Symptomatic Neuroma Formation After Below-knee Amputation Preferentially Occurs in Nerves Unrecognized at Initial Amputation

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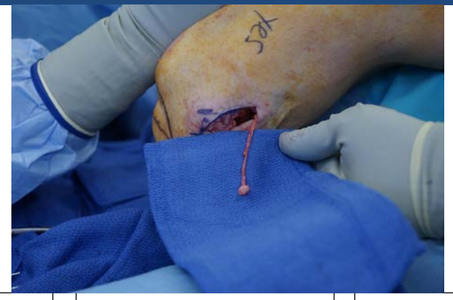
Introduction

- Symptomatic neuromas after below-knee amputation (BKA) lead to increased pain, decreased ambulation, and overall decreased quality of life
- Neuroma formation is multifactorial
- Failure to identify and treat the major sensory nerves of the leg at the time of initial amputation may increase risk of symptomatic neuroma development

Figure 1: Symptomatic Neuroma



Methods

- Case-control; single surgeon, single institution
- 22 legs treated for symptomatic neuroma after primary BKA (neuromas identified preoperatively, intraoperatively, and pathologically)
- Operative records from initial amputations reviewed to determine whether affected nerves were identified at initial amputation
- Compared to control group of 22 consecutive primary BKAs with no evidence of symptomatic neuroma at minimum 1 year follow-up

Results

- 43 total neuromas treated; 32 (74%) of affected nerves not identified at initial amputation
- 110 asymptomatic nerves in control group; 43 (39%) not identified in initial amputation
- Failure to identify nerve at initial amputation is risk factor for development of symptomatic neuroma (OR 4.53, p=0.0003)
- 19 SPN neuromas, 14 unidentified at initial amputation; 22 asymptomatic SPNs, 4 unidentified (OR 12.6, p=0.009)
- 17 saphenous neuromas, 14 unidentified at initial amputation; 22 asymptomatic saphenous nerves, 7 unidentified (OR 10.0, p=0.03)

Table 1: Study data separated by nerve

	SPN		Saphenous		Sural		Tibial		DPN		Total Nerves	
Identified?	Symptomatic	Asymptomatic	Symptomatic	Asymptomatic	Symptomatic	Asymptomatic	Symptomatic	Asymptomatic	Symptomatic	Asymptomatic	Symptomatic	Asymptomatic
No	14	4	14	7	2	22	1	4	1	6	32	43
Yes	5	18	3	15	1	0	1	18	1	16	11	67
Odds Ratio	12.6 (p=0.0009)		10.0 (p=0.003)		0.03 (p=0.06)		4.50 (p=0.32)		2.67 (p=0.51)		4.53 (p=0.0002)	

Conclusions

- Failure to identify major sensory nerves of leg at initial amputation is risk factor for symptomatic neuroma development
- Most significant for SPN and saphenous nerves
- Simply recognizing major sensory nerves of leg at initial amputation is an important step toward decreasing symptomatic neuroma development, thereby improving pain, ambulation, and quality of life

Figure 2: Nerves Recognized at Initial Amputation