

# Changing trends for lower limb amputations in developing world

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## Abstract

**Background Aims Purpose:** To find out changing trend in indications of lower limb amputations and their impact on society specifically patients from lower economic strata in developing world. **Study Design:** Case series **Case Description and Methods:** Study was carried out in Department of surgery, Govt medical college and hospital, Nagpur, INDIA. from July 2008 to October 2013. Total 404 patients had lower limb amputation. Main outcome measures were patient's age, gender, limb affected, indication of amputation and percentage of disability, complications, associated procedure performed. **Findings and Outcome:** Total 404 patients had lower limb amputation with mean age of 45 years with significant higher percentage in males (77.97%). Most common indication of amputation was diabetes mellitus 137(33.91%), peripheral vascular disease 127(31.43%), followed by trauma 65(16.08%) and tumour 44 (10.89%), with rare causes such as gas gangrene, burns, leprosy, osteomyelitis, etc. Tendency was to conserve knee with below knee to above knee ratio of 1.8:1 initially which changed to 1.21:1 after redo amputation. Prosthesis was offered to 160 (39.60%) patients from this institute, having good quality of life, other patients preferred crutches, some have preferred prosthesis from other physiotherapy centres. There was lesser morbidity, improved quality of life with better prosthetic fitting in patients of below knee amputation. **Conclusion:** Diabetes mellitus is leading indication of lower limb amputation and there is persistent increase in amputation because of Trauma with relative decline in number of amputations because of peripheral vascular disease indicating a changing trend. **Clinical Relevance:** Understanding this changing trend, lower limb amputations can very well be reduced by taking general precautions like foot care, control of blood sugar and road safety measures, it will reduce the morbidity and loss of man power.

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## INTRODUCTION

To find out changing trend in indications of lower limb amputations and their impact on society specifically patients from lower economic strata in developing world and by simple education and precautions how life can be changed in these group of people on whom there family depends for everything..

## CASE DESCRIPTION AND METHODS

Study was carried out in Department of surgery, Government medical college and hospital, Nagpur, India from July 2008 to October 2013. Total 404 patients had lower limb amputation and those underwent amputation at various levels and for various indications ranging from peripheral vascular disease, diabetes mellitus, trauma, malignancy, infections etc. were studied. All the patients were included in the study irrespective of cause, age, gender. After admission of the patient in the ward, the detailed history was taken and through clinical examination was done. In personal history, history of smoking and tobacco consumption, number of cigarettes or biddies per day and duration of smoking were noted. History of diabetes, hypertension or any cardiac problem as well the treatment which the patient receiving for it was recorded. In the clinical examination all the pulsations were specifically looked for and recorded accordingly. In patient who presented with gangrene, type of gangrene, line of demarcation, whether there is

presence of gas, etc. was looked for. Then patients were investigated pertaining to the probable aetiology. In patient of chronic as well as acute ischemia, colour Doppler study was done along with ECG, Lipid profile, etc. Blood and urine sugar was done in every case. In cases of gas gangrene gram stain smear was done. In patients with bone tumours x-ray chest, CT scan of affected limb, Biopsy was done. After amputation specimens were sent for disposal. In patients of Diabetes, Blood sugar fasting and post meal and glycosylated HbA1c were recorded. In every patient haemoglobin percentage, serum albumin, urine sugars were done as routine. And the treatment started according to the pathology. Decision of amputation and the level of amputation were jointly taken by two surgeons. Informed Consent of the patients was taken in terms of what will be the procedure, complications intraoperative or postoperative that might happen, disability and options for that disability are explained to the patients. Treatment plan was decided as per the cause and clinical findings. Plan was decided differently for cold elective cases and emergency cases. Emergency cases like wet gangrene and traumatic injuries with contamination and jeopardised blood supply were treated with guillotine amputation first followed by flap closure on selective basis. In cold cases, amputation planned on selective basis with proper antibiotics, drugs as per the cause. Patients with diabetes mellitus were treated after control of blood sugar with debridement, drainage of pus and when conservative measures have failed, then the decision for amputation was taken. Similarly patients with peripheral vascular disease were waited till development of line of demarcation, till that time patients were kept on drugs enhancing vascularity. In patients of bone tumours level of amputation decided by type of bone tumour and amputation was done by flap method. Complications were noted during stay of patient in ward and on follow up. Physiotherapy and crutches and a routine follow up were advised at the time of discharge. On Follow up 160 patients were given prosthesis in the form of artificial limb in our hospital, some patients obtained prosthesis from outside agencies and some patients were happy with crutches. Patients were closely followed in wards till their discharge and afterwards as outpatients. Along with these, detailed history, indications of amputation, site of amputation, complications occurring post-operatively and after discharge from hospital were carefully noted.

### FINDING AND OUTCOME

Total 404 patients had lower limb amputation with mean age of 45 years. Males (77.97%) are commonly affected than females (22.03%) corresponding very well with higher incidence of smoking and road traffic accident in

males. Most common indication of amputation was diabetes mellitus 137(33.91%) and peripheral vascular disease 127(31.43%), followed by trauma 65(16.06%), tumour 44(10.89%) with rare causes such as gas gangrene, burns, leprosy, osteomyelitis. Tendency was to conserve knee with BK (below knee) to AK (above knee) ratio of 1.8 initially which changed to 1.21 after redo amputation. There was lesser morbidity, improved quality of life with better prosthetic fitting in patients of below knee amputation. Percentage of mortality was 3.6%, which was comparatively lesser than other series. Prosthesis was offered to 160 (39.60%) patients having good quality of life.

Following tables will summarise the main results.

**Table 1:** Chart showing aetiology wise distribution of total number of patients

Indication of amputation	No. of patients
Diabetes mellitus	137(33.91%)
Peripheral vascular diseases	127(31.43%)
Trauma	65(16.08%)
Tumour	44(10.89%)
Gas gangrene	12(2.97%)
Burn	8(1.98%)
Osteomyelitis	5(1.24%)
Other infection	4(1%)
Leprosy	2(0.5%)

### DISCUSSION

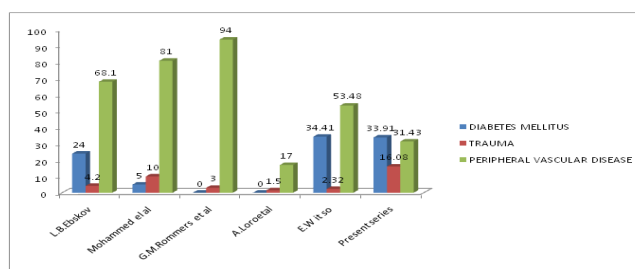
This institution caters the patients from adjacent states of Madhya Pradesh, Chattisgarh, Andhra Pradesh and Eastern Maharashtra, which represent Central India. So the study represents the trends in lower limb amputation in Central India. In this study diabetic amputations (33.91%) represent the most common cause of lower limb amputation which is much more than the study published by Mohammad *et al*<sup>1</sup> in 1997 from Asian subcontinent which was found to be 5%. Similarly studies conducted outside Asian subcontinent by L.B. Ebskov *et al*<sup>2</sup> 1989 (24%), G.M. Rommers *et al*<sup>3</sup> 1997(0%), A. Loro *et al*<sup>4</sup> 1999 (0%) were having lower number of amputations because of diabetes, while they were comparable in series by E. Witso *et al*<sup>5</sup> 2001 (34.41%). This very well indicates that incidence lower limb amputation because of Diabetics is on rise which can very well be reduced by increasing education advising proper control of blood sugar, proper foot care, taking care of wounds in early stages, following proper dietary habits. Incidence of trauma is on rise all over world so its complication like amputation is on rise. On the same grounds comparing incidence of trauma as cause of lower limb amputation, in the present series it was about 17% which is more than studies mentioned earlier like in study by Mohammad *et al*<sup>1</sup> in 1997 it is about 10%, Similarly studies conducted

outside Asian subcontinent by L.B. Ebskov *et al*<sup>2</sup> 1989 (4.2%), G.M. Rommers *et al*<sup>3</sup> 1997(3%), A. Loro (1.5%) and by E. Witso *et al*<sup>5</sup> in 2001 (2.32%) clearly indicating number of traumatic amputations is on rise which can very well be reduced by increasing the education of patients, by taking road safety measures, attending primary aid centre as early as possible. So that by taking such simple safety measures, over all injuries as well as amputations can be prevented. Peripheral vascular disease was the main culprit for lower limb amputation all over

the world but after studying recent study reports and comparing with previous one; story is different in the sense that incidence of lower impuption because of peripheral vascular disease in present series is 31.43% which is on significant lower side than studies mentioned and compared previously and mentioned in following table by simple education and avoidance of smoking, percentage of amputations is on decline so if the same strategies applied for diabetes and trauma their percentage can also be very well be reduced.

**Table 2:** Comparison of different series for indications of lower limb amputation

Indications	L.B. Ebskov <i>et al</i> (1989)	Mohammad <i>et al</i> (1997)	G.M. Rommers <i>et al</i> (1997)	A. Loro <i>Et al</i> (1999)	E. Witso <i>et al</i> (2001)	Present series
Diabetes mellitus	24%	5%	0%	0%	34.41%	33.91%
Trauma	4.2%	10%	3%	1.5%	2.32%	16.08%
Peripheral vascular disease	68.10%	81%	94%	17%	53.48%	31.43%



**Graph 1:** Showing indication of amputation as per series

From above discussion, graph and tables it is clear that there is changing trend in indications of amputation with slow but persistent increase in percentage of amputations due to Diabetes Mellitus and Trauma with persistent decline in Peripheral vascular disease as the cause.

## CONCLUSION

Diabetes mellitus is leading indication of lower limb amputation but there is persistent increase in amputation because of Trauma with relative decline in number of amputations because of peripheral vascular disease indicating a changing trend.

## CLINICAL RELEVANCE

Understanding this changing trend, lower limb amputations can very well be reduced by taking general precautions, foot care, quick care of the wound, control of blood sugar and road safety measures. It will help in reducing the morbidity and loss of working hours and man power. Public awareness programme will have an important role to play in this.

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