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DEVICE FOR TRAINING THE EXTENSOR MUSCLES IN THE UPPER EXTREMITY OF BEDRIDDEN PATIENTS PREPARATORY TO USE OF CRUTCHES

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ABSTRACT. Patients bedridden with ailments in lower extremities suffer from general muscle weakness. Systematic training of different muscle groups becomes essential. For patients needing crutches for ambulation the arm muscles have to be trained. Most exercises result in training of the flexor groups. In walking with aids, the extensors are most important.

A device has been constructed which can be adjusted to the bed and which permits the patient actively to train the triceps and latissimus muscles simulating the muscle-powers at work in gait with crutches.

The device is the upper part of a crutch-handled stick. The patient takes a grip of the handle with elbow flexed at 15° and makes steady and forceful pushes by fully extending the elbow ten times per exercise and ten times per day. This simple practice has markedly improved the patients' confidence and stability in walking-exercises with crutches.

Traction treatment for fractures of the lower extremities and surgical operations on, for instance, the pelvis, hips, knees and feet often entail long periods of bed-rest, and the resulting inactivity usually leads to a general muscular weakness. It would therefore seem to be of prime importance to exercise constantly and systematically the various muscle groups that will be subjected to particular strain at the end of immobilization. Great emphasis is generally placed on the training of the quadriceps and abdominal muscles in preparation for leaving bed and walking after a long period of bed-rest. At the beginning of walking exercises, certain aids such as walking-chairs, pylons and forearm crutches are necessary—in the first place to give the patient confident balance during the first steps, and secondly, through the power of the arm muscles, to diminish the load on the leg—for instance, after a subcapital femoral neck fracture.

During the period of bed-rest it is important to perform active exercises of the arm muscles so as to be able to control crutches, etc. These are usually done with dumb-bells and expanders, and in this way a general strengthening of the muscles in the arm and shoulder region can be obtained—particularly the flexors, biceps, anterior portion of the deltoid, pectoralis major, coracobrachial muscle and the flexors of the forearm. Most patients, however, still have difficulty in "finding" the correct technique when starting their walking exercises with crutches. This would seem to be due to the failure to make full use of the extensors of the arm, and especially the triceps, owing to unintentional neglect of this muscle group during the course of muscle training.

At this Department a device has been in use for some time whereby the patient is enabled, while still in bed, to prepare the arm muscles for use when the time comes to walk with fore-arm crutches. The device consists of the upper part of such a crutch, the handle and the forearm support (Fig. 1). It is connected to the bedframe via a stay (Fig. 2). It can be raised into position just above the matress and parallel to the body axis, and can be slid along the stay and fixed in a comfortable position alongside the body. When no longer in use the attachment to the bedframe can be released by means of two screws so that the crutch can be lowered under the bed. The device has been tentatively named the "tricepslatissimus trainer".

The elbow extensors are trained with the forearm in a crutch grip of the type to be used later for stabilization during the walking exercises. The patient, in supine position, with no pillow under the head, grips the handle so that the elbow is flexed through 15°, the usual position when walking with crutches (Fig. 3). From this position the patient pushes steadily and powerfully tion the patient pushes steadily and power-fully by fully extending the elbow, this position is retained for 5–6 seconds (Fig. 4). The manoeuvre

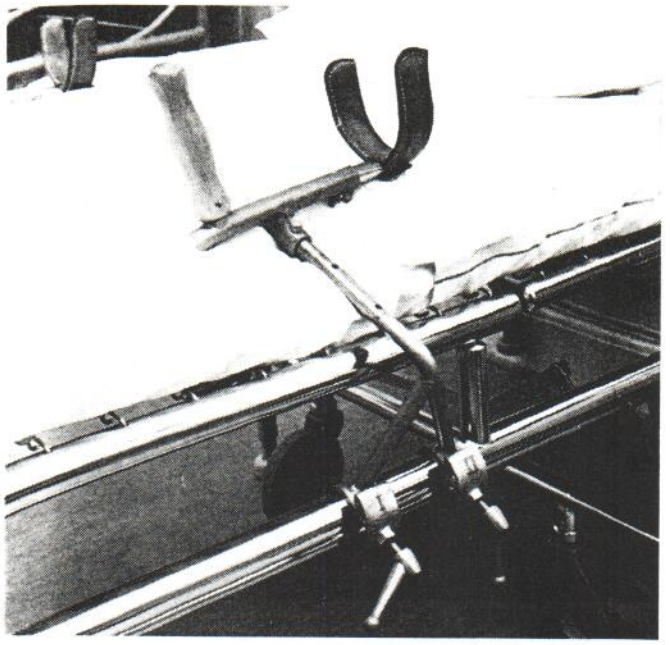

Fig. 1. "Triceps-latissimus trainer"—the upper part of a crutch-handled stick with handle and elbow support, which can slide along a stay attached to the bed frame.

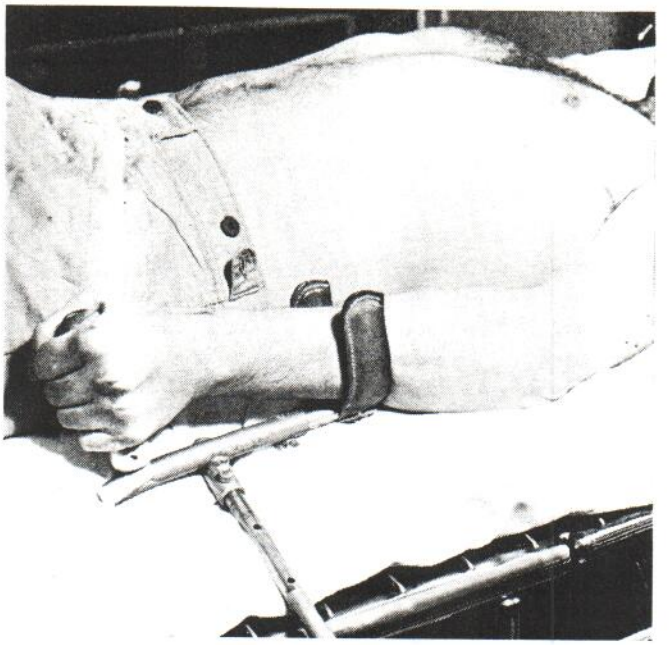

Fig. 3. The usual flexion position of the elbow, about 15°, when walking with crutches.

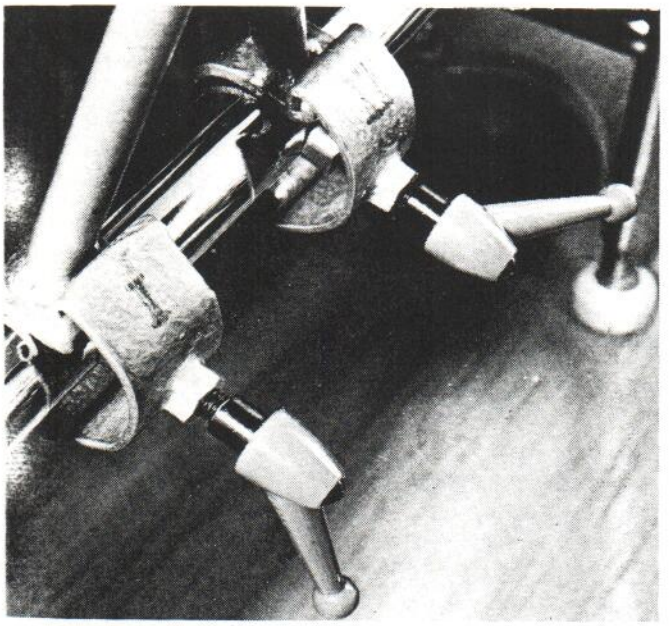

Fig. 2. Attachment to the bed frame with screws which enable the crutch to be lowered under the bed easily and rapidly.

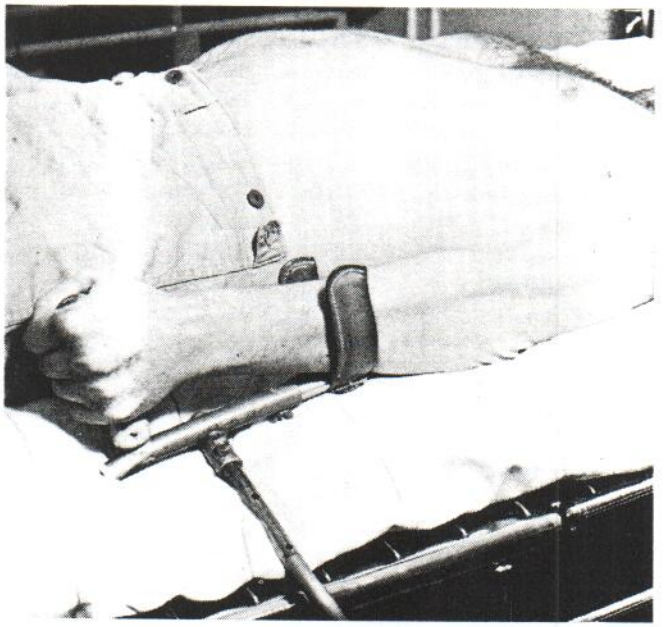

Fig. 4. Full extension of the elbow, which is retained for 5–6 seconds; this exercise actively trains the triceps and latissimus dorsi muscles.

is repeated 10 times, with intervals of a few seconds for rest. The exercise is carried out 10 times a day, giving about 100 active extensions daily.

In the short time that this training technique has been in use a marked increase in confidence has been observed in those patients who have trained the extensors in this way before beginning their walking exercises. The traditional period with walking chairs and pylons has been considerably shortened, and in many cases these aids have been rendered unnecessary.

Key words: Crutches; exercise therapy; rehabilitation.

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