Complete Summary

GUIDELINE TITLE

Progressive resistance training.

BIBLIOGRAPHIC SOURCE(S)

Mobily K, Mobily P. Progressive resistance training. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2004 Feb. 28 p. [31 references]

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

Low muscle strength

GUIDELINE CATEGORY

Management

CLINICAL SPECIALTY

Geriatrics
Nursing

INTENDED USERS

Allied Health Personnel
Nurses
Physical Therapists
Physicians

GUIDELINE OBJECTIVE(S)

To improve and maintain the functional fitness of older adults through Progressive Resistance Training (PRT)

TARGET POPULATION

Elderly patients with or at risk for low muscle strength and/or falls

INTERVENTIONS AND PRACTICES CONSIDERED

Progressive resistance training which involves the use of weights and other forms of resistance (i.e., Therabands™) to provide resistance in a series of exercises with intent of increasing muscle strength

MAJOR OUTCOMES CONSIDERED

- Functional fitness performance as measured by the use of the Functional Fitness Assessment and Progressive Resistance Training (PRT) Management Monitor
- Incidence and severity of falls before, during, and after Progressive Resistance Training program
- Functional ability
- Ability to carry on independent living and self-care activities
- Patient-reported level of quality of life

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

MEDLINE searches using the following key words: strength training; progressive resistance training; weight training; older adults; elderly; senior citizens. Also the following key journals were used: Journal of Aging and Physical Activity, Journal of Gerontology, Journal of the American Geriatrics Society. The search was for publications from 1985 forward.

NUMBER OF SOURCE DOCUMENTS

56

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

A = Evidence from well-designed meta-analysis

B = Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g., assessment, intervention or treatment)

C = Evidence from observational studies (e.g., correlational descriptive studies) or controlled trials with inconsistent results

D = Evidence from expert opinion or multiple case reports

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Review by two experts using a common critique format.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Informal Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Clinical Validation-Trial Implementation Period
External Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guideline has been implemented and evaluated in a senior center. Articles which address this are:

Mobily KE, Mobily PR, Lane BK, Semerjian TZ. Using progressive resistance training as an intervention with older adults. Therapeutic Recreation Journal 1998; 32:42-53.

Mobily KE, Mobily PR. Reliability of the 60+ functional fitness test for older adults. J of Aging & Physical Activity 1997; 5:150-162.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The rating scheme for strength of evidence (A,B,C,D) is defined at the end of the Major Recommendations field.

Assessment for Progressive Resistance Training

Assessment for progressive resistance training consists of two separate measures:

1. Assessment of physical activity readiness
2. Assessment of functional fitness

Assessment of Physical Activity Readiness

Prior to beginning this or any program of regular physical activity, the older adult should be screened using any of a number of good health screening devices (e.g. the Physical Activity Readiness Questionnaire [rPAR-Q]) (Evidence grade = B). Whatever health screening device is used, anyone reporting a contraindication for exercise should obtain a physician's approval to participate in the program.

Assessment of Functional Fitness

The most comprehensive assessment inventory is the 1996 Functional Fitness Assessment for Adults Over 60 Years (Evidence grade = C) developed by the Council on Aging and Adult Development of the American Association for Active Lifestyles and Fitness, an association of the American Alliance of Health, Physical Education, Recreation, and Dance (AAHPERD).

The tests of fitness are designed to be administered under conditions of minimal risk to the participant.

Measurement of each of the five functional fitness criteria is as follows:

- Flexibility
- Agility and dynamic balance
- Coordination
- Strength and muscle endurance
- Endurance

Description of Intervention

The following Progressive Resistance Training (PRT) intervention program describes activities that should begin on a two-month, three workouts per week basis.

The following activities should be performed as part of the PRT program. During each 40-minute session, participants should complete the following activities:

- Warm-up. 5 minutes of light exercises designed to prepare the participant for muscle conditioning and to improve overall flexibility
- Muscular conditioning. 30 minutes of exercises designed to improve muscular strength and endurance. Most of the exercises use light weights (hand-held dumbbells with typical resistance of 1 to 10 pounds for most exercises) and are progressive in nature (i.e., participant advances to higher demand levels at their own pace, according to personal ability to tolerate the exercises and accommodate the increases in demand). Generally, these exercises are performed for three sets of 8 to 10 repetitions each, progressing to three sets of 15 repetitions each.
- Cool-down. 5 minutes of light exercises (using some of the same flexibility exercises employed in the warm-up phase). The purpose of the cool-down is to return respiration levels back to normal levels and to stretch the muscles worked in the exercise session.

This program is consistent with recommendations by the American Alliance for Health, Physical Education, Recreation, and Dance and weight training authorities.

Any number of exercises can be introduced. Generally, most older adults in normal health are able to complete eight different exercises at a rate of three sets per exercise in about 30 to 40 minutes without discomfort. Introduce at least one flexibility/stretching exercise within the context of the workout. Also, try to introduce exercises that will work all parts of the body, and include:

1. Upper extremities and shoulder girdle
2. Trunk and abdomen
3. Lower extremities and pelvic girdle

Some examples of exercises that are frequently used to work the various parts of the body include the following:

- Arm curls. Hand weights are held at the sides with palms forward. Posture is upright, feet about shoulder-width apart, head erect, eyes forward. The participant then slowly curls <u>one</u> of the hand weights toward the shoulder with the hand remaining in a palm forward position at all times. The weight is slowly returned to the starting position and the opposite weight is curled toward the shoulder. Hence, the exercise sequence stresses alternating movements by each extremity at a slow rate up to 8 to 15 repetitions with each limb. Participants should begin with weight they can curl about eight times with their weakest limb. Once the participant can perform the exercise 15 times with each limb for three sets, then he/she may want to increase weight by about ten percent.
- Shoulder shrug. Hand weights are held at the sides with palms facing inward. Posture is upright, feet about shoulder-width apart, head erect, eyes forward. The participant slowly shrugs the shoulders simultaneously and then

returns the shoulders to resting position. Progression should follow the pattern described above for the arm curl; start with eight repetitions and work up to 15, then increase weight.

- Leg lunge. Hand weights are held at the sides with palms facing inward. Posture is upright, feet about shoulder-width apart, head erect, eyes forward. The participant takes a stride forward with one leg, leaning so that the lead leg supports the person's weight. The participant next returns to the starting position by pushing back to an upright standing position with the lead leg. The exercise is repeated with the opposite leg. One set consists of 8 to 15 repetitions with each leg. Normally, three sets are completed. Progression is as described above for arm curls.
- Toe raises. Hand weights are held at the sides with palms facing inward. Posture is upright, feet about shoulder-width apart, head erect, eyes forward. Both feet are simultaneously plantar flexed so that the participant slowly rises up on the "balls" of the feet. The contracted position should be held momentarily and then the participant slowly returns to the starting position. Three sets of 8 to 15 repetitions are normal with progression following the description given in for the arm curl exercise.
- Rowing. The participant bends at the waist, supporting the weight with one hand and one knee (on the same side) resting on a weight bench, or another short, stable object (e.g., chair, piano bench). A single hand weight is then held by the non-supporting hand and allowed to dangle inferiorly. On commencing the exercise the participant slowly pulls the weight upward toward the trunk (in a "rowing" motion), then returns the weight to the suspended starting position. Eight to 15 repetitions are completed with each upper extremity for three sets. Progression follows the same pattern described in the arm curl section.
- Abdominal crunches. The participant begins in a supine, lying position on an exercise mat. Legs are bent at the knees. No weight is used for this exercise, although a light weight may be used later by holding it behind the head with both hands. If the participant has no experience with this exercise, begin by just having the participant raise the head and "look at his knees." It is not necessary to complete a traditional sit-up in order to improve abdominal strength. Start with 5 repetitions and progress to 15. Progression is implemented by increasing the difficulty of the exercise; the head raise method can be advanced as the participant demonstrates tolerance by picking the "shoulder blades" off the mat and finally by curling the chest toward the legs. Make certain that the participant does not yank on his or her neck; there should be ample space between the chin and the chest (perhaps place an orange or a tennis ball between chin and chest to ensure that the participants does not pull on his or her neck while the hands are placed behind the head). Pulling on the head may also be avoided by having the participant cross his hands across his chest while completing the exercise.
- Tricep extension. Stand upright, feet about shoulder-width apart, head erect, eyes forward. The participant holds one hand weight and positions it behind the head with the elbow bent. The opposite hand is not holding a weight at this time. This starting position then has the weight behind the head with the hand holding the weight facing medially and the elbow facing forward. The weight is then slowly pushed superiorly (overhead) until the elbow is near complete extension. Eight to 15 repetitions with each limb for three sets should be completed. Progression is as described in the arm curl exercise.

- Side bends. Posture is upright, feet about shoulder-width apart, head erect, eyes forward. One hand holds a hand weight, while the other is positioned so that the hand is on the hip (iliac crest). To begin the exercise, the participant slowly bends side-ways to the side that has the weight. The participant then returns slowly to the starting position. This exercise is repeated 8 to 15 times on each side for three sets. The pattern for progression for this exercise is the same as for the arm curl.
- Quadriceps extension. In a seated position (preferably a chair with arm rests), the participant hooks one foot under each end of an exercise band (e.g. Theraband™). While resting one foot on the floor, the other leg is then kicked forward (extended) against the resistance provided by the band. This exercise is repeated 8 to 15 repetitions with each lower extremity for three sets. The exercise instructor should gauge the performance by having the participant begin with the lowest resistance band (bands may be purchased with a variety of tensile strengths). The participant should "test" the resistance provided by each band in turn until he/she determines the one consistent with performing eight to ten repetitions. Progression amounts to exercising with progressively more resistive bands when 15 repetitions over three sets are performed comfortably.
- Hamstring curls. In a standing position, the participant faces the back of a chair, or faces a window with a ledge the participant may grasp. Next, the participant stands on an exercise band with one foot, hooking the band under the sole of one foot. Next, he/she hooks the heel of the second foot under the free end of the band. While grasping the top of the chair or the window ledge the subject curls his/her leg by flexing at the knee, drawing the heel toward the buttocks on the same side. This exercise is repeated 8 to 15 repetitions with each lower extremity for three sets. The correct resistance may be determined using the same procedure described above for the quadriceps extension exercise. Likewise, progression should follow the same procedure recommended for the quadriceps extension exercise described immediately above. The exercise instructor may have to help the participant position his/her feet correctly during the first few trials.

Evaluation of Participant Outcomes and Process Factors

In order to evaluate the use of this protocol among participants at risk for low muscle strength, both outcome and process factors should be evaluated.

Outcome Factors

Use the Functional Fitness Assessment (Evidence grade = C), (described under "Assessment of Functional Fitness" in the original guideline document) at one-month intervals following the start of the PRT program. Compare baseline assessment with progress following each month in the program. Also, the participant's functional fitness performance may be compared to norms. An improvement in this functional fitness should be observed following two months.

- For the individual implementing the PRT program, this information will provide information about how effective the program is.
- For the participant, this information can be rewarding and, hopefully, encouraging enough to motivate continued participation in a program of regular exercise.

The PRT Management Monitor described in Appendix C in the original guideline document is an outcome measure that is based upon participant interviews and that elicits specific information regarding the PRT program and increases in functional fitness. Please use the Monitor on an at least monthly basis.

Other participant outcomes may be included as dictated by the specific aims of the program and for each individual participant. Examples of other outcomes that can be assessed include:

1. Record number of and severity of reported falls before, during, and after the PRT program.
2. Record functional ability through standardized tests (e.g., tests of hand function, functional reach, sit-to-stand, timed up-and-go).
3. Record reported ability to carry on independent living and self-care activities.
4. Record any increases in the participant's reported level of quality of life.

Process Factors

A sample of the nurses and/or physicians who are using this protocol need to be given the Process Evaluation Monitor (see Appendix D in the original guideline document) approximately one month following his/her use of the protocol. The purpose of this monitor is to determine his/her understanding of the protocol and to assess the support for carrying out the protocol.

Rating Scheme for Strength of Evidence

A = Evidence from well-designed meta-analysis

B = Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g. assessment, intervention or treatment)

C = Evidence from observational studies (e.g. correlational descriptive studies) or controlled trials with inconsistent results

D = Evidence from expert opinion or multiple case reports

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Improve patient's prospects for independent living
- Reduce risk of falls
- Enhance commitment to regular exercise
- Increase overall quality of life

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

This evidence-based practice is a general guideline. Patient care continues to require individualization based on patient needs and requests.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Dissemination of assessment and outcomes management tools to appropriate nursing areas at the University of Iowa Hospitals and Clinics.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Mobily K, Mobily P. Progressive resistance training. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2004 Feb. 28 p. [31 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998 (revised 2004 Feb)

GUIDELINE DEVELOPER(S)

University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core - Academic Institution

GUIDELINE DEVELOPER COMMENT

University of Iowa Hosptials & Clinics, Univeristy of Iowa College of Nursing

SOURCE(S) OF FUNDING

National Institute of Nursing Research, NIH (Grant # P30 NR03979)

GUIDELINE COMMITTEE

University of Iowa Gerontological Nursing Interventions Research Center Research Dissemination Core

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Mobily K, Mobily P. Progressive resistance training. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 1998. 25 p.

GUIDELINE AVAILABILITY

Electronic copies: Not available at this time.

Print copies: Available from the University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core, 4118 Westlawn, Iowa City, IA 52242. For more information, please see the University of Iowa Gerontological Nursing Interventions Research Center Web site.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on August 1, 1998. The information was verified by the guideline developer on December 1, 1998. This summary was updated by ECRI on June 8, 2004. The information was verified by the guideline developer on August 5, 2004.

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