leading down to the seat of perforation should always be used; the risk of any harm it may do as a channel of subsequent infection from outside is slight as compared with the disaster which may occur from any further leakage at the point of suture or from any inflammatory collection in the neighbourhood. I believe it would also give an additional chance of success if, after general irrigation, a second drain were inserted above the pubes where fluid has such a great tendency to gravitate. The neglect of this precaution had, I think, something to do with the fatal result in one of my cases, in which a quantity of turbid fluid was found *post mortem* in the pelvis.

In all these manipulations, which require some time for their performance, the effect on the patient's strength must be carefully watched, for it is obviously no good to perform an ideal operation, to leave the perforation secure and the abdomen clean, if the patient is to be removed from the operating table moribund. On the other hand, a hasty scrambling operation, leaving food lying about in the belly cavity and pockets of sero-purulent fluid unemptied, is certain to end in disaster, and tends to discredit operative interference. It should be the operator's business to secure efficient assistance and to see that all he may require in the way of instruments, sutures, etc., is ready beforehand, so that no time may be wasted after the patient is anæsthetised. This is the more important, as many operations for gastric perforation, if they are to have a chance of success, will have to be performed outside hospitals, sometimes because these are not available and at others because transporting the patients from one place to another adds to their danger.

So far I have only discussed operation immediately after perforation, before any localised abscess has had time to develop. When there is a localised abscess, whether subphrenic or elsewhere, the course to be pursued is different from that already described. A question here arises whether after the diagnosis of perforation operation should follow as soon as the patient's condition permits in all cases, or whether delay is sometimes advisable in the hope that localised suppuration may form rather than immediate general peritonitis. In answering this question, we must remember that we are perfectly in the dark as to where the point of perforation is located, and to what extent extravasation has occurred. Also that free extravasation of stomach contents is more common than localisation, and that the fate of patients with free extravasation depends upon the brevity of the time which intervenes between perforation and operation. With these facts before us there can only be agreement that delay in operation, with the hope of localised formation of matter, is not to be entertained.

If, however, abscess has formed, how is it to be approached? The point of greatest importance is that it shall be opened by an incision as directly on to it as possible, so that no risk may be run of getting outside its boundaries and infecting the peritoneum. The incision should be made over the most prominent part of the presenting swelling, whether this be in the left or in the right hypochondrium or elsewhere. Foul pus and gas—with it may be, stomach contents—will be evacuated. Some of the tissues forming the abscess wall may be recognisable but others will not. This is not a matter of importance, as no search should be made for the perforation in the stomach. It probably would not be discovered; even if it were its closure could not be effected, and, most important of all, the search for it might break through the limiting adhesions and give rise to general peritonitis. The abscess having been emptied, nothing more will be required in some cases than drainage. If, however, an extensive subphrenic collection exists, as is commonly the case, it is doubtful whether so simple a procedure is sufficient. A study of these abscesses shows that they prove very fatal from septicæmia, almost always after infecting the pleura and lung of the same side. This is so even when the abscess has been drained from the front. Some additional measure is required then to save the patient. If empyema or abscess of the lung coexists, there should be no hesitation in adopting the course presently to be laid down. If these complications are not present, such steps involve greater responsibility, but in the interests of the patient may be called for. To get at the most dependent part of these collections and drain them efficiently an opening is required

through the wall of the thorax. This is best made in the mid-axillary line on the left side, and two to three inches of the eighth rib should be removed. The lung retracts out of the way and the diaphragm is exposed. Higher up or more posterior than this it is not safe to go. If empyema exists or lung abscess, these can be now dealt with as seems best. If they are not present, the diaphragm should be stitched with a ring of sutures to the edges of the wound in the parietal pleura, and either opened at once or, perhaps better still, packed and left until the next day to secure adhesions between the pleural surfaces. On making an opening in the diaphragm, the finger passes into the left subphrenic space, just in front of the anterior margin and to the left of the spleen, and a drain should be placed *in situ*. A finger passed into the abdominal incision should guide the operator as to the place at which the opening in the diaphragm should be made so as to get as completely as possible to the bottom of the collection and yet with safety to the spleen.

It may be urged that this procedure incurs risk of inducing the very thing we wish to avoid, namely, infection of the thorax. But a study of subphrenic abscess shows that the opening of the abscess from the front is not sufficient for its cure, and that, despite the evacuation by abdominal incision, the pleura or lung nearly always become involved.

The record of operations contained in the tables I have collected shows 13 recoveries. It will not unnaturally be asked, What is the value of these lives? Have they temporarily recovered to become victims to a later perforation; or if still living, are they well enough to lead useful lives? I have inquired of the various operators, and have to thank them for their courteous replies. The record is, I think you will agree with me, a very satisfactory one. Of 10 recoveries of which I have been able to obtain recent news, all remained well at intervals of from six weeks to three years after operation, and at least as well able to work as they were before operation, and some of them much better able to do so.

In concluding my lecture on this subject, I wish to urge upon the profession the necessity for early diagnosis and treatment of this terribly fatal accident, gastric perforation. The influence of early operation is shown by the following figures: In 9 operations performed with success, the average time which intervened between perforation and operation was $7\frac{1}{2}$ hours, the longest being 10 hours and the shortest 3 hours. In 15 unsuccessful operations, the average time intervening between perforation and operation was 27 hours; the shortest was 4 hours and the longest 70 hours. The time of operation is really the dominant factor of success. Unless surgery has an opportunity within the first six or nine hours after perforation, the mortality must remain great. Given the opportunity for intervention as soon as the primary collapse has passed off, I believe the results will improve very much. If my lecture assists in enforcing the lesson, it will not have been given in vain.

THE PHYSICAL CULTURE OF YOUTH.¹

By NOBLE SMITH, F.R.C.S. EDIN.,

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Two things are essential to the healthy growth and development of the young: 1. The adoption of natural methods to train the muscles. 2. The avoidance or removal of counter-acting influences. When, as the result of the neglect of one or both of these rules, deformity results, much good may be effected by judicious treatment, even when the bones had become altered in shape. It is therefore important to recognise deformities at an early stage.

The deformities in ligament and bones are not as a rule produced by the occasional indulgence by the patient in very unnatural and unsymmetrical positions, but by the long continuance of positions of body and limbs both at rest and during exercise, which are faulty to so slight an extent only that they are frequently overlooked or disregarded. The continuance, and not the extent, of the unnatural position is the determining factor in the result. In fact, in childhood, no

¹ Read before the Gloucestershire Branch of the British Medical Association.

position, however unnatural, does harm, provided the indulgence in it be occasional and not continuous. Of the various factors which by their continuous application give rise to deformities, none are so potent and yet prove so unsuspected as clothing. Especially is this the case amongst girls. From a hygienic standpoint, 90 per cent. of modern clothing is faulty and even harmful.

Nowadays people object to belts and garters, and the objection when made to such articles tightly applied is rational. But the result of the sensible objection to tight belts and garters has been a recoil to the other extreme, a discarding altogether of belts and garters, with the result that modern clothing is suspended entirely from the shoulders, and not only from the shoulders, which is bad enough, but from the extreme acromial ends, which makes matters worse. The hips, not the shoulders, should support the nether garments, a fact which every sailor and stableman knows from practical experience. Garters, if not overtight, are harmless, even in childhood, and suspenders are only justifiable if supported from the hips. Tight garments across the chest, a fault in construction almost universal with children's clothing, must also be avoided.

After clothing, the next most important factor is food. A constant source of juvenile debility, with its resultant changes in bone and ligament, is bad or insufficient food. The nitrogenous element especially is frequently deficient. The food is either insufficient in quantity, indifferent in quality, or badly cooked. All three conditions are very common in public schools, and yet no remedy is suggested because of the mistaken idea that the complaints of schoolboys and schoolgirls against their food should never be listened to.

The bony and ligamentous tissues thus weakened by imperfect feeding and displaced by irregular pressure, increasing in directions where the steady continuance of pressure should have prevented such increase, and remaining stationary from pressure which should not have existed, obviously must result in deformity; but a deformity of such insidious origin and of so slow a growth that it becomes evident only after years of progress. With these changes and alterations in the bones and ligaments there is necessarily concomitant muscle weakness, but a weakness easily remedied and of trifling importance to the patient compared with the other changes. Now the law which brought about so great a change by the continuity of action of a factor but slight in itself can be pressed into the service of the surgeon, and the result reversed by changing the factors but making them act in the same continuous way. Just as a deformity is effected by unnatural conditions and positions acting for a long time, so cure will be effected by natural conditions and positions being restored and retained through months and even years. From the consideration of this law it becomes self-evident that it is far more important to have prolonged rest in good positions than to have frequent (but necessarily occasional) drilling. By "rest" he did not mean recumbency, but merely the avoidance of exercises that produce fatigue, such as, for instance, long walks. It is very wrong to enforce, even in the most healthy, long races and paper chases and any other exercises which cause severe prolonged strain to the heart. Such prolonged over-exertion causes impaired nutrition, which necessarily results in atrophy and weakness. He had for years insisted upon the value of intermittent exercise such as games rather than continuous exercise such as long walks, and lately Dr. Lauder Brunton in his Harveian Oration has pointed out that the spontaneous exercise of a child was that of a butterfly, not of a bee. With the same object in view a colt was allowed to gambol and never put into harness whilst young.

If children were only allowed to rest their backs when they sat down, as by leaning them against the back of a chair, there would (*ceteris paribus*) be few weak backs. It is very important that their spines, when not in action, should be kept in a natural symmetrical position; a position absolutely unattainable, for more than a very brief period, by muscular action alone. The effort to keep the spine straight when sitting on a seat with no back support is never effectual, and though the order to "sit up" produces a temporary straightening of the spine, yet relaxation slowly but surely follows, and each reapplication of the stimulating word of command produces a less and less lasting effect.

This power of the muscles to straighten the spine temporarily, and sometimes to conceal a somewhat extensive curvature must be taken into account in making a diagnosis. In examining a child, therefore, for curvature of the spine, he should be kept sitting for an appreciable time. At first he may hold himself straight, but very soon fatigue sets in, and gradually the curves appear.

From the consideration of these facts, it is obvious that the rational treatment for spinal curvature is to give plenty of light, easy, and continually-changing exercise, and yet to enable the spine to rest completely the moment the muscles relax and their supporting influence ceases. This end can be effected by fitting to the child a strong light apparatus, which differs entirely from the ordinary spinal support, and is so arranged that whilst it gives free movement in almost every direction to the chest and arms—so that a boy can, for instance, play cricket—it yet gives the spine complete support, not when the muscles are acting, but when they begin to relax and the ligaments begin to be strained by the unnatural positions into which the bones fall.

[Mr. Noble Smith then showed a young boy with spinal curvature, who before treatment had not been able to walk more than a hundred yards or engage in any games with his companions, but who, immediately after commencing to wear such an apparatus as that described, had been enabled both to take fairly long walks without fatigue and even to engage in a game of cricket, and whose spinal curvature at the time of showing—several months after the commencement of treatment—had most distinctly diminished.]

This patient had been sent to Mr. Noble Smith by Mr. Cox, of Winchcombe, and Mr. Cox, who was present, spoke to the great improvement which had taken place in the lad.]

A METHOD OF TREATING INVERSION OF THE LIMB SUBSEQUENT TO THE CURE OF EQUINO-VARUS.

By R. L. SWAN, F.R.C.S.I.,

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WHEN an aggravated equino-varus is so far cured that the sole of the foot rests on the ground in walking the surgeon, usually desists from treatment and formulates a routine to be adopted by the nurse or mother calculated to prevent collapse and to further a degree of progressive improvement by the combined influences of development and education. It will be found, however, that in the great majority of instances conditions remain which exert a distorting influence, and notwithstanding the time, trouble, and perhaps outlay which have been expended the patient may be still recognised as the victim of malformation. The conditions referred to are:

(1) *Knock Knee*.—This is seen in cases of aggravated equino-varus which has been untreated until walking has been for some time indulged in. The point of incidence of the axis of weight is internal to the contact of the outer edge of the tarsus or the adventitious bursa to the ground. This, in conjunction with the fact that there is a disproportionate relation between the body weight and the functional development of the lower limbs will favour its production. This distortion may be dealt with by any one of the ordinary methods of treatment, and with this brief notice may be dismissed.

(2) *Rotation Inward of the Leg*.—This will be found as a constant distorting element, and betrays its existence when the rectification of the equino-varus has been effected. Even when the foot has been rendered completely plantigrade the inversion of the limb will be (apart from cosmetic reasons) of great detriment to the individual. He cannot walk without tripping. The outer edge of the advancing foot strikes the back of the tendo Achillis or the dorsum of the tarsus of the stationary limb. If the surface be irregular, or unless he steps with great care, he is apt to tilt over and fall, being deprived of the support of the toes and anterior segment of the foot, which if in their normal position bear the momentum created by his weight and progress. After a time he adopts a winding method of progression, which becomes a permanent