

# Physical Function Performance and Recovery of Patients Undergoing Abdominal Surgery in Relation to Post-Operative Complications – A Prospective Real World Study

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## Background

Surgery causes physiological stress, often inducing similar stress responses as physical activity. Surgical complication rates vary from 11-69% and can be either medical or surgical in nature. Complications are associated with significant costs in terms of morbidity, finance, psychological and impact on recovery.

Many risk factors have been identified relating to the development of surgical complications such as, ASA score, BMI, surgical approach, poor physical function and co-morbidities.

Whilst cardiopulmonary exercise testing (CPET) is regarded as the gold standard for measuring aerobic capacity, it is not always widely available or suitable for all patients. No single measure has been identified to predict complications in an abdominal surgery population, particularly in relation to physical function, as the causes are likely multi-factorial. What is unclear currently, is if simple, low cost, submaximal tests that mimic common daily functions (walking, standing, gripping etc.) are useful to detect significant differences between patients who suffer complications and those who do not in abdominal surgical patients

No studies have identified the impact of complications on self-reported physical recovery post abdominal surgery as there is currently no clear definition of recovery.

## Objective

The primary aim of the study was to evaluate the physical function performance differences between those who developed complications and those who did not and determine their impact on recovery.

## Methods

### Study Design

Prospective cohort study of 43 patients who underwent elective abdominal surgeries which evaluated the physical function and recovery differences between individuals who developed complications and those who did not. A real world approach was used as assessments were based around patients routine clinical care pathways.

### Data Collection

Pre Op	Pre Discharge	30 & 60 Days Post Op
<ul style="list-style-type: none"> <li><b>Demographics</b> – age, sex, BMI, co-morbidities</li> <li><b>Pulmonary</b> – peak cough flow, spirometry</li> <li><b>Physical function</b> – 6 minute walk test, VO<sub>2</sub>peak, 30 seconds sit to stand, International Physical Activity Questionnaire</li> <li><b>Surgical</b> – ASA, Surgical grade</li> <li><b>Nutrition</b> – Malnutrition Universal Screening Tool, Albumin</li> </ul>	<ul style="list-style-type: none"> <li><b>Type of surgery</b></li> <li><b>Incision type</b></li> <li><b>Date of surgery</b></li> <li><b>Length of stay</b></li> <li><b>Initial twenty four hour Post-operative analgesia</b></li> <li><b>Morbidity</b> (Clavien-Dindo classification)</li> <li><b>Mortality</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Morbidity</b></li> <li><b>Telephone IPAQ</b></li> <li><b>Self-reported physical recovery</b></li> </ul>

## Results

### General Data

- 43 participants data were included for analysis.
- Colorectal surgery (n = 21), Colorectal reversals (n = 7), Hernia repairs (n = 10), Cholecystectomies (n = 5).
- Complication rate overall was 48.83 (n=21), 41.9% pre-discharge, 30.2% at 30 days & 21% at 60 days.

### Preoperative Significant Findings

- Differences between groups in relation to BMI (P = 0.005), Co-morbidities (P = 0.033), weekly MET minutes (P = 0.02), 6MWT (P = 0.019) and VO<sub>2</sub>Peak (P = 0.017).

### Pre-Discharge Significant Findings

- Complication rate of 41.9% pre-discharge.
- Operating time significantly different between groups (P = 0.05) & increased LOS with presence and severity of complication(s).

### 30 Days Postoperative Significant Findings

- Significant differences were found between groups in relation to recovery at 30 days (P = 0.008).

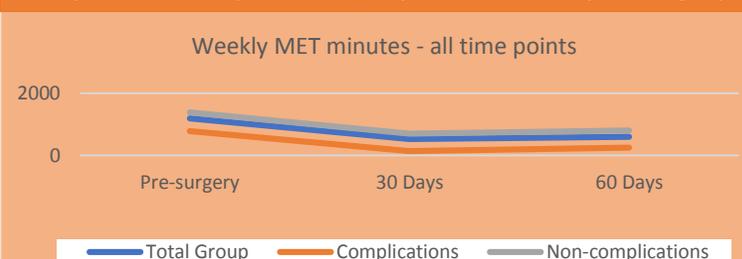
### 60 Days Postoperative Significant Findings

- Significant differences between groups in relation to weekly MET minutes (P = 0.02) weekly sitting minutes at 60 days post-surgery (P=0.03).

### Significant Changes from Preoperative Assessment to 60 Days Postoperative

- Significant reduction in weekly MET minutes in complications group from pre-surgery to 60 days post-surgery (P = 0.009) demonstrating a reduction to 31.8% of baseline reported activity. The same was apparent in the non-complications group showing a statistically significant decrease from pre-surgery to 60 days post-surgery (P = 0.002) achieving 58% of baseline activity.
- The complications groups showed a significant increase in weekly sitting minutes from pre-surgery to 60 days post-surgery (P = 0.007) remaining 54.57% higher than baseline reports.
- Both groups showed a significant reduction in recovery from baseline to 60 days post-surgery.

### Weekly METS at all time points – total, complications & non-complications groups



## Conclusion

These results show significant potentially modifiable differences between people who develop post-operative complications and those who don't. Physical activity levels remain significantly reduced for all who undergo abdominal surgery at 60 days & may lead to future medical diseases and complications if not addressed.