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PROSTHETIC FITTING IN LOWER LIMB AMPUTEES

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A series of 320 patients with lower limb amputations was analyzed. Among patients admitted from home the risk of death in hospital, was 24 per cent (28/119) following AK amputation, as compared to 14 per cent (6/43) after TK amputation and 12 per cent (12/103) after BK amputation.
Successful prosthetic fitting was achieved in 41 per cent (43/91) after AK amputation, 75 per cent (28/37) after TK amputation and 70 per cent (64/91) after BK amputation, including the 21 per cent (45/219) of patients discharged to a nursing home.

Key words: amputations; prosthetics

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After protection from the dangers of the gangrene a main task of amputation surgery must be to send the patients back to their previous surroundings with restored walking ability.

The present report describes the results of prosthetic fittings in a geriatric amputation series.

PATIENTS AND METHODS

Amputation of 320 limbs was performed in 310 patients with a mean age of 70 years (range 40–94) because of gangrene of the lower limb due to occlusive arterial disease with or without diabetes mellitus.

The mortality in hospital was 18 per cent (55/310) after an average hospitalization time of 68 days.

A total of 265 limbs were thus available for prosthetic fitting, including 17 per cent (46/265) of patients admitted from a nursing home.

The final level of amputation was above-knee (AK) in 116 cases, through-knee (TK) in 48 and below-knee (BK) in 101 cases.

Prosthetic fitting was tried in all patients with a previous walking capacity. The patients were discharged for further training when they were able to walk between parallel bars on the preliminary prosthesis, or when the prosthetic fitting had been dispensed with. The results of the prosthetic fitting presented are those obtained at discharge from hospital or the out-patient clinic.

RESULTS

The overall results of the prosthetic fitting are presented in Table 1, showing that 56 per cent (148/265) of patients were able to walk on their prosthetis. The result is significantly related to the age ($P < 0.05$).

The results obtained are related to the level of

Table 1. Prosthetic fitting of 265 amputated legs

Prosthetic fitting		Mean age
Outdoor walking	111 (42%)	67 years (40–82)
Indoor walking	37 (14%)	71 years (51–85)
Cosmetic prosthesis	5 (2%)	71 years (52–85)
Wheel chair	112 (42%)	76 years (40–93)

Table 2. Prosthetic fitting in relation to level of amputation

Level	Prosthetic gait	Wheel chair	Total
AK	47 (41%)	69	116
TK	32 (67%)	16	48
BK	69 (68%)	32	101
Total	148 (56%)	117	265

Table 3. Placement on admission to and after discharge from hospital

Admitted from	Discharged to		
	Home	Rehabilitation institution	Nursing home
Home	143	31	45 (21%)
Nursing Home	2	2	42
Total	145	33	87

Table 4. Prosthetic fitting of 178 patients discharged to home or rehabilitation institution

Level	Prosthetic gait	Wheel chair	Total
AK	43 (61%)	28	71
TK	28 (97%)	1	29
BK	65 (83%)	13	78
Total	136 (76%)	42	178

amputation in Table 2. It is demonstrated that the success rate was significantly higher for TK and BK amputees (68 per cent; 101/149) than for AK amputees.

Among patients admitted from a nursing home the final level of amputation was AK in 25 cases, TK in 11 and BK in 10 cases. Prosthetic gait was obtained in 3 TK and 1 BK amputee. This means that only 9 per cent (4/46) of patients admitted from a nursing home were successfully fitted. One of the patients was, however, discharged to a rehabilitation institution.

As shown in Table 3 only 21 per cent (45/219) of patients admitted from home were discharged to a nursing home. Prosthetic gait was achieved in 20 per cent (9/45) of these patients, as encountered in 4 AK, 2 TK and 3 BK amputees, whereas the remainders were confined to a wheel chair. The amputation levels of the non fitted patients were AK in 19 cases, TK in 6 and BK in 11 patients.

Among the patients discharged to their own home successful prosthetic fitting was achieved in 77 per cent (111/145) of cases. The success rate was 76 per cent (25/33) for patients discharged to a rehabilitation institution.

Table 4 demonstrates that the most successful amputation level in relation to prosthetic fitting was the TK amputation with a success rate of 97 per cent (28/29), as compared to 83 per cent (65/78) in BK amputees and 61 per cent (43/71) of AK amputations.

The total prognosis for amputees admitted from home in relation to the level of amputation can also be calculated, as shown in Table 5.

It is seen that the risk of death during hospitalization is highest for AK amputees, but equal for TK and BK amputees. An equal number of patients with AK and TK amputations were discharged to a nursing home. For patients discharged to their own home regaining of walking ability was superior after TK amputations. The

Table 5. Prognosis for amputees in relation to final level for patients admitted from home

Level		Risk of death	Discharge to nursing home	Home with wheel chair	Prosthetic gait
AK	119	28/119 (24%)	23/91 (25%)	25/91 (27%)	43/91 (47%)
TK	43	6/43 (14%)	8/37 (22%)	1/37 (3%)	28/37 (75%)
BK	103	12/103 (12%)	14/91 (15%)	13/91 (14%)	64/91 (70%)
Total	265	46/265 (17%)	45/219 (21%)	39/219 (18%)	135/219 (62%)

failure rate after AK amputation was higher than 50 per cent.

DISCUSSION

The goal of sending the patients back home with preserved walking ability following amputation surgery for major gangrene of the lower limb is difficult to achieve, as the patients are often in their 8th to 10th decade of life. In the present series successful prosthetic fitting and discharge home was achieved in less than half of the survivors following AK amputation, and prior to that every fourth patient died in hospital. This is consistent with previous reports (Chapman et al. 1959, Hierton & James 1973, Warren & Kihn 1968). The level of amputation is naturally determined by the extension of the gangrene, which also influences the systemic effect on the general health of the patient. It is thus fully understandable that the poorest results follow AK amputations.

It is, however, quite surprising that only 21 per cent of patients admitted from home were discharged to a nursing home. This should be seen in relation to another of the common geriatric diseases of orthopaedic surgery, namely hip fractures, where 9 per cent of the patients were discharged to a nursing home (Jensen et al. 1979). The relative success in sending the patients back to their own surroundings in this series, as compared to others (Christensen 1976), might be explained by a more differentiated choice of level of amputation and patience in the rehabilitation programme, emphasizing prosthetic fitting in all patients with a previous walking ability. There is no doubt that conservatism should be applied to the choice of level and consequently also the TK level be considered in geriatric amputees. As seen from the present series nearly all patients with TK amputations discharged to their own home regained walking capacity. It is our opinion that the TK level should be considered prior to AK amputations and even as an alternative to BK amputations in feeble patients with poor muscular balance, as most patients will be able to walk on a TK prosthesis, if necessary with a knee lock.

It is often claimed that preservation of the knee joint is essential in geriatric amputees. The present series seems to disprove this attitude. The probable explanation is that failure of prosthetic fitting with a PTB prosthesis in geriatric BK amputees are rarely followed by new attempts with a conventional BK prosthesis with knee lock. In TK amputees this is a simple procedure, which might be applied early during the rehabilitation period and cosmetic considerations are less important in geriatric amputees.

In conclusion, the success rate of prosthetis fitting is fairly equivalent in TK and BK amputees. Consequently the TK amputation level should be considered as a valid alternative to a BK amputation in feeble geriatric patients with severe ischaemia.

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