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- 1996 University of Montana (BS)
- 2000 Temple University (DPM) School of Podiatric Medicine  
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**Multi-Disciplines**

## Diabetes Care

Impact Factor in 2006: 8.28

Pathophysiology/Complications  
ORIGINAL ARTICLE

### Risk of Reamputation in Diabetic Patients Stratified by Limb and Level of Amputation

A 10-year observation

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**OBJECTIVE** — This study examined the risk of reamputation, stratified by original level of amputation, in a population of diabetic patients. We also illustrated reamputation rates by ipsilateral and contralateral limbs.

**RESEARCH DESIGN AND METHODS** — The study population included 277 diabetic patients with a first lower-extremity amputation performed between 1993 and 1997 at University Hospital in San Antonio, Texas. Reamputation episodes for the ipsilateral and contralateral limbs were recorded through 2003. Using a cumulative incidence curve analysis, we compared the reamputation rate by limb. Cumulative rates of reamputation were calculated for each limb at each amputation level at 1, 3, and 5 years.

**RESULTS** — Cumulative rates of reamputation per person were 26.7% at 1 year, 48.3% at 3 years, and 60.7% at 5 years. Ipsilateral reamputation per amputation level at the 1-, 3-, and 5-year points were toe: 22.8, 39.6, and 52.3%; ray: 28.7, 41.2, and 50%; midfoot: 18.8, 33.3, and 42.9%; and major: 4.7, 11.8, and 13.3%. For contralateral reamputation, the rates at 1, 3, and 5 years were toe: 3.5, 18.8, and 29.5%; ray: 9.3, 21.6, and 29.2%; midfoot: 9.4, 18.5, and 33.3%; and major: 11.6, 44.1, and 53.3%.

**CONCLUSIONS** — This study showed that a patient is at greatest risk for further same-limb amputation in the 6 months after the initial amputation. Although risk to the contralateral limb rises steadily, it never meets the level of that of the ipsilateral limb. This finding will help clinicians focus preventive efforts and medical resources during individualized at-risk periods for diabetic patients undergoing first-time amputations.

Diabetes Care 29:566–570, 2006

Foot ulcers and lower-extremity amputations (LEAs) are disabling complications of diabetes that can lead to significant increases in mortality and morbidity (1,2), most notably recurrent amputation at increasingly higher levels. It has been shown that a history of ulcer

patients; some studies combined reamputation episodes of both ipsilateral and contralateral limbs (5–7) and others addressed reamputation of only one extremity (8–10). Reamputations at specific levels have been studied (11–15), but

tations has not been reported before this study.

In this retrospective cohort study, we aimed to 1) illustrate the difference between the reamputation risk for ipsilateral and contralateral limbs and 2) stratify the risk of reamputation by the original level of amputation. With these findings, we hope to help clinicians estimate individualized risk for patients based on the level of first-time amputation.

#### RESEARCH DESIGN AND METHODS

In this retrospective cohort study, we identified 453 consecutive diabetic patients who were admitted for LEA at University Hospital, the facility associated with the University of Texas Health Science Center at San Antonio, from 1 January 1993 to 31 December 1997. We defined LEA as the surgical removal of bones by transection at any level of lower extremity. Autoamputations or resections of the partial bone with the distal end intact were excluded. The procedures performed were identified from ICD-9-CM codes 84.11–84.18, and diabetes was identified from any of 250 related codes. Medical records of each identified patient with an amputation were reviewed; patient cases were excluded if the patients had a traumatic LEA (n = 5), history of LEAs (n = 53), incomplete records regarding the history of their



Toe  
Amputation



Ray  
Amputation



Midfoot  
Amputation



Major  
Amputation



Contralateral  
Amputation

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# Risk of Reamputation in Diabetic Patients Stratified by Limb and Level of Amputation: A 10-year observation

~2006

- The definition of re-amputation varied
  - Some counts the reamputation occurred only on the same side.
  - Others counts the reamputation occurred on either side
- The reported reamputation rate contained all-level of amputation

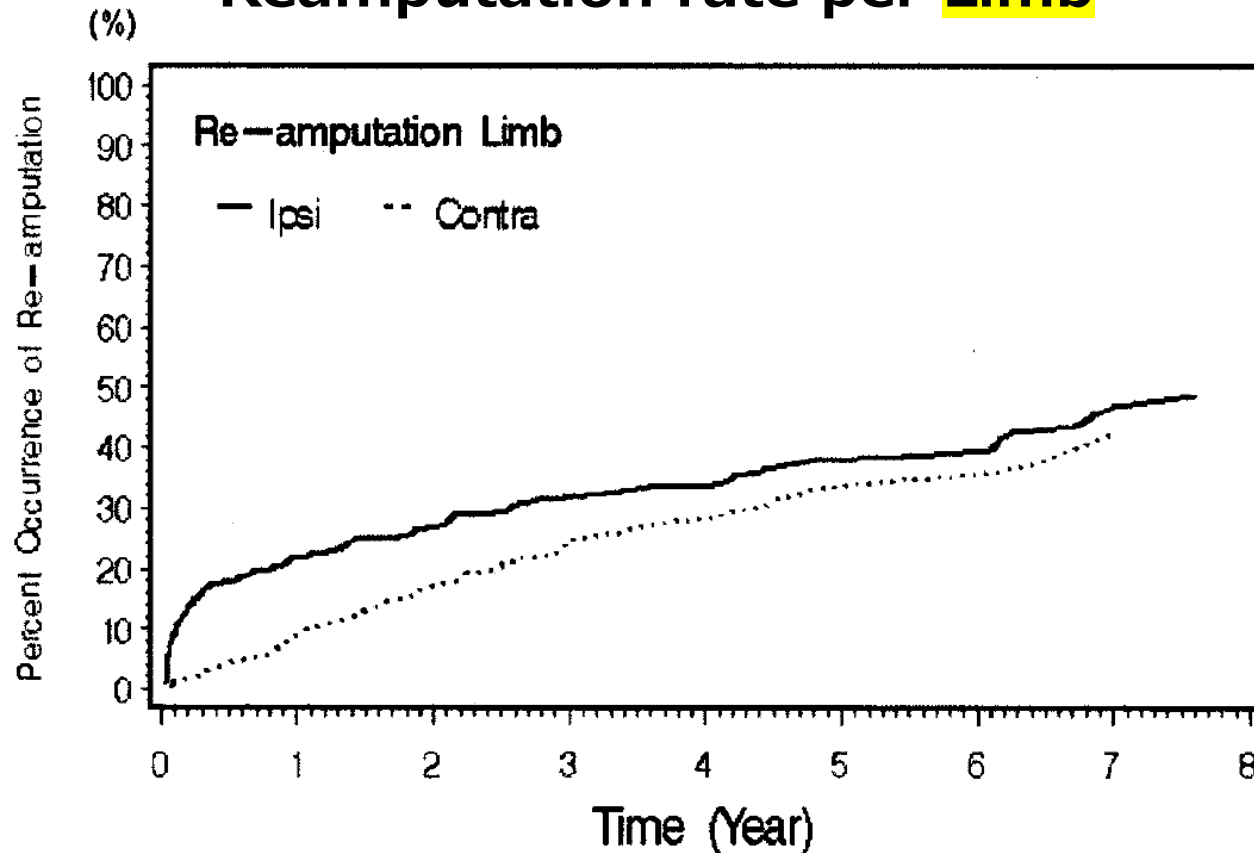
## Aims

1. To illustrate the difference between the re-amputation risk for ipsilateral (same) and contralateral(opposite) limbs
2. To stratify the risk of reamputation by the original level of amputation



**277** consecutive diabetic patients with a **1<sup>st</sup> lower-extremity amputation** between 1993-1997 observed for reamputation episode on ipsilateral and contralateral limb occurred until 2005

### Reamputation rate per Limb



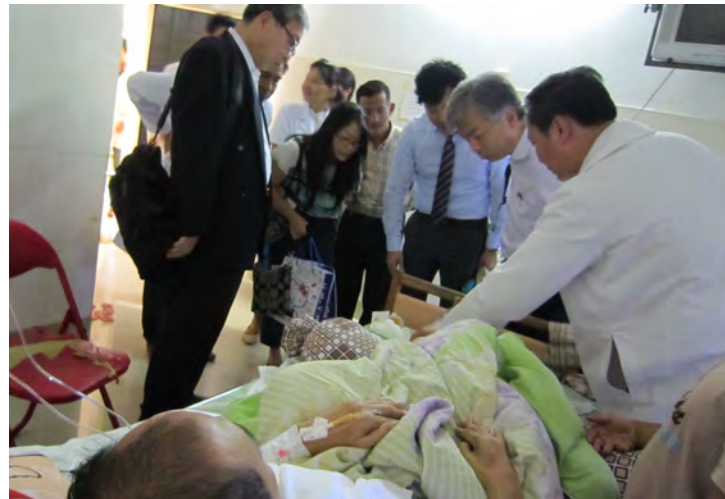
### Reamputation rate per Limb per level

Ipsilateral	1-year	3-year	5-year
Toe	22.8%	39.6%	52.3%
Ray	28.7%	41.2%	50.0%
Midfoot	18.8%	33.3%	42.9%
Major	4.7%	11.8%	13.3%

Contralateral	1-year	3-year	5-year
Toe	3.5%	18.8%	29.5%
Ray	9.3%	21.6%	29.2%
Midfoot	9.4%	18.5%	33.3%
Major	11.6%	44.1%	53.3%

Cited by **257** papers  
 Google scholar as of 2023/4/17

# International medical collaboration through WHO & the Ministry of Health



# Education to different health care professionals



# PhD Research Plan

- Foot ulcers is difficult to heal as it continuously receive the force from ground.
- International guideline recommend the use of off-loading device to heal diabetic foot ulcer.
- In Japan, Prosthesits/orthotist (PO) plays a major role in providing off-loading devices.
- Japanese experts claim the use of off-loading devices is suboptimal and guideline implementation is urgently needed.



# Podiatrists

In the country with podiatrists

**Assessment**  
of the wound

**Prescription**  
of the device

**Selection**  
of the device

**Fitting & modification**  
of the device

**Education**  
of the patient

**Functional training**

In the country **without** podiatrists (in Japan)

Plastic Surgeon/  
Dermatologist etc...

**PO** Prothesits/Orthotist

Nurses

Physical  
Therapists

Knowledge & Skills

**Interprofessional Education**



# Title/Topic

The **Effects of an Educational Program**

aimed at **improving guideline adherence**

incorporating **interprofessional education**

in the **use of off-loading devices.**

# Research Questions

RQ  
1

**What are the barriers** hindering the use of off-loading devices for Diabetic Foot Ulcers (DFU) and the level of interprofessional collaboration practice among members of the wound care clinic?

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RQ  
2

**What kind of educational program** should be employed to increase the use of off-loading devices for DFU at the chronic wound care clinic?

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RQ  
3

**What are the effects** of the educational program aimed at increasing the use of off-loading devices incorporating interprofessional education?

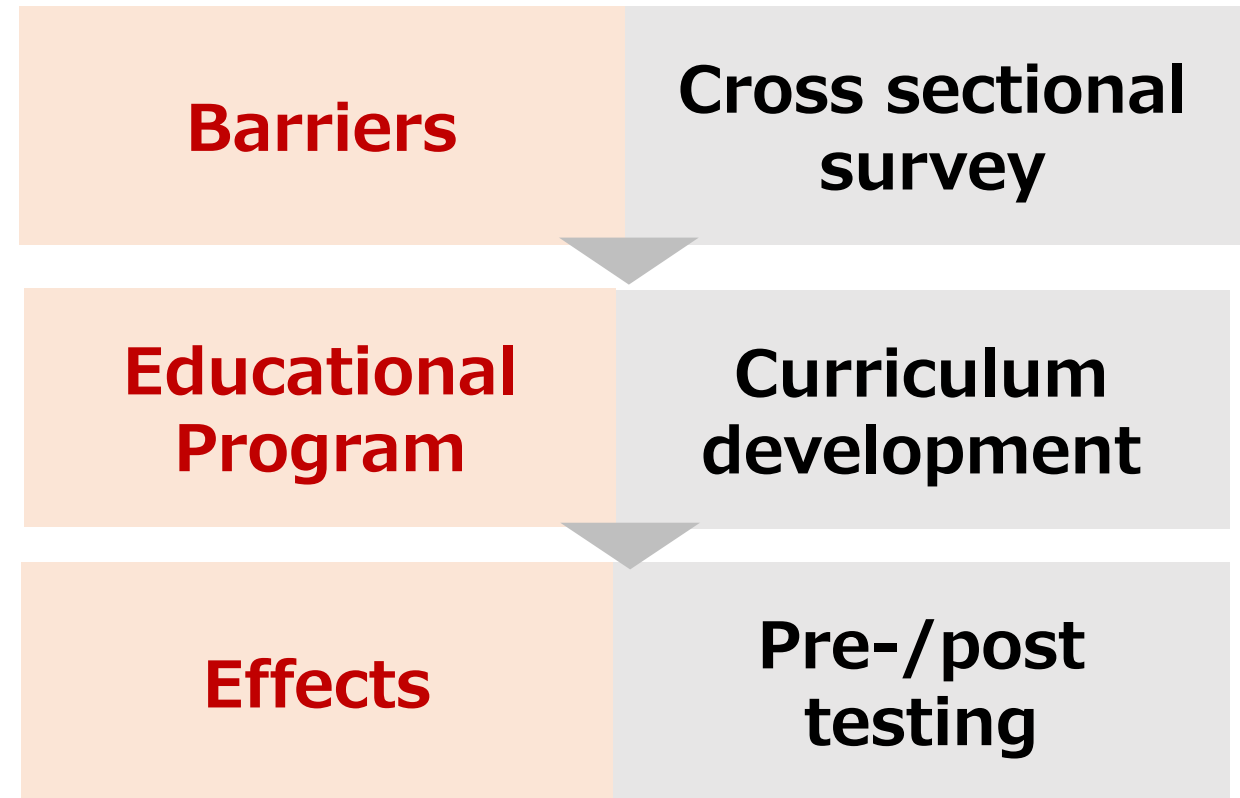
# Subjects

Members of  
the chronic wound care clinic

- physician
- nurse
- orthotists
- surgeon
- physical therapist
- etc..

at the institution registered for  
the chronic wound care  
management fee.

# Methods



# Significance

- This research will provide a novel perspective on **educational interventions for guideline implementation** by incorporating **interprofessional education** elements.
- In addition, this study can benefit those seeking to improve the health of the **diabetics** and the **elderly**, two of the most sharply increasing populations around the world.

## My professional Goal

to clinically and academically  
contribute to countries without podiatrists