SOURCES

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restrictions: Prevalence and associations among persons

living with HIV/AIDS in British Columbia. *Health and*

*Quality of Life Outcomes* 2004;**In press**.

**American College of Sports Medicine 2010**

American College of Sports Medicine. *ACSM’s guidelines for*

*exercise testing and prescription*. 8th Edition. Philadelphia

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**VO2max**

Three meta-analyses were performed for VO2max. Meta-analyses

showed a significant improvement in change of VO2max of 2.63

mL/kg/min for participants in the aerobic exercise intervention

group compared with the non-exercising control group (95% CI:

1.19, 4.07, n=276, *P*=0.0003) (Perna 1999; Smith 2001; Stringer

1998, Baigis 2002, Mutimura 2008a) (Figure 11); significant improvement

in change of VO2max of 2.40 ml/kg/min for participants

in the constant aerobic exercise group compared with

the non-exercising control group (95% CI: 0.82, 3.99, n=248,

*P*=0.003) (Stringer 1998, Smith 2001, Baigis 2002, Mutimura

2008a) Figure 12; and a significant trend towards a greater improvement

in VO2max of 4.30 mL/kg/min for participants in the

heavy-intensity exercise group compared with the moderate-intensity

exercise group (95%CI: 0.61, 7.98, n=24, *P*=0.02) (Figure

13). All point estimates are greater than 2 mL/kg/min, which suggests

a potential clinically important improvement in VO2max

among exercisers and a greater improvement with heavy- versus

moderate-intensity exercise.

**C) STRENGTH OUTCOMES**

Six of the 14 included studies assessed muscle strength (Rigsby

1992, Lox 1995, Perna 1999, Grinspoon 2000, Driscoll 2004a,

Dolan 2006).

**D-1) Weight**

Seven studies assessed body weight (Lox 1995, Terry 1999,

Grinspoon 2000, Smith 2001,Driscoll 2004a, Dolan 2006, Terry

2006). Three meta-analyses were performed, two of which included

the same studies. Meta-analyses demonstrated no difference

in change inmean body weight for participants in the exercise

group compared with the non-exercising control group as well as

participants in the constant aerobic exercise group compared with

the non-exercising control group (WMD: 0.37 kg, 95%CI: -5.32,

6.05, n=68, *P*=0.90) (Smith 2001; Lox 1995)

there was no difference in the combined aerobic and PRE

group compared with the non-exercising control group (WMD:

0.96 kg, 95% CI: -1.39, 3.30, n=60, *P*=0.42) (Grinspoon 2000,

Dolan 2006)

**D-2) Body Composition**

Nine studies assessed body composition (Lox 1995, Perna 1999,

Terry 1999, Grinspoon 2000, Smith 2001,Driscoll 2004a, Dolan

2006, Terry 2006, Mutimura 2008a). Eleven meta-analyses were

performed, each for body mass index, hip circumference, waist

circumference, waist-to-hip ratio, percent body fat, fat mass, and

leg muscle area. Four of the eleven meta-analyses were duplicates

and included the same studies. Meta-analyses demonstrated a significant

decrease in percent body fat of 1.12% (95% CI: -2.18,

-0.07,n=119, *P*=0.04) (Lox 1995, Mutimura 2008a) (Figure 19

Figure 20) for participants in the aerobic exercise group compared

with participants in the non-exercising control group, and a significant

increase in change in leg muscle area of 4.79 cm2 was found

among participants in the combined aerobic and PRE group compared

with the non-exercising control group (95% CI: 2.04, 7.54,

n=60, *P*=0.0007) (Grinspoon 2000, Dolan 2006)

Results also demonstrated no difference in change in waist circumference

(WMD: -3.53cm, 95% CI: -10.25, 3.19, n=142, *P*=

0.30) (Smith 2001, Mutimura 2008a) (Figure 22 Figure 23); hip

circumference (WMD: 0.11cm, 95% CI: -0.63, 0.85, n=142, *P*=

0.77) (Smith 2001, Mutimura 2008a) (Figure 24 and Figure 25)

andwaist-to-hip ratio (WMD: -0.51, 95%CI: -1.47, 0.45, n=142,

*P*=0.30) (Smith 2001, Mutimura 2008a) (Figure 26 and Figure

27) for participants in the aerobic exercise group compared with

participants in the non-exercising control group as well as participants

in the constant aerobic exercise group compared with the

non-exercising control group. Despite statistical non-significance,

the confidence interval indicates a trend towards a decrease in the

waist circumference among exercisers compared with non-exercisers.

This is a favourable result given that the Mutimura 2008a

participants had evidence of body fat redistribution.

Results also showed no difference in the change in body mass

index (WMD: 0.85kg/cm2, 95% CI: -0.62, 2.31, n=49, *P*=0.26)

(Lox 1995, Perna 1999) (Figure 28) for participants in the aerobic

exercise group compared with participants in the non-exercising

control group, and no difference in change in fat mass (WMD:

0.07 kg, 95% CI: -1.22, 1.36, n=60, *P*=0.92) (Grinspoon 2000,

Dolan 2006) (Figure 29) for participants in the combined aerobic

and PRE group compared with the non-exercising control group.

**F) ADVERSE EVENTS (SAFETY)**

Six of the 14 included studies reported on adverse outcomes.Metaanalysis

was not possible due to the scarcity and variability of

reporting adverse events. Adverse events were reported in three

of the 14 studies, none of which were attributed to exercise (

Rigsby 1992, Perna 1999, Dolan 2006).

**Baigis 2002 *{published data only}***

Baigis J, Korniewicz DM, Chase G, Butz A, Jacobson D,

Wu AW. Effectiveness of a home-based exercise intervention

for HIV-infected adults: a randomized trial. *JANAC* 2002;

**13**(2):33–45.

**Dolan 2006 *{published data only}***

Dolan SE, Frontera W, Librizzi J, Ljungquist K, Juan S,

Dorman R, Cole ME, Kanter JR, Grinspoon S. Effects

of a supervised home-based aerobic and progressive

resistance training regimen in women infected with human

immunodeficiency virus. A randomized trial. *Arch Inter*

*Med* 2006;**166**:1225–31.

**Driscoll 2004a *{published data only}***

Driscoll SD, Meininger GE, Lareau MT, Dolan SE, Killilea

KM, Hadigan CM, Lloyd-Jones DM, Frontera A,Walter R,

Grinspoon SK. Effects of exercise training and metformin

on body composition and cardiovascular indices in HIVinfected

patients. *AIDS* 2004;**18**(3):465–73.

**Grinspoon 2000 *{published data only}***

Grinspoon S, Corcoran C, Parlman K, Costello M,

Rosenthal D, Anderson E, Stanley T, Schoenfeld D,

Burrows B, Hayden D, Basgoz N, Klibanski A. Effects of

testosterone and progressive resistance training in eugonadal

men with AIDS wasting. *Ann Intern Med* 2000;**133**(5):

348–355.

**LaPerriere 1990 *{published data only}***

\_ LaPerriere AR, Antoni H, Schneiderman N, Ironson G,

Klimas N, Caralis P, Fletcher MA. Exercise Intervention

Attenuates Emotional Distress and Natural Killer Cell

Decrements Following Notification of Positive Serologic

Status for HIV-1. *Biofeedback Self-Regul* 1990;**15**:229–242.

**Lox 1995 *{published data only}***

Lox CL, McAuley E, Tucker RS. Exercise as an intervention

for enhancing subjective well-being in anHIV-1 population.

*J Sport Ex Psych* 1996;**17**:346–62.

**MacArthur 1993 *{published data only}***

MacArthur R D, Levine SD, Birk TJ. Supervised exercise

training improves cardiopulmonary fitness in HIV-infected

persons. *Med Sci Sports Exerc* 1993;**25**:684–88.

**Mutimura 2008a *{published data only}***

Mutimura E, Stewart A, Crowther NJ, Yarasheski KE, Cade

WT. The effects of exercise training on quality of life in

HAART-treated HIV-positive Rwandan subjects with body

fat redistribution. *Qual Life Res* 2008;**17**:377–85.

**Perna 1999 *{published data only}***

Perna FM LaPerriere A, Klimas N, Ironson G, Perry A, et

al.Cardiopulmonary and CD4 cell changes in response to

exercise training in early symptomatic HIV infection. *Med*

*Sci Sports Exerc* 1999;**31**:973–79.

**Rigsby 1992 *{published data only}***

\_ Rigsby LW, Dishman RK, Jackson AW, Maclean GS,

Raven PB. Effects of exercise training on men seropositive

for the human immunodeficiency virus-1. *Med Sci Sports*

*Exerc* 1992;**24**:6–12.

**Smith 2001 *{published data only}***

Smith BA, Neidig JL, Nickel JT, Mitchell GL, Para MF,

Fass RJ. Aerobic exercise: effects on parameters related to

fatigue, dyspnea, weight and body composition in HIVinfected

adults. *AIDS* 2001;**15**:693–701.

**Stringer 1998 *{published data only}***

\_ Stringer WW, Berezovskaya M, O’Brien WA, Beck K,

Casaburi R. The effect of exercise training on aerobic fitness,

immune indices, and quality of life in HIV+ patients. *Med*

*Sci Sports Exerc* 1998:11–16.

**Terry 1999 *{published data only}***

\_ Terry L, Sprinz E, Ribeiro JP.Moderate andHigh Intensity

Exercise Training in HIV-1 Seropositive Individuals: a

Randomized Trial. *Int J Sports Med* 1999;**20**:142–46.

**Terry 2006 *{published data only}***

Terry L, Sprinz E, Stein R, Medeiros NB, Oliveira J, Ribeiro

JP. Exercise training in HIV-1-infected individuals with

dyslipidemia and lipodystrophy. *Med Sci Sport Exer* 2006;

**38**(3):411–17.