



P1.127: Perioperative IoT-Based Telerehabilitation Enhances Postoperative QOL in Lung Cancer With COPD: RehaBoost Phase 2 Trial #1040

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INTRODUCTION

- Lung cancer patients with comorbid airflow limitation face a high risk of perioperative complications, making effective rehabilitation essential.
- However, traditional programs often strain healthcare resources.
- This study evaluates an Internet of Things (IoT)-based telerehabilitation intervention utilizing wearable devices and online coaching to optimize recovery in this high-risk population.



METHODS

The RehaBoost trial (jRCTs042230112)

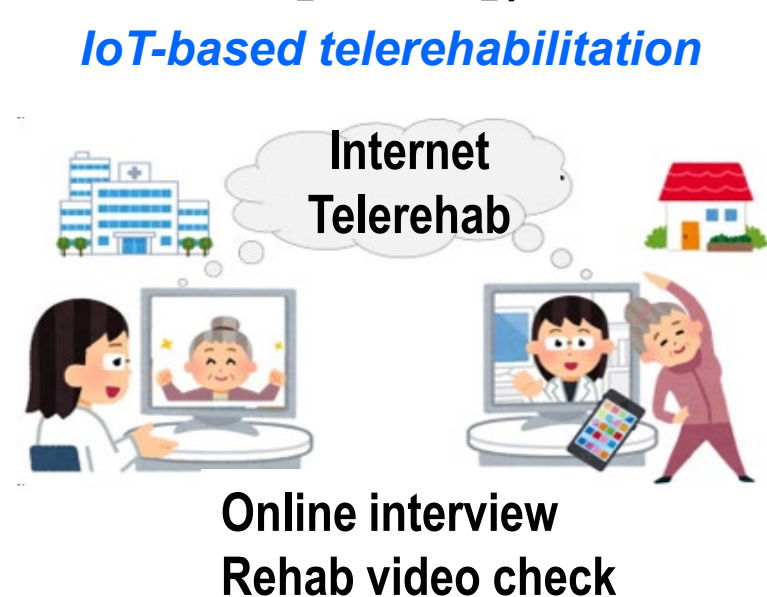
- Multicenter randomized phase 2 study.
- Study period: 2023/11/30 – 2026/8/24
- Patients were assigned:
 - Standard arm:** standard care (SC)
 - Experimental arm:** SC + IoT-based telerehabilitation*

- The primary endpoint:** the Change in 6-minute walk test (6MWT) distance from preoperative to 3-month postoperative levels (prespecified MCID: 30m).

- Secondary endpoints:**
 - Generic quality of life EQ5D5L utility value
 - EQ-VAS and disease-specific QOL (Japanese version of the COPD Assessment Test [CAT]).

- Participants**
 - Inclusion criteria;** 1) age $\geq$ 18, 2) ECOG-PS 0-2, 3) Primary lung cancer or metastatic lung cancer, 4) Anatomical lung resection, 5) FEV1% [FEV1/FVC] <70% or COPD, 6) No history of asthma, 7) Owns a smartphone, 8) Obtained a written consent.
 - Exclusion criteria;** Multiple lung cancers or concurrent other cancers who are deemed to require surgical treatment within the next six months.

- * Pre- to 3-month postoperative remote vital sign monitoring using a Fitbit wearable device with biweekly physical therapy telehealth consultations.



DISCUSSION AND CONCLUSION

Actionable Take Away Message

- At 1 month postoperatively, the telerehabilitation group showed better point estimates across all QOL outcomes.
- This trend persisted for three months, though the gap narrowed as the standard arm recovered.

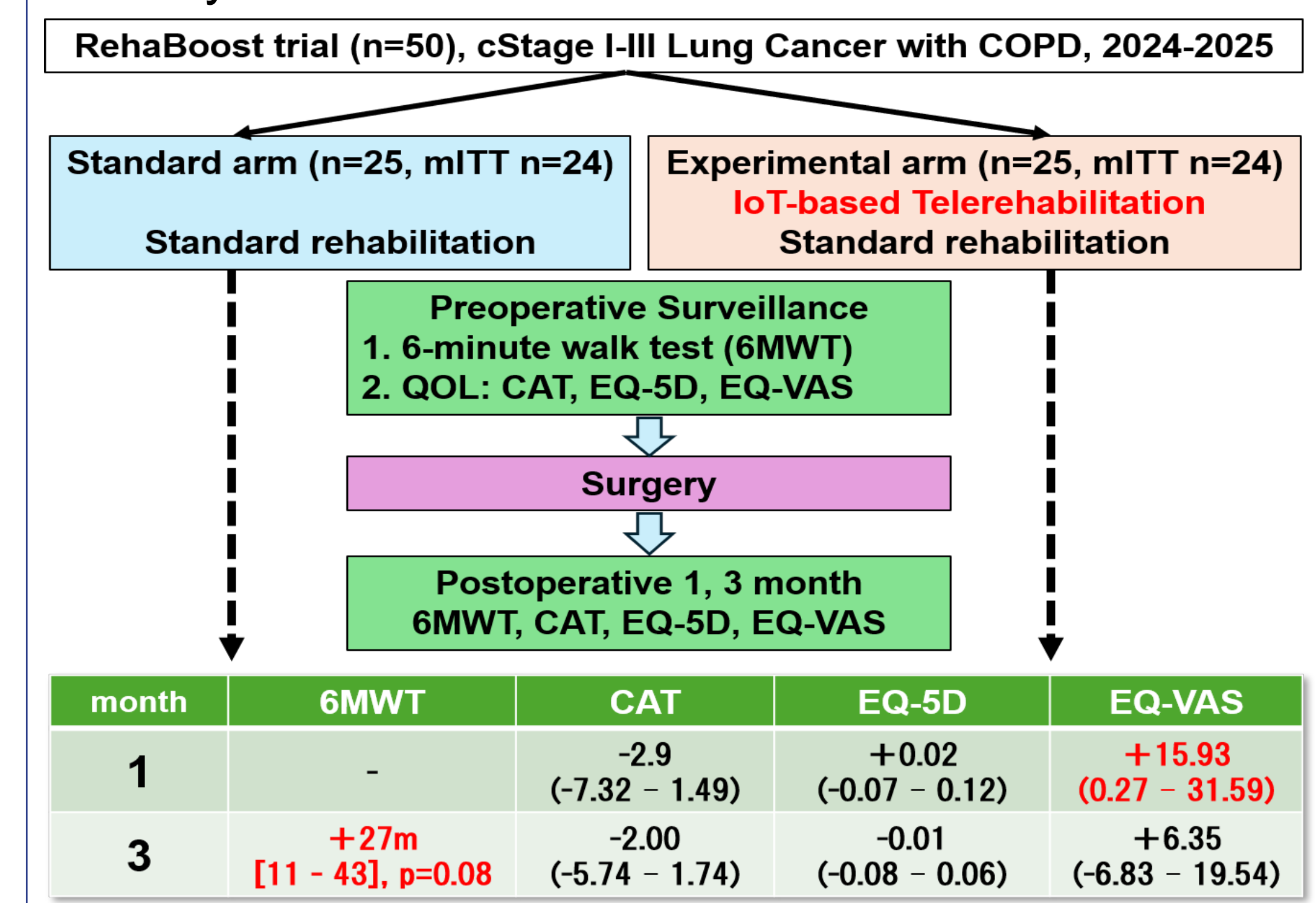
Future Direction for Research

- Future additional analyses will evaluate whether these improvements in QOL and symptoms remain significant at 6 months postoperatively.
- Perioperative IoT-based intervention effectively mitigates the early postoperative deterioration of physical function and QOL in lung cancer patients with COPD.
- Utilizing this cohort, we propose to examine the influence of surgical intervention and perioperative physical activity level on mid- to long-term skeletal muscle mass and epigenetic modifications, alongside their prognostic implications.

STATISTICAL SAMPLE SIZE DESIGN & STUDY SCHEMA

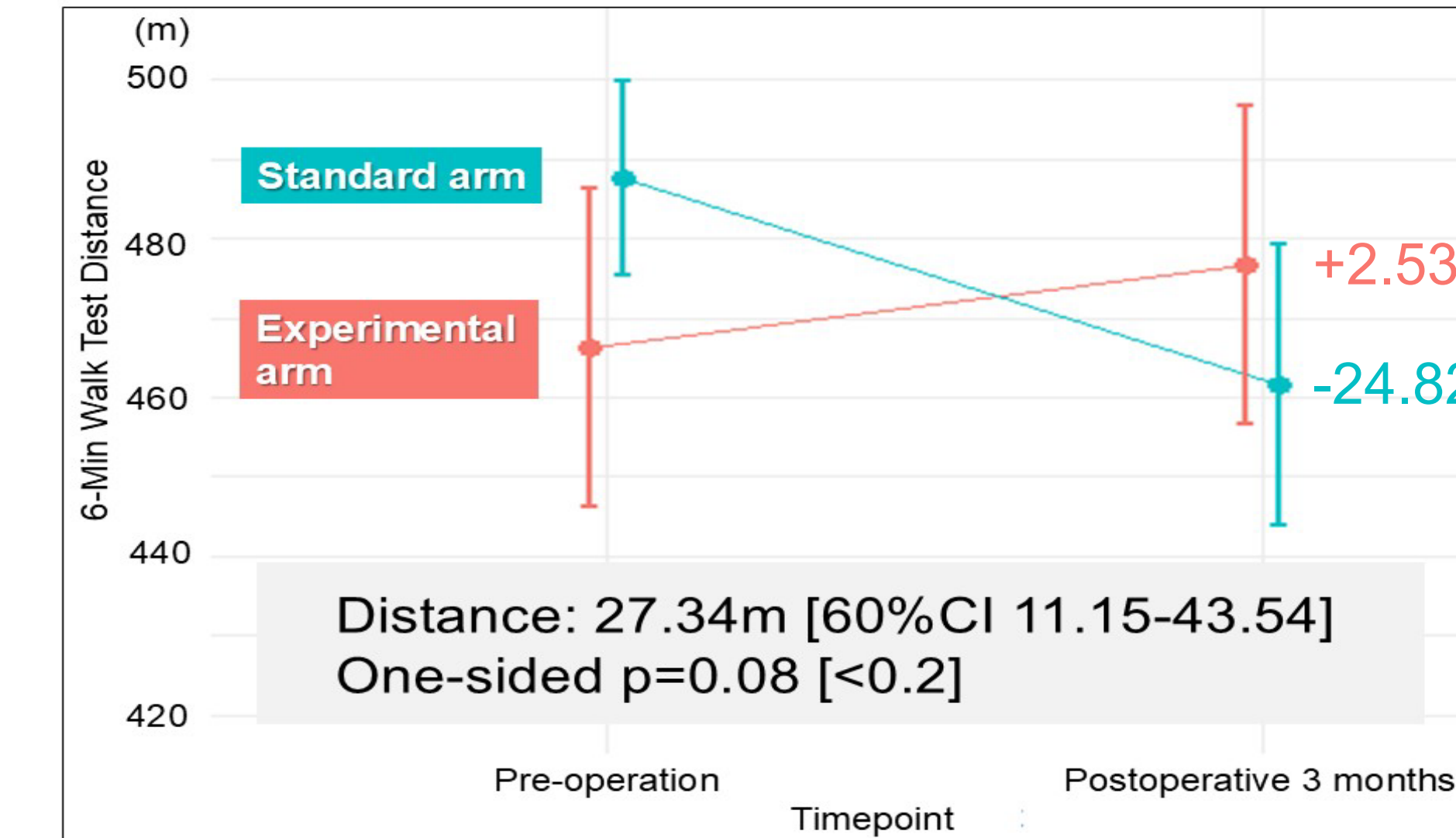
- We planned to enroll a total of 50 patients, setting the MCID for the mean change in the 6MWT distance from preoperative to 3-month postoperative values at 30m, with a standard deviation of 60m, a one-sided α of 0.2 with statistical power of 0.8, and anticipating a 5% dropout rate.

Study Schema



RESULTS

Figure 1. 6MWT distance (Primary endpoint)



The experimental group preserved 6MWT distance better (mean change: +2.53 vs. -24.82 m; difference: 27.34 m; p = 0.08).

Figure 2. QOL-1 (CAT score)

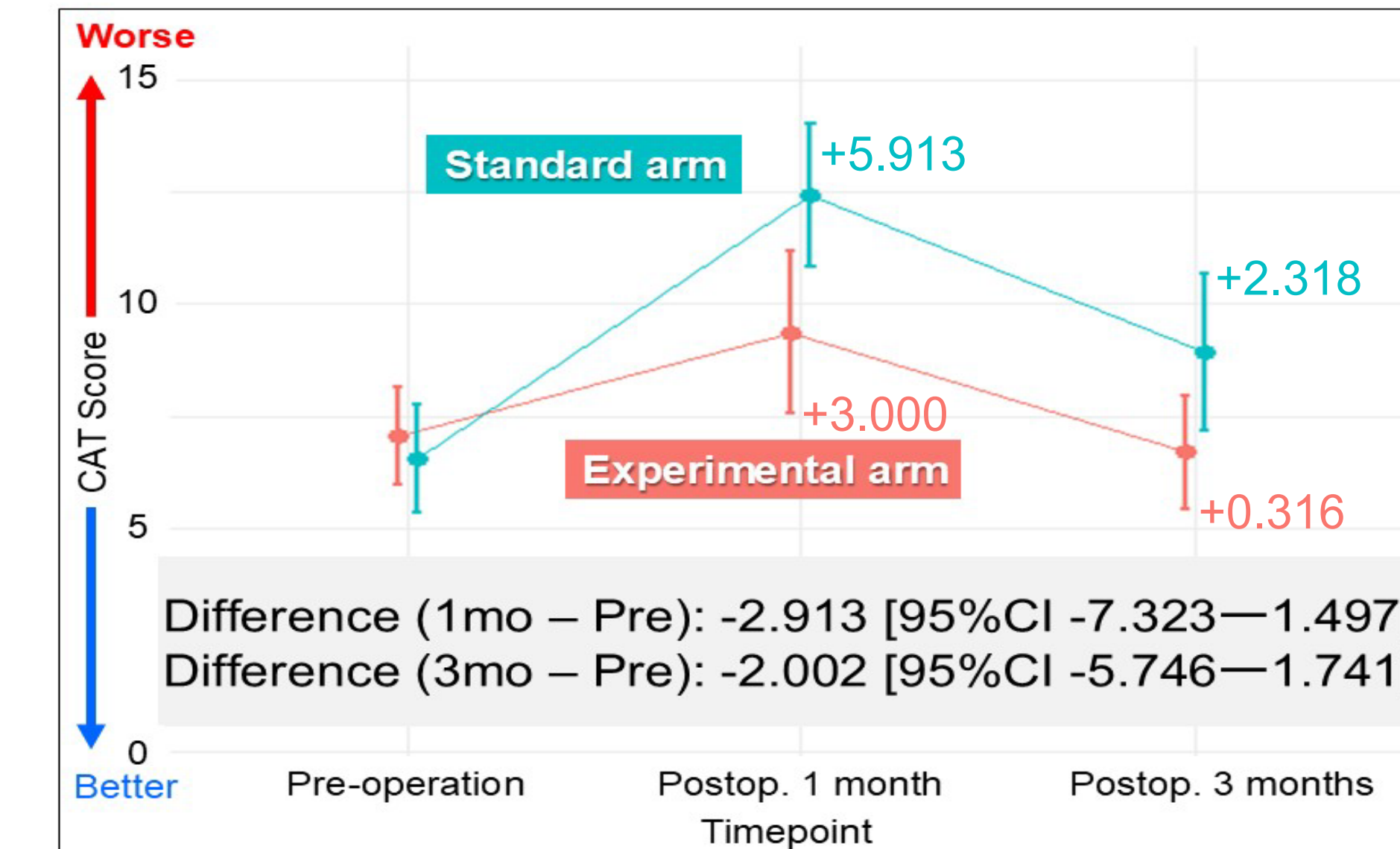
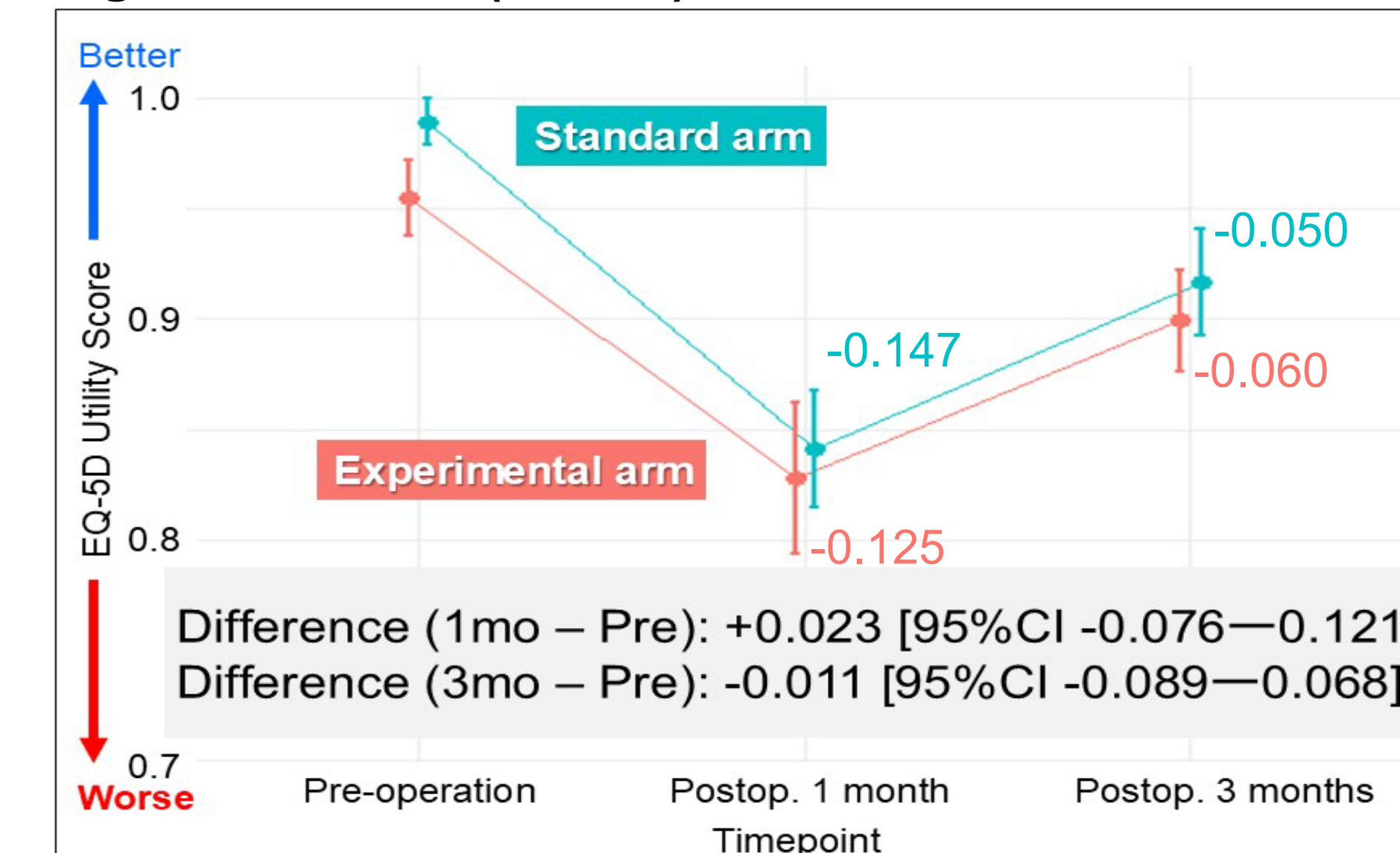


Figure 3. QOL-2 (EQ-5D)



At 1 month postoperatively, the experimental group showed better preservation of health status than the standard group across measures (Fig 2-4):

- # CAT score: +3.000 [95% CI: -0.293 to 6.293] vs. 5.913 [95% CI: 2.768 to 9.058] (difference: -2.913 [95% CI: -7.323 to 1.497])
- # EQ-5D utility: -0.125 [95% CI: -0.212 to -0.037] vs. -0.147 [95% CI: -0.201 to -0.093] (difference: +0.023 [95% CI: -0.076 to 0.121])
- # EQ-VAS: -4.00 [95% CI: -14.32 to 6.32] vs. -19.93 [95% CI: -32.75 to -7.11] (difference: +15.93 [95% CI: -0.27 to 31.59])

This trend persisted at 3 months postoperatively (Fig 2,4):

- # CAT score: 0.316 [95% CI: -2.250 to 2.882] vs. 2.318 [95% CI: -0.573 to 5.209] (difference: -2.002 [95% CI: -5.746 to 1.741])
- # EQ-VAS: 0.786 [95% CI: -12.020 to 13.591] vs. -5.571 [95% CI: -9.538 to -1.605] (difference: 6.357 [95% CI: -6.834 to 19.548])

Table 1. Characteristics

mITT (N=48)		Experimental (n=24,%)		Standard (n=24,%)	
PS (ECOG)	0	24	100	24	100
age	median [range]	73.0	[55–84]	72.5	[53–80]
sex	female	1	4.2	2	8.3
	male	23	95.8	22	91.7
surgery (pre-planned)	segmentectomy	8	33.3	8	33.3
	lobectomy	16	66.7	16	66.7
FVC (L)	median [range]	3.3	[2.5–4.5]	3.5	[1.9–6.2]
%FVC (%)	median [range]	106.5	[71.4–126.3]	105.8	[74.9–150.4]
FEV1 (L)	median [range]	2.0	[1.5–3.4]	2.1	[1.0–4.1]
%FEV1 (%)	median [range]	83.9	[62.4–122.0]	85.5	[56.8–108.9]
FEV1% (%)	median [range]	62.2	[42.2–81.4]	63.3	[46.9–76.5]

Figure 4. QOL-3 (EQ-VAS)

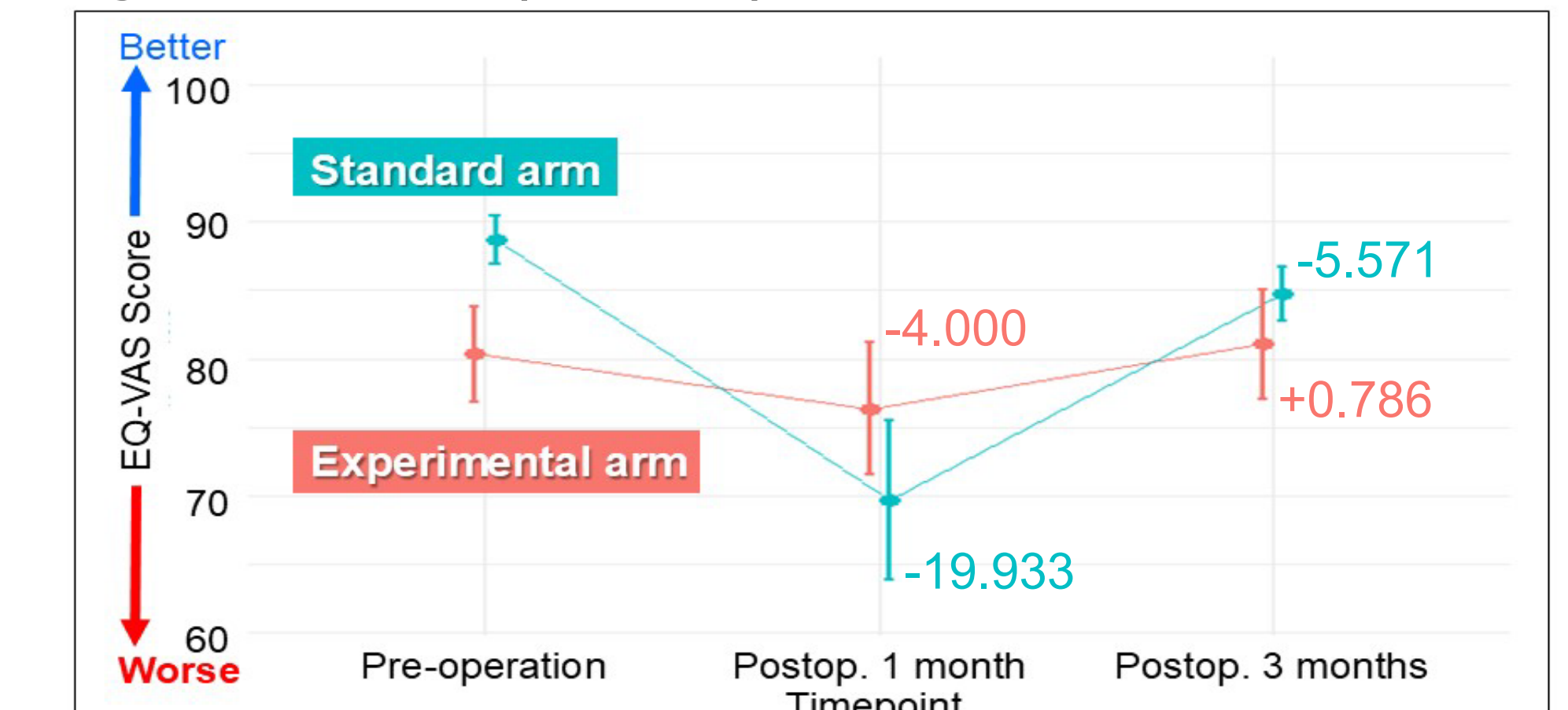


Figure 5. Respiratory function

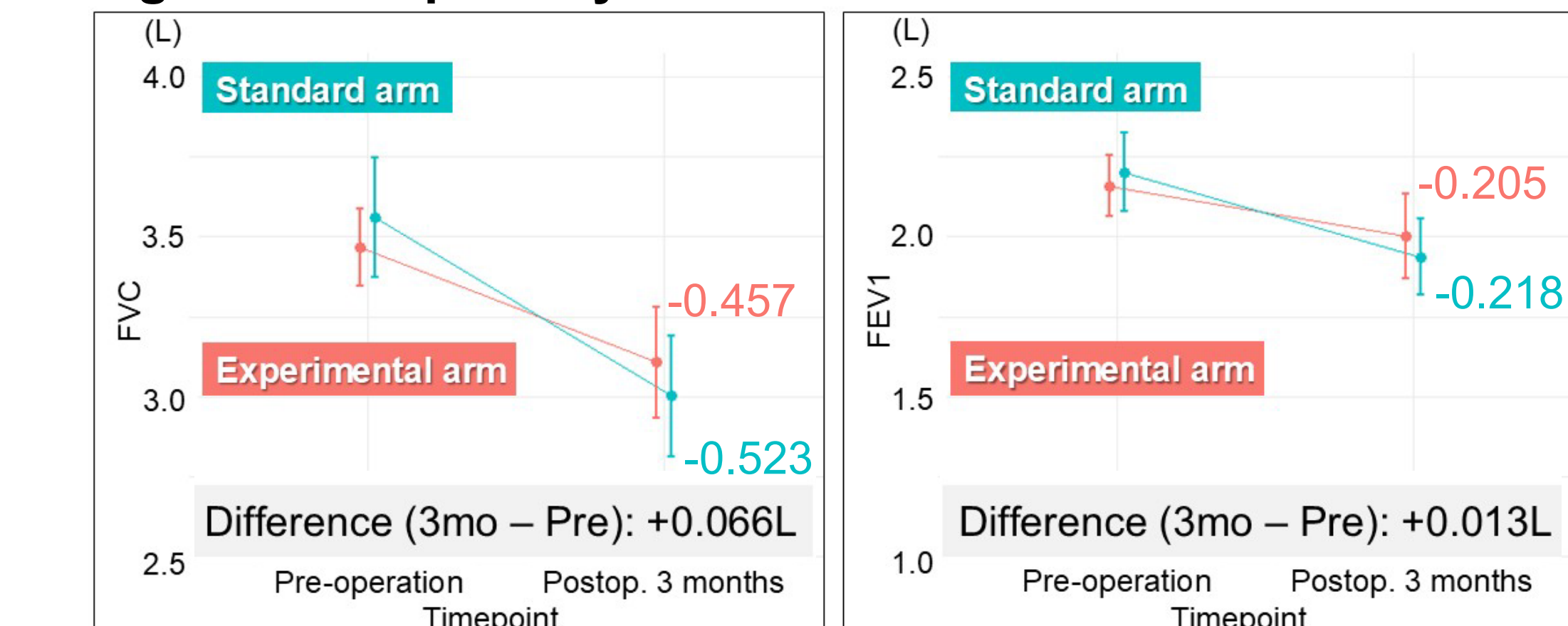
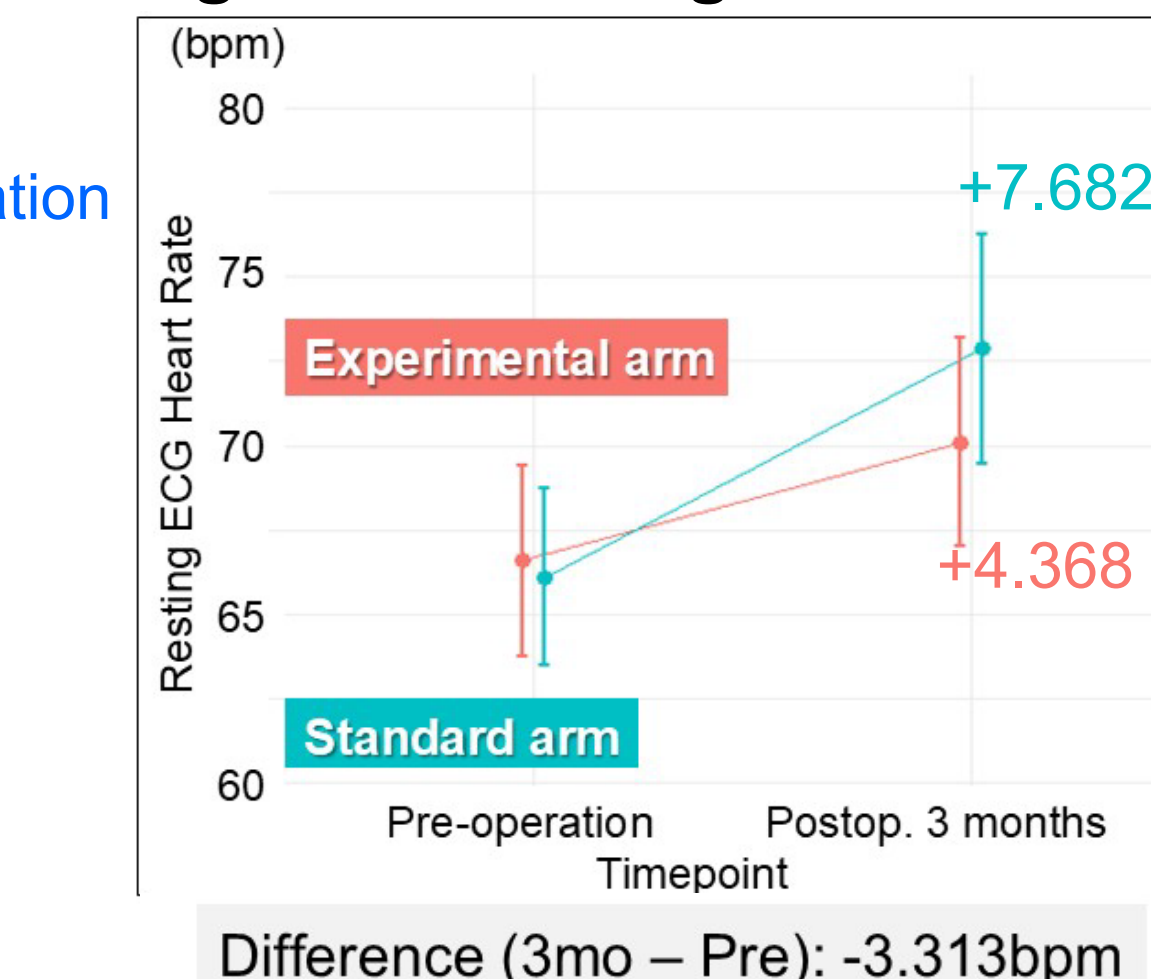


Figure 6. Resting ECG Heart Rate



At 3 months postoperatively, decreases in FVC and FEV1 were less pronounced in the experimental group than in the standard group, with only a slight increase in ECG-monitored heart rate (Fig 5,6).

No grade 4 or more adverse events were reported.

CAT, Japanese version of the COPD Assessment Test
EQ-5D, Euro QoL 5 dimensions 5-level
VAS, Visual Analogue Scale

COI Disclosure: None. AI Use Disclosure: None