Walking frames

Graham Mulley

FIG 1—Walking frame

FIG 2—Wheeled frame

FIG 3—Rollator

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The first walking frame was designed and made in 1924 by a 12 year old Cincinnati boy, Charles Williams.¹ His aunt had broken her hip and after treatment could move around her hospital room only by standing at the back of her armchair and pushing it in front of her. Charles fashioned a simple wooden walking frame that enabled his aunt to walk with more ease and confidence. The local hospital was impressed with his design and made several metal frames out of gas piping. In the 1950s aluminium frames were produced, and subsequently many modifications and additions were developed. The frame is now one of the most widely used walking aids in the world.

There are over 40 types of walking frame available in Britain. The generalist does not need to know about them all but might be interested in the basic principles of use and want to learn about their advantages and disadvantages, how to obtain them, and how to inspect them for safety.

Who uses walking frames

Frames encourage safer ambulation and independence in frail elderly people. About 85% of those using them are over 65, their mean age being 75. Loss of confidence and deteriorating balance are the main symptoms affecting those who use frames, most users suffering from arthritis, hip fracture, or stroke. Walking frames ease pain by taking some of the body's weight through the arms; they also provide confidence and stability.

Types of frame

Simple frames are used in the home; larger specialised frames are more commonly found in hospitals and rehabilitation units. Walking frames can be of fixed or variable heights. Some have wheels, some are folding. The basic four legged, three sided walking frame is the most commonly used (fig 1), being provided to three quarters of users outside the hospital. These frames are often known as Zimmer frames (after one of the manufacturers of these aids). They are sometimes called pulpit frames. This term, however, can be used for different types of frame: as it is unhelpful and may cause confusion it should perhaps be abandoned. Ideally, patients should not stoop when standing with the frame but hold it with the elbows flexed to about 15-20°. They should have well fitting footwear, not go barefoot or wear loose slippers. To use it correctly the patient lifts the frame, puts it down in front without overstretching, takes two even steps into the frame, and stops. He or she then lifts the frame again and repeats the process. These frames are stable but inevitably produce an abnormal, halting gait. They do not allow for the normal rotation of the trunk that occurs in walking. A less abnormal pattern is produced by wheeled frames.

Wheeled frames (fig 2) have two wheels or castors at the front. They can therefore be pushed along rather than having to be lifted. Ambulation is not only smoother and faster but it requires less effort. These frames are preferred for those whose painful shoulders make lifting the frame difficult; those with mild

retropulsion; and mentally infirm patients with mobility problems. They are sometimes helpful in parkinsonism. Many parkinsonian patients have difficulty initiating movement; they are therefore hindered by the stop-start-stop sequence of a walking frame. The wheeled frame helps mobility but care must be taken with those who have festinant gait; once underway, they may have difficulty stopping. Frames with small wheels do not run well over carpets, but wheels of a larger diameter do run more freely. Another type of wheeled frame is a rollator (fig 3). Here again the terminology can be confusing. Some people call any wheeled frame a rollator; I have limited the term to a large stable frame that usually has handles of adjustable height. There are two wheels at the front and two rubber ferrules (or sometimes two more wheels) at the back. Some have brakes. This frame may be useful for patients with retropulsion, for some parkinsonian patients, and for children with cerebral palsy. It has a large turning circle and is therefore difficult to manoeuvre.

Tri-wheeled walkers (or delta frames) (fig 4) are mobile triangular folding frames with a single front castor and two rear wheels, which usually have brakes. Two types of brakes are available: cable brakes and spring loaded brakes that work by bearing weight on the hand grips. The height and angle of the handles can be adjusted. These frames are easier to steer than walking frames and have a small turning circle. They are, however, more unstable and difficult to use. Modified tri-wheeled walkers may be helpful in improving the mobility of some patients who are disabled by emphysema.² By leaning forwards onto a wheeled frame a third of the body weight can be taken through the aid and patients find that they can double their walking distance. As with all wheeled frames, they are useful only over smooth, level terrain.

The alpha frame (fig 5) is a two sided frame that can also be folded flat. This is useful for patients wanting to use cars or public transport. They are not as wide as standard walking frames and are therefore preferable when there are narrow doorways. The hands are held close together, however, when holding the handles and the patient may feel less confident when using this frame. If the frame is not well maintained it sometimes fails to lock open when in use and this can be hazardous.

The reciprocal frame (fig 6) is like a short, hinged clothes horse. The idea is to allow a normal reciprocal walking pattern—as the left leg advances so does the right arm. In practice, patients have difficulties learning how to use it and the frame is awkward in the home. These frames are not popular with elderly patients.

The gutter frame (fig 7) is a larger mobility aid that allows the patient to take support through the forearms. This is particularly useful when the hands are painful or deformed or when the patient requires maximum weight relief or support. Gutter frames have two castors at the front and can therefore be pushed along. As they are big and lack manoeuvrability they are not often used in the home.

The Bond frame (fig 8) can be an adjunct to stroke rehabilitation. The arms are placed in an armrest trough and the fingers of both hands are interlocked

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FIG 4—Tri-wheeled walker (delta frame)

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FIG 5—Folding frame (alpha frame)

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FIG 6—Reciprocal frame

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round a central handgrip. There are two small front wheels. This frame gives support, maintains symmetry, and keeps the arms in the extended anti-spastic position.

Modifications to walking frames

There are other modifications and additions to frames that may be helpful in individual cases. A bandage tied across the lower side bars will discourage the patient from walking too far into the frame, which can cause instability. Patients with stammering gait (gait apraxia) may benefit from the addition of flippers fixed low down on the rear legs and projecting into the centre of the frame. The patient has to step over these, and using this adaptation may help overcome the tendency of the feet not to stick to the floor.³

Baskets can be fitted onto the front of a frame. Many patients, however, prefer a trolley (fig 9), which allows them for example to push food and utensils from the kitchen to the sitting room as well as giving them support. Other additions include seats, trays, shopping bags, and expanded handles for arthritic patients.

Frames are used not only for ambulation. Other uses have been as plant stands, as a television aerial (apparently they give good reception), and as a clothes horse to dry "smalls."

Provision of frames and education in their use

The current procedures for providing frames are variable. In a survey of 203 users of walking frames in the east Midlands, Mayfield found that frames were obtained from social services, the Red Cross, hospitals, general practitioners, and district nurses.⁴ In some districts frames are provided by community physiotherapists. About 3% of patients buy their frames privately.

FIG 7—Gutter frame

FIG 8—Bond frame

FIG 9—Trolley

Physiotherapists consider it important that patients are assessed to determine whether a frame is necessary—other aids or techniques may be more appropriate. Patients should be taught how to get up from a chair and stand with a frame. Instead of pushing down onto the chair arms and holding the frame once a standing position has been adopted some patients attempt to pull themselves up out of the chair onto the frame. This is potentially dangerous: though frames are broad based they can be pulled over, causing the patient to fall backwards. One should not be too dogmatic as some patients do seem to get up better by leaning forward and pushing themselves up from their frame. Training should also include advice on walking through doorways, turning, and moving backwards and sideways.

Practical problems and solutions

Environmental limitations—Standard walking frames cannot be used on stairs (though there are specialised frames for this purpose). Users who go upstairs to bed or to the toilet will therefore require two frames—one for upstairs the other for downstairs—and may need handrails on both sides of the stairs. Frames are unsafe on uneven terrain and care should be taken on inclines (including ramps). Frames are often too large to manoeuvre in small rooms. Some patients prefer to get around by holding onto strategically placed furniture. It is difficult to negotiate doorways, and the frame may have to be used sideways. Frames occupy a lot of space; they are rarely allowed on buses or in ambulances. Folding frames should be considered when these circumstances arise.

Effects on gait and posture—Frames offer stability but severely restrict walking speed: it is not surprising that only a third of those with frames at home use them outside. Sometimes slowing down a patient can be helpful: some walk too quickly and are at risk of falling forwards. For parkinsonian patients, who tend to assume a flexed posture, the use of two sticks may encourage a better pattern of gait.

Safety—One in eight frames shows signs of damage or has been repaired in the past. Those who issue frames must ensure that they are free from defects, safe, and clean. Assessment of disabled patients is not complete until their aids and appliances have been inspected. Important points to look out for are

- signs of bending, deformation, or fracture: a quarter of patients have fallen or nearly fallen while using their frames, and if the user falls on the frame the light alloy will fatigue. It may subsequently break, causing the patient to fall again
- protruding screws that can scratch the patient or furniture and loose or missing screws that weaken the joints of the frame
- handgrips that have become cracked, split, or loose. In one survey one in five users complained of handgrips that slipped while in use⁵
- hard plastic handgrips that may press on the hypothenar eminences causing ulnar nerve palsies.⁶ Consider padding the handles if the patient is transmitting a lot of weight through the frame over a long period
- that rubber tips are fitted and that they have not become worn.

If you find faults with a frame, contact the issuing authority.

The future

Ideally, every patient should be carefully assessed by a physiotherapist before being given a frame. If

walking frames were available only from physiotherapists safety would improve, provision of frames would be more appropriate, and patients would receive proper training in their use.

I am grateful to my physiotherapist colleagues, Rosemary Taylor, Rachel Kendall, Julie Isaac, and Janet Viner, for their helpful advice.

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Update box for *Oxford Handbook of Clinical Medicine* (2nd ed), p 287

How to use amiodarone: some warnings, and advice on monitoring

Indications: Supraventricular, nodal, and ventricular tachycardias; the Wolff-Parkinson-White syndrome (p 288); and atrial fibrillation and flutter when other drugs cannot be used. Note that amiodarone has replaced flecainide (which is now thought to promote ventricular arrhythmias and to increase mortality (p 292)).

Dose: 200 mg/8 h by mouth for seven days then 200 mg/12 h for seven days. Maintenance treatment is 200 mg/24 h. The plasma half life is very long (about 50 days). If a rapid response is essential give 5 mg/kg by intravenous infusion in ≥ 250 ml of 5% dextrose over 20-120 minutes in a coronary care unit with defibrillation facilities immediately to hand. In extreme emergencies, 150-300 mg may be given intravenously over two minutes—but there is danger of hypotension. The infusion rate per 24 hours is 1.2 g in 500 ml of 5% dextrose. If bradycardia supervenes use atropine intravenously—for example, 0.6-1.2 mg.

Interactions: Amiodarone potentiates digoxin and warfarin.

Contraindications: Pregnancy, breast feeding, thyroid disorders.

Side effects: Corneal deposits (reversible and rarely symptomatic); photosensitivity; increased international normalised ratio (INR); nightmares; hepatitis; hypothyroidism; hyperthyroidism (amiodarone is 37.5% iodine (see p 544)); alveolitis.

Monitoring: Body weight, liver function tests, thyroid function tests (thyroxine, triiodothyronine, and thyroid stimulating hormone concentrations). Consider monitoring the eyes with a slit lamp.

Amiodarone induced hyperthyroidism: Do not treat patients simply on the basis of abnormal test results; reserve treatment for those who have symptoms. If clinical hyperthyroidism supervenes concurrent antithyroid drug treatment has been successfully tried—that is, potassium perchlorate 250 mg/6 h orally for 40 days (this removes excess iodine) with methimazole 10 mg/6 h orally, the dose being reduced (but not stopped) as thyroid stimulating hormone concentration rises.¹ Endogenous thyroxine may be needed later. Seek expert help. —J M LONGMORE

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Anybody may submit an update box; all boxes are peer reviewed