

# The use of a hands-free crutch in patients with musculoskeletal injuries: randomized control trial

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Unilateral musculoskeletal below-knee injuries occur with great frequency. Patients who cannot bear weight on an injured limb usually mobilize themselves with standard crutches. When the patient also has an upper limb injury, however, mobilization might be impossible, and can result in a lengthy in-patient stay. A randomized control trial was conducted on 80 patients to share our experience with the innovative 'hands-free crutch', and to discuss the potential of this device for more frequent use in orthopaedic surgery. We present its value in facilitating early discharge in patients with both upper and lower limb injuries. We show the cost benefit of the decreased in-patient stay that the hands-free crutch provides. *International Journal of*

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## Introduction

Injuries or surgeries to the lower extremity often result in a non-weight bearing (NWB) or partial weight bearing (PWB) status for an individual. This restriction in weight bearing might be required for several days, weeks, or even months, depending on the nature and severity of the condition. To solve this, crutches are used to eliminate weight bearing by the affected extremity, while still allowing ambulation. Crutches have been in use for centuries. The use of crutches has been depicted in Egyptian tombs to as far back as in 2830 BC (Ebstein, 1972). Throughout history, various crutch apparatuses have been studied, introduced, and used for patients with restricted weight bearing (LeBlanc *et al.*, 1993; Andrews *et al.*, 1994). The standard axillary crutch (SAC) is still widely used all over the world, perhaps owing to the fact that it is economical. An alternative has not yet demonstrated superiority over the standard crutch.

Patients with both upper and lower limb injuries cannot to use their elbows or axillary crutches and this makes them bed-bound or wheel chair-bound for a long period, until their injuries heal sufficiently to allow them to subject the injured extremity to weight bearing (McCormack, 2000). In the United Kingdom, the use of axillary crutches was replaced by the use of elbow crutches owing to the potential complications arising as a result of using the former (McCormack, 2000).

Different modalities have been used to expedite the discharge of these patients and to make them independent as soon as possible after the operation. This not only benefits early mobilization, but also decreases the

amount of expenditure in patients' stay in hospital. In cases in which NWB or PWB requirements exist, the individual must rely on some type of assistive device, such as standard elbow crutches. Although elbow crutches provide a safe mode of unilateral NWB ambulation, they require the use of both upper limbs for gait (Goh *et al.*, 1986). Therefore, standard elbow crutches are not of help to individuals who are unable to use both upper limbs because of recent injury.

We used a hands-free crutch (HFC) in 40 patients with both upper and lower limb injuries, and discuss the advantages of this crutch both in terms of early mobilization and early discharge from the hospital (Fig. 1).

## Materials and methods

The purpose of the study was to evaluate the usefulness of the HFC in patients with multiple injuries. The main objective of this study was to use the HFC in patients with both upper and lower limb injuries, so that they can directly support their weight with the femur using this crutch.

The crutch is made up of lightweight carbon fibre material. A platform supports the leg, and the weight is transmitted from the knee to the crutch. The thigh of the patient is attached to the crutch using Velcro straps, which are easily adjustable and convenient to use. The learning curve for using the crutch is relatively small and is comparable with that of the conventional crutch (Fig. 1a and b).