

## **THE RELATIONSHIP OF AEROBIC CAPACITY, PHYSICAL ACTIVITY, PAIN, KNEE STRENGTH, ALIGNMENT AND DISEASE SEVERITY IN PEOPLE WITH KNEE OSTEOARTHRITIS (oa)**

Chiu CW, Sundvold A, Prost E, Minor MA.

**Purpose/Hypothesis:** People with knee OA tend to be inactive and de-conditioned. To plan treatment, the therapist needs to know the level of aerobic fitness and what factors might help assess fitness. The purpose of this study was to determine if aerobic capacity ( $VO_2$ ) was related to pain, knee alignment, disease severity and knee strength in people with knee OA.

**Subjects:** The study sample included 43 participants (27 female, 16 male), mean age  $60.1 \pm 8.9$ . These subjects were participants in an ongoing longitudinal study of differential response to exercise.

**Materials/Methods:** Data collected at baseline were used for this report. Pain was assessed by the Western Ontario MacMaster Osteoarthritis Index (WOMAC). Physical activity (min X days per week) came from participant self-report. Knee alignment was measured bilaterally and reported as degrees of varus/valgus in the more affected knee. Strength was 1 repetition maximum/ body weight. Disease severity was the total radiographic score (bilateral).  $VO_2$  was estimated from a 4-minute treadmill test calculating self-selected speed, heart rate and gender. Correlational analyses and linear regression (SPSS 14.0) with  $VO_2$  peak as the dependent variable were used to answer the research question. The null hypotheses were rejected at  $p.05$ .

**Results:** Only six of the 15 correlations were statistically significant (low to moderate strength). Alignment was related to disease severity (.45),  $VO_2$  (-.32), and strength (-.44). Strength was related to  $VO_2$  (.61) and weekly activity (.37). Three models (varying entry of severity and alignment) were chosen for regression analyses to determine the best model to predict  $VO_2$ . None produced an adjusted  $R^2$  greater than .38, i.e. only 14% of the variance in  $VO_2$  was explained by any model. In all models, the only significant relationship with  $VO_2$  was strength.

**Conclusion:** Based on this small study that considered disease and impairment factors, only strength showed a strong and consistent relationship to  $VO_2$ . More research is needed to determine the proper measurement and relationship of these factors.

**Clinical Relevance:** It appears from this study that valid information about aerobic capacity of a person with knee OA can not be gained from self-report of pain or activity, mechanical status of the knee or radiographic disease severity. A medically appropriate and clinically feasible assessment should be done to determine need for and level of aerobic training. Current guidelines call for aerobic and strengthening exercise in the comprehensive management of people with knee OA.

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