REMARKS

ON THE

CHOICE OF MECHANICAL TREATMENT IN SPINAL DISEASE: WITH REMARKS ON AFTER-TREATMENT AND PROGNOSIS.

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GIVEN a case of spinal disease; is any mechanical treatment to be adopted; and, if so, what form is it to take? This is a most common question, the answer to which must mainly come from the practitioner's general experience of the diseases which deform the spine; yet rules may be formulated to serve as a broad guide in most cases.

Omitting mention of drugs or of operation, *e.g.*, opening of abscesses, and confining the remarks now to be offered to cases of caries and of general curvature, the following rules or guides for a choice of mechanical treatment may be laid down. No description of treatment is offered. The old mechanical appliances or "spinals", and their use, will be found in works on orthopædic surgery. Sayre's method is described in his book on *Spinal Curvature*, and in the *BRITISH MEDICAL JOURNAL* for September 1878 and October 1879.

A. UNCOMPLICATED CARIES OF THE SPINE.

This may be chronic in character, or not very acute; there may be slight deformity, or none at all. There is no abscess, no sinus, nor paraplegia.

a. Of Atlas or Axis.—In the early stage, rest in the recumbent position, with the head between sand-bags, absolutely fixed, is required; and ignorance of the extent and exact situation of the disease render mechanical appliances inadmissible at first. On the subsidence of subjective symptoms, the head must be supported as under class *b*.

b. From Third Cervical to Sixth Dorsal Vertebra.—The deformity being mostly from the weight of the head, support must be given to it. This is attained (1) by a chin and occiput rest, acting crutch-like from a suitable leather corset below; (2) by a chin and occiput band, acting as a suspender, from a steel spring rod arched over the head, and rising from a plaster-of-Paris corset (this is Sayre's jury-mast). The former is a dead push up, and prevents rotation of the head on the spine; the latter gives elastic constant extension, and permits rotation; it is, therefore, the better of the two.

Note.—Disease as high as the third dorsal vertebra may be treated without the jury-mast, as under class *c*. The downward weight of the head is not obviated, but the spine is kept still by the fixation of the upper ribs by means of the jacket.

c. From Sixth Dorsal Vertebra Downwards.—A closely fitting corset of plaster-of-Paris or of poroplastic felt is required. The former (Sayre's jacket) is much better, as being more perfectly moulded to the form, more closely fitting, and therefore not felt to be present by the wearer, save by its stiffness; it is more durable, and immovable by its entirety. When this latter advantage has to be sacrificed to a patient's whims or the surgeon's wish, then the poroplastic felt which laces on can be employed; or the original plaster-jacket can be cut up the side, and made to lace on; but either way, there is a therapeutic loss. In applying the jacket to cases in class *b*, just enough extension should be employed to open up the chest as in full inspiration. In class *c*, this should be carried out to the full, just short of producing pain in the diseased spine. Extension is obtained either from the arms and head in Sayre's tripod, or by the horizontal position simply, which is second best; full room is allowed for the play of the lungs, *etc.*, by either, and the diseased vertebræ are relieved from downward pressure.

Note.—Although the alternative of the poroplastic felt jacket is offered, yet an unprejudiced trial of it makes me condemn it, as a curative agent, in the strongest terms. As a pair of stiff stays, it is useful enough in after-treatment; though even here a thin plaster-jacket, cut down and made to lace on, is far more comfortable for the patient, more efficient, and more durable.

B. CARIES OF THE SPINE WITH COMPLICATIONS.

a. Acute Caries with Pyrexia: Excessive Sensibility: Patient positively ill, or with Acute Abscess.—Absolute rest in bed is required, with general medicinal remedies; and mechanical treatment, according to position, should be used only on the subsidence of the acute symptoms.

b. Chronic Abscess.—This is treated as though the abscess were not present, only protecting it from the support employed by a layer of cotton-wool. The abscess may even, though very large, disappear.

c. Abscess discharging: Sinus.—Support should be applied, but a "window" should be cut over the wound. If this be very low down, the jacket may be cut away to accommodate it. This must never be done just above the anterior iliac spines, or the support will not be bearable. In cases of abscess discharging, the movable jacket may be used with advantage; for the "window" is always hard to manage and to keep clean.

d. Sores from Pressure: Bedsores.—These must be allowed to heal, and the cicatrices afterwards protected with cotton-wool under the support, and outside the woven vest.

e. Paraplegia.—In children, the plaster-jacket must be employed; or the jury-mast, according to position. They then can be carried about, and propped up in a chair. In adults—especially if heavy—the plaster cannot be worn lying down; pressure-sores soon form. They must be kept in bed until able to balance themselves on crutches, then the entire plaster-of-Paris jacket should be worn. Paraplegic cases are better in bed without any appliance, than up with a movable laced support, either of plaster or of poroplastic felt.

f. Caries with much or little Deformity, of long standing: no Subjective Spinal Symptoms: Ankylosis probably completed.—Though such cases are really cured already, yet, at times, oppressed action of the thoracic organs, mechanical indigestion, and pain across the pit of the stomach, remain as causes of invalidism. A twelve months' use of the plaster jacket, with the fullest extension, gives marked relief. Projecting breast-bones from angular curvature improve wonderfully, though in the boss behind there may be no apparent change. The poroplastic jacket may be employed after the plaster, but cannot, in these cases, be substituted for it from the first.

Prognosis in Caries: After-Treatment.—The rules of repair generally must be intelligently applied to spinal caries. It being a question of repair, no limits can be fixed to this; "it is never too late to mend". Saving the presence of amyloid disease, prolonged exhaustive suppuration, or other intercurrent malady, by far the greater number of cases may be viewed hopefully. Other things being equal, the earlier seen and treated, the better the chance of cure. In practice, from two to four years will be found an average time for continuing necessary mechanical treatment.

When the plaster-jacket is used, after a subsidence of every subjective symptom (tested for when changing it), during six months, it may, as a rule, begin to be discontinued. Except in quite young children, its discontinuance must be gradual; the jacket must be made movable, or of poroplastic felt; or stays can be substituted; or even the old time-honoured "spinal support", if the patient have one already by him. Thus he is weaned from the full support of the entire plaster. He should be under observation after his "cure" fully another six months, for fear of relapse.

C. LATERAL OR "GENERAL" CURVATURE.

The choice lies between the reclining board, the old "spinal supports", and Sayre's calisthenic exercise, with or without the jacket. The first is damaging to the general health; the second, curatively of little worth, and now obsolete; the last is the best mechanical mode at present known. In selecting mechanical treatment here, the stage of the disease, rather than the patient's age, or the position of the curvature, must be considered; and no such treatment should be undertaken without due attention to general health.

a. Antero-posterior General Curvature in Neck and Upper Dorsal Region, causing Poking of Head and Slouchy Appearance.—The treatment should consist of the daily use of Sayre's calisthenic exercise.

b. Outgrowing Shoulder.—This is very commonly disregarded, and masked by the dressmaker with "padding". The treatment is just as in *a*, with the addition of a well-made but ordinary corset. Over-support, taking all the work from the patient's muscles, is in these cases to be as strongly deprecated as their total neglect.

c. Curvature and Rotation present, but slight: Spine straightens in the Tripod Swing (Sayre's): Deformity augmenting: Case not over a Year's Standing.—Here the plaster-jacket (entire, not laced on, nor the poroplastic) is to be used, together with Sayre's calisthenic exercise.

d. Curvature, and especially Rotation, well marked; the latter, at least, not vanishing on Extension: Over a year's duration, and still augmenting.—The treatment is just as in the last case, as long as any improvement is to be gained.

*e. As Class *d*, or even worse; not augmenting: no Oppression of Abdominal or Thoracic Organs felt: Patient an useful member of society.*—There is no treatment; or at most calisthenic exercise, to develop the muscles and expand the chest. If support (*i.e.*, the jacket) be given, no permanent good result is obtained, save a temporary bolstering up, which the patient most distressingly misses when removed. It is true,

this may be avoided by the continued use of mechanical means. But why should a treatment be commenced which must be continued perhaps for a lifetime, where, but for the surgeon's interference at first, the patient would have gone on happily through life unaided and independent?

f. As Class e., but with oppressed Breathing and Circulation: Anæmia: Intercoastal Neuralgia. Thorough Invalids, and useless in society.—Temperament and social surroundings being considered first, the gradual use of Sayre's exercise should be ordered; then a support, either of plaster-of-Paris or of felt. Outdoor exercise should be tried and encouraged, the patient being thus supported. This treatment should be persevered in till a cessation in improvement appears: the patient will be left better than she was found. A permanent support of felt can be ordered if requisite.

Prognosis in General Curvature: After-Treatment.—In classes *a.*, *b.*, and *c.*, a cure may be expected. It is astonishing in *b* how soon—three months—complete cure may be accomplished. In *c.*, the treatment on an average will last two years. In classes *c.* and *d.*, weaning from the plaster support must be carried out as in caries; while in *d.*, amelioration, and not cure, must generally be expected. The after-treatment in *c.* and *d.* consists in the "weaning" process, and the continuance of the swing exercise at least three months after all support has been stopped. Relapse in all these cases is very likely from any failure of the general health; they should be carefully watched for some months. Classes *e.* and *f.* are essentially examples of "after-treatment" from the first; the greatest gain expected in *f.* is the loss of subjective symptoms, and breaking the neck of invalidism. Cases of the class *d.* had better at once know what *e.* and *f.* already well have learnt, that some deformity, little or much, must be to them a "condition of life". This may be thought by some a pessimist's view of the matter; but, call it by whatever name one will, an appeal to everyday experience cannot but confirm it.

THE TREATMENT OF CARIES OF THE SPINE.

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In discussing the etiology of this disease,* I expressed my reasons for agreeing with those pathologists who consider that caries is not necessarily a scrofulous or tuberculous affection. I there suggested how caries might occur in a healthy individual, as the consequence of continued irritation of traumatically injured tissues; and I also remarked that, although the disease might thus occur without a predisposing cause, it was much more likely to happen when the vital powers of the patient were depressed either by tuberculous or other constitutional disease.

These observations upon the etiology of the disease are here made for the purpose of drawing attention to the fact, that caries must be dealt with chiefly as a local affection. The general health in all cases, without doubt, requires

Fig. 1.—Drawn from a Preparation in St. Mary's Hospital Museum, being a typical specimen of Caries of the Vertebrae.

to be carefully treated; and, when symptoms of scrofula or tubercle are present, the administration of the appropriate remedies for these constitutional conditions will of course be required; but at the same time the fact must be recognised, that the disease of the spinal column cannot be cured by general treatment alone. Local rest of the diseased parts is the only treatment that will give relief or effect a cure.

The question next arises, How should this rest to the diseased vertebrae be given?

In order to answer this question, it is necessary for us to consider the alterations which take place in the spine during the progress of the disease, although these changes are probably well known to the reader. The ulcerative process usually commences at the anterior part of the vertebrae or intervertebral substances. It extends backwards, but seldom attacks the arches of the vertebrae. The usual result of the loss of substance from the ulceration is the production of a wedge-shaped excavation, the base of which presents anteriorly, and the apex posteriorly. This excavation does not generally exist as a space, because the bones above and below the seat of disease come

together as the caries progresses. Thus there are a falling forwards of the part of the spine above, an incurvation of the part below the disease, and a projection of the spinous processes in the back. Occasionally, but rarely, the disease attacks the same structures laterally, or even at the posterior part of the bodies of the vertebrae.

Fig. 2.—Very severe case of Caries, drawn from a Preparation in St. Mary's Hospital Museum, showing that even in so bad a case the Arches of the Vertebrae remain sound.

As the upper portion of the body falls forwards, the equilibrium is upset, and the superincumbent weight is not supported equally upon the vertebrae, but falls chiefly upon the anterior diseased portions of the column. Partly to relieve the pain caused by pressure of the diseased parts upon one another, and partly to restore the equilibrium and to raise the head to a more natural position, the patient supports or raises the upper part of the trunk by means of his arms, placed either upon his thighs or upon a table or chair, etc. He also uses the muscles of the back for the same purpose. Although the patient may sometimes relieve the pain by raising his body as described, yet he fails to relieve it for long; because, as the vertebrae above the disease are brought backwards, the vertebrae below the seat of disease accommodate themselves to the alteration of form—an apparent incurvation of these vertebrae taking place; and thus the superincumbent weight continues to be transmitted chiefly through the anterior diseased part of the vertebrae. The following diagrams show these conditions (Figs. 3, 4, 5, 6).

In Percival Pott's time (he wrote in 1779), violent attempts to straighten the spine used to be made, and Pott recognised the evil of such treatment. He pointed out that to draw the carious bones asunder could not be beneficial, as it would interfere with the natural mode of cure, which takes place by junction and coalescence of the diseased bones. This opinion was founded upon sound surgical principles, and holds good to the present day. Bonnet of Lyons has also deprecated all violent attempts at extension. "But," says he, "if we must not extend (*redresser*) the parts,.....is it not desirable to diminish the pressure of the upper parts of the body, and to immobilise as much as possible the parts which have been separated by the caries?" To this question I would answer "Yes". And, in order to effect this diminution of pressure upon the diseased parts, the object of treatment should be to place the spine in a position which allows the superincumbent weight to be supported by the posterior sound parts of the bodies and by the arches of the vertebrae, and, above all, to retain the spine in one fixed position. In fulfilling this object, no force whatever should be used.

When the patient lies perfectly recumbent (prone or supine), the spine assumes the desired position—i.e., the diseased parts are relieved from undue pressure; and, if we can then succeed in fixing the spine, the objects so well expressed by Bonnet will be effected.

In order to maintain the spine in the good position which it has assumed by recumbency, it is necessary not only to preserve the extended position of the portion of the spine above the disease, but also to prevent the part below the disease from arching backwards.

The means of treatment at our disposal are the following: 1. Recumbency: *a.* in the supine position; *b.* in the prone position; 2. Spinal supports: back-splints, etc., in conjunction with recumbency; 3. Plaster-of-Paris, felt, and other jackets, without recumbency.

It has been asserted that, by confining the patient to the recumbent posture, especially in scrofulous cases, the general health will suffer. Experience, however, proves the fallacy of this opinion; for, if recumbency be thoroughly carried out, and the spine also fixed in a good position, the health of the patient immediately and rapidly improves. That the patient should be able to take exercise in the open air, and

* Paper read at the annual meeting of the British Medical Association at Cambridge, August 1880, and reprinted in the JOURNAL for June 25th, 1881.