

Living Well

Exercise and HIV

Carrie-Ann Wood

Specialist Physiotherapist,
Guy's and St Thomas' Hospitals

RHIVA member

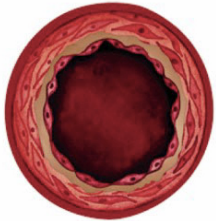
Objectives

- Consider HIV-related health conditions
- Review evidence for effectiveness of exercise intervention
- Discuss types of exercise and recommendations for performance
- Think about barriers to participation in exercise and starting to address these

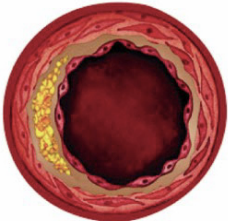
Setting the scene

- The HIV population is ageing
- “Problems we have to deal with now are not how to manage HIV, but how to manage other co-morbidities in plwHIV”
- HIV raises risks of developing other chronic diseases – earlier onset
- Potential longer term effects of earlier HAART still being discovered

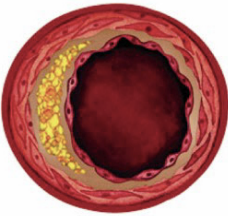
Cardiovascular disease



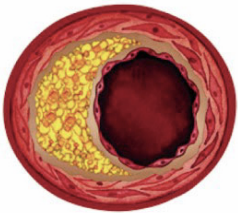
CVD major cause of morbidity and mortality in HIV (Aboud et al 2010)



Multiple studies show increased risk of heart disease even after controlling for traditional risk factors (Grinspoon 2015)



Majority of HIV+ patients demonstrate increased carotid intima media thickness (Liang et al, 1998)



CVD mortality is higher than expected in HIV + men under 65 and those with detectable viral load (Hanna et al, 2015)



Diabetes

- The risk of type 2 diabetes (T2D) in HIV is up to 4x
- Age and BMI associated with T2D, but also CD4 nadir, duration of HIV infection, lipodystrophy, PIs, d4T, AZT and ddI
- Increased insulin resistance likely due to combination of obesity, HAART and inflammation
- Poorer T2D outcomes in HIV+ compared to matched controls

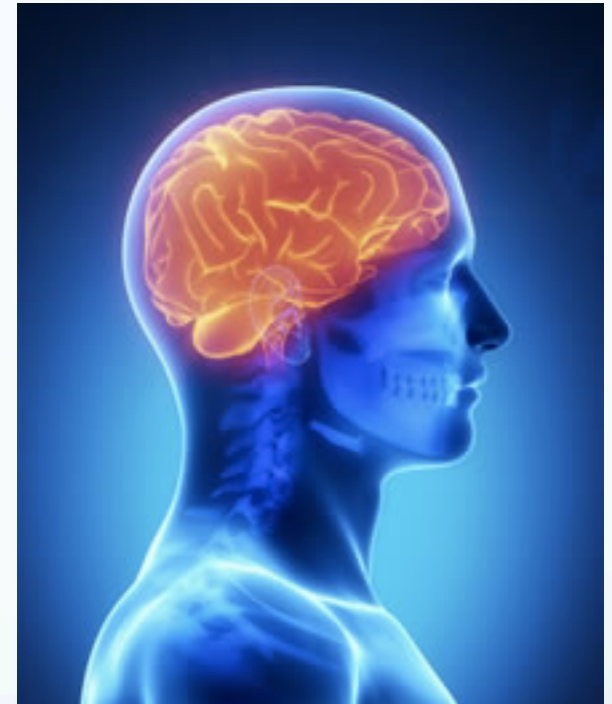


STOP Diabetes study

- Cross-sectional study of 329 patients attending South London HIV clinics
- 15% of cohort pre-diabetic, 15% diabetic
- Black Caribbeans and Black Africans are most likely to present with dysglycaemia
- Dysglycaemia is significantly correlated with:
 - Age
 - BMI
 - Weight gain $\geq 5\%$ in the year following initiation of HAART

Stroke

- An increased incidence of stroke in HIV has been attributed to higher levels of drug use and smoking in people living with HIV
- Veterans Ageing Cohort Study (VACS) examined stroke
 - Risk in HIV was 17% higher ($p=0.04$), adjusted for risk factors, drug use and comorbid disease
- Mateen et al 1.7/1000 vs 3.3/1000 person years and at younger age



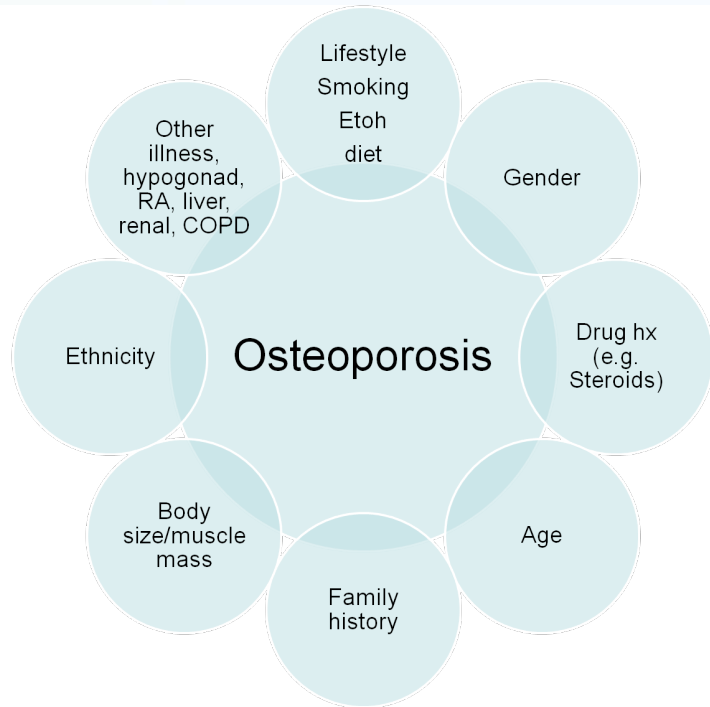
Bone health



ProBono study (2013)

- Osteopaenia: 42.8% in HIV+, 28.7% HIV-
- Osteoporosis: 17.6% in HIV+, 3.6% HIV-
- Low BMI most strongly associated risk factor
- Lifetime fracture risk was 22% higher in HIV+

Osteoporosis



Prevalence of osteoporosis is
3x greater than in uninfected
individuals

Risk factors for Osteoporosis in HIV

- (1) low weight/BMI
- (2) length of HIV infection
- (3) older age
- (4) smoking
- (5) nonblack/white ethnicity
- (6) stavudine exposure
- (7) steroid exposure
- (8) female sex
- (9) HIV RNA level
- (10) tenofovir exposure
- (11) protease inhibitor exposure
- (12) NRTI exposure

*Mallon Current Opinion in Infectious
Diseases 2010, 23:1–8*

Cognitive function



- HIV associated neurocognitive disorder (HAND) prevalent in nearly 50% of HIV+ patients (Heaton et al 2010)
- Neurocognitive risk factors include high blood pressure, hyperlipidaemia, metabolic syndrome
- HAND associated with diabetes, obesity and vascular disease

Lifestyle

- 25% of HIV patients fail to meet daily recommendations for physical activity (Filipas et al 2008)
- Richert et al (2014): 47% patients not performing regular physical activity at work or leisure
- Duncan et al (not yet published): STOP diabetes study – 48% patients not doing anything above daily requirements of walking

Relationship of physical function and quality of life among persons aging with HIV infection (Erlandson KM et al)

AIDS. 2014 Aug 24;28(13):1939-43

Cross-sectional study, 359 HIV-infected pt aged 45-65

Conclusions

- Faster gait speed and chair rise time, and greater physical activity were associated with greater QoL, independent of HIV-related mortality risk.
- Targeted exercise programs to increase physical activity and improve speed and power should be evaluated as interventions to improve QoL during ART

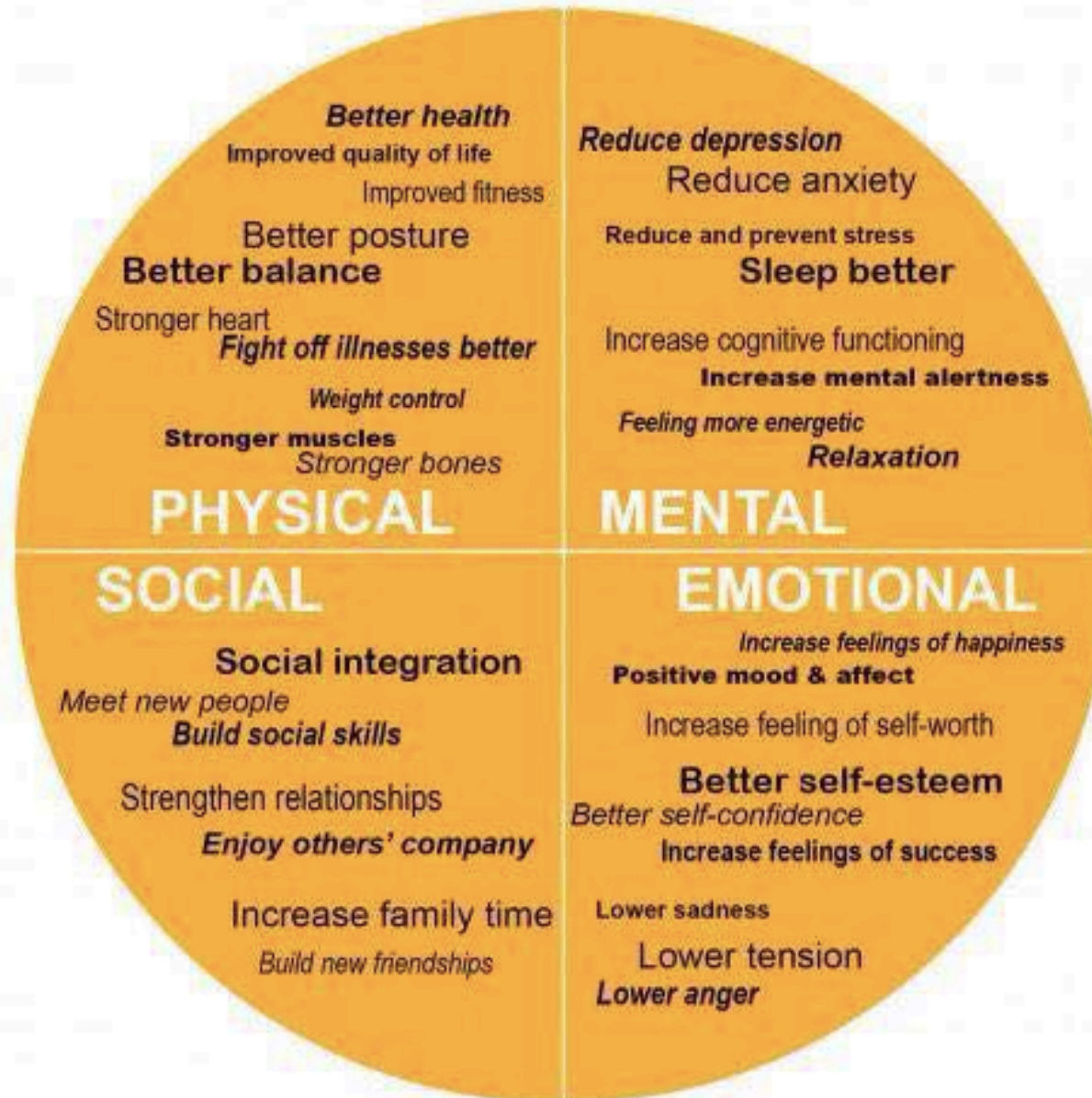
Decline in locomotor functions over time in HIV-infected patients (Richert et al)

AIDS 2014, 28:1441-1449

- Poor lower limb muscle function in half of patients with HIV
- Prevalence of low skeletal muscle mass equivalent to that of general population 10-25 years older
- Reduced muscle mass and physical function plus frailty phenotype = poorer survival
- 5STS and 6mtw significantly worse in those reporting falls
- Absence of regular physical activity associated with slower 5STS



#Exerciseworks



Cardiovascular Exercise



- Reduces total cholesterol and triglycerides
- Improves efficiency of heart and lungs
- Significant psychological benefits – anxiety, depression, tension
- Reduces risk of Neuro-cognitive impairment
- Reduces blood pressure
- Reduce risk of cardiovascular event
- Impact element good for bone density

Cochrane review

HIV & Aerobic exercise

O'Brien et al, 2010

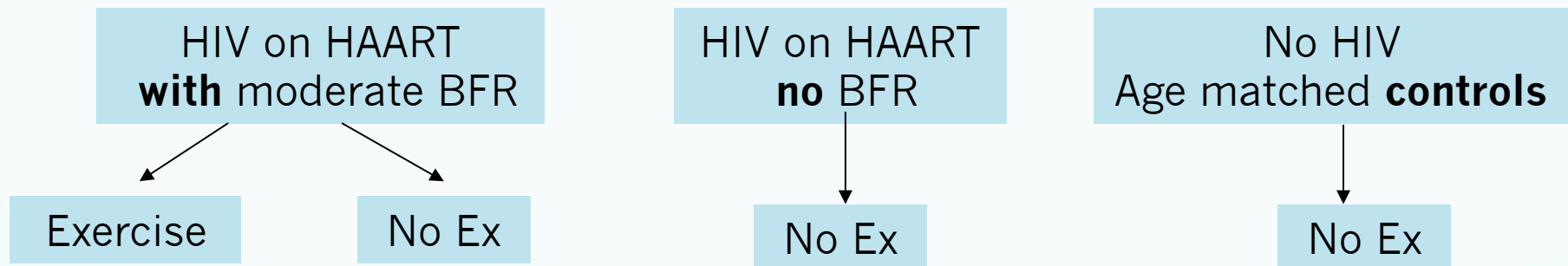
- Systematic review of 14 studies
- Constant or interval aerobic exercise interventions of 20 minutes, 3 times a week for ≥ 5 weeks are safe
- May lead to significant improvements in cardiopulmonary fitness, body composition and psychological status



Aerobic exercise in HIV

Exercise training reduces central adiposity and improves metabolic indices in HAART treated HIV positive subjects in Rwanda - a randomised controlled study

E. Mutimura et al. Aids Research and Human Retroviruses, 24 (1) 2008



Results for the Exercise Groups

- Much improved peak VO₂
- ↓ Waist circumference, BMI and WHR
- Significant ↓ in body fat and ↑ in lean body mass
 - ↓ fasting total cholesterol, TG, and glucose
 - Exercising group: *no adverse affects*

Resistance exercise

Increases HDL cholesterol

Increased muscle mass and strength

Increased bone strength and bone mineral density

Improved muscle balance

Delayed degenerative changes

Increased basal metabolic rate



Cochrane review- HIV and PRE

O'Brien et al, 2007

- Performing progressive resistive exercise (PRE) +/- aerobic exercise ≥ 3 times a week, ≥ 4 weeks appears to be safe and probably leads to positive changes in:
 - Body weight
 - Composition
 - Cardiopulmonary fitness
 - Also contributed to improvements in strength and psychological status in people living with HIV



Physical impairment in HIV infections and AIDS: responses to resistance and aerobic training

Shephard RJ

J Sports Med Phys Fitness. 2014 Jun 20.

Results

- Most patients respond well to moderate resistance and aerobic training, showing substantial gains of strength, smaller improvements of aerobic power

Conclusions

- Patients with HIV and AIDS should participate in moderate combined resistance and aerobic training programmes to elicit substantial gains in strength and cardiac function, and improve mood and quality of life
- The main challenge in the western world is to maintain compliance, since adherence to rehabilitation programmes is often poor.

The ideal...

Cardiovascular Exercise

150 minutes a week
Moderate intensity
30 mins on 5 days

Resistance Exercise

Twice a week
3 sets of 8-10 reps
Large muscle groups

Flexibility and balance

150min/wk reduces risk of premature death, CHD, CVA, HTN, DM and depression

150-300min/wk reduces risk of colon and breast cancer and prevents weight gain

The real deal...

- Adherence to exercise programmes identified as an issue in HIV care
- Benefits only retained as long as exercise is continued
- Our classes run at <50% but are free to access and transport is freely available
- Petroczi et al (2010) found 80% of the non-adherent group of people lost motivation, willpower or interest within the first two weeks of starting, also ethnicity influenced attendance

Factors influencing adherence

- Jones, Petroczi et al did a further study in 2012
“To investigate *psychological* and *socioeconomic* factors that lead to *adherence/non-adherence* to exercise programmes and medical treatment in plwHIV”
- Hypotheses
 - “The relationship between adherence to exercise and medical treatment is stronger among those with more favourable views about the goal.”
 - “The way people think about the underlying goal of the treatment explains adherence behaviours over and above the behaviour specific thinking”

Factors influencing adherence



Attendance	(n=38)
Low (≤ 6)	10
Medium (7-12)	14
High (≥ 13)	14

- Age and gender have a significant influence on efficacy to following orders
- Age influences attitudes to exercise
- Conscientiousness links exercise self-efficacy with adherence

Factors influencing adherence

- Reasons given for not doing exercise
 - Belief-based
 - Internalised justification related to exercise
 - Physical barriers independent of exercise
 - External reasons
- Those who attended more sessions related reasons of physical barriers or external factors
- Patients in medium/low attendance groups reported belief based and internally justified reasons for non-attendance

Barriers

“There are plenty of difficult obstacles in your path –
don't let yourself become one of them”

Ralph Marston



Addressing barriers

I don't have time

Every little bit counts

I'm too tired

Exercise will give me energy

It's too expensive

All I need is a pair of trainers

I hate working out

I'm going to find something I enjoy

I have children

I'm role modelling healthy behaviours
and I want to meet my grandchildren

The weather is too bad

I can do something wherever I am

I don't know what I'm doing

I can seek advice

I've missed a session

My past is not my future

Addressing barriers

Ensure they understand you don't have to hit guideline amounts immediately – it's about integrating exercise into your lifestyle, making a sustainable change, not a quick fix solution

Thank you!

Any questions?



BARRIERS TO EXERCISE

Social or Economic	Team or system	Therapy	Patient	Condition
<ul style="list-style-type: none"> • Poor social or family support • Greater number of barriers • Physical environment • Status • Living alone 	<ul style="list-style-type: none"> • PT style: reminders, monitoring, feedback, knowledge • Therapeutic alliance: communication, trust, empathy, respect 	<ul style="list-style-type: none"> • Pain exacerbation • Prescription: dose, complexity, effects, duration • Supervision • PA/Exercise • Behaviour change program 	<ul style="list-style-type: none"> • In-treatment adherence • Self-efficacy • Anxiety • Depression • Helplessness • Beliefs • Contextual factors • Locus of control 	<ul style="list-style-type: none"> • Health status: self-rated health, fewer medications • Physical ability • Cognitive ability

References

- Filipas, S et al. Physical Activity Uptake in patients with HIV:who does how much? Int J STD AIDS 2008; 19: 514-8
- Dufour, C et al. Physical Exercise is associated with less neurocognitive impairment among HIV-infected adults. J Neurovirol. 2013; 19: 410-417
- Sico, JJ et al. HIV status and the risk of ischaemic stroke among men. Neurology, 2015; 84 (19): 1933-40
- Spierer, D et al. Exercise training improves cardiovascular and autonomic profiles in HIV. Clin Auton Res 2007; 17:341-348
- Shephard, RJ. Physical impairment in HIV infections and AIDS: responses to resistance and aerobic training. J Sports Med Phys Fitness. 2014 Jun 20
- Relationship of physical function and quality of life among persons aging with HIV infection (Erlandson KM et al)
- Decline in locomotor functions over time in HIV-infected patients (Richert et al) AIDS 2014, 28:1441-1449AIDS. 2014 Aug 24;28(13):1939-43

Exercise for bone protection

- We know that regular physical activity +/- exercise training maximises BMD during adolescent and young adult years; maintains bone mass through the fifth decade; attenuates bone loss with aging and reduces falls and fractures in the elderly (Drinkwater 1995; Kasper 2004 and Kohort 2004)
- **Specificity:**
 - Only skeletal sites exposed to change in daily loading forces undergo adaptation
- **Reversibility:**
 - Benefits of exercise on bone may not persist if exercise is markedly reduced.
- **Overload forces** (physical deformation stimulate an adaptive response and requires a progressively increasing



to
on

Where Do I Go From Here?

7) Start data collection

5) Ethical application

6) Ensure everyone is on board!

3) Scoping literature review

4) Putting together a plan

1) Where do I go from here?

2) PPI involvement