ABC of sports and exercise medicine

Activity in later life

Archie Young, Susie Dinan

Regular physical activity brings important health benefits at any age. Its importance for health in old age is highlighted repeatedly in the English national service framework for older people. Any potential hazards can be reduced by education and guidance of participants.

Prevention of disease

Regular physical activity helps prevent conditions important in "old age," notably osteoporosis, non-insulin dependent diabetes mellitus, hypertension, ischaemic heart disease, stroke, and perhaps some cancers, specifically colon cancer.

Prevention of disability and immobility

Not only does regular physical activity play an important part in preventing disease, its function preserving effects are also important. Frail elderly patients with multiple disabilities may also derive functional benefits from graded physical training.

Even healthy elderly people lose strength at a rate of some 1-2% a year and power at a rate of some 3-4% a year. In addition, many elderly people have further problems because of the presence of chronic disease. The resulting weakness has important functional consequences for the performance of everyday activities. In the English National Fitness Survey, nearly half of women and 15% of men aged 70-74 years had a power to weight ratio (for extension of the lower limb) too low to be confident of being able to mount a 30 cm step without a hand rail.

A similar argument applies for endurance capacity: 80% of women and 35% of men aged 70-74 years had an aerobic power to weight ratio so low that they would be unable to sustain comfortably a walk at 5 km/h (3 mph). Similarly, at least a third of women and nearly a quarter of men aged 70-74 years had shoulder abduction so restricted that they would be unable to wash their hair without difficulty.

Regular exercise increases strength, endurance, and flexibility. In percentage terms, the improvements seen in elderly people are similar to those in younger people. Supervised programmes of specific exercises to improve strength and dynamic balance have been shown to be effective in reducing falls. International clinical guidelines now include exercise as an important component of an effective multifactorial intervention for the prevention of falls.

For those who are severely disabled, immobility has substantial hazards. Movement, even in the absence of a training effect, contributes to the prevention of faecal impaction, deep vein thrombosis, and gravitational oedema.

Prevention of isolation

In addition to its physiological effects, recreational exercise offers important opportunities for socialisation. It also permits the emotional benefits of socially acceptable touching, unconnected with dependence and the need for personal care. Touching is a rarity for many elderly people who are long bereaved.

This article is adapted from the 3rd edition of the *ABC of Sports and Exercise Medicine*, which will be published later this year.

Elderly people taking part in a water exercise class

Physical activity helps prevent:

- Disease—osteoporosis, non-insulin dependent diabetes, hypertension, ischaemic heart disease, stroke, anxiety, depression, colon cancer
- Disability—caused by intermittent claudication, angina pectoris, heart failure, asthma, chronic bronchitis, age related weakness
- Problems—Arthritic pain, poor sleep, falls, fractures
- Immobility—can cause faecal impaction, deep vein thrombosis, gravitational oedema
- Isolation—can cause loneliness or depression or both

Physical training

Appropriate physical training improves the functional abilities of people with disabling symptoms of:

- Intermittent claudication
- Angina pectoris
- Heart failure
- Asthma
- Chronic bronchitis

Strength = the ability to exert force
Power = force × speed

Improvements produced by exercise

In two studies by the Royal Free Hospital:

- Women aged 75-93 years increased their strength by 24-30% with just 12 weeks of strength training (equivalent to a "rejuvenation" of strength by 15-20 years)
- Women aged 80-93 years produced a 15% mean increase in their aerobic power to weight ratio with 24 weeks of endurance training (equivalent to a "rejuvenation" of endurance of 15 years)

Providing guidance and opportunity

What type of activity?

Any exercise programme to improve general fitness must include activities to develop strength, endurance, flexibility, and coordination in a progressive and enjoyable way. It must use all major muscle groups in exercises that train through each individual's fullest possible pain-free ranges of movement. An exercise programme for older people must also aim to load the bones; target major functional, postural, and pelvic floor muscles; include practice of functional movements; and emphasise the development of body awareness and balance skills. A combination of regular recreational walking and swimming (both at an intensity that is comfortably challenging), preferably combined with specific exercises to improve strength and flexibility, will meet most of these criteria for most people. Many older people also welcome the opportunity to participate in group exercise.

How much is enough?

Until recently, published guidelines recommended vigorous physical activity to achieve the expected health benefits. Ample evidence now shows that substantial health benefits can be obtained by an approach that is more temperate and, arguably, more likely to be sustained. For endurance activities such as walking and swimming, this approach is based on 30 minutes' exercise, five times a week, at moderate intensity,—that is, with an effort that makes the participant feel “comfortably challenged,” warm, and breathing a little more heavily. (Of course, the speed of walking that is “comfortably challenging” will vary considerably from person to person.)

The older and frailer the participant, the greater the potential benefit from the inclusion of strengthening, stretching, balance, and coordination activities and the greater the need for individually tailored exercise guidance from a trained specialist.

Exercise groups

A short chapter cannot teach how a seniors' exercise group should be run. Rather, we offer guidance to health professionals on areas to consider when they assess an exercise group to which they might refer patients or when they seek specialist training to allow them to lead groups safely and successfully.

All sessions should start and finish gradually with a warm up and warm down. For frailer participants, many of the activities should be related closely to life and maintaining independence. Techniques of lifting, walking, transferring (moving from sitting to standing, standing to lying), and even crawling should be specifically taught and discussed. Information about the specific benefits of particular exercises is greatly appreciated—for example, shoulder mobility for reaching zips; stamina for “energy” and less breathlessness during exertion; or quadriceps, handgrip, and biceps strengthening for carrying shopping or using the bus.

Above all, fitness must be fun. Important factors can be variety, the use of appropriate equipment, games, music, and opportunities for socialising (but beware of ageist assumptions about what is appropriate).

Programming

The aim is a long term commitment to a mixture of evidence based activities. The combinations should be tailored to the individual's health, fitness, functional ability, tastes, interests, and means. A home exercise programme can usefully complement the organised sessions. Provision must be made for a wide range of initial levels of habitual physical activity and for a variety of disabilities.

Exercise might include walking, swimming, weight training, circuit training, step training, exercise to music, dancing, chair work, tai chi, tennis, and bowls

Guidance on physical activity at any age

- 30 minutes of at least moderate intensity physical activity on at least five days of the week will improve health
- Two 15 minute periods of moderate activity in a day can be beneficial and a good way to start
- Every little counts towards the 30 minutes' activity total. To start with, if 15 minutes sounds too much, take a “little and often” approach, advising the participant to progress steadily from just three minutes until three minutes becomes five minutes, then five minutes twice a day, increasing to 10, 15, and finally 30 minutes of moderate activity
- Maximum benefit to health probably will be gained with 20 minutes of vigorous endurance activity three times a week, 20 minutes of strengthening activity twice a week, plus daily stretching, balance, and coordination activities
- Any activity is better than none, and even once a week is better than nothing
- It is never too late to start
- It is best to select enjoyable activities

Implications for teachers of “fitness for seniors” classes

- Emphasise posture and technique
- Give more teaching points and repeat more often
- Give more warning of directional and step changes
- Improve own body language and demonstration skills
- Improve own observation, monitoring, and correction skills
- Offer more choices
- Offer more information
- Be polished and punctual

AIM OF EXERCISE REFERRAL			
CLINICAL DIAGNOSES AND/OR PROBLEMS	Current	Previous	
	1. _____	1. _____	_____
	2. _____	2. _____	_____
	3. _____	3. _____	_____
	4. _____	4. _____	_____
MEDICATION	1. _____	_____	
	2. _____	_____	
	3. _____	_____	
	4. _____	_____	
	5. _____	_____	
POSSIBLE EFFECTS OF CURRENT MEDICATION AND/OR DIAGNOSES ON PATIENTS			
SAFE/COMFORTABLE CONDUCT OF EXERCISE			
heart rate not an indicator of exercise intensity	☐	susceptible to osteoporosis	☐
suppression of pain	☐	susceptible to asthma	☐
susceptible to arrhythmia	☐	abnormal muscle tone	☐
susceptible to angina	☐	impaired balance	☐
susceptible to hypotension	☐	impaired alertness	☐
susceptible to hypoglycaemia	☐	impaired cognition	☐
susceptible to infection	☐	urinary frequency	☐
susceptible to skin infection	☐	other - please specify	☐
susceptible to skin irritation/rashes	☐	_____	_____
susceptible to joint pain	☐	_____	_____
OTHER PRECAUTIONS OR SPECIAL CONSIDERATIONS TO BE OBSERVED			

SPECIFIC EXERCISES/APPROACHES TO BE INCLUDED (if known)			

STAGE OF HEALTH BEHAVIOURAL CHANGE			
Precontemplation	Contemplation	Preparation	Action
☐	☐	☐	☐
Maintenance	Relapse	Unknown	
☐	☐	☐	

Extract from an exercise referral form used by health professionals to transfer clinical information meaningfully to the exercise practitioner. Adapted from Dinan, Young, Iliffe, Wallace, unpublished

Programmes should provide opportunities for exclusive seniors' sessions and integration with other age groups for selected activities. Opportunities to socialise should be scheduled at all activities. Year round programming is essential. Off-peak timing improves use of resources but must not exclude the many older people still in employment. Teachers should be professionally registered, with specialist qualifications, and must be paid accordingly, but concessionary rates and discretionary financial help may be considered for individual participants.

Participants must be involved in planning, selecting, and evaluating the programme. The setting should be friendly to older people in terms of public transport, parking, access, ambience, ventilation, lighting, refreshments, floor surfaces, and changing and toilet facilities. Thought should be given for those with a disability (for example, stair rails, large print notices, and wheelchair access). Promotional material should feature appropriate older role models.

Safety

Injury prevention is a high priority. Even stiffness and minor overuse injuries reduce enjoyment and adherence and can often be avoided. An adequate warm up, the selection of safe exercises and movement patterns, regular monitoring of body alignment and exercise intensity, and an appropriate warm down are important. Precise, audible teaching instructions and visible skilled demonstrations are essential. Skilful class management and observation are needed to ensure safety in seniors' fitness sessions. These issues are taught in specialist courses for health or exercise professionals who are training to run exercise groups for older people.

Medical role

Opinion is divided over the place of informed consent forms and medical release forms for older people embarking on unaccustomed physical activity. On the one hand, everything possible to minimise any potential hazard needs to be done; this is coupled with a belief that medical review will contribute usefully. On the other hand, legitimate concerns exist about overmedicalisation of recreational activities and the impossibility of detecting all potentially important pathologies. Furthermore, medical review has tended to ensure "safety" by exclusion, failing to recognise that those people identified as carrying a higher risk of adverse events during physical activity (for example, a hypertensive person with diabetes) are the very ones who stand to gain most by participation. Fortunately, things are changing, and the need is recognised for an "enabling," pre-exercise medical review that will facilitate safe and effective recreational participation by all older people.

Doctors will usually be less able than exercise teachers to advise on the individualised prescription of particular exercises or activities. Nevertheless, clinical responsibility rests with them. Responsibility for the administration, design, and delivery of the programme, however, rests with the leisure management and instructor team or the exercise practitioner service, or both. To take this share of the overall responsibility, people supervising the conduct of the exercise must be able to show appropriate training and continuing professional development.

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Considerations when planning "fitness for seniors" classes

- Include seniors:
 - In planning and staffing
 - In evaluation
 - In promotional material
- Pre-exercise review of health information and functional needs
- First session is an individual assessment
- The evidence base
- Individualised or tailored programmes
- Progressive and multilevel programmes
- Mixture of activities
- Ensure essential facilities
- Appropriate scheduling and costing
- Include socialisation time
- Include educational opportunities

Responsibilities of doctors recommending exercise

- To identify any medical conditions and ensure they and all drugs are communicated accurately to the exercise teacher
- To highlight any ways they consider the safe conduct of exercise might be influenced by the:
 - Diagnoses—for example, susceptibility to angina, shortness of breath, arrhythmias, joint pain, and confusion
 - Drugs—for example, by suppressing pain, producing a bradycardia unrepresentative of exercise intensity, or increasing susceptibility to postural hypotension
- To educate patients who are exercising to recognise early symptoms that might indicate the exercise programme is, in some way, unsuitable for them and their chronic disease—for example:
 - Patients with osteoarthritic knees should be taught to recognise and respect an increase in pain, stiffness, or swelling
 - Patients with a history of mild, controlled heart failure should be taught that increased breathing during exercise is normal but that a decrease in the level of exercise required to provoke shortness of breath is abnormal

Setting an example as an active person will have a positive impact on your patients' behaviour

The photograph of the water exercise class is with permission of Sean O'Brien, Custom Medical Stock Photo/Science Photo Library and the photograph of elderly man on the treadmill is by Megan Maloy/Photonica. We thank Cliff Collins for advice about the Register of Exercise Professionals and our collaborators Steve Iliffe and Paul Wallace for permission to include the exercise referral form.

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