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REFASHIONING OF AMPUTATION STUMP

Omer Ali Rafiq Barawi
F.I.C.M.S., Orthopedic lecturer, College of Medicine, Sulaimanya University

Abstract

This is a prospective study was done on one hundred patients with late complications of the amputated stump between may 2001-2004 in Vincent Orthopedic center in Sulaimanya. There were eighty men and twenty women, their age range from seventeen to sixty years. Fifty patients with infected stump range from abscess formation in fifteen cases, infected epidermoid cysts in five cases to fissuring and ulceration of stump in thirty cases. Fifteen patients with painful neuromas attached to the scar tissue. Ten patients with below knee amputation had knee flexion deformity. Nine patients with below knee amputation with prominent bones compressing the skin of the stumps the fibula were long and the anterior edge of the tibia compressing the skin. Fifteen patients with loose cushion of muscles. One patient with recurrent infected above ankle amputation stump superadded by squamous cell carcinoma. All patients were treated by refashioning of the amputation stump, except one with squamous cell carcinoma.

Introduction

Amputation means cutting of the extremity through the bone, while disarticulation should be done through the joint[1], it's the least desirable procedure for any surgery. An amputation usually the unavoidable result of accident or disease should not be regarded as a final failure at the end of a long line of failures. Amputation is now a treatment not a tragedy. The management of a patient who is to have an amputation should be by a team with the closest cooperation between the surgeon, the prosthesist and the physiotherapist.

The stump has been defined by Day[2] (1980) as being the terminal segment remaining after the amputations. Stump revision any surgery designed to revise the shape or scar of an amputation. Refashioning of the amputation stump can be used instead of stump revision or re-amputation including correction of any residual deformities of the stump revision or re-amputation including correction of any residual deformities of the stump.

Complications of the amputation: one goal of postoperative management of the residual limb is to avoid common complications such as swelling, odema, joint contracture and post operative pain. Residual limb care during the early post operative period can enhance or detract from the ultimate functional outcome. ***Early:*** in addition to the complications of any operation (especially haematoma formation, secondary haemorahge from infections). There are two special hazards; First Breakdown of skin flaps, this may be due to ischaemia, or suturing under excessive tension or in below knee amputation to any unduly long tibia pressing against flap. Second is Gas

Gangrene clostridia & spores from the perineum may infect a high above knee amputation especially if performed through ischaemic tissue. ***Late***, First is skin problems: (a) many skin problems can be prevented with good hygiene. Which includes keeping both the residual limb and the prosthetic socket clean, dry and free of any residual soap or topical preparations. Contact dermatitis causing inflammation, itching & burning sensation due to allergy to different component of the prothesis (b) Bacterial folliculitis. (c) celutlitis with or with out abscess formation. (d) Epidermoid cyst due to implantation of small follicular keratin plugs. These may erode or ulcerate the overlying skin with discharge from a secondary infections may needs excision. (e) Verrucous hyperplasia (see fig 1) may cause fissuring, ulceration & possibility of subsequent infection. Persistence of chronic swelling may lead to verrucous hyperplasia, which is a wart like overgrowth of skin with pigmentation & serous discharge. It's caused by proximal constriction with the socket & in adequate distal tissue support correction of these factors will allow gradual resolution of the problem[2]. (f) Swelling occurring after stump maturation is usually caused by a prosthetic socket that is too tight proximally causing congestion of the distal end of the residual limb. If this congestion is persistent it may lead to cellulites and breakdown of the residual limb[3].

Pain: Phantom limb pain

Almost all amputees experience the phenomenon of phantom limb pain; a feeling that the amputated limb is still present sometimes in contorted positions[3]. New amputees may try to stand on the absent limb. In the early weeks or months, the phantom limb is usually painful & this pain should be treated with standered analgesics. Limb wearing usually reduces phantom limb pain, physical treatment such as daily local ultrasound for a week may relieve the pain alternatively transcutaneous electrical nerve stimulation may provide symptomatic relief; small stimulators which can be carried in a pocket are available., drugs such as the anti-epileptic carbamazepin or tricyclic antidepressant like amitrptyline taken regularly may make the symptoms more tolerable. ***Referred pain*****:** e.g osteoarthritis of hip joint may cause referred pain in the knee in below knee amputees. Residual limb pain: this may be due to (a)poorly fitting prosthesis. (b)Areas of abnormal pressure especially over the bony prominence. (c)Painful neuromas especially when the neuroma tethered to a scar or subject to pressure against bone. (d) Unresolved infection (sinus, osteitis, sequestrum). (e)Reflex sympathetic destrophy in which calcium channel blockers or tricyclic antidepressant like amitryptiline will be helpful. (f)Causalgia. [(g)]Possible recurrent tumour.

Muscle: if too much muscle is left at the end of the stump, the resulting unstable cushion induces a feeling of insecurity which may prevent proper use of a prosthesis, if so the excess soft tissue must be excised[5].

Artery: poor circulation give a cold, blue stump which is liable to ulcerate. This problem chiefly arises with blew knee amputation & often re-amputation is necessary.

Joint: the joint above an amputation may be stiff or deformed, A common deformity is fixed flexion and fixed abduction at the hip because in above knee stump, the adductors & hamstring muscles have been divided. It should be prevented by exercise & if it is established needs subtrochanteric osteotomy. Fixed flexion deformity at the knee in-patient with below knee amputation. The transfemoral amputte should be encouraged to lie prone after surgery and transtibial amputee should

not sit for long period with the knee flexed[6].

Bone: a spur often forms at the end of the stump but is usually painless, if there has been infection however the spur may be large & painful & it may be necessary to excise the end of the bone with the spur, if the bone is transmitting little weight, it becomes osteoporotic & liable to fracture such fracture are best treated by internal fixation.

Bachache: is likely to occur if the length of the prothesis incorrect, on the face of it, this should be early avoided, but many amputees find walking easier if the prosthesis is shorter than the sound limb, the most practical way to asses prosthetic length is to compare the height of the iliac crests or anterior superior iliac spines with the patient standing, these should be level for below knee amputees but 0.5 cm lower on the amputated side for above knee amputee[7].

Stump shrinkage: it's the most common cause of socket discomfort; the upper limb amputee will feel that the socket has become loose, but paradoxically the inexperienced lower limb amputee may complain that their socket feels too tight. This is because on weight bearing the stump slips too far into the socket, so the body weight is taken through pressure intolerant areas in this situation. The above knee amputee will usually complain of pain in the groin adjacent to the adductor longus whereas the below-knee amputee will experience pain or skin rubbing over the head of fibula & under the distal tibia.

Patients & methods

This is a prospective study done on 100 patients with late complications of amputated stumps between may 2001 & may 2004 in the Vincent Orthopaedic center in Sulaimanya, the center is belonging to the handicap international. They were eighty men and twenty women, their age range from 17-60 year (Table I), the indications for initial amputation is shown in table II.

Their operations done in Sulaimanya Teaching Hospital. Fifty patients with infected stump in 30 of them their were fissuring & ulceration, the operative technique was wedge resection to salvage the initial level of amputation as described by Hadden[8] et al. the basic principle of wedge resection is to regard end of the amputation stump as a hemisphere. Whereas local resection increase local tension on already compromised tissues. Resection of a wedge incorporating the full diameter of the stump will allow for re-formation of the hemisphere while minimizing local pressure. Cases with abscess treated by drainage & wound excision. Those with infected epidermoid cyst also treated by incision and drainage.

Fifteen patients with painful neuromas treated by excising 3 cm of the nerve above the bulb & buried within muscle. Fifteen patients with loose cushion treated by excision of the excessive bulk of the muscles, subsequently apposing groups of muscles are sutured over the bone end each other & to the periosteum (myoplasty) thus providing better circulation. Nine patients with prominent fibula, the fibula is cutted 3 cm shorter than the tibia & anterior end of the tibia beveled fig 3. Ten patients with below knee amputations presented with flexion deformities of the knee they were treated by surgical release of the contracted structures. Re amputation at a higher below knee was done to the patient with squamous cell carcinoma fig 4&5.

Discussion

It has been suggested that amputation surgery should be considered reconstruction rather than ablative surgery with amputation as the first step in the rehabilitation of a patient is optional with a limb in which function cannot be restored. Recent emphasis has

been on functional outcomes and patient satisfaction after amputation surgery, rather than the amount of tissue preserved or the residual limb length[3]. it is important that the surgeon should know the complications of the amputated stump in order to be avoided by proper surgical procedure & good post operative care of the stump. Infection of the amputated stump was the commonest indication for refashioning of the stump, 50 % of the cases among these in 30 cases there were ulceration & fissuring of the stump they were treated by wedge resection of the stump rather than local resection because local resection produce uneven tension which is reduced & evenly distributed after wedge resuction[8].

Abscess formation is noted in 15 cases these are due to retained foreign bodies (pieces of shell) in the amputated stump at areas under pressure by the prosthesis. This is combined with poor hygienic condition of the amputated stump creating abscess formation as they and the foreign are removed. Loose cushion of muscles of the amputated stump due to the fact that too much muscle is left at the end of the stump as in 15 cases of amputees inducing feeling of insecurity & preventing proper use of the prosthesis, so the excess of the soft tissue must be excised[5]. Occasionally a neuroma may be painful when is tethered to a scar or subjected to pressure against bone[11] as it was seen in 15 cases & treated by excising 3 cm of the nerve above the bulb & buried within muscle but we did not use Martini technique. In which the epineural skew of the nerve stump is freed from nerve fascicles for 5mm and then sealed with a synthetic tissue adhesive[10]. Joint contracture usually occur early after amputation, prior to prosthetic fitting[9] contracture are best avoided by early range of motion, appropriate splinting and early prosthetic fitting of the residual limb. All the patients which are included in the study having lower limb amputation as the Vincent Orthopedic center in Sulaimanya are doing prosthesis of the lower limb amputees only. Patients with malignant tumors are not included in this study as such cases are referred to Baghdad center for follow up including making prosthesis, receiving cytotoxic drugs & radiotherapy.

Conclusion

(1) There should be a good correlation between the orthopedic surgeon & orthotist, by this correlation the orthopedic surgeon will have good information about the facilities of the work shop & the skill of the orthotist who is making the prosthesis or the artificial limb. (2) The orthopedic surgeon should have good idea about the complications of the amputation & try to prevent them e.g. the orthopedic surgeon should consume more time in the theater in order to do the operation properly especially meticulous haemostasis & cutting the tissue properly to make amputated stump proper for the prosthesis, even post operatively it is important to prevent deformity of the stump not only by rigid dressing but by physiotherapy of the stump. (3) The amputated stump should be mature, painless, without any deformity & then the patient send for making the prosthesis. (4) If you are in doubt about the condition of the amputated stump, it's better to send the patient to the center for exercise for evaluation of the stump…otherwise the patient 'mind will be preoccupied for doing the prosthesis & when the amputated stump is not fit for doing the prosthesis, the patient will loss his confidence with the surgeon or with orthotist.

Fig 1: Below knee amputee with verucous hyperplasia

Fig 2: diagrams of end-on & side views of amputation stumps, local resection produces uneven tension this is reduced & evenly distributed after wedge resection.

Fig 3: A case of below knee amputee. Now the fibula is cutted shorter by 3 cm than the tibia. The anterior end of tibia is beveled also.

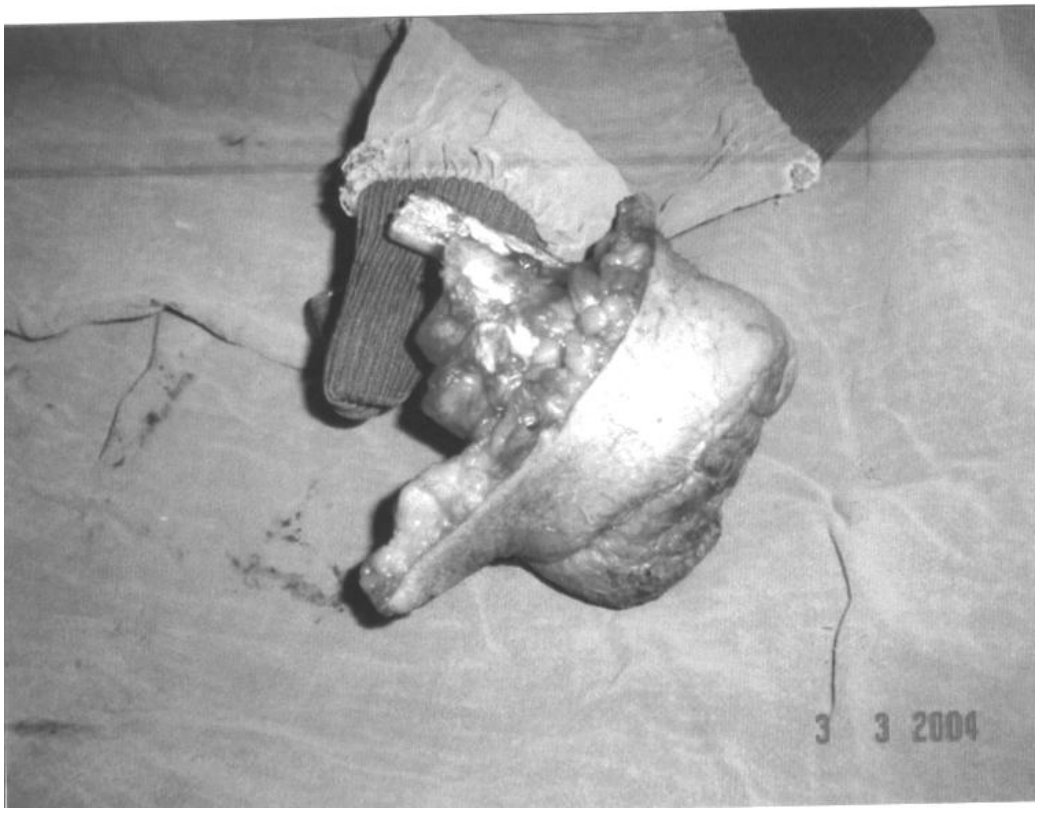

Fig 4: Re-amputation done at a higher level

Table I: Age & number of the patients

Age in years	17-27	28-37	38-47	48-57	58-67 years
Number of the cases	30	15	28	22	5 cases

Table II: The indications of the initial amputations done by other surgeons

Indications of the amputation	Number of the patients
Mine injury	45
Road traffic accident	25
Bullet injury	17
Vascular disease	13

Table III: The indications of refashioning of the amputation stump

1) Infected amputated stump	Number of the patients
a) Fissuring & ulceration	30
b) Abscess formation	15
c) Infected epidermoid cyst	5
2) Loose cushion of muscles	15
3) Painful neuromas attached to the scar or bone	15
4) Flexion deformities of the knee in below knee amputees	10
5) Prominent bones compressing the skin of the stump (fibula & sharp outer edge of tibia)	8
6) Disarticulated ankle changed to syme's amputation	1
7) Squamous cell carcinoma superadded to an infected stur	1

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