

diminishes, and their path to premature senile decrepitude is rapidly paved. On the other hand, it is to the majority of people almost incredible how much can be done by energy and will power to postpone this decay.

A matter which is not sufficiently considered is the mode of walking. A walk of three or four miles with half-bent knees and back is not as useful as one of the same length with firmly contracted muscles of the legs and thoroughly erect spine.

Persons with a sound circulation derive more benefit from walking uphill than from walking on level ground. Even to those with slight dilatation of the heart gentle ascents at a slow pace are very useful.

The benefit of walking is much enhanced by taking once or twice a week a longer walk in the country, and infinitely more so by walking tours of some weeks in mountainous or hilly regions. Marvellous is the improvement effected by them in the physical and mental condition. Old people need not be quite debarred from the benefit of such tours; they ought not to climb high mountains and glacier passes, but with judicious limits they can, with great benefit to themselves, do much more than is generally admitted.

Many other forms of muscular work can be advantageously substituted for walking, such as riding on horse-back, hunting, shooting, cricket, football, golf, fishing, etc., some of which not only benefit the body, but also the mind and the character.

By walking we employ principally the muscles of the legs and the spine; we must also put into action those of the arms and the thorax. Those of the thorax we exercise through deep inspirations and expirations, which we effect by the contractions of the intercostal muscles and the diaphragm. In so doing we massage the ribs, expand the thorax and the lungs, keep up their elasticity, powerfully influence the contractions of the heart, and compress the organs in the abdominal cavity. By the massage of the ribs we keep them in a healthy condition, the bone substance as well as the marrow, with its blood-forming function.

With the respiratory movements we ought to combine exercises of the arms in various ways, extending them, for instance, vigorously with a deep inspiration, contracting them with a full expiration; raising them perpendicularly with deep inspirations, so as to allow the air to pass freely into the apices, which, with shallow breathing, are often insufficiently expanded, and are apt to become seats of disease. The habit of shallow breathing ought to be entirely avoided, and that of full breathing, which can and ought to be substituted for it, can and ought to be acquired by every one.

The effect of these arm gymnastics is, however, not restricted to the muscles of the arms alone, but extends to those brain centres which initiate their movements. As soon as they become active, an increased amount of blood rushes to them, the small blood vessels are forced to work, and the work keeps both the blood vessels and the brain substance in a healthy condition.

The muscles of the trunk we put into action by moving the trunk upwards and downwards with deep inspirations and full expirations; or by turning the body in the erect position as much as possible around its axis, with deep inspiration from the left side to the right, and with full expiration from the right to the left. There are many other methods of exercising the different sets of the muscles of the trunk.

All the muscular actions of the body have a certain action on the bones. Each contraction of a muscle causes a pull on the bone to which it is attached; this pull acts as a kind of massage on the periosteum, the bone substance, and the bone marrow. The nutrition of the different parts of the bones is through this process maintained; the well-known brittleness of the bones in old age is prevented, the bone marrow is kept healthy, and by improving the composition of the blood increases its power to combat hostile bacilli, and thus prevent disease.

After this short discussion of the muscular actions on different parts of the body, I venture to point out the following effects:

1. Increased afflux of blood to the muscle with each contraction.
2. Increased nutrition of the muscle, combined with improved metabolism and production of body heat.

3. Increase of exchange of fluid between blood and tissues.

4. Facilitation of the removal of waste products.

5. Preservation of the elasticity of the thorax and lungs.

6. Abundant supply of oxygen for the blood and the metabolism.

7. Maintenance of a healthy condition of the organs of circulation, from the heart to the smallest arteries, capillaries, and lymphatics.

8. Massage of the bones, keeping up the healthy condition of the bone substance and the bone marrow, and through this the formation of a sufficiency of blood-efficient for the fight with hostile bacteria entering the blood.

9. Increase of the resisting power of the body against disease.

10. Persistence of the working capacity of the brain centres, which initiate the action of the different sets of muscles.

I add to this short paper a personal note regarding my view of the influence which muscular exercise has had on my longevity. I do this in the hope that some of my professional brethren may accept this view, and may induce their friends and patients to act on it in order to prolong their lives. I take no gloomy view of the conditions of old age, but think it a privilege to obtain a long life. It has not, I concede, all the pleasures, nor the powers—mental and physical—nor the imagination of youth; but it need not be helpless, useless, cheerless, and friendless if the aged person endeavours to be in harmony with the aims of the younger generations; and happily the mental faculties, especially intelligence, often survive the physical powers for many years, and enable the aged sometimes to give useful advice to his younger friends.

Although I know that it is not the exercise of the muscular system alone to which I owe the satisfactory condition of health and strength which I retain in my 95th year, but that the attention to hygienic conditions in general, to the digestive functions, to the mental work, and the tenor of the mind as I have explained in my little book on *Prolongation of Life*, has a great share in it, yet I am sure that the keeping up of the muscular system has played a prominent part in it, and does so still. The facts of my spending daily two to three hours in the open air, walking, as a rule, thirty, more frequently forty or fifty, miles a week and enjoying the beauties of nature, have not only an exhilarating effect on my mind, but keep up the whole organism and the resisting power to a considerable degree for my age. The possibility of heredity might be suggested, but this suggestion will probably be discarded, when I state that both my parents died in the 60th year—my father from cerebral apoplexy (a frequent cause of death amongst his forefathers), my mother from inherited weakness of the heart, leading to frequent bronchial attacks, anasarca and effusion into the pleural cavities. One might rather say that I had inherited a tendency not to long life, but to these life-shortening morbid conditions. If so I have been able to counteract them by energetic fighting against them from an early period of life.

#### LITERATURE.

Bacon, Roger: *The Cure of Old Age*, London, 1683. (*De prolongatione vite.*)

Brunton, Sir Lauder: *An Address on Longevity and the Means of obtaining it*, *Lancet*, November, 1906.

Oliver, Dr. G.: *Recent Studies on Blood and Blood Pressure*, 2nd ed., London, 1908.

Weber, Sir Herman: *On Means for the Prolongation of Life*, 4th ed., John Bale and Sons, 1914.

## THIGH STUMP EXTENSION SPLINT.

BY

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THE stumps following flapless or flush amputations of the thigh that have come under my notice after transport from the seat of war have all apparently suffered from having been unprovided during their treatment with some continuous extending force to counteract the natural tendency to retraction of the soft parts that in these cases leads to conical stump formation in a short time to a serious degree.

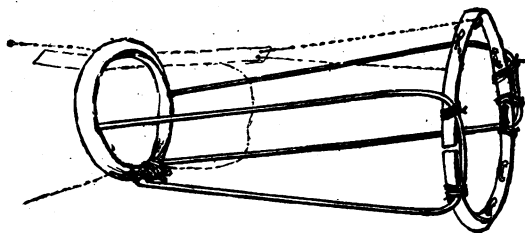
The nature of the injuries has necessitated, as a life-

saving device, the division of tissues without regard to adequate flap formation. But thereafter it becomes incumbent upon the surgeon to conserve for the patient every fraction of the stump possible. If the retraction of the soft tissues is permitted to proceed unrestrained until such time as secondary amputation is performed, it will be the general experience that an undue length of femur will require removal before the soft parts are capable of approximation, and that the ultimate shortening of the stump may prove very disappointing.

I am aware that stump extension is at times employed, but such contrivances as are usually made use of cannot, in my opinion, be relied upon to maintain the necessary continuous uniform traction during all movements of the stump and positions of the patient both in bed and during transport.

A splint that I have improvised achieves this, and after its use in numerous cases during the last two years I am able to speak of its utility. Unhappily, many of the cases that arrive in this country have reached a stage in which the tissues are fixed in retraction when counter-extension can obviously be of little use; this note is published in the hope that the splint may receive a trial in France to prevent retraction, and to afford the further advantages to the patient of freeing him from pain and of giving protection to the stump—all important factors during transport.

The splint is improvised from a Thomas splint, as modified by Jones for the arm; its ring will, as a rule, be found to slip comfortably over the thigh. One with a closely fitting ring having been selected, it is forcibly bent at the bars until the end meets the leather-covered ring, to which it is secured by a tape. A blow with a mallet will convert the ring to an oval that will, perhaps, better fit the contour of the thigh. In the rare event of the ring being too small, it may be enlarged by division with a saw close to the outer bar.



Improvised thigh stump extension splint. Note: The aluminium ring is made large when indicated by the condition of the wound, and small when direct extension is required.

A length of about twenty inches of aluminium splinting is then bent in the form of a circle, loops within, and this hoop is then inserted and secured by tape or strapping between the ends of the bent bars of the Thomas splint, which are forced apart, if necessary, to receive it. The splint is now complete, and takes but a few minutes in the making.

Extension strapping is next applied to the whole length of the stump at the points of the circumference selected as best suited for effective flap extension. The projecting ends of the strips should be folded so that their adhesive surfaces are effaced, and in each two openings are snipped for the passage of tape that is so passed as, when extension is made, to appose the lateral edges of the plaster to the skin. The coaptation of the plaster strips to the surface is further secured by a circular band of the same material round them all near the end of the stump. Efficient substitutes for adhesive strapping, and in some ways better, are strips of bandage or gauze affixed in like manner with glue.

The splint is now applied, the padded ring being carefully insinuated upwards until it gets a firm bearing against the tuberosity of the ischium. Being close fitting it gives additional security against slipping of the extension strips.

Extension is now made by drawing upon the tapes or strips and securing them by adequate tension in the direction of their application to their corresponding segment of the aluminium ring by slip-knots, daily attention to which will ensure that a uniform tension is maintained conforming with the give of the soft parts.

The splint is light, and forms a frame that supports and

moves with all movements of the stump, the flaps of which are held in fixed extension, while the splint is self-secured by means of its extension bands. Extension is maintained whatever the position of the stump and whatever its movement, so that the position of the patient can be varied and attendance on him rendered easy. After the application of the splint the patient is freed from pain, and no cradle is necessary, as the splint affords the necessary protection. The open aluminium ring allows access for swabbing and dressing, and from the side a kidney-shaped dish can be introduced beneath the wound.

The dressings being maintained in position by the framework of the splint, no bandage is required, so that access to the wound is ready and provides for prompt attention in case of haemorrhage.

I should like particularly to recommend the use of this splint during transport. The material is available and it requires only a few minutes to be made. In October, 1915, Sir G. H. Makins showed an adaptation of a Thomas knee splint, but not of the same character as mine.

## Memoranda:

### MEDICAL, SURGICAL, OBSTETRICAL.

#### LONG LIFE AFTER EXCISION OF RECTAL CANCER.

It is well known that freedom from recurrence after complete removal of cancer of the intestine is more likely than in many other situations. As it is not always easy to obtain the history of a case after many years, I am much indebted to Sir William Whitla, of Belfast, for giving me the completed record of a case thirty-one years after operation. Such a case is of much interest, and affords encouragement. In 1887 I operated in Belfast upon one of Sir William's patients, assisted by Mr. (now Sir Anthony) Bowlby and Mr. Sinclair of the Belfast Royal Hospital.

The patient was a lady 53 years of age, who had had symptoms for six months. Examination under an anaesthetic showed that the disease commenced three inches above the anus, and extended upwards about four inches. It completely surrounded the bowel, producing considerable stricture. The posterior wall was more deeply invaded than the anterior. The operation was difficult and prolonged, but eventually, after freely opening the peritoneum, a complete segment of the bowel five inches in length was removed, including half an inch of sound margin both above and below the growth. Microscopic examination showed a typical specimen of adenoid cancer. The patient, under the care of Sir William Whitla and Mr. Sinclair, made a good recovery.

Five years later, owing to some contraction, an inguinal colotomy was performed (not under my advice). I saw the patient thirteen years after the operation. She was in excellent health, and there was no sign of recurrence. The colotomy opening gave hardly any trouble.

Sir William Whitla has most kindly sent me, under date February, 1918, a letter as to the sequence of the case: "I enclose a card informing you of the death of your old cancer case operated on in 1887. She has just died at the age of 84. Surely this is a record."

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#### THE GUILLOTINE AMPUTATION.

THE number of cases in which a guillotine amputation has been performed at casualty clearing stations and base hospitals in France induces me to ask if some other method of amputating could not with safety be practised. Unfortunately I have not had an opportunity of seeing cases as they present themselves at a casualty clearing station, but I think it is equally unfortunate that so few surgeons working at the front have not had an opportunity of seeing the after-results of the guillotine method.

It may be that the fear of gas gangrene is the important factor which has caused this plan to be adopted so generally. A guillotine amputation invariably necessitates reamputation, but, apart from this, the great disadvantage is that by the time the patient arrives in England the skin has retracted so much that a large granulating and suppurating stump is exposed. The