

### Specifications for the construction of high chair for quadriceps exercise:

It should be made of strong solid wood, so that it is too heavy to tip over easily.

**The legs:** should be made 4" longer than normal, of a square shape and joined by cross-bars 3" above floor level. Domes may be inserted into the bases if desired.

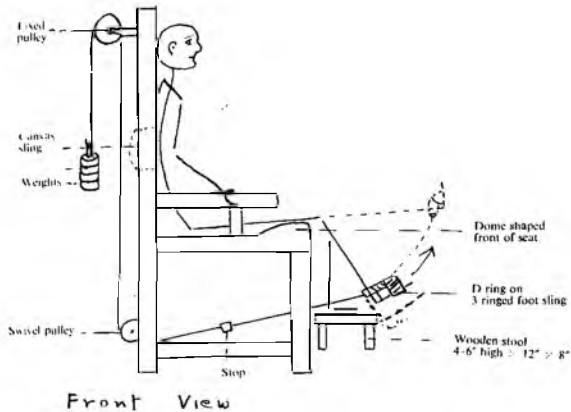
**The seat:** This should be wide enough to accommodate the largest patient and it may be built up in front into a half-domed shape, to prevent the patient from sliding forwards and also to give leverage for muscle work. The whole surface of the seat may be covered with sponge rubber

**The back:** There are two upright struts fixed to the rear corners of the seat, extending to just above head height of average patient; they are joined together at the top by a thick crossbar, slightly curved for head support.

**Sling:** A broad piece of canvas is placed round these uprights and stitched to itself. This makes an adjustable back support and allows the patient with hip or lumbar deformities to sit in comfort.

**The arms:** These are made of unpadded wood, narrow enough to be gripped easily. They come forward from the uprights at elbow level, almost to the level of the front of the seat. There is a strong supporting strut to the side of the seat.

See Diagram IVb



### Apparatus for quadriceps work:

Fitted to this chair:

- (1) At the middle of the back of the head crossbar, a strong, deeply grooved pulley wheel is firmly screwed in.
- (2) At the middle of the back of the crossbar between the two rear legs of the chair, a swivel pulley is fixed so that it moves freely above the bar.
- (3) A rope or metal cable is inserted between the pulleys with a hook on each end for attachment to (a) bag or rod holding weights, and (b) the D-loop on the patient's foot sling.
- (4) A "cup-hook" is screwed into the back of the front crossbar and this saves the weight crashing to the floor and subsequent grovelling to pick up the rope.
- (5) A three-ringed foot sling is put round the patients foot and ankle with the D-ring at the heel.
- (6) A small but strong wooden stool, 4-6" high, 12" long and 8" wide is put under the foot not being exercised. This also assists getting on and off the chair. These stools have many other uses in a department.

**Adjustments:** The range of movement required must decide the precise point of attachment of the weights.

If the rope is too long, the weight touches the ground; if it is too short it is stopped by the upper pulley wheel before the patient has fully extended her knee.

A stopper may be put on the rope under the chair to prevent too much knee flexion.

These practical pieces of apparatus have been evolved as a result of seven years single-handed work, mostly with hemiplegics, building up from nothing to geriatric units in England. Though heavy, the results of this work were very satisfying. Now these departments are properly established and run by a chartered physiotherapist, a remedial gymnast (male), two assistant nurses and a porter in each hospital.

## DOES YOUR WHEEL CHAIR FIT ?

MISS M. HUMPHREY, B.Sc.(Phys.) WITS.

How often have you given or received this request "Please order a wheel-chair for this patient". No more—no less.

Do you KNOW why some chairs have the large wheels in front and some at the back?

Do you KNOW that a wheel-chair without brakes is a dangerous vehicle?

Do you KNOW that wheels of 5 in. or less can be positively lethal?

Do you KNOW that there are many makes on the market and that the manufacturers of a good and reliable make are only too ready to make any adjustment you may require?

A wheel-chair is like any orthopaedic appliance worn by a patient and should be ordered with just as much care. The patient's disability, weight, age and sex are all important factors to be taken into consideration when it is prescribed. For it stands to reason that if it is necessary to order a wheel-chair for a patient it is going to be a pretty permanent essential for the rest of his life. As he is likely to spend a great deal of time in the chair it must measure up to his specific requirements. It must be comfortable. It must be easily manoeuvrable, it must be built in such a way as to facilitate transfer with the minimum of physical effort and above all it must be as safe and stable as a wheel-chair can possibly be.

### WHEELS

All models should have two large and two small wheels.

Whether the large wheels are at the front or back depends largely on the patient's disability.

Large wheels should have a diameter of 23 in.; small wheels 8 in.—*not less*, as smaller wheels are more likely to become entangled in rugs, cracks and small objects.

### HANDRIM PROJECTIONS

Horizontal, vertical or diagonal projections may be attached to the handrims.

The number, length, and the desired spacing should be specified.

The projections are indicated for patients who have shoulder muscle power, but no power in the hands.

### TYRES

The tyres on the standard models are of solid rubber but pneumatic tyres may be prescribed to make riding easier.

### BRAKES

Every chair should have brakes to prevent rolling on an incline or when the patient desires to get out of the chair without its being held by another person. The brakes must be within easy reach, and if arm rests are removable, must be low enough so they do not interfere with moving sideways out of the chair. Removable extension attachments should be prescribed with the removable arm rests.

### SEAT

The height, depth and width of the seat must be considered in relation to the size of the patient, the area in which the chair is to be used and the prosthetic appliances that are worn. The standard specifications of the seat are usually 20 in. from the floor, 18 in. between the front uprights and 16 in. in width and depth at seat level.

### BACK REST

The backrest is made of fabric in order that the chair may be folded. There is a standard height for the back rest (16½ in.) but it can be ordered slack or tight. If it is desirable to support the head, a headrest extension can be prescribed. The headrest can easily be removed when the chair is placed in a car. By inserting a zipper in the backrest or attaching the back to the metal bars with small turn-buckles the back can be opened and closed by the patient without much difficulty. By opening the backrest the patient can slide in and out of the back of the chair to get to and from the bed or toilet seat.

### ARM RESTS

The standard wheel-chairs have rounded metal arm rests but when patients are confined to their chairs for long periods of time it is more desirable to have flat wooden or upholstered arm rests.

Detachable arms are useful for those who must enter the chair from the side.

### FOOT BOARDS

There are many variations of the foot boards such as swinging foot boards and detachable foot boards.

### CUSHION SEATS

A foam rubber cushion seat should be prescribed for patients who have sensory as well as motor disabilities. All patients who are required to spend many hours in their wheel-chairs will be made more comfortable thereby and less liable to develop pressure sores.

### CARE OF WHEEL CHAIRS

Proper care of the wheel-chair after it is purchased is as important as the care of an automobile. With a little regular attention, the life and usefulness of the wheelchair can be prolonged in good condition. Most new wheel-chair owners are provided, by the chair manufacturer or the dealer, with circulars giving instructions for the proper care and lubrication.

### HINTS ON GENERAL CARE

To open the chair it is necessary to push down on the seat rails. Never try to open the chair by pulling it apart. To close the chair, raise the footboards, then lift the seat until it is almost closed, tuck the seat down between the seat rails and close the remainder of the way by pushing the sides together. Never pile suitcases or packages on top of your chair. If the chair does not fold or open properly, do not force it but take it to your dealer for proper adjustment.

### DOUBLE AMPUTEE

The most useful chair for a double amputee would be a light-weight durable folding chair.

This should have brakes and the large wheels in front. Having the large wheels in front will compensate for the loss of weight of the lower extremities. The danger of the chair tipping over is eliminated.

### THE PARAPLEGIC

As for the amputee, but the following points should be taken into consideration.

1. A paraplegic should use a special foam cushion which tends to raise the level of the chair seat. The patient should be able to rest his arms comfortably on the arm rests. The chair back should be sufficiently high to give adequate support.

2. Swinging detachable foot rests should be considered to facilitate transfer techniques at the wheel-chair and ambulatory level. When swung out of the way they allow closer approach to the furniture.

3. Whether the large wheels are in front or at the back is a matter of personal choice.

#### (a) Large wheels in front.

If the chair tips it will tip forward and the patient can usually save himself by stretching out his arms.

The patient who wishes to be completely independent usually chooses this type of chair as he finds it more comfortable to push.

#### (b) Large wheels at back.

If this chair tips the patient is apt to hit the back of his head on the floor.

These patients usually end up by having someone else to push them.

### THE QUADRIPELEGIC

As in the above but in this case the large wheels should be at the back, and one detachable arm should be provided to facilitate transfer from bed to chair.

As the life expectancy of these patients has been considerably extended it is often feasible to motorize their chairs thus giving the patient a fair degree of independence.

There are two units which are commercially obtainable which have been built to fit a standard model chair. Although expensive they can do much to lighten the load of the patient and his family.

### THE AGED AND DEBILITATED

As for the amputee but in this case the large wheel should be at the back as this type of chair is much easier for an attendant to manage. A detachable arm is also an advantage as are adjustable leg rests.

No wheel-chair is cheap but it will be less expensive in the long run to purchase a sturdy well-made chair than one that will constantly be in need of repair which is both costly and inconveniences the patient.

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