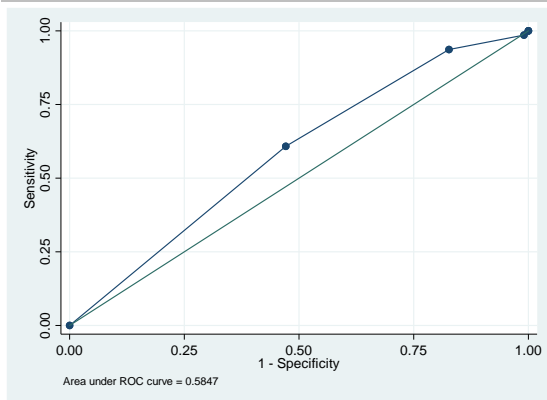


**Supplementary appendix.** Univariate analysis for predictors of a successful spontaneous breathing trial.

**Objective measurement of cough**

OBS	Area	Std. Err	95% conf. Interval
451	0.58	0.03	0.52 - 0.64

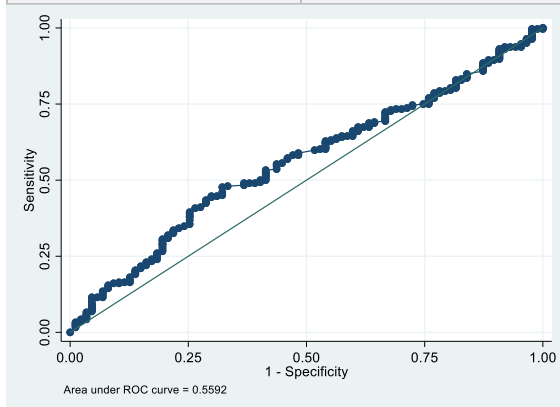


p = 0.002

OR 1.74 95%CI 1.12 – 2.70; P = 0.015

**Velocity of diaphragmatic contraction (VDC)**

OBS	Area	Std. Err	95% conf. interval
391	0.55	0.03	0.49 0.62

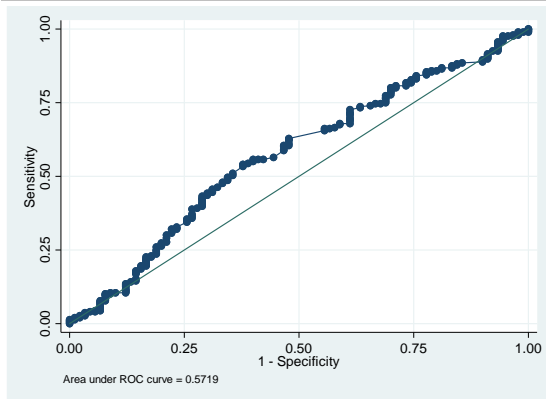


p = 0.04

OR 0.52 95%CI 0.31 – 0.86; P = 0.011

### Duration of the diaphragmatic cycle

OBS	Area	Std. Err	95% conf. Interval
386	0.57	0.03	0.50 0.64

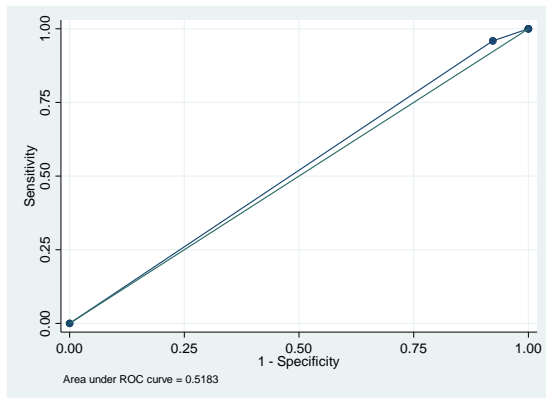


p = 0.019

OR 1.94 95%CI 1.19 – 3.14; P = 0.008

### Leak test:

OBS	Area	Std. Err	95% conf. Interval
444	0.51	0.01	0.49 - 0.54

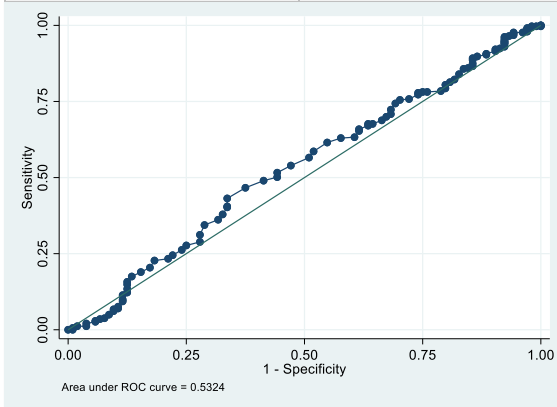


p = 0.100

The AUC-ROC was 0.51 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 (p = 0.100). This indicates that the leak test lacks discriminative capacity to predict success in the spontaneous breathing trial.

### Rapid and shallow breathing index (RSBI):

OBS	Area	Std. Err	95% conf. Interval
447	0.53	0.03	0.46 - 0.59

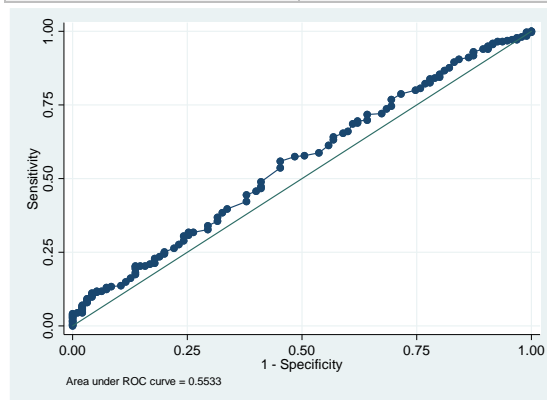


**p = 0.161**

The AUC-ROC was 0.53 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 ( $p = 0.161$ ). This indicates that the RSBI lacks discriminative capacity to predict success in the spontaneous breathing trial.

### Inspiratory total time:

OBS	Area	Std. Err	95% conf. Interval
410	0.55	0.03	0.48 0.62

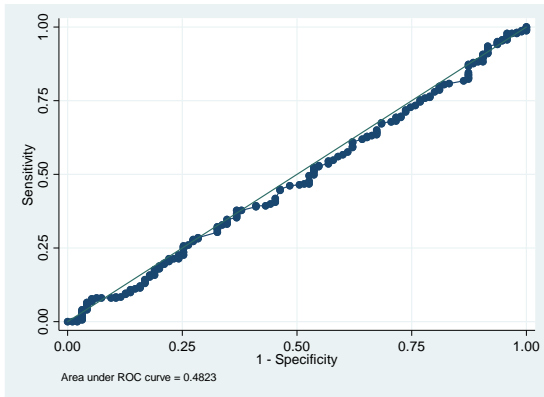


**p = 0.057**

The AUC-ROC was 0.55 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 ( $p = 0.057$ ). This indicates that the inspiratory total time lacks discriminative capacity to predict success in the spontaneous breathing trial.

### Diaphragmatic excursion

OBS	Area	Std. Err	95% conf. Interval
418	0.48	0.03	0.41 - 0.54

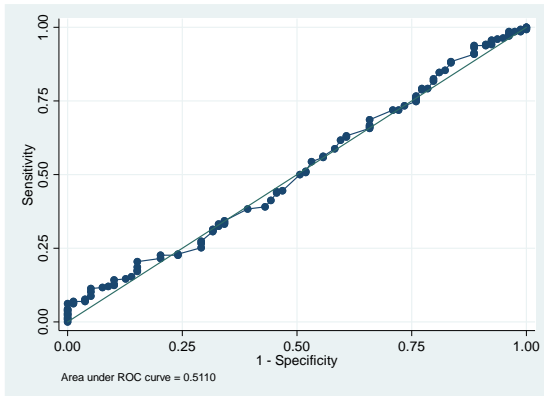


$p = 0.300$

The AUC-ROC was 0.48 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 ( $p = 0.300$ ). This indicates that the diaphragmatic excursion lacks discriminative capacity to predict success in the spontaneous breathing trial.

### Diaphragmatic thickening index

OBS	Area	Std. Err	95% conf. interval
353	0.51	0.03	0.43 0.58



$p = 0.384$

The AUC-ROC was 0.51 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 ( $p = 0.384$ ). This indicates that the diaphragmatic thickening index lacks discriminative capacity to predict success in the spontaneous breathing trial.

**Supplementary file 1b.** univariate analysis for predictors of a successful extubation

**Spontaneous breathing trial (SBT)**

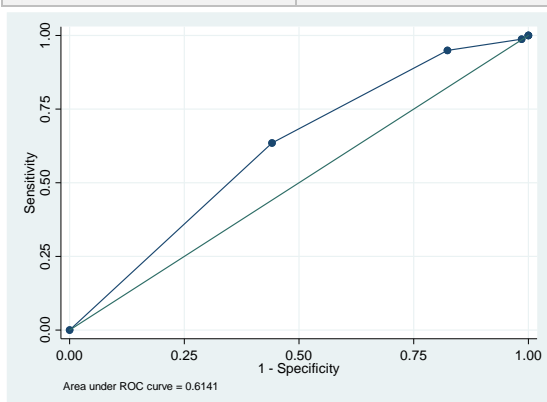
OBS	Area	Std. Err	95% conf. Interval
456	0.86	0.019	0.82 0.89

p < 0.001

OR 167.0 95%CI 64.0 – 436.0; P < 0.001

**Objective measurement of cough**

OBS	Area	Std. Err	95% conf. Interval
451	0.61	0.02	0.56 0.66

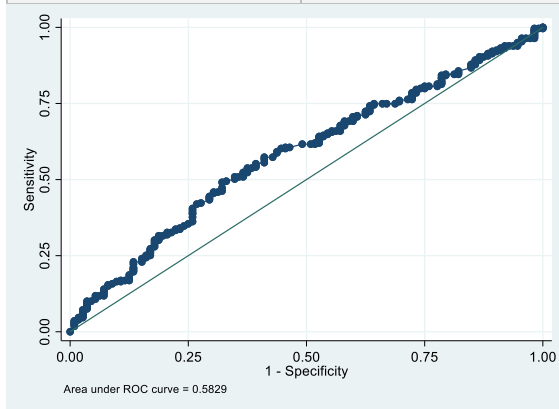


p < 0.001

OR 1.90 95%CI 1.43 – 2.54; P < 0.001

### Velocity of diaphragmatic contraction (VDC)

OBS	Area	Std. Err	95% conf. interval
391	0.58	0.03	0.52 - 0.64

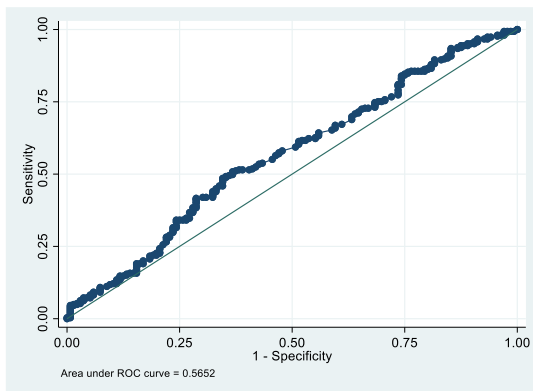


$p = 0.004$

OR 0.85 95%CI 0.73 – 0.99; P = 0.04

### Leak test:

OBS	Area	Std. Err	95% conf. Interval
441	0.56	0.03	0.50 - 0.62

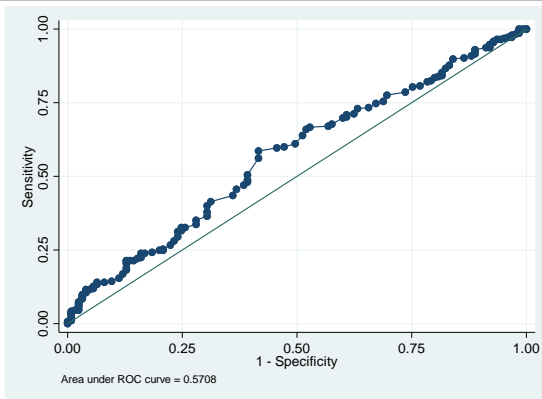


$p = 0.014$

OR 1.002 95%CI 1.0004 – 1.004; P = 0.02

### Inspiratory total time:

OBS	Area	Std. Err	95% conf. interval
410	0.57	0.03	0.51 - 0.63

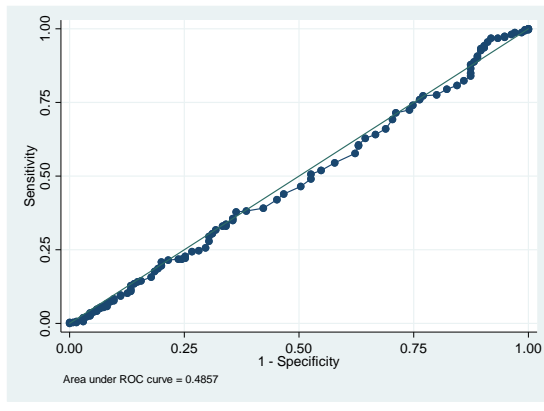


$p = 0.010$

OR 2.10 95%CI 1.14 – 3.87;  $P = 0.02$

### Rapid and shallow breathing index (RSBI):

OBS	Area	Std. Err	95% conf. Interval
447	0.48	0.03	0.42 - 0.54

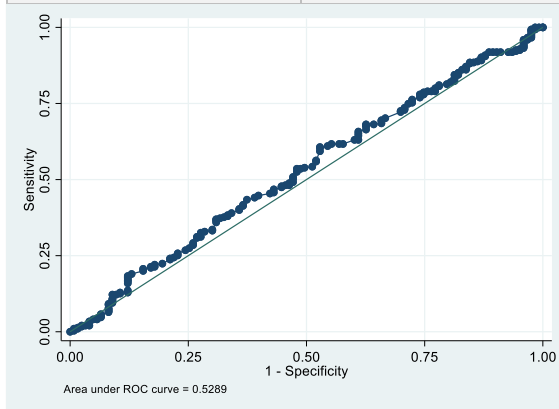


$p = 0.317$

The AUC-ROC was 0.48 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 ( $p = 0.317$ ). This indicates that the RSBI lacks discriminative capacity to predict success in the extubation.

### Diaphragmatic excursion

OBS	Area	Std. Err	95% conf. interval
418	0.53	0.03	0.46 - 0.59

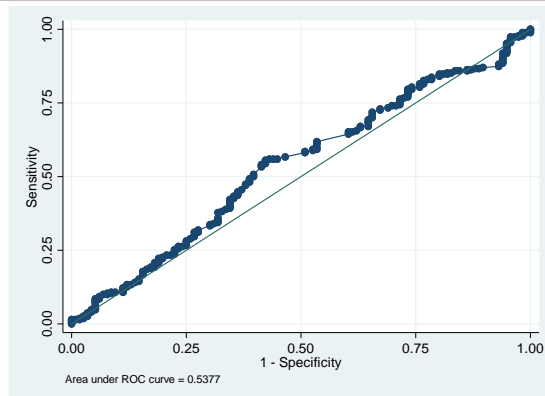


p = 0.176

The AUC-ROC was 0.53 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 (p = 0.176). This indicates that the diaphragmatic excursion lacks discriminative capacity to predict success in the extubation.

### Duration of the diaphragmatic cycle

OBS	Area	Std. Err	95% conf. interval
386	0.53	0.03	0.47 - 0.60



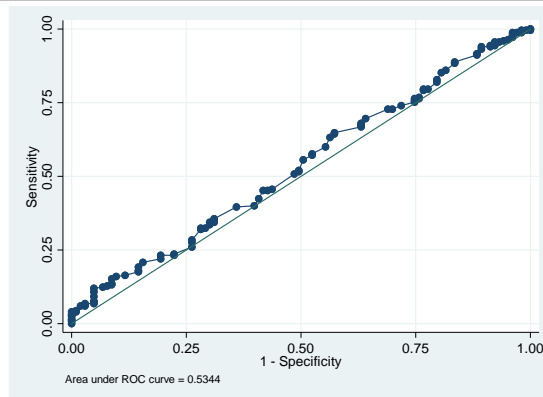
p = 0.120

The AUC-ROC was 0.53 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 (p = 0.120). This indicates that the duration of the diaphragmatic cycle lacks discriminative capacity to predict success in the extubation.



### Diaphragmatic thickening index

OBS	Area	Std. Err	95% conf. interval
353	0.53	0.03	0.46 - 0.60



$p = 0.384$

The AUC-ROC was 0.53 with a confidence interval spanning the null value (0.5) and a non-significant difference from 0.5 ( $p = 0.384$ ). This indicates that the diaphragmatic thickening index lacks discriminative capacity to predict success in the extubation.

**Supplementary appendix.** Interaction analysis.

**Supplementary table 2a.** Spontaneous breathing trial parsimonious model

SBT	Coef.	Std Err.	z	P>z	95% CI	
OMC	0.519	0.063	8.220	<0.001	0.395	0.643
VDC	-0.123	0.031	-3.960	<0.001	-0.184	-0.062
_cons	0.304	0.171	1.780	0.075	-0.031	0.639

Notes: SBT: Spontaneous breathing trial; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

\*R<sup>2</sup>: 0.03

**Supplementary table 2b.** SBT model with the interaction variable

SBT	Coef.	Std. Err.	z	P> z	95% CI	
OMC	0.625	0.119	5.280	<0.001	0.393	0.857
VDC	-0.027	0.096	-0.280	0.782	-0.216	0.162
OMC x VDC	-0.040	0.038	-1.060	0.289	-0.115	0.034
_cons	0.054	0.291	0.190	0.852	-0.515	0.624

Notes: SBT: Spontaneous breathing trial; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

\*R<sup>2</sup>: 0.03

The interaction variable (Cough x Velocity of diaphragmatic contraction) was not significantly associated with SBT and did not improve R<sup>2</sup> the of the model.

**Supplementary table 2c.** Evaluation of collinearity in the SBT predictor model with the interaction variable

Variable	VIF	SQRT VIF	Tolerance	R-Squared
OMC	3.58	1.89	0.279	0.720
VDC	12	3.46	0.083	0.916
OMC x VDC	15.13	3.89	0.066	0.933

Notes: VIF: variance inflation factor; SQRT VIF: The square root of variance inflation factor; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

\*The variance inflation factor was 15.13 and the tolerance 0.066, indicating collinearity induced by the interaction variable.

As the interaction variable (Cough x Velocity of diaphragmatic contraction) was not significantly associated with SBT, did not improve the R<sup>2</sup> of the model and induced collinearity, this variable was not introduced in the final model.

**Supplementary table 2d.** Successful extubation parsimonious model

Successful extubation	Coef.	Std. Err.	Z	P>z	95% CI	
SBT	5.646	0.254	22.18	<0.001	5.147	6.145
OMC	0.745	0.090	8.21	<0.001	0.567	0.923
VDC	-0.220	0.045	-4.87	<0.001	-0.309	-0.131
_cons	-4.692	0.346	-13.55	<0.001	-5.371	-4.014

Notes: SBT: Spontaneous breathing trial; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

R<sup>2</sup>: 0.55

**Supplementary table 2e.** Successful extubation predictor Model with the interaction variables

successful extubation	Coef.	Std. Err.	z	P>z	[95% Conf.	
SBT	4.718	0.528	8.930	<0.001	3.683	5.754
OMC	0.606	0.171	3.560	<0.001	0.272	0.941
VDC	-0.734	0.261	-2.810	0.005	-1.247	-0.222
OMC x VDC	0.051	0.054	0.970	0.334	-0.053	0.157
VDC x SBT	0.413	0.229	1.800	0.071	-0.036	0.862
_cons	-3.503	0.654	-5.350	<0.001	-4.786	-2.221

Notes: SBT: Spontaneous breathing trial; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

R<sup>2</sup>: 0.55

The interaction variables (OMC x VDC and VDC x SBT) were not significantly associated

with a successful extubation and did not improve R<sup>2</sup> the of the model

**Supplementary table 2f.** Evaluation of collinearity in the successful extubation predictor model with the interaction variables

Variable	VIF	SQRT VIF	Tolerance	R-Squared
SBT	4.350	2.090	0.230	0.770
OMC	3.700	1.920	0.271	0.730
VDC	13.580	3.680	0.074	0.926
OMC x VDC	15.520	3.940	0.065	0.936
VDC x SBT	7.040	2.650	0.142	0.858

Notes: VIF: variance inflation factor; SQRT VIF: The square root of variance inflation factor; SBT: Spontaneous breathing trial; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

\*The variance inflation factor was  $> 7$  and the tolerance  $< 0.15$  for the interaction variables, indicating collinearity induced by the interaction variables.

As the interaction variables (OMC x VDC and VDC x SBT) were not significantly associated with SBT, did not improve the  $R^2$  of the model, and induced collinearity, these variables were not introduced in the final model.

**Supplementary appendix.** Collinearity analysis.

**Supplementary table 3a.** Spontaneous breathing trial predictor model, collinearity analysis.

Variable	VIF	SQRT VIF	Tolerance	R-Squared
OMC	1.000	1.000	0.997	0.003
VDC	1.000	1.000	0.997	0.003

Notes: VIF: variance inflation factor; SQRT VIF: The square root of variance inflation factor; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

\*The variance inflation factor was 1 and the tolerance 0.99, indicating absence of collinearity

**Supplementary table 3b.** successful extubation predictor model, collinearity analysis.

Variable	VIF	SQRT VIF	Tolerance	R-Squared
SBT	1.030	1.020	0.968	0.032
OMC	1.030	1.020	0.970	0.030
VDC	1.010	1.000	0.991	0.009

Notes: VIF: variance inflation factor; SQRT VIF: The square root of variance inflation factor; SBT: Spontaneous breathing trial; OMC: Objective measurement of cough; VDC: Velocity of diaphragmatic contraction.

\*The highest variance inflation factor was 1.03 and the lowest tolerance 0.96, indicating absence of collinearity