



HEALTH AND FUNCTIONAL FITNESS ASSESSMENT

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Exercise & Specific Populations
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Client Profile

In discussions of your general physical background, it was noted that you have a generally active lifestyle. You attend the gym independently once a week and participate in Pilates classes. Both in addition to this strength training program. The further recommendations developed will be based upon these lifestyle behaviours and will be specifically designed to improve overall strength and to help preserve your independence.

Although you fall into the 'Older adults' category, your baseline functional fitness can be deemed substantial. Your activity level puts you in the 'active' bracket for your age so the main areas to focus on are maintaining strength, muscle mass and bone density and how we can fit this into your everyday life. Your food frequency questionnaire was completed with no immediate indications of bad eating habits.

The evaluation of diet and test data has therefore given a good indication of future recommendations that can be seen at the end.



Introduction

Deterioration of basic functional movements declines throughout the aging process. Many of the elderly population lose independence in basic daily activities each year through the decline in functional mobility and various conditions brought on from limited activity. A decline that is more apparent in women than men. Figures state that women outlive men by seven or eight years, and after the age of 80, around 88% of women live on their own. The majority of elderly women are not physically active enough to maintain independence leading to additional adverse outcomes such as admissions to hospitals, nursing homes and a greater use of home services. Disability is also more common in women and could be a possible outcome of lack of activity.

Frailty, often associated with the elderly population, is generally seen as reduced muscle strength and fatigue, and is considered to increase the risk of falls. Falls have been associated with a reduced quality of life and can have serious consequences such as broken bones or head injuries. Most falls in older adults occur while walking and figures state at least one-third of 65+ fall each year leading to a fear of falling and a reduced confidence. This reduced confidence results in restricting activity levels, which, ironically further increases the risk of falling.

Evidence of mitigation strategies to slow down the aging process recommend exercise and nutrition along with pharmaceutical interventions which help to improve physical function. Physical activity in the elderly population is recommended as a preventative factor against several health conditions including osteoporosis, obesity, depression, coronary heart disease and type 2 diabetes. The progression of osteoporosis may be delayed through increased activity levels which is of paramount importance for postmenopausal women, as this group are at high risk for the development of this particular condition. Physical activity in old ages can help to sustain muscle mass and bone density which is a vital component in reducing the onset of age-related conditions.

Ageing is linked to a loss of strength and power due to a natural decrease of lean muscle mass (sarcopenia) and neurological function. Levels of which begin to decline after age 30, particularly among sedentary people. Sarcopenia is considered to be one of the most important factors leading to disability or frailty in older adults. This may impair your capacity to participate in daily activities which were once enjoyable. This deterioration can be slowed down by adopting a healthier lifestyle, including regular exercise and a healthy diet.

Strength training will enable you to get stronger and allow you to continue to do things for yourself as you get older, for example carrying your own groceries and other daily tasks. Strength training gives many health benefits, particularly for women as they age. By regularly participating in some form of strength training, whether that be resistance training or Pilates for example, body composition can be improved, muscle mass and bone density can be maintained, and independence can be preserved. Weaker bones are more susceptible to fracturing and are at risk of breaking even from a minor fall. Strength training puts pressure on the bones, which activates bone-forming cells to slow bone loss and to build up bone density.

Metabolism declines as you age putting you at a higher risk of developing obesity which is linked to many chronic diseases. Muscle is more metabolically active than fat, increasing the resting metabolism. So by maintaining or building more muscle mass can be beneficial in reducing the likelihood of developing these conditions.

Resistance training also enhances cognitive function and improve mental health. Reducing depression, improving quality of sleep and even memory.



Testing & Results

Body Composition				
	Weight (kg)	BMI	Muscle Mass (kg)	Fat Mass (kg)
Pre	58.3		38.1	31
Post	56.1	21.9	37	30.5
% Lost	2.2		1.1	0.5
Target	55	21	38	29

Over the past 8-weeks a decline in 0.5% body fat, and 1.1% muscle mass has resulted in an overall weight loss of 2.2kg. The training that I am going to advise with regards to nutrition and physical activity will therefore give you a target weight of 55kg. Ideally, we don't want a reduction in muscle mass and so I have set the target of maintaining this. This can be achieved through regular strength training which is incorporated into a sample training schedule at the end.

Body Mass Index (BMI) is a general indication of a healthy weight for your height. This measure should only be used as a baseline as it does not take into account fat weight and muscle weight. Body composition is used to describe the percentages of fat, bone, water and muscle within the body. This program was designed to improve strength, but your data demonstrates improvements in all aspect of body composition. You have started the fat-burning process, and if you keep up your training, you will continue to see results. For further fat loss additional cardiovascular based exercises are advised. Again, this has been incorporated into a sample training schedule at the end.

	Balance			
	Open Dominant	Open Non-Dominant	Closed Dominant	Closed Non-Dominant
Pre	1 min	1 min	2.26 sec	1.36 sec
Post	1 min	1 min	4.21 sec	2.57 sec

Balance tests provide a good indication of proprioceptor status. Proprioception is the awareness of oneself and Proprioceptors are the sensory receptors responsible for detecting movement and body position through a stimulus. The longer you are able to balance the better your proprioceptive status.

The data above shows an improvement of balance with eyes closed on both the dominant and non-dominant foot. To further improve balance and proprioceptive status, simple balance exercises could help to improve this further. These can be done anywhere and can be easily incorporated into a daily routine without any hassle. Simple tasks such as standing on one leg or heel to toe walking.



	20m Up & Go	Agility	Weight Lift (x5)	Grip Strength	
				<i>Dom</i>	<i>Non-Dom</i>
Pre	14.28 sec	8.35 sec	13.42 sec	26.1	21.8
Post	12.32 sec	6.94 sec	11.38 sec	27.6	23.5

20m Up & Go

The 20m Up & Go test was measuring your ability to stand, walk 20m and sit back down as quickly as possible. It is a common screening test to gauge functional mobility in a frail population to identify functional decline. This requires sufficient balance and strength in order to stand up out of the chair without the assistance of arm rests. Your times indicate an overall improvement. By continuing your active lifestyle these results could be improved but the aim of maintaining the ability to move smoothly and efficiently through the test shows a good indication of your mobility and balance.

Agility

Agility comprises of decision making and movement direction changes with a cardiovascular stimulus. This requires good physical, perceptual and cognitive status to carry out agility-based tasks.

The Agility test followed the rules of 'hopscotch', with the starting position being stood on two feet then jumping and landing on one foot, re-gaining balance, then jumping off one foot and landing on two. This was repeated 8 times in one direction, to then turn and repeat in the opposite direction. The times are documented above and show an overall improvement. Although the current training program didn't focus on agility-based exercises, there was still a 1.41sec improvement. Balance is an important element of agility and so continuing with your Pilates classes is advised for core strength along with continued strength training.

Weight lift & Grip Strength

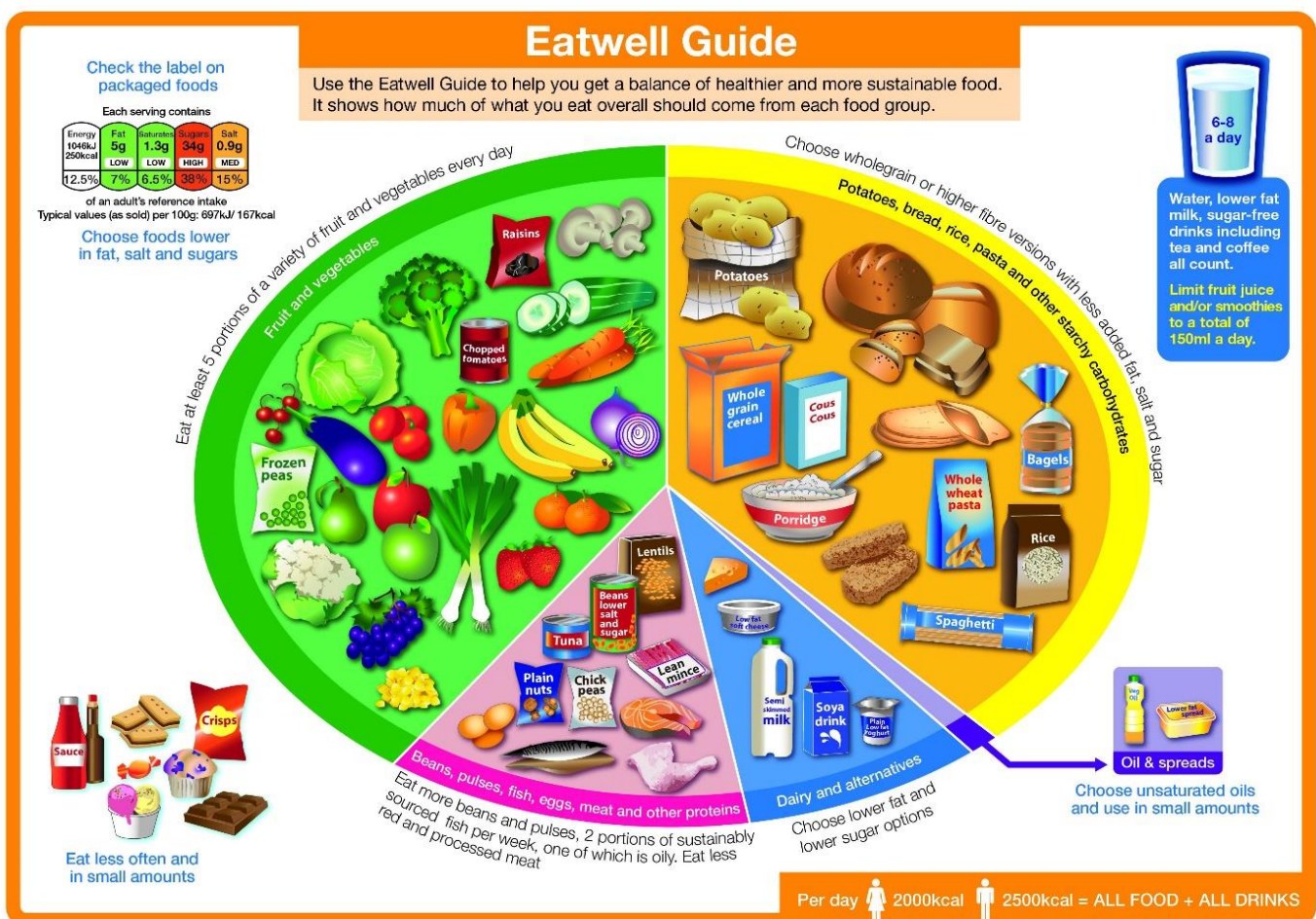
Strength training is becoming a more crucial form of training within the older population. Two strength tests were carried out and results display an increase in both strength and time to complete in the weighted lift and in the overall grip strength. By continuing with a strength element in your weekly training your target can be reached by maintaining your strength and muscle mass percentage.



Diet

Referring to your food frequency questionnaire, the consumption of saturated fats was noted. Saturated fats are mainly found in animal sources. Eating too many saturated fats can raise the 'bad' cholesterol in your body- increasing the risk of heart disease. Although your consumption isn't rationally high, reducing the amount of butter added to your veg or potatoes once cooked for example would help to further reduce consumption. Swapping to unsaturated fats, (which can be found in certain oils) can further reduce levels of 'bad' cholesterol while also increase 'good' cholesterol. Overall, your food frequency questionnaire doesn't show any signs of bad eating habits.

The Eatwell Guide is a visual representation of how different foods and drinks can contribute to a healthy lifestyle and has been categorised into five different food groups, highlighting the estimated daily portions of each category. Following the Dietary Reference Values (DRV) guidelines it is suggested that Carbohydrates, Protein, fruit and vegetables, Dairy, Fats and oils/spreads should be included in your daily intake to maintain general health.



Source: Public Health England in association with the Welsh government, Food Standards Scotland and the Food Standards Agency in Northern Ireland

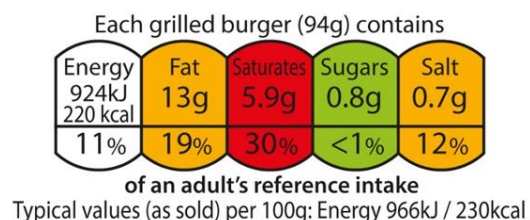
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The table below shows a break down for women 70+ and their macronutrient recommendations.

Calorie Intake (kcal)	Sedentary: 1600	Moderately active: 1,800	Active: 2000
Macronutrients, Minerals & Vitamins	Daily Nutritional Goal		Found in
<i>Protein (g)</i>	0.75g/kg/bodyweight =46.5 (female 75+ years)		Meats, Poultry, Fish & Seafood, Eggs, Dairy Products, Soy, Nuts/seeds
<i>Carbohydrate (g)</i>	Approximately 50% of total dietary energy		Sugar: Naturally occurring sugars in fruits, vegetables, and milk/milk products. Refined sugars in sweet foods such as pastries, syrups, cookies, and soft drinks Starch: Potatoes, Lentils, Beans, Corn, Grains- rice, oats, wheat.
<i>Fibre (g)</i>	30/day		Whole-grain foods – bread, pasta, cereal, nuts & seeds, some fruits and vegetables
<i>Total Fat (g)</i>	Reduce to about 35% of dietary energy		
<i>Saturated Fats</i>	Reduce to no more than about 10% of dietary energy		Fatty meat, butter, cakes, biscuits, cured meats, pastries,
<i>Unsaturated Fats</i>	Provide no more than about 2% of dietary energy		Fish, tofu, avocado, nuts & seeds, Oils
<i>Salt</i>	Should not exceed 6g/day		

It is advised that foods high in fats, salt and sugars such as crisps, chocolates, processed sauces etc should be consumed less often and in smaller portions. To help people make better foods choices, Public Health England have included a food labelling system which uses a ‘traffic light’ colour system, displaying the amounts contained in each group with relevance to the DRV guidelines. High contents are shown in red, medium in amber and low in green. It is advised to choose foods and drinks with green or amber labels as they are more probable to be a healthier choice.



Basal Metabolic Rate (BMR) is the daily minimum level of energy/calories your body requires when at rest in order to function effectively. A person with a high BMR burns more calories but this changes during the ageing process. Typically, BMR peaks at around 16/17 years, after which point it starts to decrease. An increase in muscle mass will speed up your BMR leading to an increase in calories burned. Due to changing dietary needs through aging and the heightened risk of malnutrition, a healthy diet should be followed. Females aged 60+ require about 1,600 to 2,200 calories per day, dependent on activity level.

Malnutrition is a condition that develops when the body is deprived of vital vitamins, minerals and nutrients needed to maintain healthy bodily functions. It is common in older adults and can lead to health-related outcomes such as decreased quality of life and increased mortality. A diet with insufficient nutrition can result in loss of body weight, muscle mass and strength-decreasing basic physical functions such as mobility. Malnutrition is another risk factor for functional impairment and falls in older adults.

Deficits in protein intake can accelerate age related muscle mass waste and the development of sarcopenia. Malnutrition involving deficits in other nutrients is also related to impaired cognition and diseases such as Alzheimer's. By ensuring adequate nutrition it can help to maintain everyday living and to preserve your functional independence. A higher protein diet in elderly people benefits their bone stability by increasing their bone density. Bone mass and density tend to fall with age, particularly among postmenopausal women. Vitamin D and calcium are well known for their important roles in bone health. Calcium is an essential component of healthy teeth and bones, and vitamin D is important for the absorption of calcium.

The ability to absorb vitamin B12 is decreased with age along with certain medications influencing absorption further. Supplementation of vitamin B12 should be discussed with your healthcare provider to determine if or what supplements are appropriate.

The sensation of thirst has been noted to decline through aging. With the added concern of bladder control or mobility issues further influencing the lack of fluid consumption. It is important to drink plenty of water to not only prevent dehydration but to aid the digestion of food and absorption of nutrients. The hydration section of the Eatwell Guide highlights that 6-8 glasses of water, low-fat milk and sugar free drinks such as tea and coffee should be consumed per day.



Future Recommendations

Physical Activity

Although you currently fall under the category of 'active' for your age, continuing with this will help to maintain your health and well-being, decreasing your likelihood of developing age-related conditions. This training program has shown the benefits of strength training alongside your current activities. I would recommend continuing with a strength training aspect during your week.

Training Schedule

Following the recommended guidelines for physical activity and taking into consideration your lifestyle, I have put together a sample 6-week training schedule. This does not have to be followed strictly and you can swap and change the days to suit your own routine. Try to reach the duration/intensity recommended to reach the physical activity goals of 150 minutes of moderate activity or 75 minutes of vigorous activity per week. Moderate intensity activities should aim to raise your heart rate, encourage heavier breathing, and increase overall body temperature. You should be able to hold a conversation while carrying out these activities. Examples include: Brisk walking, cycling. Vigorous intensity activities should also increase your heart rate, encourage heavier breathing, and raise your body temperature, but it should be difficult to hold a conversation. Examples include: Running, Uphill brisk walk, Swimming. Minimising sedentary behaviours are also recommended. These could include reducing time spent watching TV or swapping a long bus or car journey for walking part of the way.

I have made this plan based on the understanding that you attend Pilates on a Tuesday evening and the gym independently on a Friday. I have added the current strength training session to a Wednesday and two recreational days each week. Recreational activities could be anything from playing with grandchildren to pottering in your garden- anything involving more activity and lessening sedentary behaviour.



	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1		Pilates	Strength/ Aerobic	Recreational	Strength/ Aerobic	Recreational	
Week 2	Recreational	Pilates	Strength/ Aerobic	Recreational	Strength/ Aerobic		
Week 3		Pilates	Strength/ Aerobic	Recreational	Strength/ Aerobic	Recreational	
Week 4	Recreational	Pilates	Strength/ Aerobic	Recreational	Strength/ Aerobic		
Week 5		Pilates	Strength/ Aerobic	Recreational	Strength/ Aerobic	Recreational	
Week 6	Recreational	Pilates	Strength/ Aerobic	Recreational	Strength/ Aerobic		

*Strength: 2 Sets/10-15reps/4 exercises.

*Aerobic: 10-15min Cardio of choice.

