Submaximal cardiopulmonary exercise testing to evaluate aerobic capacity in patients with knee osteoarthritis scheduled for total knee arthroplasty: *a feasibility study*.

**ABSTRACT**

*Background*
Higher aerobic capacity before surgery possibly is prognostic for a better and faster recovery in patients with knee osteoarthritis (OA) scheduled for total knee arthroplasty (TKA). Cardiopulmonary exercise testing (CPET) is the gold standard to evaluate aerobic capacity; however, until now no studies have investigated the feasibility of submaximal CPET using cycle ergometry in this population.

*Aim*
To investigate the feasibility of submaximal CPET in patients with knee OA scheduled for TKA surgery in three domains: 1) recruitment rate of participants who are representative of the target study population; 2) feasibility of a submaximal CPET procedure; and 3) acceptability and suitability. Furthermore, this study aimed to assess the aerobic capacity of participants using submaximal CPET indicators and to compare these results with normative values.

*Methods*In this cross-sectional multi-centre feasibility study, participants with knee OA scheduled for primary unilateral TKA surgery performed a submaximal CPET following preoperative screening, three to six weeks before surgery. To examine their experiences, participants completed a questionnaire and one week later they were contacted by telephone. CPET feasibility was assessed against five criteria: 1) recruitment rate ≥20%; 2) CPET performance rate ≥90%; 3) ≥90% of participants reached the ventilatory anaerobic threshold (VAT); 4) no serious adverse events; and 5) ≥80% of participants had a positive attitude towards CPET. Aerobic capacity was evaluated using the oxygen uptake (VO2) at the VAT and oxygen uptake efficiency slope (OUES) .

*Results*
All feasibility criteria were met: 14 representative participants were recruited (recruitment rate: 53.8%), all were able to perform the test, reached the VAT, were positive towards CPET and no serious adverse events occurred. The median VO2 at the VAT was 12.82 ml.kg-1.min-1 (IQR 11.29–13.63). The median OUES was 23.09.kg-1 (IQR 20.23–28.90), and 109.5% and 113.0% of predicted.

*Conclusion and key findings*

Submaximal CPET using cycle ergometry is feasible in patients with knee OA scheduled for TKA surgery to evaluate aerobic capacity. Based on these results, the exercise test can be used preoperatively to identify patients with a reduced aerobic capacity.

*Trial registration:* NCT04773262.

*Keywords:* Osteoarthritis, Knee, Cardiopulmonary Exercise Testing, Feasibility.