A Guide for the Health Professional on the Benefits of Physical Activity

Help for the health professional in understanding the science behind the Nations Physical Activity Guidelines and ways of motivating their patient to increase their physical activity.

In association with Public Health Wales, The Welsh Deanery and Exercise Works

Endorsed by RCGP Wales and the British Association of Sport and Exercise Medicine

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Contents

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Motivate 2 Move

"If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health"

Hippocrates 460-377 BC

Introduction

Primarily designed for General Practitioners and their teams and based on a comprehensive research approach, the purpose of this document is to give all health professionals the tools and information to enable them to educate, motivate and encourage patients about the benefits of physical activity.

Why encourage physical activity?

- The World Health Organisation ranks physical **inactivity** as the **fourth largest cause of global mortality** [1]
- In the UK 60-70% of our population take insufficient exercise [2]
- Physical inactivity is linked with many chronic health problems including cardiovascular diseases, type 2 diabetes, obesity, cancer, dementia, depression and osteoporosis [2]
- The present cost of physical inactivity in the UK and the NHS, when indirect costs to the economy are added to health costs, has been estimated to be £8.2 billion [3]
- Physical activity is known to be essential for improved health, preservation of function and there is evidence of prolonged life resulting from as little as 15 minutes of regular and moderate daily exercise [4]
- Long term studies of men and women in the USA have shown a positive linear relationship between physical activity and health and conversely, a low cardio respiratory fitness level as the largest attributable factor for all causes of death [5]
- **Physical inactivity kills** more **than smoking, diabetes and obesity combined** [5]
- Exercise as prevention or as a treatment now features in 39 UK national guidelines [6]

Chapter1

The UK Physical Activity Guidelines

This summary of the guidelines is drawn from the 2011 updated UK Physical Activity Guidelines supporting documents,[1, 2] and the British Association of Sport and Exercise Scientists consensus report .[3]

The **UK Physical Activity Guidelines advice for adults (19-65)** states:

- ✓ Aim to be active daily. Activity should add up to over 150 minutes per week by participating in at least 30 minutes of ***moderate*** intensity physical activity on 5 or more days a week, or in multiple bouts of 10 minutes or more.
- ✓ Comparable benefits can be achieved through ***vigorous*** activity of 75 minutes a week, or in a combination of moderate and vigorous activity.
- ✓ Adults should also undertake physical activity to improve **muscle strength** on at least two days a week.
- ✓ All adults should **minimize** extended **sedentary** (sitting) periods.

Download Factsheet 4: Adults (19-64 years)

-***Moderate intensity*** physical activity causes adults to feel warmer, breathe harder and the heart beats faster, with the example of brisk walking being the easiest to recognize.

-***Vigorous intensity*** physical activity causes adults to get warm quickly, breathe much harder, perspire and find it difficult to maintain a conversation.

Depending on body weight, 150 minutes of moderate aerobic activity or 75 minutes of vigorous activity will expend about 800-1200 kcal. [3]

The dose-response relationship between physical activity and health is clear across all ages and there are therefore guidelines for all ages of life. The main differences are summarized below and the full guidelines can be accessed via the links shown.

- **UK Guidelines for Under-fives not yet walking**
  Physical activity should be encouraged from birth, particularly through floor based play and water based activities in safe environments. All under 5s should minimize the time spent being sedentary (restrained or sitting) for extended periods (except sleeping)

Download Factsheet 1: Early years (under 5s not yet walking)

- **UK Guidelines for Under-fives capable of walking**
  180 minutes (three hours) – each day, once a child is able to walk.
  For non-walkers, physical activity should be encouraged from birth, particularly through floor-based play and water-based activities in safe environments.

Download Factsheet 2: Early years (under 5s capable of walking)

- **UK Guidelines for Children and young people (5-18 year olds)**
  There is a greater emphasis on encouraging 60 minutes a day and up to several hours every day of moderate to vigorous intensity physical activity. Three days a week should include vigorous intensity activities that strengthen muscle and bone. This age group should also minimize the amount of time spent being sedentary (sitting) for extended periods.

Download Factsheet 3: Children and young people (5-18 years)

- **UK Guidelines for Older people (65+)**
  150 minutes (two and half hours) – each week of moderate to vigorous intensity physical activity (and adults should aim to do some physical activity every day). Muscle strengthening activity should also be included twice a week. Any individual at risk of falling should incorporate activity to improve balance and coordination on at least two days a week. All adults should also minimize the amount of time spent being sedentary (sitting) for extended periods.

Download Factsheet 5: Older adults (65+ years)

For most health outcomes, additional benefits occur as the amount of physical activity increases via increased intensity, frequency and or duration.

The Evidence of the Health Benefits of Physical Activity

The UK guidelines were drawn up to promote physical activity because of the overwhelming evidence of the health benefits. The following ten chapters present the evidence of the main health benefits in brief key messages for health professionals. This evidence summary is drawn from the 2011 updated UK Physical Activity Guidelines supporting documents,[1, 2] the British Association of Sport and Exercise Scientists consensus report [3] and large scale reviews from USA, [4] Canada,[5] Sweden, [6] and Denmark ,[7] which have used major systemic reviews, meta-analysis and consensus statements to reach their conclusions.

Chapter 2

All-Cause Mortality (longevity)

Numerous reviews have highlighted the inverse relationship between physical activity and premature all-cause mortality. The UK consensus view is that there is an approximate 30% risk reduction across all studies, comparing the most active with the least active. [1]

Further respected longitudinal evidence from the USA points to low cardiorespiratory fitness being a more important risk factor for all-cause mortality than hypertension, high cholesterol, obesity, diabetes or smoking. [2] In fact, ***low fitness has been shown to kill more Americans than smoking, diabetes and obesity combined.*** [3]

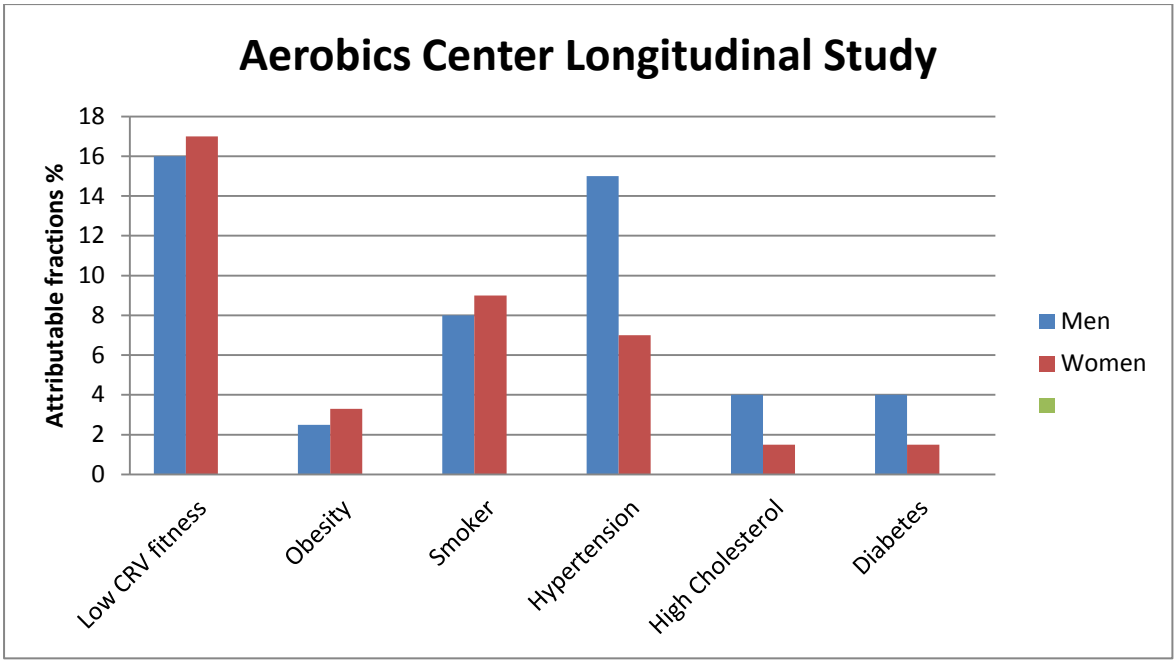


Figure 1 Attributable fractions (%) for all-cause deaths in 40,842 (3333 deaths) men and 12,943 (491 deaths) women in the Aerobics Center Longitudinal Study. The attributable fractions are adjusted for age and each other item in the figure. The attributable fraction is an estimate of the number of deaths in a population that would have been avoided if a specific risk factor had been absent. [2]

Many patients find it difficult to understand the meaning of risk reduction and so research has also been used to show the effect of physical activity on longevity. Even low amounts of physical activity reduce the risk of dying prematurely, with this benefit being shown in individuals who exercise as little as 15 minutes a day living approximately 3 years longer than inactive individuals. [4] The same study suggested 30 minutes of regular physical activity (the UK Physical Activity Guideline level) could potentially extend life by 4.2 years in males and 3.7 years in females.

Chapter 3

Cancer

Cancer develops at a cellular level influenced by genetic, environmental and lifestyle factors via a number of interacting biological mechanisms.

A sedentary lifestyle is now widely recognised as a key component in the risk factors of several cancers.

There is now clear data on the positive effects of physical activity both on the prevention of some cancers and on clinical outcomes after diagnosis.

1. There is strong evidence that physically active men and women have a 30-40% lower risk of **colon cancer** compared to inactive individuals. [1, 2, 3, 4, 5]

    - Studies indicate a positive dose-response relationship so that the longer the duration and the higher the intensity of physical activity, the better the protective effect found for colon cancer. [4]
    - Likely biological mechanisms of physical activity reducing the risk of colon cancer include a reduced intestinal transit time, increased insulin sensitivity and cell proliferation of the intestinal epithelium. [6, 7]

2. Physically active women have a 20-30% lower risk of **breast cancer**, with the evidence strongest in post menopausal women. [1, 2, 3, 4, 5]

    - Likely mechanisms linking physical activity with the reduction of risk is the impact of physical activity on the metabolism of sex hormones. High oestrogen levels are associated with breast cancer and physical activity reduces the cumulative oestrogen dose that women experience via a number of pathways. [4]

3. There is moderate evidence of a lower risk of **endometrial cancer**. [2, 3, 4]

    - High levels of oestrogen again are associated with uterine cancers. A potential mechanism for the lower risk with increased physical activity is the lower lifetime accumulation of oestrogen; increased insulin sensitivity is also thought to contribute. [4]

4. There is moderate evidence of a lower risk of high grade **prostate cancer**, but with higher doses of activity required. [4, 5]

    - 30 minutes or more of walking or cycling during adult life is associated with a reduced incidence of prostatic cancer. Compared to those who did 30 minutes of walking or cycling per day, *every additional 30 minutes reduces the risk of prostate cancer by 7%.* [8]
    - Plausible mechanisms include the effect of physical activity on testosterone and insulin sensitivity. [4]

5. There is moderate evidence of a lower risk of **lung cancer**, but the problems of adjusting for the risk factor of smoking makes it difficult to draw firm conclusions. [2, 4]

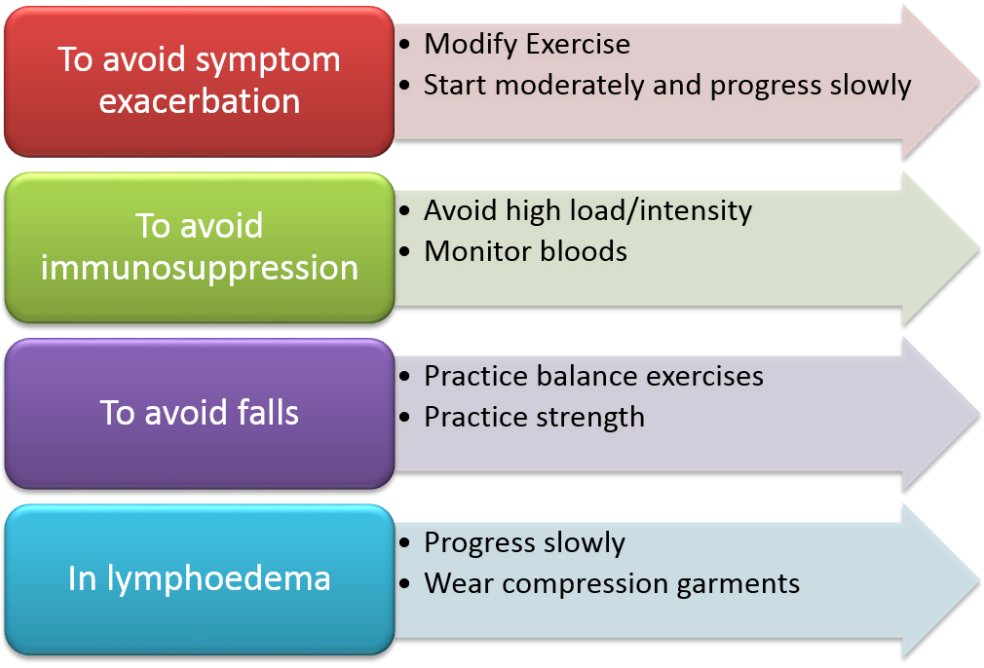
- Potential mechanisms relate to how physical activity affects the time that potential carcinogens are in contact with lung cells through improved blood capacity and blood flow.

Physical activity during and after treatment

Although patients often feel unwell before or during treatment for cancer, we know that *physical activity improves their fitness, functional ability, emotional well-being and fatigue levels.* It has been shown to improve cancer patients' quality of life during both the treatment and rehabilitation phase and should therefore be encouraged. [7, 8, 9, 10, 11, 12]

A number of recent studies have looked at whether physical activity benefits actual cancer survival, something that had previously been uncertain. These 3 meta-analyses have been on either breast, [13] colon[14] or both types of cancer. [15] Each has shown an inverse relationship between physical activity and mortality in patients going on to develop breast or colon cancer. With survivors of breast and colon who increased their physical activity from any level from pre to post diagnosis, a decreased mortality risk of 39% was shown.[15]

Safety considerations during and after treatment.[16]



Contraindications

Disease or treatment causing Hb < 60 g/L, wbc < $0.5x10^9$/L , or platelets < 20×10^9 (12)

Read more at: http://fyss.se/wp-content/uploads/2011/06/19.-Cancer.pdf

Chapter 4

Cardio Respiratory Health

- ***Ischaemic heart disease***

Primary prevention: there is a clear inverse relationship between physical activity and cardiovascular disease which is dose responsive. The reduction in cardiovascular mortality is of the order of 20-50%, depending on the level of physical fitness. [1]

Secondary prevention: in established heart disease, regular adapted exercise is required to reduce mortality, and habitual physical activity has been shown to reduce all-cause mortality by 25-30%. [1] Despite this, 57% of adults in the UK having had a cardiac event do not attend cardiac rehabilitation exercise programmes. [2] Yet the evidence of cardiac rehabilitation is associated with a reduction in morbidity, cardiac mortality (26-36%), total mortality (13-26%) and reduces hospital readmissions (28-56%).[3]

NICE guidelines on secondary prevention patients following a myocardial infarct [4] recommend:

- Patients should be advised to undertake regular physical activity sufficient to increase exercise capacity.
- They should be advised to be physically active for 20-30 min a day to the point of breathlessness.
- Patients not achieving this should be advised to increase their activity in a gradual step-by-step way, aiming to increase their exercise capacity.
- They should start at a level that is comfortable, and increase the duration and intensity as they gain fitness.
- The benefit of exercise may be enhanced by tailored advice from a suitable qualified professional.

Contraindications
Heart disease: Acute myocardial infarction or unstable angina until stable for at least 5 days, dyspnoea at rest, pericarditis, myocarditis, endocarditis, symptomatic aortic stenosis. [5, 6]

Read more at: http://fyss.se/wp-content/uploads/2011/06/21.-Coronary-artery-disease.pdf

- ***Heart failure***

Trials support the evidence of the beneficial effect of physical activity training in patients with stable heart failure in NYHA class I, II and III. [7, 5, 8]

The benefits of exercise have been shown by meta-analysis to;[8, 9, 10]

- Physiologically increase VO2 max
- Functionally increase walking speed and tolerance
- Significantly reduce hospital admissions

- Improve quality of life
- No evidence of increased or decreased all cause mortality in the short term (up to 12 months)
- An emerging trend towards reducing mortality in trials longer than 1 year [8]

Guidance from the local cardiac rehabilitation clinic or heart failure service may be required, depending on one's own experience, as stress testing and advice on intensity of exercise may be necessary.

Contraindications
Heart failure which is uncontrolled or NHHA class 1V [7]

Read more at: http://fyss.se/wp-content/uploads/2011/06/29.-Heart-failure.pdf

- ***Hypertension***

The evidence supports an inverse relationship between physical activity and the incidence of hypertension. Apart from prevention, it is also effective in treatment with clinically relevant reductions in blood pressure.

- The acute effect of physical activity causes a decrease in blood pressure lasting 4-10 hours, but may last up to 22 hours; thus daily activity may achieve clinically significant improvement [1, 11]
- The effect seems to be greatest in those with established hypertension
- Review data support the observation that physical activity training in hypertensive patients can show a reduction of 7 and 5 mmHg in systolic and diastolic blood pressure respectively [12]
- The main recommendation is for aerobic fitness training but moderate intensity strength training is also beneficial when combined [13, 14]
- Reductions of this magnitude have important clinical implications

    1. Firstly, they are of a similar magnitude to conventional medication.
    2. Secondly, *just a 2mmHg reduction in systolic blood pressure is associated with reductions of 10% and 7% in the risks of stroke and coronary heart disease respectively*. [15]

Pharmacology v physical activity

There is plenty of strong data from randomized controlled trials showing reductions in stroke risk in those taking antihypertensive medication.[16] However, there is less evidence that they significantly reduce the risk of all-cause mortality and myocardial infarction, with the exception of thiazide diuretics and angiotensin-converting enzyme inhibitors. [17] However, there is strong evidence that regular physical activity can reduce the risks of all-cause mortality and cardiovascular mortality.[18]

The comparison of the mortality and morbidity risk reduction between long-term antihypertensive medication and physical activity is made below and reinforces the appropriateness for physical activity as a treatment in hypertensive patients.[17]

Table 1: Mortality and morbidity risk reductions with long-term anti-hypertensive medication and physical activity[17]

Intervention	All-cause mortality	Cardio-vascular mortality	Myocardial infarction
ACE-I *	10%	19%	NR
Thiazide *	9%	NR	22%
β-blocker *	6% (NS)	NR	8% (NS)
$Ca2^+$ channel blockers *	-6% (NS)	NR	29% (NS)
Regular physical activity (self-reported) #	29%	30%	NR
Regular physical activity (fitness tests) #	41%	57%	NR

NS: Not significant; NR: Not reported. *: Randomised control trials. #: Prospective cohort studies

Contraindications
Blood pressures of a systolic >180 or diastolic >100 or higher should receive medication before regular physical activity [6,] with particular restrictions on heavy weights strength conditioning which can create particularly high pressures. [14]

Read more at: http://fyss.se/wp-content/uploads/2011/06/31.-Hypertension.pdf

- ***Lipids***

Isolated hypercholesterolaemia and mixed dyslipidaemia with high LDL cholesterol, high triglycerides and low HDL cholesterol are associated with an elevated risk of atherosclerosis.

Aerobic fitness training has been shown to be beneficial in reducing triglycerides and elevating the protective HDL cholesterol, with some effect in also lowering LDL cholesterol.

Best results are achieved with regular daily moderate intensity aerobic exercise or vigorous exercise at slightly higher volumes of the present UK guidelines, expending 1200-2000 kcal per week equivalent of up to 360 minutes moderate activity a week. This workload per week is associated with a 5-8% increase in HDL cholesterol and a decrease in triglycerides of approximately 10%. [19] It should supplement other interventions.

Read more at: http://fyss.se/wp-content/uploads/2011/06/33.-Lipids.pdf

- ***Peripheral Arterial Disease***

Peripheral arterial disease (PAD) is an important marker of overall cardiovascular disease, with about 65% of patients with PAD also having clinically relevant cerebral or coronary artery disease. [20]

There is a strong consensus view that physical training in the form of walking is important in the management of peripheral arterial disease. [20, 21] This is important as the disease responds poorly to pharmacotherapy. [20] Three large reviews concluded that physical exercise increased the walking distance to the onset of pain by 179% or 225m and the maximum walking distance by 122% or 398m. [22, 23, 24]

NICE advises; [25]

- Offering a supervised exercise programme to all patients with intermittent claudication.
- Consider providing a supervised exercise programme which involves:
  1. 2 hours of supervised exercise a week for a three month period.
  2. **Encouraging people to exercise to the point of *maximal* pain**.

Exercise should continue lifelong with expected improvement in walking distance with higher quality of life and reduced pain. It may also slow the progression of further atherosclerotic disease.

Read more at: http://fyss.se/wp-content/uploads/2011/06/41.-Peripheral-arterial-disease.pdf

- ***Stroke***

Primary prevention: the benefits of physical activity on the prevention of stroke are well documented. [1, 5, 26, 27, 28] Risk factors for stroke include hypertension, type 2 diabetes and hyperlipidaemia all of which are beneficially affected by physical activity. It is not surprising then that there is a clear inverse relationship between activity and risk of stroke. It is also clearly dose dependent and depending on the amount of activity, the effect is a 20% to 35% lowering of risk. [29]

Secondary prevention: the adverse vascular disease profile of many stroke patients remains after a first stroke and, physical activity should continue to be encouraged.

Treatment*:* there is a huge variation in the degree of disability after a stroke. Once stabilized an individualised aerobic fitness training programme, can increase the endurance for day to day activities. This can improve self confidence of patients to take part in physical activity themselves. [30] Similarly, muscle strengthening of the lower limbs has been shown to increase function thereby improving quality of life. [28]

Read more at: http://fyss.se/wp-content/uploads/2011/06/47.-Stroke.pdf

Chapter 5

Metabolic Health

- ***Metabolic Syndrome***

Metabolic syndrome is a cluster of factors including abdominal obesity, insulin resistance, hyperlipidaemia and hypertension, which increase the risk of type 2 diabetes, cardiovascular disease, dementia and some forms of cancer. Regular physical activity has a beneficial effect on all these factors and so may reduce the risk of these serious medical problems.

To prevent and treat, it is recommended *to reduce sedentary time and use moderate intensity exercise daily for a minimum of 30 but preferably 60 minutes.* [1]

Physical activity is **proven** to reduce the associated health risks of metabolic syndrome **even if individuals who exercise remain obese.** [2, 3] This is a **key point** as both patients and health professionals are often over focused on weight and quickly become demoralized if weight loss is not achieved.

Read more at: http://fyss.se/wp-content/uploads/2011/06/34.-Metabolic-syndrome.pdf

- ***Type 1 Diabetes***

There is no evidence that regular physical activity can prevent type 1 diabetes and little evidence to date that regular physical activity is beneficial in established type 1 diabetes. Regular physical activity is however still recommended, as this can lead to improvements in lipid profile, body weight and blood pressure, which may lessen the increased cardiovascular disease to which people with diabetes are prone. [4]

Regular physical activity also increases the sensitivity to insulin, primarily in skeletal muscle, which may lead to a reduced need for insulin. [5]

Patients and doctors need to be aware that hypoglycaemia can occur during exercise. However, it is generally less well known that the tendency towards hypoglycaemia can last up to 24 hours after exercise. [4] Risks of exercise-induced hypoglycaemia can be avoided by careful insulin dosing and diet planning with the planned exercise. [4]

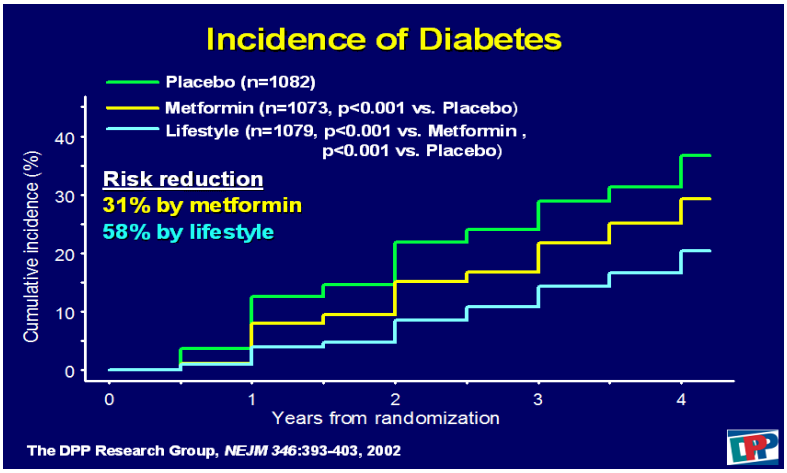
Read more at: http://fyss.se/wp-content/uploads/2011/06/25.-Diabetes-mellitus-–-type-1-diabetes.pdf

- ***Type 2 Diabetes***

It is known that physical inactivity is a major risk factor for developing type 2 diabetes. [6]

Primary prevention: many studies have shown that type 2 diabetes can be prevented in high risk (obese) patients by taking regular exercise and following dietary guidelines. [7, 8] In all, there have

been three major trials of diabetes prevention with intensive lifestyle counselling in China,[9] Finland[7] and the US.[10] In the largest trial,[10] the US Diabetes Prevention Program, high risk individuals were assigned to a placebo control, a lifestyle intervention (which included aerobic activity of at least 150min/week) or a third group who were given metformin 850mg twice daily. ***Lifestyle advice was nearly twice as effective in preventing diabetes compared to metformin drug therapy in high risk individuals (58% v 31% reductions in incidence) over 3 years of study***. [10]



In each of these trials there was a 40-60% relative risk reduction in the incidence of diabetes in the lifestyles intervention group. This translated into one case of diabetes being averted by treating around seven people with glucose impairment for three years. [11, 12, 13] However, the long term follow up studies showed that lifestyle interventions delayed on average the onset of diabetes by two to four years rather than preventing it totally.[12, 13, 14]

In the ***treatment*** of type 2 diabetes, regular physical activity remains a major part of treatment, alongside dietary and pharmacological interventions. Aerobic training remains the mainstay of treatment, but benefits also occur with strength training and greatest when combined. [15] A meta-analysis comparing physical activity advice against structured exercise training consisting of aerobic exercise, resistance exercising or a combination, showed all were associated with a reduction of $HbA_{1c.}$ [16] Longer programs than the recommended 150 minutes per week were associated with a greater reduction of $HbA_{1c.}$ [16] This study also confirmed physical activity is associated with lower HbA_{1c} but only when combined with dietary advice.[16]

Physical activity improves insulin sensitivity. It is increased sensitivity to insulin, once achieved, that is important in obtaining good metabolic control, but physical activity also impacts on lowering the risk of cardiovascular complications by improving the blood lipid profile, Hba1c, body weight and lowering blood pressure. [17]

Hypoglycaemia rarely occurs in diet controlled, metformin or gliptin-treated diabetes unless any exercise is prolonged or strenuous, such as in marathon running. [18] In patients on sulphonylureas, glinides or insulin, moderate to vigorous exercise may cause a drop in blood glucose (sugar) with the

effect lasting up to 12 hours post exercise. [19] Those wanting to take prolonged exercise may need to halve or further reduce oral medication, depending on their blood glucose levels and will need to monitor themselves more frequently. They should also be able to recognize the symptoms of hypoglycaemia. Suitable alteration of carbohydrate intake before, during and after exercise may then be required.

Contraindications
Uncontrolled blood glucose of >13 mmol or <5.5 mmol/l, which should be corrected first. [20]

Patients with diabetic peripheral or autonomic neuropathy or foot ulcers should avoid weight bearing exercise.
Any acute illness or infection in a diabetic. [17]

Read more at: http://fyss.se/wp-content/uploads/2011/06/26.-Diabetes-mellitus-–-type-2-diabetes.pdf

Chapter 6

Mental Health

- ***Depression***

There is good supporting evidence for the use of regular moderate intense physical activity in the acute treatment of mild to moderate depression[1, 2] and in helping reduce the risk of relapse, [2] though low intensity exercise appears to have no effect.[3] Advice on exercise should be given in parallel to antidepressant medication and or psychotherapy treatments.

Studies examining whether physical activity might be protective against the risk of subsequent depression have shown a promising positive effect.[4] Evidence appears effective from childhood (9-15yrs) up to twenty years later.[5]

Read more at: http://fyss.se/wp-content/uploads/2011/06/24.-Depression.pdf

- ***Anxiety***

Many studies have evaluated the effect of physical activity on anxiety and most link physical activity to a consistent reduction of anxiety symptoms. This is best seen in state anxiety with less evidence on trait states. [6, 7]

Read more at: http://fyss.se/wp-content/uploads/2011/06/16.-Anxiety.pdf

- ***Schizophrenia***

Physical activity can play an important role in the treatment of schizophrenia. Physical activity has been shown to significantly reduce negative symptoms of mental state and improve the control of positive symptoms.[8, 9]

The physical health of schizophrenic patients is often poor with a high risk of premature death and a shorter life expectancy of at least 10 years. [10] Schizophrenic patients are more likely to smoke, have an unhealthy diet and be physical inactive. [11] Studies on schizophrenic patients (although small) receiving exercise programs, have so far shown a positive effect on both physical health and quality of life. [8, 9]

Read more at: http://fyss.se/wp-content/uploads/2011/06/44.-Schizophrenia.pdf

- ***Sleep and psychological well-being***

Physical activity has been shown to improve the quality of sleep, [12, 13] whilst many studies have shown improved well-being with physical activity training. [14] Improved psychological well being is also the commonest comment made on feedback questionnaires. [6]

Read more at; http://fyss.se/wp-content/uploads/2011/06/46.-Stress.pdf

- ***Dementia***

Dementia is a word used to describe a group of symptoms including memory loss, confusion, mood changes and difficulty with day to day tasks. It encompasses several forms with Alzheimer's disease being the commonest and vascular dementia the second. The risk of dementia rises with age, with 1 in 3 people over 65 affected. [15]

There is a higher risk of vascular dementia for those with a family history, hypertension, high cholesterol, smoking and diabetes, with vascular factors being potentially modifiable by physical activity. [16] Up to a third of Alzheimer's disease may also be attributable by modifiable risk factors, the highest factor being physical inactivity. [17]

There is clear strong evidence that people who follow recommended levels of activity have a reduction in risk of cognitive decline in the order of 20-30%. [18, 19] Higher levels of activity are associated with better cognitive function and a 20% lower risk of cognitive impairment in the highest quartile of activity. [20, 21, 22]

Apart from the potential of improving cognitive function, exercise programs also appear to have an improvement in the ability to perform activities of daily function in people with dementia, and also improve their family carer's quality of life.[23]

Read more at: http://fyss.se/wp-content/uploads/2011/06/23.-Dementia.pdf

Chapter 7

Musculoskeletal Health

- ***Fibromyalgia***

Fibromyalgia consists of a multi symptom syndrome characterized by widespread diffuse treatment-resistant, non-inflammatory joint and muscle pains of at least 3 months duration. [1] Two common symptoms are: reduced muscle strength and rapid fatigue with patients typically being unfit. [2, 3, 4]

Fibromyalgia is difficult to manage, but physical training combined with cognitive behavioural therapy has been promoted as being the most promising treatment. [5] Evidence from a meta-analysis of random controlled trials concluded that aerobic training had a beneficial effect on fibromyalgia. The highest quality trials show significantly better improvements in the exercise groups for fitness and tender point pain thresholds. [6]

- ***Osteoarthritis***

Contrary to common belief, there is no evidence that regular physical activity promotes the development of osteoarthritis (OA), provided there is no associated major joint injury. [7]

Major joint osteoarthritis is the commonest chronic disease in older people. [8] Once present, both fitness training and dynamic strength training have been shown to reduce pain, improve function and improve overall well-being.[9] The evidence is best for OA of the knee, but studies on hip and hand point to the same conclusions. [8]

Aerobic activity is thought to increase endorphin levels which reduce the sensation of pain, whilst increased muscle strength and improved neuromuscular function improve the stability around a joint. These factors, coupled with any associated weight control, will help reduce the load through the joint and hence reduce pain, improve function and improve well-being.

Exercise training also reduces pain and improves function (strength, gait, balance) in the absence of weight loss. **A key message about exercise and weight loss** is that it is better to talk about fat loss, as weight loss is often compromised by an increase in lean mass (i.e. muscle mass). For example, exercise might produce very impressive improvements in body composition, e.g. a 2kg increase in lean mass and a 2.5kg decrease in fat mass, but an unimpressive overall change in body weight, tending to discourage patients who are primarily motivated by weight loss and not an improvement in health.

There appears to be a dose-response relationship where strength and fitness improvements lead to better gains. Training is best planned with small but steady increases in load on the joint and with exercise; there is a greater reduction in pain compared to NSAID treatment occurring after 6-8 weeks of activity. [10] This gives a clear choice of activity over NSAID medication for many patients.

Perhaps the greatest incentive for osteoarthritic patients from 35 upwards with co-morbidities of cardiovascular disease, diabetes, cancer and walking disability is that they are at significantly enhanced risk of dying prematurely. [11] It has been suggested even light exercise eg: moving around

the house during commercial breaks for those patients with OA who watch many hours of TV, might mitigate the risk.[12]

Read more at: http://fyss.se/wp-content/uploads/2011/06/37.-Osteoarthritis.pdf

- ***Osteoporosis***

Prevention: The peak bone mass is achieved by 20 – 30 years of age, so to achieve maximum bone mass during adolescence, a balanced diet and multi-activity physical education in schools with weight bearing exercise needs to be encouraged from early years and even from first walking. [7,] Once our peak bone mass is achieved, a gradual bone loss commences and there is now increasing evidence that physical activity can help prevent the bone loss associated with ageing across the lifespan of individuals. [13, 14, 15, 16, 17, 18, 19]

Weight bearing exercise, especially resistance exercise, appears to have the greatest effects on bone mineral density. [20] There is an inverse relationship of physical activity with the relative risk of hip and vertebral fracture with risk reduction for hip fracture of 36 - 68% at the highest level of activity. [7]

Warning: excessive physical activity can have an unintentional negative effect on bones in girls, who may develop exercise dependent secondary amenorrhoea and then lose bone most commonly around a weight of 45kg. [1]

Established disease: weight bearing exercise is still encouraged to minimize further bone loss, but also to help prevent falls and subsequent fractures. Balance, strength and coordination exercise combined with walking is complementary. [1]

Contraindications
Avoid activities which have a high risk of falling

Read more at: http://fyss.se/wp-content/uploads/2011/06/38.-Osteoporosis.pdf

- *Rheumatoid Arthritis*

Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease characterised by reduced joint flexibility, muscle function and aerobic fitness. There ***is also an increased risk of cardiovascular disease,*** [21] which combined with an ***increased risk of type 2 diabetes, metabolic syndrome and osteoporosis and its related fractures,*** provides a very strong indication for promoting physical activity in patients with this common condition. In addition, exercise can counter the important effect of ***rheumatoid cachexia,*** whereby 2/3 of patients with controlled RA have significant muscle wasting and increased obesity. [22] This low muscle mass and adiposity are strong independent predictors of disability in RA patients [23, 24] and controlling disease activity by standard drug therapy including ant-TNF therapy fails to restore either muscle mass or reduce fat mass so there is a strong case for progressive resistance training in patients with RA. [25, 26, 27]

Historically, it has been thought by many that increasing the level of stress on the joints would increase pain, disease activity and joint damage [28]. However, major reviews on dynamic exercise therapy, have found a positive effect on aerobic capacity, muscle strength and functional ability. [28, 29, 30, 31] Exercise training has been shown to redress the adverse effects of rheumatoid cachexia on body composition and also to restore normal levels of physical function in established RA patients. [32] Importantly there has been no increase in pain or disease activity and with long term exercise programs **no** significant differences in radiological progression were observed. [28]

Despite being aware of the importance of exercise, many RA patients are less active than the general population. [33] Patient's perceptions of the effects of exercise are a fear of exacerbation of pain, fatigue and joint damage. [34] They also perceive that health professionals lack exercise knowledge regarding specific exercise recommendations and the occurrence of joint damage. [34]

All patients with RA should be encouraged to be physically active. Low intensity exercise can be recommended for all patients with RA regardless of their disease state. However, to increase aerobic function and muscle function the patient needs to be encouraged to progress into moderate to high intensity exercises***, with the knowledge and evidence of improved muscle function and quality of life [28, 29, 30 31, 35] without evidence of progression of joint destruction. [31, 36]***

Precautions:

- Increased physical activity should be introduced slowly to minimize the risk of aggravating symptoms and in smaller increments than normally recommended.
- Caution also needs to be taken after any cortisone injections and joint replacement surgery that may not stand up to intense exercise initially.[37]

Read more at: http://fyss.se/wp-content/uploads/2011/06/43.-Rheumatoid-arthritis.pdf

- ***Prevention of falls and fracture***

In the elderly, with or without other health conditions, diminishing muscle function with or without coexisting pain can limit daily activity and increase the risk of a fall and fracture. However, the available evidence for this age is that general exercise, Tai Chi or a programme for muscle strengthening and balance reduces the risk of falls and fractures. [38]

Strength training may need to precede walking exercise to make the physical activity possible. In the elderly two decades of loss of strength and muscle mass can be regained by two months of strength training. [39]

Chapter 8

Neurological Disorders

- ***Multiple Sclerosis (MS)***

There is a large variation of symptoms from person to person with MS, with the majority developing increasing disability over time. It is also common for patients with MS to avoid physical activity, so as to limit tiredness and avoid elevated body temperature.

Physical activity does not prevent MS. However, physical activity is recommended as it can improve muscle function, aerobic fitness, mobility and quality of life. [1, 2]

Patients with MS often suffer from severe fatigue and can also have heat intolerance. Thus it is common for patients with MS to avoid physical activity, so as to limit their symptoms.

To cope with the fatigue, graded exercise is recommended and with time the fatigue experienced can reduce.[3] For heat intolerance, a tepid shower post exercise or a cooling suit, have been shown to help whilst, air conditioning and a sun protective hat can also help. [4]

Read more at: http://fyss.se/wp-content/uploads/2011/06/35.-Multiple-sclerosis.pdf

- ***Parkinson's Disease***

Physical activity does not prevent or affect the progress of Parkinson's disease. The disease is characterized by a usually slow progression of rigidity, hypokinesia and tremor. [5] As a result, patients tend towards inactivity, a fear of falling and reduced daily activities.

There is now an increasing number of studies that show that a variety of forms of exercise or physiotherapy in later stages, can maintain and improve mobility, with improved daily functions and a reduced risk of falls and associated injuries. [5] Early interventions after diagnosis to promote physical activity should focus on strength and balance to prevent future falls.

Read more at: http://fyss.se/wp-content/uploads/2011/06/40.-Parkinson's-disease.pdf

- ***Spinal cord injury***

A spinal cord injury destroys the connections between the brain and the area distal to the injury. [6] This, depending on the level, will proportionately affect the individual's ability to be physically active.

A high cord injury with a complete tetraplegia may render the patient wholly dependent on carers and limited to passive movements and stretching to lessen complications.

However, for lower and or incomplete spinal injury, there may be areas of intact skeletal muscle function that can be actively exercised. This is essential in any rehabilitation plan and an individual

exercise programme is required addressing how aerobic fitness, muscle strength, coordination and balance can be improved. [6]

Specialized physiotherapists are needed to plan, guide and manage this process and should encourage the patient and carers to continue the physical training programme long term.

Read more at: http://fyss.se/wp-content/uploads/2011/06/45.-Spinal-cord-injury.pdf

- ***Pain***

Physical activity is commonly used in the treatment and rehabilitation of many painful conditions.

The effect of physical activity on pain is:

- Partly direct through release of endorphins, distraction and in theory, increased activity in non pain transmitting sensory fibres.
- Partly non-direct, with improved mood, sleep and reduced stress levels also contributing to less pain.
- Coupled with an individual improving their functional capacity through exercise. [7]

For example, with exercise programmes for back pain or osteoarthritis, the patient will often improve their pain and functional activity levels considerably.

Read more at: http://fyss.se/wp-content/uploads/2011/06/39.-Pain.pdf

Chapter 9

Obesity

There is no strong evidence that physical activity of 150 minutes a week, on its own achieves any significant weight loss. [1]

However, activity of 300 minutes or more per week, or a combination of diet and exercise interventions, have been shown to be more effective in reducing weight than either intervention alone.

Furthermore, there is strong evidence that physical activity helps people achieve weight stability. Aerobic exercise will be most beneficial by virtue of energy expenditure, though resistance strength training has also been shown to maintain overall health and reduce mortality in men. [1, 2]

It is also very important to ***stress that aerobic physical activity offers substantial health benefits even if weight loss is not achieved,*** as patients often have unrealistic weight loss expectations. [3] It is better to talk about fat loss, as often the weight loss is compromised by an increase in lean muscle mass. Exercise might produce impressive improvements in body composition, e.g. a 2kg increase in lean mass and 2.5kg decrease in fat mass but with an unimpressive change in total body weight which might discourage patients who are primarily motivated by weight loss. This is a **key concept** to get across to overweight patients, that they can reduce their disease potential if they are active, compared to an inactive individual of similar weight.

An example of this is from a study published in 2009, where 58 sedentary and overweight men undertook a supervised aerobic exercise programme for 12 weeks. [4] The mean reduction in weight was 3.63kg. However, 26 of the 58 failed to achieve predicted weight loss and only had a mean weight loss of 0.9kg.

Examining of other health parameters showed the following significant findings:

- Increased aerobic capacity (6-3 ml/kg/min, $p<0.01$)
- Deceased systolic blood pressure (-6 mm Hg, $p<0.05$)
- Decreased diastolic blood pressure (-3.9 mm Hg, $p<0.01$)
- Decreased waist circumference (-3.7 cm, $p<0.01$)
- Decreased resting pulse (-4.8 bpm, $p<0.001$)

In addition, these individuals experienced an acute exercise induced increase in positive mood. An example case study is shown in Case Histories.

Put another way, **a fit and 'fat' person has a lower risk of adverse health problems and death than an unfit thin person.** [5]

Individuals vary greatly in how much physical activity they need to achieve and maintain a healthy weight. Adults, who find it difficult to maintain their weight, should be encouraged to:

1. Reduce energy intake
2. Minimise sedentary behaviour
3. Work on progressively increasing their physical activity, initially up to and then past 30 minutes up to 60 minutes a day or more.

Advice to obese individuals must be realistic as they are often unfit with coexisting co-morbidities present.

Small steps in gained activity through everyday changes should be encouraged and maintained even if more formal physical activity remains difficult. See The Paradigm of Sitting and Getting Started.

Read more at: http://fyss.se/wp-content/uploads/2011/06/36.-Obesity.pdf

Chapter 10

Respiratory Disease

- ***Asthma***

Asthma is a common condition with a variable intensity leading to a reduced physical performance in many individuals. Physical activity training does not appear to change lung function, but does improve cardiopulmonary fitness and thereby performance.

Many asthmatics suffer with exercise induced bronco-spasm arising during or post exertion.

- It varies with the intensity and type of activity and the surrounding environment [1]
- Patients should not exercise if they are actively wheezy or if peak flows have declined
- Symptoms may be greatest in cold dry air, dusty polluted air or when pollen levels are high [1]
- Least symptoms are experienced in warm humid environments [1]
- Physical activity should take place when their condition is stable [1]

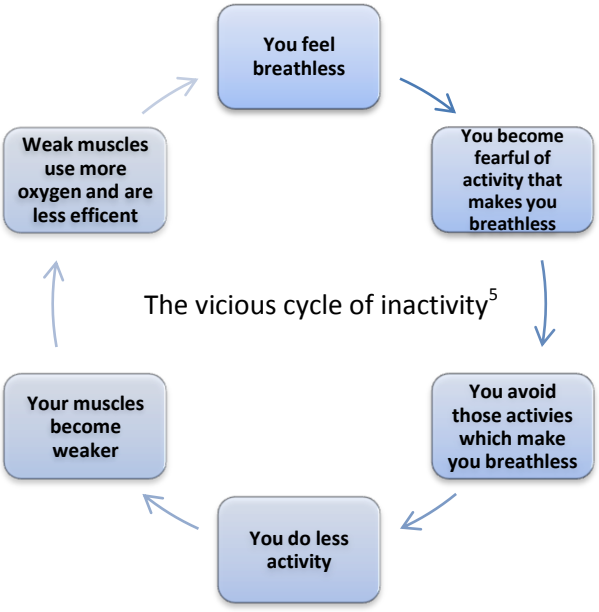
Precautions against exercise induced symptoms can be taken. Pre-medication with beta-2 agonists 15 minutes before exercise, an extended warm up and a gradual cool down has been shown to minimize or completely prevent symptoms of breathing difficulties. [1, 2]

Contraindications
Unstable asthma or actively wheezing [3]

Read more at: http://fyss.se/wp-content/uploads/2011/06/17.-Asthma.pdf

- ***Chronic Obstructive Pulmonary Disease (COPD)***

As COPD progresses, patients have increased dyspnoea. This dyspnoea often makes the patients anxious about moving and leads them to become more sedentary. [3] This in turn causes a decreasing cardiovascular capacity and reduced peripheral skeletal muscle strength, contributing to a worsening functional level, which in turn exacerbates their dyspnoea. [4] This is what the patient feels.



The vicious cycle of inactivity[5]

Conversely, physical exercise training has clearly shown patients to be less afraid of exerting themselves and to become more physically active. [6, 7] By improving their cardio respiratory muscles and peripheral skeletal muscle, they can have a better quality of life, increased well-being, less fatigue and less feeling of dyspnoea, resulting in lower morbidity with fewer hospital admissions. [8, 9] The effect is on muscle and mental well being. No training study has shown a change in lung function. [7]

Contraindications
Resting O_2 saturation of 90% or less [4]

Read more at: http://fyss.se/wp-content/uploads/2011/06/20.-Chronic-obstructive-pulmonary-disease.pdf

Chapter 11

The Paradigm of Sitting.

In the revised UK physical activity guidelines of 2011, a new emphasis was made in every age group to ***"minimize the amount of time spent being sedentary (sitting) for extended periods."***

Why?

Key concept: There is now increasing observational evidence that prolonged sitting time and lack of whole-body muscle movements are strongly associated with obesity, metabolic syndrome, type 2 diabetes, cardiovascular disease risk, cancer and total mortality **which is independent of daily moderate to vigorous intensity physical activity.** [1, 2, 3, 4, 5]

The amount of research supporting the independent importance of sedentary behaviour is small but consistent. The implication of the research is that although we should continue to extol the real benefits of regular moderate exercise, **we need to warn of the risks of too much sitting.** People already not being physically active will increase their risk even further by prolonged sitting.

To avoid the concept of exercise which many people feel they can't achieve or want to, then NEAT should be offered.

NEAT (Non Exercise Activity Thermogenesis) is a term that refers to daily physical activities that are not perceived as exercise or training. We now know any activity however small is better than sitting still and those small activities accumulate and count towards our daily energy expenditure.

Examples;

- Promote and support standing meetings. Standing burns 15 calories an hour compared to 5 an hour sitting
- Getting up from a desk to walk across the office to speak to a colleague rather than phone or email
- Use standing desks at work
- Standing whilst speaking on the phone
- If using a cordless phone walk and talk
- Using manual buttons on televisions rather than remotes
- Get up and move in commercial breaks on the TV, often the adverts are usually about how to ruin your health!
- Parking the car on the far side of a car park at a supermarket or elsewhere
- Using the stairs not the lift or escalator

There is a fun 4 minute cartoon video about avoiding being sedentary – 'Let's Make our Day Harder' on You Tube, which may help some patients by showing it in your waiting rooms.

http://www.youtube.com/watch?v=whPuRLil4c0

Chapter 12

Motivation to Change Health Behaviour

Health promotion forms part of many primary care consultations, be it advice about exercise, weight loss, smoking or alcohol. These consultations are often fraught with difficulty, as many patients are resistant to being told what to do or what is good for them. Moving from this direct style of consultation to a more guiding style that encourages patient motivation is thought to increase the success of health promotion.

Motivational interviewing was originally developed in the field of addiction counselling, but has also been used to promote behaviour change in a wide range of healthcare settings, such as smoking cessation, weight loss and promoting increased physical activity.

There is increasing evidence of its effectiveness, [1, 2] with 80% of 72 studies finding that motivational interviewing outperformed traditional advice-giving. [3] It is associated with a more respectful and less combative consultation – this feels professionally better and is certainly more enjoyable for both doctors and their patients.

Motivational Interviewing (MI) by Prof S Rollnick

A consultation that leans on MI has one strong characteristic that supercedes all else: instead of adopting an expert position and using a directing style to persuade the patient why or how they might get more exercise, you adopt a guiding style. It is a more collaborative process of helping the patients to say why and how they might get more exercise. You structure the consultation and provide information (with permission) but most of the time you are eliciting their own motivation to change. This is often expressed in the form of *change talk*. [4] The more change talk you can elicit from the patient, the better the outcome is likely to be. There is emerging evidence to support this focus on the language used by the patient. [5]

One useful aid might be the recently developed framework for MI [6] that describes four processes in a constructive conversation about behaviour change:

Engaging

Focusing

Evoking

Planning

They do not always emerge in a linear sequence, but the logic is this: step one is to ***engage*** with the patient and establish an agreed ***focus*** for the conversation; then the central task is ***evoking*** the patient's own motivation to change, followed by ***planning*** if the person is ready for this. These processes are highlighted in the example below, alongside other key skills.

Example MI Dialogue. By Prof S Rollnick

This example is based on a fictitious consultation between a 51 year old male and his doctor. He is overweight, with borderline raised BP, who gets short of breath when walking secondary to his poor cardiovascular fitness and sedentary job. He travels to work on the bus and works on the third floor of an office.

Doctor: OK, so that's your tablets sorted out, and now I wanted to ask you whether it's ok with you to spend just a couple of minutes talking about something completely different….. Would that be OK? (*Asking permission will help a lot*)

Patient: Yeah OK, what's that then?

Dr: It's about exercise. Would you mind if we chatted about that if I promise not to nag at you about it?

Pt: Yeah OK, as long as you keep to that promise (laughs). (*The focus is clear. Engagement is not strong, yet.)*

Dr: So rather than me talk about it, could you? Could you tell me how you feel about getting more exercise?

Pt: Hate the thought to be honest with you.

Dr: You're not persuaded about this one (*That's a reflective listening statement, not a question)*

Pt: Well I do know that it would help my health (*change talk)*, but the effort is really too much.

Dr: You get quite a lot done each day, and adding exercise doesn't seem like it could fit (*another reflective listening statement*)

Pt: Yeah you guessed right, I don't just sit around all day and the thought of going to the gym just doesn't fit for me.

Dr: Going to the gym isn't for you, you are busy enough and yet you know it would be good for your health to get more exercise, have I got you? (*A summary that also includes the change talk)*

Pt: Yeah you've got me for sure. (*Engagement is now much better, as a result of listening and then summarising).*

Dr: Can I ask you how do you see the benefits of just a slow and steady increase in exercise? (*A question that allows the Dr to start evoking change talk)*

Pt: Me? Well if it was slow, and I didn't have to go crazy like at a gym, it might help me (*change talk)*.

Dr: It would help you to feel healthier (*a listening statement again, to reflect the change talk and it's also a guess about why it might help)*

Pt: Sort of, but at least I could fit it in, and I might succeed, and I could feel good about that. (*More change talk)*

Dr: Because you don't want to take on some big task like the gym. What suits you more is something smaller to start with. (*Reflecting again, trying to understand how he really feels)*

Pt: If I decide to do it and I haven't yet. (*Patient backs off)*

Dr: You don't want to be pushed into this (Dr doesn't try to win the argument or be clever – just uses a listening statement)

Pt: Exactly, but it might be worth thinking about. Thanks for not lecturing me Dr (laughs)

Dr: *Dr summarises how patient feels and keeps the door open for another time*.

Six weeks later the patient returns for another check on his borderline blood pressure.

Dr: Well thanks for coming back again. I saw you six weeks ago, didn't I?

Pt: Yes, you asked me to come back to check the blood pressure.

Dr: (*Doctor checks BP*) Well it's still on the high side, so we could now ask the question what will help you to get it down and avoid this becoming a cause for concern in the future?

Pt: Well I know I don't want any of those tablets for blood pressure if possible Doc.

Dr: Sure, that's fine for now. Can I raise the subject of exercise again, if I promise not to lecture you?

Pt: You told me that last time, but fair game, you didn't lecture me, so yes fine (laughs)

Dr: I promise again!

Pt: I believe you again, but what now?

Dr: My question would be this: are there some simple small steps you can take to introduce a little more exercise into your daily life?

Pt: I'm glad you are not on about the gym.

Dr: Sure, that's too drastic for you (*reflective listening*)

Pt: I don't do drastic, my life's busy enough.

Dr: Small things might be possible (*reflective listening again – a guess about what might work*)

Pt: Yes, maybe but I'm not sure what you mean by small things?

Dr: *Presents a range of options, not a single idea, with the aim of encouraging the patient to select thus*: So that's a number of possibilities. You will be the best judge of what might work for you. (*Reinforcing autonomy is a critical aspect of skilful consulting about behaviour change*).

Pt: Well of all those things you mention, there's only two that make sense to me: walking up the stairs rather than the lift and getting off the bus 2 stops before work and walking the last part (*patient emits change talk*).

Dr: You can see a way of doing these simple things (the *best response to change talk is a simple reflection*).

Pt: I guess I can, and if it works I might try walking that same distance after work again (*more change talk*).

Dr: You want to experiment and see what works for you (*more reflection*).

Pt: Yeah I am happy to try those two things (*change talk*).

Dr: *Summarises all the change talk that has emerged*. So you don't want tablets, and you think you might be able to walk up the stairs at work, and get off the bus two stops early, and walk into work.

Pt: Knowing me, I'll give it a go. It might help me to feel better about myself (*change talk*).

Dr: And would you mind coming to see me for a brief catch-up in six weeks?

Pt: Sure.....Etc etc

In addition to motivational interviewing, GP's may have their own favourite method of motivation to elicit behaviour change that they wish to use. In promoting exercise, alternative **socio-behavioural** approaches have also been developed to help people change physical activity patterns. The following case study is an example of such a technique:

Edith

In recent years, 50 year old Edith has experienced more and more bouts of prolonged unhappiness. She has not been diagnosed with clinical depression, but her GP has recommended she becomes physically active. She has done little if no purposeful exercise since her teenage years when she used to hate sport and physical education at school, finding it threatening and embarrassing. Edith is on the borderline between overweight and obesity with a BMI of 29 and has been recently been diagnosed with mild hypertension. She has a family history of type 2 diabetes.

The start point for Edith is to construct an activity programme with the help of an exercise professional using a person-centred approach.

The first step is to discuss with Edith her past history in sport and exercise and help her to work out which activities she might be interested in starting. During this discussion, we discover she has not been involved in any sport or exercise since leaving school (her 7-day recall of activity revealed less than 10min of activity- only walking- each day) and that she never enjoyed team games such as hockey at school. She says she might enjoy some group activity, but feels she is not confident to join a group at the moment. She would like to think she could join a group of women with similar kinds of issues at some point.

The second step is to weigh up the pros and cons Edith perceives in becoming more active. Edith agrees that being more active is important for her and might help her feel more positive about herself and life in general, as well as help her lose some weight and get her blood pressure down. However, Edith does not feel very sporty or athletic and finds it difficult to see ways in which she can be more active, so the conversation turns to walking as a starting strategy.

The next important task is short-term goal setting that can provide a sense of steady but safe improvement. Short term goals have to have a flavour of where, when, and what. They need to be specific and agreed (following the SMART principle of being Specific, Measurable, Agreed, Realistic and Time phased).

The discussion moves to time difficulties, as Edith is still holding a demanding full-time job and finding it difficult to cope. The key motivational issue, then, is to ensure small goals for the early weeks that are achievable but that will move her forwards. Goals that are too demanding at this point may undermine confidence and disappoint if they are not reached. It is important to emphasize that mental health or mood benefits may be experienced fairly quickly and there will be changes in exercise capacity in a matter of a few weeks.

Case study reference[7]

Summary

NICE guidelines recommend using techniques that create attitude and behaviour change within health care interventions. [8] Whilst no single method can be universally applied, a combination of motivational interviewing and written physical activity on prescription has been used effectively in Sweden for the past 10 years. A follow up study there has shown a majority (65%) still adhering to the advice after 6 months, with partial adherence at 19% and non adherence 16%. This, as they point out, *"is as good as adherence to other treatments for chronic diseases. This is significant because even a small increase in physical activity is important both on an individual level and for public health*". [9]

Read more about the Swedish MI advice at:

http://fyss.se/wp-content/uploads/2011/06/5.-Motivational-interviewing-about-physical.pdf and useful links to learn more about Motivational Interviewing is provided in Resources.

Chapter 13

Starting to Exercise.

For many patients the thought of starting to exercise can be overwhelming. It is perceived as being difficult, painful, largely gym-based, with only demanding regimes producing real benefits.

These are false beliefs and much of the advice about exercise should be about incorporating more physical activity into everyday life, with alternative choices if required, to gym-based exercise. This section will aim to give brief guidance on the main principles of exercise, how to start exercise and how to dispel these beliefs.

Assessment of present levels of activity;

- *The UK General Practice Physical Activity Questionnaire (GPPAQ)* [1] can be used to categories patients into levels of activity.

- '*The Exercise Vital Sign'.* [2] A brief assessment using 2 questions:

1 "On average how many days/ week do you engage in moderate or greater physical activity (like a brisk walk)?"
2 "On those days, how many minutes do you engage in activity at this level?"

Then multiply the two measures to arrive at an average minutes per week of moderate exercise that you can compare with the recommended guidelines on physical activity or use to monitor progress.

Four important aspects of exercise;

- *Cardiovascular fitness*
- *Muscular strength*
- *Endurance*
- *Flexibility*

Many of the health benefits of exercise come from improved ***cardiovascular fitness*** using aerobic exercise (see Cardio respiratory health). However ***muscle strength*** and resistance exercises also benefit bone formation, glucose metabolism, hypertension and maintenance of weight.

Muscle strength and ***endurance*** are also essential to maintain mobility and prevention of falls, which increases in importance as we grow older. ***Flexibility*** is often overlooked, but is also important as it reduces the possibility of injury, stiffness and an inability to perform simple tasks like turning around to enable you to park your car.

There are some simple basic principles that can be used in 'prescribing exercise', which if patients can grasp, will promote more enjoyment and increase motivation, cutting through some of their beliefs/fears of pain or difficulty.

Warm up and Cool down

It is desirable that individuals include a warm up and cool down as part of their activity. This may be the same activity performed at a lower intensity. For example, walking at a slow pace for your warm up and cool down, with a moderate intensity walk for 30 minutes as the main activity.

Apply the **FITT principle**.

F*requency* – How many times a week for an activity?

I*ntensity* ---- How hard to exert?

T*ype* --------- Which type of activity agreed with the patient?

T*ime* --------- How long in minutes?

The current UK physical activity guidelines are for moderate intensity activity on 5 or more days a week. For individuals who have led a sedentary lifestyle this may be difficult to establish initially. Here, the advice may be to exercise aerobically three times a week, allowing a day or two in between exercise days. However, once this is established individuals should be encouraged to increase the frequency to 5 or more days.

Frequency is the most important aspect to establish as without a routine pattern it will not become a lifestyle change. Motivation is what gets you started but habit is what keeps you going.

Time or how long to exercise, should be established but should not include any warm up or cool down. Present guidelines have recently changed and people can be advised that bouts of physical activity of 10 min or more accumulated throughout the day are as effective as longer sessions.

Newcomers to exercise may need to start at low ***intensity*** but need to be aware that the evidence for health change is mostly from moderate exercise, so if walking they won't improve their cardiovascular fitness with a gentle stroll for 30 minutes. If walking, aim to increase the number of minutes of walk before increasing the intensity (by walking faster or uphill).

There are many activities that can be started and it is most important to find a *type* of exercise that the individual finds enjoyable convenient, affordable and achievable. Walking, cycling and swimming are three of the commonest and known to virtually everyone, but dancing, yoga, Pilates and T'ai Chi are also very popular and help prevent falls and encourage core strength.

Definitions of moderate and vigorous intensity:

- *Moderate intensity* physical activity causes adults to feel warmer, breathe harder and the heart beats faster with the example of brisk walking being the easiest to recognize.
- *Vigorous intensity* physical activity causes adults to get warm quickly, breathe much harder, perspire and find it difficult to maintain a conversation

Monitoring

Some people find it helpful to monitor their progress and use it to motivate themselves.

Ways of monitoring progress:

- Keep an exercise diary – cheap and easy to record your progress, success, feelings and identify barriers to exercise.
- Pedometers – cheap easy to use, but not always reliable.
- Accelerometers – more reliable and can be linked to a computer program for monitoring.
- Walk4life – the walking web based site which is free to join in and uses ordinance survey maps and routes and has a 'track your progress' page to monitor your own fitness.

The above advice is partly taken from Bandolier.[3] Further advice on Starting to exercise available from their fuller version at: www.medicine.ox.ac.uk/bandolier/booth/hliving/startoex.html and the Swedish guidance at:

http://fyss.se/wp-content/uploads/2011/06/2.-General-recommendations-regarding-physical-activity.pdf

Disclaimer

Health professionals are not trained in giving exercise programmes to individuals and this resource is not intended to encourage anyone to go beyond their own experience. However, guiding someone to walk, swim, cycle or dance is within everyone's understanding.

Getting Started

Increasing physical activity for many is difficult and we need encouragement and ideas that can be integrated into daily life.

There are many ways of increasing activity and walking is one of the easiest ways. If 30 minutes all at once seems too much, then try short bouts in the day. For example:

- Leave the car at home for short trips to shops or friends
- Walk to school with the children when you can
- Park the car when used, at the far side of a car park
- If commuting, get off the train or bus one or two stops early to fit in a walk to work
- If you work in a large office, walk to talk to colleagues rather than use the phone
- At home or work if you have a cordless phone, walk and talk
- Avoid lifts and escalators –use the stairs
- Meet friends for a walk
- Use an exercise bike whist watching TV; don't store it in the spare room!

Around the house many jobs involve activity and can help get you going.

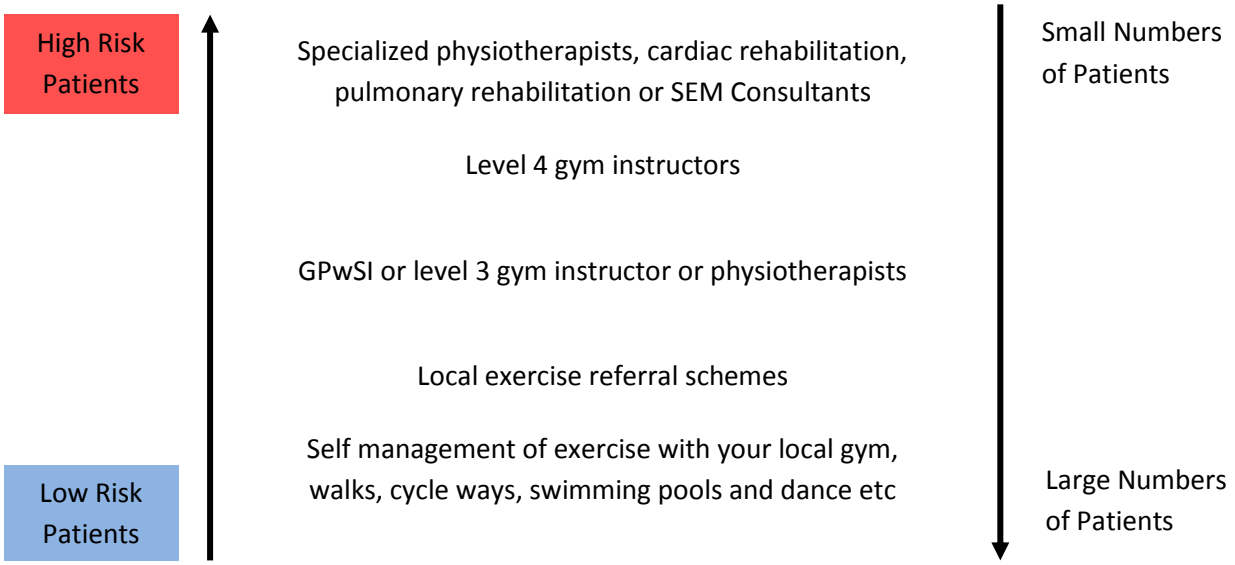
- Cleaning and polishing furniture, floors and windows
- Cutting the grass or the hedge
- Brushing the yard or raking up leaves
- Washing and polishing the car by hand
- DIY – carpentry, sanding, painting, building etc

There are many other activities but most important is finding a form of exercise that the individual finds enjoyable, social and achievable.

- Walking – walk with a friend or join a walking group. Walk4life has information on local walks and walking groups for most areas
- Cycling – many cycle paths have or are being developed across the UK and it is a fun activity for all the family. Sustrans has the national cycle network map freely available
- Dance – increasingly popular, enjoyable and social with many alternative types such as salsa, zumba, line dancing and ballroom
- Swimming – traditional fun for the family and water aerobics for some
- Golf – 18 holes is five miles on most courses
- Tennis, squash, badminton – many clubs and courts all around the country for fun and competition
- Football – the nation's most popular sport, so get out with your children and kick a ball again!
- Yoga and Pilates – excellent activities for flexibility, core strength and posture to relieve and prevent many back problems

Remember every activity counts.

The Referral Pathway



In Primary Care across the UK, there are almost 900,000 GP consultations daily. [4] The average patient visits their GP about 4 times per year. [5] During these visits there is ample opportunity for the GP, practice nurse and health care assistant to promote exercise as a beneficial lifestyle and as a form of treatment in many diseases. In Secondary Care there are many thousands of outpatients and inpatient consultations where exercise advice should be incorporated into the treatment plan.

The majority of patients need encouragement towards being more active through simple guiding techniques of Motivational Interviewing and straight forward advice on promoting activity or taking up exercise. Many patients do not want to go to a gym, but prefer to participate in walking, cycling, swimming and dancing, the advice for which falls comfortably within the role of any health professional.

As patients present with more complex problems, with one or more co-morbidities, doctors or nurses may prefer to refer to Local Exercise Schemes or physiotherapists depending on the conditions and level of risk for more detailed advice on specific exercise plans. However, there is still plenty of simple encouragement regarding walking, gardening and housework, which can be done in parallel, as any activity provides a valid health benefit.

For a small number of patients their activity needs require rehabilitation through specialised physiotherapists or high level 4 gym instructors, or through pulmonary or cardiac rehabilitation units. Assessments of these patients may need to be made by Cardiac, Respiratory or, if available, Sport and Exercise Medicine (SEM) consultants.

Absolute Contraindications of Exercise

- Uncontrolled or poorly controlled asthma [6]
- Cancer or blood disorders: when treatment or disease cause leucocytes below 0.5 x 10^9/L, haemoglobin below 60g/L or platelets below 20 x 10^9 /L [6]
- COPD: patients are required to be stable before training and oxygen saturation levels should be above 88-90% [7]
- Diabetes: if blood glucose is >13 mmol or <5.5 mmol/l then it should be corrected first [8] Patients with diabetic peripheral or autonomic neuropathy or foot ulcers should avoid weight bearing exercise. Any diabetic with acute illness or infection [6]
- Heart disease: acute myocardial infarction or unstable angina until stable for at least 5 days, dyspnoea at rest, pericarditis, myocarditis, endocarditis, symptomatic aortic stenosis, cardiomyopathy, unstable or acute heart failure, uncontrolled tachycardia [6]
- Hypertension: resting blood pressures of a systolic >180 or diastolic >100 or higher should receive medication before regular physical activity, [8] with particular restrictions on heavy weights strength conditioning, which can create particularly high pressures [9]
- Osteoporosis: avoid activities with a high risk of falling [6]
- Fever: should be settled to avoid a risk of developing myocarditis [8]
- Unexplained dizzy spells [8]
- Acute pulmonary embolus or pulmonary infarction. Excessive or unexplained breathlessness on exertion [8]
- Any acute severe illness

(Absolute contraindications taken from BACR (2006) Phase IV Exercise Instructor Training Manual and ACSM (2009) Guidelines for Exercise Testing and Prescription) Courtesy of Wales NERS guidelines.[8]

Chapter 14

Resources for Primary Care

1. **Department of Health Physical Activity guidelines.**

The full set of **2011 updated physical activity guidelines** and background supporting documents are accessible here with pdf files of all the information. Includes the summary evidence on Sedentary behaviour and Obesity

Physical active guidelines fact sheets for all ages available in doctor waiting rooms to hand out to patients or display.

Download Factsheet 1: Early years (under 5s not yet walking)
Download Factsheet 2: Early years (under 5s capable of walking)
Download Factsheet 3: Children and young people (5-18 years)
Download Factsheet 4: Adults (19-64 years)
Download Factsheet 5: Older adults (65+ years)

2. **The GPPAQ questionnaire for assessments:**

The General Practice Physical Activity Questionnaire (GPPAQ) background information here

3. **Useful Web sites/links including:**

FYSS in English. The Professionals Association for Physical Activity and Swedish National Institute of Public Health book that has a downloadable pdf file in English, of their very comprehensive work on how to prevent and treat various diseases and conditions using physical activity. A fantastic reference work.

Exercise Works! An excellent UK and international site for up to date, evidence based physical activity news via twitter account @exerciseworks and a vast resource section via its professional links section. Educational courses, Exercise prescription sheets, physical activity strategies and patient exercise booklets available to purchase by individuals or health care organizations. Ann Gates is also a professional speaker on all topics related to physical activity.

The Global Physical Activity Network, which globally communicates the latest research around the world. Sign up to a free fortnightly e-news letter with the latest research and developments on getting the global population more active.

The UK Faculty of Sport and Exercise Medicine where you will find documents on the application of exercise medicine 'A Fresh Approach' and 'A Fresh Approach in Practice' which outline the benefits of sport and exercise services to patients and the NHS.

The British Association of Sport and Exercise Medicine (BASEM)who have educational courses on sport medicine and exercise medicine and give you the early basis for a career in sport and exercise medicine.

The British Journal of Sport Medicine website, with leading journal articles on sports and exercise medicine. A very useful education section with excellent orthopaedic medicine examination videos, case histories information on exercise medicine and BMJ learning material. Also plenty of blogs and podcasts to listen to.

The British Association of Sport and Exercise Scientists (BASES) who produced the evidence behind the UK guidelines on physical activity. The BASES Position statement of the ABC of Physical Activity and Health published in the Journal of Sports Sciences.

An international website on motivational interviewing. Some useful hand outs under 'Clinicians'.

Stephen Rollnick, Psychologist/Author and co-founder of Motivational interviewing, his own courses and publications.

Enrol on patient behaviour courses based on Motivational Interviewing via GP Update

Video's to show in waiting rooms;

- 'No excuses'. A short YouTube video to help get over some of the common excuses.
- 23-and-a-half-hours. A superb cartoon video expressing the benefits of exercise. Millions of hits, worth watching and see why. 9 min long.
- Lets make our day harder another cartoon video about avoiding being so sedentary.

Walk4life. A useful walk site for the UK with a simple ordnance search map to look for walks anywhere in the UK and a useful widget device (puts their website direct on your own website) for local use. The widget can be loaded onto business websites, public companies websites etc. Individuals who sign up free can put their own walks on and monitor their own fitness.

Sustrans. The cycle charity promoting cycling as a healthier, cleaner and cheaper mode of transport with plenty of advice and cycle routes available by a postcode search. Has the National Cycle Network on their site to access for routes near you.

4A Aide memoires for the doctor

The Busy Doctors Very Brief Guide to promoting Physical Activity For your desk and your practice nurse- two pages on proven benefits, risks of inactivity, key take home messages, motivation and starting tips. Print and keep as a reminder.

A one page version as an aide memoire or patient handout A brief reminder of PA guidelines and key messages.

The Motivate2move PDF version of the website for your desktop with interactive links.

4B Advice sheets for patients, click on the links.

Getting Started Simple tips on increasing activity in your daily life.

Do you sit at a desk all day? The Chartered Society of Physiotherapists has a useful set of exercises on a free pdf download for desk workers or even use yourself!

A Sitting poster from the Washington Post, display it in the office.

The British Lung Foundation advice for patients for exercise.

The British Heart Foundation exercise advice for over 65's.

The Arthritis Research UK Exercise sheets and videos for patients on;

- Ankle sprain exercises
- Back pain exercises
- Knee pain exercises
- Neck pain exercises
- Osteoarthritis
- Plantar fasciitis
- Shoulder pain exercises
- Elbow pain including tennis elbow
- Keep moving conditions for home exercises

ShoulderDoc.co.uk is a website designed to provide information for patients and doctors on shoulder injuries.

Appendix 1 The Busy Doctors Guide to Exercise guidance

The Chief Medical Officers 2011 UK Physical Activity Guidelines for Adults

- Aim to be active daily, participating in **at least** 30 minutes of **moderate** physical activity on 5 or more days a week, or in multiple bouts of 10 minutes or more.
- Benefits can be achieved also with combinations of moderate and vigorous activity.
- In addition adults should improve muscle strength on at least 2 days a week and avoid extended sedentary (sitting) periods in any week.

Dangers of a sedentary lifestyle.

- Reduces your life expectancy
- Increases the risk of breast cancer by 20-30%
- Increases the risk of colon cancer by 30-40%
- Significantly increases the risk of type 2 diabetes and all its complications.
- Increases the risk of ischaemic heart disease and complications
- Increases the risk of high blood pressure and complications of a stroke
- Increases the risk of obesity and all its complications
- Increases the risk of osteoporosis and resulting pain and fractures
- Increases the risk of falls in later life and reduced function of everyday activities
- Increases the level of triglycerides and reduces protective HDL cholesterol

Benefits of regular physical activity;

- Extend your life by 4.2 years if male and 3.7 years if female
- Reduce your risk of breast cancer by 20-30%
- Reduce your risk of colon cancer by 30-40%
- Reduce your risk of heart disease
- Reduce the risk of high blood pressure
- Reduce your blood pressure by an average of 7/5 mmhg
- Reduce your triglycerides by 5-10%
- Increase your level of protective HDL cholesterol
- Reduces risk of osteoporosis
- Will help prevent the risk of falls and fractures in later life

Key messages

- **Physical inactivity KILLS MORE THAN SMOKING, DIABTES and OBESITY combined.**
- **Psychological well-being is the commonest comment made on feedback questionnaires by individuals who start increasing activity.**
- **A 'fit and fat' person has a lower risk of adverse health problems and death than an 'unfit thin' person.**
- **The paradigm of sitting - that too much sitting or prolonged inactive muscle use, increases the risk of obesity, metabolic syndrome, type 2 diabetes, cardiovascular disease risk, cancer and total mortality, which is independent of daily moderate to vigorous intensity physical activity.**

MOTIVATION of patients – key to any success in health promotion

Consultations can be difficult, as many patients are resistant to being told what to do or what is good for them. Moving from a direct style of consultation to a more guiding style that encourages patient motivation is thought to increase the success of health promotion.

Using **Motivational Interviewing** (MI) has been used to promote behaviour change in a wide range of healthcare settings. There is increasing evidence of its effectiveness.

Instead of adopting an expert position and using a directing style to persuade the patient why or how they might get more exercise, you adopt a guiding style. It is a more collaborative process of helping the patients to say why and how they might get more exercise. You structure the consultation and you provide information (with permission) but most of the time you are eliciting their own motivation to change.

For fuller details of how to learn how to do MI see: http://www.stephenrollnick.com/index.php/all-commentary/69-motivational-interviewing-article-published-in-the-british-medical-journal

Starting to Exercise

For many patients the thought of starting to exercise can be overwhelming. It is perceived as difficult, painful, largely gym based and that major commitment is required in order to be beneficial.

There are four important **aspects of exercise**:

- *Cardiovascular fitness;* aerobic exercise to improve heart and lungs circulation.
- *Muscular strength*; weight or resistance exercise to maintain strength and prevent falls.
- *Endurance*; helps maintain strength and prevent falls.
- *Flexibility*; reduces stiffness and maintains range of movements.

The aim is to build up to a minimum of 30 minutes of moderate exercise on 5 or more days a week.

- If this is too much, start with 10 minute walks and increase the activity by 2 minutes a day.
- Set realistic goals. Every individual is different.
- Encourage types of activity which the individual finds enjoyable, fun and sociable.
- Try to incorporate more activity into daily life: stairs instead of escalators, park the car when used, at the far side of a car park etc.

More detailed advice on Starting to Exercise from:
www.medicine.ox.ac.uk/bandolier/booth/hliving/startoex.html

Appendix 2 A one page version as an aide memoire or patient handout

The UK Physical Activity Guidelines advice for adults is to;

- Aim to be active daily. Activity should add up to over 150 minutes per week by participating, in at least 30 minutes of *moderate* intensity physical activity on 5 or more days a week, or in multiple bouts of 10 minutes or more.
- Comparable benefits can be achieved through vigorous activity of 75 minutes a week or through a combination of moderate and vigorous activity.
- Adults should also undertake physical activity to improve muscle strength on at least two days a week.
- All adults should minimize extended sedentary (sitting) periods.

There are real Dangers of a sedentary lifestyle or being inactive.

- Increases the risk of breast cancer by 20-30%.
- Increases the risk of colon cancer by 30-40%.
- Significantly increases the risk of type 2 diabetes and all its complications.
- Increases the risk of ischaemic heart disease and complications.
- Increases the risk of high blood pressure and complications of a stroke.
- Increases the risk of obesity and all its complications.
- Increases the risk of osteoporosis and resulting pain and fractures.
- Increases the risk of falls in later life and reduced function of everyday activities.
- Increases the level of triglycerides and reduces protective HDL cholesterol.
- Inactivity is a risk factor for spinal disc degeneration.

Key messages

- **Use it or lose it.**
- **Physical inactivity kills more than smoking, diabetes and obesity combined**.
- **Psychological well-being is the commonest comment made on feedback questionnaires by individuals who start increasing activity.**
- **A fit and fat person has a lower risk of adverse health problems and death than an unfit thin person.**
- **Longitudinal studies show being inactive is as dangerous to your health as smoking 20 cigarettes a day.**
- **The paradigm of sitting - that too much sitting or prolonged inactive muscle use, increases the risk of obesity, metabolic syndrome, type 2 diabetes, cardiovascular disease risk, cancer and total mortality, which is independent of daily moderate to vigorous intensity physical activity.**

Appendix 3 Getting Started

Increasing physical activity for many is difficult and we need encouragement and ideas that can help us integrate into daily life.

There are many ways of increasing activity and walking is one of the easiest ways. If 30 minutes all at once seems too much then try short bouts during the day:

- Leave the car at home for short trips to shops or friends.
- Walk to school with the children when you can.
- Park the car when used, at the far side of a car park.
- If commuting, get off the train or bus one or two stops early to fit in a walk to work.
- If you work in a large office, walk to talk to colleagues rather than use the phone.
- At home or work if you have a cordless phone, walk and talk.
- Avoid lifts and escalators – use the stairs.
- Meet friends for a walk.
- Use an exercise bike whist watching TV; don't store it in the spare room!

Around the house many jobs involve activity and can help get you going.

- Cleaning and polishing furniture, floors and windows.
- Cutting the grass or the hedge.
- Brushing the yard or raking up leaves.
- Washing and polishing the car by hand.
- DIY – carpentry, sanding, painting, building etc

There are many other activities that can be taken up and it is most important to find a form of physical activity that is enjoyable and achievable.

- Walking – walk with a friend or join a walking group. Walk4life has information on local walks and walking groups for many areas.
- Cycling – many cycle ways have or are being developed across the UK and is a fun activity for all the family.
- Dance – increasingly popular, enjoyable and social with many alternative types such as salsa, zumba, line dancing and ballroom.
- Swimming – traditional fun for the family and water aerobics for some.
- Golf – 18 holes is five miles on most courses.
- Tennis, squash, badminton – many clubs and courts all around the country for fun and competition.
- Football – the nation's most popular sport, but get out with your children and kick a ball again.
- Yoga and Pilates – excellent activities for flexibility, core strength and posture to relieve and prevent many back problems.

Remember all activity counts

3 Tips for GP's in promoting Physical Activity Guidelines (PAG).

- Display PAG in a prominent place in your waiting rooms

- Have PAG guidelines for each age group as hand-outs in your waiting room

- Print PAG on your FP10 prescriptions 'right hand side'. Target different age groups and/or different disease groups or everyone. Set it for 2-3 months and repeat it 2-3 times a year so as to catch people's attention.

- Send exercise advice invitations to targeted disease groups e.g.; your hypertensive's on your register

- Olympic legacy; obtain your local sport facilities, gyms, swimming pools, cycle ways, walking routes/groups, fitness classes, Pilates, Tai Chi, zumba etc. Display them by your PAG in the waiting room or on an activity page for health on your website.

- Also on your website add the walk4life widget. It is easy to load on and is free. Find it on; Walk4life A useful site for the UK with a simple ordnance search map to look for walks anywhere in the UK. The widget can be loaded onto business websites, public companies websites etc (tell your patients). Individuals who sign up free can put their own walks on and monitor their own fitness.

- If you have a practice intranet, store the 'pdf' files of what will be provided to every GP this year on exercise promotion, for printing off and using for reference. Alternatively when provided with the link to Motivate2Move store it your computer favourites. Or download the pdf of Motivate2Move from resources and place it on your computer desktop where you can enter it in one click and use its interactive hyperlinks.

- If you have a health video channel in your waiting room run the You Tube videos of 'Lets make our Day Harder' and '23-and-a-half-hours'.

6. **Podcasts**

Available on the British Journal of Sports Medicine website are a selection of podcasts on exercise medicine at:

http://bjsm.bmj.com/site/podcasts/

7. Case histories. Examples can motivate some patients and are useful for nurses to quote.

Case 1 Hypertension or Not?

A 52 old man was referred by the practice nurse for initiation of blood pressure medication after having had 3 raised blood pressures recorded, 170/96, 176/100, 178/98.

This gave a conventional diagnosis of mild hypertension. He had a busy job but denied being stressed. Ambulatory blood pressure monitoring was not available in this case. His initial treatment plan:

- ✓ Lifestyle advice of low salt, losing weight and regular exercise was advised. The patient was keen to avoid medication if possible.
- ✓ Motivation for the patient came from a desire to avoid medication.
- ✓ Specific advice on exercise was given for 30 minutes of moderate exercise on 6-7 days a week. He presently did no regular exercise. Different forms of exercise were explored and walking chosen as being the most practical.
- ✓ A follow up appointment was made for 4/52.

Repeat BP and weight recordings were made at monthly follow up appointments.

- ✓ The following recordings were made. 164/92, 162/90, 156/86, 154/86, 146/ 82, 144/ 82.
- ✓ He noted he was sleeping better, felt much better and hadn't realised he had been stressed with his job. He lost 2kg.
- ✓ NICE recommends ambulatory 24hr monitoring before a diagnosis of hypertension. This may have picked up a white coat hypertension diagnosis. Lifestyle intervention would still be indicated.

"Discharged" with a normal BP profile but follow up check at 6/12.

Potential cost savings:

- ☺ Cost of drug prescription for hypertension treatment for 12/12 each year until maybe he becomes hypertensive in the future.
- ☺ Blood test monitoring of electrolytes if he had ACE or diuretics per year.
- ☺ Clinical time for future monitoring 2 x BP checks and problems or side effects.

Costs incurred:

Appointments x 6 to initially monitor, but if initially he was treated, then follow up and stabilisation after initiating anti-hypertensive's may have cancelled these out.

Case 2 Depression.

A 46 year old man presented with mild depression. His PHQ9 score for depression was 9/30.One normal mode of practice would have been to start an antidepressant and follow up monthly.

Instead, an alternative behaviour lifestyle approach was chosen with an emphasis on exercise which the patient previously enjoyed but had allowed to relapse. His initial treatment plan:

- ✓ Exercise discussed with motivational interviewing and 7/7 of 30 minutes moderate exercise was 'prescribed' with cycling being the chosen exercise in the form of commuting to and from work.
- ✓ Follow up monthly was undertaken with the addition of the Welsh bibliography prescribing scheme (self help books from the local library).
- ✓ Slow resolution of depression occurred and the patient episode resolved after 12/12.

Cost savings:

- ☺ Antidepressant medication for 12 months or more.
- ☺ *Appointments cost neutral*, same number of patient follow up appointments used as this doctor's normal practice.

Case 3 Obesity.

A - 38 old female type 2 new diabetic presented following a diagnosis of diabetes and being overweight. Wt 154kg, BMI= 51.6

For the first 2 years despite advice on diet and exercise, her weight fluctuated with crash diets and intermittent exercise between 154kg and 137kg, but after 2 years it was back to 151kg and with ever rising Hba1c she had progressed onto metformin with increasing doses. One year ago with metformin at 1gm bd and an abnormal hba1c yet again she was given motivational interviewing guidance on activity.

Prior to this she;

"Used to dread getting out of bed in the morning. I wish I wouldn't wake up."

Now for the first time she has exercised regularly and consistently.

"I look forward to the day. I have lost inches from my waist and my back pain has gone."

Her Hba1c has dropped for the first time and is now normal on metformin 1gm bd. Her weight is 141 kg. She has decided to increase her activity time with a target of 300 minutes a week.

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