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Adherence to an Exercise Intervention Among Older Women Post Hip Fracture

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Abstract

The purpose of this study was to evaluate adherence to home-based exercise interventions among older women post hip fracture that were randomized to one of three exercise intervention groups or a routine care group. A total of 157 female hip fracture patients provided data for the intervention analysis. Factors evaluated baseline, 2, 6, and 12 months post hip fracture included demographic variables, adherence to treatment visits, self-efficacy, outcome expectations, stage of change for exercise, social support for exercise, mood, health status, pain, and fear of falling. The hypothesized model tested the direct and indirect impact of all study variables on adherence to exercise intervention sessions. Different factors appeared to influence adherence to visits across the recovery trajectory.

Keywords

self-efficacy; outcome expectations; exercise

Adherence to exercise sessions in intervention studies among senior populations varies greatly depending on the population studied and the type of exercise program included (Martin & Sinden, 2001). Adherence rates are defined as the total number of sessions completed/the total number of sessions included in the intervention. Prior studies among senior populations show

a mean adherence rate of 63%, with rates being higher in programs that are less than 6 months in duration (Martin & Sinden, 2001; Rejeski, et al., 2005; Tsauo, Leu, Chen, & Yang, 2005). Historically, among senior populations who have participated in home-based exercise programs post hip fracture, adherence rates have ranged from 14% (Tsauo et al., 2005) to 80% (Mangione, Craik, Tomlinson, & Palombaro, 2005; Sherrington, Lord, & Herbert, 2004). These studies vary widely in terms of sample size, type of intervention, and duration of intervention. Moreover, little detail is generally provided with regard to the activities engaged in during the exercise intervention sessions. As such, understanding adherence to exercise interventions among senior populations, as well as a more detailed level of participation, is critical so that treatment effects can be optimized and provided in a cost effective manner. This study, therefore, considered adherence to an exercise intervention among senior populations post hip fracture and examined the factors that influence adherence over a 12-month intervention period.

Factors Influencing Exercise Adherence

A number of variables have been reported to specifically influence adherence to regular exercise among senior populations (Brawley, Rejeski, & King, 2003; Conn, Burks, Pomeroy, Ulbrich, & Cochran, 2003; Resnick, Vogel, & Luisi, 2006). These include demographic factors, physical health, mental health, cognitive status, and social support. The impact of these variables, however, has been inconsistent and may be sample specific (Greene, Haldeman, Kaminski, Neal, Lim, & Conn, 2006; Schutzer & Graves, 2004). There is also some evidence that gait and balance, functional status, pain, and fear of falling may influence an individual's willingness to engage in exercise activities (Bruce, Devine, & Prince, 2002; Cumming, Salkeld, Thomas, & Szonyi, 2000; Delbacre, Crombez, Vanderstraeten, Willems, & Cambier, 2004; Fletcher & Hirdes, 2004; Li, Fisher, Harmer, McAuley, & Wilson, 2003; Martin, Hart, Spector, Doyle, & Harari, 2005). Another important interpersonal factor influencing participation in exercise is social support from friends, family, and experts (Greene et al., 2006; Lee & Laffrey, 2006; Lippke & Ziegelmann, 2006; Resnick, Orwig, Magaziner, & Wynne, 2002; Resnick, Vogel, & Luisi, 2006; Sharma, Sargent, & Stacy, 2005).

From a theoretical perspective, social cognitive theory (specifically, the theory of self-efficacy) has been reported to consistently explain a variety of behaviors (Marcus et al., 2006; Pinto, Lynn, Marcus, DePue, & Goldstein, 2001; Trost, Owen, Bauman, Sallis, & Brown, 2002). Built on the principle of triadic reciprocal causation, social cognitive theory suggests an ongoing interaction between the person, his or her behavioral choices, and the environment. Within this theoretical framework, the theory of self-efficacy suggests that the stronger the individual's self-efficacy and outcome expectations, the more likely it is that he or she will initiate and persist with a given activity. Both self-efficacy and outcome expectations have been reported to play an influential role in the adoption and maintenance of exercise behavior in senior populations (Brassington, Atienza, Perczek, DiLorenzo, & King, 2002; Estabrooks, Fox, Doerksen, Bradshaw, & King, 2005; Gyurcsik, Estabrooks, & Frahm-Templar, 2003; Li, Fisher, Harmer, & McAuley, 2005; McAuley, Konopack, Motl, Morris, Doerksen, & Rosengren, 2006).

The transtheoretical model (TTM; Prochaska & Velicer, 1997) has also been used to explain adherence to exercise. The central construct of TTM is stage of change, which describes behavior change as a progression through a series of stages. Research indicates that as individuals progress through the stages, they report exercising more, are more fit based on physiological measures, and appear to have stronger self-efficacy expectations (Ackerman, Deyo, & LoGerfo, 2005; Godin, Lambert, Owen, Nolin, & Prudhomme, 2004).

Purpose

The purpose of this study was to describe adherence to a home-based exercise intervention among older women post hip fracture who were randomized to one of three exercise intervention groups and one routine care group. In addition to the intervention, the factors influencing adherence were examined at different points along the recovery trajectory, including at 2, 6, and 12 months post fracture. Specifically, it was hypothesized that age, cognitive status, physical and mental health, social support, pain, fear of falling, and mood all influence self-efficacy and outcome expectations, which influence stage of change. These variables, in addition to exposure to treatment, were hypothesized to influence adherence to intervention sessions (see Figure 1).

Method

Study Design

This study was a randomized controlled trial using a repeated measure design with participants randomized to one of four groups: (a) combined exercise and motivational intervention group (referred to as Exercise Plus); (b) exercise only intervention group (referred to as Exercise Only); (c) motivation only intervention group (referred to as Plus Only); or (d) routine care group. Random assignment was conducted following recruitment and baseline testing, which occurred within the first 22 days post hip fracture. Following baseline testing, data collection was conducted at 2, 6, and 12 months post hip fracture. The home-based exercise intervention was implemented as soon as Medicare-covered rehabilitation services were completed and the participant was willing to allow the interventionist to come to the home setting.

Sample

Participants were recruited from nine hospitals in a large metropolitan area in the northeastern United States between July 2000 and September 2004. Eligible individuals (a) were female, (b) were 65 years of age or older, (c) were community-dwelling at the time of fracture, (d) had to have sustained a nonpathologic fracture, and (e) must have undergone surgical repair of the hip fracture within 72 hours of admission (for further description of eligibility and recruitment, see Resnick et al., 2007). Medical exclusions included evidence of cardiovascular disease and neuromuscular conditions that would increase the risk of exercising while alone at home. Participants were also required to be able to walk without human assistance prior to the fracture and were required to score ≥ 20 on the Folstein Mini Mental State Exam (Folstein, Folstein, & McHugh, 1975). Informed consent and baseline measures needed to be obtained within 22 days of the fracture to be eligible for randomization. Institutional Review Board approvals were obtained from the appropriate facilities, and all enrolled subjects provided their own informed consent. A Data and Safety Monitoring Board met quarterly and reviewed all adverse events and safety reports.

A total of 208 female hip fracture patients consented within 15 days of hip fracture, and participants were randomized into groups. Of the 208, 157 were randomized to treatment (Exercise Plus, Exercise Only, or Plus Only), thus providing data for this analysis. The majority of the treatment participants were Caucasian (97%), and the average age of the participants was 81.0 ± 6.9 . Approximately one-third of the participants were married. The remaining were widowed (57%), never married (3%), or divorced/separated (5%). The average number of years in school was 12.3 ± 3.0 . The control group ($n = 51$) did not differ significantly from the treatment group on such demographic variables. Of the 157 participants randomized to treatment groups, 17 (11%) dropped out of the study by the 6-month follow-up period, and 36 (23%) refused any exposure to the treatment. There were no differences in baseline scores on study variables between those who dropped out of the study and those who did not, or between

those who refused any exposure to the intervention and those who were exposed to at least one exercise session. The control group was not part of the analysis, as there was no adherence data for the group.

Intervention Program

As previously stated, there were three treatment groups, including an exercise only group (Exercise Only), a motivation only group (Plus Only), and a combined exercise and motivational intervention group (Exercise Plus). The exercise component of the program is a home-based exercise intervention provided by exercise trainers that incorporates an aerobic exercise program using a Stairstep, a comprehensive strengthening program that covers all muscles groups, and stretching exercises (Resnick et al., 2007). Each relevant participant was shown how to complete the exercises (aerobic, resistive, and stretching) but no exercises were performed with the individual during the treatment visit (Resnick, Magaziner, Orwig, & Zimmerman, 2002). Participants were encouraged to perform aerobic activity at least three days per week and strength training two days per week for 30 minutes.

The motivational (Plus) component was also implemented by an exercise trainer. This component included self-efficacy-based interventions using education, verbal encouragement through goal setting and positive reinforcement, removal of unpleasant sensations associated with exercise, and individualized cueing. Initially, visits from the trainer occurred twice per week, but this was decreased to once a month in the final four months of the program. During the final four months, weekly motivational telephone calls were made to the participants randomized to receive the Plus component. Assuming that the participant completed all Medicare-covered rehabilitation services by one-month post fracture, the maximum number of anticipated intervention sessions was 38.

Treatment fidelity was considered with regard to study design, training, delivery of treatment, and receipt of treatment (Resnick et al., 2005). Training of the interventionists was completed as delineated in the procedure manual, and retraining was ongoing through monthly meetings between the trainers and the investigators who developed the Exercise Only and Plus Only interventions. The Exercise Only group on average received 45% of the total possible visits, the Plus Only group received 63% of the total possible visits, and the Exercise Plus group received 55% of the total possible visits. Five different interventionists were directly observed a total of 70 times by two of the investigators. Overall, there was 91% adherence to delivery of the intervention across all treatment groups, and in 92% of the observed visits, the participants demonstrated evidence that they received the intervention as intended.

Measures

Data were collected by the trainers during each session, and included (a) the total number of visits over the 12-month study period and (b) resistance used during resistance activities and the number of minutes the participant engaged in aerobic activity. To be consistent across all participants, only data extracted from the first visit and the final visit of the trainers were used, and only biceps and quadriceps strength testing were described.

Survey measures completed at 2, 6, and 12 months post hip fracture included the Self-efficacy for Exercise Scale (SEE), the Outcome Expectations for Exercise-Scale (OEE), the Social Support for Exercise Habits Scale, the MOS Short Form Health Survey (SF-36), the Center for Epidemiological Studies Depression Scale (CESD), and a stage of change scale. Additional assessments included self-report measures of participants' fear of falling and pain. Note that the Folstein Mini Mental State Exam (Folstein et al., 1975) was only administered at the beginning of the study as a means of determining inclusion/exclusion.

Self-Efficacy and Outcome Expectations—The Self-efficacy for Exercise Scale (SEE; Resnick & Jenkins, 2000) is a 9-item measure that focuses on self-efficacy expectations related to the ability to continue to exercise in the face of barriers to exercising. Prior use of this measure with senior populations provides evidence of reliability and validity (Harnirattisai & Johnson, 2002, 2005; Resnick & Jenkins, 2000). The Outcome Expectations for Exercise Scale (OEE; Resnick, Zimmerman, Orwig, Furstenberg, & Magaziner, 2000) is a 9-item measure that focuses on the perceived consequences of exercise for senior populations. Prior use demonstrates sufficient internal consistency and validity evidence (Harnirattisai & Johnson, 2002; Resnick et al., 2000; Resnick, Zimmerman, Orwig, Furstenberg, & Magaziner, 2001).

Stage of Change for Exercise—Stages of exercise adoption were assessed using an adaptation of the stage of change questionnaire originally developed by Marcus and colleagues (1992). This measure has been validated with reported exercise and has been shown to have excellent specificity (88%) and sensitivity (95%; Lee, Nigg, DiClemente, & Courneya, 2001).

Social Support for Exercise Habits Scale—The Social Support for Exercise Habits Scale (Lee, Nigg, et al., 2001) was developed to measure the influence of family and friends on exercise behavior. The measure includes 15 items that reflect social interactions that might influence exercise behavior. Psychometric testing provides evidence of internal consistency (alphas ranging from .61 to .91), test retest reliability ($r = .55$ to $.79$), and validity (Resnick, Orwig, Magaziner, & Wynne, 2002).

Short Form Health Survey—The MOS Short Form Health Survey (SF-36; Ware & Sherbourne, 1992) assesses eight health concepts related to mental and physical health status. There is support for the reliability and validity of this measure when used with senior populations (Stewart, Hays, & Ware, 1988; Stewart, King, & Haskell, 1993).

Center for Epidemiological Studies Depression Scale—The Center for Epidemiological Studies Depression Scale (CESD; Radloff, 1977) was used to assess depressive symptoms among participants. Prior use of this measure provides evidence of reliability and validity (Bohannon, Maljanian, & Goethe, 2003; Caracciolo & Giaquinto, 2002; Radloff, 1977; Turk & Okifuji, 1994).

Fear of Falling—Fear of falling was evaluated by asking participants to rate their fear of falling on a scale ranging from 0 (*no fear*) to 4 (*a lot of fear*). This single question was reported to be reliable and valid in varied samples and settings (Resnick, 1998).

Pain—Participants were asked to rate their self-reported levels of pain using the 0 (*no pain*) to 10 (*a lot of pain*) Numeric Rating Scale (NRS; Herr & Mobily, 1991, 1993). Use of the NRS with senior populations has been noted to have a low incidence of error and to correlate significantly with other pain measures ($r = .91$; Herr & Mobily, 1991, 1993).

Data Analysis

Descriptive statistics and analysis of variance were used to determine if there was a trainer effect on adherence to intervention visits. Model testing was done using structural equation modeling and the Amos statistical program. The sample covariance matrix was used as input and a maximum likelihood solution was sought. The chi-square statistic, the normed fit index (NFI), and Steigers Root Mean Square Error of Approximation (RMSEA) were used to estimate model fit (Bollen, 1989; Loehlin, 1998). Path significance was based on the Critical Ratio (CR).

Results

The first intervention session from the trainer was on average 87.2 days ($SD = 37.5$) or approximately 12 weeks post hip fracture, and on average participants had 22.3 visits ($SD = 14.7$). Group results are shown in Table 1. There was a nonsignificant difference in mean number of intervention visits by group ($F = 2.3, p = 0.11$), and a nonsignificant difference in number of visits adhered to between the different exercise trainers ($F = 1.9, p = .05$). In the baseline to 2-month period, the mean number of visits was 1.3 ($SD = 2.2$); in the 2- to 6-month period, the mean number of visits was 15.7 ($SD = 7.7$); and in the 6- to 12-month period, the mean number of visits was 10.8 ($SD = 6.7$). Although not significantly different among treatment groups, 17 of the 51 individuals randomized to the Exercise Only group (33%), 8 of the 54 individuals randomized to the Plus Only group (17%), and 11 of the 52 individuals randomized to the Exercise Plus group (15%) were unwilling to participate in intervention sessions ($F = 3.0, p = .05$).

Muscle strength training activity is shown in Table 2 for right and left quadriceps' strength with weights worn at the ankle, and bicep strength training using either hand-held or wrist weights. Table 3 provides a description of the mean Theraband® colors used over the 12-month recovery period (higher color/number indicates greater resistance). There was an overall increase in the resistance participants used over the study period. Participants also increased the amount of time spent in aerobic exercise from the first visit (showing a mean of 13.28 minutes of activity; $SD = 11.37$) to the final visit (showing a mean of 17.85 minutes of activity; $SD = 12.77$).

Baseline to 2 Months Post Hip Fracture

The full hypothesized model of predictors of adherence to treatment sessions from baseline to 2 months post hip fracture (with the exception of social support for exercise which was not obtained at baseline) was not supported by the data ($\chi^2 = 172.0, df = 50$, Ratio 3.4, NFI = .56, RMSEA = .13). Only 3 of the 69 hypothesized paths were significant (see Figure 2). The revised model, with nonsignificant paths removed, had an improved fit of the data to the model ($\chi^2 = 8.1, df = 3$, Ratio 2.7, NFI = .86, RMSEA = .11) and explained 6% of the variance in adherence to visits. Self-efficacy was related to stage of change and indirectly related to adherence to visits, such that those with stronger self-efficacy were more likely to participate in the training visits. Stage of change was the only variable that directly influenced the number of training visits. Those already exercising or contemplating exercise were more likely to adhere to the proposed intervention visits in the early post hip fracture period.

2–6 Months Post Hip Fracture

The full, hypothesized model of predictors of adherence to the treatment from 2 to 6 months post hip fracture was not supported by the data ($\chi^2 = 356.2, df = 82$, Ratio 4.3, NFI = .49, RMSEA = .13). Only nine of the hypothesized paths were significant (see Figure 3). The revised model showed a fair fit ($\chi^2 = 54.7, df = 27$, Ratio 2.0, NFI = .61, RMSEA = .08) and explained 7% of the variance in adherence to intervention sessions. Cognitive status and comorbidities influenced self-efficacy expectations, such that those who were more cognitively intact and had fewer comorbidities had stronger self-efficacy expectations. Self-efficacy expectations positively influenced outcome expectations. Outcome expectations, depressive symptoms, and social support from experts directly influenced adherence to sessions. Those who had greater social support for exercise from experts, stronger outcome expectations for exercise, and fewer depressive symptoms were more likely to adhere to exercise sessions. Cognitive status, comorbidities, and social support for exercise from family and experts all indirectly influenced adherence to visits through self-efficacy and outcome expectations.

6–12 Months Post Hip Fracture

For the 6- to 12-month post hip fracture period, the full hypothesized model of predictors of adherence was not supported by the data ($\chi^2 = 431.0$, $df = 87$, Ratio 5.2, NFI = .46, RMSEA = .14). Only 11 of the hypothesized paths were significant (see Figure 4). In the revised model, there was an improved although still poor fit between the data and the model ($\chi^2 = 94.5$, $df = 28$, Ratio 3.4, NFI = .74, RMSEA = .12), and the model explained 24% of the variance in number of visits. Self-efficacy expectations, physical health status, and pain all directly influenced adherence to visits. Those who had lower physical health status, less pain, and stronger self-efficacy expectations were more likely to adhere to visits in the 6–12 month period post hip fracture. Mental and physical health and fear of falling all indirectly influenced adherence to visits through self-efficacy expectations. Those with better mental and physical health and less fear of falling had stronger self-efficacy expectations for exercise.

Discussion

The Exercise Plus Program was developed to be consistent with the tenets of social cognitive theory and specifically the theory of self-efficacy. Consistent with prior reports on adherence to exercise (Martin & Sinden, 2001; Rejeski et al., 2005; Tsao et al., 2005), we noted that participants were willing to receive approximately half of the intended exercise intervention visits. Yet, the full theoretically proposed model was not supported by the data and did not explain adherence to the exercise sessions at any of the time points. Revised models at each time point did show a small improved fit and each explained a small amount of the variance in adherence to exercise sessions (6–24%).

It was hypothesized that the same theoretical model would explain adherence to the exercise intervention sessions at all follow-up time points. There were, however, differences in terms of which factors influenced behavior at the 0–2, 2–6, and 6–12-month post hip fracture periods. Stage of change only influenced adherence to exercise sessions in the first two months post hip fracture, which was reflective of the initiation of exercise post fracture. The importance of stage of change during initiation of exercise activities has previously been reported (Steptoe, Rink, & Kerry, 2000). As such, interventions to motivate individuals following an acute event such as a hip fracture that focus on helping individuals move toward more active stages of change might be particularly useful during this time point (Burbank, Riebe, Padula, & Nigg, 2002).

Consistent with prior research (Marcus et al., 2006), self-efficacy was either directly or indirectly associated with adherence to exercise sessions at each time point. However, those with less social support for exercise from experts had stronger self-efficacy expectations. It is possible that the experts (i.e., exercise trainers) helped the participants recognize what it *really* meant to engage in a moderate level of physical activity, and consequently, their confidence to engage in this level of activity decreased. McAuley et al. (2006) suggested that a decline in self-efficacy following exposure to an exercise intervention can occur, particularly when (a) the individual is exposed to a new exercise program, (b) there is a change in clinical condition or ability, (c) there is a decrease in exposure to exercise classes (or in this case the trainer in the home setting), or (d) the exercise program is progressively more challenging.

It was only during the 2- to 6-month time frame that outcome expectations and social support from experts and family influenced adherence to exercise sessions. Family support positively influenced outcome expectations for exercise and thereby influenced adherence to exercise sessions. The direct, positive influence of social support from experts on adherence to exercise suggests that despite the decline in self-efficacy, the participants found the training visits to be a positive experience, or at least were willing to allow the trainer to visit and provide the exercise intervention. Likewise, it was only during the 2- to 6-month period that cognitive

status indirectly influenced adherence to exercise sessions, such that those with better cognitive status had stronger self-efficacy expectations and thereby were more likely to adhere to visits. Given that individuals with cognitive impairment can participate and achieve beneficial outcomes associated with exercise post hip fracture (Littbrand, Rosendahl, Lindelöf, Lundin-Olsson, Gustafson, & Nyberg, 2006), special interventions may need to be implemented to optimize self-efficacy expectations and help these individuals adhere to interventions. In so doing, clinicians can help ensure that older women with cognitive impairment have equal opportunity to be exposed to exercise interventions post hip fracture.

During the 2- to 6-month and 6- to 12-month follow-up periods, physical health (measured by evidence of comorbidities or overall physical health status) and mental health (measured by evidence of depressive symptoms or mental health status) directly or indirectly influenced adherence to exercise sessions. However, it was only in the 6- to 12-month hip fracture recovery period that pain and fear of falling influenced adherence to exercise sessions. Fear of falling may be more influential at this point, as the participants are likely to be doing more activity alone rather than under the supervision of a therapist or caregiver. In addition, pain may have had a greater impact on adherence to visits during this later recovery period, as the pain may have been reflective of problems such as loosened hardware or from new clinical problems such as exacerbations in degenerative joint disease. It is therefore recommended that providers remain vigilant in addressing physical and mental health, pain, and fear of falling among senior populations throughout the entire first year post hip fracture. Participants may simply need reassurance that management of chronic illness, both physical and mental, is generally improved by regular exercise.

Despite some support for the revised models, only a small percentage of the variance in adherence to exercise sessions was explained. To more comprehensively address adherence to exercise interventions, it may be helpful to consider using the social ecological model (Fleury & Lee, 2006; Taylor et al., 2007). The social ecological model incorporates intrapersonal, interpersonal, organizational, environmental, and policy-related components of behavior and can be used to guide interventions focused on (a) including peers and family to motivate the individual to participate in study-related exercise intervention sessions, (b) optimizing the physical environment to support participation, and (c) addressing intrapersonal factors such as low levels of vitamin D.

Conclusion

The findings from this study demonstrate the challenges associated with helping older women post hip fracture to adhere to a research-based exercise program. Although the full hypothesized model was not supported, the results offer some suggestion that throughout the recovery period, adherence to exercise sessions among women post hip fracture may be improved by strengthening self-efficacy and outcome expectations related to exercise and decreasing pain and fear of falling. It appears that different factors influence adherence to exercise sessions at different points along the recovery period. Future exercise intervention studies with older women post hip fracture should consider the use of a social ecological model that addresses intrapersonal and interpersonal interactions, environment challenges, and policy issues. By doing so, adherence to exercise sessions in randomized controlled trials may be further optimized, and thus, the knowledge needed to establish best practices in the post hip fracture recovery period can be achieved.

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Figure 1.
Full hypothesized model.

Figure 2.
Baseline to 2-month adherence to visits.

Figure 3.
2- to 6-month adherence to visits.

Figure 4.
6- to 12-month adherence to visits.

Table 1
Mean Number of Visits Along the Recovery Trajectory Post Hip Fracture (2-, 6-, and 12-months Post Hip Fracture)

Number of Visits	Group	N	Mean	SD	Minimum	Maximum
0–2 months	Exercise Only	34	1.9	2.7	0	9.00
	Exercise Plus	44	.79	1.5	0	5.00
	Plus Only	43	1.4	2.4	0	10.00
2–6 Months	Exercise Only	34	16.0	8.6	0	25.00
	Exercise Plus	44	16.1	7.2	0	28.00
	Plus Only	43	15.0	7.4	0	24.00
6–12 months	Exercise Only	34	9.0	5.7	0	25.00
	Exercise Plus	44	12.1	6.0	0	23.00
	Plus Only	43	11.1	7.5	0	31.00

Table 2

Exercise Weight Used

Variable	Number of Participant Visits	Mean	SD	Minimum	Maximum
First visit: Right Leg	65	.80	.90	0	2.5
First visit: Left Leg	65	.81	.88	0	2.5
First visit: Right Biceps	65	.07	.39	0	2.5
First visit: Left Biceps	65	.07	.39	0	2.5
Final visit: Right Leg	63	1.71	1.24	0	6
Final visit: Left Leg	63	1.74	1.22	0	6
First visit: Right Biceps	63	.13	.70	0	5
First visit: Left Biceps	63	.13	.70	0	5

Note. Weight applied to ankle for quadriceps training and wrist for biceps training.

Table 3

Theraband@ Progression of Participants

Variable	Number of Participants	Mean	SD
First visit: Right Biceps	69	2.16	1.30
First visit: Left Biceps	68	2.15	1.31
Last visit: Right Biceps	68	3.24	1.71
Last visit: Left Biceps	68	3.19	1.76

Note. Theraband@ Color Key: 0 = no band; 1 = tan; 2 = yellow; 3 = red; 4 = green; 5 = blue; 6 = black; 7 = silver