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Evaluating current physiotherapy airway clearance management for Bronchiectasis patients admitted for intravenous antibiotics

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Introduction

Research has shown that physiotherapists across the UK use a variety of Airway Clearance Techniques (ACTs) in stable bronchiectasis (Bx). This study provides novel qualitative data analysing changes in airway clearance of exacerbating Bx patients.

Aim

To analyse changes in airway clearance techniques during an exacerbation.

Method

Patients admitted with an exacerbation of Bx completed a physiotherapy assessment alongside a visual analogue scale (VAS) for ease of clearance (EOC) and Leicester cough questionnaire (LCQ) on admission and discharge. Changes in ACTs and clinical reasoning were recorded.

Results

Twenty patients were included (Table 1). Eighty percent had their technique altered from admission to discharge (Figure 1) in parallel with a statistical improvement in their LCQ and EOC VAS (Table 2). Overall there was a 60% increase in the use of modified postural drainage (mPD) as an additional adjunct and a 25% increase in oscillating positive expiratory pressure (OPEP). Fifteen percent were changed to autogenic drainage (AD). Of those using ACBT on admission (65%), 46% had mPD added, and 46% had both OPEP and mPD added. Most common reasoning for change were lower lobe secretions (mPD or OPEP added) or airway irritability (AD).

Conclusion

Previous studies have shown ACBT is a prominent ACT. However, our results suggest ACBT is rarely used in isolation. A large proportion of patients were advised to complete mPD. Evidence suggests mPD is effective but often unpopular; therefore further follow up should be completed to ascertain if this remains suitable for the patient during stability.

Table 1: Demographic data

N=20	Median (IQR)
Age	58 (46-71)
Male/Female	3/17
Length of stay	11 (10-12)
FEV1	1.28 (0.78-2.19)
FVC	2.48 (1.91-3.12)

Table 2: Median differences in outcome measures pre and post admission

	Median (IQR) pre score	Median (IQR) post score	Wilcoxon Z score
LCQ	66 (51-89)	86 (75-102)*	-2.778
EOC VAS	4.3 (2.2-7.9)	7 (6-8.4)*	-3.828

*p>0.005

Figure 1: Airway clearance technique on admission

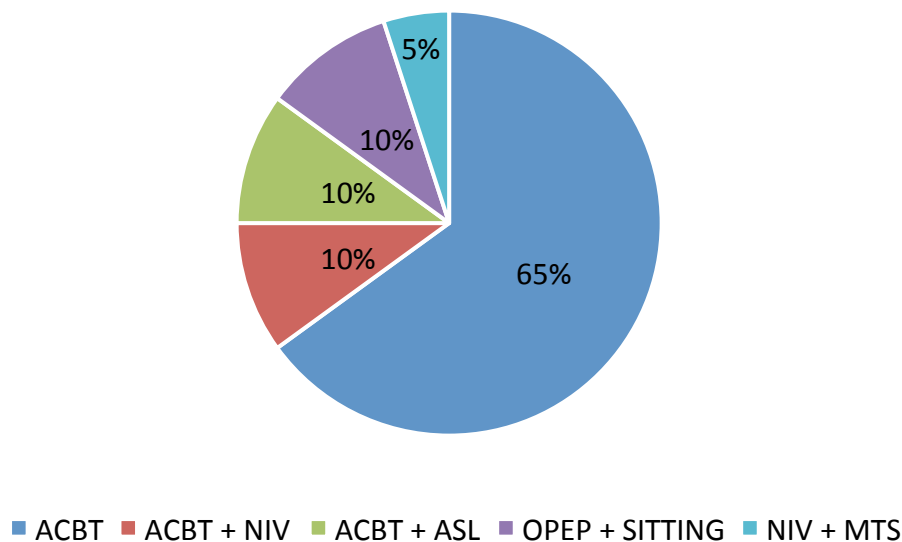
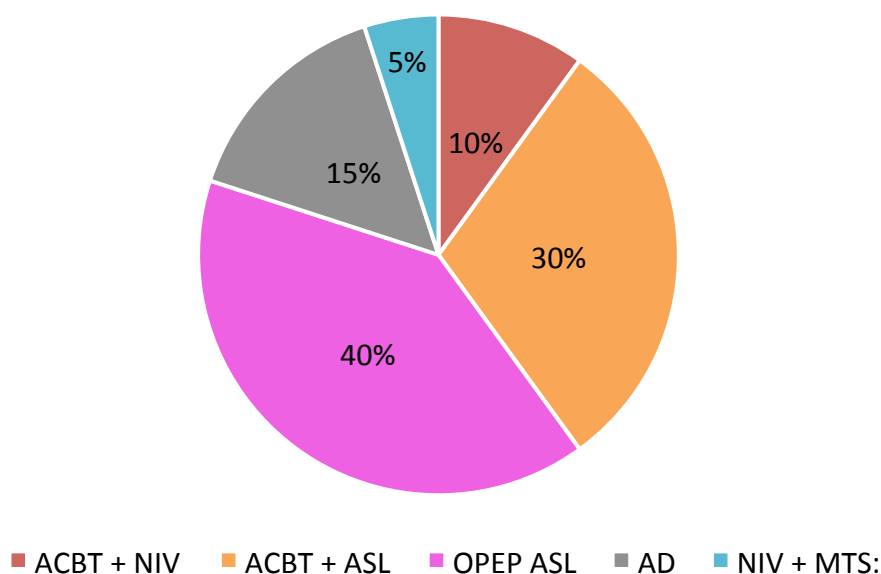


Figure 2: Airway clearance technique on discharge



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Recording breathing pattern using a contactless optical device (Structured Light Plethysmography (SLP))

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Introduction

Structured Light Plethysmography (SLP) is a motion analysis system which uses PC gaming techniques to record breathing movements and extrapolate timing and volume estimates. Measurement validity of SLP compared to other non-invasive devices has not been determined.

Aim

To examine the measurement validity of SLP by comparing recordings at rest and after exercise on a cycle ergometer with data from the current “reference standard” non-invasive device - Respiratory Inductive Plethysmography (RIP).

Methods

Fifty healthy adults (30 males) with mean age 29 (SD 6.79) were studied at rest and after 10 minutes moderate exercise. Simultaneous breathing pattern recordings were taken by RIP and SLP. Bland and Altman plots (plus 95% limits of agreement) were used to examine agreement between devices. Paired-sample T-tests looked for significant differences between measurements.

Results

Good agreement with no significant differences ($p > 0.05$) between devices was found for all timing components before and after exercise. Good agreement was found between SLP and RIP for all regional contributions to chest wall motion at rest, but not after exercise. When “customised” regional contributions from SLP were compared to respective measurements from RIP, closer agreement was found. Breath-by-breath analysis showed no systematic bias between devices when looking at breathing pattern variability. Low agreement and significant differences ($p < 0.05$) were found for inspiration and expiration volumes, due to different technologies for estimating volume used by each device.

Conclusion

SLP can be considered an acceptable new recording device to assess timing parameters and chest wall motion in healthy adults at rest.

“My goal is staying alive for the next year”: A qualitative interview study exploring perceptions of goals amongst people with COPD

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Introduction

Chronic obstructive pulmonary disease (COPD) is a condition commonly seen by physiotherapists in the context of rehabilitation. Goal-setting is described as a ‘cornerstone’ of rehabilitation, for which patient-clinician collaboration is advocated. Despite support for goal-setting, research in neurology and musculoskeletal settings suggests that patients may struggle to identify goals. However, little research has yet explored goals with patients with COPD.

Aim

To explore perceptions of goals amongst patients with stable COPD.

Methods

A qualitative design was used to explore patient goals and perceptions of goals. Thirteen patients (7 male) aged 45-80 years with mild-very severe COPD were purposively selected. Semi-structured interviews were conducted in patient homes or on a University campus. Interviews were audio-recorded, transcribed verbatim, analysed thematically and managed using NVivo 10. Research reflexivity, constant comparison, negative case analysis and peer review were used to enhance rigour.

Results

All patients described having things they wanted to achieve. However, not all considered such achievements to be ‘goals’, and so not all agreed they had goals. Some patients reported moving towards their goals spontaneously, whereas others described mapping clear pathways to achieving their goals. Physical fitness, social circumstances and life events were particular barriers/facilitators to goal pursuit and achievement.

Conclusion

Patients with COPD may differ in their understanding of, and approach to achieving, goals. This presents a challenge to health professionals working with this group, who may need to consider modifying their language, and adapting the process of goal-setting, to suit the individual’s worldview.

Self-Management in Pulmonary Rehabilitation: A focus group study with ex-pulmonary rehab patients, Breathe Easy support group members and Healthcare Professionals

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Introduction

Pulmonary rehabilitation is associated with positive improvements in functional status, but the benefits obtained in exercise performance, quality of life, and symptoms with pulmonary rehabilitation diminish over time. A recent British Thoracic Society audit revealed that there are significant barriers to attending pulmonary rehabilitation leading to high drop-out rates. This study aimed to explore the factors influencing long-term participation with pulmonary rehabilitation.

Methods

Focus groups were carried out with a purposive sample of ex-pulmonary rehabilitation patients (2 groups, total 4 participants), healthcare professionals (2 groups, total 8 participants) and Breathe Easy support group members (2 groups, total 8 participants). Verbatim transcripts formed the basis for thematic network analysis.

Results

Preliminary analysis revealed global themes including self-management, psychological support and motivation. These were recognised by all participants but expressions of the underlying meaning varied between groups. For example motivation within the healthcare professionals group focussed around the value of a support network and group dynamics; within the ex-pulmonary rehabilitation patients it centralised around the positive feedback from improved outcomes and in the Breathe Easy group the social interaction and friendships were seen as key support mechanisms.

Conclusions

An enhanced understanding of these alternative perspectives between groups is a necessary first step in the development of strategies to facilitate improved long-term active participation with pulmonary rehabilitation programmes.

Nebulised hypertonic saline reduces infection rates and improves quality of life in non-CF bronchiectasis

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Introduction

Nebulised hypertonic saline is widely used in the management of bronchiectasis but there is little evidence to support its use (Hart, et al 2014). Studies within this area are predominantly in people with cystic fibrosis (CF). The service evaluation was undertaken to identify the benefits of 7% hypertonic saline 4ml twice daily and specifically its impact on treatment burden and quality of life in adult non-CF bronchiectasis.

Methods

Nineteen patients with radiologically confirmed bronchiectasis were included. 7% hypertonic saline was trialled and spirometry was undertaken to ensure a drop in FEV1 of more than 15% did not occur. Incidence of infection, the Quality of Life-Bronchiectasis (QOL-B) scores (Quittner et al, 2009) and Leicester Cough Questionnaire (Birring Thorax 2003) score were completed over a six-month period.

Results

Complete data sets were available for 13 patients, mean (range) age 67 (53-80) yrs. Results are shown in the figure and table.

Figure 1: Number of patients requiring antibiotics

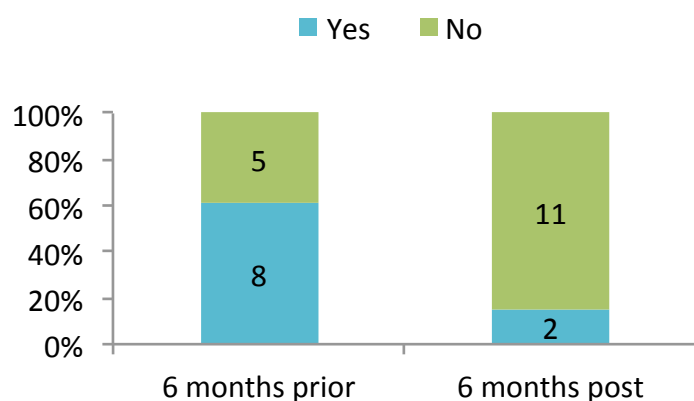


Table 1: Symptom and Quality of Life Scores.

* indicates where between group difference greater than the Minimal Important Difference for that score

		Pre-test Mean	Post-test Mean
QOL-B	* Health perceptions	48.1	61.5
	Physical functioning	55.3	59.5
	Role functioning	64.6	68.7
	* Vitality	46.1	58.1
	Emotional functioning	85.9	87.8
	* Social functioning	51.7	66.0
	* Respiratory symptoms	59.1	69.3
	Treatment burden (n=12)	63.0	67.5
* Leicester Cough Questionnaire		14.0	16.3
MRC Dyspnoea Score		2.6	2.3

Conclusions

There was a significant reduction in infection rates. Improvement was seen in the QOL-B scores and was clinically significant in health, vitality, social and respiration. Interestingly there was no decline in treatment burden which indicates the use of saline may not impose a burden on patients which is unacceptable, but does improve quality of life, increasing its acceptability as a treatment.

The search for an ambulatory oxygen outcome measure for use in the community: A literature review

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Introduction

The six minute walk test (6MWT) is the test of choice for ambulatory oxygen (AO) assessment in the United Kingdom¹. Studies have shown a more cost-effective oxygen service if assessments take place at home² however 6MWT is not suitable for home use, therefore a more suitable measure is required. A literature review was undertaken to identify possible alternative measures.

Methods

AMED, EMBASE, HMIC, Medline and CINAHL were searched using the terms: ambulatory oxygen assessment; 6-Minute Walk Test; exercise tests.

Results

268 abstracts were identified and screened. Articles were included if they compared 6MWT and another exercise test comparing physiological outcomes. Three papers were found for review^{3 4 5}.

Ozalevli et al³ carried out a randomised crossover study comparing 6MWT with standard sit to stand (STS) test. Dyspnoea increased in both tests however heart rate (HR) increased significantly more in 6MWT and SpO₂ dropped only in 6MWT, ($p < 0.05$ for both).

Hagerty et al⁴ compared ADL stations with 5MWT in a randomized cross-over design. Average SpO₂ during the last 30 seconds of the 5MWT were significantly lower than during the ADL stations ($p < 0.05$).

Aguilaniu et al⁵ carried out a crossover study comparing a semi-paced timed chair-rise test (3CRT) with 6MWT. End exercise SpO₂ & HR were not significantly different between tests ($p > 0.05$) and repeatability of both were very similar (0.93 and 0.86 for 6MWT and 0.94 and 0.81 for 3CRT).

Conclusion

SpO₂ & HR responded differently to STS test and ADL stations than 6MWT. However, 3CRT elicited a similar response to 6MWT. The 3CRT shows potential for assessment of AO in the community however further research is required.

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¹<http://slideplayer.com/slide/10903736/> Downloaded 10/02/2017.

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Defining skills and attributes for safe, effective on-call physiotherapy practice: a modified Delphi study

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Introduction

Clinical competence relates not only to operational skills, but also to non-operational attributes such as communication and decision making. The relative importance of different non-operational attributes is likely to vary between physiotherapy specialties depending on the nature and context of patient problems. Within respiratory care, on-call physiotherapy is often delivered by both respiratory and non-respiratory physiotherapy staff. Consensus as to skills and attributes required for safe, effective on-call practice would help guide future training strategies.

Aim

To identify those attributes, clinical reasoning methods and non-operational skills deemed important for safe, effective on-call physiotherapy by a panel of cardiorespiratory experts and postgraduate physiotherapy students.

Methods

Nine expert physiotherapists were asked, 'what makes a safe and effective on-call respiratory physiotherapist?' A comprehensive list of statements was compiled, grouped into themes and summarised. The expert panel and 27 postgraduate cardiorespiratory students ranked their top 5 most important factors and were invited to add additional items. The accumulative ranked list was returned to the participants for further ranking until consensus was reached.

Results

'Ability to balance benefits versus risks of treatment' was ranked the highest by 100% of experts and 80% of postgraduate students. 'Knowledge of his/her limitations' and 'ability to clinically reason a broad range of scenarios' were ranked second and third respectively.

Conclusion

On-call training programmes should explore and address clinical reasoning skills, particularly with regard to the complexities of balancing perceived risks and benefits of treatments and the limits of ability or scope of competent practice in individual on-call staff.

Using Models for Change to Improve Exercise Provision on the Cystic Fibrosis Unit

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Introduction

Our 2015 CF service peer review recommended 'provision of supervised exercise sessions for all inpatients'; highlighting an area for improvement.

A 'Tools for Change' course helped identify issues and assisted finding and delivering solutions within current resources.

Aim

To improve delivery and uptake of exercise for CF in-patients.

Objective

Eighty per cent of in-patients admitted with CF to have a personalised written exercise plan.

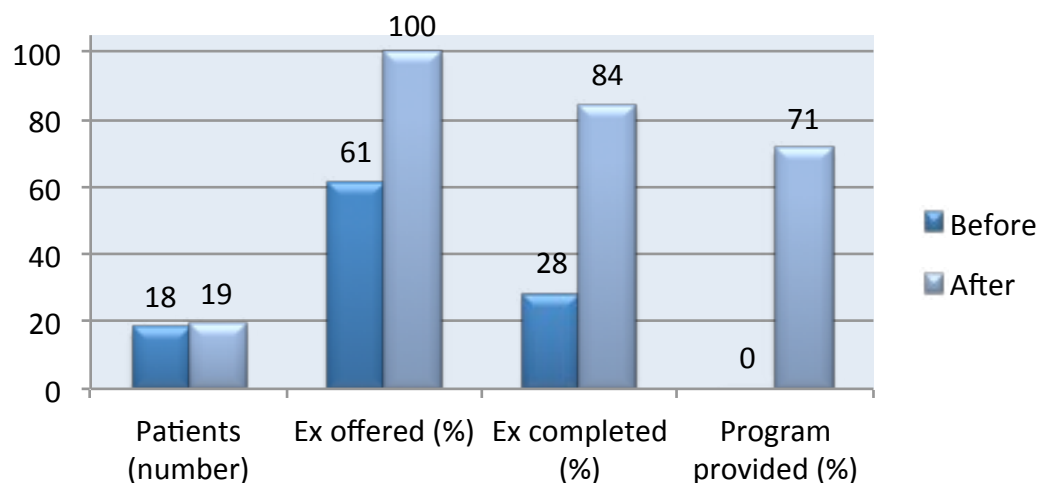
Methods

1. A 'Gemba walk'; watching an exercise session and obtaining a patient's views, identified problems in current exercise provision.
2. Stakeholders were identified and their opinions were obtained. An 'elevator pitch' succinctly stated why the project was important and its aims; helping people understand the need for change.
3. Objectives were decided that were achievable in the timeframe and within current resources.
4. Data were collected for 6 weeks before and after project launch and included exercise offered, exercise undertaken and written exercise program provision.
5. An information leaflet on exercise and a computerised 'exercise library' were developed.
6. In-patient exercise programs launched.

Results

- Figure 1 shows information on patient numbers, provision and uptake of exercise.
- MDT members are encouraging exercise more; 'exercise bike and weights' was a medical plan.
- The dietician is advising on exercising with diabetes.

Figure 1 Provision and uptake of exercise



Conclusion

Provision of exercise has improved on the CF unit to just under the 80% target. Exercise program provision will continue and is expected increase as familiarity increases. Future work will assess the quality and efficacy of these programs.

Physiotherapy students' experiences of completing a "shadow" on-call: the considerations that clinical educators and academics could make to maximise the learning experience

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This reports on data collected as part of an undergraduate research dissertation project submitted in 2015

Introduction

Completion of a "shadow" on-call at undergraduate level has been recommended as a cost effective way for graded exposure and opportunities for this are being provided. However, the experiences obtained from these are not reported in literature and identification of these are pertinent in supporting future practice education to ensure experiences are of maximal value.

Purpose

At Cardiff University an undergraduate student explored student physiotherapists' experiences of completing a shadow on-call whilst on clinical placement; this will present on one theme that emerged.

Methods

A qualitative research approach using face-to-face, semi-structured was completed with three final-year students. Verbatim transcription and thematic analysis was employed alongside triangulation, reflexivity and an interview guide based on a review of available literature. Data was analysed using thematic analysis.

Results

One theme will be presented: the considerations that clinical educators and academics could make to maximise the learning experience. Multiple data quotes from multiple participants are provided to corroborate the theme.

Conclusion

Clinical educators and academics can use the findings of this work to inform future practice when providing opportunities for students to complete a shadow on-call. This work begins to address a gap in the literature. Further work in this area is warranted with both undergraduates and newly qualified physiotherapists.

No funding was received.

Ethical approval for the study was gained from the Cardiff University School of Healthcare Sciences Board of Ethics Committee in August 2014.

Critical Care Rehabilitation: Assessing the patient benefit and economic impact of service redesign

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Introduction

Previously, at the Countess of Chester Hospital, when a patient was discharged from Critical Care to the ward the patient would be followed up by the ward therapist to continue their rehabilitation. Since 2014, patients ventilated for more than 4 days or those with significant rehabilitation needs are followed up by the specialist Critical Care therapists to the point of hospital discharge.

Objectives

Compare the new and old pathways in terms of hospital length of stay, intensive care length of stay, discharge destination and mobility status on discharge.

Method

Data was collected retrospectively (2011-2013) for the old pathway (n=20) and (2014-2016) for the new pathway (n=75). Quantitative data was collected and median and averages were used to analyse the data. The Manchester Mobility Scale was used as an outcome measure.

Results

The impact on ICU length of stay, discharge destination and mobility status were analysed, along with predicted cost savings.

	Old pathway	New pathway
Intensive Care Length of stay	20.5	18
Mobility Status	Independent 15%	Independent 40%
Discharge destination Home	Home 55%	Home 77%

The reduction in ICU length of stay resulted in a cost saving of £233,812.

Conclusion

The new pathway improved patient's functional outcome, reduced ICU length of stay and increased the number of patients who were discharged home from the acute hospital.

Respiratory Physiotherapy On-Call Services: Demonstrating the importance of annual review and evaluation to understand capacity, demand and complexity

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Introduction

As supported by the ACPRC position statement all trusts providing acute medical and surgical services should ensure patient access to respiratory physiotherapy 24 hours a day, seven days per week. However a number of services are experiencing greater demands exceeding capacity and putting pressure on existing resources.

Aim

Lancashire Teaching Hospitals is a regional trauma centre providing a 24/7 day respiratory physiotherapy on call service. Previous therapy staffing restructures, recruitment and retention issues and a recent Care Quality Commission (CQC) inspection identifying concerns regarding staff competencies prompted a thorough service evaluation.

Methods

Several methods were combined to capture a comprehensive view of the current service. These included a survey of all staff who participated in the on-call service to gauge competence and confidence of their skills, staff job roles were analysed via focus groups to consider their exposure to respiratory working, quantitative data auditing the demands of the service including frequency, time and speciality of call outs were examined as well as liaison with executive stakeholders of the on-call service at the Trust.

Result

These actions resulted in significant modifications to the physiotherapy on-call service delivery including the introduction of a compensatory rest policy. A change management approach was utilised to implement new ways of working and continuing leadership of the service is planned.

Conclusion

The importance of this review demonstrates the need to evaluate on-call services within the current demands of acute care to promote the sustainability of life-saving respiratory care to patients by physiotherapists.

Can a physiotherapy led telemedicine service in home mechanical ventilation improve patient care?

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Introduction

The University Hospital Southampton home ventilation (HMV) facility is a tertiary service currently serving over 300 patients across the Wessex region. Many of the patients have complex needs and are located in rural areas of the region, making hospital review visits difficult. The use of remote monitoring in HMV is rapidly evolving and allows the clinician to view a patient's ventilation data and change ventilator settings in a timely fashion, without the need for patients to attend the hospital clinics.

Method

This project evaluated the use of remote monitoring in HMV for a small cohort of patients, referred to UHS for longterm ventilatory support. Patients were selected according to their suitability for remote monitoring. Patients were advised that their ventilation data would be monitored daily/weekly by a Physiotherapist. Ventilator settings were changed via Encore Anywhere if required and patients/carers were informed of these changes via a telephone call.

Results

Six patients have been selected for remote monitoring of their HMV over a six month period (June-December 2016). A total of two hospital admissions, 11 hospital visits and six domiciliary visits have been avoided over the six month period.

Conclusions

This telemedicine project is still in its infancy but has already shown benefits, in terms of reducing the need for domiciliary and hospital visits, as well as acute hospital admissions. These preliminary findings suggest financial benefits as well as significant improvements in both quality of care and patient experience, when using remote monitoring systems in HMV.

Ear acupuncture for anxiety in patients with COPD: Is it feasible?

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Background

Pulmonary rehabilitation (PR) is the key treatment to improve physical, emotional and social functioning for patients with COPD (NICE 2010), but anxiety and depression often prevents patients gaining maximum benefit. Any therapy that reduces anxiety or depression should therefore increase effectiveness of PR. Acupuncture has been found to reduce anxiety in other groups, but its impact on COPD associated anxiety is unknown.

Aim

Feasibility study of ear acupuncture (EA) as adjunctive treatment to patients with COPD attending PR programmes.

Method

Patients diagnosed with COPD and referred for PR at UHSFT, were eligible. Participants were randomised into 2 groups: Group A had real EA in the form of indwelling gold plated “seeds” at the appropriate acupuncture point; Group B had sham EA (seeds placed on an area of the ear with no known EA points). Seeds in both groups were to be pressed whenever participants felt anxious or breathless. Seeds were replaced once weekly, for six weeks. Primary outcome: Hospital Anxiety and Depression Scale (HADS).

Results

17 participants were recruited. 1 participant found EA unacceptable and withdrew. The 16 remaining participants found wearing the ear seeds acceptable. There were significant improvements from baseline to outcome in both anxiety ($p=0.015$) and depression ($p=0.01$) on HADS within the real EA treatment group, but not the sham group. No between group differences were detected at outcome.

Conclusion

Ear acupuncture was a feasible adjunctive treatment option for this sample of patients with COPD, attending PR. A larger trial is needed to confirm effectiveness.

For patients with idiopathic pulmonary fibrosis, a pulmonary rehabilitation maintenance class using interval training appears equivalent to a standard maintenance class in terms of exercise capacity and health-related quality of life

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Introduction

Idiopathic pulmonary fibrosis (IPF) is a progressive, life limiting disease with limited options for treatment and management. Conventional pulmonary rehabilitation (PR) improves functional exercise capacity in the IPF population, but gains within a PR programme appear to deteriorate within 3-6months after PR.

Aims and Objectives

This pilot study investigated whether PR maintenance (PRM) classes for patients with IPF could maintain gains in exercise capacity and HRQoL following PR and whether interval training in PRM was better tolerated by patients in comparison to a standard care PRM.

Methods

After completion of standard PR, five participants (mean age 70yrs (58-80), 4male) first completed 6 weeks of standard PRM and then 6 weeks of interval training PRM. All participants completed incremental shuttle walk tests (ISWT) and HRQoL questionnaires before and after both PRM programmes.

Results

Interval training was well tolerated and feedback was very positive. A non-significant group mean gain of 16m (422m vs 438m, $p=0.60$) in ISWT was observed after 12 weeks of maintenance classes compared with end of PR scores, with 4/5 improving or maintaining their PR scores overall. There were no significant differences in HRQoL scores (within normal ranges throughout) or ISWT distance gain (10m vs 20m respectively) between the standard PRM and interval training PRM programmes.

Conclusion

This small pilot study suggests that interval training is well tolerated and promising for patients with IPF. Both standard PRM and interval training PRM classes may limit regression of functional exercise capacity gains following PR, although these findings should be confirmed by a larger trial.

A service evaluation of physiotherapy in children with difficult to control asthma: Analysing outcomes before and after intervention

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Introduction

There is limited research around physiotherapy for children with asthma. We evaluated our dedicated out-patient physiotherapy service for children with asthma, which tailors asthma education, breathing techniques based on buteyko principles, and diaphragmatic breathing with inhaler technique, around individual children's needs.

Method

We reviewed data before and after physiotherapy in children referred in 2016 who completed the programme (average four sessions). Outcomes included Asthma Control Test (ACT) scores, attainment of personal goal, Nijmegen hyperventilation score, and structured assessment of breathing pattern disorder (BPD) (e.g. upper chest breathing).

Results

Of 212 referrals, 104 children attended and completed their physiotherapy programme, and are described here (79 are currently receiving input).

In 89/104 who completed an ACT before and after physiotherapy there was an average improvement of 5 points (3 point change is clinically significant). 77/104 set an individual goal, of which 71 (92%) felt they achieved this after physiotherapy input. In 67/104 who completed a Nijmegen questionnaire before and after intervention there was an average improvement of 9 points. 98/104 (94%) had a BPD before physiotherapy, and only 6/104 (6%) afterwards.

Conclusion

Children receiving physiotherapy interventions achieved personal goals, and demonstrated improvements in asthma control, hyperventilation symptoms and BPD.

Limitations

Observational studies demonstrating interventional benefit are prone to confounding factors. Additionally the relevance of the Nijmegen questionnaire score is unknown.

Future

We are currently collecting data around hospital admission rates pre and post physiotherapy intervention. A randomized controlled trial evaluating butyeko based physiotherapy programmes for children with asthma would help determine clinical and cost effectiveness.

Peri-operative breathlessness management in lung cancer

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Evidence supporting pulmonary rehabilitation in chronic airway diseases has grown in recent years, showing an improvement in dyspnoea, exercise capacity and quality of life. This concept has been applied in lung cancer and other respiratory diseases, and suggests evidence of benefit in these patients¹.

This study aimed to assess the influence of a peri-operative multidisciplinary thoracic rehabilitation group on dyspnoea and self-management of dyspnoea for patients undergoing lung surgery or with suspected or confirmed lung cancer.

The quality improvement project included 50 participants, all of whom were invited to attend a one off thoracic rehabilitation group, consisting of education and an exercise class. Outcomes were the Medical Research Council (MRC) dyspnoea score² and a numerical rating scale³ (NRS) for participants' confidence in managing symptoms of breathlessness. Scores were recorded prior to the intervention and two weeks post intervention. 33 (67%) participants fully attended the group, 8 (16%) attended the education component only and 9 (18%) did not attend.

A Wilcoxon signed-rank test demonstrated a thoracic rehabilitation group did elicit a statistically significant change in both MRC dyspnoea score ($Z = -4.38$, $p = <0.001$) and NRS for confidence ($Z = -3.91$, $p = <0.001$). The median [IQR] scores pre-intervention for MRC dyspnoea were 4 [3-5] and NRS for confidence were 3 [3-7], compared with post-intervention scores of 3 [2-4] and 7.5 [5.25-8], respectively.

These results are promising for the future of improving outcomes in patients with lung cancer undergoing surgery, through the use of a pulmonary rehabilitation style programme.

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Does surgical rib fixation affect the rate of pulmonary complications following major trauma?

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Introduction

Flail chest injuries cause significant morbidity and are associated with prolonged periods of mechanical ventilation and post traumatic pneumonia^{1,2}. Recent evidence of surgical rib stabilization has been shown to be associated with reduced ventilator days, lower incidence of pneumonia, and reduced medical costs³. Surgical rib stabilisation was introduced at our hospital in July 2015.

Aim

To evaluate the impact of surgical fixation of flail chest on development of post injury pulmonary complications.

Method

Data was collected from all patients admitted to a large West Midlands multi trauma centre with flail chest injury between November 2015 and August 2016. Primary outcome was development of pulmonary complications, assessed using the Brooks Brunn tool. Secondary outcomes included incidence of mechanical ventilation and tracheostomy rates. Data was analysed using the Fisher exact test.

Results

A total of 36 patients were admitted with flail chest injuries during the trial period, of which 10 underwent surgical fixation (see Table 1). Pulmonary complication rates were significantly higher in the fixation group (90% vs 35%, $p < 0.01$), with higher rates of mechanical ventilation also seen (100% vs 35%, $p < 0.001$). No significant differences were seen in terms of ISS or APACHE II scores between groups at baseline.

Table 1 Results

	Surgical stabilization (n=10)	Conservative Management (n=26)	p
Age	65.1	57.9	
Male n(%)	9 (90)	19 (73)	
ISS	26.6	24	0.409
APACHE	13.9	12.5	0.570
PPC	9 (90%)	9(35%)	<0.01
Mechanically ventilated	10 (100%)	9 (35 %)	<0.001
Ventilator days	11.9	12.8	0.958
Tracheostomy	4 (40%)	8 (31 %)	0.701

Conclusion

Patients admitted with flail chest injury undergoing surgical fixation were more likely to suffer with pulmonary complications and require invasive ventilation. A number of patients in the non-fixation group did meet the criteria for surgical fixation and it is not clear why surgery was not performed. It may be that only those already developing complications were surgically fixed hence the higher rates seen.

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Evaluating Risk Factors that may predict pulmonary complications in patients with chest wall trauma

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Introduction

The development of pneumonia is a significant risk factor for mortality in patients with blunt chest wall trauma¹. Clinical symptoms are not considered an accurate predictor of outcome following blunt chest wall trauma³ and there is a lack of research to identify risk factors for delayed deterioration².

Aims

To identify potential risk factors for development of pulmonary complications for patients following chest wall trauma.

Method

Data was collected from all patients admitted to a large multi trauma centre in the west midlands with ≥ 3 rib fractures between November 2015 and August 2016. Development of pulmonary complications was assessed using the Brooks Brunn tool and analysed for association with a number of potential risk factors identified from previous literature. Data was analysed using the fisher exact test.

Results

71 patients were admitted with ≥ 3 rib fractures during the study period, of which 29 developed pulmonary complications. ISS on admission was significantly higher (23.6 vs 18.2, $p=0.0160$) in the group that developed pulmonary complications (See Table.1.) Those patients who developed pulmonary complications were more likely to be ventilated (Table.2) and had significantly longer duration of mechanical ventilation (12 v 7 days, $p=0.028$) and incidence of tracheostomy (52% vs 13%, $p=0.002$).

Table 1 – Demographics

	Pulmonary complications (n=33)	No pulmonary complications (n=38)	
Age	60.4	56.2	
Male	27 (82%)	28 (74%)	0.5704

	Pulmonary complications (n=33)	No pulmonary complications (n=38)	
Apache II	14.5	12	0.09435
ISS	23.6	18.2	0.01609
Respiratory history n(%)	6 (18%)	6 (16%)	1.000

Table 2 – Outcomes

	PPC's	No PPC's	
NIV ventilated	9	2	0.007
Trache	24	11	0.0001
Vent days	17	5	0.0002
Died	12	7	0.02845
	4	0	0.031

Conclusion

Patients with three or more rib fractures with a high ISS score are most at risk of developing pulmonary complications. When pulmonary complications develop, patients are more likely to require invasive ventilation or NIV and are more likely to have a tracheostomy. This may aid therapists in prioritising therapy for patients most at risk in the future.

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Application of Mechanical Insufflation-Exsufflation in a Cardiac Intensive Care Setting to prevent tracheostomy and aid extubation

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Introduction

Mechanical insufflation-exsufflation (MI-E) is a cough augmentation device often used in a neuromuscular disease population. More recently its use has been explored successfully in other clinical environments. This narrative provides a single patient example of MI-E application within a cardiac intensive care (CICU) environment.

Patient

The patient (Table 1) was initially admitted with pyrexia and lethargy, and was intubated and ventilated due to type I respiratory failure (T1RF) having a hypoxic arrest on induction. They were transferred to CICU with acute mitral valve (MV) stenosis, pulmonary oedema and T1RF. Post MV repair bilateral pneumothoraces were diagnosed. The patient presented to physiotherapy 3/7 post operatively with acute changes on auscultation indicating retained secretions.

Table 1: Patient history

Premature infant 29/40

Congenital mitral valve stenosis, with mitral valve repair at 5/12 old

Bilateral grade 4 intraventricular haemorrhage with hydrocephalus and VP shunt

Cerebral palsy with gross developmental delay (wheelchair bound)

Epilepsy

Recurrent LRTI

PEG fed

Intervention

MI-E (NIPPY Clear way, B&D Electromedical, UK) was initiated in manual mode (+28cmH₂O: -40cmH₂O) via endotracheal tube (ETT). Repeated cycles were followed by closed suction.

Cardiovascular observations (blood pressure, heart rate and rhythm), oxygen saturations and ventilator settings (peak inspiratory pressures, resistance and compliance) were measured throughout.

Outcome

The patient was successfully extubated to non invasive ventilation 3 days following initiation of MI-E. MI-E continued for 2 days post extubation. During this time there were no adverse safety issues, and no acute deterioration in the clinical status of the patient. Tracheostomy was avoided in this patient.

Conclusion

This case study provides example of the safe implementation of MI-E within a CICU setting in a high risk patient to prevent tracheostomy and aid extubation.

Revolutionising critical care (CC) rehabilitation: A service evaluation of the role of therapy support workers (TSW)

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Consistently providing the nationally recommended amount of rehabilitation therapy to patients recovering from critical illness was identified as an area of service improvement. This project aimed to improve patient care by increasing the frequency and intensity of early rehabilitation.

Our Trusts 'Dragons Den' initiative funded the employment of two TSW for one year and the purchase of a cycle ergometer. The TSW's delivered combined occupational and physiotherapy treatments prescribed by registered therapists which were goal orientated and focused on maximising function. This was achieved through early engagement in cycle ergometry, physical activity and cognitive rehabilitation through activities of daily living including personal care and therapeutic activities.

248 patients received 'at least 45 minutes of indicated rehabilitation therapy 5 times a week', achieving compliance with intensive care society guidelines, (2013). Mean length of stay in CC reduced from 5.1 days (2014/2015) to 4.5 days (2015/2016), improving patient flow through the Trust. Our data for in bed cycle ergometry displayed a positive trend of patients standing quicker. Patients demonstrated improvements from baseline to discharge in the Chelsea critical care physical assessment tool (CPAx), Functional independence measure (FIM) and Functional assessment measure (FAM) outcomes.

The employment of TSW appears to be a cost-effective way to improve the quality and frequency of rehabilitation delivered to patients recovering from critical illness and this may lead to reduction in their length of stay in CC, this has justified their permanent employment. Further investigation is warranted regarding hospital length of stay and the patient's long term outcomes.

PAVAR goal setting Improves Health Outcomes in a Physiotherapy-led Community Respiratory Team

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Introduction

Goal setting is an essential component of rehabilitation, fundamental to patient centred practice. It is often hindered by vague non collaborative goals rarely involving the patient. The PAVAR approach allows goal setting tailored to individual chronic needs in which patients are proactive, take responsibility and are included in shared decision making. The five stages of PAVAR are Problem, Achieve, Value, Actions and Results. This project aimed to apply this approach to patients with severe Chronic Obstructive Pulmonary Disease.

Aims and Objectives

Implement person centred goal setting PAVAR and determine its effectiveness in patients with severe COPD in the domiciliary setting.

Methods

Staff were trained on PAVAR framework (see diagram 1) with weekly Peer Support meetings. Patients were given own goal paperwork, set their own goals and worked to achieve this with team support. Patients scored their goal(s) attainment post intervention from 0% (no success) to 100% (complete success). Quality of life and impact of disease improvements were assessed using the COPD Assessment Test (CAT) pre and post intervention.

Results

Mean patient scored goal attainment was 82% in 234 patients who completed the pilot. CAT score decreased by a mean of 5 points, a change of 2 is clinically and statistically significant, $p=0.001$. There was a statistically significant association between goal attainment and CAT score (figure 2).

Conclusion

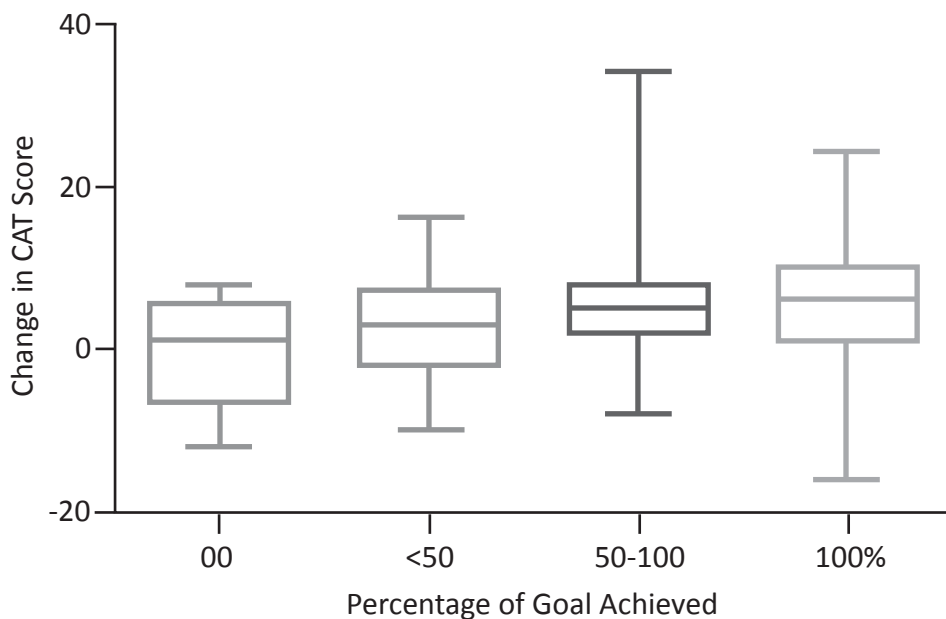
This pilot suggests that PAVAR goal setting can improve impact of disease and quality of life in COPD. This was not a randomised controlled trial however and further work is required to prove the utility of this method in chronic disease management.

Diagram 1: PAVAR APPROACH

PAVAR

Problem	<p>Patient Problem</p> <p>What is the problem that the patient describes and identifies</p> <p>Using agreed prompt questions</p> <p>Documented in the patients own language</p>
Achieve	<p>Patient Goal</p> <p>What does the patient wish to achieve</p> <p>This should be written as a SMART goal in the patients language</p> <p>The Miche behaviour wheel of change is utilised to effect a positive behavioural change in the patient</p>
Value	<p>Patient Value</p> <p>What would achieving this goal mean to the patient. Values are known to increase a patients motivation to change</p> <p>Patient prioritises their own goals</p>
Actions	<p>Patient Action Plan- include <i>if then</i> plans of</p> <p>What, when, where and how are they going to undertake to achieve their goals and also identification of contingency plans</p>
Results	<p>Patient Results</p> <p>Regular joint monitoring of the patients progress to their own goals</p> <p>The patient scores their own achievements to show to what extent they feel they have achieved their goal on a scale of 0-100 (0 being not achieved and 100 being fully achieved)</p>

Figure 2: Correlation between CAT Score and Goal Setting



A Root Cause Analysis (RCA) of barriers to physiotherapist-led extubation assessment

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Introduction

Extubation failure is associated with worse patient outcomes in the Adult Intensive Care Unit (AICU) (Thille et al 2013). At Guy's and St Thomas' NHS Foundation Trust (GSTFT) physiotherapists assess suitability for extubation in the AICU according to locally agreed guidelines. A retrospective casenote audit was conducted revealing sub-optimal adherence to said guidance particularly regarding completion of spontaneous breathing trials and feedback of physiotherapy assessment findings to the multi-disciplinary team (MDT).

Aims

To perform an RCA to identify barriers to physiotherapy-led extubation assessment in AICU at GSTFT.

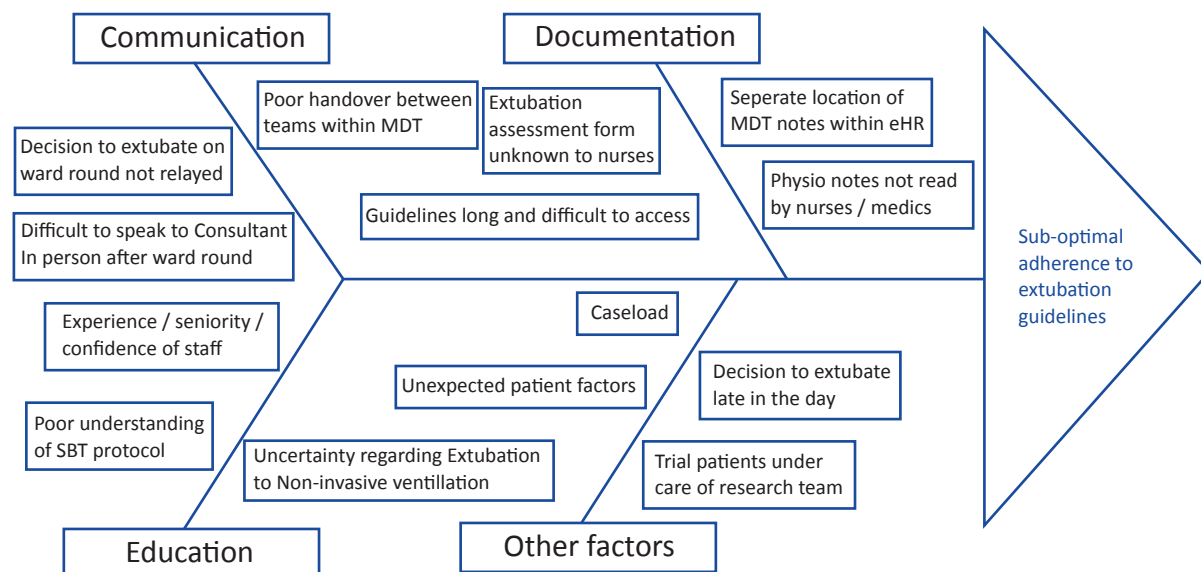
Methods

Semi-structured interviews with the MDT (medical team, nursing staff and physiotherapists) were conducted to explore barriers to physiotherapist-led extubation assessment. Transcripts of the interviews were recorded and themes were identified.

Results

Broad themes identified as barriers to physiotherapist-led extubation assessment were communication, documentation and education. All members of the MDT highlighted issues within these themes. See figure 1 for fishbone analysis.

Figure 1. Fishbone Analysis of Barriers to Extubation Assessment



Conclusions

Physiotherapist-led extubation assessment could be further facilitated by ensuring MDT buy-in and a collaborative approach particularly with regards communication, documentation and education. This could advance the goal of timely and appropriate extubation practices in the AICU.

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A single case study of the use of Philips Respironics DreamStation positive airway pressure device during chest clearance in an adult Cystic Fibrosis patient

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Introduction

Cystic Fibrosis (CF) is a genetically inherited condition. A cycle of infection and tissue damage occurs, leading to lung disease and failure. Optimisation of sputum clearance is a key focus, with little evidence supporting the use of any one technique or device. Intermittent positive pressure breathing (IPPB) is a commonly used chest clearance adjunct, but is no longer in production. This case reports the use of an alternative positive airway pressure device as part of airway clearance treatment in an adult CF patient with moderate lung disease.

Intervention

Usual treatment consisted of inhaled mannitol dry powder, IPPB and Autogenic Drainage (AD).

Mannitol was taken before treatment. The DreamStation bi-level ventilation device (Philips Respironics) (Table 1) replaced IPPB, with AD being modified to Forced Expiratory Technique (FET).

Four cycles of ten normal breaths with four FET breaths using the DreamStation were performed. Further FETs without the DreamStation were then used to expectorate secretions.

Table 1: Ventilator settings (delivered via a mouthpiece)

IPAP	EPAP	Rise time
26cmH ₂ O	4cmH ₂ O	3 (400ms)

Outcome

Self-reported ease of use, effectiveness at clearing sputum and perceived sputum quantity were assessed on a ten point Likert scale. Results indicated a greater ease of use and effectiveness with increased sputum clearance compared to usual treatment, with benefits improving over time. Subjective feedback indicated optimal device effectiveness when the patient felt most productive and mannitol was used beforehand. Cardiovascular parameters were stable and no adverse responses occurred. A slight drying sensation in the throat was the main aggravating factor.

Conclusion

This case report demonstrates the potential use of the DreamStation to facilitate chest clearance in an adult CF patient.

A feasibility study to investigate the effectiveness of using a Mechanical In-Exsufflator (MI-E) device for lung volume recruitment via positive pressure breathing as an alternative to the Mark 7 Respirator Intermittent Positive Pressure device (IPPB)

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Introduction

Intermittent Positive Pressure Breathing (IPPB) via the Mark 7 Respirator has been used successfully for many years. Due to reduced demand of this product replacement and servicing of this device is difficult and costly. There are now Mechanical In-Exsufflator (MI-E) devices that can operate in an IPPB mode.

Objective

To explore the feasibility of using an MI-E device (NIPPY Clearway) in an Intermittent Positive Pressure Breathing (IPPB) mode as an alternative to the Mark 7 Respirator for patients with retained secretions.

Method

A before and after observational study design which included:

- Patients with reduced lung volumes who are at risk of respiratory complications.
- Patients with retained secretions who are unable to clear effectively secondary to poor respiratory effort.

An MI-E device was established in an IPPB mode. A protocol, treatment pathway and audit tool was used over a 5 month period.

Results

32 patients were included categorised in terms of severity of illness. The mean severity score was 3.4/6. 100% found the MI-E device as an effective IPPB tool and reported the device easy to use and effective.

Outcome measure	Percentage of patients pre IPPB	Percentage of improvement post use
reduction in oxygen saturations	75	79
retained secretions	87.5	96
increased RR	28	77
reduced breath sounds	69	100
focal changes on CXR	69	64
unable to take a deep breath	41	46
Improvement in FVC	16	60

Conclusions

In this study the use of IPPB via a MI-E device was an effective cost effective treatment strategy for patients with respiratory compromise.

A pragmatic service evaluation of the implementation of the Florence (FLO) telehealth system in the early pulmonary rehabilitation (EPR) management of people with Chronic Obstructive Pulmonary Disease (COPD) following acute exacerbation

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Introduction

NICE guidelines recommend early PR for people following AECOPD. Potential problems highlighted have been associated with adherence and safety. FLO Simple Telehealth has the potential to address these problems.

Aim

To conduct a comprehensive pragmatic service evaluation assessing the feasibility of implementation of FLO telehealth within EPR following acute exacerbation of COPD (AECOPD).

Methods

Semi-structured interviews were conducted and the CRQ, GAD-7 and PHQ-9 questionnaires were administered prior to and following FLO telehealth to support EPR. Qualitative data analysis involved the use of the COM-B theoretical framework and NVivo Software.

Results

Six participants were interviewed at baseline. Three participants commenced and completed EPR and were interviewed at follow up. Interview data demonstrated that FLO was acceptable prior to and following EPR in a small number of participants. Questionnaire response was poor prohibiting triangulation of data.

Conclusions

FLO was found to be feasible in clinical practice and acceptable to service users. Strengths of the evaluation included the identification of factors to improve the implementation of FLO within EPR. Limitations were predominantly associated with small sample size and questionnaire response rate. Further evaluation of the clinical and cost effectiveness of FLO for supported EPR and self-management is warranted.

Feasibility of inspiratory muscle training (IMT) in people with Chronic Obstructive Pulmonary Disease (COPD) who decline pulmonary rehabilitation (PR)

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Introduction

NICE guidelines recommend PR for the management of COPD, yet adherence and attendance is poor. IMT may be a potential treatment option for those that decline PR.

Aim

To assess the feasibility of undertaking a pilot randomised controlled trial (RCT) assessing the clinical and cost effectiveness of IMT in people with COPD who declined PR.

Objectives

Assess recruitment and attrition rate and reasons for dropout, adherence with and acceptability of IMT, outcome measures, research tools and study protocol, attitudes to PR, IMT and other treatment interventions.

Method

IMT participants received 8 weeks of home-based IMT with supervised visits once weekly by a physiotherapist. Training continued unsupervised for a further 18 weeks. Semi-structured interviews were conducted at baseline and six months.

Outcome measures

Spirometry, inspiratory muscle strength, accelerometry and quality of life questionnaires measured at baseline, eight weeks and six months. Adherence data from the IMT device and participants' diaries.

Results

11 participants were interviewed and 10 participants commenced IMT training, seven participants completed the follow up assessment. IMT was found to be acceptable and adherence was high. Study design was acceptable however adherence with paper diaries was poor.

Conclusions

A pilot RCT to establish efficacy and cost-effectiveness of IMT in those who decline PR was found to be feasible.

Training to support the delivery of a physical activity intervention for bronchiectasis: ‘LIVELY in BE.’

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Introduction

Evidence highlights the need for patients with Bronchiectasis (BE) to become more physically active¹, but few resources are available to facilitate education and implementation of methods to promote physical activity (PA) in BE.

Aim

To translate our research on PA into practice, and create resources to support the delivery of PA in BE.

Methods

Stages included:

- Development of Health Professional (HP) and patient materials: involved translating findings from our research on PA in BE, and from the LIVELY COPD study²,
- Conducting HP training workshops in Northern Ireland: included provision of intervention materials and pedometers to attendees,
- Post-workshop mentorship programme to facilitate translation,
- Collection of information on the integration of the intervention into practice.

Results

‘LIVELY in BE’ is a home-based pedometer-driven walking intervention for patients with BE. It includes materials to support HPs delivering the intervention to the patient. Patients use a manual at home to plan and record walking.

13 HPs (10 physiotherapists, 3 nurses) received training mostly via group-based workshops. Feedback was positive: all were satisfied / very satisfied with the workshop content and felt confident / very confident to deliver the intervention: “Good to have research based approaches in practice.” Feedback was incorporated into the materials for future workshops.

HPs have started to deliver the programme in clinical practice [n=4 patients so far] and we are evaluating the impact of the intervention on patients’ physical activity.

Conclusion

‘LIVELY in BE’ resources will be made available online. An evidence-based PA intervention can now be delivered to patients with BE.

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Patient perceptions of a physical activity intervention and pulmonary rehabilitation from the LIVELY COPD project

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Introduction

Pulmonary rehabilitation (PR) is recommended for people with COPD, and there is increasing research in physical activity interventions (PAI). However, there is limited research exploring patients' perceptions of PR or PAIs in COPD. The LIVELY COPD project was a randomised controlled feasibility trial investigating the effects of a PAI and PR on physical activity (PA) in people with COPD.

Aims

To explore patients' perceptions of the PAI or of PR delivered within the LIVELY project.

Methods

Semi structured interviews were conducted. Interviews were recorded and transcribed verbatim. Transcripts were analysed using template analysis (King 1998).

Results

N=32/50 (16 PAI:16 PR) participants completed interviews: mean age (SD), PAI, 61(8) yrs; PR, 67(7) yrs; PAI, 10M; PR, 7M. Five core themes were identified in the semi structured interview schedule (1) Perceived benefit and impact of PAI/PR on health; (2) Views and satisfaction with PAI/PR; (3) Adherence to the PAI/PR; (4) Views about outcome measures; (5) Views about continuing exercise/PA. These core themes were common to both groups; however, there were differences in the sub themes which emerged through analysis of the transcripts. Patients in both groups experienced a range of benefits through participation in the PAI/PR and in general participants were satisfied with their respective programme. Barriers to adherence were encountered in both groups; there was a stronger emphasis on facilitators in the PAI.

Conclusions

This research has given us a deeper understanding of patients' experiences about these interventions; particularly how individual's views could help personalise their treatment and promote adherence.

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Outpatient physiotherapy for non-cystic fibrosis bronchiectasis and patient's perception of airway clearance techniques: A service evaluation

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Introduction

National guidelines for non-cystic fibrosis bronchiectasis (nCFB) recommend best practice for physiotherapists. Primarily airway clearance techniques (ACTs) should be taught to those with nCFB to increase sputum clearance and promote self-management (Pasteur, Bilton and Hill 2010, Bott et al. 2009). Patient preference for ACTs is not demonstrated in the current literature. It was therefore decided that an evaluation of current practice would inform best practice.

Aims and Objectives

1. To assess whether adults with nCFB were offered physiotherapy treatment in line with national guidelines.
2. To understand perceived effectiveness and preference of ACTs in nCFB.

Methods

A postal questionnaire was sent to 188 individuals with nCFB who had been treated by outpatient physiotherapists across one NHS hospital trust between 1st September 2014 and 31st August 2015.

Results

ACBT was taught to 82.9% of patients, PD to 38.2% and oPEP to 23.9%. ACBT was the most preferred method and PD the least. ACBT was perceived as both the most and least effective ACT. Physiotherapy was shown to significantly reduce time spent completing chest clearance ($t= 5.507, p \leq 0.05$).

Conclusions

Current practice appears to be in line with recommendations however improvements need to be made in the use of PD and oPEP. All ACTs have mixed perception and perceived effectiveness therefore physiotherapists need to be aware that an individuals' needs should be considered and alternatives explored.

Designing a package of on-call education and support: easing the anxious physiotherapist into their respiratory on-call duties and beyond

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Introduction

There is the expectation that Physiotherapists working within the acute hospital setting will participate in respiratory on-calls. For junior staff, this can be an intimidating duty. We have therefore developed a package of education, practical application and support in order to consolidate their learning and prepare them for being on-call.

Objective

To improve physiotherapists competence and confidence when working on-call in a large acute district general hospital.

Methods

A cohort of 10 staff was put through the eLearning programme followed by a simulation (SIM) based training session. We utilised the ACPRC Self-evaluation of competence questionnaire, pre and post training, and 'Satisfaction with Simulation Experience Scale' post SIM. In addition to this, we provide a 'Buddy' system of senior respiratory physiotherapists providing telephone advice; ALERT training and biannual on-call update sessions to ensure continuing support.

Results

Evaluation is ongoing, however initial analysis showed that 100% of participants would recommend completing this training. Thematic responses have indicated that the SIM training was beneficial in several respects and we are continuing to develop and evaluate this. The eLearning is still under development and will be evaluated separately.

Conclusion

This package enhances the competence and confidence of the junior staff new to on-call and out of hours duties.

Methods of assessing the effect of Continuous Positive Airway Pressure (CPAP) in excessive dynamic airway collapse (EDAC) – Case reports

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Introduction

EDAC refers to the pathological collapse of airways during expiration due to posterior wall muscle laxity leading to a >50% loss of airway cross-sectional area. This can lead to loss of airway patency and symptomatic dyspnoea. CPAP has been suggested as a treatment for EDAC without the need for invasive treatments.

Aims and objectives

Demonstrating the effectiveness of CPAP on EDAC can be difficult as many patients present with co-morbidities which may mask the impact of CPAP when using subjective criteria. Therefore on separate patients with complex respiratory conditions we set out to determine whether we could objectively demonstrate improvement in respiratory function either via bronchoscopy or computed tomography (CT).

Methods

In three separate patients with complex respiratory conditions including Churg Strauss Syndrome and COPD we evaluated their response to CPAP at 5 cm increments up to a pressure of 20 cmH₂O via bronchoscopy or CT.

Results

At the maximum pressure support the airway area increased from 1.54cm² to 5.35cm² equating to a 400% increase in volume. CT imaging was used in a second patient to objectively identify any improvement in patient with multiple issues affecting the lung. In this instance the airway area increased by up to 52.9%, when comparing the scan images from the same day.

Conclusions

CPAP can be shown to be an effective, relatively inexpensive, treatment for EDAC via bronchoscopy or CT and therefore guide its use when additional diseases may mask its effect.

Analysis of activity levels and productivity whilst physiotherapy students are on placement: Developing a model to include students in workforce planning

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Introduction

Clinical placements are a fundamental component of health professionals' education. It has been suggested that increased demand upon services, staff shortages and financial constraints in both health and education sectors, as well as the perception that student presence negatively impacts upon productivity and activity levels have made clinicians less willing to accept students on clinical placements.

Aim

To explore the impact of student supervision on clinical activity levels during weekend shifts.

Method

Data was collected on number, duration and perceived benefit of patient contacts on weekends with and without students on placement between 1/5/15-10/1/16 at St George's Hospital, London. Continuous and categorical data were analysed using t-tests and Fisher's exact test, respectively.

Results

Table 1: Comparison of outcomes for weekends with and without students.

Outcome	Weekends with students	Weekends without students	p value
Mean number of patient contacts	66.25	44.69	0.0009
Patients with better outcome	83	107	ND
Patients with worse outcome	13	13	
Doubles seen	199/211 (94.31%)	209/273 (76.56%)	0.0001
Mean number of discharged	1.28	1.08	ND
Mean time spent with patients (mins)/weekend	1697.13	1220.54	0.0101

Conclusions

Moses et al., 2015 demonstrated that including students in a seven day model, aids independent working and autonomy and improves clinical reasoning skills and confidence. From an employer perspective we have demonstrated that students can increase productivity and aid safe delivery of clinical activity as part of weekend working.

Therapy departments working as part of a seven day model should include students in workforce planning to enhance clinical productivity and improve student experience.

Can physiotherapists utilise lung ultrasound to enhance management of critical care patients? A case report demonstrating this novel diagnostic strategy

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Introduction

Historically, physiotherapists have relied on the use of auscultation and chest radiograph (CXR) interpretation for the assessment of pulmonary pathology. Research into physiotherapy use of lung ultrasound (LUS) as an assessment adjunct is still in its infancy.

Objective

To demonstrate the potential impact of LUS performed by physiotherapists within critical care.

Method

A physiotherapeutic assessment of a deteriorating post-operative patient was conducted following reintubation. The initial physiotherapeutic assessment using CXR review and auscultation suggested bibasal consolidation. Medical management included antibiotic therapy for a chest infection. Physiotherapy treatment included manual hyperinflation, with no improvement demonstrated. The physiotherapists used LUS to investigate demonstrating unexpected large bibasal pleural effusions.

Results

The medical team inserted bilateral chest drains with 4 litres drained in total. Clinical improvement was seen, including extubation within 24 hours, an improved CXR and reduction in oxygen requirements to room air within 48 hours.

Conclusion

Initial working diagnosis of this patient suggested chest infection following interpretation of the available investigations. Physiotherapy initiated LUS added a differential diagnosis of large pleural effusions adding to this patient's respiratory deterioration. Following a review of the medical management plan, the patient made significant clinical improvement. This case study demonstrates that the physiotherapeutic management of a deteriorating patient within critical care can be guided by the use of LUS.

Integrating novel frameworks to enhance the quality and sustainability of emergency on-call training in physiotherapy

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Introduction

A national survey established inconsistencies in the design, content and delivery simulation-based emergency on-call physiotherapy training in the UK¹. Local on-call training is often developed in isolation¹, often creating inefficiencies and the limiting scalability of training provisions.

Purpose

The purpose of this research was to develop a series of frameworks to support the design, development and evaluation of emergency on-call training in physiotherapy.

Methods

A series of sequential exploratory mixed methods studies:

- a) provided a comprehensive analysis of current practice¹⁻³
- b) facilitated the development of a series of standardised frameworks^{2,3} to support the design, development and evaluation of emergency on-call training in physiotherapy.

The Integrated Simulation and Technology Enhanced Learning framework² and clinical reasoning framework³ were then implemented within the design and evaluation of an emergency on-call simulation-based training programme for newly qualified and non-respiratory physiotherapists.

Results

Eight authentic immersive scenarios were developed and the learning outcomes, were mapped to the ACPRC competency matrix⁴. The instructional medium included high equipment, environmental and psychological fidelity featuring human patient simulators or simulated patients. Realism was achieved through authentic artefacts and cues within the scenario design. Structured pre-briefing was provided before participants were immersed within the increasingly complex scenarios, immediately followed by a facilitator-led debrief. Findings the pre-/post-course evaluation from two NHS Trusts indicate that participants demonstrated a significant improvement in self-reported confidence^{4,5}, clinical reasoning⁶ and learner satisfaction⁷.

Conclusion

Collectively, the findings from these studies emphasize the importance of comprehensive design, development and evaluation; including equity of access, cost efficiency and sustainability.

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Developing a Physiotherapy Risk Assessment Tool for Abdominal Surgery: A Service Improvement Project

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Introduction

The Cardiff and Vale Abdominal Surgery Risk Assessment (CVASRA) tool was created in 2013, in response to increasing demands and reduced resources. The CVASRA risk stratifies post-operative abdominal surgery patients based on the likelihood of developing pulmonary or mobility complications.

The CVASRA has been regularly reviewed, however, a recent evaluation (n=222), demonstrated higher than anticipated rates of PPC (7%) and re-referral rates (19.6%)¹.

Aims

A quality improvement programme was devised to review and modify the existing tool using a PDSA programme. The aim was to reduce incidence of PPC's and re-referral rates. Secondary outcomes were additional physiotherapy resources requirements and hospital length of stay.

Method

A prospective analysis was completed over a one-month period. The score used to identify high risk patients was reduced from 14 to 10 and wording for "Functional ability" was altered to better reflect pre-operative mobility status. PPC and re-referral rates were compared to the previous evaluation¹.

Results

A total of 74 patients were included. PPC rates were much lower rates in the current study (1.5% versus 7%). Similarly the re-referral rate was lower within the current evaluation. Additionally, high risk patients received greater physiotherapy contact (53.6 minutes v 36.7 minutes).

Discussion & Conclusions

The reduction of the CVASRA threshold figure has reduced the occurrence of PPC's and reduced the rate of re-referral to physiotherapy.

As a result of the above findings, we will continue to use 10 as the marker for identifying patients who are deemed high risk ensuring a prudent and efficient service.

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An evaluation of the physiotherapy rehabilitation service on critical care. Are limitations to rehabilitation within critical care changing?

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Introduction

Early rehabilitation has been shown to reduce both critical care (CC) and hospital length of stay, and can reduce the significant effects of critical illness on physical and non-physical morbidity. In early 2015, a service evaluation was carried out by Physiotherapists to assess the length of time from CC admission to 1st sitting on the edge of the bed (SOEOB), and also to reasons why SOEOB was not completed. Since that service evaluation was completed, clinical practice has changed on CC across the MDT to facilitate early rehab. We therefore repeated the previous service evaluation to identify any changes.

Method

A 4-week service evaluation was completed, with physiotherapists documenting for every patient contact, whether a SOEOB was completed and if not, the primary limiting factor and any additional factors that contributed.

Results

592 physiotherapy treatment sessions were planned. Out of these planned sessions, 39.4% involved a SOEOB (17.1% in 2015) and median time from admission to 1st SOEOB was 4 days (11days in 2015). The primary reason for non-completion was sedation at 25.1% (47.9% in 2015).

Conclusion

Changes made across the MDT have resulted in rehabilitation being commenced much sooner, and much more intensely for patients in CC. Further analysis of the data is needed to investigate the clinical impact that this increased early rehabilitation has on the functional outcome.

Using Inspiratory Muscle Training to Improve Cough Strength in a Complete Cervical Spinal Cord Injury – A Single Case Study Report

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Introduction

It is well recognised that patients with high cervical spinal cord injuries have severely diminished cough function which often requires augmentation to ensure adequate secretion clearance. For those with peak cough flow of less than 170litres/minute it is recommended that prophylactic mechanical insufflation exsufflation (MI-E) is used. However, this requires both expensive equipment and regular monitoring to ensure its effectiveness. In this single case study, inspiratory muscle training (IMT) was commenced primarily to improve lung function through diaphragmatic strengthening.

Methods

Mr. D is a 35-year-old male who suffered a C5/6 fracture dislocation following a motocross speedway accident. He underwent an ACDF in October 2015 but subsequently did not gain any motor or sensory function below the level of the injury. He was admitted to the regional spinal centre in February 2016 and commenced on an IMT programme using the PowerBreathe KH2 in June 2016.

Results

Lung function and cough strength during the IMT programme are shown in table 1.

Date	Baseline – 18/06/16	29/09/16	12/12/16
FEV1	1.56	1.94	2.00
FVC	1.90	2.32	2.46
FEV1/FVC	82%	84%	81%
MIP	74.5	80.2	91.7
PCF	120	185	210

Discussion and Conclusions

This single case study has highlighted that even in complete high cervical cord injuries, IMT can have positive effects on both lung function, and more interestingly cough function through improvements in peak cough flow. Mr. D has remained infection free since initiating IMT and no longer requires MI-E on discharge from the regional spinal unit.

Training and education for respiratory on-call physiotherapists in the United Kingdom

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Introduction

Physiotherapists from different specialties (both within respiratory care and from non-respiratory areas), often provide emergency, on-call physiotherapy to patients outside of normal working hours. Differences in competence between specialist respiratory and non-respiratory physiotherapists have been documented. Little is known about how respiratory on-call training is delivered, or competence maintained, with no new information regarding the delivery of respiratory on-call services produced since 2005.

Study Aims

To investigate current on-call respiratory physiotherapy training and education in the United Kingdom.

Methods

An online survey was developed and piloted. Physiotherapists were recruited through professional networks and via social media. Inclusion criteria were physiotherapists who either organised the on-call rota or delivered training for on-call physiotherapists.

Results

Data were successfully collected from 107 physiotherapists from teaching hospitals (43%), district general hospitals (38%) and specialist centres (17%) (2% unknown). There was wide variation in the processes that physiotherapists completed prior to undertaking on-call duties, including formal in-service training (85%), clinical shadowing (76%) and the completion of all/part of a respiratory rotation (51%). To assess competence, 63% were assessed by a senior colleague, 57% referred to their trust's competencies, 39% used the ACPRC competence questionnaire and simulation used in on-call assessment in 24% of cases. 20% of respondents did not assess competence. Once on the on-call rota, competence was reassessed in 41% of respondents (via a variety of methods).

Conclusion

On-call service training in the UK remains varied. A cohesive approach to on-call physiotherapy training would allow non-respiratory physiotherapists access to high quality respiratory education.

A service evaluation: The effectiveness of the Critical Illness Rehabilitation Team on structured and enhanced rehabilitation in ICU patients

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Background

Survivors of critical illness are often left with significant muscle weakness and reduced function following discharge¹. Transition from ICU to the ward is associated with increased anxiety among patients. In October 2015 the trust signed up to the Critical Illness Rehabilitation CQUIN to improve the rehabilitation pathway for patients admitted to ICU, in line with NICE guidance². A Critical Illness Rehabilitation Team (CIRT) was introduced in March 2016 to deliver this CQUIN.

Aims and Objectives

To evaluate the effectiveness of the CIRT team in relation to CQUIN targets and patient outcomes.

Methods

Data was collected for a period of 6 months following introduction of the CIRT team and compared to historical data. A comprehensive assessment was completed for all patients with a length of stay ≥ 5 days, excluding those with established rehabilitation pathways (e.g. trauma). Patient received twice daily therapy including additional exercise, mobility and functional activities. Outcome measures used were the CQUIN targets and Manchester Mobility Score (MMS).

Results

Following the implementation of CIRT a significant improvement in performance was seen in all CQUIN targets. There was a corresponding increase in mobility at the point of ICU discharge (MMS 2 v 4). Patient satisfaction, particularly the transition from ICU to the ward was reported to have improved and 100% of patients felt CIRT was vital to their recovery.

	Pre CIRT	Post CIRT
	Baseline	Following introduction of CIRT
Short clinical assessment completed within 24 hours of admission to ICU	30%	98%
Comprehensive assessment updated at ICU discharge	19%	90%
Rehabilitation pathway updated at hospital discharge	0%	100%
Mobility at ICU discharge (Manchester Mobility Score)	2	4
Patient satisfaction	Moderate	Very high

Conclusion

The implementation of the CIRT improved adherence to all CQUIN for critical care rehabilitation. This was associated with a significant improvement in mobility and patient satisfaction.

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Rehabilitation practices within three critical care units in the UK – A service evaluation

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Introduction

The negative effects of mechanical ventilation and the associated bed rest are well documented, with critical illness found to have significant long term impact on patients both physically and non-physically. Early rehabilitation in critically ill patients has been demonstrated to be safe and is associated with many positive outcomes.

Aim

To quantify the amount of rehabilitation provided for patients within three critical care units.

Method

Data was collected from 28th April 2015 to 12th May 2015. All patients admitted to three intensive care units were included. For every treatment session, the treating physiotherapist recorded, on a pre-designed tool, the type of treatment taking place as well as organ support being provided, for example airway type. Interventions included respiratory treatments, positioning, passive movements, active exercise, sit on edge of bed, pat slide to chair, hoist transfer, sit to stand, step transfer and walking.

Results

A total of 539 physiotherapy interventions were reported over the data collection period. Overall, 28% patients (n=152) were mobilised out of bed (sit on edge of bed or higher level of mobilisation). Among patients with an endotracheal tube, tracheostomy and spontaneous ventilation, 1%, 20% and 49% were mobilised out of bed respectively. The most common barriers to mobilising patients out of bed were endotracheal tubes, vasopressor agents and renal replacement therapy.

Table 1 - Level of mobilisation levels depending on presence of organ support

Organ Support	Yes	No	P value
Ventilated	10%	49%	<0.001
Vasopressors	3%	38%	<0.001
Renal support	3%	37%	<0.001
Sedation	0%	41%	<0.001

Conclusion

The study provides useful benchmarking of current rehabilitation at the three critical care units. It demonstrates that although physiotherapy is a standard of care in the UK critical care units, interventions involving active mobilisation are limited in patients receiving organ support.

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