

## Technical note—tilting stubbies

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### Abstract

Bilateral amputees who are fitted with standard full length prostheses find it difficult to walk fast or climb up and down stairs. Usually stubbies, or short prostheses with non-articulated rocker bottoms, are also provided, especially for geriatric amputees. An interchangeable system has been evolved which enables the same prosthesis to be used either as a full length prosthesis or as a stubby.

An above-knee prosthesis is converted into a stubby by removing the shin and foot piece from the socket/knee unit and replacing it with an articulated hollow rocker.

The tilting of the socket/knee unit which is made possible by the articulation at the junction of the rocker and socket enables the amputee to lower his body to use Indian type toilets with the help of a low level folding portable commode, in addition, tilting helps the amputee to work outdoors in gardens and fields.

The interchangeable system is particularly suitable for bilateral amputees in developing countries.

Bilateral above-knee amputees and those with asymmetrical amputations of above-knee on one side and below-knee on the other, who are fitted with standard length prostheses find it difficult to walk fast or climb up and down stairs. Usually stubbies or short prostheses with non-articulated rocker bottoms are also provided, especially for geriatric amputees. In advanced countries mobility for bilateral above-knee amputees fitted with long prostheses may not be a problem, as they can use wheelchairs inside the home and transfer to cars for mobility outside. However,

cars and wheelchairs are beyond the reach of many of the bilateral amputees in developing countries. Even if free wheelchairs are provided, they may not be able to use them, as their small houses are not designed for wheelchair use. For mobility outside they have to make use of public transport systems.

A bilateral above-knee amputee will desire more stability say while walking through the corridors of a moving train or when he wants to walk fast or walk on uneven ground. In such circumstances, a reduction in height ensures better stability. Hence most bilateral above-knee amputees ask for stubbies even when they are fitted with full length prostheses.

Toileting is a major problem for a bilateral above-knee amputee using an Indian type toilet where the user has to squat. Bilateral amputees fitted with long prostheses or non-articulated stubbies find it difficult to lower their body to use Indian type toilets.

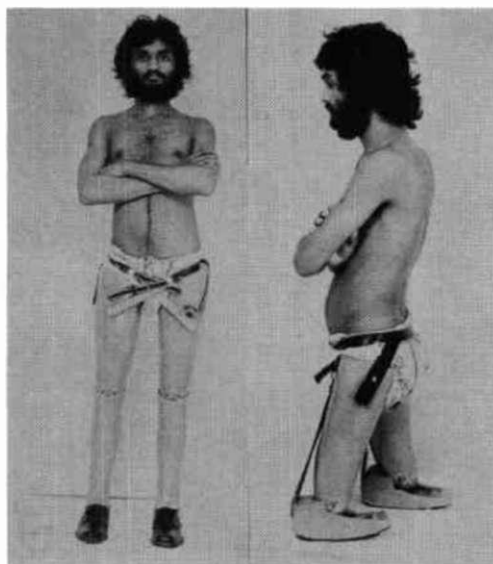


Fig 1. Left, bilateral above-knee amputee fitted with long prostheses. Right, tilting stubbies fitted.

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An attempt to solve the toileting problem and at the same time provide improved mobility was made by devising a system in which the shin and foot of a standard above-knee prosthesis (Fig. 1, left) could be replaced by an articulated rocker attached to the socket.

The knee bolt is removed from the prosthesis by the patient and the shin and foot detached. The hollow rocker, which is fitted with the same size knee joint sidestraps, is attached to the socket/knee unit by the same bolt. The tilting stubby is now ready for use. Careful alignment ensures the ability to walk safely with articulation at the socket/rocker junction (Fig. 1, right).

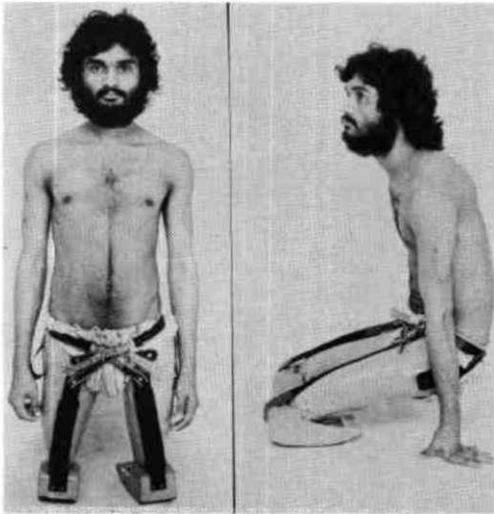


Fig. 2. Left, bilateral amputee using tilting stubbies. Right, extension bias to assist extension and control flexion.

An elastic extension bias controls flexion of the socket-knee unit with respect to the rocker when the amputee is lowering his body and

assists in extension while raising the body from the floor (Fig. 2, left).

When the amputee wishes to restore the prosthesis to the standard length, the rocker is removed and the shin/foot assembly re-attached.

The tilting action which is provided by the articulation between the rocker and the socket/knee unit (Fig. 2, right) enables the amputee to use Indian toilets with the aid of a portable folding commode.

#### *Advantages of the interchangeable system*

- a) The bilateral above-knee amputee can first be fitted with the socket-knee units attached to the hollow rockers for early walking training. This helps to strengthen the stump musculature, reduce flexion contractures, and gets him accustomed to ischial weight bearing. Once the amputee has gained confidence the shin and foot assembly is fitted to adjust the prosthesis to the standard length.
- b) There is considerable reduction in cost and fabrication time as additional sockets are not necessary.
- c) While travelling, there is no need to carry a pair of stubbies in addition to the standard prostheses. Only two extra rockers need be carried for attachment when necessary.
- d) The amputee can use Indian type toilets and can also work in fields and gardens without difficulty.

Bilateral amputations are rare compared to unilateral amputations. Therefore some of the problems unique to bilateral above-knee amputees are likely to be overlooked. It is hoped that this contribution will stimulate interest in solving such special problems.