

Plaster Casts*

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A step-by-step description is given of a method of applying a plaster of Paris walking cast that can be performed by one technician with minimal assistance.

Plaster of Paris walking casts are recommended for the treatment of foot ulcers in leprosy. They are also an essential part of the treatment of tarsal-bone disintegration in leprosy. To be effective, a cast must be strong, light, and well fitted so that it does not rub and cause an abrasion which, because of anaesthesia, may remain unnoticed until a deep ulcer has developed. Since a plaster applied to an oedematous leg or foot becomes loose as the swelling subsides, steps should be taken to reduce swelling before the walking plaster is applied.

Introduction

A simple method of applying a walking cast developed by the staff at Hay Ling Chau is here described in the hope that it may interest medical orderlies and other field workers. Alternative appliances for enabling the patient to walk are also available.

Method

1. POSITION

(a) The patient lies face down on the couch with the knee of the affected side held at 90° of flexion. This means that the leg is not being supported on the horizontal plane and so reduces the risk of isolated pressure spots being caused by the assistant inadvertently pressing on the wet plaster (Fig. 1).

(b) The ankle and foot are easily controlled. (1) The patient can hold the foot correctly himself, in a good position. (2) Finger-tip pressure on the toes will maintain an anatomically normal foot. (3) If the foot arch needs much moulding, a strip of cotton bandage may be passed across the arch and pulled by the assistant to exert downward pressure on the arch while the assistant pushes the forefoot plantarwise. The combined action will give maximum arch moulding while the plaster is moulded over the bandage (Fig. 1). (4) Where there is marked heel inversion because of contracting soft tissues, an assistant forcibly moulds the foot until sufficient plaster is applied to hold the foot in the desired position. (5) If the metatarsals or phalanges are damaged, it may be advisable to use adhesive plaster and/or small splints to straighten the toes, and thus enable healing to proceed in a position of function.

N.B.: In most leprosy patients, it is important to apply the plaster with the

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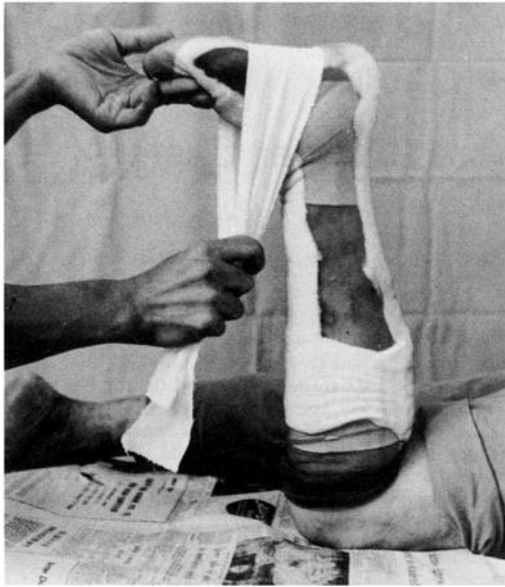


Fig. 1. The patient lies face downward on the plinth with the affected foot prepared for plastering. The position of the foot is held by use of a cotton bandage as described under Position (b) 3.

foot at right-angles to the leg, or even slightly dorsiflexed. If the plaster is applied while the foot is in plantar flexion, contracture of the tendo Achilles may occur, especially if the dorsiflexors of the foot are weak. Furthermore, the foot should be kept slightly everted (and not inverted), and the toes should be straight.

2. SKIN PROTECTION

Adequate protection must be provided at any points subject to pressure or friction, such as the front of the ankle and the upper end of the plaster, that is, near the knee. (a) Elastoplast has proved an excellent material, in that it moulds to the contours of the limb and does not move. A figure-of-eight bandage protecting the malleoli and the front of the ankle, combined with a cuff at the proximal limit of the plaster, is adequate. The upper limit of the plaster is determined by the patient's habits: if squatting is part of his way of life, the cuff needs to be lower than is usual. (b) Orthopaedic felt is satisfactory as a protector. (c) Rolls of cotton wool may be used, but care must be taken that the application provides a uniform layer that is not too thick and will not allow movement of the whole plaster. A combination of 2 or more of these "pressure point protectors" is probably best. (d) Old nylon stockings provide an excellent substitute for tubular stockingette; indeed they are in some ways preferable, since being already shaped they do not wrinkle in front of the ankle. Also the intact stocking toes keep dust and dirt from the ulcerated area.

At Hay Ling Chau, the routine for a plaster application is as follows:

(1) Elastoplast is applied around the ankle as a figure-of-eight. (2) A circular

cuff is made of the same material at the level of the upper edge of the plaster. (3) A nylon stocking is rolled on and pulled up over the knee. (4) A layer of wool is applied along the sole and 3 in (7.5 cm) up the back of the leg to protect the heel (which is very vulnerable to pressure), carried over the tibial ridge, and over the Elastoplast at the level of upper edge of the plaster. (5) A second nylon stocking put on over the wool holds this firmly in position. (6) The position is checked and maintained—as described in Section 1. (7) Plaster of Paris is then applied. (8) A cuff of nylon stocking and wool is turned down over the proximal edge of the wet plaster. This provides a nice cuff and helps to reduce rubbing at the proximal end of the plaster.

3. PLASTER APPLICATION

(1) A back slab of 8 to 10 layers of 6-in (15-cm)-wide plaster bandages is made, big enough to reach from the toe tips to the proximal (upper) edge. After being soaked, rubbed in and smoothed on a flat surface it is then applied carefully, moulded well on to the arch of the foot and round the heel and the tendo Achilles to ensure a good fit.

(2) A 3- or 4-in (7.5- or 10-cm) bandage is soaked and applied to the ankle and arch area to hold the foot and heel in position. If a cotton bandage is used to hold position (as described in 1, b, 3 above) this is not removed till the plaster is dry, but it can be worked around and later cut.

(3) A 6-in (15-cm) bandage is then soaked and applied proximally to give good support and fit around the calf, to form the upper limit of the plaster, and to complete the leg.

(4) When the plaster is dry enough to maintain the desired position of the foot, any moulding can be removed and the plaster completed by further 4- or 6-in bandages. It is important when applying the plaster to the toes that they be plantarflexed. Care must be taken that in applying the plaster the fifth toe is not extended at the metatarso-phalangeal joint.

(5) The proximal edge of the cast is smoothed off and the stocking or stockingette turned over to provide a smooth edge.

(6) The plaster must be completely dry before walking is allowed. This takes at least 24 h. If possible, the walking appliance should be applied only after the plaster is dry to ensure that the patient does not walk too soon.

4. WALKING APPLIANCE

(a) Bohler-type walking irons should be used for any patient with osteoporosis or tarsal-bone disintegration of the talus and/or ankle joint to minimize compression of the ankle region. A simple metal walking iron can be made by a local metal worker. Double cross bars on the long side pieces are desirable and these pieces should be malleable in order to fit the cast well (Fig. 2). The total weight of the iron must be considered in selecting a suitable metal or it may be so heavy that the patient cannot walk.

(b) Wooden or rubber rockers can be applied to the foot. Wooden ones can be made from a wooden packing case by a jobbing carpenter as shown on the diagram (Fig. 3), and shod with car tyre or made like the Karigiri shuffle board described by Ross (1962).

(c) For patients with bilateral foot lesions, or others for whom stability when standing may be a problem, a flat sole can be made on the plaster. Care must be taken that the plane of the sole is at 90° to the tibial line and that the foot is not

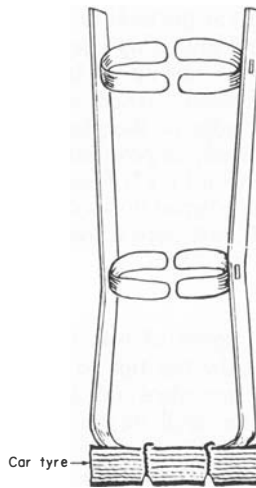


Fig. 2. A Bohler type walking iron made by a local metal worker and shod with car tyre.

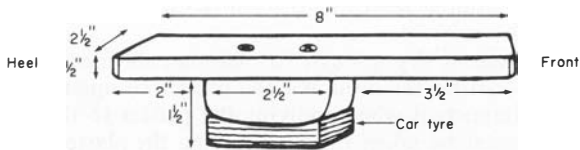


Fig. 3. A wooden rocker (showing dimensions) shod with car tyre.

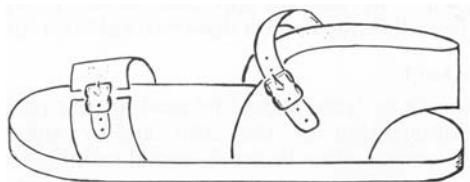


Fig. 4. Rubber-soled sandal with canvas straps and buckles to wear over a plaster cast.

forced into eversion or inversion. The sole is built up with plaster and smoothed off with a flat board. When it is dry the patient is provided with a sandal with a rubber or leather sole and adjustable straps that can fit over the plaster (Fig. 4). In wet weather a plastic bag can be used between the sandal and the plaster. These flat plasters have proved very useful and effective, especially in the elderly and less active patients and those in whom both feet need treatment at the same time (Fig. 5).



Fig. 5. Sandalled plaster casts on a patient with bilateral foot lesions.

Comments

The use of walking plasters may cause osteoporosis, the degree of decalcification being proportional to the length of time the plaster is worn. Any foot that has been in plaster for 6 weeks or more should be observed carefully for several weeks after removal of the plaster. Unsupported and unrestricted ambulation should not be allowed at once, as the development of tarsal-bone disintegration following the use of a walking plaster is a very real possibility.

Early treatment of lesions due to tarsal-bone disintegration can result in complete recovery in an undeformed position. On the other hand, neglect may result in a grossly deformed foot and much disability.

References

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