Postural Rest in Pulmonary Tuberculosis

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Of the countless methods suggested and tried in the treatment of various forms of tuberculosis, that which is most recognised and approved is rest.

"Bed rest" implies an infinite variety of standards. To some physicians and patients its limitations are not breached even by frequent trips to the bath-room. This is bed rest in name only, and is of little therapeutic value. This article, however, is not a discussion of bed rest, which has already been most adequately dealt with on numerous occasions, but of an aspect of it, namely postural rest in pulmonary tuberculosis.

The application of posture in tuberculosis is not a new idea but is a neglected one. In this hospital, since the introduction of this form of therapy in 1947, the results have been so overwhelmingly more superior to bed rest alone or combined with collapse therapy, that, though scientifically it is difficult to make a truly controlled experiment, it has gained, I think, our universal enthusiasm.

In 1916 in the Journal of the American Medical Association, Webb, Forrester and Gilbert drew attention to the neglect of the simple procedure of postural rest in the treatment of pulmonary tuberculosis. Again in 1921 they reported more than 200 excellent results. The failures they encountered were in patients either too far advanced with bilateral disease, or in those who failed to carry the treatment out faithfully. They noted that it was insufficient to instruct patients merely to rest in bed, and overlook the fact that they will more naturally tend to lie on the least affected side, so putting an added burden on the more diseased organ, and reducing the ventilation in the dependent lung. From observations they made under the fluoroscope, the ribs of the recumbent lung were close together and moved less than those over the uppermost lung; the diaphragmatic excursions were at first greater on the dependent side, but this soon settles. They observed hyperemia of the dependent lung after prolonged rest on the affected side, and noted that the shift of the heart and mediastinum to the affected

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Figure 1a: S., European male, aged 25 years, with tension cavities in right upper lobe.

Figure 1b: S., after three months on postural rest alone. Sputa were negative for tubercle bacilli.

Figure 1c: S., showing cavity closure maintained after a year of returning to work as a Sanitary Inspector.
side occurred rapidly, producing relaxation of tissues and the effect of collapse therapy in the dependent lung.

For cases of bilateral disease rest on the back was advocated, with bags of shot placed over the upper lobes.

No mention of the tilted position of the bed was made.

Peck³ in a short discourse on the Modalities of Bed Rest, presented before the meeting of the Illinois Trudeau Society in 1946 mentioned in passing that in pursuit of the three fundamental modalities of rest, namely adequate drainage, muscular relaxation and mental repose a brief trial of the elevated foot position was made to improve drainage, but abandoned when it was realized that the problem was not so much elimination of sputum from the trachea and larger bronchi, as from the involved broncho-pulmonary segments where disease had most severely interfered with the normal cleansing mechanism. He advocated a continual change in position from supine to prone and both lateral positions at intervals throughout the day; a change being made roughly every half hour to permit drainage from diseased areas and prevent stasis of contaminated secretions in normal areas; his contention being that the unreasoning adherence to the state of immobility fails to take into account the need for pulmonary and cavity drainage, adequate drainage being the basic principle of treatment in all other inflammatory processes; and, since cavitation is known to occur, with noticeable predilection posteriorly in the chest, the postero-lateral segment of the upper lobe, and the dorsal segment

FIGURE 2: Patients on postural therapy.
Figure 3a: M.D., African female, aged 32 years. After a year of bed rest with a left phrenic crush and pneumoperitoneum, she still had a large left apical cavity and was considered for lobectomy. — Figure 3b: M.D., after three months on postural rest the cavity is closing. She became sputum negative two months later and maintained the postural therapy for six months. — Figure 3c: M.D., three months after discharge; her cavity remains closed and gastric contents are negative for tubercle bacilli on culture.
of the lower lobe being the most commonly involved, the problem of drainage in a recumbent patient depends on explosive and damaging cough.

This appears to be logical reasoning, yet from observation of the response of many cases of upper lobe cavitation, and the often dramatic cessation of cough in these cases, it would seem that gravity plays a less important part in the drainage of tuberculous cavities than one would suppose.

*Physical and Physiological Principles of Postural Rest*

The method of applying postural rest varies a little from ward to ward, depending on how strongly the physician in charge feels about the principles involved, and which principle he considers the more important.

Dilwynn Thomas, in a personal communication considered that the secretions dammed up in the dependent cavity and became fibrosed. We have not seen a case which suggested that this was the mechanism of healing and cavity closure. In our experience four principles are thought to play a part in the success of this form of rest.

Firstly, by tipping the foot of the bed to an effectively high angle of about 20 degree, providing the patient maintains the position for long periods, there is an apparent hyperaemia in that part of the lung which is normally least well supplied with blood on account of its relative immobility during pulmonary excursions, viz, the superior retroradicular area, which is also that most frequently involved in pulmonary tuberculosis.

Secondly by positioning the patient with unilateral cavitation onto the affected side, there is a restriction of movement of the chest wall on that side, and a movement of the heart and mediastinum producing relaxation of pulmonary tissues. The weight of abdominal organs on the diaphragm may enhance this splinting effect.

Thirdly, drainage, even from apical cavities, appears to be improved. Salkin, Cadden and McIndoe declare that only a small number of cavities have dependent drainage, and that the majority of cavities drain from bronchi arising from the upper parts of the cavity wall. From observation of the rapid disappearance of tension cavities under this postural regime, it is suggested that in tracheo-bronchial tuberculosis with obstruction of the outflow of air from a segmental bronchus, the change in position may either render the bronchus patent or block it entirely, so producing cavity closure, which, if maintained for long enough is permanent. (See Fig. 1a, b end c).
Figure 4a: B.P. European boy, aged 19 years. Admitted with a positive sputum; he had a short history and was febrile. Streptomycin was withheld because of acute shortage. Figure 4b: B.P., six weeks after admission. Postural therapy was the only treatment he received. His sputum was negative and has remained so. Figure 4c: B.P., a year later and three months after discharge. Postural therapy had been maintained for six months.
Method of Applying Postural Rest

The methods of applying the principle of posture to patients suffering from pulmonary tuberculosis depends partly on what the individual regards as the most important factor on which its success depends. Where the theory of hyperaemia is regarded as the most important it would be considered sufficient that the patient maintains the tilted position for almost 24 hours a day, being allowed freedom to move from side to side as inclination dictates. The majority of patients with unilateral cavitation are encouraged to lie for most of the day on the affected side, to effect the partial immobilization.

The foot of the bed is tilted, on solidly built blocks, to an angle of about 20 degrees. This degree of tilting may be gradually achieved over a period of several days on graduated blocks. Where patients at first complain of insomnia, or dyspepsia after meals, the bed may be brought down for the night or for a short period after meals till their bodily mechanics have adjusted themselves, and their enthusiasm and optimism bolstered up sufficiently for them to accept the treatment in its entirety. (See Fig. 2).

For the average case the posture should be maintained for almost 24 hours a day. The patient is permitted a small pillow under the head. He should learn to eat, read and write in this position. Often these latter activities are so hampered that somnolence is easier. After an initial period of complete bed rest it has been our habit to allow patients to attend to the major operations of their toilet once a day, in the bathroom, and when progress indicates, to have full bathroom privileges while on postural therapy. Giddiness, experienced when the vertical position is assumed, makes them quite anxious to return to their tilted bed.

The tendency of patients to sit up against the bars of the bed or to raise their shoulders on doubled pillows makes a parody of the whole procedure and calls for intensified efforts on the part of the doctor and staff to make the patient wish to help himself. It is often surprisingly difficult.

Patients who have become quiescent and fully convalescent have been advised to maintain the tilted position at night after return home. Some, who have returned to work at a stage of unstable but improved disease, as a result of economic pressure upon their families, have continued to improve and heal to an extent quite unexpected and convincing; some postural rest is better than none at all.

Indications

The indications for this form of therapy are most elastic and are, seemingly, limited only by the contraindications.
FIGURE 5a: O.K., a young African female with acute exudative tuberculosis and cavitation of the right upper lobe. After three months of rest, the cavity is much reduced and the infiltration is clearing. Figure 5b: O.K., after six months of postural rest. She started to get up at this stage and has remained well during almost two years following.
Figure 6a: Mrs. F., European female, aged 28 years. Rapid spread of right upper lobe infiltration with cavitation, while on bed rest and pneumoperitoneum, which was abandoned and the patient put on postural rest. — Figure 6b: Mrs. F., nine months later and shortly after discharge. Sputa were negative and have remained so during brief follow-up period.

Figure 7a: S.F., a colored female, aged 17 years. After a year of bed rest, left phrenic paralysis and pneumoperitoneum, she still has giant apical cavities on either side. Bronchoscopy showed tuberculous tracheobronchitis. — Figure 7b: S.F., after 63 days streptomycin and postural rest cavities are smaller, no longer visible on the right. She continues on postural rest and P.A.S. and progress is still encouraging three months later.
Figure 8a: B.S., European male, aged 25 years, with right subclavicular infiltration and cavity. Sputum was positive.—Figure 8b: B.S., after one month on postural rest at home, prior to admission to hospital.—Figure 8c: B.S., after four months on postural rest. Gastric contents were negative for tubercle bacilli. A right phrenic crush was done prior to allowing the patient up. He remains well a year later.
From the minimal infiltrations to gross bilateral disease there is seldom any reason why postural therapy should not be used as part of the treatment programme. In itself it is safe and free from possible complications and, we are convinced, more effective than simple bed rest.

A trial of postural therapy in the initial waiting period, during which the patient is assessed, may save a patient the dangers of collapse therapy; or, where collapse therapy already exists, with only partial success, postural therapy may save them the additional methods of collapse employed to augment an unsuccessful result, and the inevitable curtailment of respiratory function may be circumvented. Major surgery was avoided in the case illustrated in Fig. 3a, b and c, where lobectomy was being considered.

Recent acute infiltrations of one or both lungs such as might be considered suitable for Streptomycin or other Chemotherapy have shown dramatic response (Fig. 4a,b,c). In the case illustrated it is a philosophical question whether bed rest, as such, would have achieved the same result.

Upper lobe cavities have shown particularly satisfying response, of many cases only a representative few can be published (See Figure 5a,b,c, and 6a,b).

Postural rest, chemotherapy and collapse therapy should be complementary parts of the therapeutic regime. The addition of phrenic paralysis, to give more adequate relaxation of pulmonary tissue, and above all to tide a patient over the period when they are starting to get up, seems logical (Figure 7a,b and 8a,b,c).

Many patients adjust themselves shortly to their new requirements and accept with enthusiasm and optimism, reflected from those around them, the limitations imposed upon them. Some react to the enforced and uncompromising rest by a state of nervous tension and irritation. A feeling of exhaustion from lying in bed and complaints of muscular pains, which lead to constant fidgeting for relief and comfort, of insomnia and anorexia, palpitations and constipation, are frequent from those unsuited to the treatment; these patients fail entirely to have the benefits even of bed rest, even though they remain in bed and some do not even do that. It is a reflection on our approach perhaps; these patients may be better for a preliminary period of acclimatization to hospital and discipline before postural therapy is attempted.

The most definite contraindication to this form of treatment is a history of peptic ulcer, or persistent dyspepsia during the treatment. A quiescent ulcer may become active as a result of posture being maintained.

Asthma and emphysema are not always contraindications to
the therapy, indeed, Elwell\textsuperscript{4} has treated a variety of chronic pulmonary conditions, including asthmatics and cases of right heart failure, on postural therapy with encouraging results. If the patient is brought to the point of desiring the treatment himself, no discomfort is noted in many cases. Elwell maintains that in non-tuberculous asthmatics an attack can often be aborted or prevented by the assumption of the tilted position.

A failing left heart makes the maintenance of postural treatment, as described here, impossible. Pregnancy however can go to full term in the normal way, with the foetal position unaffected by months spent in the tilted position.

It has been our custom till recently to interrupt the postural treatment temporarily when a patient has had an haemoptysis or heavily blood stained sputum. Elwell\textsuperscript{4} however, reports that he has, for a long while, maintained the position during haemoptysis with nothing but benefit, and finds the dreaded spread from bronchial embolism much less frequent.

Occasionally the cavity drainage seems to be interfered with, rather than improved in a particular case, which in all other respects appears similar to many other successfully treated cases, and the patient becomes toxic and febrile, cough may increase and sputum be retained. One should be prepared to abandon the treatment when this occurs. Diminution of cough and of troublesome wheezing of which some patients complain, is a noticeable feature of the early days on postural therapy.

**SUMMARY**

From our short experience of this form of treatment, and despite the relatively few patients who give their complete co-operation it has been the impression throughout the hospital that the response to postural rest far outweighs that of ordinary bed rest and appears to deserve more wholehearted approval and acclaim than any other single method of treatment.

We are indebted to Mrs. Barton-Hoare for doing the photographic work connected with this article.

**RESUMEN**

Basada sobre nuestra corta experiencia con este tratamiento, y a pesar de que relativamente pocos pacientes prestaron su completa cooperación, la impresión a través del hospital ha sido que la respuesta al descanso postural es mucho mayor que al descanso en cama ordinario y que parece merecer una aprobación y aplauso generales que cualquier otro método de tratamiento.
RESUME

Les auteurs concluent, après leur courte expérience de ce moyen de traitement que, malgré le nombre relativement peu élevé de malades qui offrirent une coopération vraiment totale, les résultats du repos en position de drainage sont largement supérieurs au simple repos au lit. Ce mode de traitement semble réserver plus de succès que toute autre méthode.

REFERENCES