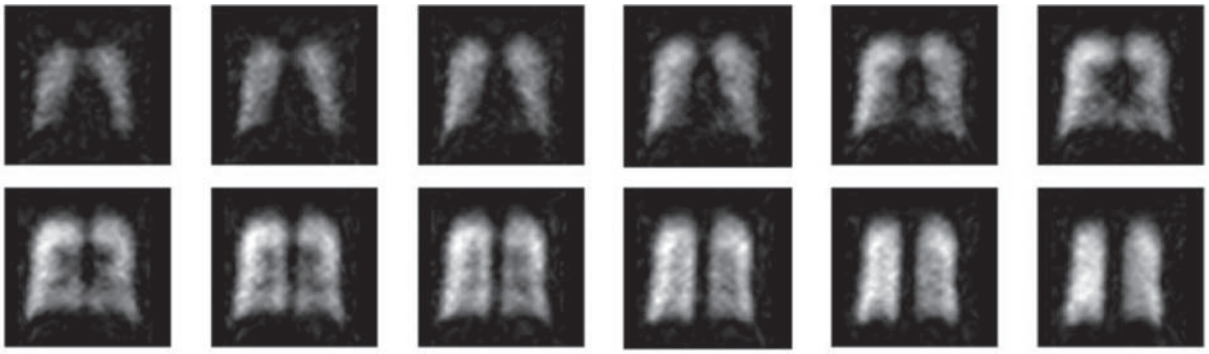

Abstract P137 Figure 1 Example 19F images (coronal views) Acquired during an 18s breath-hold after 3 deep gas inhalations.

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P138 KINETICS OF INTRATHORACIC PRESSURE CHANGE FOLLOWING ADMINISTRATION OF CPAP

MCP Apps, E Walsted, M Pavitt, L Swanton, A Lewis, S Buttery, J Garner, N Hopkinson, M Polkey, J Hull. *Royal Brompton and Harefield NHS Trust, London, UK*

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Introduction An understanding of the changes in intra-thoracic pressure in response to application of Continuous Positive Airway Pressure (CPAP) is important in the study of thoracic and ventilator mechanics and device tolerability. It is unclear how quickly intra-thoracic pressure, measured directly with balloon catheters, responds to a change in CPAP. The aim of this study was to evaluate the kinetics of pressure stabilisation in healthy subjects.

Methods Mouth pressure (Pmo) was measured directly at the facemask of a NIPPY3 CPAP system, oesophageal pressure (Poes) and gastric (Pga) pressures were measured with balloon catheters in healthy subjects (n=7), seated at rest, with 10 min spontaneous ventilation followed by 20 min at CPAP of 5 cm/H_20, then 20 min at CPAP 10 cm/H_20, then 10 min no CPAP.

Results Pmo was lower than the setting for CPAP on the NIPPY3 machine; for CPAP=5 cm/H_20 mean Pmo=4.67 cm/H_20, SD 0.29 cm/H_20; for CPAP=10 cm/H_20, mean Pmo=9.09 cm/H_20, SD 0.3 cm/H_20. Poes with 5 cm/H_20 was higher than with no CPAP; 3.31 v 0.13 cm/H_20, $p<0.05$; with 10 cm/H_20, 5.16 v 3.31 cm/H_20, $p<0.05$; with CPAP back to 0 cm/H_20, 5.18 v 1.1 cm/H_20, $p<0.05$. There was a wide variability of gastric pressures both with and without CPAP; no significant changes in Pga with CPAP. Stabilisation of Pmo and Poes pressures after CPAP settings were changed occurred within 2 min for change in CPAP from 0–5 cm/H_20, 5–10 cm/H_20, and 10–0 cm/H_20 with Pmo maximum time to stabilise 80 s, Poes maximum time to stabilise 86 s. Pga stabilisation took longer; for CPAP setting change 0–5 cm/H_20, time to stability for Pga was 111–470 s; for CPAP 5–10 cm/H_20, 46–183 s; for CPAP setting change 10–0 cm/H_20, 37–135 s.

Conclusions In healthy subjects the kinetics of thoracic pressure stabilisation, following application of CPAP, is highly variable. Gastric pressure takes longer to stabilise and varies more than Pmo and Poes. This may reflect variation in diaphragm tonicity, gastric contraction or abdominal wall tone. These variable time constraints need considering when evaluating CPAP intervention. Subject variability in gastric pressure may contribute to reduced tolerability in some individuals and requires further study.

P139 A RANDOMISED COMPARATIVE STUDY OF COUGH PEAK EXPIRATORY FLOW (CPEF) USING FULL FACE MASK VS MOUTHPIECE INTERFACES IN HEALTHY SUBJECTS

A Mearns, F Subhan, L Roberts. *University of Plymouth, Plymouth, UK*

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Background Cough Peak Expiratory Flow (CPEF) is a respiratory muscle function test designed to assess the ability to clear airway secretions adequately. Present practice requires CPEF to be measured using a mouthpiece, which has proven problematic in patients the neuromuscular disease(s). The study aimed to determine the effectiveness of using a facemask *vs* mouthpiece in measuring CPEF.

Hypothesis CPEF measured via an Interurgical Anaesthetic Full-Face Mask will provide comparably similar (CI 0.95) Results to those obtained using a flanged mouthpiece.

Participant Population Healthy participants were recruited into the study through faculty newsletters, social media advertisements and random convenient sampling of network connexions. Participants were screened, following ethical approval, using a specifically-designed Pre-screening Medical Questionnaire (PSMQ) against an Inclusion criterion, before inclusion to the study.

Methods Testing procedure ensured standard spirometry position was adopted. The participant was asked to expire to residual volume (RV), followed by a rapid inhalation to total lung capacity (TLC) where a forceful cough manoeuvre was made. Procedure was repeated at least 3 times, with 45 s rest between attempts. A maximum of 8 attempts per interface was allowed, with a 10 min change-over period between interfaces. A students 2-sample t-test , Bland-Altman and regression analysis were employed to statistically analyse the data. Randomisation occurred using the exce RAND command on the sample ID's.

Results 60 healthy subjects were recruited, of which 58 participant's Results were deemed appropriate to study. The mean result of each interface was analysed to indicate no significant differences of CPEF measurements in healthy subjects (CI 95%, p=0.971). There were no significant differences between Age and Gender (CI 95%, Age p=0.453, Gender p=0.902)

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Abstract P139 Table 1 Descriptive statistics of individual subgroups of the study

		Mean ± SD	
		CPEF(f) (L/min)	CPEF (m) (L/min)
Group Total	n=58	512.30 ± 89.40	511.70 ± 87.90
Gender; Male	n=30	584.24 ± 49.43	583.58 ± 48.84
Gender; Female	n=28	435.30 ± 48.60	434.78 ± 43.22
Age; 18-39	n=41	525.00 ± 85.40	523.0 ± 85.2
Age; 40-60	n=18	479.80 ± 95.20	483.70 ± 92.80
CPEFmax	n=58	522.60 ± 89.60	523.80 ± 88.80

with the different interfaces. Analysis of each interfaces' maximal effort ($CPEF_{max}$) indicated no significant differences (CI 95%, p=0.943). Randomised sequence data was analysed, where it concluded that there was no significant influence of interface sequencing on the Results (CI=95%, p=0.671).

Conclusion The study's Results support the hypothesis, suggesting interchangeability of both interfaces. This now offers a platform for further study in the viability of facemask CPEF within the clinical setting, as well as providing a standardised protocol and CPEF reference values.

P140 HYPOXIC CHALLENGE TESTING IN MOTOR NEURONE DISEASE

IJ Cliff, N Mustfa, H Stone. *University Hospitals of North Midlands, Stoke-on-Trent, UK*

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Introduction Respiratory muscle weakness is a feature of motor neurone disease (MND), develops insidiously and presents with subtle symptoms. It can be difficult to assess in MND patients who, as a result, may be at risk of desaturation at altitude. Hypoxic challenge tests (HCT) can identify patients who would benefit from in-flight oxygen, but evidence as to which patients should be referred is lacking. The aim of this study was to identify factors that may predict the need for in-flight oxygen in this group of patients where maintaining their independence for as long as possible is paramount.

Methods 81 consecutive HCT's in 53 male, 28 female patients, and the contemporaneous assessments for respiratory muscle weakness on patients with MND. Data from patients requiring in-flight oxygen according to the HCT was compared to data from patients who did not, in accordance with the BTS Guidance for Air Travel 2011.

Results The median patient age of patients who passed the HCT was 62 years; those that failed the HCT were significantly older with a median age of 68 years (p=0.009). There was a significant difference in baseline PaO_2 and $PaCO_2$ between the groups as shown in Table 1; patients who passed the HCT had higher baseline Pa02 and lower PaC02 (10.4 kPa and 5.3 kPa versus 9.3 kPa and 6.2 kPa respectively p=0.0001 and 0.0014). No other parameter, including BMI, smoking history, or physiological measurement including SNIP, or spirometry, could predict the outcome of the HCT.

Conclusions Although MND patients that are likely to fail a HCT have a higher baseline C02, a threshold C02 value that could identify patients needing in-flight oxygen was not determined. We recommend that the safest approach is to refer all patients with MND that intend to fly for HCT assessment until more evidence-based data is available, which is the current practice at this regional centre.

Abstract P140 Table 1 Demographic data for the 2 patient groups – those that pass and those that fail the HCT

	Pass	Fail
Number of Tests	60	21
Age (Years)	62 (57.5–68.0)	68 (61.5–71.8) **
BMI	24.5 (21.7–28.0)	24.9 (21.5–28.1)
Pack years	8.5 (0.4–15.5)	1.5 (0.0–31.0)
pH	7.43 (7.41–7.45)	7.42 (7.40–7.43)
PaCO2 kPa	5.3 (5.1–5.8)	6.2 (5.4–6.7) **
PaO2 kPa	10.4 (9.5–11.1)	9.4 (8.8–9.7) **
HCO3	26.4 (25.1–27.7)	27.8 (26.9–30.8) **
BE	2.5 (0.9–3.8)	4.5 (2.8–6.1) **
SaO2	95 (95.0–95.0)	96 (95.0–96.0)
SNIP (cmH20)	35.0 (25.0–49.3)	30.5 (21.5–54.0)
FEV1 (L)	2.1 (1.5–2.7)	1.5 (0.77–2.79)
FEV1% Predicted	71.00 (51–93)	53.00 (42–96)
FVC (L)	2.7 (1.81–3.27)	1.8 (1.07–3.08)
FVC% Predicted	69 (46–87)	71 (54–89)
FEV1/FVC	83 (77.5–90.0)	77 (65.8–84.9)

** denotes significant difference between the groups with a p value<0.01

P141 PULMONARY FUNCTION TEST PHYSIOLOGY AND PROGRESSION IN DIFFUSE IDIOPATHIC PULMONARY NEUROENDOCRINE CELL HYPERPLASIA (DIPNECH)

[1]J Barlow, [2]D Ryan, [3]W Mansoor, [3]M Howell, [4]N Clayton, [4]R Niven. *[1]University of Manchester, Manchester, UK; [2]Beaumont Hospital, Respiratory Department, Dublin, Ireland; [3]The Christie NHS Foundation Trust, Manchester, UK; [4]North West Lung Centre, University Hospital South Manchester, Manchester, UK*

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