LONG TERM EFFECTS OF PROSTHESES ON STUMP IN LOWER LIMB AMPUTEES : A CRITICAL ANALYSIS OF 100 CASES

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ABSTRACT

One hundred lower limb amputees wearing prostheses for more than 5 years were studied and long terms effects on stumps were noted. Common changes were tissue destruction, tissue proliferation, contact dermatitis, circulatory changes, recurrent folliculitis, bursa formation, and eczematous changes. Out of 100 stumps examined long terms changes were observed in 25 stumps.

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KEY WORDS : Amputation stumps; Amputees; Tissue destruction; Dermatitis.

Introduction

The skin of an amputee who wears a prosthesis is subjected to many abuses. Most leg prostheses have a snugly fitting socket in which air cannot circulate freely and perspiration is trapped [1]. The socket may cause stress on localized areas of the stump skin. In the above-knee amputees pressure may be exerted on the adductor region of the thigh, the groin, and the ischial tuberosity points of contact with socket rim [2].

In the below-knee amputee, pressure may be exerted over the anterior tibial area and the sides and sometimes the end of the stump. In the conventional below-knee prosthesis constriction of soft tissues by the thigh corset may cause significant obstruction to venous and lymphatic drainage of the leg. In addition skin is vulnerable to the possible irritant or allergenic action of the materials used in the manufacture of prosthesis.

Material and Methods

One hundred consecutive unselected lower limb amputees who were admitted to Artificial Limb Centre, Pune, during January 1990 to December 1990, provided the material for this study. Amputees wearing prostheses for more than 5 years were included in this study. The patients had mostly undergone amputation elsewhere and were admitted to our Centre for a new limb. In all cases a detailed

history and clinical examination was carried out. All the cases were then evaluated in consultation with the rehabilitation team which included a senior surgeon and limb-fitter. Particular attention was paid towards treatment of various complications.

Results

The mean age of the 100 patients was 35 years in the range of 21 to 50 years. Males comprised a much higher percentage of amputees in the study. This probably reflects their work in profession with a much higher risk (Army, Industry, etc.), than the females. Majority of cases studied were ex-army personnel (68%), factory workers (6%) and farmers (4%). Trauma was the cause of amputation in maximum number of cases (73%). Mine blast injuries, railway and road accidents accounted for majority of traumatic amputation. Amongst the factory workers most had their limbs crushed by machinery.

The maximum number of amputations were below knee (51), followed by above knee (40), Syme's (6), through knee (2) and foot (1). Table 1 depicts the type of prosthetic fitting in 100 cases.

The prosthesis had been worn for a minimum period of 5 years in 6 patients and maximum over 30 years in 1 patient. Table 2 shows the various long term effects on stumps. Tissue destruction

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was seen in 3 patients whose stumps were found to be macerated due to excessive sweating and lack of ventilation. Intertrigo was noticed on the stumps of 2 patients where skin-folds were in apposition. Tissue proliferation changes were noticed in the form of lichenification and callosities. Three patients were having contact dermatitis of the amputation stump caused by contact of the skin with chemical substances. Circulatory changes were seen in the stumps of 4 patients in the form of pigmentation (2), oedema (1), ischaemic ulcers (1). Recurrent folliculitis and pyoderma was seen in 4 patients. Stumps of 3 patients showed bursa formation. Eczematous changes were seen in the stump of one above-knee amputee.

TABLE 1
Prosthetic fittings

Nomenclature of prosthesis	No of cases
Above knee	
Conventional	10
Total contact	11
Suction	5
Short peg legs	14
Through knee	
Leather socket	2
Below knee	
PTB	38
Conventional	10
Slip socket	2
Peg legs	1
Syme's	
Syme's PTB	4
Syme's conventional	2
Foot	
Surgical shoes	1

TABLE 2
Long term effects of prostheses on stumps

Long term changes	No of cases
Tissue destruction	5
Tissue proliferation	5
Contact dermatitis	3
Circulatory changes	4
Recurrent folliculitis	4
Bursa formation	3
Eczematous changes	1

Discussion

Amputation at each level is attended by distinct problems of functional loss, fitting and alignment of the prosthesis, and medical difficulties such as skin disorders that are secondary to the use of the limb [3]. Since continued use of the prosthesis is important for rehabilitation, it is of vital concern to the physician and the prosthetist to prevent any disorder which may return the patient to the crutches or bed rest. Some amputees may have no disorder of the stump skin for months or years while others, whose skin has less tolerance for trauma, experience frequent difficulties.

Continued rubbing and pressure are capable of producing tissue destruction and proliferation. Stump skin often becomes macerated or worn away by poor prosthetic fit or alignment. As a result of long continued rubbing the skin becomes thickened and leathery. There can occur scaling, redness, oedema, fissuring or erosions.

Many of the materials used in the manufacture of the prosthesis are common primary irritants. Epoxy resins are frequently used to improve the appearance of the socket. These resins may produce a primary irritant dermatitis [4]. A new socket of an artificial limb or an incorrectly fitted socket may predispose the stump to oedema by imposing a pressure distribution that disturbs the circulation. Circulatory problems can lead to stasis dermatitis with or without eczematous changes. Localized pressure from a poorly fitting prosthesis can result in chronic ulcers of the stump.

The skin of the stump within a socket is never completely dry and it often becomes soft and macerated from long lasting sweat and therefore provides a warm, moist favourable habitat for most bacteria.

Multiple cysts, commonly called post-traumatic epidermoid cysts occur sometimes on the stump skin [5]. In above-knee amputees they are seen most frequently in the adductor region of the thigh. In below-knee amputees they occur on the anterior tibial surface and in the popliteal area. These cysts are freely movable under the skin. They are either oval or round and may be as large as 4.5 cm in diameter. In some cases cysts may rupture with discharge of a serous or seropurulent fluid often mixed with blood. Benign tumours like fibroma,

angioma, fibroangioma, neuroma, pyogenic granuloma and malignant tumours like squamous cell carcinoma have occurred in the skin of stumps.

The importance of early recognition and treatment of skin lesions on the stumps of amputees cannot be over emphasized. Even a minor skin eruption may, through neglect, become an extensive disorder that will seriously threaten the amputees's mental, social and economic rehabilitation. Proper stump hygiene is often effective in alleviating or averting some of these conditions. A simple hygienic programme with use of bland soap has often had a preventive or a therapeutic effect on a cutaneous disorder. If a stump sock is worn it should be changed every day and should be washed as soon as it is taken off before perspiration is allowed to dry in it.

The skills of engineers and prosthetists must be combined with the contributions of dermatologists and other medical specialists in the management of skin problems of the amputees.

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