# **Common Late Complications of Longitudinal Forefoot Amputations in Neuropathic Foot** Treatment

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## INTRODUCTION

Advances in surgical techniques and prosthetics have improved amputation outcomes, but challenges remain for patients with peripheral neuropathy undergoing partial foot amputations. While distal amputations are preferred to preserve function, complications are frequent-especially in longitudinal resections involving one to four rays

#### **OBJECTIVE**

To describe and quantify the complications arising in consecutive neuropathic patients undergoing partial longitudinal amputations of the foot.

#### **METHODS**

Retrospective study conducted with data collected from the medical records of patients treated at the Insensitive Foot Clinic of the Foot and Ankle Group of Hospital das Clínicas (HCFMUSP) who underwent partial longitudinal amputation of the foot rays in the period from 2000 to 2016.

### RESULTS

28 patients met the inclusion criteria, with a total of 31 feet amputated/partially amputated.

Fig 1. Frequency of insensitive foot causes

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### RESULTS

The study had 13 additional amputations: transtibial (n=5), transmetatarsal (n=5), toes (n=2), and Chopart joint (n=1). The mean time to additional amputation was 32.9 months, mainly due to infection (92.3%). Among diabetic patients (n=8), the reamputation rate was 50%. Eight patients underwent further non-amputation surgeries: two for infected wound debridement and six for mechanical foot rebalancing. Patients who initially underwent amputation of the fifth ray had a 58.3% reamputation rate.

Table 2. Amputations occurring as a complication of the amputated ray based on the insensitive foot aetiology and proximate cause of the amputation

Insensitive foot aetiology	Initial amputation	Cause of initial amputation	Secondary amputation	Cause of secondary amputation	Time elapsed between procedures, months
Diabetes	5th ray	Infected ulcer	Transtibial	Infection	5
Diabetes	5th ray	Infected ulcer	Transtibial	Infection	18
Diabetes	3rd ray	Uninfected ulcer	Transmetatarsal	Uninfected ulcer	71
Diabetes	2nd ray	Infected ulcer	Transmetatarsal	Infection	56
Diabetes	1st ray	Infected ulcer	Transmetatarsal	Infection	4
Diabetes	1st ray	Infected ulcer	Transmetatarsal	Infection	9
Diabetes	4th and 5th rays	Infected ulcer	Chopart	Infection	99
Diabetes	5th ray	Infected ulcer	Fourth toe	Infection	56
Diabetes	2nd ray	Infected ulcer	Third toe	Infection	2
Alcoholic neuropathy	5th ray	Infected ulcer	Transtibial	Infection	16
Congenital insensitivity	5th ray	Infected ulcer	Transtibial	Infection	49
Peripheral nerve injury (sciatic nerve)	5th ray	Infected ulcer	Transtibial	Infection	28
Peripheral nerve injury (congenital clubfoot sequela)	1st ray	Infected ulcer	Transmetatarsal	Infection	15



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Causes of foot insensitivity included: diabetes, leprosy, alcoholic neuropathy, secondary to traumatic peripheral nerve injury and other



Four patients underwent simultaneous resection arthroplasty of the metatarsal heads. Infected ulcers were the indication for partial longitudinal foot amputation in 93.5% of 31 operated feet; only 6.5% had non-infected ulcers.

Follow-up ranged from 11 to 169 months (mean: 60 months). After the initial procedure, 28.6% of patients required no further interventions, 42.8% underwent additional amputations, and 28.6% had other surgical procedures.

I have no conflict of interest

# DISCUSSION

71.4% of patients in this study required additional surgery, mainly due to infection, with higher complication rates in diabetics. Comorbidities and biomechanical imbalance after ray resection likely contributed to reulceration and reamputation, particularly in 5th and 1st ray amputations, which caused forefoot deformities and overload. These findings suggest that partial longitudinal amputations of peripheral rays should be carefully indicated, considering the need for mechanical rebalancing or alternative amputation strategies.

> Table 4. Rate of reamputations according to the ray initially amputated

	Ray initially amputated	Total number, n	Reamputations, n (%)
	1st ray	6	3 (50.0)
	2nd ray	8	2 (25.0)
	3rd ray	7	1 (14.3)
	4th ray	3	1 (33.3)
	5th ray	12	7 (58.3)
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#### CONCLUSION

Partial longitudinal amputation of the foot in neuropathic patients exhibited a high reoperation rate, especially in patients with diabetes or in patients with initial amputation of the peripheral rays.

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