LONG POSTERIOR-FLAP MYOPLASTIC BELOW-KNEE AMPUTATION (BURGESS OPERATION) IN PERIPHERAL VASCULAR DISEASE

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One of the most unfortunate calamities that can befall an individual is the loss of a limb. When amputation is necessitated because of advanced peripheral vascular disease the outlook is even more grim because the likehood of the patient requiring a subsequent major amputation of the opposite lower limb increases with time. Mazet (1963) has estimated the incidence of this as 10% after one year and as much as 33% of those surviving five years.

Amputation of a lower limb should therefore be a planned procedure taking into account not only the surgeon's preference for a particular operation but also the possible effects which this procedure is likely have on the patient's future life Such factors as the patient's age, occupation, mental stability and other concomitant disease should all be considered.

Two problems face the surgeon when he decides to amputate. He must try to obtain primary healing of the skin flaps and he must give the patient a strong, mobile and useful stump. These two aims are in part in opposition to each other. The higher up the limb the surgeon amputates the better the chance of primary healing, but with this goes a higher mortality rate and a lower chance of rehabilitation for the patient. Amputations lower down the limb give a stronger stump and a greater chance of a return to walking but the healing rate is slower Table 1.

With the orthodox below-knee amputation it is usually the anterior flap which necroses. Injection studies have shown that in obliterative vascular disease this area of skin is often ischaemic.

In 1967 Burgess described a technique of below-knee amputation using a long posterior flap completely eliminating the anterior flap. Promising results with this operation were reported in 1969 at the Combined British and American Surgical Research Society Meeting held at the Royal College of Surgeons in London. Having become acquainted with this technique at this meeting I have been using it as my standard procedure, where possible, for below-knee amputation.

The Operation. (Fig. 1)

1. **Position of patient** is supine with a sandbag under the thigh.

TABLE 1
Amputations

	Above-knee (Warren et al 1968)	*Below-knee* (Warren et al 1968)	*Gritti-Stokes* (P. Martin et al 1967)
Mortality	28%	10%	6%
Primary healing	71	49	79
Delayed healing	11	18	12
Overall healing	82	67	91
Second amputation		13	7
Walked again (Unilateral amp)	46	76	55

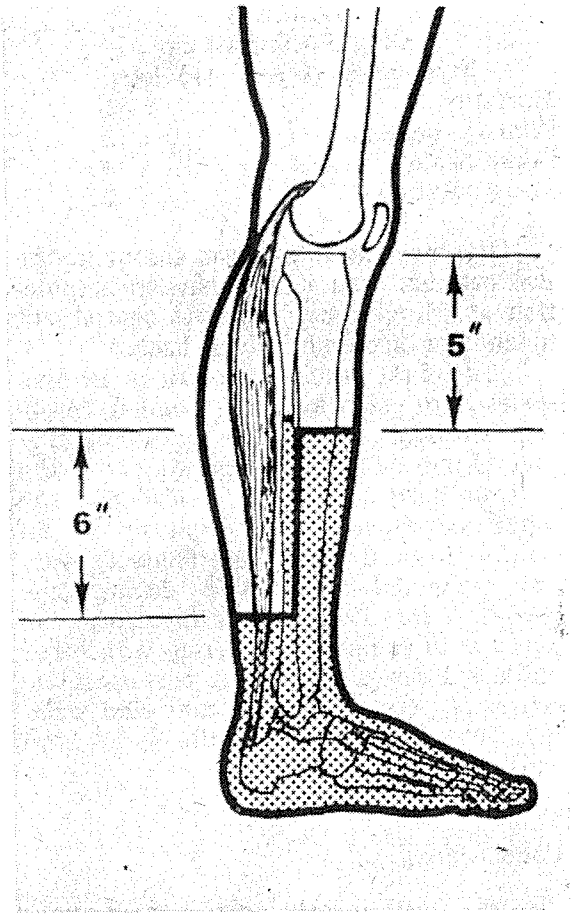


Figure 1.

2. **Skin Flaps:** anteriorly a transverse incision is made 5" below the knee joint extending a little over one third around the circumference of the leg. The tissues are divided to the periosteum.

From each end of this incision another cut is made vertically downwards towards the foot for a further 6". The incision is then continued around the remainder of the circumference to form the long posterior flap.

3. The anterior tibial muscles and periosteum are divided in the line of the anterior incision and stripped proximally 1 inch from the bone. The tibia is then divided and bevelled.

4. A bone hook is inserted in the medullary cavity of the distal fragment of the tibia which is steadied while the fibula is divided ½" above the line of tibial section.

5. By traction on the bone-hook the posterior tibial and proximal vessels are exposed, divided and ligated with catgut. The soleus and gastrocnemius muscles are dissected from the tibia and fibula of the specimen, which is freed by dividing these muscles at the line of the distal skin incision. The bulk of these muscles is reduced by slicing the muscle mass obliquely from the site of bone division to the end of the posterior flap. This is best performed with a Syme's amputation knife.

6. All edges of the tibia are smoothened. The muscles of the posterior flap are ligated with tissue forceps and brought up to be sutured to the deep fascia and and anterior tibal muscles and reflected periosteum anteriorly, with slight tension.

7. The posterior skin flaps is similarly trimmed and approximated to the anterior incision without tension. At the extremities of the flap some dog-ear formation usually occurs. The skin is closed with interrupted fine nylon sutures, the drain protruding from each corner of the wound.

8. The wound is dressed with gauze and the limb is then wrapped in a thin layer of orthopaedic cotton wool over which an elastic crepe bandage is firmly applied. The drain is removed on the 4th post-operative day and the sutures on the 21st day.

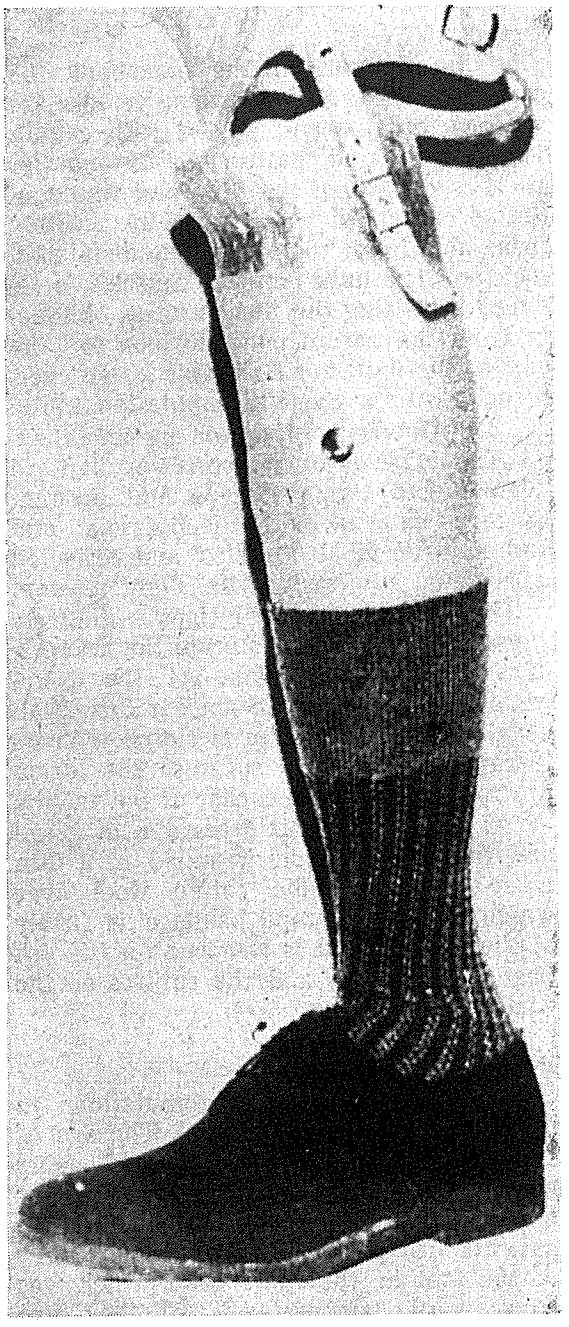
Present Study

Fifteen below-knee amputations in fifteen patients were studied. The age of the patients was 43 years to 80 years (mean 65 years). The indications for operation are shown in Table 2. Five patients had previous partial amputations of the foot in the same limb which was subsequently amputated. Another five had previous lumbar sympathectomy on the same side.

TABLE 2

Long Posterior-Flap Myoplastic B.K.A.
15 amputations: 15 patients

Indications	*No. of amputations*
Diabetec gangrene	10
Arteriosclerosis	4
Buerger's disease	1



F gure 2.

The results of this study are shown in Table 3. Primary healing occured in 66% of patients while complete healing occurred in 86.6% which compares favourably with the results obtained by Warren & Kihn (1968) with the conventional below-knee amputation.

TABLE 3
Long Posterior-Flap Myoplastic (B.K.A. (15 legs)

Mortality	1
Primary healing	9
Delay healing	3
Re-amputation	2

Popliteal pulsation was absent in the two patients who had to have re-amputation at a higher level but was also absent in another six limbs which healed.

The first three amputations in this series were performed in a London Teaching Hospital where the physiotherapy and Limb Fitting Departments were well-equipped and highly efficient. The other operations were carried out at St. Luke's Hospital were these facilities were not adequately developed during the period of this study. It is therefore impossible to compare this series with other published series as regards post-operative course in terms of limb-fitting and walking. Ten of the patients in this series have walked.

Conclusions.

The encouraging results obtained in this series agree with those of Hunter-Craig et al. (1970).

The long posterior-flap below-knee amputation with myoplasty has several advantages:

1. The troublesome anterior flap is is eliminated.
2. The myoplasty of the gastrocnemius and soleus muscles encourages venous return and augments the force of knee flexion.
3. The shape of the stump is ideally suited to modern total-contact prosthesis and the patellar tendon-bearing prosthesis (fig. 2) allows continuation of an active life with an excellent cosmetic appearance.
4. Finally the good results obtained in some patients with advanced peripheral vascular disease has been most encouraging.

References

BURGESS, E.M., *et al* Clin. Orthop. 37, 17, 1967.

HUNTER-CRAIG, I., *et al*, B.J.S. 57, 62, 1970.

MAZET, R., Office of Vocational Rehabilitation Project, 431, 1963.

WARREN, R. & KEHN, R.B. (1968) Surgery, 63, 107.