

1C3(a)iv. Rehabilitation Procedures - Elderly Population Without Chronic Conditions: Fitness and Nutrition

Fitness

Joint flexibility is an essential component of driving skill. If upper extremity range of movement is impaired in the older driver, mobility and coordination may be seriously weakened. Older drivers with some upper extremity dysfunction may not be able to steer effectively with both hands gripping the steering wheel rim. Upper extremity movements required for hand control and steering control operation include shoulder abduction, flexion, extension, internal rotation, external rotation, circumduction, and forearm flexion, extension, supination, and pronation (Gurgold and Harden, 1978).

Also with advancing age there is decreased head and neck mobility that adversely affects the older person's ability to complete driving tasks. A restricted range of motion can reduce an older driver's ability to operate an automobile, especially for effectively scanning directly and indirectly (mirrors) to the rear and sides of his/her vehicle to observe blind spots, as well as hindering timely recognition of conflicts during turning and merging maneuvers at intersections (Ostrow, Shaffron, and McPherson, 1992).

Decreased flexibility with age is probably the result of combined histological and morphological changes in the components of the joint, including cartilage, ligaments, and tendons (Adrian, 1981; Serfass, 1980). The greater calcification of cartilage and surrounding tissue, the shortening of muscles, increased tension and anxiety, and the prevalence of arthritic and other orthopedic conditions all contribute to reduced flexibility (Piscopo, 1981). Changes in joints and tendons may adversely affect the flexibility and stability of joints. Studies that have made assessments of flexibility in older persons generally support the conclusion of a decline in flexibility in the middle and later years. Motion perception in the lower extremities, metatarsophalangeal joints (those between the toe and ankle bones), decline with age as well (Kokmen, Bossemeyer, and Williams, 1978). It has also been reported that over 50 percent of people over the age of 65 have osteoarthritis in at least one joint.

One encouraging note is that many of the movement execution problems associated with losses in flexibility pervasive among older road users may stem simply from an overall decline in physical fitness among this group, and is thus amenable to remediation. One research study involving 63 older drivers found that drivers ages 60 to 75 demonstrated less shoulder flexibility and torso/neck rotation than a comparison group including 43 younger drivers (McPherson, Ostrow, and Shaffron, 1988). However, an exercise program conducted by Ostrow et al. (1992) was shown to be an effective intervention for older drivers for enhancing driving skills that accentuate demands on the range of motion, such as observing to the rear and parallel parking. The exercises consisted of chin flexion/extension, neck rotations, head side bending, chin tucks, rotating the shoulders backward, and trunk rotations. After participating in the program, older drivers showed improvements using a field-based assessment of automotive driving skill. Subjects in the experimental group who received the range-of-motion training looked more

frequently to the sides and rear of their vehicle than drivers in a control group who did not participate in the exercise program.

Meister (1998) reports that exercise can significantly benefit even people above the age of 80. In a study of nursing-home residents whose average age was 87, ten weeks of progressive resistance exercise led to significant increases in muscular strength, walking speed, and stair-climbing ability.

As described in section IA2(a) of this *Notebook*, older drivers who have diminished physical performance ability are more likely to be involved in automobile crashes, than older drivers who are physically fit. Information about the benefits of exercise for older adults is ubiquitous. Brochures with activity tips for older adults may be found in grocery stores; articles are written in the magazine sections of Sunday newspapers (e.g., *Parade Magazine*); the internet has hundreds of advertisements for fitness videos and programs for older adults; and video rental centers, retailers and discount stores offer exercise videotapes geared to seniors. Examples are provided at the end of this section. As noted throughout various sections of this *Notebook*, health and social service providers are aware of the benefits of exercise for older persons, and have developed exercise programs that are presented in senior centers, local health and fitness centers, and hospital wellness centers. Other sources that may reference the benefits of fitness and include simple exercises are identified in *Notebook* Section IB3.

According to Dr. Nicholas DiNubile, an orthopedic consultant to the Philadelphia 76'ers basketball team and the Pennsylvania Ballet, fitness strengthens bones, improves balance, and makes falls less likely to occur; if people are in better shape and have better muscle tone, they are less likely to sustain a severe fracture if they do fall (O'Shea, *Parade Magazine*, September 6, 1998). O'Shea states that falls are the leading cause of death and injury in the U.S. for persons over age 65. Across America, nearly 1,000 people fracture their hips in falls every day. Falling has been associated with increased crash risk; some of the same factors that are associated with falling are associated with automobile crashes.

Seniors need to do exercises that will increase muscle strength, aerobic endurance, and flexibility. Weight-bearing exercises that put stress on bones helps to prevent calcium loss; this will help to strengthen bones and help them to absorb vital minerals. Weight training with light dumbbells, weight machines, or calisthenics (push ups, dips, chins) are all good for the upper body. It is not necessary to go to a gym for this kind of exercise; several resources note that weight training can be accomplished at home using 2.5 pound weights (soup cans, water bottles). A position stand on "Exercise and Physical Activity for Older Adults" by the American College of Sports (summarized by Bowerman, 1998) states that "when the intensity of exercise is low, only modest increases in strength are achieved by older subjects." They state that a number of studies have demonstrated that, given an adequate training stimulus, older men and women show similar or greater strength gains compared with young individuals as a result of resistance training. Two- to threefold increases in muscle strength can be accomplished in a 3- to 4-month timeframe in older adults. They further state that the effects of a heavy-resistance strength-training program on bone density in older adults can offset the typical age-associated declines in bone health by maintaining or increasing bone mineral density and total body mineral content. However, in addition to its effect on bone, strength training also increases muscle mass and

strength, dynamic balance, and overall levels of physical activity. All of these outcomes may result in a reduction in the risk of osteoporotic fractures.

Next is aerobic endurance. Aerobic activities are those which increase the heart rate and make a person breathe more quickly, such as bicycling, swimming, and brisk walking while swinging one's arms. Bowerman (1998) says that endurance training appears to lower blood pressure to the same degree in young and older hypertensive adults. He states that the contraindications to exercise testing and exercise training for older men and women are the same as for young adults. The major absolute contraindications precluding exercise testing are:

- ❖ Recent ECG changes or myocardial infarction
- ❖ Third degree heart block
- ❖ Unstable angina
- ❖ Acute congestive heart failure
- ❖ Uncontrolled arrhythmias

The major relative contraindications for exercise testing include:

- ❖ Elevated blood pressure
- ❖ Complex ventricular ectopy
- ❖ Cardiomyopathies
- ❖ Uncontrolled metabolic diseases
- ❖ Valvular heart disease

Regular aerobic exercise can increase oxygen uptake, which brings greater endurance for the heart, lungs, and skeletal muscles, and improved ability to burn fat. One workout program geared to seniors is **Geri-Fit**. It was developed by a geriatrician and has been medically reviewed and approved by doctors, physical therapists, exercise physiologists, and other health care professionals. It is a 45-minute strength training exercise program for older adults. The exercises are performed seated in a chair, and classes are guided by a trained and certified instructor. Participants bring their own set of 2-pound dumbbells to class. Their website lists several agencies that have purchased their exercise program, which include two senior centers in Ohio. There are dozens of aerobic exercise videotapes on the market, many of which are geared to seniors. Jodi Stolove, a fitness instructor, has three videotapes ranging from 20 to 45 minutes on chair dancing (O'Shea, *Parade Magazine*, May 17, 1998). She states that they provide a balanced workout that includes a warm-up, toning, aerobic conditioning, stomach crunches, and gentle stretching, all from a chair. The seated workouts are ideal for individuals with a bad knee, arthritis, or poor balance. One videotape exercise program found on the internet is called "More

Gain, Less Pain: A Low-Stress Exercise Program for Seniors"

(www.fitnesslink.com/moregain.htm). It features Charles Manning, a Certified Personal Trainer, Certified Aerobic Instructor and Corporate Fitness Director. The tapes feature a warm-up, aerobic training, muscle strengthening and toning, and a final stretch. The cost is \$19.95. Of course, individuals can contact their local health and fitness club, YMCA, hospital wellness center, or senior center to find out what programs are available in weight training and aerobics for seniors. For example, Howard County (Maryland) Office on Aging provides: seated exercise classes; American Arthritis Foundation-approved exercise classes; Tai Chi; low-impact aerobics; and country line dancing in their senior centers. Classes are twice weekly for 8 to 12 weeks, and cost approximately \$25.00.

The last area is flexibility. Staying flexible is important for reaching, bending, keeping balance, and lowers the risk of serious injury in the event of a fall. Simple exercises can be done at home, and most of the videotape exercise programs and regular programming of exercise shows on TV include stretching. Yoga classes at the local YMCA or senior center are another option. Other home activities such as raking leaves and sweeping provide a benefit. Simple exercises are shown at the end of this section, from a pamphlet distributed by the Central Plains (Kansas) Area Agency on Aging.

The National Institute on Aging is currently funding a study to determine whether a multicomponent physical conditioning program can enhance driving performance and improve physical ability among active drivers age 70 and older who have physical impairments, but who are free of severe visual and cognitive impairments (TRB Committee A3B13: *Safe Mobility of Older Persons*, Newsletter, November 1998).