

Physiotherapy in the Surgery of Respiratory Disease

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Furthermore, to justify expenditure on a full-time surgical staff and on equipment and technicians a minimum number of three operations with cardio-respiratory by-pass should be undertaken each week, quite apart from an average of 10 to 15 standard thoracotomies for closed cardiac, pulmonary and oesophageal surgery and 10 to 20 therapeutic and diagnostic endoscopies. To ensure that a surgical team orientated particularly to surgery with cardio-respiratory by-pass is kept busy, anaesthetic, nursing and physiotherapeutic services must be consistent. Shortage of any of the ancillary services affects the working of the team. For example, an anaesthetic pool, provided it is full may well be the most economic way to supply the anaesthetic service in a particular region. It is when an anaesthetic pool is understaffed and becomes a puddle that the shortcomings of such an arrangement are made clear. All surgical undertakings have arbitrarily to be limited. Moreover anaesthetic care does not terminate with the return of consciousness at the end of an operation and the calibre of anaesthetic services envisaged includes heavy involvement in the management of patients in the field of intensive care. The purpose of a specialised unit is frustrated if it depends upon occasional anaesthetic help. It follows that a Cardio-Thoracic Surgical Unit should not depend upon an anaesthetic pool but requires its own anaesthetists whose services are augmented, and whose knowledge is disseminated by rotation through the special unit of junior anaesthetic staff in training, who may well be part of an anaesthetic pool. The same criteria apply to nursing staff and physiotherapists. It is quite pointless for the nursing activities in an intensive care unit to be dependent upon activities elsewhere in the hospital and nurses must be specific to a unit. In precisely the same way, for the requirements of physiotherapy to be dependent upon a physiotherapeutic pool means that the number of physiotherapists available in a unit that is supplying a service will hinge on requirements elsewhere in the Province and a variable level of physiotherapeutic help is unacceptable. The contributions of good physiotherapy to pre-operative management, to early post-operative care and to rehabilitation are inestimable, but these must be consistent. Physiotherapists vary greatly in their capacity for work and in their calibre and a particular interest in the management of patients who require or have been submitted to thoracic surgical procedures is not necessarily a requirement for a physiotherapist to be well qualified and good at her job. That not all are prepared to supply the calibre of service required and which extends over a 24-hour day, does not necessarily detract from their usefulness in other spheres of physiotherapy. But where there are available physiotherapists whose interest is specifically that of thoracic surgery and who are prepared to devote themselves to the job, they should be seconded to an appropriate unit and not remain part of a pool, and for the proper handling, by physiotherapists, of the material available in the Province of Natal at least three physiotherapists are required to staff the Thoracic Surgical Unit and its intensive care areas.

REFERENCES

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The purpose of this paper is to define the place of physiotherapy in a Thoracic Surgical Service and to outline methods of treatment with reference particularly to physiotherapy before and after surgery for respiratory disease.

Are physiotherapists necessary? Since much of their task is physical, would strong men rather than slender and often attractive, but not necessarily physically robust women be more appropriately employed? Could the duties of physiotherapists in the ward not better be undertaken by an augmented nursing staff? Should a physiotherapist be specific to a unit and not peripatetic throughout a hospital? Over what period of the 24-hour day should a physiotherapist be available? At least a partial answer must be supplied to these fundamental questions before the place of physiotherapy in a Surgical Service can be defined.

In the past academic and social distinction may have existed between nurses and physiotherapists, but these distinctions are now largely arbitrary, although educational requirements for training in physiotherapy are a little different from those required for training as a nurse. For most girls the decision to embark on either training is probably little more than personal predelection. The decision once made, training in the basic sciences and in the wards is entirely different in the two services, and the recently qualified nurse is not trained to do the ward work of a physiotherapist, nor is the recently qualified physiotherapist trained to nurse. Close contact in the wards will, however, have taught both the elements of patient care, and it would probably make little extra demand on an augmented nursing staff, provided there is both willingness and intelligent application, to undertake the ward duties of a physiotherapist in relation to pre-operative preparation of a patient for thoracic surgery and early post-operative care. The duties of a physiotherapist in the department of physiotherapy, where specialised equipment is used, will always remain beyond the scope of the nursing staff. However, there is everywhere a nursing shortage, and it is, therefore, entirely academic to envisage the possibility of an augmented nursing staff for the purpose of physiotherapy in a thoracic surgical unit, and it can only be accepted with gratitude that there are two disciplines—both understaffed—whose function may overlap a little, but which in the end provide a level of skilled paramedical labour able, with difficulty, to cope with the volume of work. Suitable men are rarely attracted to physiotherapy, are unsuitable for use in female wards, and, on the whole, elicit less effective response from male patients. Skill and sound training have proved effective alternatives to physical strength in the achievement of successful physiotherapy and, just as good nursing will always remain the prerogative of a woman, so will good physiotherapy.

There can be no doubt that a trained physiotherapist should be specific to a unit and that only trainees and recent graduates should move about the hospital. Ineffectual physiotherapy is not only useless, but imposes an additional burden on the patient, and, as in all other aspects of patient care, success hinges precisely on the calibre, skill and devotion of the individual. The efficiency of any unit hinges

precisely on the calibre, skill and devotion of the staff, both medical and paramedical, and continuity of service within a unit is essential for a high level of team work to be established. A physiotherapist specific to a unit is just as essential as a ward sister who regards the unit as her responsibility and who, with an advancing sense of possessiveness, devotes time and care to the management of her unit far beyond the normal call of duty. In intensive care units particularly, there will frequently be patients whose requirements for physiotherapy extend throughout the 24-hour day and, while there is not the need for a continuous service in physiotherapy, it must be recognised that there will be occasions when a physiotherapist will be required to attend at intervals during the night.

There follows in outline current methods of physiotherapy which are at present applied to patients in the Thoracic Surgical Unit in Durban and which have been applied for many years in the Thoracic Surgical Service in Edinburgh.

BEFORE OPERATION

The object of pre-operative training is to achieve a clear air-way and to improve ventilation. A clear air-way is most quickly achieved by a combination of physiotherapy and appropriate chemotherapy, and most patients have to be taught how to cough effectively. By graduated breathing exercises ventilation can be improved, and the physiotherapist, given time, can demonstrate improvement both in vital capacity and forced expiratory volume. The pre-operative period is necessary also to establish rapport between patient and physiotherapist, and in an acute surgical ward this period is nearly always too short, because of the demands on the surgical service.

On the day of admission patients who are well enough are included in a class in which breathing exercises—diaphragmatic breathing and localised breathing with resisted inspiration and long, relaxed expiration—and arm, leg, and trunk exercises are taught, and posture is improved. The patient with bronchitis or bronchiectasis is given additional appropriate and individual treatment.

AFTER OPERATION

Provided there is not a surgical contra-indication, post-operative physiotherapy is started *on the day of operation*. The patient is encouraged to breathe deeply and to cough, and the shoulder on the side of thoracotomy is moved with assistance through its full range. Recovery from thoracotomy is least often complicated when the air-way is clear and the lungs fill completely the pleural spaces. The surgeon ensures that the pleural spaces are empty of air or liquid and it is the responsibility of the physiotherapist to maintain a clear air-way. Pain, physical weakness, and the pre-operative respiratory state of the patient are the factors most likely to limit the efficacy of physiotherapy at this stage, a stage where it is all too common to see the physiotherapist leaning heavily on rather than helping the patient.

During the *first and second post-operative days* physiotherapeutic management is conservative. The patient is supported on pillows in the recumbent position and is encouraged to prolong the expiratory phase of respiration while being gently shaken, and he sits forward to cough. Postural drainage is painful and demands the expenditure of energy, and is avoided at this stage, all energy being conserved for the exertion of coughing. The shoulders are moved through a full range; all muscles of the legs are exercised; diaphragmatic and localised, especially basal breathing are encouraged. The patient is attended three times each day by the physiotherapist, when the routine outlined above is repeated.

From the *third day* postural drainage is given, but only for short periods, and progress is usually so rapid that the post-operative patient is able to join the remedial class by the

fifth post-operative day. With regard to postural drainage a word of caution may appropriately be inserted here. Patients submitted to the operation of oesophago-gastroctomy have lost the mechanism at the cardia which prevents reflux. These patients should not in any circumstances be postured in such a way that alimentary contents can flow by gravitation into the mouth, because the likely sequel to this is aspiration pneumonia which may well be a lethal complication. The patient, who pre-operatively, has a "frozen" chest—usually because of chronic empyema thoracis—is subjected to resisted breathing exercises with shaking and trunk movement from the first post-operative day, in the belief that these exertions may more quickly mobilise ribs after decortication, and because pain in these patients is almost invariably less severe.

The airway is cleared by bronchoscopy when physical weakness precludes effective physiotherapy and when there is radiographic evidence of lobar atelectasis. Over many years there has been noted a marked decrease in the necessity for post-operative therapeutic bronchoscopy. This change in post-operative management is related, it is believed, to improved surgical technique and intelligent conservatism in physiotherapy. In a unit which undertakes more than 500 thoracotomies annually, therapeutic bronchoscopy is now required on fewer than 10 patients each year, in comparison with an incidence of post-operative bronchoscopy in 1952 of 20 per cent of thoracotomies undertaken.

In an attempt to improve pulmonary expansion in the post-operative period, use has recently been made of respirators, such as the "Bird," which are triggered, and which deliver through a face-mask a mixture of air and oxygen under pressure and so assist expansion. After the use of these machines it has been found that patients cough more easily and more effectively.

The patient in whom a tracheostomy has been made is managed by coarse shaking in conjunction with prolonged expiration in both lateral positions, the secretions being removed by tracheal suction as each side is cleared. A similar routine is followed for a patient who is being maintained by positive pressure respiration but here the anaesthetist assists by hyperventilation of the lungs because small areas of pulmonary shrinkage are so common in patients being artificially ventilated. Where intermittent positive pressure respiration is used in the management of flail (crushed) chest, physiotherapy is limited, early, to limb movements, dependent upon the presence of other injury. When the chest wall is less unstable, hyperventilation, fine shaking, or vibration, and tracheal suction are undertaken in the manner outlined, but caution is adopted in turning the patient into the lateral position, and it is usual to undertake physiotherapy with the patient turned only a little to one or other side. In the patient who has a tracheostomy it is a wise precaution once daily to inspect the bronchi with a bronchoscope *per vias naturales*—and it is possible in adult patients atraumatically to introduce an adolescent Negus bronchoscope past the tracheostomy tube without removing this, since there is ample room in the trachea for both—to ensure that all distal bronchi are cleared under vision. More vigorous physiotherapy is instituted when the chest is stable and the patient has been weaned from the respirator; the lateral position is adopted without hesitation, rib springing and shaking are used, and diaphragmatic and localised breathing and coughing are all encouraged. A patient will continue to have difficulty with coughing until a tracheostomy tube of a bore which permits of its easy occlusion is introduced. When a cuffed rubber tube is replaced with a silver tube, the patient can then be taught to cover the opening with a finger and expectorate without difficulty if the tube does not have an operculum.

It will thus be seen that there is a trend towards a more gentle approach in the treatment of patients who have been submitted to pulmonary surgery or subjected to thoracic