

strongly negatively heliotropic. The larvae required much moisture. They grew slowly, compared to house-fly and flesh-fly larvae, reaching full growth in from fourteen to twenty-six days (usually about eighteen), depending on moisture, light and temperature. Before pupation the larvae crawled up into the drier layers of the decaying vegetable matter in which they developed and became pupae in less than one hour after they had begun to change. We found the pupal period at from 23 to 26 C. to vary from six to twenty-six days, but usually to lie between nine and thirteen days.

The total time, at 21 C. from the laying of the egg to the hatching of the adult fly was from thirty-three to thirty-six days, as observed in five individuals.

The length of life of the flies, under the favorable conditions of feeding in our principal experiments, was,

us to doubt that the fly is the usual agent in spreading the disease in nature.

3. On the basis of the evidence now at hand we should continue to isolate persons sick with poliomyelitis or convalescent, and we should attempt to limit the formation of human carriers and to detect and control them. Screening of sick-rooms against the stable-fly and other flying insects is a precaution which should be added to those directed against contact infection, but not substituted for them.

4. The measures used in suppressing the house-fly are not applicable to the control of the stable-fly owing to its different breeding habits and food-supply. Methods should be devised for diminishing the numbers of stable-flies as they are a great annoyance to cattle and, in all probability, are capable of transferring and inoculating a number of the diseases of animals.

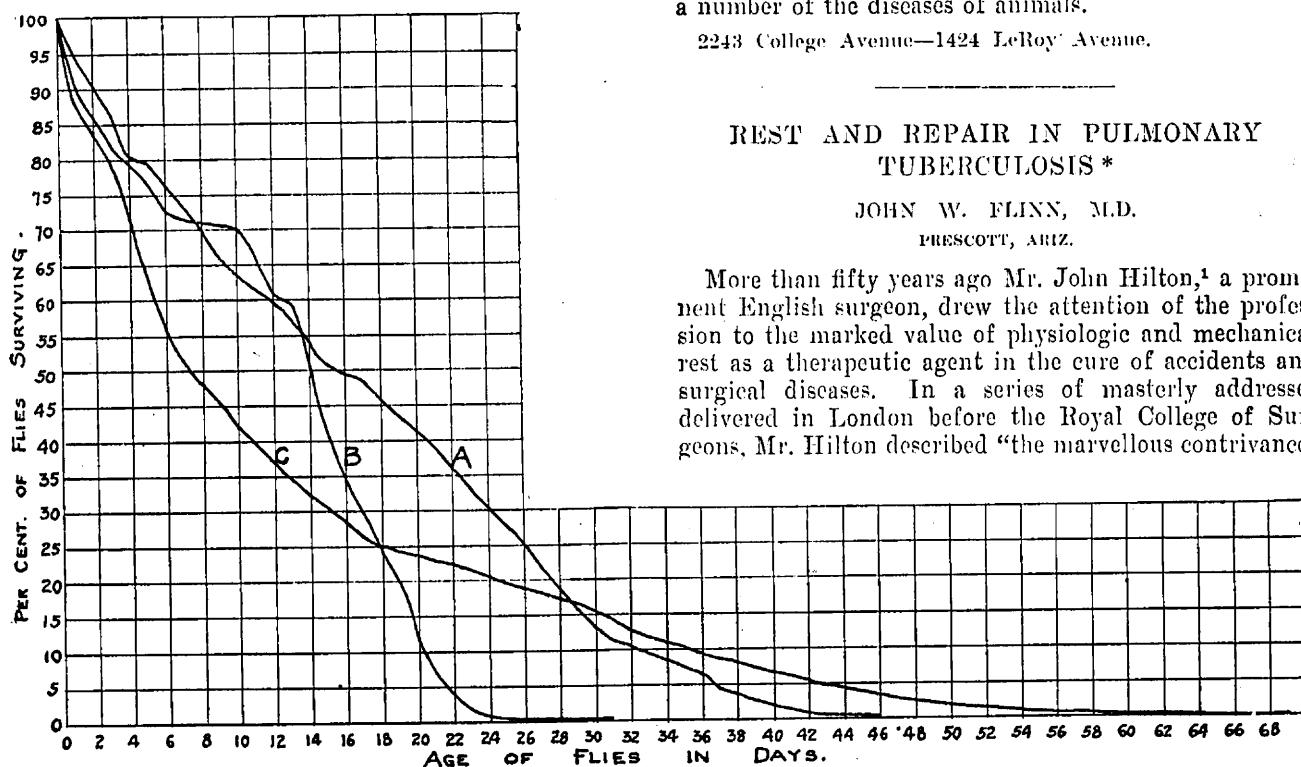
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REST AND REPAIR IN PULMONARY TUBERCULOSIS*

JOHN W. FLINN, M.D.

PRESCOTT, ARIZ.

More than fifty years ago Mr. John Hilton,¹ a prominent English surgeon, drew the attention of the profession to the marked value of physiologic and mechanical rest as a therapeutic agent in the cure of accidents and surgical diseases. In a series of masterly addresses delivered in London before the Royal College of Surgeons, Mr. Hilton described "the marvellous contrivances



Longevity chart of *Stomoxys calcitrans*: A, percentage curve of 1,300 stable-flies surviving on each day after hatching; hatched between December 12 and 20, 1912; used in Experiment 1; room temperature, usually between 12 and 20 C. (53.6 and 68 F.). B, percentage curve of 650 stable-flies surviving on each day after hatching; hatched between Dec. 22, 1912, and Jan. 3, 1913; used in Experiment 3; insectary temperature, from 23 to 36 C. (from 73.4 to 78.8 F.). C, percentage curve of 2,000 stable-flies surviving on each day after hatching; hatched between April 7 and 18, 1913; used in experiments 5, 6 and 7; room temperature, usually between 12 and 20 C.

on the average, twenty days. The maximum was sixty-nine days, and was observed in a female fly.

The three longevity curves plotted in the accompanying chart show the percentage of survivors at all ages in three large groups of flies under different conditions of season and temperature.

CONCLUSIONS

1. In a series of seven experiments in which the conditions were varied, we were unable to transmit poliomyelitis from monkey to monkey through the agency of the stable-fly.

2. Further experimentation may reveal conditions under which the stable-fly can readily transfer poliomyelitis, but the negative results of our work and of the second set of experiments of Anderson and Frost⁴ lead

which Nature has employed for securing rest to the different organs of the body when in health," and "the instinctive promptings of Nature to secure rest on the occurrence of accidents or diseases."

Mr. Hilton says:

"So intimate is the association between rest and growth as to make them appear on a superficial view to stand to each other in relation of cause and effect. Accurate observation of the animal and vegetable world certainly reveals their perpetual coexistence; and growth as a rule seems *pari passu* with physiological rest." "A homely illustration may be found in the fact that in infancy the child who sleeps much mostly thrives. *Mutatis mutandis* the observation is equally true that the wakeful restless child seldom displays the evidence of active nutrition. Doubtless all will admit that in infancy development is in its highest state of activity and

4. Anderson, John F., and Frost, W. H.: Poliomyelitis: Further Attempts to Transmit the Disease through the Agency of the Stable-Fly (*Stomoxys calcitrans*), Pub. Health Rep., Washington, May 2, 1913, xxviii, 833.

* Read in the Section on Practice of Medicine of the American Medical Association, at the Sixty-Fourth Annual Session, held at Minneapolis, June, 1913.

1. Hilton: Rest and Pain. Geo. Bell & Sons, London, 1907.

that the healthy infant passes the greater portion of its life in a state of rest and sleep. Growth—the renewal of some parts and the fresh development of others—seems thus to claim sleep and rest as its helpmates." "Growth is the antetype of repair prefiguring the physiological capabilities of existing structures to repair themselves." "Repair is but the repetition of growth. The same elements, the same kindred conditions are necessary to the same results. Rest is the necessary antecedent to the healthy accomplishment of both repair and growth."

He pointed out that in acute and chronic inflammations of the soft tissues, injuries to bones and joints, and in most surgical diseases the object of treatment is to bring about rest of the injured parts. Surgeons soon began to recognize the supreme importance of rest as a therapeutic agent, and to-day² "the surgeon entirely relies on rest, after his operation, to heal the wound he made."

REST IN MEDICINE

Physicians, on the other hand, have been wondrous slow to appreciate what rest can accomplish in preventing and curing disease. In 1874, Weir Mitchell began to develop his rest treatment for neurasthenia and hysteria, and through his influence absolute rest in bed was first given a recognized place in medical therapeutics. In acute fevers from whatever cause, in chronic diseases of the heart, of the kidneys, and lately in chronic gastrointestinal affections, rest in bed is an integral part of treatment; and yet it has apparently occurred to but few that the same treatment is just as necessary in chronic disease of the lungs.

Although Hilton in 1860 demonstrated conclusively the value of physiologic rest in acute and chronic inflammations with or without abscess formation, and although the experience of surgeons from that day to this has served only to verify and emphasize these views, the profession has apparently utterly failed to recognize the fact, that physiologic rest of the lungs must be of the very first importance in the treatment of chronic inflammation and abscess formation in the lung tissue. One will search American medical literature in vain for any extended reference to the value of rest in the treatment of pulmonary tuberculosis, or for definite information regarding its use. With the exception of the little work³ by Norman Bridge published in 1903 and a few scattered papers, practically nothing has been written on this important subject. Bridge was strongly impressed with the value of rest to the lung tissue, but unfortunately was content with mechanical measures for producing this rest, such as "to inflate the pleural cavity with sterile air or nitrogen gas after the manner of Murphy" or "by means of adhesive bandages applied about the chest to nullify the motion of the ribs on the affected side" or "a perfectly fitting unyielding jacket or splint embracing one side of the chest," either of the latter two be worn for several months. While such mechanical measures are of undoubted benefit in some instances, they are applicable only to a limited number of cases. Nevertheless, these views were a marked step in advance, and probably did a great deal toward suggesting the larger possibilities of physiologic rest of the whole structure of the lung.

Within the last two years the operation of artificial pneumothorax has been revived, and experience has shown it to be of distinct value but only in a limited field. Perhaps the greatest ultimate good which will

come from this method of treatment will be its effect in teaching the profession the value of rest to the lung in all cases of pulmonary tuberculosis. As Bushnell⁴ says: "The best proof of the value of rest in progressive tuberculosis is furnished by the results of pneumothorax, which are, that the diseased lung is greatly benefited by compression; but if the non-compressed lung contains too much tuberculosis it is damaged by the increased activity forced on it by the collapse of its fellow. The experience in pneumothorax thus constitutes a beautiful double proof of the efficacy of rest."

REST IN BED

The questions naturally arise: Is it possible to give physiologic rest to the lungs? If so what means are at our disposal to induce such rest? So intimately are the lungs and heart, in their functions, connected with each other and with every other organ of the body that it is impossible to rest them without giving rest to the body as a whole. Consequently the recumbent position is the one means of giving rest to the lungs. Rest in bed alone will give the required rest to the diseased lung tissue. In pulmonary tuberculosis the word rest should always signify rest in bed. The very first rule in the treatment of pulmonary tuberculosis should be: Put your patient to bed!

For what class of cases should rest in bed be prescribed? For absolutely every case without exception. So soon as manifest tuberculosis can be detected in any patient, that person should be confined absolutely in bed for at least one month, and in the great majority of cases for two months, and this regardless of whether there is fever or not. This preliminary treatment of a month or two in bed will accomplish more than any other factor in starting the patient on the road to permanent recovery. Rest in bed improves the appetite, aids digestion and assimilation, increases the weight, lowers the temperature, slows the pulse and respirations, lessens the cough, decreases the expectoration, allays nervous irritability, and conduces to natural sleep. Surely a therapeutic measure which will produce such results should be used in every case without exception.

GRADED REST

And rest should be prescribed in definite quantities, just the same as drugs and other therapeutic agents. Written instructions should be given patients stating what degree and how many hours of rest should be taken each day. It is a distinct advantage to recognize three grades of rest in bed: 1. If the temperature does not go above 100 F., or the pulse above 100, at any time during the day, the patient may be allowed to get up in his bathrobe and bedroom slippers to make his toilet in the morning, and to go to the bathroom to evacuate his bowels and bladder, provided the bathroom is immediately adjoining. His meals should be eaten sitting up in bed. The remainder of the day should be spent lying flat. If the temperature is not above 99.5 F., reading in the recumbent position may be indulged in for a few hours each day. 2. With a maximum temperature between 100 F. and 101 F., or a pulse persistently above 100, the toilet should be made in bed, a urinal used and the patient allowed out of bed only to move his bowels. No reading should be permitted. 3. When the temperature reaches over 101 F. or the pulse 110 at any hour of the day, the patient should not be permitted even to sit up in bed. The urinal and bed-pan should be used, and the patient should be washed and fed by a

2. Leach: *Therap. Gaz.*, Feb. 15, 1913.

3. Bridge: *Tuberculosis*. W. B. Saunders & Co., Philadelphia, 1903.

4. Bushnell: Personal letter.

nurse. A temperature over 102 F. demands, in addition, the ice-cap, and, if necessary, cold sponging.

When a certain grade of rest does not bring the maximum temperature below 100 F. in two weeks, the next higher grade of rest should be tried. Loss of appetite, indigestion, lassitude, sleeplessness, and nervous irritability are all indications for a greater degree of rest.

Objection will probably be made that individualization should be used; that hard-and-fast rules can not be formulated which will apply to every case. This is only partially true. Individualization is important, but individualization based on definite principles. Moreover, the power to individualize properly comes only with experience; the inexperienced should follow the general rules closely and allow exceptions to them only when it has been definitely established that the rule is not proving beneficial.

TUBERCULOSIS GENERAL AS WELL AS LOCAL

In searching for facts which will enable the physician to determine how much longer than the initial one or two months, rest in bed should be continued, it is important to remember that pulmonary tuberculosis is, except in its very early incipency, a constitutional disease affecting the whole body, as well as a local disease of the lungs. In addition to the local symptoms (cough and expectoration, and often pain, hemoptysis, and dyspnea) there are present in a large proportion of cases, loss of appetite, lassitude, elevation of temperature, acceleration of pulse, loss of weight, chills, and night sweats. It is these evidences of systemic infection which especially demand rest in bed, and the rest should be continued until all constitutional symptoms have disappeared. Keep the patient in bed until the temperature and pulse are normal and until he has about regained his normal weight. While, in most early cases, the constitutional symptoms will disappear after the first one or two months in bed, later cases require four and six months, and often a year or more, in the recumbent position. I have seen one case in which the disease was arrested after three consecutive years in bed.

Not only is rest in bed of supreme importance in the treatment of active tuberculosis of the lung, but it continues to be a valuable remedy after the lung lesion has become quiescent and the patient is taking active exercise. Two hours absolute rest in bed in his night clothes should be given every patient under exercise each afternoon, until he returns to his former work. The experience of Patterson⁵ of Frimley is strong evidence of the value of rest in bed after active exercise, while his observations on the effect of his "complete immobilization" in bed to combat the effect of what he terms "excessive auto-inoculations" constitute one of the strongest proofs extant of the great value of absolute rest in bed in the treatment of systemic infection in pulmonary tuberculosis.

And even after the patient has returned to his former occupation, one hour's rest in the recumbent position preferably in bed in his night clothes after the noon-day meal, should be insisted on, unless his circumstances are such that it seems absolutely impossible for him to do so. In all cases, his evenings should be spent lying in the recumbent position and his Sundays should be spent in bed for some months after returning to work. In many cases, a day in bed in the middle of the week, is necessary to enable the patient to attend properly to his work during the remaining five days. The observance of

these rules will do much to prevent such recurrences of the disease as have been so woefully prevalent in the past, recurrences which came principally because patients were not advised of the necessity for a large degree of rest for months and often years after returning to their former occupations.

THE ESSENTIALS OF TREATMENT

Although much good work has been done in the last ten years on the influence of serums, vaccines, and other special treatments in pulmonary tuberculosis, so much has been written along these lines that the profession is apt to forget that fresh air, good food, and rest are still the *sine qua non* of treatment in this disease. They are the principal working tools of the craft, and surely it is the part of a master-workman to perfect himself in the use of these, rather than to neglect them in experimenting with instruments many of which are of doubtful utility.

The truly wonderful therapeutic effects of fresh air and good food have long been known to the profession, but rest is an agent the use of which physicians have been slow to recognize. As all three are of such importance it is indeed difficult to compare them. Perhaps one can not better express their relative importance than by a paraphrase. In the treatment of pulmonary tuberculosis there now abideth fresh air, good food, rest, these three; but the greatest of these is rest.

ABSTRACT OF DISCUSSION

DR. CHARLES L. MINOR, Asheville, N. C.: The truths of medicine are so beautiful that when we realize any special one we are apt to be absolutely blinded by it to the existence of other truths. I am glad to hear the importance of rest emphasized before a body of medical men, because the great sin in the treatment of tuberculosis is abuse of exercise. We can also have the abuse of rest, and I am afraid that unless there be some limitation of the extremes to which doctors would push rest, it might become somewhat of an abuse. Although, as I say, it is distinctly safer to err on this than on the other side. There are exceptions to everything and when the doctor says that in every case, from the beginning, the patient should always have extreme rest in bed, he is going too far. We realize perfectly that, whatever the state of the patient, he should be at rest for two or three weeks so that the physician can study the case. If the infection is beyond a certain degree, moreover, we realize the importance of rest for a longer time. The tendency to keep the patient absolutely at rest for too long a time is apt, in my experience, to unfit him for a return to work, for which he must be trained and prepared by varieties of exercise. I have seen a number of patients treated by competent men who have been kept at rest and fattened up so unduly that they could not resume work. I would not force exercise too far, but it seems to me that Dr. Flinn is extreme in stretching rest too far. Let us strike a happy medium.

DR. S. A. KNORF, New York: I wonder if Dr. Flinn has thought of tuberculosis also as a social problem and what it would mean and what cost it would involve to have the more than one and a half million tuberculous patients in the United States put to bed, some for six months, some for a year, and some for three years. It is now well known that for every one of the two hundred thousand deaths we have annually from tuberculosis in the United States we have about eight living tuberculous patients, a goodly number of them still doing their work and supporting their families, others without families supporting themselves, and thus not a burden to the community. Professor Cabot has inaugurated a wonderfully efficient social-service system in connection with the work in the Massachusetts General Hospital. He, of course, looks after the physical welfare of the patients, but

5. Patterson: *Auto-Inoculation in Pulmonary Tuberculosis*, James Nesbeth & Co., London, 1911.

he also investigates thoroughly their social conditions and judiciously watches and guides the earning activity of the patient. Those who are able are permitted to work only enough not to do them any harm, and that is the policy all modern phthisiotherapists are bound to follow. I agree with Dr. Flinn that a patient whose temperature is 100 or more must be in bed and rest, but not every case of tuberculosis is febrile and the patient need not be in bed. In the Municipal Sanatorium at Otisville we have several hundred patients, nearly all of them in the earlier stages of the disease. We have few nurses and servants. The institution owes its inception to Prof. Hermann M. Biggs of New York; it is he who conceived the idea of utilizing the patients' ability to work, not only for their own good, but also to reduce the cost of their maintenance. The result is that we have a goodly number of cures and that the Otisville Municipal Sanatorium is considered to-day one of the most economically and successfully conducted institutions in the United States. When the patient arrives at Otisville, he is carefully examined and, whether febrile or afebrile, allowed to rest for a week. After a while, if continually afebrile, he is put to work. He is carefully watched by the physician of his division and only with concomitant improvement of his condition are his working hours increased in number. The experience of Patterson at the Frimley Sanatorium in England, King of Loomis, and, if I am rightly informed, of Beach in the sanatorium of Minnesota, and the work in Otisville and many other institutions would indicate that occupation therapy or auto-tuberculin inoculation in pulmonary tuberculosis is a most valuable means of accomplishing a cure in a goodly number of cases. Of course, we must individualize.

DR. JOHN RITTER, Chicago: Dr. Norman Bridge of California, at the tuberculosis meeting in Washington some years ago, brought out the fact that we are too much in the habit of having our patients practice pulmonary gymnastics, when we should institute and advise pulmonary rest. I believe that when the lung is incapacitated we should use judgment and institute rest, as a surgeon does in the case of a tuberculous knee-joint or hip-joint. The lung is damaged, the heart is weakened, and the toxic condition of the body all require rest. I think that Dr. Flinn is right, but that this method of rest may have a tendency to make a large class of lazy, idle tuberculous persons.

DR. F. M. PORTINGER, Monrovia, Cal.: Dr. Flinn, in my estimation, has laid down a carefully devised plan by which he no doubt obtains excellent results. Every man has a certain way of working and by his method arrives at certain conclusions and obtains certain results. This does not necessarily mean that his method is best. It probably is best for him, but we must be careful not to draw a general conclusion from any one set of observations. I use a great deal more rest in treating tuberculosis than I ever did before. I put patients to bed now that I would not have thought of putting to bed several years ago. I would advise all who are attempting to treat men and women who have been leading active lives to put them to bed when beginning treatment. This is the easiest way to gain control of the patient. If patients are permitted to be up and around it is almost impossible to get thorough control of them. I put patients to bed for at least a week whether they have fever or not. If I find that they are not adjusting themselves correctly to the enforced rest, I keep them there longer. I have taken men of affairs who had been extremely busy and put them to bed for one or two months and in this way changed them from nervous, energetic business men to cooperating patients. The greatest thing in the treatment of tuberculosis is to individualize. If there is any place where common sense is needed, it is in treating these chronic cases, in which you are compelled to put up the fight, not only with the patients but also for them, to guide them in every act of their life, not for a few days or a few weeks, but for months and often for years. Tuberculosis is not the only question to consider. It is an accident that has happened to a human being. If this is borne in mind and the patient treated as well as the disease, it will add greatly to successful treatment.

DR. THOMAS H. HAY, Stevens Point, Wis.: It seems to me that there has been a misconception of Dr. Flinn's paper on the subject of rest. It has been said that he did not display any special effort to individualize in the application of rest. It seems to me he did individualize, for he stated, as I remember, that he treated some patients in bed for one week, some for two weeks, some for three months and some for even a year, and he does not make it a rule to treat every patient in bed for three years; that was a single case. My own experience is that there is no therapeutic agent which is so neglected as the application of rest to the tuberculous patient. Why the social and economic aspects of tuberculosis should influence the application of therapeutic measures I cannot understand. It has no more to do with the case than has the social aspect of typhoid, pneumonia or any other disease. I cannot understand why tuberculosis should be treated in such an imbecile and idiotic way by the medical profession as it has been for generations. It is a common thing to see patients go to their graves without any rest; in fact, it was a common observation that in previous years a considerable number of tuberculosis patients died in a chair, and many now die sitting up, if they do not die on the street. I think that Dr. Flinn's attitude on the question of rest is perfectly reasonable. We should do as Dr. Pottenger says, and I am glad to see that he has learned the value of rest and is employing that knowledge more than he did in former years. I am a firm believer in the broader application of rest. I have seen many cases which responded to the rest treatment in three weeks and some in three months. I have in mind a case in which the patient was in bed for about sixteen months, and to-day he is perfectly well, doing an amount of work proper for a normal, well-regulated person. Dr. Flinn should have stated what he understands by absolute rest, and the proper application of the principle of rest and what he means by it. Dr. Dewey of Wauwatosa remarked to me that the majority of people make hard work of absolute rest. The majority of people do not know what it means. It means rest in bed, without visitors, without reading, without talk and without thought, if that is possible. I tell the patients to go to bed and count the knots in the ceiling, because it is no mental or imaginative effort to do so.

DR. RICHARD C. CABOT, Boston: So much has been said about rest that I want to put in a word. Think what happens to an arm if you put it in splints. Atrophy of the muscles occurs, and when you take a roentgenogram of the arm you wonder if the bones are diseased. Rest sometimes does great harm. It is not the only physiologic principle of healing. Exercise is another and often more important principle. Rest may mean destruction and the breaking down of tissue. These theoretical conclusions, however, should not influence us in the practical question of treating tuberculosis. The only question is, does it help? If the absolute rest treatment can be shown by Dr. Flinn, or any one else, to produce better results than any other plan, then of course we must do the best we can to get these better results. I think most of us who have treated tuberculosis know that we have to individualize. We have to consider the psychic side—the mental side. That is what we mean by the social problem. There are some people who become so neurasthenic and so lazy as a result of our treatment that we give them back to society in a worse condition than when they came to us. It is doubtful whether we have done the community any good by restoring them to society as so-called "cured" persons.

DR. JOHN W. FLINN, Prescott, Ariz.: I am firmly of the opinion that it is a great pity that men holding prominent positions in the profession do not emphasize the rest treatment of tuberculosis more than they do. I believe that they are responsible for a great deal of harm that is being done throughout the country, which we notice especially in the Southwest. In regard to individualizing, it seems to me that in the past, the cart has been put before the horse. My plea is to lay down general principles, to lay stress on those principles, and, after we have learned them thoroughly, then begin to individualize. One of the greatest faults with the treatment in the past has been that we have been individualiz-

ing without principles. Dr. Cabot has asked for results and I believe that I can show them. In spite of everything that has been said to the contrary, I am still of the opinion that in active tuberculosis rest is the most powerful therapeutic agent we have at the present time. And I have serious doubts as to whether it is possible to push it to extremes so long as the disease is active. You might notice that the word "exercise" was not mentioned in the paper. When it is time for exercise I am as firm a believer in it as anybody, but I do not believe in exercise so long as the tuberculosis is active. So long as it is active I do not believe you can push the rest to an extreme.

EPIDIDYMYOTOMY

THE RADICAL OPERATIVE TREATMENT OF EPIDIDYMITIS

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No operative procedure which has been recently suggested has given more gratifying results to both the surgeon and the patient than that for the relief and cure of acute epididymitis. The comparatively easily attained results are all that could be desired by the surgeon and are almost miraculous in the immediate relief they bring to the suffering patient. The relief is so immediate as to render the continuance of the internal administration of sedatives and opiates as well as the loathsome external applications entirely unnecessary. After the operation, the abatement of the fever takes place in twenty-four and not more than forty-eight hours, as a rule, and in from four to eight days the patient is able to resume his usual duties if not too violent. In view of these facts, and since I believe that this operation is devoid of risk to the patient's life, if accomplished with proper aseptic surgical surroundings, it seems to me that it should be the procedure of choice.

Epididymotomy (incision and opening of the epididymis) is an entirely rational procedure based on an accurate study of the pathology of the existing lesions. The catarrhal inflammation present causes the secretion of a varying quantity of serous fluid by the tubular glands of the epididymis, and frequently there is an exudation of some of this fluid into the tunica vaginalis, forming a hydrocele. The usual symptoms of the disease, swelling, tenderness, pain, dragging, etc., are proportionate to the amount of fluid secreted. Consequently, the liberation of the fluid from its sacs of restriction immediately relieves all symptoms.

It is customary for patients with epididymitis to appear for treatment some days after the onset of the symptoms, when pus and abscess formation will in all probability be present. If, however, the disease can be arrested in its first stages by the method under consideration, this pus and abscess formation can usually be avoided. Thus it argues that in an attack mild in character and seemingly amenable to medicinal treatment, the operative plan is more expedient, obviating as it does the possibility of future development of pus and abscess; but if the disease has progressed to the point of pus, this pus is usually confined in the intertubular connective tissues, and the abscess formed is small. It is rare that the focus of the abscess is large except in old and neglected cases. Again, the judicious method of treatment is to open the abscess and liberate the pus.

The operation which I perform is one of comparative simplicity, being a modification of that suggested by Hagner of Washington, D. C. The time required for its

accomplishment is short, rarely being more than from five to ten minutes. The preparation of the patient is the same as that for the administration of a general anesthetic, as local anesthesia is not advisable. The local sterilization of the scrotum may be accomplished in any satisfactory manner, but I have always used the simple method of applying a weak alcoholic iodine solution (from 2 to 3 per cent.) after the parts were properly shaved; always with the precaution of applying the iodine solution only after the skin is thoroughly dried.

The incision in the scrotum is made over the most prominent portion of the swelling. It varies usually from 2 to 4 inches, but should be of sufficient length to allow of the delivery of the testicle, which is wrapped in cloths moistened with warm sterile water or saline solution. A small incision is made in the tunica vaginalis which allows the fluid of the hydrocele to escape. Then the portion of the epididymis which is inflamed is punctured in numerous places with a blunt probe or grooved director. This relieves the tension by allowing the restricted fluid to escape. If pus is present, it will be seen escaping from the punctures, in which case an incision is made in the epididymis in its longitudinal axis to allow free drainage. A probe directed into the pus focus with the addition of mild pressure will free the focus of the greater parts of the pus. After thorough washing of the organ with warm normal saline solution, a short drain composed of a half dozen strands of silkworm gut is inserted into the pus focus. The testicle is returned to the scrotum, which has previously been cleansed with warm normal saline solution, the subcutaneous tissues united by one or two sutures of small catgut, and the skin united by silkworm gut sutures, with the drain passing out at the lower angle of the wound. When the swelling is great, it may be necessary to observe certain precautions to prevent the silkworm gut sutures from tearing out of the inflamed friable tissues, in which case I make use of the button suture, which fulfils this requirement admirably.

After the operation, a simple gauze dressing is applied which I change at the end of forty-eight hours, when I remove the drainage, if present. During this period a T bandage supports the scrotum. One other gauze dressing is usually all that is necessary and is removed on the fifth or sixth day following the operation when the silkworm gut sutures are removed. Most patients are fitted with suspensory bandages and allowed to be out of bed from the third to the fifth day and return to their usual duties from the fourth to the eighth day.

If no pus focus is discovered, the testicle is returned to the scrotum with no drainage, the convalescence being simpler and quicker.

The immediate results of this operation in acute cases are astonishing. The pain vanishes at once, the swelling disappears rapidly, and the tenderness subsides with the swelling. The patient is comfortable from the time he recovers from the anesthetic.

The remote results of the operation are just as remarkable when it is considered that relapses never occur. In a series of one hundred cases, in which I have operated in twenty-five, I know of no relapses. The most gratifying results occur in acute cases or in cases in which the tissues have not become permanently swollen and indurated. The pain is relieved instantly in all cases, but the less the induration, the more rapid and complete will be the return to normal in size and shape of the testicle, and the less apt there is to be occlusion of the vas deferens and the epididymis with the resulting sterility, especially if the attack be bilateral.