115. Physiotherapy and rehabilitation strategies in respiratory diseases and beyond

P1162

Aerobic exercise training cannot be prescribed based on predictive heart rate equations in moderate or severe asthmatic patients

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Background: Recent studies have shown that physical training improves exercise capacity and health related quality of life (HRQoL) in asthmatics; however the best way to prescribe aerobic exercise intensity in these patients remains poorly known.
Objective: To evaluate if predictive heart rate equations can be used to prescribe exercise intensity in subjects with moderate or severe asthma.
Methods: Ninety-eight adults with moderate to severe asthma aged 36 (ranging from 24–53) years were submitted to a symptom-limited cardiopulmonary exercise testing (CPET) and anaerobic threshold (AT) was determined by two independent experienced reserchers. The association and agreement between maximum heart rate (HR_{max}) achieved on CPET and age-predicted Tanaka's maximum HR [208 – (0.7×age)] were evaluated, respectively, by Pearson's correlation and intraclass correlation coefficient. Similar analysis was applied between HR determined by CPET and heart rate reserve [(FC_{rest} + 0.5 (HR_{max}-HR_{rest})], widely used to estimate exercise intensity at AT.
Results: Maximal HR obtained by CPET was significantly lower than age-predictive equation (177.0 vs. 182.8 bpm, respectively, $p<0.05$). There was a weak correlation ($p<0,001$; r=0,46) and a weak agreement ($p<0,001$; ICC=0,26) between the achieved and estimated HR_{max}. At anaerobic threshold the HR obtained by CPET was similar to HR predicted equation (128 vs. 131 bpm, respectively, $p>0.05$), however, no correlation or agreement was observed between the HR ($p>0.05$).
Conclusion: Exercise prescription for adults with moderate or severe asthma should be determined directly by an exercise test instead of using age-predicted equations.

P1163

Evidence for single limb exercise in patients with COPD or chronic heart failure – A systematic review

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Background: Although single limb exercise (SLE), i.e. training using one arm and/or one leg at a time, has been used in patients with COPD or chronic heart failure (CHF) the evidence for SLE has not been evaluated systematically and remains unclear.
Objectives: Our hypothesis was that SLE is beneficial for patients with COPD or CHF. The aim of this systematic review was to investigate the current evidence for SLE compared to any comparator and regarding exercise capacity, quality of life (QoL) or dyspnea in patients with COPD or CHF.
Methods: CENTRAL, PubMed and PEDro databases were searched for randomized controlled trials fulfilling inclusion criteria. Extraction of data, evaluation of study quality using the PEDro scale and the Cochrane risk of bias tool was performed by two review authors. Data and evidence for SLE were summarized in accordance with GRADE guidelines.
Results: Six RCTs, (two in COPD, and four in CHF) met the inclusion criteria. COPD: Low quality evidence indicates improved exercise capacity but no difference on dyspnea after one-legged cycling compared to two-legged cycling. CHF: Low quality evidence indicate improved exercise capacity after single limb strength training compared to a control and two-legged cycling and improved QoL compared to a control. Meters walked and some QoL outcomes improved more after two-legged knee extension compared to one-legged knee extension. No differences between regimes on other exercise capacity and QoL outcomes was found.
Conclusions: The strength of the overall evidence to support the use of SLE regimes compared to other exercise regimes or control in patients with COPD or CHF is low and further research is requested.

P1164

Changes in heart rate and blood pressure variability during and following a period of slow breathing

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Hypertension is a complication of COPD and there is interest in developing non-pharmacological ways of managing the problem. Training with slow breathing is effective in reducing blood pressure but the physiological mechanism underlying this action is not known. Slow breathing is particularly effective in modulating heart rate variability (HRV) and also affects diastolic blood pressure variation (dBPV). We hypothesised that slow breathing would modify HRV and dBPV and the effects would persist for some time, being the basis of a training adaptation which might be of benefit to COPD patients.
Eleven subjects (8 male, age 28-67 years) were recruited, 6 normotensive and 5 with well managed essential hypertension. Subjects breathed at 12 breaths per minute (brpm) then at 6 brpm and finally at 12 brpm, each or 10 min. There were no differences in mean heart rate, systolic or diastolic blood pressures with breathing rate but there were major changes HRV and dBPV during slow breathing, with an increase of power at low and a decrease at high spectral frequencies. Heart rate was entrained to breathing in younger and normotensive subjects at 12 brpm while the older and hypertensive subjects showed little evidence of this until breathing at 6 brpm. In all subjects the spectral changes developed and resolved over several minutes following each change in breathing rate; dBPV changed more slowly than HRV.
Slow breathing modulates vagal and sympathetic activity which takes time to develop and resolve indicating neuronal plasticity which, with repetition, could be the basis of the anti-hypertensive action of slow breathing training.

P1165

Effect of percutaneous transluminal coronary angioplasty on deep breathing heart rate variability

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Background: Coronary angioplasty (PTCA) is a common treatment method in patients with coronary heart disease, but its effects on deep-breathing heart rate variability (HRV) has not been well established.
Objective: The aim of the study was to analyse deep breathing heart rate variability, which reflect the sympathovagal control of heart rate in patients before, after 1 and 30 days of elective PTCA.
Methods: The study consisted of 10 consecutive patients (7 men, 3 women) with age of 62.4±11.6 years, single-vessel coronary artery disease (CAD) who underwent elective coronary angioplasty with stent implant. Heart-rate variability (HRV) was obtained at rest (spontaneous breathing) and during respiratory sinus arrhythmia maneuver (RSA-M) by cardiofrequencimeter (Polar S810i) before, after 1 and 30 days of PTCA. RSA-M consisted of deep-breathing in 6 respiratory cycles per minute. HRV analyses were obtained by the time, frequency-domain (high frequency- HF; and low frequency-LF) and non-linear methods (triangular R-R intervals-RR-tri and Approximate Entropy -ApEn).
Results: The PTCA did not induce changes during deep-breathing when compared to spontaneous breathing in the time domain indices ($P>0.05$). However, before

of PTCA higher values of BF/AF ratio were observed (P<0.05). Interestingly, deep-breathing increased RR-tri only before and after 1 day of PTCA (P<0.05) and ApEn decreased only after 1 month (P<0.05).
Conclusion: Patients with CAD presented sympathetic activation before PTCA, which produced altered responses during deep-breathing after the procedure.

P1166
Does music affect fatigue perception during exercise in COPD patients?
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Introduction: Performing daily life activities is difficult for many COPD patients. Pulmonary rehabilitation (PR) is useful to improve exercise tolerance. If dyspnoea remains the primary debilitating symptom associated with COPD, fatigue is also frequent in patients suffering from lung disease, especially during and after physical activities. Influence of music on dyspnoea was previously reported. The aim of this preliminary study was to observe the influence of music on fatigue during pulmonary rehabilitation sessions.
Material and method: 12 COPD patients regularly attending our PR program were recruited (age=63.9 y.o. ± 13.0). Fatigue was measured during two sessions by a questionnaire comprising 8 items. Investigation was performed during two separate sessions with or without music. PR exercises were the same during both sessions.
Results: There was no difference in total fatigue score (16.7±4.7 vs 17.1±5.0; p = 0.58). The 8 items were not different between both sessions. Except for two items, all questions were well correlated between the two sessions.
Conclusion: In this preliminary study, we have shown that music does not influence fatigue perception during a PR session.

P1167
The results of a rehabilitation program including inspiratory muscle training in COPD patients
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Background: Respiratory muscle impairment could contribute to dyspnoea, exercise intolerance and diminished quality of life in COPD patients.
Aim: To evaluate the results of a pulmonary rehabilitation (PR) program that includes inspiratory muscle training (IMT) in COPD patients.
Method: Inspiratory muscle strength (maximal inspiratory pressure MIP), exercise tolerance (6 minutes walking test 6MWT), dyspnoea score (Medical Research Council MRC scale) and quality of life (St. George Respiratory Questionnaire SGRQ) were analyzed in stable COPD patients before and after PR. All performed an outpatient PR program for 2 months 3 sessions/week, including daily home IMT at 30-60% of MIP.
Results: We included 20 COPD patients, stage II-IV GOLD, mean age 63 years, 16 males, mean FEV1 1.27 L (44.7% of predicted).
Mean values for the measured parameters were: MIP 63.9 cm H20, 6MWT distance (6MWD) 407.1 m, dyspnoea MRC score 3.05 points and SGRQ score 46.5 (symptoms 45.6, activity 63.7, impact 35.6).
There was a significant improvement in the following mean values at the end of PR program: MIP increased by 9.6 cmH2O (p=0.003) and 6MWD by 55 m (p=0.001); dyspnoea score decreased by 0.75 (p=0.001). SGRQ score un-significantly decreased by 4.9 points (p>0.05). A greater improvement of MIP was seen in stage III-IV patients (12.5 cm H20) compared to stage II patients (8.6 cm H2O).
Conclusions: Our rehabilitation program including general and inspiratory muscle training led to a significant improvement in inspiratory muscle strength, walking distance and symptoms. The greater improvement in respiratory muscle strength in severe and very severe COPD patients will be verified in a larger population study.

P1168

WITHDRAWN

P1169
The effectiveness of carrying out 6 month and 1 year re-assessments for respiratory patients post pulmonary rehabilitation
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Introduction: Pulmonary Rehabilitation (PR) Re-assessment groups are offered at 6 months and 1 year post completion of PR. The purpose is to review patients current health status, monitor exercise tolerance, mood and quality of life and check compliance with self management skills taught in PR
Aim: To determine the level of attendance at 6 months and 1 year re-assessments in order to establish whether this is an effective method of review, both for the patient and Community Respiratory Team.
Method: All patients who completed PR were invited to re-assessments at 6 months and 1 year post PR. The number of patients who attended were recorded.
Results: 262 patients completed PR between January 2009 and December 2012. 40 patients were excluded from assessments and analysis at the 6 months re-assessments due to staff shortages and severe weather. 13 patients (6 at 6 months and 7 at 1 year) had died and also excluded.

Table 1. Patient Attendance at Reassessments

	6 month Reassessment		1 year Reassessments	
Site	n=Attended/Invited	% Attended	n=Attended/Invited	% Attended
Site 1	28/52	54%	19/61	31%
Site 2	38/55	69%	27/74	36%
Site 3	23/47	49%	21/59	36%
Overall	89/154	58%	67/194	35%

Conclusion: These data indicate a drop of 23% in attendance at the 1 year re-assessment from 6 months, therefore suggesting this may not be the most effective method of review and furthermore provides reasonable evidence to support a re-evaluation of the 1 year re-assessment. There is cause to ensure review of those not attending reassessments as they are at high risk of poor self management and the ongoing review method of these patients needs further consideration.

P1170
One year follow-up after a program of physical activity promotion in smokers: Preliminary results
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Background: Programs to promote the increase of physical activity in daily life (PADL) have generated growing interest aiming to prevent the deleterious effects of physical inactivity. Recent literature has shown that a short-term protocol using pedometers (or step counters) was able to increase PADL in apparently healthy smokers. However, the long-term effects of such a protocol were not yet studied.
Objectives: To evaluate the results of 1-year follow-up after a program aimed at increasing PADL in smokers.
Methods: 43 smokers without lung function impairment were studied (20 males; 52 [48-58] years; 20 [20-30] cigarettes-day). The 5-month program used informative booklets and pedometers in order to achieve a goal of 10000 steps/day. Subjects were assessed at baseline, immediately after the end of the program, six months and one year later. Outcomes were PADL assessed for one week at each assessment point, besides lung function, six-minute walking distance (6MWD), smoking habits and quality of life.
Results: Immediately after the program there was significant increase in steps/day (8779 [5632-11021] *vs* 10694 [8402-12482]; mean improvement of 2641 [452-3436] steps/day), together with improvements in the 6MWD and general health status (p<0.05 for all). However, over the 1-year follow-up period (n=14) there was progressive reduction in steps/day when compared to the assessment at the end of the program (after six months: -599 [-3476-1707] and after one year: -1876 [-4297-440]).
Conclusions: Improvement in PADL obtained immediately after a program of physical activity promotion in smokers does not seem to be maintained over the long term. Strategies for maintaining these gains are needed.

P1171

Breathing exercises for cardiac surgery patients – A national survey of clinical practice

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There are differences in routines regarding recommendations of breathing exercises for cardiac surgery patients around the world. To date, no surveys of the use of breathing exercises for cardiac surgery patients in Europe have been performed.
Aim: The aim of this national survey was to determine current practice of chest physiotherapy and breathing exercises for cardiac surgery patients in Sweden.
Method: A total population sample was identified and postal questionnaires were sent to the 33 physiotherapists working at the departments of thoracic surgery in Sweden. Structured and open-ended questions were asked about the routine care of patients undergoing cardiac surgery.
Results: In total, 29 replies were received. All physiotherapists instructed the patients to perform postoperative breathing exercises hourly, on a regular basis. Positive expiratory pressure device breathing was routinely used as first choice treatment by 83% of the physiotherapists. Instruction how to perform the breathing exercises as well as the frequency and duration of exercises differed between physiotherapists. Recommendation to continue breathing exercises after discharge was given by 66% of the physiotherapists, but how long the patients were recommended to continue the breathing exercises varied from 1 to 3 months.
Conclusion: This survey provides an initial insight into chest physiotherapy management in Sweden. The routine use of breathing exercises is universal during the first postoperative days, but choice of breathing exercises and number of treatment sessions given vary. Comparison with treatment regimens in other countries is warranted to improve the postoperative management of the cardiac surgery patient.

P1172

An effect of the home-based rehabilitation programme following the outpatient rehabilitation programme in patients with pulmonary sarcoidosis

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Background: Definition of the pulmonary rehabilitation (PR) precisely describes how such a programme should be established and what parts should be included. However, success in completing the programme should motivate patients to keep at it and thus to prolong the beneficial effect of it.
Aim: To evaluate an effect of a 6-week home-based PR following a 6-week outpatient PR on health status and health-related quality of life (HRQL) in patients with pulmonary sarcoidosis (PS).
Methods: There were 18 patients with PS (mean age 50.3±13.3) recruited to the PR programme. The assessments included lung function tests, maximal inspiratory (MIP) and expiratory (MEP) mouth pressures, chest expansion, 6-minute walk test (6MWT) and HRQL using the Sarcoidosis Health Questionnaire. Patients underwent a 6-week outpatient PR followed by a 6-week home-based PR programme, which both consisted of respiratory physiotherapy and regular physical activity training.
Results: Baseline data showed decreased breathing muscle strength (MIP 89%, MEP 65%), limited chest expansion and relatively normal results in 6MWT (105% of predicted). Completing outpatient PR programme induced statistically significant changes in all measured parameters but lung function tests. Further significant improvement was observed in MIP during the following home-based PR programme.
Conclusion: Achieved improvements of the 6-week outpatient PR remained also after the 6-week home-based PR and therefore patients should be encouraged in continuing the PR programme at home.
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P1173

Analysis of the usability and motivation of the use of video game platforms as a training system in patients with cystic fibrosis (CF)

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Physical training is already part of the care package offered to most patients with CF. The CF treatment requires a high level of patient adherence which is the relevant aspect that decrease the daily time available for physical activity. Training using video games platforms can be a key factor to guarantee this adherence. Our goal was to assess the use, preferences, motivations and the types of video games that could be used as a training modality at patients home.

A total of 24 CF patients: age (12±3.7 years); BMI (18±3); FVC (97±20%pred); FEV_1 (93±20%pred) answered a questionnaire specifically designed to evaluate the usability and management of the video game platforms for exercise training. Patients played three different video games Wii Fit Plus (Wii-Fit); Wii Family Training (Wii-Train) and Wii Active (Wii-Acti). After this protocol they were asked about their feelings and impressions about them.
The questionnaire showed that video game platforms are usual in child environment (87.5%), they play about 1-4 days per week (50%), they spend playing about 1-2 hours per session (87%), and the main goal is to have fun (79%). During the protocol, the platform that the children like the most was the Wii-Fit (42%) followed by the Wii-Acti, and they considered both a good system to practice exercise at home (83.3%).
The video game platforms represent a common element in CF children and teenagers life. They use this type of platforms frequently and they show highly motivated to incorporate them as a training modality for respiratory rehabilitation programs at home.
Proyecto AVANZA, TSI-020110-2009-431. Ministerio de Industria Turismo y Comercio, Spain.

P1174

Video game exercise effectiveness of a domiciliary respiratory rehabilitation program in cystic fibrosis (CF) patients

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CF is a multisystemic disease characterized by an abnormal ventilation response to exercise, the main limitating factor to exercise tolerance. Exercise training using video games platforms can be a key factor to guarantee the adherence to the respiratory rehabilitation programs. Our goal was to evaluate the efficacy of a domiciliary exercise program using the Wii™ video game platform as a training system in CF patients.
The study included 7 CF patients: age (11.4±3.92 years); BMI (18.4±3); FVC (78.9±18%); FEV_1 (74.7±22%). All performed a domiciliary respiratory rehabilitation program using the Wii™ video game platform with the Active 2 game. The program consisted of exercise about 30-min every day, 5 days/week during 6 weeks. The measurements evaluated from the beginning to the final were: exercise tolerance using the six minutes walk test (6MWT) and the shuttle test (Shut) and quality of life using the Cystic Fibrosis Questionnaire-Revised (CFQ-R).
The exercise program improved the distance walked during the 6MWT (649 vs 670m) and during the Shut (622 vs 708m) ($p<0.05$, both), pre vs post respectively. However, the differences between the dyspnea and fatigue perception were no statistically significant. In relation with the CFQ-R, the data obtained from the respiratory symptoms (p= 0,045) and physical tendency domains (p=0,047) were statistically significant ($p<0.05$, both).
The domiciliary respiratory rehabilitation program in CF patients, executed with the Wii™ video game platform, is feasible and can induce significant increases in exercise tolerance and quality of life.
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P1175

Respiratory muscle training in impaired elderly: Threshold loading versus Pranayama breathing exercises

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Introduction: In the older elderly, the respiratory function may be seriously compromised when the decrease of respiratory muscle (RM) strength coexists with comorbidity and immobility syndrome.
The aim of this study was to determine the effectiveness of RM training using the Threshold IMT device, or Pranayama breathing exercises vs. a control group in impaired elderly. Our general hypothesis was that RM training would improve RM function among this population.
Methods: Institutionalized elderly, who were unable to walk, were allocated randomly into three groups: a control group and two experimental groups (Threshold and Pranayama). Experimental groups performed a supervised interval-based training protocol, either through respiratory threshold loading or Pranayama breathing exercises, which lasted six weeks (5 days per week). Maximum respiratory pressures (MIP and MEP) and Maximum Voluntary Ventilation (MVV) were measured at four time points: pre-training, intermediate, post-training and follow-up (weeks 0, 4, 7 and 10, respectively).
Results: Seventy-one residents (90% female, mean age 85) completed the study: Control (n=24); Threshold (n=23); Pranayama (n=24). There was a significant treatment effect on the MIP ($F_{6,204}=6,755$, $p<0.001$, $\eta 2=0.166$), MEP ($F_{6,204}=4.257$, $p<0.001$, $\eta 2=0.111$) and MVV ($F_{6,204}=5.322$, $p<0.001$, $\eta 2=0.135$).

Conclusion: Pranayama training group works differently and significantly better than the other two groups, and may be therefore, a powerful alternative to general exercise conditioning in order to improve RM function (strength and endurance) in the elderly population with a significant loss of mobility and exercise capacity.

P1176

Impact of body position in premature newborn receiving nasal CPAP

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Introduction: The body position affects the cervical-thoracic-abdominal biomechanics and has impact on lung ventilation and perfusion. The impact of body position during CPAP is not well recognized.
Objective: To evaluate the clinical impact of the prone and supine positions in newborn preterm infants breathing without support or on nasal CPAP.
Methods: Thirty two preterm infants with GA from 26 to 35 weeks, BW <2.275 g and of both sexes were prospectively evaluated. Infants were separated if they were in use of nasal CPAP (n=16) or breathing without any support (n=16). Body position (pronation and supination) was changed following a random order. Preterm stand at each decubitus for one hour, and respiratory rate, oxygen saturation, heart rate and Silverman-Andersen bulletin (SA) were registered every ten minutes.
Results: The 16 infants of the nasal CPAP group presented GA of 30±2.0 weeks, BW of 1.353±281g, 56% were male and had 3±2.4 days of life at study. The 16 infants without breathing support presented respectively 33±1,5 weeks, 1.776±238 g, 37% were male and had 4±1,5 days of life at study. Clinical parameters of infants in nasal CPAP were not influenced by body position. Infants breathing without support presented at prone position better parameters, but with small clinical relevance, regarding oxygen saturation (95% ± 1.6 vs 94% ± 3.1, $p<0.01$) and SA (0.2±0.4 vs 0.7±0.6, $p<0.01$).
Conclusion: No difference in clinical parameters were found after changing the postural position in infants at nasal CPAP. When infants were breathing without support, prone position showed a small but statistically significant improvement in oxygen saturation and SA bulletin.

P1177

Comparative evaluation of vibrocompression and bag squeezing: A randomized study

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Introduction: Few scientific evidence has demonstrated the effects of respiratory physiotherapy in intubated children. The clearance maneuvers in mechanical ventilation in this population require further investigation.
Objectives: Analyze and compare the hemodynamic effects, ventilation and respiratory mechanics of two techniques in intubated children with respiratory failure.
Method: Eleven children with mean age of 28.42±15.42 month were randomized into two groups according to the technique used: (1) Bag Squeezing (BS; n=5) and (2) vibrocompression thoracic (VCT; n=6). All variables were studied before, immediately and 30, 60 and 120min after the maneuvers ($p<.05$).
Results: For both groups were found similar results, no significant differences. Heart rate and mean blood pressure presented higher in BS group in the post maneuver (p=.04, p=.43) compared with pre maneuver. The HR, ETCO2, plateau pressure and static compliance were also higher in the post-maneuver in VCT group. There was no significant difference in the other respiratory variables or respiratory mechanics. Significant negative correlation between Rst e Cst was observed in the BS at all the times evaluated (R=.97,p=.00;R=.89,p=.04;R=.75,p=.00) The same results were observed for VC and ETCO2 post maneuvers (R=.90,p=.03). In the VCT was found positive correlation between the Rst and the Pp before maneuver (R=.97,p=.01),30(R=.94,p=.00) and 120min post (R=.66,p=.00) and between VC and ETCO2. There was also a positive correlation between VC and ETCO2 immediately after maneuver (R=.82,p=.04) and 30 min post (R=.87,p=.02).
Conclusion: Both techniques didn't present changes in hemodynamic and ventilatory responses, even in the respiratory mechanic.

P1178

Patient experience of an airway clearance technique in a UK university hospital setting

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Introduction: To gain insight into patient experiences using an airway clearance technique in a heterogeneous patient group with neuromuscular disease. The lung volume recruitment bag(LVR)utilises positive pressure to augment inspiratory volume and increase cough strength.
Method: Patients responded to a telephone questionnaire carried out by university members. Our study group was 8 patients aged 21-79 with either SMA, muscular dystrophy, motor neuron disease or spinal cord lesions. All patients had received a LVR bag within the past year and had been taught how to use it by a respiratory physiotherapist.
Results:

Patient experience of LVR bag (n=8)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The bag is easy to use	4	3	1	0	0
I understood the verbal instructions I was given about the bag	5	2	1	0	0
I understood the written instructions I was given about the bag	2	2	4	0	0
I can clear my phlegm more easily since I have been using the bag	3	3	2	0	0
I am able to take a deeper breath when I use the bag	5	1	1	1	0
I have had fewer chest infections since I have been using the bag	1	0	6	1	0
I am less frightened of choking since I have been using the bag	3	1	4	0	0

Discussion: To our knowledge this is the first report of patient satisfaction using the innovative LVR bag. 6/8 patients were able to clear sputum more easily after using the LVR bag. 7/8 patients found the verbal instructions easy to follow and strongly agreed/agreed that the bag was easy to use. In 7/8 patients, the technique required the assistance of a carer. Our study shows the LVR bag is easy to use and aids patient sputum clearance. Therefore, this technique warrants further investigation in a larger population with a wider range of conditions.

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Experimental model of atelectasis in newborn pigs

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Background: There are few studies using animal models in chest physiotherapy, moreover, there are no models to assess these effects in newborns.
Aims: The objective of this study was to develop a model of atelectasis by bronchial obstruction in newborn pigs for the study of neonatal physiotherapy.
Methods: Newborn pigs resulting from a cross-breeding between Large White and Landrace, properly sedated, anesthetized, tracheostomized, paralyzed and mechanically ventilated were used. The animals received artificial mucus infusion through an infusion pump, underwent radiological assessment of the lungs and blood gas analysis was performed to confirm the production of atelectasis.
Results: The model showed consistent results between parameters of oxygenation and radiological analysis. The atelectasis model was successfully developed in over 70% of cases, surpassing 90% of attempts in the final phase of the study.
Conclusions: This model of atelectasis showed results consistent enough to be used in studies of chest physiotherapy techniques in newborn pigs.

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Bag-squeezing maneuver in experimental model of meconium aspiration syndrome in newborn pigs

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Introduction: The use of broncho alveolar lavage (BAL) and surfactant therapy has been tested in humans and in animal models getting promising results as well as Bag-squezing maneuver has shown good results in adults.
Aims: To evaluate the effects of the combination of Bag Squeezing maneuver with broncho-alveolar surfactant in an experimental model of Meconium Aspiration Syndrome in newborn pigs.
Methodology: Were used in the study newborn pigs (n = 15), ventilated with fixed parameters. After instillation of human meconium 4ml/kg diluted to 20%, the pigs were randomized into three groups: CONTROL-SAM model subjected only aspiration (n = 5), Grupo BAL-SAM model treated only with surfactant BAL (n = 5), and Grupo BAL + BAG-SAM model treated with BAL with surfactant associated with Bag Squeezing maneuver (n = 5). For the LBA was used 15ml/kg of Curosurf™ diluted in NaCl (5mg/ml). Blood gases, vital signs and behavior of mechanical ventilation were analyzed throughout the study.
Results: The that group received a BAL + BAG improved blood gas, reducted of airway resistance (p = 0, 004) and compliance lung (p = 0.003) better than the other groups with a significant increase in the amount of meconium removed (p = 0.046) with the bag-squeezing maneuver.

Conclusion: The association of Bag-squeezing maneuver can bring benefits to gasometric parameters mechanical ventilation and increase the removal of meconium.

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Comparison of two techniques of chest physioherapy in experimental model of atelectasis in newborn pigs

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Objective: To compare the effectiveness of two techniques of respiratory therapy in an experimental model of atelectasis by bronchial obstruction in newborn pigs.
Methods: 24 pigs sedated, tracheostomized and mechanically ventilated. For the induction of atelectasis, artificial mucus was infused (Poly(ethylene oxide), Sigma-Aldrich™, USA) using an infusion pump through the tracheal tube. Confirmation of atelectasis was a chest X-ray and by a pressure drop of oxygen in arterial blood. The animals were divided into 3 groups: group 1 that received tracheal aspiration after 20 minutes of confirmation of atelectasis, group 2 underwent the technique of bag squeezing over tracheal aspiration and group 3 underwent vibration chest. To evaluate the effectiveness of techniques one second X-ray was done. To evaluate the changes during the procedures were performed arterial blood gases and pulmonary mechanics evaluation before and after the induction of atelectasis immediately and 30 minutes after the procedure.
Results: The mean percentage change in the PO2 was statistically detect significant between the groups (control: 97,80±37,33, bag squeezing: 166,75±68,63 e vibration: 104,41±45,45, p=0,0408), with improvement in oxygenation in the group undergoing the technique of bag squeezing. The remaining variables did not differ.
Conclusions: The results suggest that the technique of bag squeezing is more efficient than manual vibration chest in these animal model, but clinical improvement was not accompanied by detectable radiological improvement.