Splints

Patricia M Riley

A splint is a device applied to part of the body for protection or to help in restoring or improving function. Splints may be static or dynamic. Protective static splints prevent weak muscles being stretched and support joints by substituting for weak muscles. They are useful in cases of trauma and spinal cord injury and as resting splints for patients with rheumatoid arthritis. Corrective static splints force the affected joint into the correct or near correct alignment and are used for contracture of burn scars and tendon adhesions and as working splints for patients with rheumatoid arthritis. Dynamic splints give mobility to the patient's joints by providing forces that substitute for absent muscle power—for example, postoperative outriggers for metacarpophalangeal joint replacements.

Types of splint

Splints are either resting, working, or serial.

Resting splints maintain the joint in the optimum anatomical, rehabilitative, or prophylactic position. They work at night or during rest periods (in certain cases they may be used continually for a prescribed period). Night resting splints are commonly used to provide support and rest in the functional anatomical positions, but the splinted limb cannot be used functionally while the splint is in place. They are used in cases of rheumatoid arthritis, trauma, hand surgery, cerebrovascular accidents, burns, and skin grafts. Night resting splints are usually made in Orthoplast or Sansplint thermoplastic material (fig 1).

Working splints allow the patient to use the limb functionally while it is splinted. They usually hold one joint in a static position while other joints are free to function—for example, wrist splints allow full elbow and finger movement. They may incorporate a dynamic component, giving assisted or resisted movement. Wrist working splints are commonly used in cases of rheumatoid arthritis to ease and protect painful wrist joints thus ensuring a more stable wrist to carry out functional activity. These splints are also used in

FIG 1—Night resting splint. Top: pattern; bottom: in position with velcro straps

FIG 2—Wrist working splint. Top: pattern; bottom, complete

FIG 3—High profile dynamic outrigger

cases of the carpal tunnel syndrome as maintaining the wrist in an extended position eases symptoms and in cases of trauma. They are usually made from Plastazote and Vitratene, providing a flexible yet supportive splint and allow full movement of the metacarpophalangeal joint (fig 2).

High profile dynamic outriggers (fig 3) may be used in metacarpophalangeal joint replacement and trauma. They allow flexion of the joints but maintain them in extension. They may be used as part of a postoperative regimen for a specified time.

Serial splints may be resting or working splints. They are used to improve gradually the range of movement by regular readjustment of the splint to stretch soft tissue or joint contracture.

The ideal splint must be neat, comfortable, lightweight, durable, washable, individually and simply designed, free of pressure areas (unless pressure is required in specific cases such as in patients with burn scars), easily adjustable, and understood by the patient, staff, and relatives concerned.

Who needs a splint?

There are several conditions in which splints can help in rehabilitating and managing patients.

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Rheumatoid arthritis—In this condition splints can be used as part of a joint protection programme to keep them in alignment, ease pain, and rest them in a functional position. Splints do not prevent ulnar drift or permanently correct it but can slow down the process if used with joint protection techniques. Splints that temporarily provide joint alignment enable the patient to have better function.

Burn scars—Where there is burned tissue it is important that the joints are maintained in the optimum anatomical position. This helps to maintain function and prevent contracture. If contractures have formed in immature scar tissue serial splinting is possible to gradually stretch out the scar.

Flexor tendon injuries—Postoperatively surgeons commonly request dynamic splinting to a repaired tendon to allow movement through the tendon sheath while not exerting any force of movement on it. Once the tendon has healed serial splinting may be required to stretch the tendon and help release adhesions.

Neurological conditions that result in poor function—for example, motor neurone disease and tetraplegia due to either traumatic spinal cord injury or other means—may benefit from resting splints that maintain the optimum position of function and working splints that provide increased means of function. Certain conditions that result in spasticity of a limb may benefit from splinting. Splinting the palmar surface of a spastic hand, however, may increase the tone and thereby worsen the condition. A variety of other types of splints not applied to the palmar surface may be used. Even when it is a longstanding problem (older than six months) palmar splinting may not be contraindicated and can actively help to improve function and reduce pain.

Trauma resulting from crush injuries and fractures often requires support in a functional position in the form of resting, working, or serial splints.

Who provides splints?

Splints are usually provided by hospital based occupational therapists, who learn the techniques of splint making as part of their training. Orthotists may also be involved through a hospital's surgical appliance department. They are usually apprentice trained by commercial companies that provide surgical appliances and visit hospitals on a sessional basis.

What materials are used?

Thermoplastic materials are used as they can be softened and moulded with either dry or wet heat to the appropriate style and position. Orthotists usually use high temperature materials, which can only be shaped on a mould and not directly on to the patient's limb. Occupational therapists use low temperature materials, which can be moulded directly on to the patient. The use of low temperature materials means that the splint may be made with relative ease and speed. The patient can be assessed and fitted and leave hospital with the splint in place often in one or two hours. As there are changes in the patient's condition the splint may be easily adjusted as required. Some commonly used materials are Orthoplast, Sansplint, Hexcelite, Plasta-zote, and Orfit.

How can splinting be successful?

The initial prescription for splinting must be appropriate and the doctor responsible for the patient needs to discuss what is required with the therapists concerned and a plan of the treatment needs to be organised. The therapist and doctor must have good lines of communication and be aware of the use and limitations of splinting. Follow up must be regular, by both the doctor and the therapist, and progress charted. The patient and the carer (if appropriate) need explanations of the splinting regimen so that they can participate in it and be motivated to use the splint. Finally, it is essential to remember that a splint is only part of the total treatment received by the patient yet has equal importance to those other treatments.

Appendix

RECOMMENDED READING

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ANY QUESTIONS

Would it be advisable to prescribe anabolic steroids to a 70 year old woman with osteoporosis who had a successful mastectomy for cancer of the breast seven years ago?

Doctors have long been worried about whether it is safe to use drugs with hormone effects (particularly oestrogens, but also anabolic steroids because of their androgenic properties) for benign conditions in women previously treated for breast cancer. Sadly, due to conflicting studies, there is no hard evidence to help us. But it has always seemed to me that any occult breast cancer is at least as likely to improve, as a result of what is done, as to get worse. If hormone treatment for clinical recurrence is far more likely to help than to harm why should we fear the opposite if there is subclinical disease?

There are two main kinds of soft evidence. Occasional cases of recurrence after such treatment have been reported. But as breast cancer is a common condition that quite often recurs after five to 10 years of good health this could easily be just coincidence. Secondly, there are anxieties

prompted by popular medical theories, which have always seemed to me unconvincing, particularly the idea of breast cancer as oestrogen dependent. When treating recurrent breast cancer the response rates are as good for oestrogen treatment as they are for so called antioestrogen drugs like tamoxifen.^{1,2} That shows how little we really know despite 50 years' study.

If there are good reasons to try anabolic steroids for this patient's osteoporosis—I'm presuming that malignancy has been excluded; and, of course, the worse her symptoms and the more remedies that have already been tried the stronger the case—I don't think that there should be much hesitation. —T B BREWIN, *medical adviser, Marie Curie Foundation, London*

- 1 Ribeiro GG. A clinical trial to compare the use of tamoxifen vs stilboestrol in the management of postmenopausal women with breast cancer. *Review of Endocrine Related Cancers* 1981; suppl 9:409-14.
- 2 Ingle JN, Ahmann DL, Green SJ. Randomised clinical trial of diethylstilbestrol versus tamoxifen in postmenopausal women with advanced breast cancer. *N Engl J Med* 1981;304: 16-21.