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University of Wales
Trinity Saint David

‘TRANSFORMING EDUCATION, TRANSFORMING LIVES.....’

Daniel Martin
MSc BSc MHCP MCSP MAACP

Learning Outcomes

- Describe benefits of physical activity on childhood obesity and juvenile bariatric patients
- Understand and explain potential strategies to minimise risk of chronic health conditions
- Describe CIs of physical activity on childhood obesity and juvenile bariatric patients
- Discuss prevalent neurological impairments found in the UK and how they are managed
- Explain how exercise can assist in functional improvement in elderly patients



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The Young

- Childhood obesity is emerging as a serious global public health problem with prevalence rates of obesity increasing in both adults and children in most parts of the world
- Recent studies of school children in England and Scotland showed that obesity in children had increased substantially between 1984 and 1994
- Another UK study of children aged 3-5 years found prevalence rates of obesity as 6%, 7.6% and 7.2% at 2, 4 and 5 years respectively.
- 2,630 English children obesity prevalence ranged from 10% at 6 years to 17% at 15 years of age
- <https://www.youtube.com/watch?v=Y6OCeOU2eyI>

Causes of Childhood Obesity

- Obesity is caused by an imbalance of energy intake and energy output although the mechanisms are not fully understood.
- $\text{ENERGY STORED (fat stored)} = \text{ENERGY INTAKE (food intake)} - \text{ENERGY OUTPUT (BMR + physical activity + thermogenesis)}$
(BMR = basal metabolic rate)
- Complex and multi-factorial condition resulting from interactions between genetics and the environment.
- Genetic predisposition plus environmental factors provide an increased opportunity for overeating and lack of activity.
- The role of the environment in the development of obesity has been implicated by the rapid changes in lifestyle over the past 50 years.
- A recent national dietary survey showed that total energy intake has declined over the past decade and therefore inactivity is thought to play a crucial role in the aetiology of obesity.
- Childhood obesity has been identified as an important public health problem and the modifiable risks of inactivity and diet composition are those targeted.



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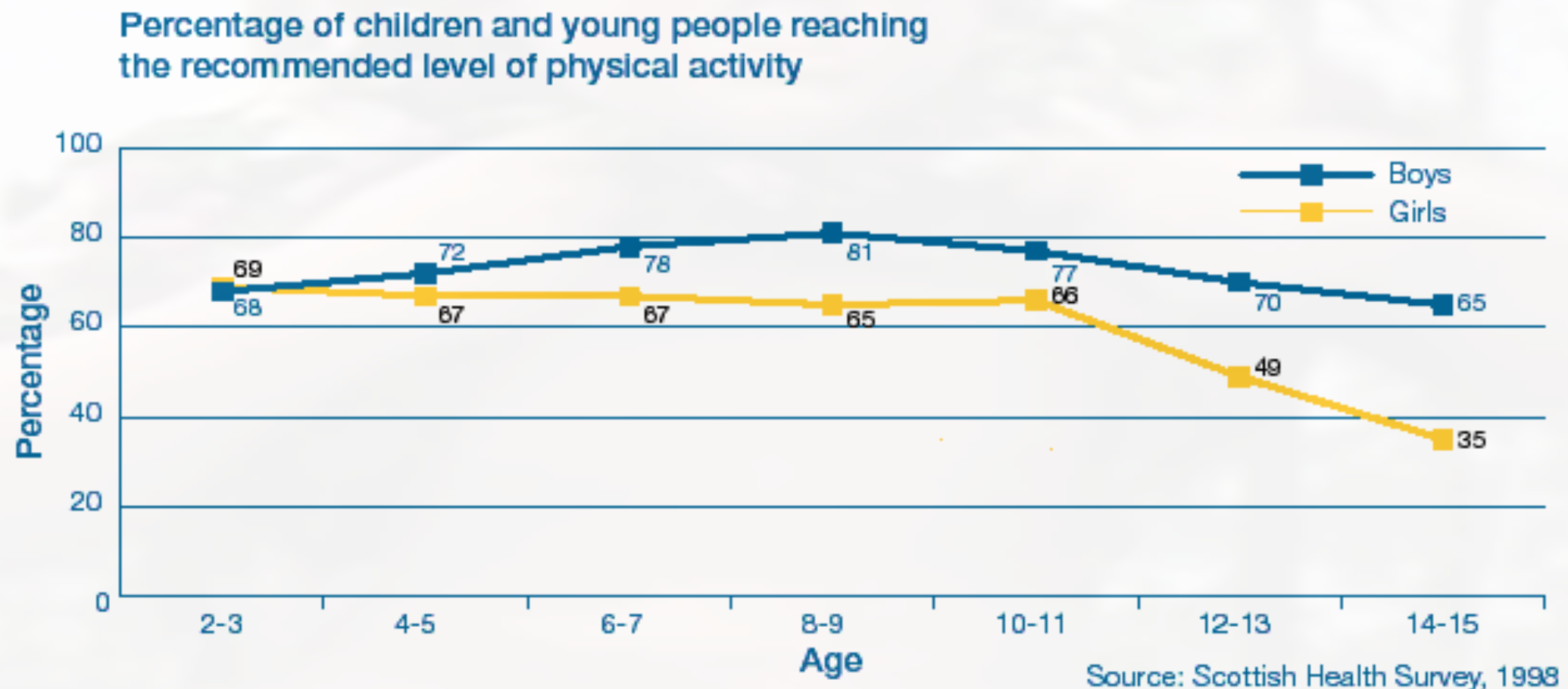
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Environmental causes of Obesity

- Increased sedentary activities
- Decreased physical activity
- Shift in diet to fast/pre-packaged food with high calorie content.
- Adult obesity is strongly associated with adverse health outcomes such as cardiovascular disease, diabetes, certain cancers and respiratory problems.
- Currently there is limited evidence to link childhood obesity to these later outcomes.
- Longitudinal studies show that childhood obesity is a strong predictor of adult obesity, specially during adolescence
- Therefore, the earlier childhood obesity can be prevented the less likely that adult obesity will occur.

Physical activity in children and adolescents in Scotland



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Consequences of Childhood Obesity

- Early, intermediate, and long-term risks of childhood obesity are summarised in the next slide;
- Metabolic complications of childhood obesity have been shown to affect long-term health and are associated with cardiovascular disease in adult life
- Obese children suffer psycho-social problems as a result of social discrimination, these include poor self-esteem and poor body image
- There is also increasing evidence to show serious social, economic and health consequences of childhood obesity



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Early Term Consequences of CO

- physical appearance (influences self-esteem)
- psycho-social (social discrimination, peer problems, behavioural problems)
- orthopaedic problems
- menstrual abnormalities
- skin alterations (skin infections, poor wound healing, acne)
- pulmonary problems and sleep apnoea
- increased blood pressure and hypertension
- Physically illiterate (due to decreased activity/mobility)



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Intermediate consequences of Childhood Obesity

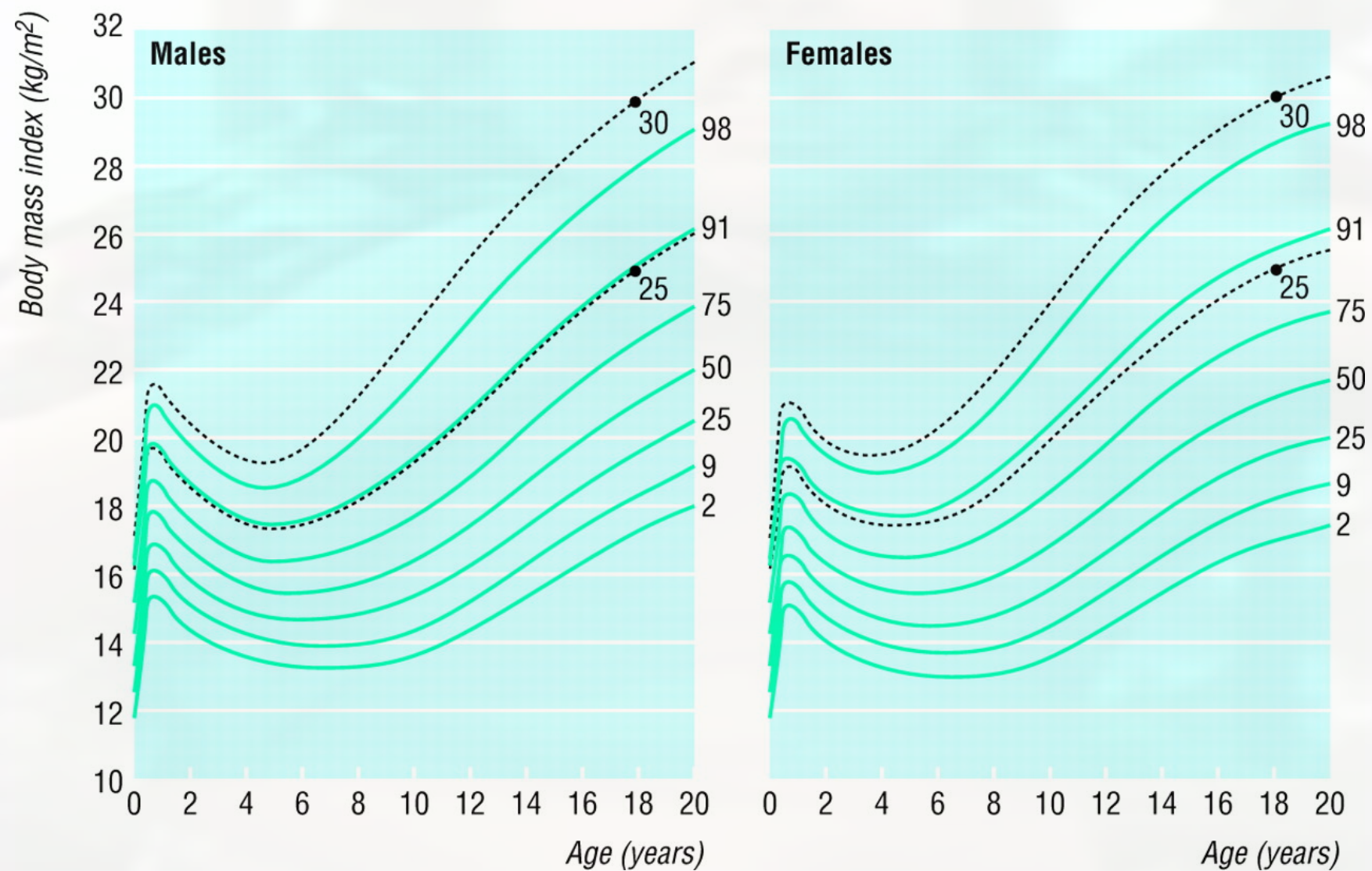
- Metabolic complications (abnormal lipids, hyperinsulinaemia, glucose intolerance)
- Increased risk of development of Type 2 diabetes
- **Long-term consequences of childhood obesity**
- Increased all-cause mortality risk
- Increased risk of heart disease



Defining Childhood Obesity

- A simple and popular method of assessing the degree of obesity in adults is the body mass index (BMI).
 $\text{BMI} = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$
- The classification is based on adult morbidity and mortality risks with each cut off point representing increased morbidity. The cut off points are unsuitable for children because BMI values vary throughout childhood during growth and maturation.
- Therefore, BMI reference curves have been developed in British children based on nationally representative growth data for the assessment of childhood obesity in the UK
- The 91st and 98th centile have been suggested as reasonable cut off points for classifying overweight and obesity in childhood.





Cole, et al. BMJ 2000;320:1240



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Effects of Sedentary Lifestyle

- Sedentary lifestyles and sustained inactivity have been identified as risk factors for childhood obesity.
- A fitness survey by Allied Dunbar 1992 showed children's physical activity levels and attitudes persist into adult life.
- Increased TV viewing, increased availability of video and computer games, parental work habits, the increased volume of traffic, issues of personal safety and other cultural aspects of environment have decreased the opportunities for exercise.
- Changes in physical activity levels and sedentary behaviour are critical to treating childhood obesity.
- Television viewing has been put forward as one of the easiest factors to modify.
- TV viewing is thought to contribute to obesity directly by inactivity or indirectly through increased food intake either during viewing, or as a result of food advertising.
- An intervention study showed reduced TV viewing in obese children was successful in reducing relative body fatness.



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Benefits of Regular Exercise

- Regular exercise/physical activity in adulthood helps to reduce morbidity and mortality from several chronic diseases, particularly cardiovascular diseases.
- In childhood it is known to help reduce obesity, improve lipid levels, normalise blood pressure, maximise bone mineral density and increase exercise tolerance .
- Exercise is one of the main aspects of childhood obesity treatment that can be modified together with diet and behaviour.



Health benefits of exercise:

- decrease all-cause mortality
- normalise blood pressure
- reduce cardiovascular risk by improved lipid profile
- maximise bone mineral density to help prevent osteoporosis in later life
- improve weight management
- increase cardiovascular fitness and strength
- improve diabetic control and glucose metabolism
- reduce depression/mental stress and improves self esteem/body image
- improve endocrine function.



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Most Beneficial types of Exercise

- Research suggests that a reduction in sedentary behaviour in children is more effective in the treatment/prevention of obesity than imposing a structured exercise programme.
- Adherence may be improved by giving children the opportunity of choice over the type and level of activity, making the activity more enjoyable. Previous research has shown that one of the most difficult aspects of weight control in children is adherence to exercise
- Too few studies that compare different exercise programmes to make any firm conclusions.
- Over the past 10 years there has also been a shift away from using exercise training to promoting increased moderate activity for everyone.
- Low level activity done regularly is likely to be more beneficial in the long-term by producing better adherence than a typical exercise programme



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Health Promotion Strategies

- Health promotion strategies in preventing childhood obesity should focus on ways which children and families can develop a more active lifestyle.
- For example, through the encouragement of enjoyable activities which can be integrated into normal daily routines long-term.
- Family-based intervention programmes in the United States have been successful in treating and preventing young adult obesity by providing families with education on eating and lifestyle
- School based weight gain prevention studies showed improved fitness and body fat levels in children given lessons on nutrition and physical activity
- Environment factors such as safer transport routes eg. footpaths and cycle routes and greater access and availability to sporting/leisure facilities, is another way of decreasing inactivity in children.



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Recommendations

- Set realistic goals
- Limit access to inactivity eg. limit TV viewing/computer game playing to 1-2 hours a day
- Encourage activities that are enjoyable, fun and varied
- Encourage daily activities that can be maintained long-term, eg. walking to school, walking up the stairs instead of using the lift, helping with household chores
- Family support
- Peer support
- Get children to define 'exercise' as every time they are active
- Combine activity with a healthy balanced diet
- Emphasise choice of activity with children
- Encourage walking and swimming for those who dislike team games
- Start with low intensity exercise of short duration and build up duration, avoid high intensity as this may strain the musculoskeletal system
- Provide reinforcement of small achievements



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Childhood medical conditions and contraindications

- If the obese/overweight child has co-existing medical complications such as diabetes, osteoarthritic/joint problems, poor mobility or heart problems, an initial physical examination by GP is recommended before commencing physical activity.
- Obesity drugs have not been studied in children for safety and long-term effects. The general consensus by obesity specialists is that drugs are not the answer.



Monitoring Process

- An important part of behaviour and lifestyle modification is to monitor progress.
- Ideally short and long-term goals should be set in respect to physical activity and diet.
- Self-monitoring in older children or via parents in younger children should be used as a tool to facilitate behaviour change.
- Recommended methods of monitoring :
 - Weight and height plotted on growth charts to assess normal growth
 - BMI charts to measure weight loss/maintenance and weight gain
 - Activity diaries to record daily activities, which helps goal setting and monitoring
 - Food diaries to record daily intake, which provides nutritional assessment and helps to identify specific dietary goals
 - Body fat measurements normally used for scientific research.



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What are the barriers to children accessing physical activity and how might these be overcome?



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The Old

- We are an ageing population
- A child born now can expect to live 10 years longer than one born in 1950 and 25 years longer than one born at the beginning of this century (Dall, 1994).

Year	% chance of male living to 55	% chance of female living to 55	% chance of male living to 75	% chance of female living to 75
1841	40	41	14	19
1981	93	95	61	74

- Who are they?
- Typically defined as somebody aged 50+
- WHO, Age Concern
- Significant variations in status of 50+



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Benefits of an Active Older Life

- Growing evidence of the importance of physical activity for older adults including the immediate and long term physiological, psychological and social benefits.
- Being active can:
 - Increase muscle strength and flexibility
 - Reduce stress and anxiety
 - Reduce risk of depression
 - Enhance psychological well being, mood and self esteem
 - Reduce the risk of a number of cardiovascular diseases and diseases such as diabetes, cancer and osteoporosis
 - Enhances sleep quality and quantity
 - Leads to new friendships



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Benefits of an Active Older Lifestyle

- Immobility amongst older adults can also lead to
 - Deep Vein Thrombosis
 - Oedema
 - Contractures
 - Pressure Sores
 - Faecal Impaction



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Research findings: Preventing Falls

- 30% of people over the age of 65 and nearly 50% of over 80s fall each year in the UK.
- Fractures are the largest cause of accidental death in older people and hip fractures present the worst outcome for both the individual and the health service, barring death, to result from a fall.
- Over half of all people who have had a hip repair or replacement following a fall never regain full mobility and within a year 20% will have moved into nursing care or died (Skeleton & Dinan, 2001)



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Research findings: Osteoporosis

- One of the main functions of the skeleton is to support the body against gravitational forces and to provide a resistant attachment for muscles to enable locomotion.
- The natural stimulus for maintenance of bone-strength is therefore loading.
- Research has suggested that only a few repetitions of site-specific loading of bone are necessary to stimulate increased formation of bone.
- Research supports the benefits of exercise on bone strength and the role of exercise in osteoporosis management Bassey (1999)



Research Findings: Strokes

- In most developed countries 0.2% of the population will suffer a stroke each year.
- In England and Wales, this amounts to approximately 110,000 people every year experiencing a first ever stroke, and 132,000 acute strokes in total

Impairment	Incidence
Walking	Over 50% of stroke patients experience difficulty with mobility
Arm Function	>80% have some impairment of arm function
Cognitive Impairment	35% have some form of cognitive impairment
Dysphasia (language)	1/3 rd of patients have difficulties in producing or understanding speech
Dysphagia (swallowing)	45% admissions experience difficulties in swallowing
Perceptual impairment	10-39% of sub acute cases



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Research Findings: Strokes

- Post stroke is often a prolonged period of inactivity
- Strength, aerobic training and task-specific exercises
- Strength training increases power output in affected limbs
- Aerobic exercise can increase both work output and cardiorespiratory fitness following stroke
- Functional skills training increases independency following a stroke however physical fatigue can occur post stroke and this may limit the length of time possible for practise.
- Mental practise of specific tasks may offer an alternative and could be combined with physical practise.
- <https://www.stroke.org.uk/>



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Research Findings: Parkinson's

- Characterised by jerky, ataxic movements
- Festinating gait
- Inadequate levels of dopamine in the brain
- Rigidity of muscles
- Progressive disease process
- <http://www.parkinsons.org.uk/>



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Research Findings: Multiple Sclerosis

- Gradual demyelination of the nervous system
- Immune response targets myelin
- Virtually unknown near the equator possible
- Vitamin D and Smoking are possible environmental factors.
- Low risk genetic component
- MRI and lumbar puncture aid diagnosis
- <https://youtu.be/7cla8xkJhwM?list=PL8341E5EFBFA85B30>
- <https://www.mssociety.org.uk/what-is-ms>



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Concerns relating to physical activity and the older person

- Fear of injury
 - No evidence to support theory that the older person is at higher risk of injury
 - Older person takes long to recover from injury
- Overexertion
 - ACSM 'training in 80-100yrd olds in nursing homes shows no evidence of serious cardiovascular incidence, sudden death, myocardial infarction'
- Falls



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Older Athletes: The Ageing Process

- Strength, endurance, bone density and flexibility are all lost at a rate of about 10% per **decade** (50+)
- A **weeks** bed rest will reduce muscular strength by up to 20%
- Health survey for England (2000) 86% of women and 78% of men living in care homes were sedentary i.e. engaged in prolonged periods of sitting or lying



Older Athletes

Recommendations

- Generally: all adults must undertake 30 minutes of **moderate** physical activity on at least 5 days per week to improve health
- Older athletes with a history of inactivity:- 2 x 15 minutes
- Or 6 x 5 minutes
- In addition, ACSM and WHO recommend 2 muscle strength and endurance sessions per week incorporating balance work
- Stretching used before and after exercise (at least 3-5 times per week)
- <https://vimeo.com/153227423>



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What are the barriers to the older person accessing physical activity and how might these be overcome?



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