

THE GERIATRIC AMPUTEE

"Sans Teeth, Sans Eyes, Sans Taste—Sans Everything"

Donald Caine, M.B., B.Ch., D.P.R.M.

Repatriation Artificial Limb and Appliance Centre
Sydney, Australia

INTRODUCTION

In a recent survey, Warren and Kihn (1) reported that 59 percent of all amputations done in England and Wales in 1963 were performed on patients over 60 years of age. Burgess (2) has suggested that 80 percent of civilian amputations in the United States and Canada result from ischemia and that most of the patients are elderly. Pedersen (3) (quoting Hanson) noted that the amputation rate in males over 60 in Sweden had risen from 34 per 100,000 in 1947 to 129 per 100,000 in 1963, and he thought this experience was mirrored in the United States. The problem of amputation is clearly a problem of old people.

The outlook in terms of fitting a prosthesis to these patients is not good. McKenzie (4) reported that 50 percent of elderly patients fitted at Roehampton discarded their "limbs" within 6 months. In a combined study reported by Mazet (5) 60 percent of those who received prostheses did not use them for long. Boyd and Bloor (6) commented "for what it is worth, however, we can state that most of our patients have been fitted with limbs, and that only a small number are wearing them regularly." In a survey carried out in Australia in 1967 (7) the proportion fitted in the various states varied from 44 to 71 percent among veterans, and from 6 to 44 percent among civilians. "Good functional results" among ex-servicemen varied from 7.7 to 60 percent.

Pedersen, Burgess, and others have drawn attention to the importance of preserving the knee in amputations on older patients. "Debility, impaired vision, poor balance, neuropathy, compromised circulation and joint function in the remaining lower limb, all emphasize the need to save the knee" (Burgess). Pedersen is even more specific and for him the problem of the geriatric amputee is "the problem of the preservation of the knee joint." The patient who has been given an above-knee prosthesis must acquire the balance and stability to maintain control over the inanimate moving part—the knee—placed between the stump and the ground, and he must learn a new pattern of muscular activity in which control

over the prosthetic knee is exercised at the hip. This may well be beyond the capacity of many older patients. By contrast the Australian survey noted that "some of those fitted with below-knee 'legs' were frail and although they achieved complete social independence with their below-knee legs, it is doubtful whether any attempt would have been made to fit a prosthesis had amputation been done above the knee."

Clearly, the additional load imposed when amputation is done above the knee is very much greater than when the knee joint is preserved. Today, recognition of the greater viability of the short (4 in.) stump (8), the improvement in stump circulation associated with the long musculocutaneous flap, the prevention of edema and the promotion of healing by the immediate postoperative prosthesis (9), and the improvement in prosthetic techniques in relation to short below-knee stumps have combined to bring about a very marked increase in the proportion of patients undergoing amputation below the knee, and the improved functional potential of these patients is reflected in the results which are being achieved. It is still necessary, however, to amputate above the knee; Mazet has drawn attention to the numbers who survive to lose the second leg, and the problems of geriatric medicine may complicate the picture of even the unilateral below-knee amputee. Old people suffer from multiple disabilities and amputation at any level is an additional load frequently imposed on patients who are already operating close to the limits of their physical resources. The problems inherent in the disabilities of age listed by Burgess remain problems at whatever level the amputation is done. To suggest that the problem of the geriatric amputee is the "problem of the preservation of the knee joint" is an oversimplification which obscures the essential nature of the task in hand. If geriatric patients suffer from multiple disabilities then amputation simply adds to the list. Whether amputation tips the balance so that a precarious independence is lost may well depend on the level at which it has been done. But it may also depend on the attention which is devoted to the other disabilities, and one has frequently been left wondering just how well old people might do if the care devoted to prosthetic restoration at amputee clinics could also be given to all their other problems.

A major problem facing those treating old people is that the natural history of their condition is one of deterioration. In addition, both institutional and domestic attendants, who are frequently overworked, do not have the time to supervise the slow uncertain efforts of their charges and find it more efficient to do whatever is needed themselves. There is therefore an added loss of function which results from the lack of opportunity to exercise such limited skills as may still be available. A limb-fitting organization, charged with a continuing responsibility extending over many years, is periodically faced with the criticism that "its legs are not as good as they used to be." This criticism almost always emanates

from the relatives of a patient whose waning physical capacity is being aggravated by steadily diminishing opportunities to exercise what is left. Rehabilitation, therefore, is not only a matter of restoring function lost as a direct result of amputation, but is very much concerned with delaying the inevitable and restoring such function as is lost by lack of usage.

One of the commonest explanations for failure of rehabilitation is lack of motivation. Lack of purpose, the cost of effort, and the growing dependence of many who are old and frail may make the work required to master a prosthesis appear somewhat pointless. This lack of opportunity to exercise social skills and the effects of both major and minor physical disorders add very considerably to the difficulties of treating the geriatric amputee.

A GERIATRIC DAY CENTER

In 1968 the Repatriation Artificial Limb and Appliance Center in Sydney replaced its amputee clinic with a geriatric day center. Originally intended for patients with musculoskeletal disorders, many of whom would be candidates for prostheses or orthotic appliances, it was soon recognized that because geriatric patients suffer from a multiplicity of disorders it is virtually impossible to isolate those requiring mechanical aids and to exclude the other conditions from treatment. The Center was therefore equipped to cope with the problems of an aging population.

In addition to the prescription of a prosthesis and training in its use, provision has been made for the treatment of:

1. Social atrophy, particularly of those who have spent a long time in some form of custodial care.
2. Function in the activities of daily living.
3. Additional major disorders, particularly of the central nervous and cardiovascular systems.
4. Minor but disabling problems which, because they do not endanger life, are frequently overlooked.

In dealing with social atrophy we have recognized that a relatively large proportion of the disabled elderly receive some form of custodial care either at home or in institutions. Increasing dependence, associated with lack of opportunity for making decisions, often results in withdrawal and reduction in interpersonal communication. Depression and apathy with passive or querulous submission are common. We have approached the problem of social atrophy with a program in which patients are divided into three groups. One engages in group discussion, one pursues light industrial activity, and one receives physical treatment. Each session lasts for something less than an hour and the groups rotate so that every group engages in each activity. There is a tea break and

when the three sessions have ended, light lunch is provided. The afternoon is devoted to recreation which includes games and a cinema once a week. The afternoon session also provides an opportunity for special attention to be given to those who require it.

Group discussions have improved the ability to communicate. Not only do they speak more easily, but ideas seem to flow and they are prepared to discuss, criticize, and make suggestions regarding the Center. In addition physical disaster is intensely personal, and it is often difficult for those who are young and fit to establish a satisfactory personal relationship with patients. By contrast it is common to find patients talking to each other, exchanging fears and experiences, and offering advice. Those who have experienced the loss of a limb derive a considerable measure of support from others with similar problems at various stages of their training, and the organization of amputees into groups for gait training is now accepted practice. Group discussions provide better opportunities for individual patients to talk about their fears, and the discussion group can and does give added support to its members.

Industrial therapy is used to promote decision-making and to provide a sense of productive purpose. The tasks are simple but varied. They are set out in front of each chair so that the work associated with every place at the work table is quite obvious. There is minimal direction of patients who come into the room, and they are free to sit wherever they choose. However, they soon learn that having selected a place they must do the work set out at that place, and it is interesting to watch uncertainty give way to clear-cut preference. As the work changes reasonably often this becomes a valuable exercise in decision-making. Recreation in groups of varying sizes provides additional opportunities for making decisions and establishing contacts.

Dependence in the day-to-day matters of personal toilet is one of the more demoralizing experiences to which these patients are exposed. Coping with this often calls for ingenuity on the part of the therapist coupled with training of the patient. An example of the sort of difficulties which must be resolved is that which confronts the elderly bilateral amputee who manages to take himself to the toilet but experiences great difficulty in replacing his trousers. To be effective, training should be related to the context in which it will be applied and the patient's domicile should be inspected, ideally by the therapist who will train him or at least by some other therapist who is fully conversant with the problem.

At the physical level edema is a recurring problem. It may vary from day to day and with different periods of the same day. It calls for attention to any obvious nutritional disturbance, for adequate stabilization of cardiac insufficiency, and frequently for the use of diuretics. There may be continuing small variations in stump size which may sometimes have to be accommodated by varying the number of stump socks used.

Fortunately, postoperative edema is now usually well controlled by the postoperative rigid dressing. The term "dressing" rather than prosthesis is deliberate, as we have found that the use of a plaster-of-paris dressing achieves as much whether it is accompanied by early ambulation or when ambulation is delayed a week or 10 days. In old patients the occasional unfortunate pressure effect noted with early ambulation has led us to abandon the more spectacular practice of getting them to stand and to walk within a few days of surgery.

Cerebrovascular accidents with persistent neurological deficits are relatively common in the aged. When complicated by amputation, the outlook will depend on the side of the amputation in relation to the hemiplegia, on the level of amputation, and on the extent of brain damage. In general, amputation of the unaffected side creates a functionally bilateral problem which is more difficult to treat. Where amputation has been carried out below the knee, the patient may learn to walk even when amputation is done on the unaffected side, and even when the second leg has been amputated. Amputation above the knee of the non-paralyzed limb, however, is rarely consistent with the establishment of a functional prosthetic gait. Aphasia presents difficulties for both the patient and his attendants. Many aphasics can hear and understand quite well (10). It is frustrating for them to be shouted at or treated as unintelligent, and it is important that both therapists and prosthetists recognize their ability to understand instructions—and incidentally any discussion about their condition. Major difficulties are experienced when there has been loss of awareness of the affected side. There is often gross incoordination and a persistent failure to acquire a satisfactory walking pattern. The condition can usually be confirmed by the obvious deficiencies in drawings produced by the patient and these can be useful as a guide to prognosis. Persistent involvement of one arm and the difficulty which the individual amputee then experiences call for patience in training. Gross spasticity of one side may interfere with prosthetic restoration, but lesser degrees can be overcome and are consistent with an adequate gait.

The effect of limited physical capacity must be recognized in the organization of gait training. Quite apart from physical effects, fatigue is often discouraging to the aged. Short periods of activity must alternate with rests, and 20–30 minute sessions of intensive treatment often fail to meet the requirement of disabled old men or women. For walking training or active or resisted movements, it is often necessary to treat patients in groups of three or four. Instruction, practice, and rest can then alternate as the therapist moves on from one patient to the next. Staff are thus kept fully occupied while patients receive adequate but not over-enthusiastic attention. It is worth stressing that during the early part of any program, a great deal of time must be spent while the patient learns

to balance and to transfer weight from one leg to the other. Older patients often have difficulty, for example, learning to move the body forward over the swinging prosthesis. It is important that they do this so that the knee can be stabilized by early involvement of the keel of the SACH foot.

The geriatric amputee, no less than any other geriatric patient, is liable to be suffering from a variety of minor problems which are often neglected. The patient who is withdrawn because he is deaf may become an active participant when given a suitable hearing aid. Ill-fitting, badly designed shoes finally immobilize the old man who has corns, but who would otherwise be moderately active. Poor teeth may affect nutrition, and the frustration of errors of refraction will be familiar to most people over 50 who have lost or broken their spectacles. The diminishing vestibular function of the aged adds to the burdens of the elderly amputee who must learn to balance on his artificial leg.

Prescription calls for careful local and general examination and assessment. The difficulties which older patients who have had above-knee amputations experience in donning suction sockets is well documented and where possible, dependence on an attendant should be avoided. In practice, although the suction socket is more efficient when properly worn, many will be better off with fixed pelvic band suspension. At one time there was a local belief that the older patient was happier with a knee-locking device. Because the suggestion that stability was important to the elderly above-knee amputee carried some weight, we fitted six patients with a knee-locking prosthesis and six others with conventional intermittent friction knees. When they had learned to walk, we provided each with the alternative-type limb, providing intermittent friction to those previously given knee locks, and knee locks to those who had originally been provided with intermittent friction knees. That each group favored the type of limb with which they had first been fitted should occasion no surprise. Having applied very considerable effort to the job of learning to walk on an above-knee prosthesis, the amputee has little incentive remaining to make the additional effort necessary to master an alternative pattern. The point of the exercise was that, although not statistically completely significant, the results were sufficiently suggestive to support our own practice in which knee locks—excluding the cases in the experiment—had been prescribed only three times in 10 years. It may be worth stressing that these comments do not apply where knee locks constitute a substitute for correct alignment.

After amputation below the knee the majority of old people function best on PTB limbs. This is so in spite of the frequency with which degenerative changes in the knee can be demonstrated on X-ray. In practice it has been clinical symptoms rather than radiological appearance which has counted, and in the absence of preoperative symptoms the PTB can

usually be prescribed with confidence. Skin damage or clinically obtrusive arthritis indicates the need for weight relief by means of a thigh lacer or tuber-bearing [ischial-bearing] prosthesis with "slip" socket.

We have not been able to reproduce the satisfactory results obtained by others in applying side irons and a thigh corset to a PTB. Nor has the PTB proved satisfactory for bilateral amputees where the amputation has been done at different levels. As far as we can determine this is not so much a matter of stability as a matter of different neuromuscular patterns. Harris and Vitali (11) have drawn attention to the difficulties in training older patients who have unequal levels of amputation. The walking pattern with a conventional thigh-lacing prosthesis is closer to that with an above-knee prosthesis than the pattern with a PTB. The individual patient who already has problems of balance may find it easier to manage similar rather than dissimilar limbs.

The prosthesis can often be adapted to the clinical requirements of the individual, and we have successfully fitted a bilateral below-knee amputee with gross painful arthritis of one knee with a conventional thigh-lacing slip socket on one side and a tuber-bearing knee-locking leg on the other. The patient is 94 and walks with the aid of forearm crutches.

DISCUSSION

In 1967 Davis et al. (12), under the title "Rehabilitation of the Geriatric Amputee. A Plea for Moderation," reported that 41 of 103 patients completed a prosthetic rehabilitation program, but only 21 were using their prostheses 2 years later. They state "It is our conviction that the geriatric amputee should be selected cautiously for prosthetic rehabilitation, and that elderly diabetics with occlusive arteriosclerotic disease probably should not be fitted with lower-extremity prostheses. In an elderly patient below-knee amputation should only be done after thorough appraisal of the circulation of the affected limb." In 1970 Kohn (13) found that modification of training programs could favorably influence the use of a prosthesis by an amputee with cardiac disease and reported 88 percent successful prosthesis wearers for periods of 6 to 31 months. Sterling (14) found that 15 of 19 patients with a history of heart disease were able to complete the amputee rehabilitation program. These represent extremes in regard to results and conclusions. In their report on "The Care of the Aged," the New South Wales Consultative Committee (15) urged that first priority should be given to the promotion of social well being, the preservation of independence and of dignity, and the prevention of disability. This applies as much to amputees as to any other group and involves the provision of specialized therapeutic services and the organization of an environment in which patients are gently prevailed upon to participate in all the activities of a social group. It is

slowly being recognized that rehabilitation is not just a matter of making suitable facilities available to patients on a take it or leave it basis. The problem of the nonparticipant is not just a disciplinary matter and discipline may defeat its own ends.

Diamond (16) and his associates at Bellevue Hospital found that non-participation in a rehabilitation program was associated with a strong sense of guilt. At the Albert Einstein Hospital in New York, Abramson and his associates (17, 18) have applied the principle of the therapeutic community to rehabilitation situations. It is no coincidence that Diamond found it necessary to introduce "casual programs" to reinforce the activities of the ward. As a result of meeting the Albert Einstein group we have been more successful in creating a situation in which effort is divorced from challenge and in which at least part of our program is apparently undirected. A social worker, for example, chatting informally to a group of patients appears to make better contact than is possible from opposite sides of a desk.

Mazet has laid down criteria for fitting the geriatric amputee. The prevalence of the problems covered by his disqualifying criteria must necessarily place a relatively low ceiling on the number for whom prosthetic restoration would be attempted. Where the geriatric amputee is automatically referred to an amputee clinic, some such approach is almost inevitable.

Since the establishment of a geriatric day center, we have successfully fitted patients in whom amputation—on occasion bilateral—has complicated hemiplegia, cardiac insufficiency, and osteoarthritis. We have seen the return of motivation and the quite astonishing improvement in at least one human derelict who was quite disinterested and disorientated for time and place. Although we have not had much success at prosthetic restoration for patients suffering from parkinsonian tremor, gross ataxia, or for hemiplegics with loss of body image for the affected side, we have nonetheless lifted our horizon in respect of patients for whom we prescribe prostheses. In general we have satisfied ourselves that the multiplicity of complaints among old people is such that amputation is but another of the ills to which the aging flesh is heir, and that it is more profitable to consider the geriatric amputee as a problem of clinical and psychosocial medicine rather than as a simple biomechanical exercise.

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