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EDITORIAL

Mucus transport and physiotherapy – a new series

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Mucociliary clearance is a physical defence mechanism which protects the lungs from damage caused by inhaled or endogenous particles within the airways. Many factors contribute to altered mucociliary clearance, including pollution, age, posture, mobility, exercise and disease. A number of diseases of the chest are characterized by increased mucus production, including chronic bronchitis, bronchiectasis and cystic fibrosis, which, in concert with damage to cilia from a variety of host and bacterial sources, can lead to impairment of the mucociliary escalator and retention of secretions within the bronchial tree. These retained secretions can provide an environmental niche in which bacteria can proliferate and colonize the lower respiratory tract and eventually act as a powerful stimulus to the inflammatory processes that are associated with the pathogenesis of many of the respiratory diseases that are characterized by excess mucus production and loss of integrity of the ciliated epithelium. Secretion retention can also contribute to the symptoms of airflow obstruction, wheeze, shortness of breath and cough.

Since it has been recognized that certain chest diseases are accompanied by mucus hypersecretion and retention of secretions within the bronchial tree, much work has been published on mucus composition and regulation and on how drugs and other agents (either delivered directly for the purpose or indirectly from their main therapeutic effect) can alter mucus composition and/or aid expectoration. The main clinical focus of improving mucus transport, however, for almost a century, has been physiotherapy.

One of the earliest medical papers on physiotherapy for airway clearance was that of EWART [1], who in 1901 described a technique of "empty bronchus treatment by posture in the bronchiectasis of children", which required continuous drainage in the head-down position for hours at a time. In 1934, NELSON [2] recognized the importance of precise anatomical knowledge of the bronchial tree for postural drainage. It is the positions described by H.P. Nelson that are still used today for the drainage of specific lobes with retained secretions.

Until the late 1970s, physiotherapy for airway clearance was mainly a passive treatment on the part of the patient, with the physiotherapist providing manual techniques of percussion, vibration and shaking with the patient appropriately positioned. Randomized controlled trials in 1979 [3], comparing this "conventional treatment" with postural drainage using the active cycle of breathing techniques (which incorporated the forced expiration technique) led to a more active, comfortable and effective airway clearance treatment. Another major advantage was that many patients were able to carry out their own treatment as effectively without assistance.

The recognition that breathing exercises and breathing control were important facets of airway clearance has led to the development of several methods of airway clearance coming from different countries, but all encouraging effective independent treatment regimens particularly aimed at improving compliance in patients with cystic fibrosis [4] and bronchiectasis.

Today the physiotherapist has a variety of techniques and devices available for improving airway clearance and airway function. The advance of the clinical expertise of physiotherapists is only facilitated however when they no longer have to work under prescriptive regimens. In the UK, the autonomy of the profession was recognized in 1977 [5]. Prescriptive physiotherapy regimens inhibit the growth of professional development, but in countries where the physiotherapist is an autonomous practitioner, treatment programmes are designed according to the individual patient′s specific needs. The physiotherapist develops the ability to recognize a physiotherapy problem, and specifically when to and when not to treat. Assessment and reassessment of the patient being the key to effective physiotherapy.

Some confusion exists in the literature about the benefit of physiotherapy developed from studies performed in patients who did not have a problem that would have responded to physiotherapy. One such example was the study of GRAHAM and BRADLEY [6], in which patients with acute primary pneumonia were treated with intermittent positive pressure breathing (IPPB) and chest physiotherapy. It was not surprising that no benefit was shown in this group of patients, but this study influenced practitioners for a long time against the use of IPPB in other conditions in which there was a problem that would have responded. It is critical, however, that the technique or tool utilized is appropriate for the patient′s problem.

The literature needs careful scrutiny. In some studies the term "chest physiotherapy" has not been described in detail, making valid comparisons impossible. In others, where an attempt has been made to perform further studies on a particular technique, it has not been carried out in the same way as described in the original study. There are many unanswered questions in cardiorespiratory physiotherapy, and high quality research needs to be encouraged.

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This series of papers is on mucus transport and physiotherapy, starting in this issue with the regulation of mucociliary clearance in health and disease [7]. It is important to remember that airway clearance is only one component of cardiorespiratory physiotherapy. Patients may have additional problems that will respond to physiotherapy, *e.g.* breathlessness, pain and reduced exercise tolerance. These papers follow from the first physiotherapy symposium held within the European Respiratory Society Annual Congress in September 1996, and have provided an excellent opportunity to review practice and discuss the available evidence for physiotherapy in airway clearance.

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