electromyography. Measurements were made over 2 minutes of tidal breathing followed by maximal inspiratory manoeuvres (inspiration to total lung capacity and maximal sniff manoeuvres) and the values for root mean square (RMS) EMG_{para} per breath, $EMG_{para\%max}$ (RMS EMG_{para} as a proportion of volitional maximum), Neural Respiratory Drive Index (NRDI) and sex-specific standardised residuals (*z*-scores) recorded. After each measurement, equipment was decontaminated using alcohol-based wipes and surface electrodes were disposed of. Symptom questionnaires and radiographic assessment of lung oedema (RALE) scores were recorded.

Results Between 4th June and 2nd July 2020, EMG_{para} was measured in 25 patients. All approached patients consented to participate, no adverse events occurred. Mean±SD age 57.1 ±15.6 years, 64% male, BMI 29.4±5.6 kg/m^2, 29% current/ex-smokers. mMRC was at pre-COVID baseline in 56%, 32% reported persistent burdensome breathlessness. Respiratory rate 15±3 breaths/minute, oxygen saturation 98±2.0%, heart rate 87±12 bpm. EMG_{para} measures are presented in table 1. Z-scores of all EMG_{para} indices were raised. NRDI was associated with admission, worst inpatient and follow-up RALE scores (R=0.41 (p=0.04), R=0.40 (p=0.046) and R=0.49 (p=0.01), respectively), not mMRC (R=0.24, p=0.24).

Abstract P240 Table 1 Measures of parasternal electromyography

	Measured value	*Z*-score
EMG_{para} (**μV**)	5.80 (3.91–12.26)	1.27 (0.73–2.10)
$EMG_{para\%max}$ (%)	15.45 (11.41–23.27)	2.93 (1.91–4.34)
NRDI (%.bpm)	224 (164–306)	2.68 (1.79–3.90)

Data are presented as median (interquartile range). Abbreviations: z-score = standardised residual, EMG_{para} = mean root mean square parasternal electromyography per breath, **μV = microvolts,** $EMG_{para\%max}$ = **EMG_{para} as a proportion of volitional maximum,** NRDI = **Neural Respiratory Drive Index.**

Conclusions Inspiratory muscle activation was high, which may reflect underlying interstitial pathology, critical illness myopathy, deconditioning or anxiety relating to clinic attendance. Parasternal electromyography is a well-tolerated technique that avoids aerosolisation of respiratory droplets and utilises equipment that is easily decontaminated between patients. This makes it a practical and informative measure of lung function during the COVID-19 pandemic.

P241 A PILOT RCT ASSESSING THE INCLUSION OF PHYSICAL ACTIVITY COUNSELLING TO STANDARD CARE PULMONARY REHABILITATION IN PATIENTS WITH COPD

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Introduction Pedometer-based physical activity (PA) counselling is effective in inducing meaningful improvements in daily PA as a standalone intervention and alongside pulmonary rehabilitation (PR) in patients with COPD. However, findings surrounding its effectiveness in patients with profoundly low activity levels remain inconsistent.

Objective To determine patient acceptability and compliance to PA counselling alongside PR and its effects on daily PA levels.

Methods In this pilot RCT, patients were assigned 1:1 to receive standard care (PR alone, twice weekly for 8 weeks) or PR alongside PA counselling (PR+PA) comprising motivational interviews, pedometer step goals (reviewed twice weekly) and patient feedback. Patients with HADS ≥8 participated in Cognitive Behavioural Therapy sessions. A study specific questionnaire and adherence to components of the intervention assessed patient acceptability and compliance to PA counselling.

Results A total of 37 patients (mean±SD: FEV_1: 49±18%, baseline steps/day: 3249±1898) completed the study in the PR+PA (n=19) and PR alone (n=18) arms. Overall the PA counselling intervention was well received by patients (72% indicating they liked taking part) and patient compliance to components of the intervention was high (PA diary: 91±18% and acceptability to step goal targets: 68±12%). Pedometer (Fitbug) derived steps/day increased throughout the 8-week intervention (mean [95% CI] difference: 1370 [681, 2057] steps; p=0.001). Patients in both arms improved the 6MWD (PR alone mean [95% CI] difference: 39 [20, 65] m; PR+PA mean [95% CI] difference: 47 [23, 70] m, p=0.594) and CAT scores (PR alone mean [95% CI] difference: -2.0 [-3.5, -0.4] points; PR+PA mean [95% CI] difference: -3.6 [-5.2, -1.9] points, p=0.143). However, there were significant differences in favour of the PR+PA compared to PR alone arms at 8 weeks in the magnitude of improvement in accelerometer (Actigraph-wGT3X) derived measures for daily steps (mean [95% CI] difference: 845 [296, 1396] steps, p=0.004), and movement intensity (mean [95% CI] difference: 95 [30, 156] VMU, p=0.005).

Conclusions PA counselling alongside PR was well received by patients and compliance to various components of the intervention was high. PA counselling using pedometers is effective in enhancing daily PA in COPD patients with low PA levels at the onset of PR.

P242 CAN EXISTING ROUTINE CLINICAL DATA BE USED TO PREDICT HYPOXAEMIA FOR MND PATIENTS UNDERTAKING COMMERCIAL FLIGHT?

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Introduction Pre-COVID-19, the total number of passengers traveling by commercial airlines rose to 4.3 billion, with Europe amounting to a 7.2% increase. The risks of respiratory compromised patients developing hypoxaemia during flight is well documented. Assessment of these patients is time consuming and often requires specialised equipment. Furthermore, the majority of evidence is based on research into patients with Chronic Obstructive Pulmonary Disease (COPD). The aim of this study is to investigate potential predictive biomarkers relating to the development of hypoxaemia during flight in patients with Motor Neurone Disease (MND).

Methods 118 MND patients referred into a fitness to fly service (n=118) completed baseline lung function and a Hypoxic Challenge Test (HCT) as part of a risk stratification for

Abstract P242 Table 1 Descriptive statistics for physiological parameters by condition, including indications of statistical significance

	MND		
Variable	**Pass**	**Fail**	**p value**
Age	61.5 (12.67)	66 (14.18)	0.076
FEV_1	2.12 (0.80)	1.25 (0.71)	0.001
FEV_1 %	70 (24.43)	45 (21.04)	0.001
FVC	2.61 (1.02)	1.74 (0.88)	0.003
FVC %	68 (24.09)	49 (19.68)	0.004
PaO_2 21%	10.30 (1.14)	9.045 (1.18)	0.001
PaO_2 15%	7.60 (1.147)	6.39 (0.25)	0.001
$PaCO_2$ 21%	5.28 (0.75)	6.24 (0.86)	0.001
BE 21%	2.35 (2.37)	5.70 (3.34)	0.001

planned air travel (77 male). Data from patients requiring in-flight oxygen was compared to patients who did not, in accordance with the British Thoracic Society recommendations 2011: Managing passengers with stable respiratory disease planning air travel. Statistical analysis was performed using one-way ANOVA, Kruskal-Wallis, and Chi-Squared tests, as appropriate.

Results There was no significant difference between the pass (n=94) and fail (n=24) groups for age, gender, smoking history or BMI. There was a significant difference for all spirometry data (FEV_1, FVC and FEV_1/FVC ratio – absolute, percent predicted and standardised residuals). Moreover, the resting blood gases ($FiO_2$21%) data showed significant difference for all parameters with the exception of pH (<0.001). The Regression analysis showed limited predictive value of spirometry and/or resting blood gas data with the exception of $PaCO_2$ and base excess (BE).

Conclusions The predictive value of spirometic paraments and resting blood gases are limited in assessing hypoxaemia during commercial flight in MND patients, with the exception of parameters relating to respiratory failure. Despite the significant difference between the two groups, routine physiological data was limited in the predictive regression equations. We recommend that the safest approach in managing this group of patients is to perform an HCT in all patients intending to use air travel until more evidence-based data is available.

P243 CAN HISTORICAL ASSUMPTIONS BE USED TO ASSESS FITNESS TO FLY FOR MND AND ILD PATIENTS? AN EVALUATION OF PHYSIOLOGICAL PARAMETERS TO RISK STRATIFY PATIENTS PLANNING AIR TRAVEL

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Introduction The risk associated with commercial flight for respiratory compromised patients is well known. Many of the assumptions are based on studies that have included patients with Chronic Obstructive Pulmonary Disease (COPD) and have often been extended to other respiratory and non-respiratory disorders. This study aimed to examine differences in physiological parameters and Hypoxic Challenge Test (HCT) outcome in patients with Motor Neurone Disease (MND), Interstitial Lung Disease (ILD) and COPD.

Methods Respiratory patients who were referred into a fitness to fly service (n=225) with COPD (n=51), MND (n=118) and ILD (n=56) completed baseline lung function and a HCT as part of a risk stratification for planned air travel. Statistical analysis was performed using one-way ANOVA, Kruskal-Wallis, and Chi-Squared tests, as appropriate.

Results Demographic data relating to age, smoking history and BMI were significantly different between the patient groups. Spirometric data showed significant differences in Forced Expiratory Volume in one second (FEV_1) absolute, percent predicted and standardised residuals, however there was no significant difference in Forced Vital Capacity (FVC) absolute or percent predicted. Resting capillary blood gases (CBGs) ($FiO_2$21%) showed significant differences between patient groups in all parameters with the exception of pH. Responses to the hypoxic mix during the HCT ($FiO_2$15%) showed differences in all CBG values with the exception of pH. This was also mirrored in the corrective values ($FiO_2$28%). The difference between the PaO2 at rest (21%) and during the HCT (15%) is higher in the MND and ILD groups (2.66and 2.74 kPa respectively) versus the COPD group (2.2kPa). The HCT fail rate was greatest for the COPD group (table 1).

Conclusions In this retrospective, exploratory examination, the physiological data supports significant differences between the disorders for the majority of data. The assumptions and algorithms based on the study of COPD patients cannot be assumed for MND or ILD, and these groups need to be

Abstract P243 Table 1 Descriptive statistics for physiological parameters by condition, including indications of statistical significance

	MND		ILD		COPD		
Variable	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**p value**
Age	63	12.99	69.5	7.05	66	9.24	0.001
FEV_1 (L)	1.94	0.85	1.91	0.65	1.13	0.61	0.001
FEV_1 %	65.93	25.72	76.1	19.19	44.76	25.55	0.001
FVC (L)	2.46	1.05	2.54	0.84	2.62	0.95	0.676
FVC %	64.59	24.35	70.8	18.11	74.24	23.13	0.059
PaO_2 21%	10.12	0.12	9.46	1.05	8.68	1.01	0.001
PaO_2 15%	7.46	1.01	6.72	0.75	6.48	0.92	0.001
PaO_2 28%	11.7	2.56	11	2.56	8.94	2.25	0.002
% HCT Fail	20.34		51.79		62.75		0.001