

BASIC CONSIDERATIONS IN THE PRESCRIBING OF WHEEL CHAIRS*

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Modern concepts of rehabilitation have brought about a significant change in the role of the wheel chair to the disabled individual. In past years, a wheel chair was looking upon primarily as a convenient means of transporting a disabled person from place to place or for changing his position from lying to sitting. Today the wheel chair has become an important instrument in aiding the severely disabled to attain a high level of functional rehabilitation.

Wheel chairs are now used as rehabilitation appliances to give individuals with non-functioning lower extremities the means for independent locomotion and an increased potential for productive living. Special accessories for wheel chairs have been designed for specific needs. When properly selected, these accessories eliminate numerous barriers which restrict activities of daily living for the disabled persons and facilitate a wide range of independent movement for them. The individualized selection of a wheel chair and accessories is important mainly to the more severely disabled individual, such as one with a spinal cord injury with complete paralysis below the waist; one with a neurological disorder with complete or partial paralysis of one side of the body; one with bilateral amputations which preclude the use of artificial limbs; one with severe arthritis with deformity of the joints and contracture of muscles in the arms and legs.

A proper wheel chair and accessories should be selected when such a disabled individual has reached a plateau in his recovery, for only then can his needs be evaluated and resolved. There is one exception to this principle, however. It pertains to the disabled individual with a progressive disease such as multiple sclerosis, where improvement is intermittent and unpredictable. For the disabled individual with a progressive disease, the wheel chair and accessories should be selected to meet his anticipated physical handicaps at the most serious stage of his disease, while still permitting the use of a wheel chair. In all instances, however, the disabled individual should have at least one functional arm with sufficient strength and range of motion to enable him to get out of bed and into the wheel chair and vice versa.

An evaluation of the physical abilities as well as physical disabilities of the disabled individual is necessary, therefore, to determine the proper wheel chair and accessories for him. If he is capable of voluntarily moving one lower extremity as is the situation in the hemiplegic or the remaining segments of the lower extremities as in the bilateral amputee, the individual would be able to position himself in bed and could enter the wheel chair from the front and between the armrests. A wheel chair with stationary or

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non-removable armrests would be indicated for him. On the other hand, if a disabled individual is incapable of voluntarily moving his legs, like the patient with a spinal cord injury, he would be unable to get into the proper bed position to enter the wheel chair from the front, but would have to lift himself into the wheel chair from the side. A wheel chair with removable armrests (see fig. 5) would thus be indicated for him.

The hemiplegic patient with normal arm and leg on the unaffected side would be able to use the standard wheel chair described below in figure 1, providing the height of the seat permits his foot to touch the floor while sitting comfortably in the wheel chair. His unaffected arm would enable him to propel the wheel chair by pushing the large rear wheel, and his unaffected leg would enable him to guide and push the wheel chair with his foot on the floor. However, if the hemiplegic individual does not have the use of a normal leg but does have a normal arm, he would require a "One Arm Drive" wheel chair (fig. 2), which can be guided and propelled simultaneously with only one hand. This type of wheel chair has an additional rim on the large wheel which is connected to the opposite wheel by an axle, thus permitting control of the large wheel on the paralyzed side with the added rim on the uninvolved side.

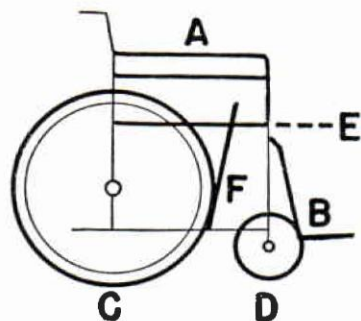


Fig. 1. Standard wheel chair for general medical and surgical patients. A, upholstered non-removable armrests. B, adjustable footrests. C, 24 inch rear wheels. D, 8 inch or 5 inch front casters. E, seat not higher than 19½ inches from floor. F, brakes.

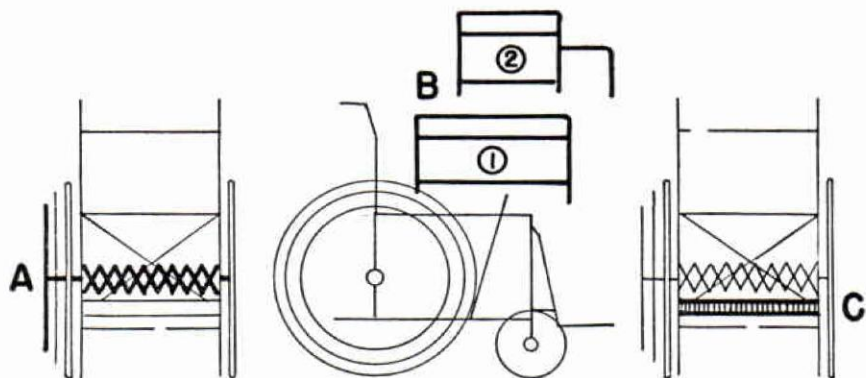


Fig. 2. Wheel chair for hemiplegic and triplegic patients. A, one arm drive component. B, removable regular (1) and desk (2) armrests. C, heel strap.

The bilateral amputee requires a wheel chair with the rear axles and large wheels set back for balance (fig. 3) to compensate for the loss of weight of his missing lower extremities. If such a special wheel chair is not available, the standard wheel chair with a 10 to 15 pound weight (sandbag) fastened on the footrests will serve the purpose. This added weight will shift the center of gravity of the wheel chair and will reduce the possibility of it and the patient toppling backward, which is most apt to occur when going up inclines. In addition, legrests would be required which could be swung away from the front of the wheel chair so as to permit the wheel chair to appose closely to the bed, chair, car, commode or anything else the amputee may wish to use. The standard non-movable legrests would place the bilateral amputee approximately 18 inches away from the object to which he wished to transfer. This would present a serious hazard and require considerable effort to accomplish.

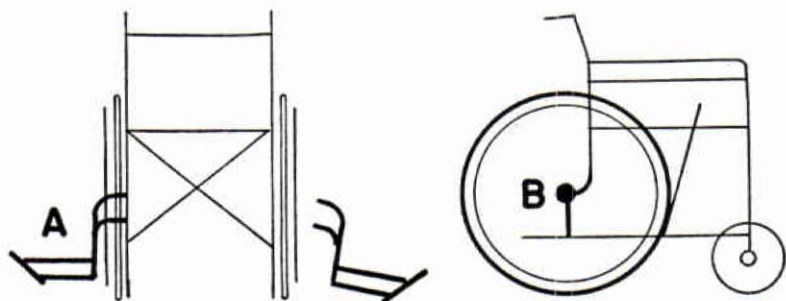


Fig. 3. Wheel chair for bilateral amputee patients. A, swinging and detachable legrests. B, rear axles and wheels offset to rear.

The arthritic individual with frozen knee joints requires adjustable legrests which may be elevated to the most comfortable position for the knees. However, the arthritic person with involvement of the hips or vertebral column requires an adjustable back which may be adjusted to the most comfortable angle for him. Some arthritic individuals with extensive involvement may require both the adjustable legrests and the adjustable back (fig. 4).

The varying types of wheel chairs and special accessories suggested for severely disabled individuals are illustrated in figures 2 through 5. The basic parts of the standard wheel chair are shown in figure 1. Additional accessories should be selected to provide the patient with the greatest comfort and optimal functioning in activities of daily living outside the hospital. The width of the adult-size wheel chair, which is 24 inches, may present a problem to patients when at home or outside the home. Since some doors are less than 24 inches wide, patients will not be able to pass from one room to another, particularly the bathroom which usually has an even narrower door. This problem, however, may be resolved by reducing the width of the wheel chair either by tightening the heel strap (see fig. 5) or by removing one or both of the outer rims on the large wheels. For the slim or small patient, the junior size wheel chair, which is 22 inches wide, is recommended for negotiating tight places.

The desk type armrests (see fig. 5) are very practical in that they enable patients to roll their wheel chairs 6 additional inches under a table or desk, permitting them to sit in an erect position instead of a forward

leaning position while eating or working. In order to permit the patient in a wheel chair with regular armrests to sit erect, the table or desk would have to be raised 5 inches by placing blocks under the table or desk legs. This will enable the patient to roll his wheel chair under the table or desk. The armrests should be upholstered to make the patient comfortable, which is a very important consideration. (Another item of comfort recommended is a 4 inch foam rubber cushion seat.)

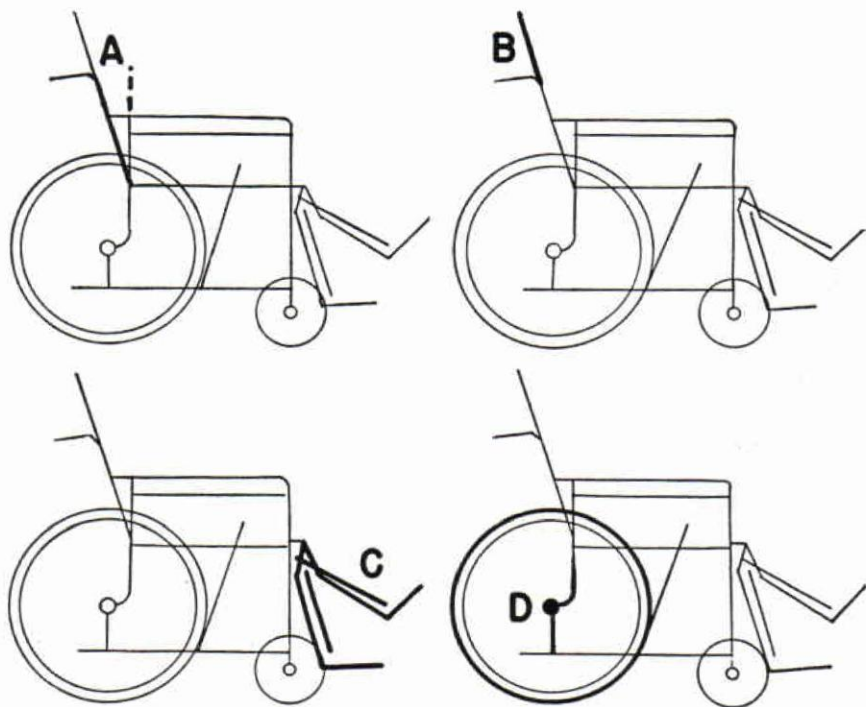


Fig. 4. Wheel chair for arthritic patients. A, reclining back (full or semi). B, 10 inch head extension. C, adjustable legrests. D, rear axles and wheels offset to rear.

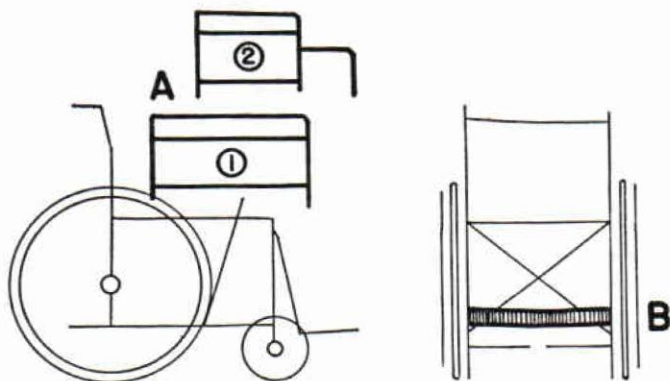


Fig. 5. Wheel chair for paraplegic patients. A, removable regular (1) or desk (2) armrests. B, heel strap.

Although 8 inch wheel casters are used most frequently, some patients may find the 5 inch casters easier to propel, particularly on floors which are covered with rugs or carpets. The 8 inch wheel casters, however, are especially recommended for traveling on rough or uneven ground. Less effort is required in propelling a wheel chair with these casters.

All wheel chairs should be so constructed that they can be folded and opened easily. The paraplegic patient, for example, should be able to fold or open his wheel chair with one hand while supporting himself with the other hand.

Important for efficient and optimal use of wheel chairs, but incidental to the main purpose of this paper, is their proper maintenance, which is covered thoroughly by Cicensia, Sampson, and Hoberman¹. Another important point is that wheel chairs can be made more functional for certain patients by special adapted devices, such as knobs for outer rims to enable patients with weak or no grip to propel the wheel chairs with their palms or with the web of their thumbs, arm slings and supports for patients with weak upper extremities, and the split back to facilitate movement onto the commode. These adapted devices can be selected from the pamphlet, "Self Help Devices," published by the Institute of Physical Medicine and Rehabilitation, 400 West 34 Street, New York 16, N. Y., and from the catalogues published by wheel chair manufacturers.

The ability of severely disabled individuals to perform activities of daily living is often dependent upon medical appliances, such as the wheel chair. Definitely, the wheel chair for many disabled patients represents the difference between bedridden invalidism and rehabilitation. Furnishing these patients with wheel chairs to meet the needs of their specific disabilities, therefore, is a very important aspect in their rehabilitation. For this reason, physicians, or other individuals specifically trained, should be concerned with the selection of the proper wheel chairs for these patients.

Summary

The principle of individualizing wheel chairs to meet the specific needs of disabled persons evolved from the modern concepts of rehabilitation. Special types of wheel chairs and accessories are advocated for patients with spinal cord injuries, cerebral vascular accidents, bilateral amputations of lower extremities, and extensive arthritis. Prescription wheel chairs should be ordered only when these patients reach the plateau in their recovery. In varied types of wheel chairs and accessories described, the minimal physical requirement for propelling a wheel chair independently is one functional upper extremity. A physician or a trained rehabilitation specialist should be responsible for the selection of a wheel chair and its accessories to insure maximum usefulness to the disabled person.

REFERENCE

1. Cicensia, E. F., Sampson, O. C., and Hoberman, M. *Maintenance and minor repairs of the wheel chair.* Am. J. Phys. Med., 35:206-217, 1956.