ProQuest Central	334	332	2
26	“rote exercise”	10/13/17	NARIC	8	8	0
27	added purpose activity	10/13/17	NARIC	3	3	0
28	occupation-based activity	10/13/17	NARIC	6	6	0
29	occupation-based exercise	10/13/17	NARIC	2	2	0
30	“purpos* activity”	10/13/17	NARIC	0	0	0

31	“functional activity”	10/13/17	NARIC	79	79	0
32	“functional exercise”	10/13/17	NARIC	13	13	0
33	"rote exercise" and "skilled nursing facilit*"	10/20/17	ProQuest Central	8	8	0
34	rote exercise key terms in abstract, “SNF” key terms w/o hospital, “therapy”	10/20/17	ProQuest Central	199	198	1
35	("skilled nursing facilit*" OR "post-acute inpatient rehab* facilit*" OR "inpatient rehab*") AND ("rote exercise" OR "biomechanical exercise" OR "resistance training" OR "strength training" OR "preparatory methods" OR "single purpose exercise" OR "exercise therapy") AND therapy AND ("Tinetti" OR "strength" OR "functional outcomes" OR "ADL" OR "FIM" OR "standing tolerance" OR "functional performance" OR "LOS" OR "repetitions" OR "mobility" OR "balance" OR "Barthel Index" OR "SF 36")	10/20/17	ProQuest Central	125	124	1
36	("skilled nursing facilit*" OR "post-acute inpatient rehab* facilit*" OR "inpatient rehab*") AND ("rote exercise" OR "biomechanical exercise" OR "resistance training" OR "strength training" OR "preparatory methods" OR "single purpose exercise" OR "exercise therapy") AND therapy AND ("Tinetti" OR "strength" OR "functional outcomes" OR "ADL" OR "FIM" OR "standing tolerance" OR "functional performance" OR "LOS" OR "repetitions" OR "mobility" OR "balance" OR "Barthel Index" OR "SF 36") 10/21/17-1/22/18	1/22/18	ProQuest Central	4	4	0
37	rote exercise key terms in abstract, “SNF” key terms w/o hospital, “therapy” last 3 months	1/22/18	ProQuest Central	8	8	0
38	"rote exercise" and "skilled nursing facilit*" last 3 months	1/22/18	ProQuest Central	8	8	0

39	"activity-based" key terms, "rote exercise" key terms, "SNF" key terms w/o hospital, "therapy" last 3 months	1/22/18	ProQuest Central	7	7	0
40	"activity-based" key terms, "rote exercise" key terms, "SNF" key terms, date October 2017 – January 2018	1/22/18	CINAHL	0	0	0
41	"rote exercise" key terms, "SNF" key terms, date October 2017 – January 2018	1/22/18	CINAHL	9	9	0
42	"activity-based" key terms, "SNF" key terms, date October 2017 – January 2018	1/22/18	CINAHL	1	1	0
44	"activity-based" key terms, "rote exercise" key terms, "SNF" key terms, date 10/10/2017 - present	1/22/18	PubMed	16	16	0
45	"rote exercise" key terms, "SNF" key terms, date 10/10/2017 - present	1/22/18	PubMed	39	39	0
46	"activity-based" key terms, "SNF" key terms, date 10/10/2017 - present	1/22/18	PubMed	26	26	0
	Total number of articles used in review from database searches = 31					

Table 3. Articles from citation tracking.

Article	Date	Database	Initial Hits	Articles Excluded	Total Selected for Review
Adding meaning to a design copy task through representational stimuli	10/21/17	Google Scholar	25	25	0
Adding purpose to the repetitive exercise of elderly women through imagery	10/21/17	Google Scholar	53	53	0
The effects of electronic music-making as a therapeutic activity for improving upper extremity active range of motion	10/21/17	Google Scholar	23	23	0

The extent dynamic standing endurance is effected when CVA subjects performa personally meaningful activities rather than nonmeaningful tasks	10/21/17	Google Scholar	34	34	0
Effect of preference on distance walked by assisted living residents	10/21/17	Google Scholar	17	17	0
Materials-based occupation versus imagery-based occupation versus rote exercise: a replication and extension	10/21/17	Google Scholar	35	35	0
Is there a role for meaningful activity in stroke rehabilitation?	10/21/17	Google Scholar	15	15	0
Comparison of performance in materials-based occupation, imagery-based occupation, and rote exercise in nursing home residents	10/21/17	Google Scholar	56	56	0
Effect of rehabilitation task on organization of movement after stroke	10/21/17	Google Scholar	185	184	1
Total number of articles used in review from citation tracking = 1					

Table 4. Articles from reference tracking.

Article	Date	Articles Referenced	Articles Excluded	Total Selected for Review
Can play increase standing tolerance? A pilot-study.	10/14/17	19	18	1
Comparing Occupation-Based and Repetitive Task Practice Interventions for Optimal Stroke Recovery: A Pilot Randomized Trial	10/14/17	36	35	1
A comparison of performance in added-purpose occupations and rote exercise for dynamic standing balance in persons with hemiplegia	10/14/17	23	22	1

Exercise training in the debilitated aged: strength and functional outcomes	10/14/17	27	26	1
Total number of articles used in review from reference tracking = 4				

Total number of articles used in review from database searches = 31
Total number of articles used in review from citation tracking = 1
Total number of articles used in review from reference tracking = 4
Total number of articles used in review from UPS Master's Thesis = 0
Total number of articles used in CAT = 36

Summary of Study Designs of Articles Selected for the CAT Table

Pyramid Side	**Study Design/Methodology of Selected Articles**	**Number of Articles Selected**
Experimental	_1_Meta-Analyses of Experimental Trials _21_Individual Randomized Controlled Trials _3_Controlled Clinical Trials _1_Single Subject Studies	26
Outcome	_0_Meta-Analyses of Related Outcome Studies _0_Individual Quasi-Experimental Studies _0_Case-Control Studies _9_One Group Pre-Post Studies	9
Qualitative	_0__Meta-Syntheses of Related Qualitative Studies _0_Small Group Qualitative Studies _0_Brief vs prolonged engagement with participants _0_Triangulation of data (multiple sources) _0_Interpretation (peer & member-checking) _0_A posteriori (exploratory) vs a priori (confirmatory) interpretive scheme _0_Qualitative Study on a Single Person	0
Descriptive	_0_Systematic Reviews of Related Descriptive Studies _0_Association, Correlational Studies _0_Multiple Case Studies (Series), Normative Studies _1_Individual Case Studies	1

Comments: AOTA Levels I- # of articles = 22 II- # of articles = 3 III- # of articles = 9 IV- # of articles = 1 V- # of articles = 1	*36*

CAT Table 1. Quantitative Evidence

Author, Year, Journal, Country	**Study Purpose**	**Study Design, Pyramid, AOTA Evidence Levels, PEDro Rating**	**Participants/ Sample Size/ Inclusion / Exclusion Criteria**	**Interventions (IV)**	**Outcomes Measures (DV)**	**Summary of Results**	**Limitations**
Activity-based Compared to Rote Exercise Studies							
de Bruin & Murer 2006 *Clinical Rehabilitation* Switzerland	To examine the effect of additional functional exercises on LE function of participants using strength training compared to participants only using strength training	RCT, single blind Pyramid: E2 AOTA: I PEDro: 6/10	I: > 70 yo, senior citizens hostel resident, walk 6 m (*N = 32)* E: Severe cognitive impairment; progressive terminal, acute, or unstable chronic illness; myocardial infarction; LE fracture < 6 mo ago; current resistance training	Tx: Ctrl protocol + balance training using activities (30 min on same day as second weekly strength training) (*n* = 16) Ctrl: 12 wks of resistance training (45 mins 2x/ wk) (*n* = 16)	Tinetti Assessment Tool, Biodex Balance System for dynamic stability, maximal isometric knee extensor muscle force, physical performance (summed scores of timed walking measure, chair stand test, and tandem stand)	Tx group showed significant improvement compared to baseline in: Tinetti Balance (p = .026) Physical performance (p = .012) Dynamic stability (p = .009) with significant difference between groups for limits of stability after intervention (p = .031), moderate effect size	High attrition rate in both groups, functional isn't clearly defined, not a functional exercise group only
DeKuiper et al. 1993 *OTJR* US	To compare performance of LE movement of residents using materials-based occupation, imagery-based occupation, and rote exercise	RCT, counterbalanced crossover design Pyramid: E2 AOTA: I PEDro: 4/10	I: Elderly residents of nursing and retirement home, Paracheck score of 25-45, 76-98 yo (*N* = 28) E: No exclusion criteria reported	A) Materials-based occupation (kicking a balloon) B) Imagery-based occupation (imagining a balloon while kicking) C) Rote exercise (kicking foot repetitively)	Vertical distance and speed of movement, number of exercise repetitions	Significantly more repetitions in materials-based occupations compared to the imagery-based and rote exercise conditions (p < .001), no significant difference in imagery-based occupation and rote exercise condition, or between all conditions for vertical distance and speed	Population demographics not specified, not in a specified rehab setting, outcomes not performance or function based

Dolecheck & Schkade 1999 *OTJR* US	To compare the dynamic standing endurance of elderly subjects using personally meaningful goal-directed therapeutic activities vs non-personally meaningful activities	Single group, pre-post study, repeated measures design Pyramid: O4 AOTA: III PEDro: 4/6	I: Adult nursing home residents post-CVA, standing tolerance of <5 mins, min A for standing & ability to comprehend/follow directions (N = 6) E: No exclusion criteria reported	A) Meaningful tasks chosen by individual participant B) Non-meaningful tasks differing for individual participants	Standing time	Personally meaningful activities significantly increased standing time compared to non-meaningful tasks ($p < .05$ for all but one subject) as determined by comparing each subject's regression equations	Study does not explicitly state how non-meaningful tasks were chosen despite there being differences in non-meaningful tasks for each participant
Herbert & Greene 2001 *Physical & Occupational Therapy in Geriatrics* US	To determine the effect of preference of task on distance walked by assisted living residents	Single group, pre-post study, repeated measures design Pyramid: O4 AOTA: III PEDro: 5/6	I: Female residents from an assisted living facility, 70-89 yo, 7 still drove, 3 exhibited short term memory loss, 1 used cane for walking (N = 7) E: No exclusion criteria reported.	Walking with a dog outside, alone outside, with a dog inside and alone inside. (Participants identified which of the tasks were the most preferred, then performed all 4 tasks)	Distance walked	Distance walked was significantly greater for the most preferred tasks compared to the least preferred task (p = .016) Distance walked was significantly greater when walking with dog compared to walking alone (p = .05)	Small sample size
Hoppes 1997 *Physical & Occupational Therapy in Geriatrics* US	To determine if geriatric participants improved standing tolerance when engaged in game playing vs. non-playful activities	Single group, pre-post study Pyramid: O4 AOTA: III PEDro: 5/6	I: Residents of a SNF, 66-85 yo, variety of medical dx, medically stable (N = 10) E: No exclusion criteria reported	Participants engaged in alternating trials bw game-playing and non-playful activities while standing at an elevated table, asked to stand for as long as they could	Standing tolerance measured in sec	Participants stood significantly longer when engaged in game playing than non-playful activities ($p < .01$)	No Ctrl group, no blinded pre/post test
Hsieh et al. 1994 *AJOT*	To compare amount of exercise repetitions of patients using	RCT Pyramid: E2 AOTA: 1	I: Patients from the Veterans General Hospital in Taipei, <6 mo post CVA, dx of	A) Added-materials occupation (picking up and throwing small balls) (n = 7) B) Imagery-based	Frequency and duration of exercise repetitions and frequency of discontinuation	Pts did significantly more exercise repetitions in added-materials condition and imagery-based condition than in rote	Did not control for the variable of imagination, increasing variability of each

US	added-materials occupation, imagery-based occupation, and rote exercise	PEDro: 3/10	unilateral cerebral hemiplegia, 51-78 yo (N = 21) E: No exclusion criteria reported	occupation (imagining picking up and throwing ball) (n = 7) C) Rote exercise (bending to touch ground, elevating arm, flexing and extending elbow) (n = 7)	lasting ≥ 5 secs	exercise condition (p < .05) There was no significant difference bw added-materials and imagery-based condition (p > .05)	imagery-based condition, presence of target materials in imagery-based condition may have affected performance
Lang et al. 1992 *AJOT* US	To compare performance of a LE movement of residents in a nursing home using materials-based occupation, imagery-based occupation, and rote exercise	RCT, crossover design Pyramid: E2 AOTA:1 PEDro: 4/10	I: Residents in a nursing home, 56-93 yo, Paracheck Geriatric Rating Scale > 25 (N = 15) E: No exclusion criteria reported	A) Materials-based occupation (kicking a balloon) B) Imagery-based occupation (imagining a balloon while kicking) C) Kicking foot repetitively	Number of exercise repetitions	Residents kicked significantly more during the materials-based occupation (p = .04) than during other two conditions, no significant difference between imagery-based occupation and rote exercise	Population demographics not specified, not in a specified rehab setting with residents in need of therapeutic exercises, outcomes not performance or function based
Licht & Nelson 1990 *AJOT* US	To compare drawing accuracy of participants engaged in meaningful, representational design copy task and non-meaningful, non-representational design copy task	RCT Pyramid: E2 AOTA: 1 PEDro: 6/10	I: Elderly participants from 6 nursing homes, 67-92 yo, Paracheck scale range of 33-50, able to draw w/ a pen and follow instructions of task, functional vision and hearing, no history of neurological disease or injury (N = 30) E: No exclusion criteria reported	A) Representational design copy task (copying images of arrow, house and face) (n = 15) B) Nonrepresentational (copying geometric images) (n = 15)	Drawing accuracy (number of errors in copied image)	Participants made significantly fewer drawing errors when engaged in the meaningful, representational design copy task (p < .01)	Dx not specified making it difficult to generalize findings

Lin et al. 2007 *Am J Phys Med Rehabil* Taiwan	To compare the reaching performance and balance on patients post CVA during tasks with and without an object	Single group, pre-post study Pyramid: O4 AOTA: III PEDro: 4/6	I: Patients post-first stroke from a medical center rehabilitation program, 39-79 yo, able to use less affected arm to reach forward while standing, absence of apraxia and hemineglect (n = 35) Healthy individuals from the community, 36-76 yo (n = 31) (N = 66) E: No exclusion criteria reported	A) Reaching for object B) Reaching without object present	Reaching distance and smoothness, and postural control in terms of forward distance, mediolateral shift, and average velocity center of pressure	Reaching for object did not significantly increase smoothness of reaching than reaching without object present Reaching for task object was significantly greater on patients w/ L CVA's average velocity center of pressure and on patients w/ R CVA's average velocity center of pressure and forward distance compared to reaching without object (p = .001)	Does not specify the rehabilitation setting within the medical center, large standard deviations of client characteristics indicating sample variability and possible confounding variables
Paul & Ramsey 1998 *Occupational Therapy International* US	To compare effects of electronic music making activity with those of physical exercises	RCT Pyramid: E2 AOTA: 1 PEDro: 7/10	I: Participants of New York City nursing facility with unilateral cerebral hemiplegia, 55-70 yo (N = 20) E: No exclusion criteria reported	Tx: Music making activity using electronic music making devices (n = 10) Ctrl: Physical exercises involving shoulder flexion and elbow extension (n = 10)	Shoulder flexion and elbow extension AROM	Tx group did not improve significantly more than control group	Participants were participating in other activities throughout the day, possibly affecting the results, family was informed about the study and which group their loved one was in, family may have facilitated ROM exercises outside of the study, knowing that the loved one was in Ctrl group, Ctrl group intervention too similar to outcome measures

Riccio et al. 1990 *AJOT* US	To compare the effect of verbally elicited imagery of reaching up and reaching down exercises with rote exercise	RCT, counterbalance design Pyramid: E2 AOTA: 1 PEDro: 4/10	I: Female residents in a nursing home, residential retirement home and foster care home, ages 62-96 yo, with a mean Paracheck score of 44.7 (N = 27) E: Paracheck score < 25	A) Imagery condition of reaching-up to pick apples and reaching-down to pick up coins B) Rote exercise of reaching-up and reaching down	Frequency and duration of exercise repetitions	Imagery condition of reaching-up to pick apples elicited significantly more repetitions than rote exercise (p = .012) Imagery condition of reaching-down to pick coins was in the same direction but difficult to interpret statistically	Not in a specified rehab setting with residents in need of therapeutic exercises, does not specify client diagnoses indicating sample variability and possible confounding variables
Schmidt & Nelson 1996 *OTJR* US	To examine and compare the effects of rote exercise, occupationally embedded exercise, and altruistic occupationally embedded exercise	RCT, counterbalanced-crossover design Pyramid: E2 AOTA: I PEDro: 6/10	I: Receiving upper extremity strengthening in OT at one of two inpatient rehab facilities, w/ neurologic conditions and/or LE problems, 21-80 yo (N = 19) E: Pulmonary precautions	A) Sanding a board (rote exercise) B) Sanding board for shelf (occupationally embedded exercise) C) Sanding board for rocking horse for sick children (altruistic occupationally embedded exercise)	Repetitions, distance of motion (max point of extension)	No significant differences in repetitions or distance of motion between any of the exercises (p > .05)	Rote activity could be classified as activity-based, activities may not have been meaningful or different enough to participants, study carried out over 3 consecutive days
Tomori et al. 2015 *Clinical Rehabilitation* Japan	To compare and determine efficacy of occupation-based and impairment-based approaches in subacute stroke patients in a subacute rehabilitation hospital	RCT, multicenter pilot Pyramid: E2 AOTA: 1 PEDro: 7/10	I: Hospitalized, Aug 2012-Nov 2013, ≥ 40 yo, stroke (infarct, hemorrhagic), ≥ 30 days post onset, ≥ 24 on Mini -Mental State Examination, attended to by OT not involved in study allocation (N = 37)	Tx: Occupation-based interventions (>⅔ of intervention time) (n = 16) Ctrl: Basic function exercises and simulated occupational practice (>⅔ of intervention time) (n = 21)	Short Form-36, Brunnstrom recovery stages, FIM Pre-and post interventions (2 mo period)	No significant differences (p > .05) between Tx and Ctrl groups for all outcomes	High attrition rate in both groups, higher in Tx group (8 of 11 discharged home possibly indicating efficacy of Tx approach), occupation-based and impairment-based interventions were present in both Tx and Ctrl groups

			E: Aphasia, depression, cardiac or progressive disease, OT deemed contraindicated				
Trombly & Wu 1998 *AJOT* US	To compare reaching movements of participants using goal-directed action and rote exercise and to examine effect of functional specificity of object	RCT, repeated-measures counterbalanced design Pyramid: E2 AOTA: 1 PEDro: 4/10	I: Nonhospitalized participants, post-CVA, recruited from rehab hospital and stroke clubs, 45-84 yo, able to reach/grasp with hemiparetic arm (N = 14) E: No exclusion criteria reported	Experiment 1: A) Goal directed action (reach for preferred food) B) Rote exercise (reach to spatial location) Experiment 2: Functional specificity A) Natural context (pick up receiver of active telephone) B) Partial context (pick up detached receiver) C) Simulated context (pick up a stick)	Reaching movements including smoothness, speed, displacement, indication of force and planning strategy	Experiment 1: Patients performed smoother, faster, more forceful and more preplanned reaching movements during goal directed action compared to rote exercise ($p < .05$) Experiment 2: There was no significant difference between functional specificity of natural context, partial context and simulated context	Setting location of participants not specified, months post-stroke varied from 5-175 mo, increasing likelihood of confounding variables
Yoder et al. 1989 *AJOT* US	To compare exercise repetitions, duration, and frequency of stops of residents using added purpose of stirring cookie dough activity and rotary arm exercise with no added purpose	RCT Pyramid: E2 AOTA: I PEDro: 5/10	I: Elderly female residents in a nursing home, 70-92 yo, with a minimum Paracheck score of 25 (N = 30) E: No exclusion criteria reported	A) Stirred for exercise (rote) B) Added-purpose exercise to stir for the purpose of baking cookies	Exercise stirring repetitions, duration of exercise and frequency of stops in stirring	Added purpose treatment had statistically significantly more stirring repetitions ($p < .05$)	Some demographics and diagnoses were not specified making it difficult to generalize findings
Rote Exercise Studies							

Carmeli et al. 2000 *Gerontolgy* Isreal	To determine the effect of exercise on sarcopenia, decrease in muscle mass, and functional abilities	Controlled clinical trial Pyramid: E3 AOTA: II PEDro: 3/10	I: Ambulatory, 78-87 yo, grouped into male female groups with subgroups based on age (≤83, ≥ 84) (*N* = 60) E: Acute disease, uncontrolled chronic disease	Tx: Exercise group 3x/week for 12 weeks conducted by a physical education instructor, residents in long term SNF (*n* = 31) Ctrl: No exercise, residents of old-persons home (*n* = 29)	Muscle strength of knees, TUGT, 3 min distance walk test	TUGT: Significant improvements in Tx groups with older participants ($p < .05$) Muscle strength improved in Tx groups with younger participants ($p < .05$)	Ctrl group not matched for age or sex and were in a different setting with no inclusion/exclusion criteria stated
Chen et al. 2015 *International Journal of Nursing Studies* Taiwan	To determine the effectiveness of an elastic band exercise program on functional fitness of elderly in wc	Cluster Randomized Trial Pyramid: E2 AOTA: 1 PEDro: 6/10	I; Wc users, >65 yo, cognitively intact, mod-heavy dependency in ADLs, from 10 nursing homes (*N* = 114) E: Acute or severe illness, suffering from SCI injury with no rehab potential	Tx: 5 nursing homes, 40 mins wc-bound Senior Elastic Band program, 3x/week/6 mo (*n* = 59) Ctrl: 5 nursing homes, instructed to perform ADLs as usual, excluding elastic band exercises (*n* = 55)	ADL function measured by MBI, lung capacity, body flexibility, muscle power and endurance	Tx group improved more than the Ctrl group on all measures after 6 mo ($p < .05$)	Clustering assignment of nursing home could have unknown effects, interventions were completed in the lobby of nursing homes which may have added a distractibility variable
Fisher et al. 1991 *Arch Phys Med Rehabil* US	To determine effect of muscle rehabilitation program on nursing home residents	Single group, pre-post study Pyramid: O4 AOTA: III PEDro: 5/6	I: Functionally impaired elderly nursing home residents, 60-90 yo (*N*=14) E: Unstable medical conditions w/ risk of injury, severe paranoia, metastatic malignancy, uncontrolled cardiac disease, hypertension, unstable angina pectoris	Muscle rehabilitation program involved isometric and isotonic contraction exercises of the lower extremity	Endurance, strength and contraction velocity	75% of residents had improved muscle function w/ 35% increasing endurance, 15% increasing strength and 10% increasing speed, maintained 4 mo post rehabilitation, some residents did not improve	Improvements were only seen in some residents, *P* values not reported

Gmitter et al. 2009 *Journal of Geriatric Physical Therapy* US	To determine if a participant benefited from a progressive, high intensity resistance training program over 2 mo	Single subject study Pyramid: E4 AOTA: IV PEDro: 3/6	Participant is 97 yo, in SNF 3 months post surgical repair of hip fracture (*N* = 1)	Training regimen consisted of resistance training w/ weighted belt, endurance and balance training	LE strength measured by dynamometer, functional mobility measured by TUGT, Six Minute Walk, BBS, gait speed	Participant improved in LE strength, 3-10 lbs for all actions Functional mobility improved in all tests	Participant may have been more motivated than the average pt, did not have any comorbidities which is uncommon in a SNF and for a 97 yo
Harada et al. 1995 *Physical Therapy* US	To determine the effect of an individualized PT mobility training program on gait, balance and functional performance of elderly individuals	Single group, pre-post study, repeated measures design Pyramid: O4 AOTA: III PEDro: 5/6	I: Elderly individuals living in residential care facilities with impaired balance and difficulty performing at least one functional activity, 71-97 yo, minimum score of 20 on Folstein Mini Mental State Examination (*N* = 27) E: Blind, currently receiving PT	ROM, strengthening, stability, mobility/balance, transfers/walking exercise	BBS, Balance subscale of Tinetti, Performance-Oriented Mobility Assessment, gait speed	Balance improved significantly and improvement was maintained at 1 month follow-up ($p < .05$) Gait speed did not significantly improve	Details of each exercise were not specified to ensure that the exercises were rote/nonfunctional, possible confounders of inherent change over time, learning and socialization
Krist et al. 2013 *Clinical Interventions in Aging* Germany	To determine the effectiveness of progressive resistance training on mobility, strength, and QoL in the elderly	Single group, pre-post study Pyramid: O4 AOTA: III PEDro: 4/6	I: Residents from 5 different nursing homes in Germany, mild to severe impaired mobility, >77 yo (*N* = 10) E: Moderate to severe dementia, cardiac arrhythmia, elevated BP during exercise,	Progressive resistance training 2x/week, using 6 different exercise machines, training done in 3 sets of 8 repetitions, weight increments increased to the next level when all repetitions could be completed	Mobility measured by the EMS, muscle strength measured by lifted weight, QoL measured by Short Form-36 Survey, physical and emotional subscales	Mobility improved in every participant, overall 24% ($p < .005$) Muscle strength increased on all of the six exercise machines ($p < .005$) No significant differences found for QoL, both physical and emotional subscales	Familiarization with the gym machines could have contributed to improvement, participants under legal care were not included which make up around 80% of the nursing home population

			epilepsy, or legal care				
Littbrand et al. 2009 *Journal of the American Geriatrics Society* Sweden	To determine the effectiveness of a high-intensity functional exercise program on ADLs in the elderly	RCT, cluster randomized Pyramid: E2 AOTA: I PEDro: 8/10	I: Residents from 9 different residential care facilities, >65 yo, dependent in ADLs, able to stand up from a chair with armrests with assistance from no more than one person, 52.4% of participants had dementia (*N* = 191) E: No reported exclusion criteria	Tx: High intensity functional exercise, 5x every 2 weeks for 13 weeks, Progressed by increasing performance on exercise or adding weight to a weighted belt worn around the waist (*n* = 91) Ctrl: No exercise, while sitting (*n* = 100)	ADLs measured using MBI	Only participants in the Tx group with dementia improved scores in MBI ($p < .001$)	Participants had to be able to stand up from a chair with armrests with the assistance from no more than one person, meaning they may have selected participants with higher functional mobility
Meuleman et al. 2000 *Arch Phys Med Rehabil* US	To examine if debilitated elderly patients would have short term physical improvement after receiving exercise training	RCT Pyramid: E2 AOTA: 1 PEDro: 6/10	I: Participants from Veterans Affairs and community nursing homes, > 60 yrs, impairment in at least 1 physical ADL (*N* = 58) E: Those w/ dementia, sustained CVA in past 3 wks	Tx: Resistance training 3x/week, endurance training 2x/week (*n* = 26) Ctrl: No intervention (*n* =32)	Isometric strength, endurance, functional state	Strength increased significantly more in Tx group ($p = .009$), no significant difference at 6 and 12 mo follow up Tx had statistically significant more improvement on functional activity of the most dysfunctional ($p = .04$), no significant difference at 6 and 12 mo follow up No significant difference in endurance between groups	Large and uneven drop-out rate between groups (larger rate in training group), participants in Ctrl group received no treatment and therefore findings may have been due to a non-specific stimulation

Sullivan et al. 2001 *American Journal of Physical Medicine & Rehabilitation* US	To determine whether a progressive resistance muscle strength training on the LE would improve strength in elderly participants	Single group, pre-post study Pyramid: O4 AOTA: III PEDro: 5/6	I: Participants from a geriatric rehab recuperative care unit and a community nursing home, >64 yo, recent and potentially reversible functional decline (N = 19) E: Those w/ near terminal medical disorder, unresolved malignancy, severe cognitive impairment	Progressive resistance muscle strength training of the lower limb, 3 days/wk for 10 weeks, consisted of warm up, leg presses, weight lifting, gait training	Leg muscle strength, functional abilities measured by gait speed and sit to stand, and body composition	Leg muscle strength significantly improved (p < .05), with an average gain of 74% 79% of participants for sit to stand and 53% of participants for gait speed significantly improved (p < .05)	Nonrandomized
Tibaek et al. 2014 *Clin Rehabil* Denmark	To examine the effectiveness of resistance strength training on functional outcomes of older residents in a geriatric rehab hospital	RCT Pyramid: E2 AOTA: I PEDro: 6/10	I: Ability to stand independently w/ or w/o walking aids or bed/bench support (N = 71) E: LOS < 7 days, dementia, inability to communicate or be active	Tx: Resistance strength training 50 min sessions, 4x/week, along with standard care (n = 36) Ctrl: Standard care (regular physiotherapy) (n = 35)	LOS, TUGT, 30-sec chair-stand test, 10-m walk test, MBI (transfer, walking, stairs), use of walking aids	Significant improvement in Tx group not seen in ctrl: 10-m walk test (p < .01) and MBI (walking) (p = .01) Mixed-effects model showed that Tx group improved more than Ctrl group in all outcomes, but not statistically significant	High attrition rate in Tx (n = 29) and Ctrl (n = 27) and missing outcome data for many residents, both possibly due to low functioning of participants
Yang et al. 2006 *Clin Rehabil* Taiwan	To examine if task-oriented progressive resistance strength training impacts functional performance in those post stroke	RCT Pyramid: E2 AOTA: 1 PEDro: 7/10	I: Participants were > 1 yr post stroke, 45-74 yo, recruited from hospitals and referrals (N = 48) E: No reported exclusion criteria	Tx: Received task-oriented progressive (increasing complexity, repetitions) resistance strength training, circuit class design (n = 24) Ctrl: No rehab (n = 24)	LE muscle strength and functional performance (gait performance, 6-minute walk test, step test, TUGT)	Tx group significantly improved in LE muscle strength (p < .05) and all functional performance measures besides step test improved (p < .05) Ctrl group declined in muscle strength and all functional performance measures score stayed the same or declined (p < .05)	No follow up, participants were all volunteers and may have therefore been more willing or motivated than the general population

Activity-based Studies							
Ferreira et al. 2014 *Topics in Geriatric Rehabilitation* Brazil	To determine if a functional exercise program for balance improves balance and reduces falls	Single group, pre-post study Pyramid: O4 AOTA: III PEDro: 4/6	I: Elderly participants in long term care facilities who could walk independently, 63-92 yo (N = 6) E: Those with 2+ absences and illnesses that made physical activity impossible	Functional exercise program with 30 mins of activities (dance, walk, target shooting, activities w/ bats), 4x/week for 3.5 weeks	BBS, % of falls	All participants improved their BBS score and had a reduction in falls of at least 35% ($p < .05$)	Participants often left during interventions, lack of diversity among participants
Gustafsson & McKenna 2010 *Topics in Stroke Rehabilitation* Australia	To examine if an additional occupation-based group program has an effect on activity levels and well-being	Controlled clinical trial Pyramid: E3 AOTA: II PEDro: 6/10	I: Preexisting groups of participants from two inpatient rehab hospitals, >18 yo, participating in rehab after first stroke, adequate communication and cognition for questionnaire completion (N = 9) E: Participants medically unwell or bed bound	Unit A: Offered daily occupation-based group program along with individual therapy (n = 11) Unit B: Standard daily individual therapy, with recreation group 1x/week (n = 8)	Activity level, MBI score of functional independence, LOS	There were no statistically significant differences between groups for activity level, MBI Unit B had statistically significantly shorter length of stays than Unit A ($p < .05$)	Hospitals may have had other variables that were not accounted for, no record of participation for participants in Unit A

Hsu et al. 2010 *Physiotherapy Theory and Practice* Canada	To determine the effects of playing a Wii bowling game on residents in a long-term care facility	RCT, counterbalanced-crossover design Pyramid: E2 AOTA: I PEDro: 7/10	I: >50 yo, sx or impairment in upper extremity impacting function, currently participating in standard exercise group, English speaking (*N* = 34) E: Severe cognitive impairments	Tx: Standard exercise program + played Wii bowling paired, max 20 min session 2x/week for 4 weeks Ctrl: Standard exercise (strength, coordination, and balance exercises) in a group, 2-4 sessions/week for 4 weeks	Nursing Home Physical Performance Test (NHPPT), Physical Activity Enjoyment Scale (PACES), Numeric Rating Scale (NRS) for pain intensity, AROM, Global Perceived Rating of Change (GPRC)	No significant differences between Tx and Ctrl except enjoyment of activity (PACES-M) was significantly greater in Tx protocol ($p = .014$)	Small sample size, Ctrl intervention not standardized, Limited intensity of Tx intervention, upper extremity function based on self-report
Holmerová et al. 2010 *Journal of Aging and Health* Czech Republic	To determine the effects of a dance program on lower body functioning in the elderly	RCT Pyramid: E2 AOTA: I PEDro: 5/10	I: Participants who lived in one of 7 residential care facilities selected, able to walk short distances with no assist, >60 yo (*N* = 52) E: Wc bound	Tx: 3 mo Exercise Dance For Seniors program, 75 minutes 1x/week, aimed at mobility, included warm up, dance period, and cool down (*n* = 27) Ctrl: Regular daily activities (*n* = 25)	Lower body functioning measured by the chair-stand test, 2 min step test, chair sit and reach test, and TUGT	Tx group improved significantly more that the Ctrl group in all measures of lower body functioning ($p < .026$)	Participants mostly women, study only looked at lower body functioning, no follow up
Keogh et al. 2014 *Journal of Aging and Physical Activity* New Zealand	To determine the benefit of playing the Nintendo Wii Sports (NWS) on functional ability, physical activity, QoL of residential aged-care (RAC) residents	Controlled clinical trials Pyramid: E3 AOTA: II PEDro: 6/10	I: Residents from two RAC facilities, could walk at least 10 min, cognitively intact, 75-91 yo (*N* = 34) E: No reported exclusion criteria	Tx: Participant choice on frequency, duration, and type of NWS games played, no coercion from the researchers (*n* = 19) Ctrl: No NWS, treatment and activities as usual (*n* = 15)	Level of functional ability measured by bicep curl and Four Square Step Test, physical ability measured by Rapid Assessment of Physical Activity, QoL measured by World Health Organization Quality of Life Questionnaire	Tx participants averaged 30 +/- 24 min of NWS time/ week for 8 weeks. Tx group improved significantly more on bicep curl repetitions ($p = .038$), physical activity scores ($p = .009$), and psychological QoL ($p = .012$)	No blinding, participants in RAC facilities were not randomly assigned within could lead to confounding variables
Kerse et al. 2008	To examine the effectiveness of a functional activity	Cluster RCT Pyramid: E2	I: 65+ yo, able to communicate and remember goals	Tx: Goal setting and functional activity intervention for 6	Self-reported and observed function QoL, # of falls	Tx: Residents with normal cognition deteriorated less in overall function ($p =$	Report that 44% of Tx group did few or no activity

BMJ New Zealand	program for elder residents in low level dependency residential care	AOTA: I PEDro: 7/10	(*N* = 682) E: Facilities exclusively for young people or palliative care, residents w/ anxiety as primary diagnosis, acutely unwell, or in terminal state	months (*n* = 330) Ctrl: Usual care with 2 social visits to control for attention received in Tx group (*n* = 352)	Observed basic mobility and functional task w/: TUGT, Elderly Mobility Scale, and FICSIT-4 balance test, geriatric depression scale, modified fear of falling scale, and hospital admissions	.024) and lower limb function (*p* = .015) during first 6 months of follow up Cognitively impaired in Tx group had significantly increased depression scores (*p* = .004), no other significant differences	sessions, operational definition of functional activities not described, gerontology nurse conducted assessments and intervention, though OT/R available for questions
Peri et al. 2008 *Age and Ageing* New Zealand	To determine if performing repetitive ADLs improved health status, life satisfaction, and mobility in elderly living in residential care facilities compared to a Ctrl group	Cluster RCT Pyramid: E2 AOTA: 1 PEDro: 7/10	I: All residents that did not meet exclusion criteria, regardless of cognitive or physical ability (*N* = 149) E: < 65 yo, receiving respite or terminal care, quadriplegia	Tx: Setting pt centered goals and tailored activity program including implementing repetitive activities of bed mobility, sit to stand, and transfers (*n* = 73) Ctrl: Usual care (*n* = 76)	EMS, TUGT, Short Form-36 (physical component summary and Mental health component summary)	No differences between groups in all measures except physical component summary of Short Form-36 were significantly greater in Tx group (*p* < .05) at 3 months	OT/Rs and PTs part of staff at some homes, Ctrl group observed participating in Tx activities w/ Tx group, Tx adherence was low due to staffing shortages, setting is similar to assisted living facilities in US, program designed by registered nurses and implemented by healthcare assistants
Preissner 2010 *AJOT* US	To describe the use of Occupational Therapy Task-Oriented Approach with an individual in inpatient rehab with cognitive deficits following a stroke	Case Study Pyramid: D4 AOTA: V PEDro: 1/3	83 yo woman w/ recent left stroke, hx: dementia, myocardial infarction, and hypertension (*N* = 1)	Tx: 90 mins of occupational therapy 6 days/wk for 4 weeks using occupation focused interventions that minimized need for new learning	FIM	Improvement on all FIM items	Concurrently receiving other rehab services, low generalizability

Sackley et al. *BMJ* 2015 UK	Examine efficacy of OT program in maintaining functional activity in care home residents with stroke	Cluster RCT Pyramid: E2 AOTA: I PEDro: 8/10	I: Hx of ischaemic or haemorrhagic stroke or transient ischemic attack, including those with language and cognitive impairments (*N* = 1042) E: Receiving end of life care	Tx: OT with a client centered approach and task specific training delivered by OT/R, frequency and duration varied depending on participants' needs, 114 homes (*n* = 568 residents) Ctrl: Usual care w/o OT. 114 homes (*n* = 474 residents)	MBI, Rivermead mobility index, Geriatric depression scale-15, EuroQol EQ-5D-3L All measured at baseline, 3, 6, and 12 months post randomization	No significant difference across all outcomes at all time points ($p > .5$)	Care homes included nursing (Tx = 64 %, Ctrl = 65%) and residential homes, interventions were not elaborated on and may have included education of staff, severe or very severe on MBI, may not be reflective of SNF residents

Key:
A = assist, ADL = Activity of Daily Living, AJOT = American Journal of Occupational Therapy, AROM = active range of motion, BBS = Berg Balance Scale, bw= between, Ctrl = Control, CVA= Cardiovascular accident, dx = diagnosis, EMS = Elderly Mobility Scale, E = exclusion, FIM = Functional Independence Measure, Hx = history, I = inclusion, L = left, LE = lower extremity, LOS = length of stay, OT/R = occupational therapist, m = meter, min = minimum, MBI = Modified Barthel Index, mins = minutes, mo = months, OT = occupational therapy, OTJR = The Occupational Therapy Journal of Research, pt = patient, PT = physical therapy, QoL = quality of life, R = right, RCT = Randomized Control Trial, rehab = rehabilitation, ROM = range of motion, SNF = Skilled Nursing Facility, sx = symptom, TUGT = Timed Up and Go Test, Tx = Treatment, wc = wheelchair, wk = week, w/ = with, w/o = without, yr = year, yo = years old

CAT Table 2. Systematic Review Evidence

Author, Year, Journal, Country	**Study Purpose**	**Study Design/ Level of Evidence**	**Number of Papers Included, Inclusion and Exclusion Criteria**	**Interventions (IV)**	**Outcome Measures (DV)**	**Summary of Results**	**Limitations**
Valenzuela 2012 *Journal of the American Medical Directors Association* Australia	To synthesize existing evidence from clinical trials determining whether progressive resistance training improves strength and functional performance	Pyramid: E1 PEDro scores of at least 8/10	1,495 papers screened from 10 databases, 13 papers kept I: Clinical trials, in nursing homes, progressive resistance training as primary intervention E: Articles that used combined training programs, no isolated progressive resistance	Progressive resistance training, upper and lower body strengthening exercises, seated or standing. Trial duration 2-12 months, most often 3x/week. Intensity increased by resistance or volume. Many studies had control groups, consisting of placebo exercise, crafts, movies, reading, or	Muscle strength, upper and lower limb, muscle endurance, functional outcomes like gait speed and stair climbing power	Strength significantly improved in both upper and lower body ($p < .05$) Functional outcomes significantly improved ($p < .009$) Muscle endurance improved significantly ($p < .05$) Overall positive effect	Studies often had small sample sizes, limited research on interventions that research the effects of progressive resistance training exclusively

			training, not in a nursing institution, or articles that used the same cohort as a previous kept article	singing		of progressive resistance training on elderly adults in nursing homes	

Summary of Key Findings:

Summary of Experimental Studies

Our summarized findings of research directly comparing activity-based interventions to rote exercise interventions revealed a variety of results. Studies reviewed showed that activity-based interventions lead to greater dynamic stability, physical performance, balance, movement quality, and exercise repetitions compared to rote exercise interventions. In contrast, some studies found no significant differences in AROM and Functional Independence Measure (FIM) scores. A few studies also compared imagery-based interventions with activity-based and rote exercise, with mixed results. One study found that activity-based and imagery-based interventions increased exercise repetitions compared to rote exercise, while another study found imagery-based interventions increased repetitions more than rote exercise. Despite these findings, one study found that only activity-based interventions significantly increased repetitions compared to imagery and rote exercise interventions. Our summarized findings for studies using the terminology “meaningful” and “nonmeaningful” were not in agreement. One study found that engaging in meaningful activities increased movement quality. However, another study found that engaging in meaningful activities did not increase movement quality. An additional study found that meaningful activity did not increase repetitions and distance of reach. Overall, the research findings for meaningful activity versus nonmeaningful activity are inconclusive.

We found many studies examining the effects of rote exercise on physical and functional outcomes. These studies reported that rote exercise interventions increase functional mobility, muscle strength in upper and lower body, walking speed, muscle endurance, and ADL performance as compared to no treatment. One study found that a rote exercise intervention had no effect on endurance.

Studies examining the effects of activity-based interventions compared to no treatment found no significant differences in activity level, ADL ability, pain reduction, AROM, mobility and length of stay in facility. To contrast this, other studies found significant improvements in lower body functioning, mobility, reach, standing tolerance, exercise repetitions, and physical activity when

compared with no treatment. Overall, the evidence supporting activity-based interventions over rote exercise was thin but consistent.

Summary of Outcome Studies

Our summarized findings of research found a few common patterns when directly comparing meaningful vs nonmeaningful activities. A few studies found that when engaging in meaningful activity, participants increased standing time and distance walked compared to when engaging in a nonmeaningful activity. However, one study found that activity-based interventions did not increase reaching movements compared to rote exercise.

Multiple outcome studies examining the effects of rote exercise indicated that rote exercise increased muscle function (including strength), balance, and functional mobility.

One study indicated that activity-based interventions increased balance.

In conclusion, there was sufficient evidence to support rote exercise interventions and limited mixed evidence to support meaningful and activity-based interventions.

Summary of Qualitative Studies

N/A

Summary of Descriptive Studies

One case study found that all FIM scores increased after activity-based interventions.

Implications for Practitioners:

These findings can be beneficial for occupational therapists, occupational therapy assistants, physical therapists, physical therapy assistants and any other rehabilitation team member, including administrators of SNFs, who are responsible for ensuring that patients meet their goals while the facility meets their fiscal responsibilities. The majority of studies determining the effectiveness of activity-based intervention and rote exercise interventions individually found significantly improved

outcomes in comparison to no treatment, with rote exercise interventions having more supporting evidence. However, the majority of studies that directly compare activity-based and rote exercise interventions (75%) indicate that activity-based interventions are more beneficial for patients receiving therapy services in residential and inpatient facilities. Understanding that the literature supports the effectiveness of activity-based over rote exercise when directly comparing the two interventions can help therapists make an informed decision to use activity-based intervention as opposed to primarily utilizing rote exercise with their patients in SNFs. It also helps therapists justify the benefits of using activity-based interventions to consumers. This literature indicates to rehabilitation teams that activity-based interventions should have a primary role in therapy sessions in order to maximize functional performance. Therapists who currently utilize a more rote exercise based therapy routine could add in activities, while still working on the same physical outcome.

Implications for Consumers:

Consumers who may benefit from our critical appraisal of the literature include patients receiving occupational or physical therapy in a SNF or similar inpatient care facility with similar client demographics. Consumers are often elderly and have severe cognitive and/ or physical impairments. Considering patient impairments, they may not be in a position to advocate for themselves, thus caregivers must advocate for patients. Patients and family members can advocate for themselves or loved ones to receive activity-based interventions in order for the patients to receive therapy interventions that lead to greater improvements in outcomes. However, it is also important for consumers to know the individual benefits of participating in rote exercise alone.

Implications for Researchers:

There was limited research found on activity-based interventions and comparison of activity-based interventions to rote exercise, especially research directly relevant to SNFs. A common theme discovered was a higher level of intensity and progressive challenge for participants in studies on rote

exercise, while studies on activity-based interventions did not have an element of high intensity or increasing challenge. It would be valuable for research to be performed on activity-based interventions at the same physical rigor as many of the rote exercise interventions in SNFs, though this may be more challenging to address for certain activities.

Bottom Line for Occupational Therapy Practice/ Recommendations for Better Practice

While research is limited regarding activity-based interventions in SNFs, the literature that does exist supports the use of activity-based interventions. Therefore, occupational therapists should apply their knowledge on the increased benefits of activity-based interventions compared to rote exercise interventions to inform their decisions on interventions used during therapy. Jindra, specifically, can utilize these findings to encourage her occupational therapy and physical therapy staff to employ activity-based interventions with their SNF clients in order to provide the most effective care. In addition, research that examines the effectiveness of imagery-based interventions may provide evidence for the utilization of a low-cost rehabilitation intervention.

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Involvement Plan

Introduction

Our group met with Joette Jindra, OTR/L, director of rehabilitation and our research collaborator, to discuss her ideas and goals for an intervention plan. Collaboratively, we agreed that an in-service would be the most appropriate way to provide information to her entire team. Logistically, she stated that we could have a maximum of 30 minutes for the in-service and that she would like to invite the physical therapists as well as occupational therapists to attend. There would be a screen and equipment available for us to connect a PowerPoint presentation to, which could be used as a visual aid for our presentation. To document knowledge translation, Jindra and our group agreed that providing a pre-survey right before the in-service, and a post-survey just after the in-service would be the most efficient. A follow-up survey was also discussed to be given two to four weeks later, however due to time constraints this was not feasible.

Regarding the in-service itself, Jindra recommended that we make the presentation conversational and interactive. She suggested we have the therapists think of activity-based interventions that could be substituted for a commonly used rote exercise intervention, such as utilizing the arm bike. Similarly, she thought that we could encourage the therapists to think about the desired goal of a rote exercise, such as increased range of motion, and then think of an activity-based task that could achieve that same goal. Jindra also noted that the therapists often have group sessions, and therefore, she encouraged us to mention how group activities can be made activity-based as well.

The tasks that this implementation contained were creating a pre-survey and post-survey to document the knowledge translation that had occurred due to the implementation of our in-service. In addition, we created a PowerPoint presentation with our main points highlighted in order to provide the therapy team attending with a visual of the information we were sharing.

Task/Product	**Deadline Date**	**Steps w/ Dates to achieve the final outcome**
~A pre-survey was given to the ManorCare therapy staff to identify their knowledge about activity-based interventions and how often they implement activity-based interventions. We allowed 7 minutes for the distribution and completion of the pre-survey.	Wednesday, April 4th	~Draft of pre-survey submitted to project chair and course mentor two weeks before in-service ~Pre-survey provided on Wednesday, April 4th
~The in-service was provided to the ManorCare therapy staff of about 10 staff members, educating staff on our findings, the definition of activity-based interventions and examples of activity-based interventions. A PowerPoint was used as a visual to support our in-service presentation. Staff were encouraged to discuss and provide examples of how they could use their clinic equipment to make a rote exercise activity more activity-based. We allowed 10-15 minutes for the presentation.	Wednesday, April 4th	~Draft of our presentation was completed two weeks before our in-service ~PowerPoint for our presentation was completed two weeks before our in-service ~In-service was provided to ManorCare therapy staff on Wednesday, April 4th
~A post-survey was given to the ManorCare therapy staff to identify their current knowledge after the in-service about activity-based interventions, how activity-based interventions could be implemented during therapy sessions, and whether they planned to use activity-based interventions more often following the in-service. We allowed 7 minutes for the collection and completion of the post-survey.	Wednesday, April 4th	~Draft of post-survey submitted to project chair and course mentor two weeks before in-service -Post-survey given to ManorCare therapy staff provided on Wednesday, April 4th
~Analysis of the results from the pre- and post-surveys	Saturday, April 7th	

Context

ManorCare's rehab team consists of a variety of healthcare professionals which include occupational therapists, physical therapists, certified occupational therapy and physical therapy assistants, speech-language pathologists, and rehab aides. Due to varying educational

backgrounds and personal preferences, rehab professionals use both activity-based and rote exercise interventions. While therapists are able to choose their interventions independently, Jindra would prefer if her team employed primarily activity-based interventions, especially during group interventions. According to Jindra, the regional supervisor also supports the use of activity-based intervention over rote exercise, primarily because third party payers require functional outcomes. Additionally, the facility supports activity-based interventions by providing necessary materials including a full kitchen, games, omni-VR, and crafts to implement activity-based interventions. Therapists can also request materials as the facility has the financial resources to purchase additional items.

Suspected barriers to the therapists utilizing our knowledge translation were personal preference and educational background, along with perceived extra effort and time. For example, a therapist may feel comfortable and confident in the performance outcomes of a commonly used rote exercise, such as using a table-top bike.

Outcomes

The pre- and post-survey occurring prior to and following the in-service were used to evaluate whether or not each staff member's knowledge and beliefs had changed and if so, how. We specifically evaluated whether the staff's knowledge about the definition of activity-based interventions, examples of activity-based interventions, their use of activity-based interventions, benefits of activity-based interventions, and their opinions about activity-based interventions had changed based on the information provided by the in-service. We also evaluated whether or not the staff members found that the in-service provided new information.

Description of Activities and Products Completed

The knowledge translation process began with collaborating with the course mentor, project chair, and collaborating practitioner to evaluate the most effective way to share with others the knowledge obtained from completing the CAT. All parties agreed that an in-service

for therapists at ManorCare would be the best option, due to the knowledge being valuable for therapists' clinical reasoning for treatment planning. The in-service consisted of an interactive presentation from the student researchers, with a PowerPoint visual aide (See Appendix B). A pre- and post-survey was given to all attendees to gather data on knowledge translation (See Appendix A). The final date of in-service was on April 4, 2018 from 12:00 pm - 12:30 pm at ManorCare in Tacoma, WA.

The process of creating the PowerPoint and pre- and post-survey included the student researchers creating a draft that was sent to the course mentor and project chair for feedback two weeks prior to the scheduled date of the in-service. The student researchers revised the PowerPoint and surveys based on the feedback, and when finalized, sent the copies to the collaborating practitioner to review.

The collaborating practitioner informed the student therapists that physical therapists were likely going to be attending the in-service. Therefore, the survey and discussion questions were created to allow interprofessional collaboration and comprehension. In the end, physical therapists were unable to attend due to time constraints. This likely did not impact the success of the presentation; however, having interprofessional discussions may have enhanced the knowledge translation.

When creating the PowerPoint presentation, the biggest challenge was defining the term "activity-based intervention" in a clear and concise manner to increase participant comprehension. A clear definition was critical because the entire CAT and subsequent presentation centered around this term, and it is also a term that may have varying meanings to different therapists. To select one definition, the student researchers searched the articles reviewed in the CAT to find the best suited one for the presentation. The final definition used in the in-service presentation was adapted from Schmidt and Nelson (1996).

On the date of the in-service, the student researchers arrived at ManorCare early to set up the materials. A total of eight occupational therapists and certified occupational therapy assistants attended the in-service, in addition to the collaborating practitioner. The student researchers asked the attendees to fill out the pre-survey before the presentation started. It is important to note that at least two of the therapists were unfamiliar with the term “rote exercise” on the pre-survey, demonstrated by the therapists consulting with one another and completing an internet search to learn the definition. On several occasions throughout the presentation the attendees were asked to share their ideas with the group in order to facilitate engagement and demonstrate knowledge learned. When the presentation was completed, the attendees were asked to fill out the post-survey before exiting the room.

A difficulty that arose was that several of the therapists attending the presentation took longer than planned to arrive. Due to time restrictions, the student researchers had to start the presentation when two therapists were just taking their seats, resulting in the researchers having to repeat the instructions of the pre-survey multiple times. This could have impacted the validity of the pre-survey results for those therapists, who may have rushed through the survey or used information from the introduction of the presentation to answer the questions.

Table of Completed In-service Activities and Products

Task/Product	**Deadline Date**	**Steps w/ Dates to achieve the final outcome**	**Met Deadline?/Date Completed**
~A pre-survey was given to the ManorCare therapy staff to identify their knowledge about activity-based interventions and how often they implement activity-based interventions. We allowed 7 minutes for the distribution and completion of the pre-survey.	Wednesday, April 4th	~Draft of pre-survey submitted to the project chair and course mentor two weeks before in-service ~Pre-survey provided on Wednesday, April 4th	~Yes, a pre-survey draft was emailed to the project chair and course mentor on Wednesday, March 21st, two weeks prior to the in-service. ~A corrected version of the pre-survey was emailed to the project chair and course mentor on Wednesday, March 28th.
~The in-service was provided to the ManorCare therapy staff of about 10 staff members, educating the staff on our findings, the definition of activity-based interventions and examples of activity-based interventions. A PowerPoint was used as a visual to support our in-service presentation. The staff was encouraged to discuss and provide examples of how they could use their clinic equipment to make a rote exercise more activity-based. We allowed 10-15 minutes for the presentation.	Wednesday, April 4th	~Draft of our presentation was completed two weeks before our in-service ~PowerPoint for our presentation was completed two weeks before our in-service ~In-service was provided to ManorCare therapy staff on Wednesday, April 4th	~Yes, a PowerPoint draft was emailed to the project chair and course mentor on Wednesday, March 21st, two weeks prior to the in-service. ~A corrected version of the presentation was emailed to the project chair and course mentor on Wednesday, March 28th.

~A post-survey was given to the ManorCare therapy staff to identify their current knowledge after the in-service about activity-based interventions, how activity-based interventions can be implemented during therapy sessions, and whether they planned to use activity-based interventions more often following the in-service. We allowed 7 minutes for the collection and completion of the post-survey.	Wednesday, April 4th	~Draft of post-survey submitted to the project chair and course mentor two weeks before in-service ~Post-survey given to ManorCare therapy staff provided on Wednesday, April 4th	~Yes, a post-survey draft was emailed to the project chair and course mentor on Wednesday, March 21st, two weeks prior to the in-service. ~A corrected version of the post-survey was emailed to the project chair and course mentor on Wednesday, March 28th.
~Analysis of the results from the pre- and post-surveys	Saturday, April 7th		~Yes, the student researchers conducted an analysis of the pre and post-survey results on Saturday, April 7th.

Outcomes and Effectiveness

In order to measure the outcomes of the in-service at ManorCare, the student researchers created a pre- and post-survey for the attendees to fill out before the in-service and right after the presentation concluded. The pre-survey consists of seven questions, including one short answer and six multiple choice questions. The purpose of the pre-survey was to collect baseline data on the familiarity of the therapists with the topic of activity-based interventions in comparison to rote exercise, including frequency of use and general knowledge of the terms. The post-survey has the same seven questions from the pre-survey, with two additional multiple choice questions. The two additional questions inquired about effectiveness of the presentation. When filling out the post-survey, the attendees were instructed to consider the information presented. The majority of the questions were the same in order to measure knowledge translation as a result of the presentation. All attendees of the in-service presentation filled out a pre- and post-survey,

resulting in nine complete pre- and post-surveys. Statistics were conducted comparing the responses on the pre-survey to those on the post-survey.

The results of the survey indicated that knowledge translation through the in-service presentation was successful. Respondents' ability to identify the activity-based interventions from a list of interventions increased from 86% correct responses to 93%. In addition, one respondent reported using activity-based interventions less in the post-survey than in the pre-survey. This indicates that the attendees gained a better understanding of the definition of activity-based interventions. This was likely supported by group discussions prompted by the interactive components of the in-service during which attendees described activity-based interventions they currently use and brainstormed additional activities to use in place of rote exercise interventions. The importance of the interactive component was highlighted at the end of the presentation when the therapists were asked to share additional activity-based interventions. Two therapists stated rote exercises and other therapists corrected the inaccurate responses, explaining why the examples were not considered activity-based. There is also a possibility that the differences between activity-based interventions and rote exercise may still be unclear for some who attended the in-service presentation.

The survey also addressed the attendees' perspective on the in-service. All attendees indicated that the in-service was helpful and the majority, 88%, indicated that it would very likely or somewhat likely change their decision-making. These responses suggest multiple levels of success with knowledge translation from increasing clinicians' knowledge of definitions, to awareness of evidence and benefits, and to ultimately influence treatment intervention selections. This was likely supported by an effort to adapt knowledge to the ManorCare environment by encouraging the attendees to discuss the resources currently available to them.

Interestingly, there was little difference in the pre- and post-survey regarding the respondents' selection of the amount of current evidence in literature comparing the two types of

intervention. The survey results did not indicate a change in understanding of existing literature. However, student researchers realized that the answer choices may not have been as comprehensive or reflective of the possible spectrum of available evidence, which may have impacted the results.

Discussion and comments in the post-survey also indicated that some attendees were influenced by the consideration of the importance of meaningfulness to clients in determining whether an intervention should be activity-based or rote exercise, with some clients preferring rote exercise. While meaningfulness is an important factor to consider when treatment planning and a potential topic for future research, the goal of the in-service was to educate the therapists on activity-based interventions in comparison with rote exercise, regardless of the meaningfulness associated with a specific intervention.

Overall, the student researchers found that the survey questions were sufficient to determine the immediate effectiveness of the in-service in knowledge dissemination. A follow-up survey two to four weeks after the in-service would have been beneficial to determine if the knowledge translation resulted in implementation of findings at the facility. However, due to time constraints, this was not feasible. Additionally, it was challenging to create relevant questions for the survey to measure knowledge translation without developing questions that were leading by showing a preference for activity-based interventions.

There was no change in percentage on the type of intervention chosen with varying times to prepare and plan. However, it is important to note that one respondent reported that having a longer amount of time resulted in them choosing an activity-based intervention, as opposed to a selecting a rote exercise when they have limited preparation time. This raised an important question for future consideration about whether preparation time impacts therapists' decisions regarding intervention selection.

Evaluation of the Overall Process of Project

Throughout this project, we worked well as a team to construct our CAT. Despite initial difficulty with constructing a relevant topic pertaining to a facility that we were unfamiliar with, the students worked well together to problem solve and brainstorm several ideas that were of interest to Jindra. Communication within the group and among our collaborator, chair and mentor was key to our success. With proper communication, our group was able to meet deadlines and plan for each assignment despite different class schedules and outside obligations. Our group had many initial concerns regarding the process of completing our CAT, including identifying relevant search terms and developing inclusion and exclusion criteria. However, each group member made an effort to meet or communicate with the necessary faculty to gain a proper understanding of the components of the project, resolve these concerns, and ultimately provide the best work possible. With a common goal of trying our best to complete a thorough CAT, each group member was aware of their individual responsibilities. As many assignments, including the initial research for our CAT, contained multiple parts, our group divided the work so that each member had their own responsibilities. If the responsibilities were fewer for one group member compared to the others', that group member took on other responsibilities to ensure that everyone contributed equally to the process. The group's ability to problem solve as a team, when faced with challenges regarding the research topic or process, was evident throughout the project as all components of the CAT were completed on time. Each member demonstrated an equal contribution to the project, bringing unique skills that benefited the research, writing and presentation of the CAT as a whole.

Recommendations for the Future

After presenting our results to Jindra, she expressed interest in our findings on imagery-based interventions and its potential as a therapeutic intervention in SNFs. From our literary search, we found two articles that compared imagery-based interventions to activity-based

interventions and rote exercise. Despite both articles concluding that patients engaged in more repetitions in the activity-based intervention compared to the imagery-based intervention or rote exercise, further research can be conducted to gain a more thorough understanding of the benefits of imagery-based interventions. As the implementation of imagery-based interventions may require less resources and expenses from the facility, research suggesting any benefits for imagery-based interventions in SNFs may be helpful in supporting the potential use of this cost-effective intervention at ManorCare.

Many occupational therapists and assistants discussed during our in-service that they choose meaningful interventions to implement with their clients. Thus, another future project could be examining the research on the effectiveness of client performance outcomes when engaging in meaningful versus nonmeaningful interventions. Although we did not specifically search for these terms during our literature search, we found several articles that included meaningful and nonmeaningful interventions as another treatment group. Despite our findings that activity-based interventions are more effective on physical performance outcomes than rote exercise, activity-based interventions may not necessarily correspond to a meaningful activity for every individual. Therefore, it may be beneficial to research whether participation in meaningful activities versus nonmeaningful activities is more effective. Lastly, Jindra mentioned an interest in group interventions utilizing activity-based interventions versus rote exercise. Further research can be conducted to address this topic.

Appendix A

Pre-Survey:

1. Describe an activity-based intervention that you have used recently with a client:

2. Which of the following are activity-based interventions? Circle all that apply:
    a. Walking up and down the hall
    b. Walking to the cafeteria to eat lunch
    c. Playing balloon volleyball
    d. Using the hand bike
    e. Lifting dowels up in the air 10x
    f. Playing Ladderball

3. How often did you use an activity-based intervention in the past week?
    a. Every intervention
    b. Most interventions
    c. Few interventions
    d. Never

4. Based on your experience, do you think that activity-based interventions or rote exercises are more beneficial to clients?
    a. Activity-based interventions are always more beneficial
    b. Activity-based interventions are frequently more beneficial
    c. Activity-based interventions and rote exercise are equally beneficial
    d. Rote exercises are frequently more beneficial
    e. Rote exercises are always more beneficial

5. If you had 3 minute to plan and set up a therapeutic intervention, would you **prefer** to use an activity-based intervention or a rote exercise?
    a. Activity-based intervention
    b. Rote exercise

6. If you had 10 minutes to plan and set up a therapeutic intervention, would you **prefer** to use an activity-based intervention or a rote exercise?
    a. Activity-based intervention
    b. Rote exercise

7. How much evidence do you think exists in the literature comparing activity-based intervention to rote exercise?
    a. Substantial amount of evidence
    b. A fair amount of evidence
    c. Unsubstantial amount of evidence
    d. No evidence

Post-Survey:

Based on the information provided in the in-service, please answer the following questions:

1. Describe an activity-based intervention that you have used recently with a client:

2. Which of the following are activity-based interventions? Circle all that apply:
    a. Walking up and down the hall
    b. Walking to the cafeteria to eat lunch
    c. Playing balloon volleyball
    d. Using the hand bike
    e. Lifting dowels up in the air 10x
    f. Playing Ladderball

3. How often did you use an activity-based intervention in the past week?
    a. Every intervention
    b. Most interventions
    c. Few interventions
    d. Never

4. Based on your experience **and the information presented,** do you think that activity-based interventions or rote exercises are more beneficial to clients?
    a. Activity-based interventions are always more beneficial
    b. Activity-based interventions are frequently more beneficial
    c. Activity-based interventions and rote exercise are equally beneficial
    d. Rote exercises are frequently more beneficial
    e. Rote exercises are always more beneficial

5. If you had 3 minute to plan and set up a therapeutic intervention, would you **prefer** to use an activity-based intervention or a rote exercise?
    a. Activity-based intervention
    b. Rote exercise

6. If you had 10 minutes to plan and set up a therapeutic intervention, would you **prefer** to use an activity-based intervention or a rote exercise?
    a. Activity-based intervention
    b. Rote exercise

7. How much evidence do you think exists in the literature comparing activity-based intervention to rote exercise?
    a. Substantial amount of evidence
    b. A fair amount of evidence
    c. Unsubstantial amount of evidence
    d. No evidence

8. Was the information presented during this in-service helpful?
    a. Yes
    b. No
    c. Not sure

9. How likely is it that you will change your decision-making with clients based on the information presented in this in-service?
    a. Very likely
    b. Somewhat likely
    c. Somewhat unlikely
    d. Very unlikely

Appendix B

Inservice: Activity-Based Interventions

Loren Burnett, Kelsey Tasoe, Kirsten Woodard
Master of Occupational Therapy students
University of Puget Sound

Pre-Survey

Question:

- What are some examples of individual and group interventions commonly used here at ManorCare?

- Discuss with people around you the pros and cons of activity-based interventions and rote exercise.

Research Question:

Is **activity-based intervention** (meaningful or nonmeaningful) or **rote exercise** more effective for improving physical performance outcomes in patients residing in skilled nursing facilities (SNF)?

Definition:

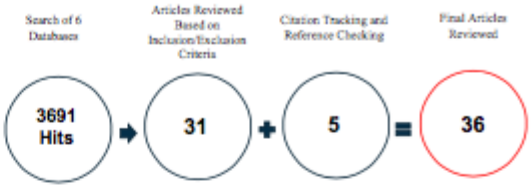
Activity-Based Intervention:

An occupationally embedded task with a by-product of pursuing an explicit functional goal (Schmidt and Nelson, 1996).

Activity-Based Intervention Examples:

- Balance training using ADLs, such as bed mobility and grooming at sink
- Stirring cookie dough
- Sanding a board to make a shelf
- Walking with a dog
- Game-playing (Wii)
- Picking up and throwing balls
- Kicking balloons
- Drawing a meaningful picture
- Reaching for objects such as coins
- Music making activity
- Dance
- Target shooting

Process



Results:

- Total of 36 articles
- Examples of journals articles were found in:
  - *American Journal of Occupational Therapy*
  - *Clinical Rehabilitation*
  - *Occupational Therapy Journal of Research*
  - *American Journal of Physical*
  - *British Medical Journal*
  - *Medicine and Rehabilitation*
  - *Physical and Occupational Therapy in Geriatrics*

Results:

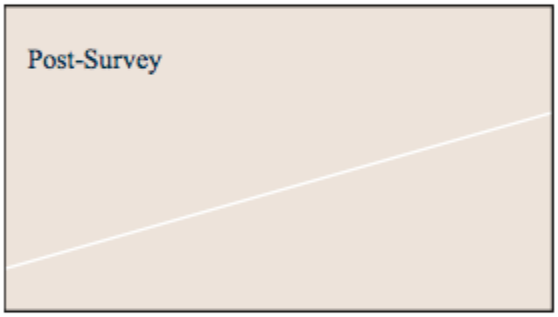
- Both types of interventions were effective in improving physical performance outcomes.
- However, when directly comparing the two types of intervention: Thin but consistent evidence that **activity-based interventions are more beneficial than rote exercise** for patients receiving therapy services in residential and inpatient facilities.

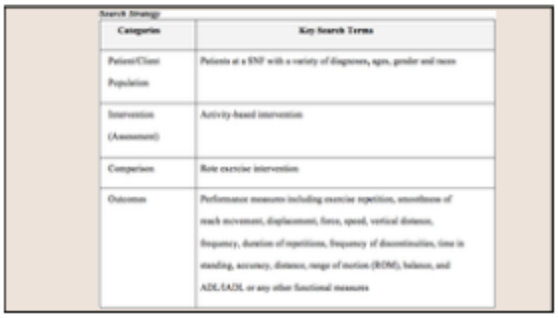
Implications for practitioners:

- Findings benefit various rehabilitation team members in a SNF.
- Evidence suggests that use of activity-based interventions are more beneficial in improving physical performance outcomes.
- Therapists can add in a functional object or activity to a rote exercise routine.

Limitations:

- Expanded search to include various inpatient settings due to limited research on skilled nursing facilities specifically
- Several studies used the terms "meaningful" and "nonmeaningful" to describe activities
- Limited studies directly compared activity-based interventions to rote exercise
- Diagnoses in the articles may not be representative of population at ManorCare





Search Strategy

Categories	Key Search Terms
Patient/Client Population	Patients at a SNF with a variety of diagnoses, ages, gender and races
Intervention (Assessment)	Activity-based intervention
Comparison	Rote exercise intervention
Outcomes	Performance measures including exercise repetition, smoothness of each movement, displacement, force, speed, vertical distance, frequency, duration of repetitions, frequency of discontinuities, time in standing, accuracy, distance, range of motion (ROM), balance, and ADL/IADL or any other functional measures

Key Terms	Synonyms
Activity-Based	"added purpose activity" OR "added purpose exercise" OR "added purpose occupations" OR "occupationally embedded exercise" OR "occupation-based activity" OR "occupation-based exercise" OR "purpose* activity" OR "purpose* exercise" OR "task oriented" OR "functional activity" OR "functional exercise" OR "goal-directed action" OR "meaningful activity" OR "materials-based occupation" OR "activity-based exercise" OR "activity-based treatment" OR "activity-based intervention"
Rote Exercise	"rote exercise" OR "biomechanical exercise" OR "non-purposeful activity" OR "non-purposeful exercise" OR "nonpurposeful activity" OR "nonpurposeful exercise" OR "general exercise" OR "resistance training" OR "strength training" OR "preparatory methods" OR "physical activity" OR "single purpose exercise" OR "exercise therapy"
Skilled Nursing Facility	"skilled nursing facility*" OR "residential care facility*" OR "assisted living facility*" OR "nursing home" OR "care home environment*" OR "residential care home" OR "nursing facility*" or "residential care nursing home facility*" OR "post-acute inpatient rehab* facility*" OR "inpatient rehab*"

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