



Exercise therapy in chronic diseases

Have you taken your daily dosage of exercise?



- SAAFP 25th National Family Practitioners Conference
- Andrew Heilbrunn and Philippe Gradidge



What is *physical activity*?



- *Any bodily movement* produced by the skeletal muscles resulting in *energy expenditure above* the resting state
- *Any movement* as simple as walking, gardening or even cleaning the house



Norwood Sport
Medicine and
Exercise Institute

That dreaded word!





*Norwood Sport
Medicine and
Exercise Institute*

Benefits of Physical activity

People who are active daily live longer and have a greater sense of well-being.





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Benefits of Physical activity

Regular physical activity may decrease

- All cause mortality by **30%**. Even 10 minutes..
- Type 2 diabetes by **40%**,
- Cardiovascular disease by **20-35%**,
- Dementia and **Depression** by **30%**,
- **30%** reduction in falls



Benefits of Physical activity

Furthermore....

- Hip fractures by **68%**
- It may play a role in preventing certain cancers.
- Regular physical activity at the correct intensity can aid in the management of:
 - blood glucose control,
 - blood pressure,
 - blood lipid levels and a healthy weight.
- Reduce the amount of chronic medications one has to take.
- May improve sleep



Benefits of Physical activity

- Despite, ...**less of it**
- Further **sobering global statistics** reveal that physical inactivity is responsible for:
 - **9 %** of premature deaths.
 - is currently the **4th leading cause** of mortality worldwide. WHO (2020)
 - In the USA only **6%** of people that are working do **enough** activity at **work to improve there** health....
- **Interestingly....wealthy countries... low**



So, what is to be blamed for this increase in our sedentary lifestyles?

- Increasing urbanisation, **deskbound jobs**, **technology** and modern living have removed many regular forms of physical activity from our daily lives.
- Cars, lifts, computers





Obesity epidemic

- **Decline in physical activity is a key contributor to the global obesity epidemic ...**
- **However it is not obesity that we should really ..**

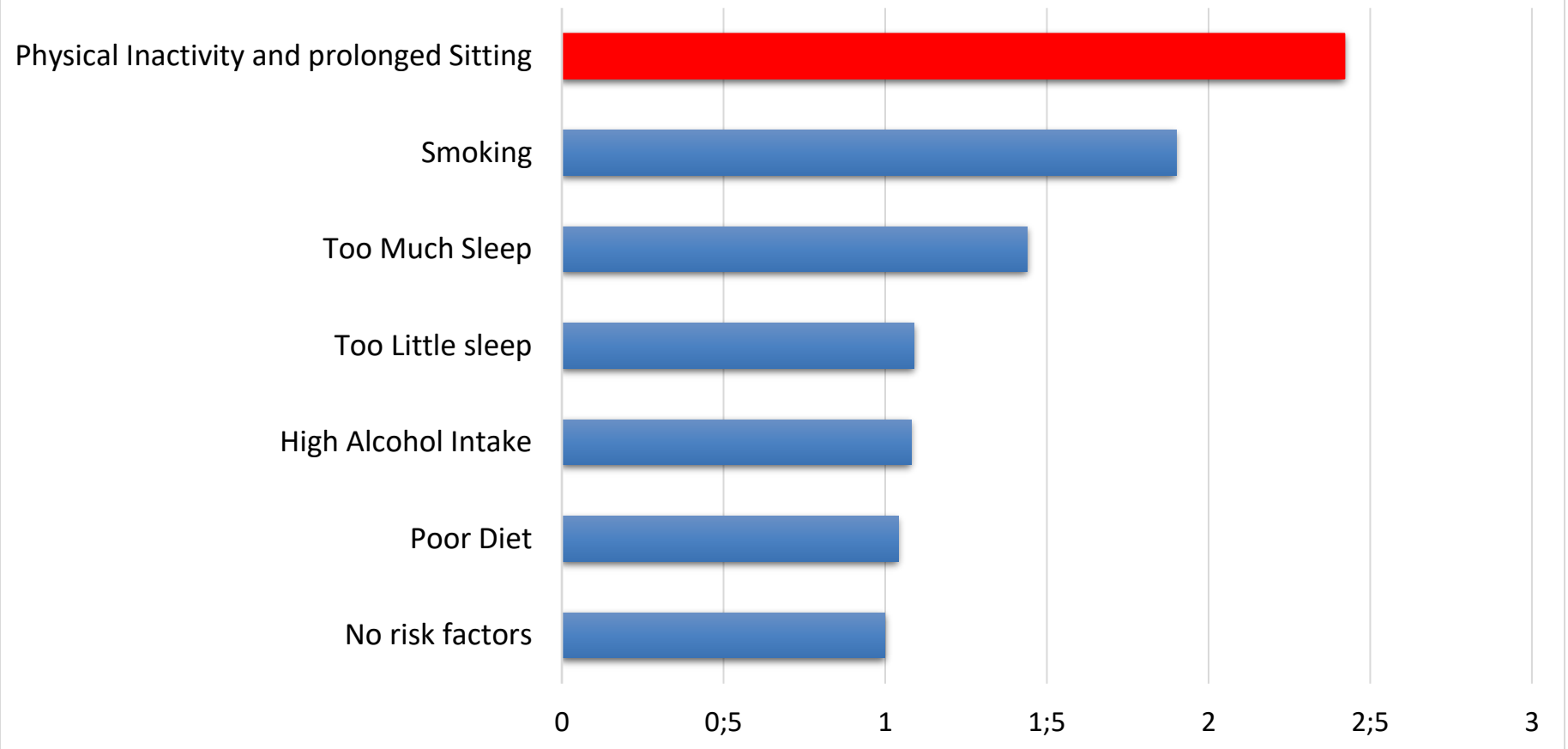




Which “Poor” health Decision kills most adults?

Risk of dying (RR) from any cause (both sexes, >45y)

Hazard ratios for all-cause mortality for different lifestyle risk behaviours





Is Exercise medicine?

- If **inactivity** is so detrimental to ones health and exercise has potentially a **“polypill”** effect and is the **“miracle cure”**, why aren't we prescribing it enough?





If exercise is medicine, are doctors starting to prescribe it?

- Exercise as a therapy is mentioned in **most chronic disease prevention** and treatment guidelines,
- Some doctors may **prescribe exercises** ...
- Surveys suggest that **doctors who exercise themselves** are **more likely** ...
- **Therefore, targeting doctors to be more active may provide a substantial population effect.**



If exercise is medicine, are doctors starting to prescribe it?

- According to Haseler in the BMJ in 2019, any contact.... A simple discussion on the topic may bring about behavioural change
- The reality is that most doctors in practice today received **little, if any**, training on the role of exercise in managing disease.
- This is however changing with programmes such as [Exercise is Medicine](#) (EIM), a global health initiative managed by the **American College of Sports Medicine**.





Activity Continuum

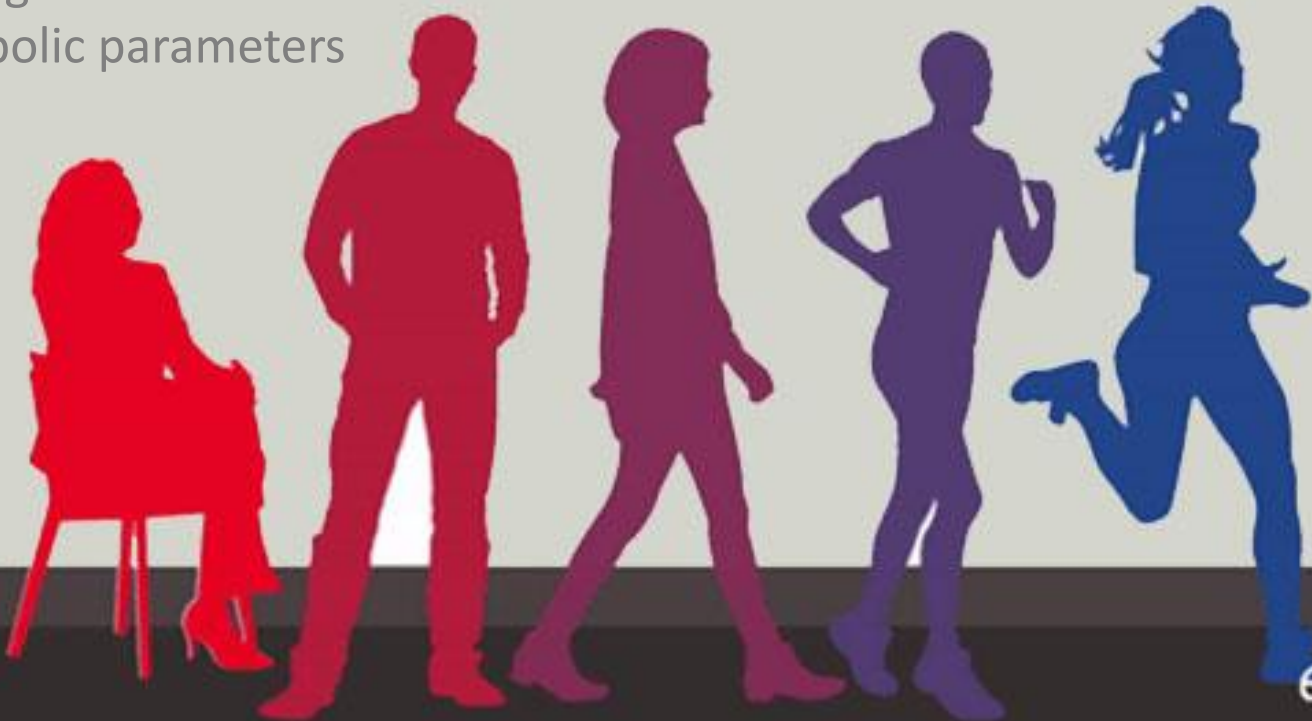
Sedentary

Light activity

Moderate activity

Vigorous activity

- Blood glucose control
- Metabolic parameters
- QOL





Clinical practice pearls of wisdom

- When discussing activity patterns with people with chronic conditions in clinical practice, it is reasonable, therefore, to promote both the **reduction of prolonged sitting and the accumulation of moderate-to-vigorous physical activity in the person's daily routine.**



How much exercise is necessary to improve one's health physiologically?



- Paffenbarger 1993, Blair 1995



Have you taken your daily dosage of exercise?

In fact **being** active on a daily basis was seen in **the same light** as taking your daily medication for a **chronic condition**





Pre-exercise programme evaluation



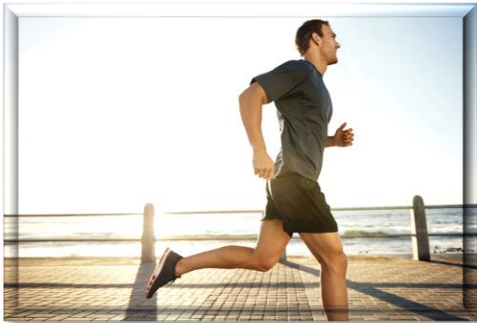
- Previous *experience* with exercise
- *Thoughts* and feelings re *exercise*
- Heart disease
- Blood pressure
- Peripheral neuropathy
- Peripheral vascular disease
- Autonomic neuropathy
- Anthropometry (BMI, waist circumference, body fat %)
- Orthopaedic injury

■ SEMDSA. (2017). Physical activity. *JEMDSA*, 22(1), 30–33.



Types of Physical Activity

Aerobic/Endurance



- *Continuous, rhythmic, repetitive movement of the same large muscle groups for at least 10 minutes at a time*
- Walking, cycling, swimming or jogging
- *Low to moderate intensity carried out continuously for a long period*

Resistance/Interval



- *Brief, repetitive movements using weights, body weight, weight machines and resistance bands*
- Weight machines, Thera-Band[®] exercises or free weight lifting
- *Higher intensity, carried out in short bursts with rest intervals (Intermittent/interval exercise)*

- Sigal, RJ et al. Physical Activity and Diabetes. *Canadian Journal of Diabetes*, 2018, Volume 42, S54 - S63
- The Society for Endocrinology, Metabolism and Diabetes of South Africa. 'Chapter 6: Medical Nutrition Therapy' in 2017 SEMDSA Guideline for the Management of Type 2 Diabetes. *JEMDSA* 2017; 21(1)(Supplement 1): S30-33



Tai Chi, Yoga and Aqua Exercise

[R+]



Evidence (systematic review and meta-analysis)

- Tai Chi
- Yoga
- Aqua exercise (OA ,insensate feet, extreme weight)

- [Qin J, Chen Y, Guo S, You Y, Xu Y, Wu J, et al. Effect of Tai Chi on Quality of Life, Body Mass Index, and Waist-Hip Ratio in Patients With Type 2 Diabetes Mellitus: A Systematic Review and Meta-Analysis. Front Endocrinol . 2020;11: 543627.](#)
- [Cui J, Yan JH, Yan LM, Pan L, Le JJ, Guo YZ. Effects of yoga in adults with type 2 diabetes mellitus: a meta-analysis. J Diabetes Investig. 2017;8\(2\):201-9.](#)



Physical activity and type 2 diabetes mellitus-guidelines

American, Canadian and SEMDSA guidelines 2023

- People with Diabetes should do the following :
 - **>150 mins** of endurance type activities/week
 - **Increase** duration and intensity with time and improved cardiorespiratory fitness.
 - **Slowly increase** intensity of resistance training with time.
 - **Combine** endurance and resistance exercises.
 - Be **supervised** if possible



Exercise prescription



- Yet to see....
- Are the exercise guidelines suitable for a lot of the patients we see in our practices?
- How do we approach high risk , multiple pathologies, complications and co morbidities such as COPD, Ortho injuries,, polyneuropathies
- 2 case studies



Case Study 1: Dr AH

Dr. AH is a 78-year-old man with type 2 diabetes.

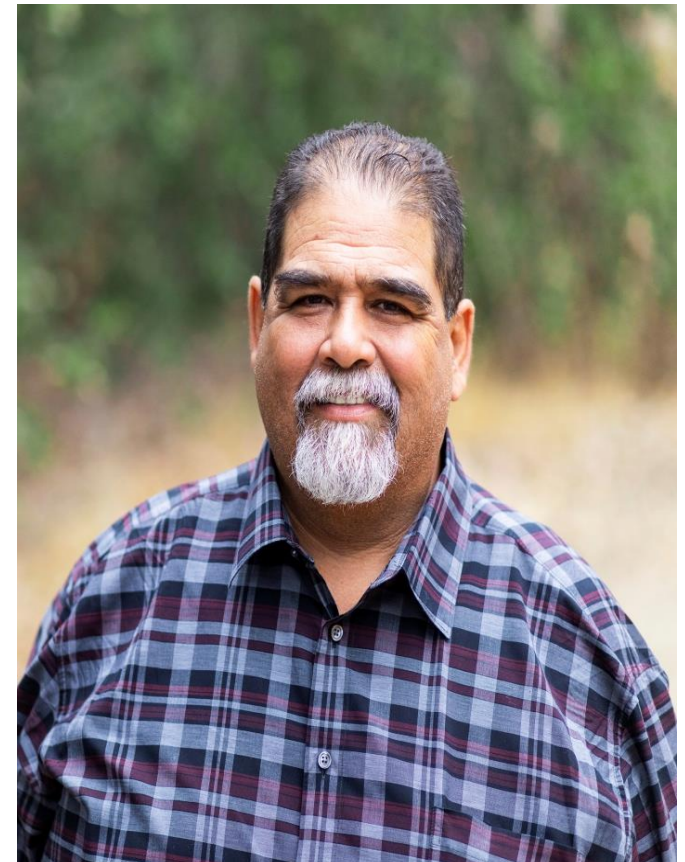
BMI of 36 kg/m².

Dr AH. has the following co-morbidities and orthopaedic injuries:

COPD; CIDP (Chronic inflammatory demyelinating polyneuropathy); Lower back pathology (Laminectomy in 2018); Severe arthritis in both knees, requiring 2 knee replacements when the risk of contracting Covid 19 is significantly less.

Medications include: Janumet, Diagluclide, Eltroxin , Xarelto, Arycor, Puricos , Truстан, monthly infusion of Immunoglobulin

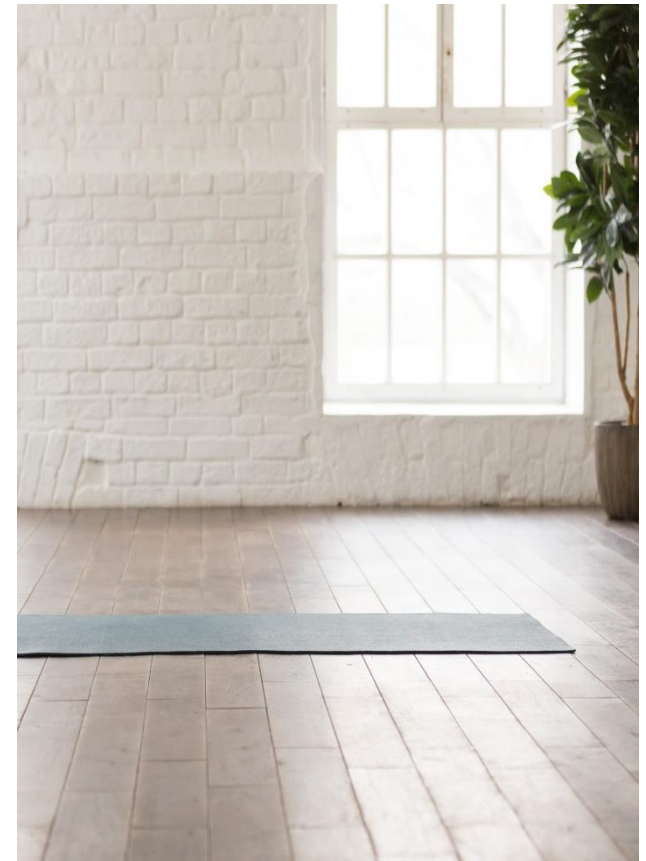
HBA1c% 5.3%





Case Study 1 cont.

- We could not do an effort ECG or basic fitness test due to his lack of mobility and lack of cardiorespiratory fitness.
- He could cycle at the lowest intensity for 1 minute maximum.
- He could not get out of a low chair without help.
- His shoulders were painful after 3 repetitions of a low intensity exercise.
- His neck muscles were very painful when performing shoulder and arm exercises.
- His Osteoarthritic knees ached with the slightest movement.
- He could do basic core exercises lying on a plinth or seated in a chair.
- His balance was poor and he could not walk in a straight line.
- He could not slow himself down going down decline.
- He battled to walk up an incline.





It was quite a challenge!



Case study 2

**Mrs HW is 67 yrs. old Type 2 DM for 25 years(insulin requiring).
She is morbidly obese with a Body mass index (BMI) of 47 kg/m²**

Mrs HW has the following co-morbidities and orthopaedic injuries:

- Gastroparesis
- Hypertension
- Hypercholesterolemia
- Polyneuropathy
- Radiculopathy (pain radiating from Cervical and Lumbar regions)
- Psoriatic arthritis
- Hyperparathyroidism (Parathyroidectomy in June 2020)
- Right knee pathology (Chondromalacia patella)
- Right shoulder rotator cuff repair from a fall (February 2019)
- Balance and proprioception problems (sensory gait ataxia) often suffers with dizziness and vertigo.
- Recently diagnosed with Endometrial cancer (Hysterectomy in October 2020)
- Depression

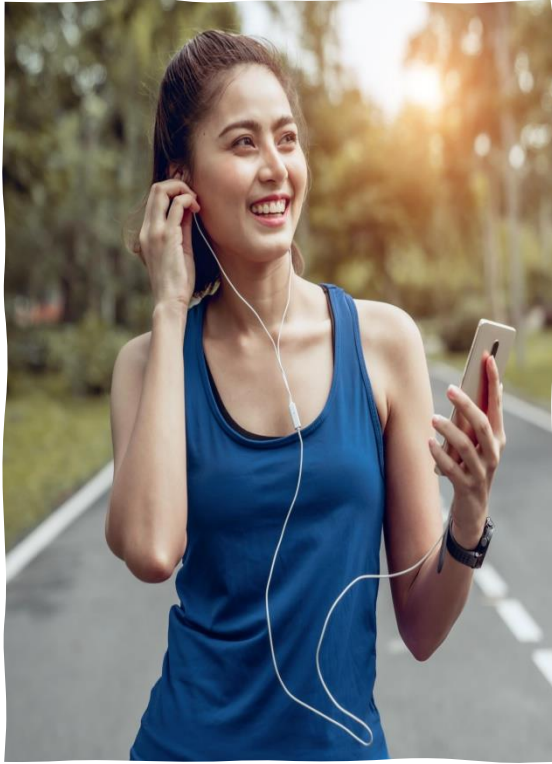


Case study 2 cont.

- Mrs HW is on the following medications:
- Humalog (3 x 20-25 pre-prandial) and Humulin N (30 units mane and 30 units nocte), Cozaar, Fluoxatine, Calciferol.
- HBA1c% =8.4% (patient is on a CGM) - sub optimal control with significant blood glucose variability.
- We could not do an effort ECG due to her lack of mobility and lack of cardiorespiratory fitness.
- She could cycle on a stationary bike at the lowest intensity for 3 minutes maximum.
- She could not get out of a low chair without help. Her right shoulder was painful (recovering from rotator cuff repair surgery).
- Her neck and lower back were painful on certain movements.
- She could do basic core exercises lying on a plinth or seated in a chair.

More
confusion?!



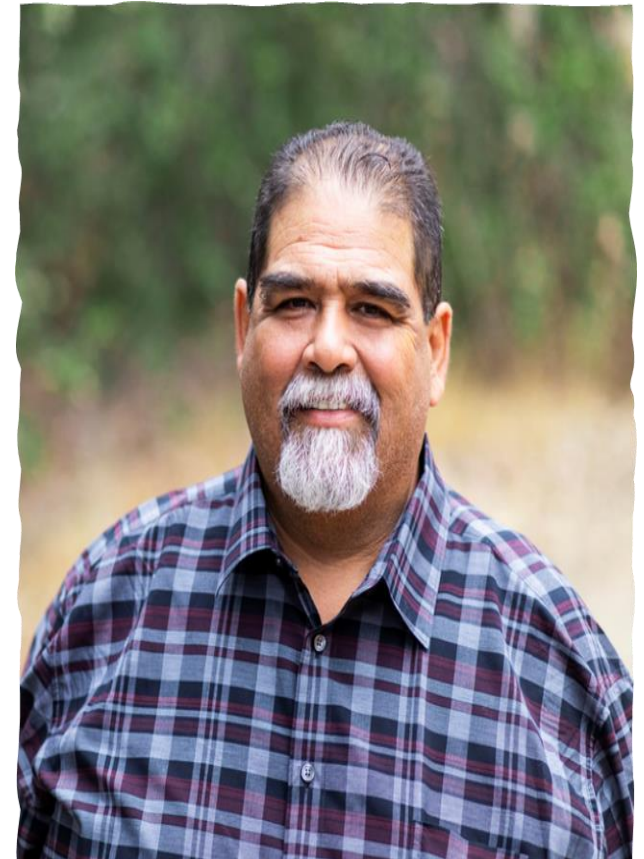


Evidence based exercise prescription for cardiovascular, orthopaedic, neurological and respiratory pathologies



Post 6-months exercise rehabilitation (Dr AH)

- Blood glucose control- generally was always well controlled.
- Ability to get off of a low chair or toilet improved significantly.
- He can do 5 minutes on a stationary bike....
- He can do 12 reps of low intensity resistance exercise...
- Sleep improved significantly
- General mobility at home improved.
- Balance was an ongoing challenge, frightened of falling. We have just started with a Neuro physiotherapist to aid in DR. AH's balance
- Psychological and social aspect were very important
- Pre rehabilitation for knee replacement
- Enjoyed the variety and short interval training. He managed with his breathing. He only experienced pain in the knees when walking or performing calf stretches.





Post 6-months exercise rehabilitation (Mrs HW)

- Blood glucose control- improved, particularly on exercise days and the day after.
- Ability to get off a low chair or toilet improved significantly.
- She can do 8 -10 minutes on a stationary bike....
- She can do 10-15 reps of low intensity resistance exercise...
- Balance improved with exercise.
- Sleep had improved.
- General mobility at home had improved
- Stress levels were lower with regular exercise
- Social aspect was most important





Suitable & safe exercises for these case studies





Conclusion



EVERY MOVE COUNTS

Being active has significant health benefits for hearts, bodies and minds, whether you're walking, wheeling or cycling, dancing, doing sport or playing with your kids.



LIMIT
sedentary time



REPLACE
with some
physical activity



**ANY
IS BETTER
THAN NONE**



150
minutes
PER WEEK



**150
to 300**
minutes
PER WEEK



60
minutes
PER DAY



On at least
2 days
a week

muscle
strengthening
activities



On at least
3 days
a week

multicomponent
activities for
balance and
strength



**MORE
IS BETTER**



more than
300
minutes
PER
WEEK



**PREGNANT &
POSTPARTUM
WOMEN**

**ADULTS &
OLDER ADULTS**

**CHILDREN &
ADOLESCENTS**

ADULTS

OLDER ADULTS

EVERYONE WHO CAN