Clinical Outcome Following Revision for Major Lower Limb Amputation

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The Problem

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Introduction

- Limited literature to guide practice in revision amputation surgery
- Clinical practice followed Dr. Hunter at SCIL

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Review of the Literature

- **The value of revision surgery after initial amputation of an upper or lower limb.**

  Wood MR, Hunter GA, Millstein SG.

  Prosthetics and Orthotics International, 1987;11: 17-20

  284 WSIB patients(184 Lower limb amputees)

  Single or multiple revisions

  All revisions carried out after 6 weeks of index operation

  100% success in revisions for specific local pathology (e.g. late infections, bone spurs, soft tissue adjustments)

  ~35% success where pain alone indication for Sx

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Review of the Literature

- **Reamputation,mortality and healthcare costs among persons with dysvascular lower limb amputations**.

  Dillingham TR, Pezzin LE, Shore AD.

  Arch Phys Med Rehab,2005;86(3):480-6

  - 12 month reamputation and mortality rates in **3565** dysvascular amputees
  - 26% required reamputation within 12 months
  - 33% Mortality rate
  - 35% distal (Foot &Ankle) amputees required revision to proximal level

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Review of the literature

- **Reamputation occurrence in the diabetic population in South Wales, UK.**

  Kanade et al

  Int Wound J, 2007;4(4): 344-352

  - Chart review of **473** patients with and without diabetes referred for rehabilitation
  - 46% reamputation rates in diabetic population (205 patients)
  - 30% reamputation rate in non-diabetic, dysvascular patients (181 patients)
  - In addition, 22% of diabetics had a contralateral amputation within 2 years versus 16% non-diabetic dysvascular patients

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Study Objectives

- To describe:

  1. Indications and Complications in Major Lower Limb Revision Amputations
  2. Clinical Outcomes
     - a) Level of Surgery
     - b) Effect on Ambulatory Status
     - c) Relief of symptoms
     - d) Mortality and Morbidity

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Methods

- Retrospective Chart review after local REB approval
- Location- *Sunnybrook Centre for Independent Living (SCIL), SHSC, Toronto, ON*
- Source- Senior Author's Personal Database (JJM)
- All major lower limb revision amputations 1998-2008
- Data Abstraction (DA) sheet to gather consistent data where available

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Methods

- Ambulatory Status classified as Volpicelli et al 1987
  - Unlimited Community Ambulator (6)
  - Limited Community Ambulator (5)
  - Unlimited Household Ambulator (4)
  - Limited Household Ambulator (3)
  - Supervised Household Ambulator (2)
  - Wheelchair dependent (1)
  - Bedridden (0)

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Inclusion Criteria

- All major lower limb reamputations at and above the ankle and below the hip
- WSIB and Non WSIB subjects

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Exclusion Criteria:

- Dementia
- Any other Psychiatric Illness

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- **Confidentiality**

  Study number assigned to each subject

  Data stored in a password-protected computer

  Hard copies of DA forms in a locked filing cabinet

Conflicts: No benefits received by authors to support this study

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Results: Demographics n=54

Age of Candidates	Male	Female	All
Average Age at Amputation (yrs)	57.1	61.1	58.2
Minimum Age	20	19	19
Maximum Age	86	86	86

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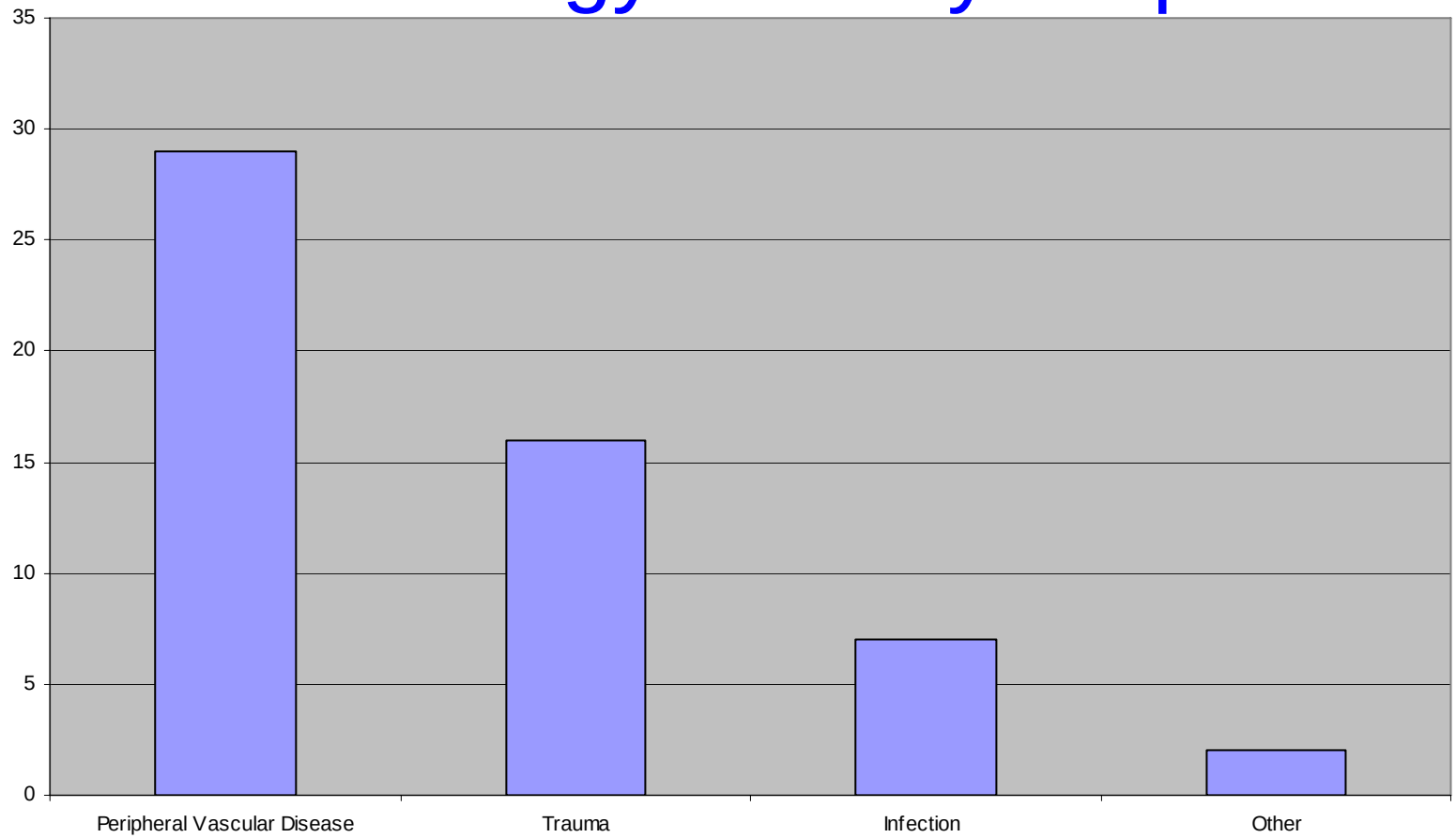
Results: Etiology Primary Amputation



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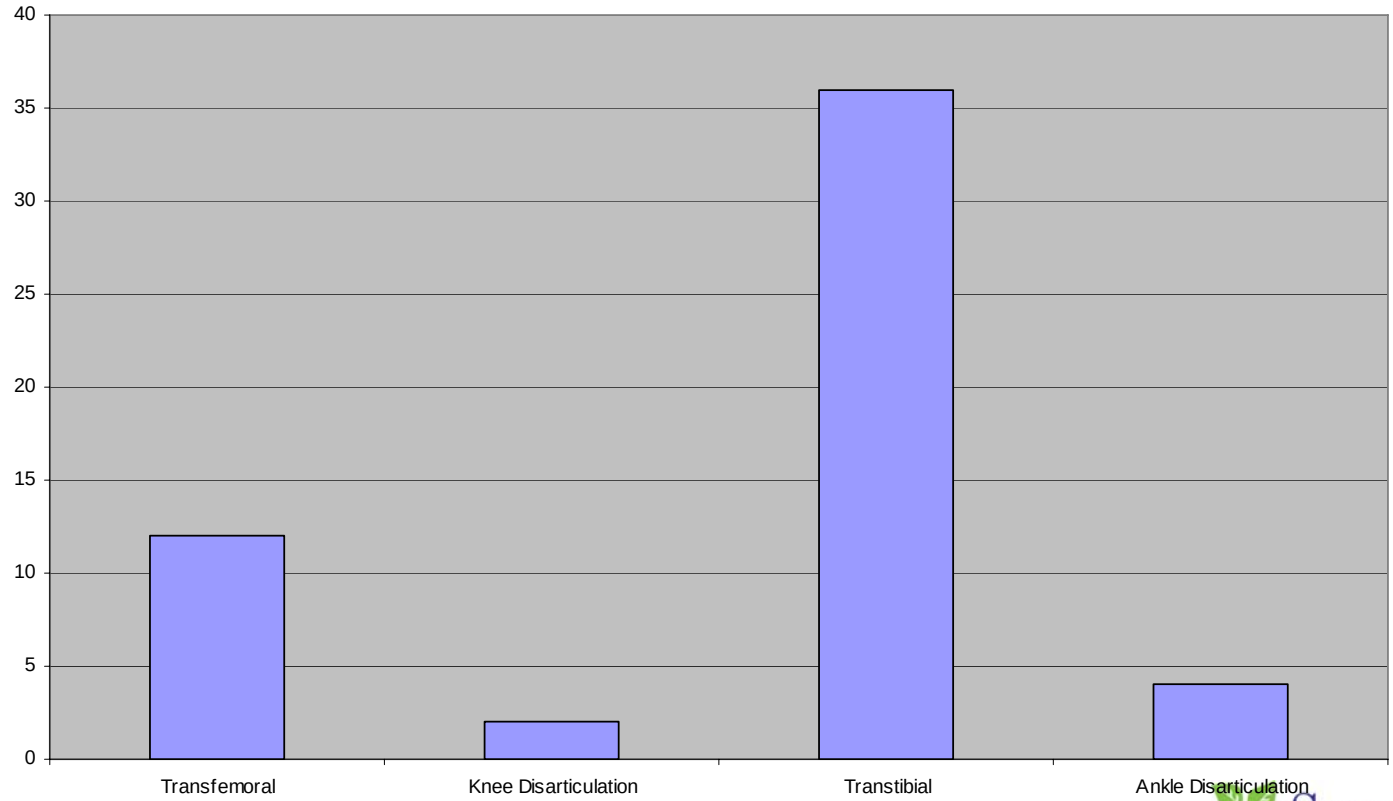
Results: Level of Primary Amputation n=54



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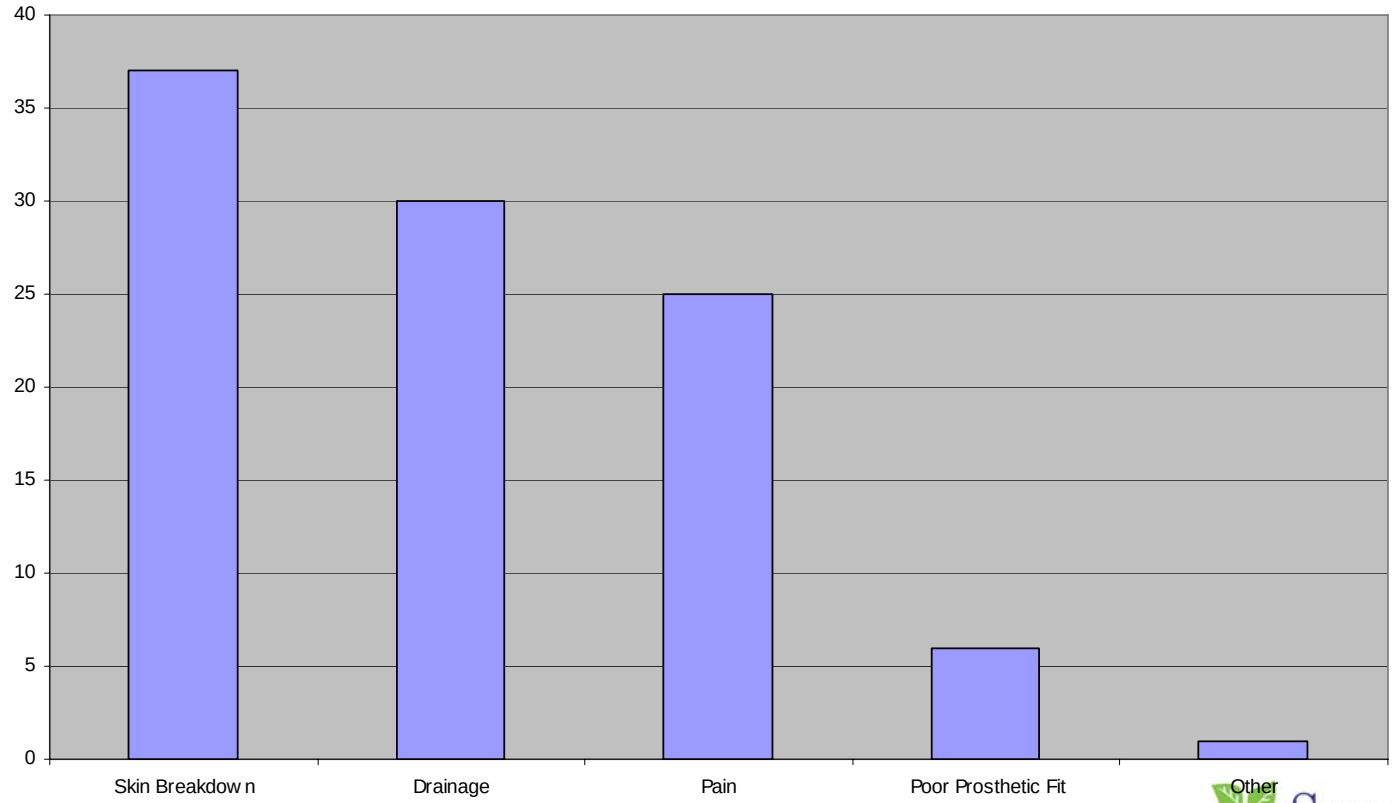
Results: Clinical Complaints/Findings Leading to Revision Surgery



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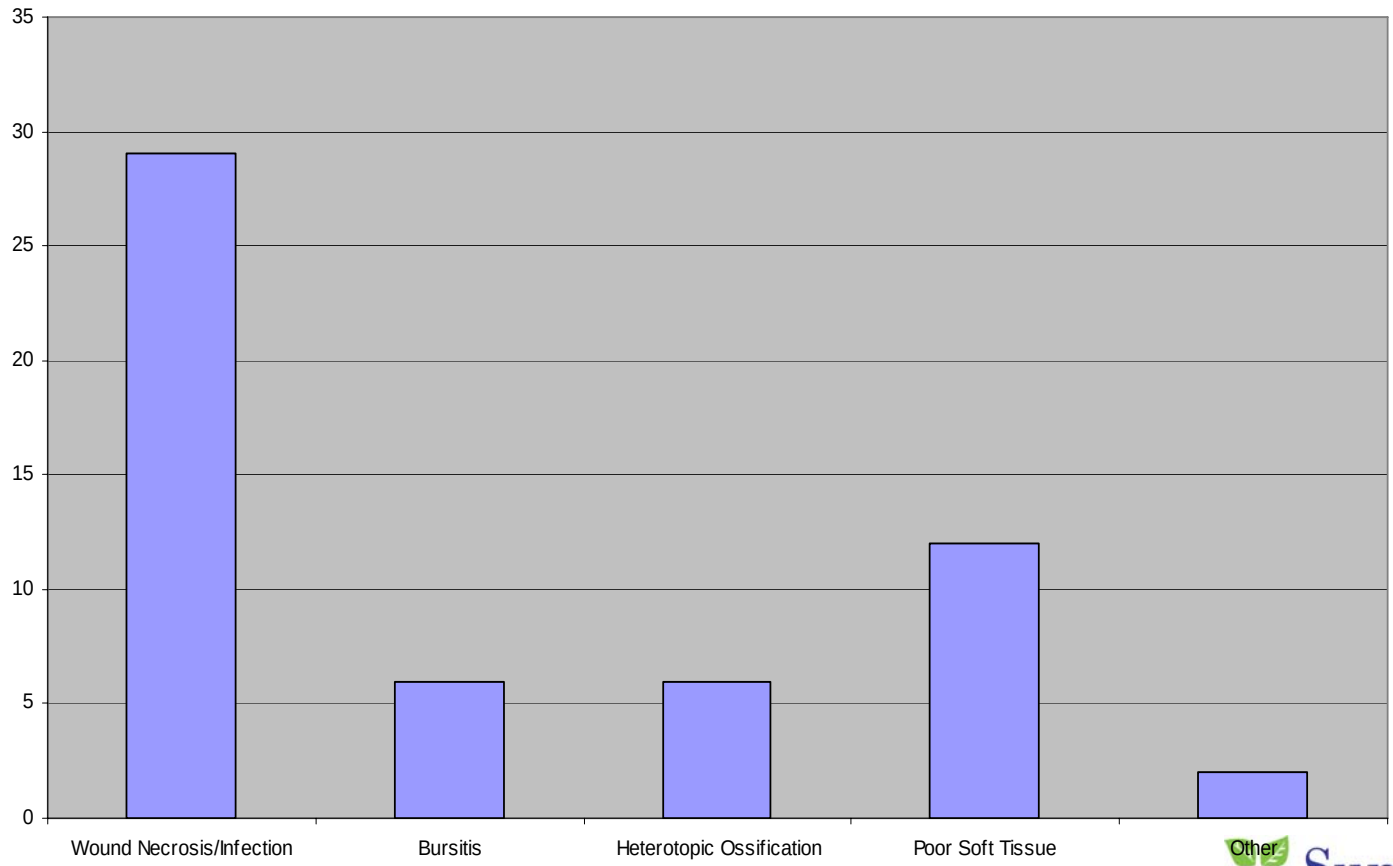
Surgical Indication for Revision Surgery n=54



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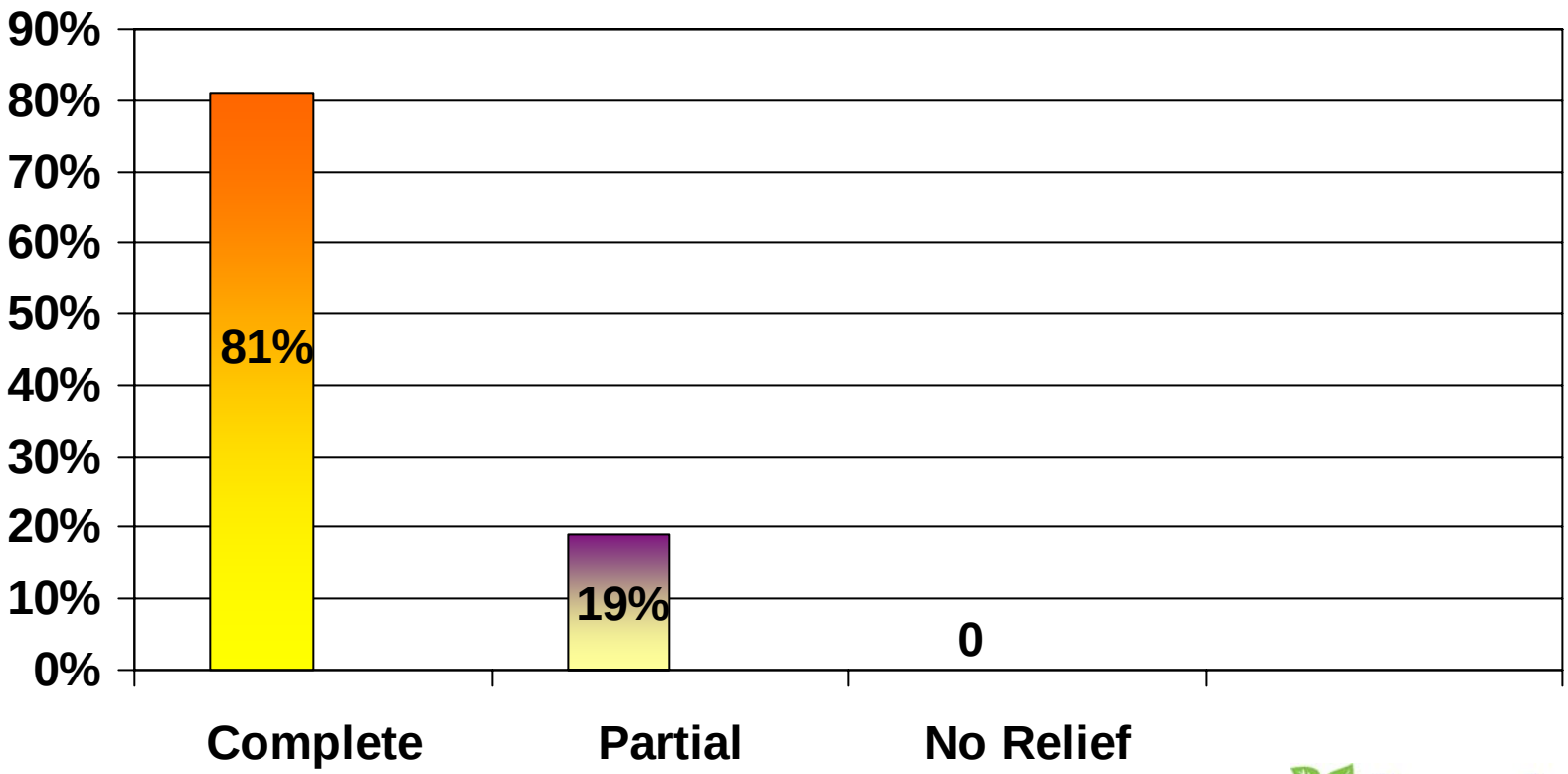
Results: Relief of Symptoms



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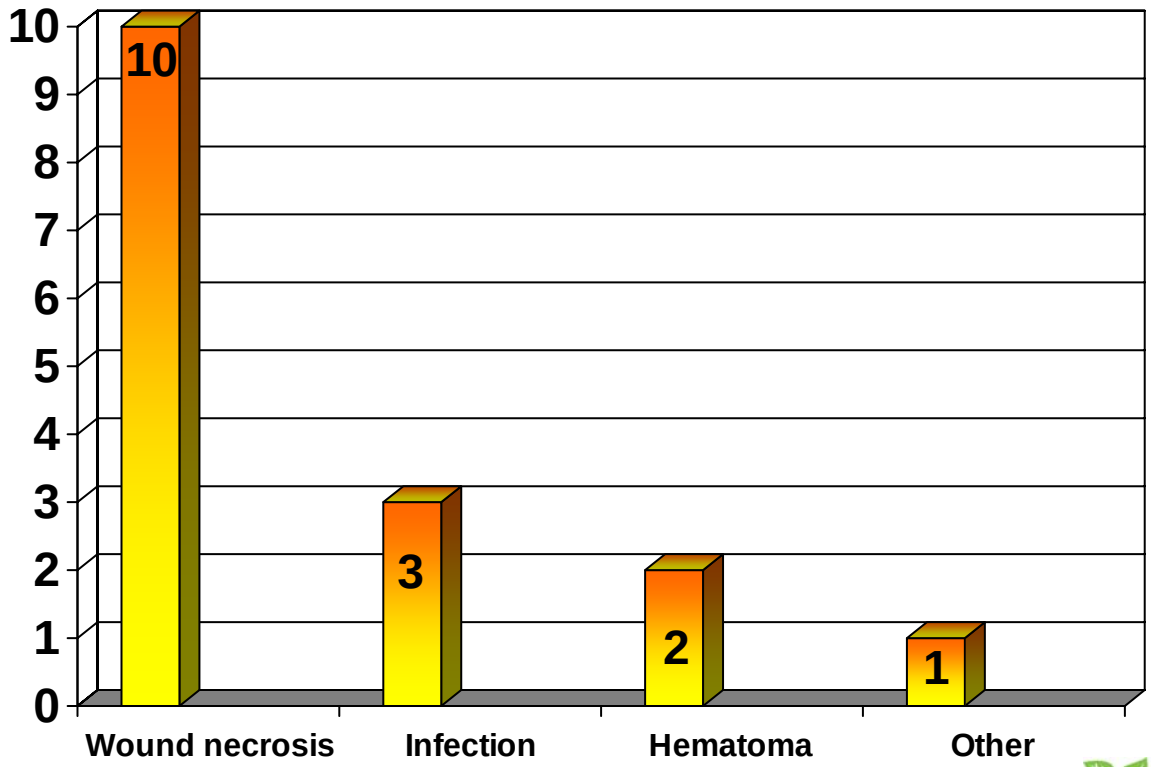
Surgical Complications (Overall)



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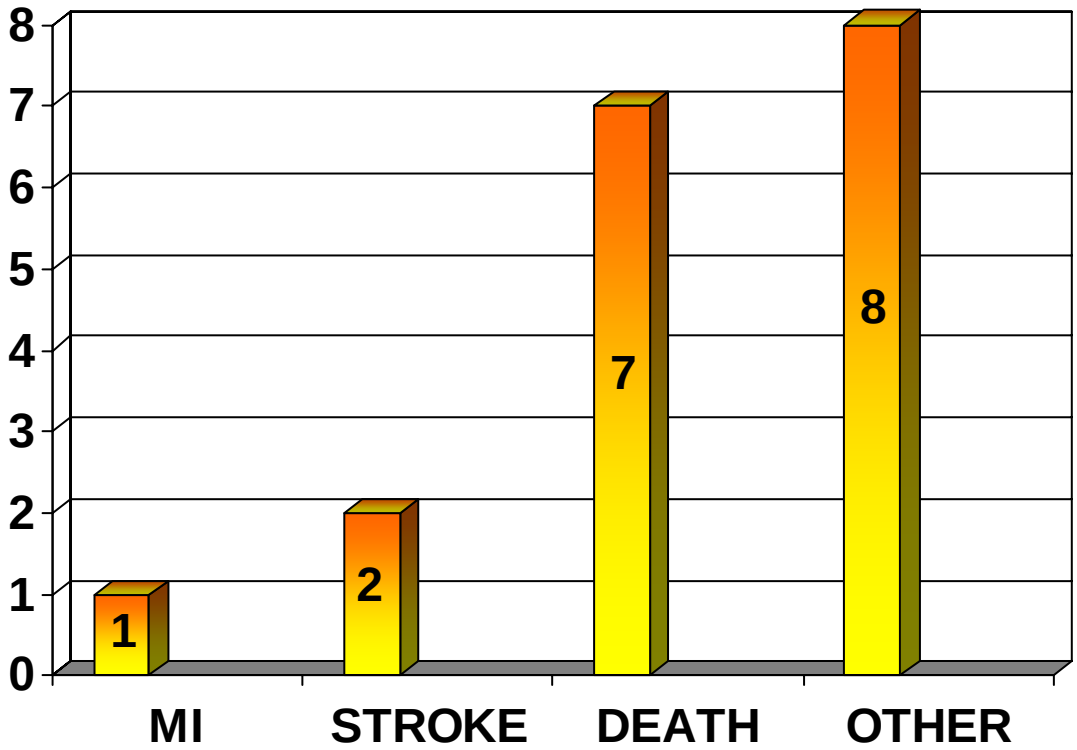
General Medical Complications (Overall)



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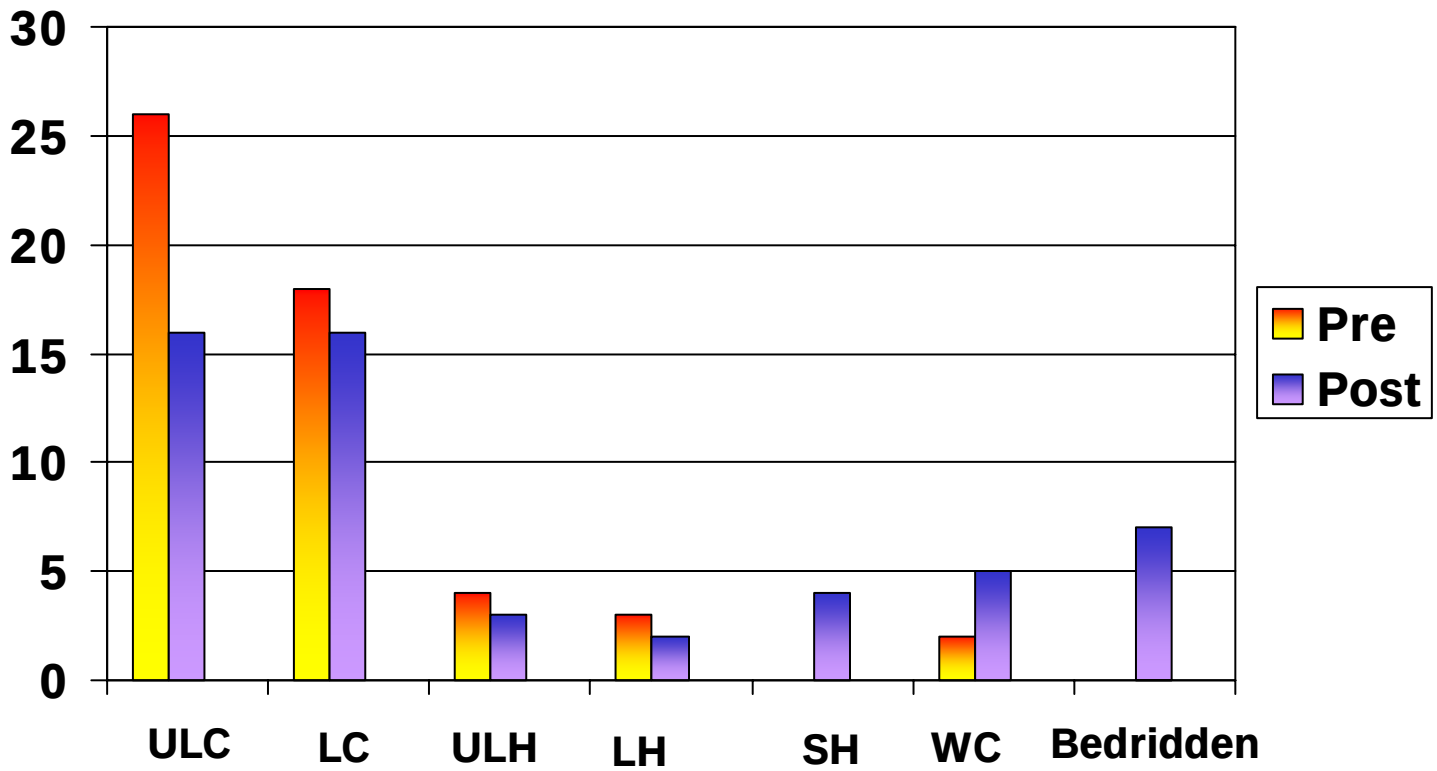
Results: Ambulatory Status (All levels)



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Results by Level Initial Amputation

- Ankle Disarticulation
- Transtibial
- Knee Disarticulation
- Transfemoral

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Results by Level Initial Amputation

- Ankle Disarticulation: n=4
  - All 4 revised to transtibial level.
  - 2/4 remained unlimited community ambulators and 1 became limited community ambulator; one became bedridden due to medical complications and died.
  - ¾ complete relief of pre-op symptoms, ¼ partial
- Knee Disarticulation: n=2
  - Revised to Transfemoral level with complete relief
  - 1 /2 became limited community ambulator. Final ambulatory status of other is unclear from chart

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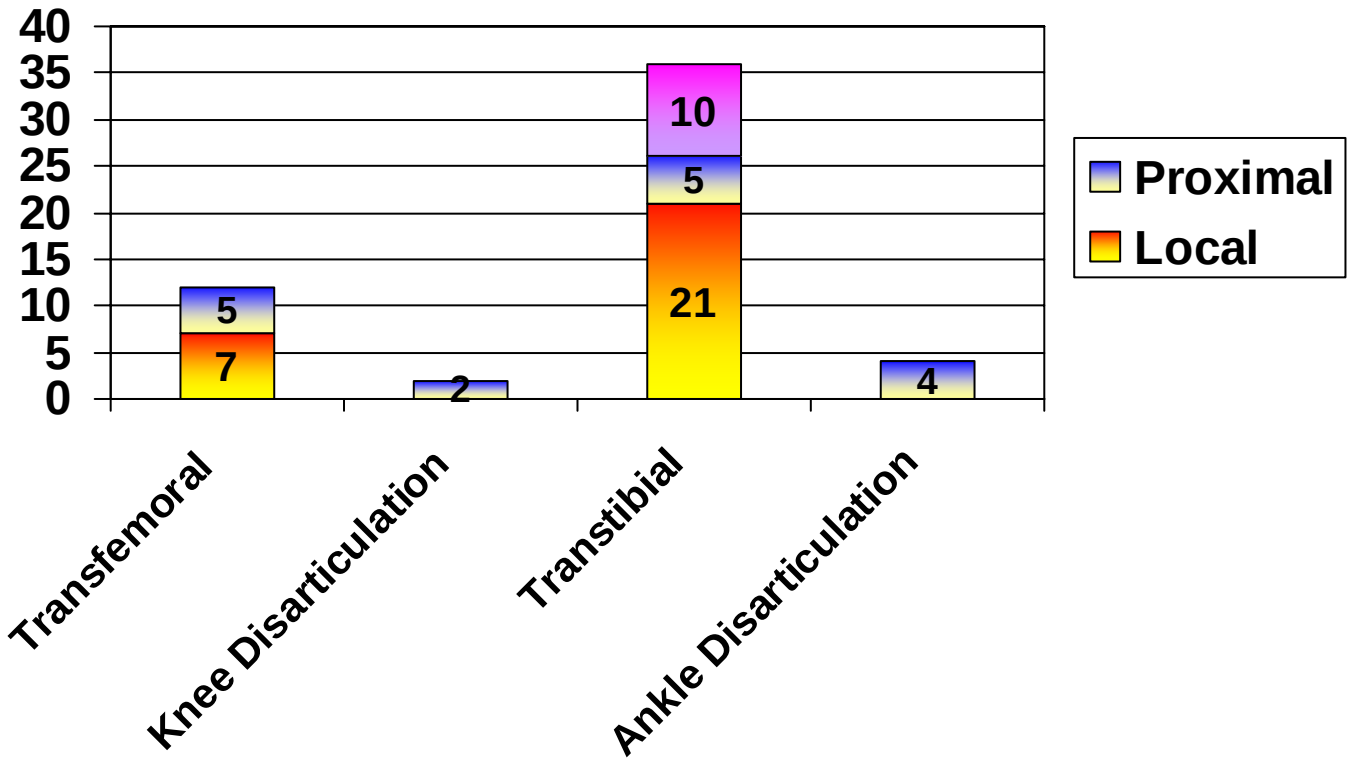
Results: Levels of Revision



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Results: Time to Revision

	Average	Range
Transfemoral(n=12)	3.2 yrs	(.1-18.1 yrs)
Knee Disarticulation(n=2)	6.0 yrs	(1-11.0yrs)
Transtibial(n=36)	5.0 yrs	(.1-38.2 yrs)
Ankle Disarticulation(n=4)	13.3 yrs	(1.4-51.3yrs)

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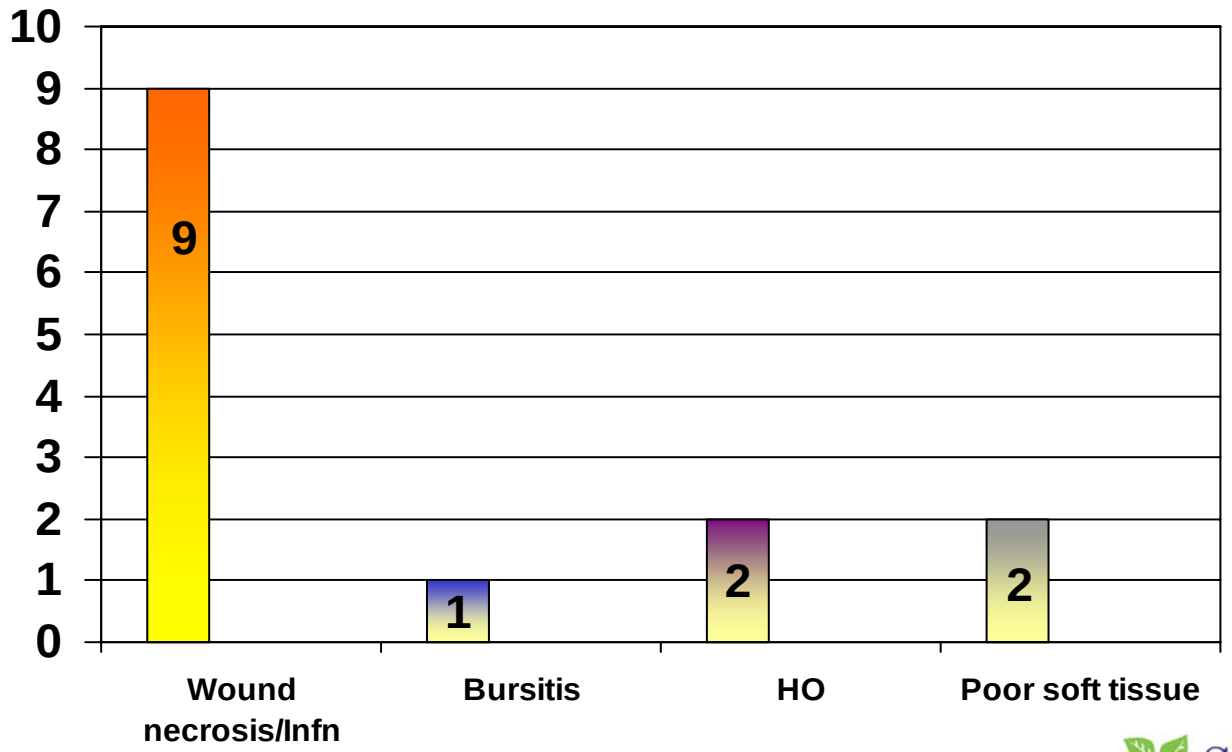
Results: Indications for revision

- Transfemoral n=12



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Wound Necrosis/Infection

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Late Soft Tissue Problem

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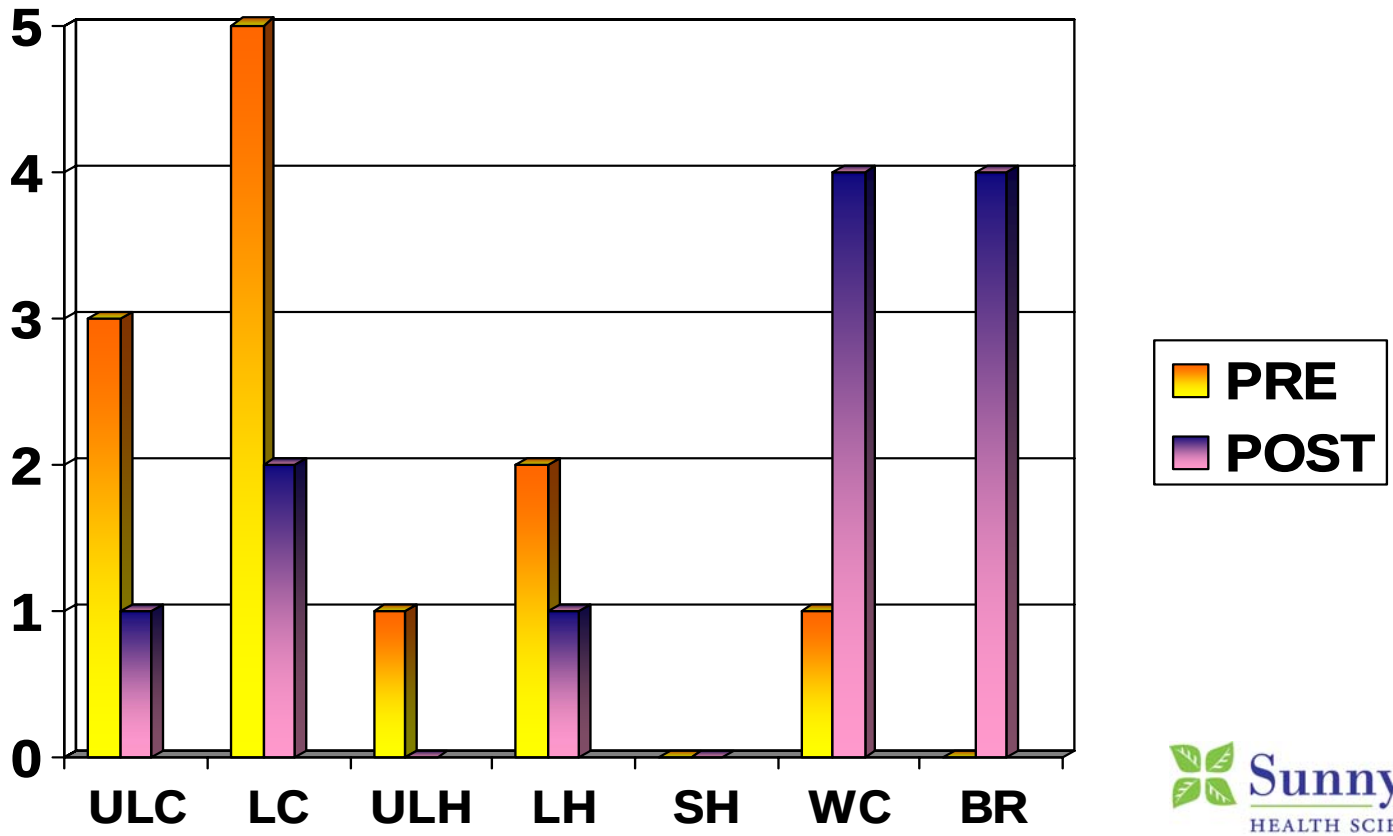
Results: Ambulatory Status (By Level)

- Transfemoral



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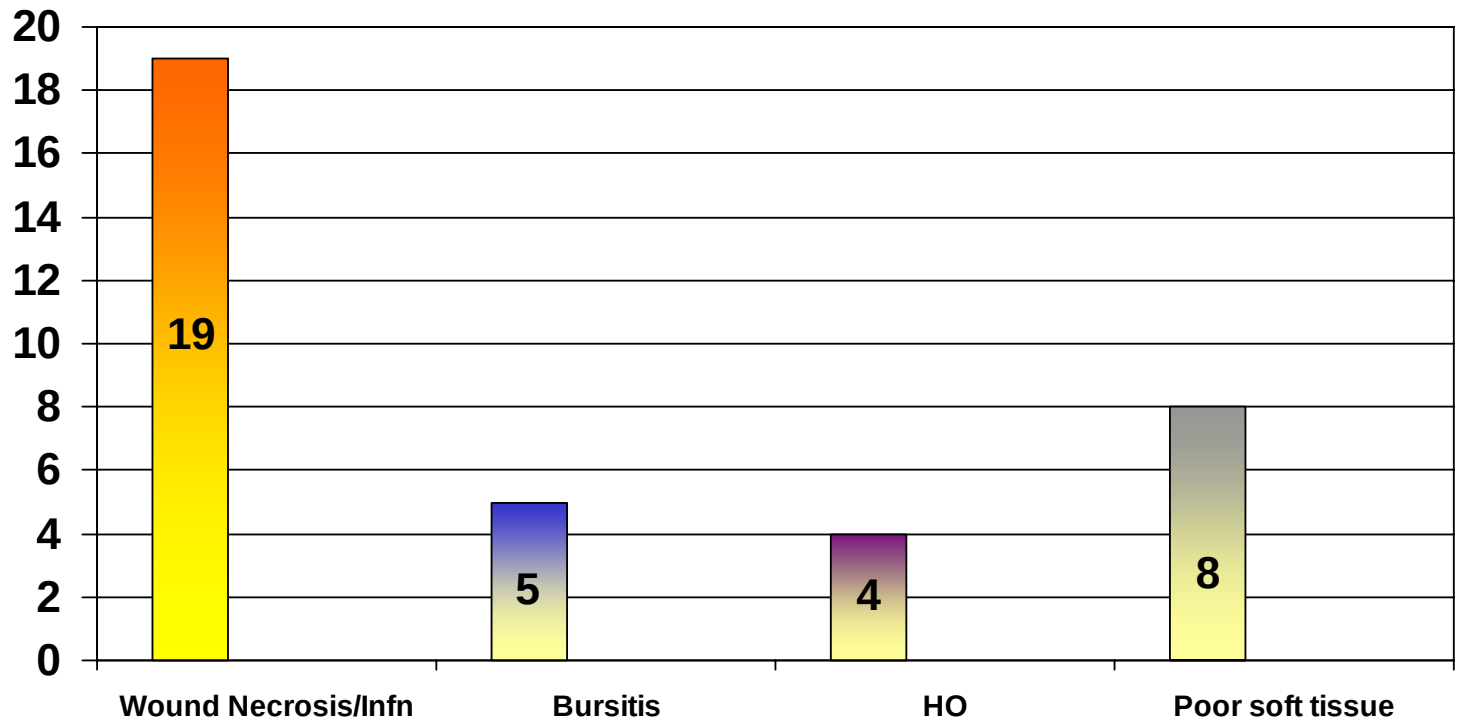
Results: Indications for revision

- Transtibial n=36



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Extensive Soft Tissue Injury from Trauma

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Late Skin Breakdown due to Poor ST

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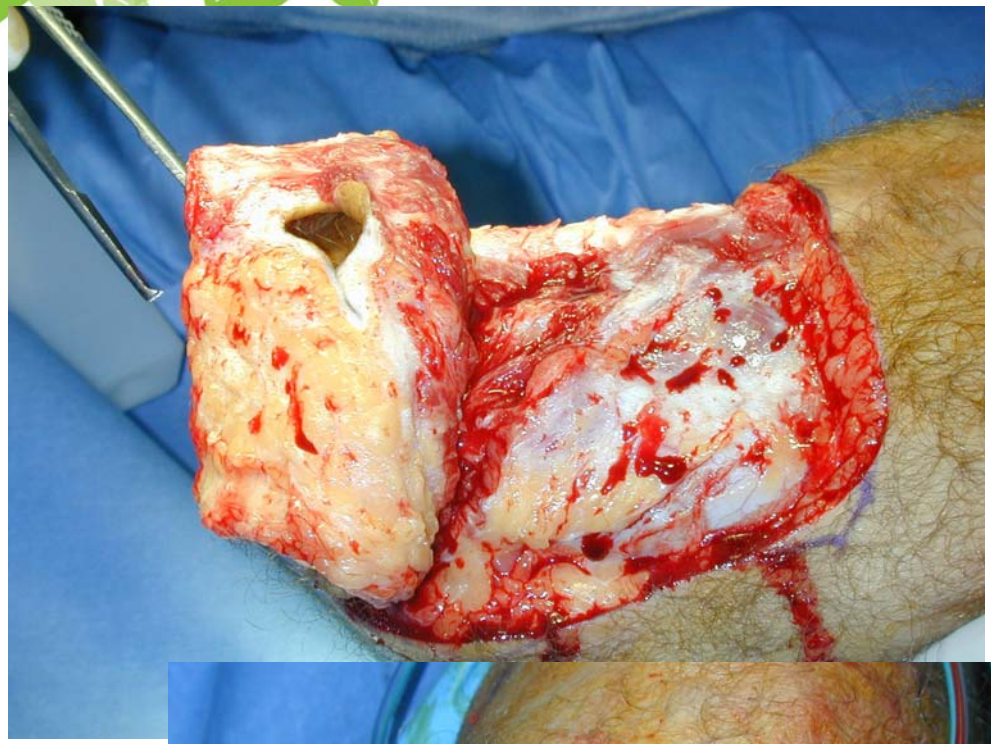

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Transtibial with deep cleft and minimal padding

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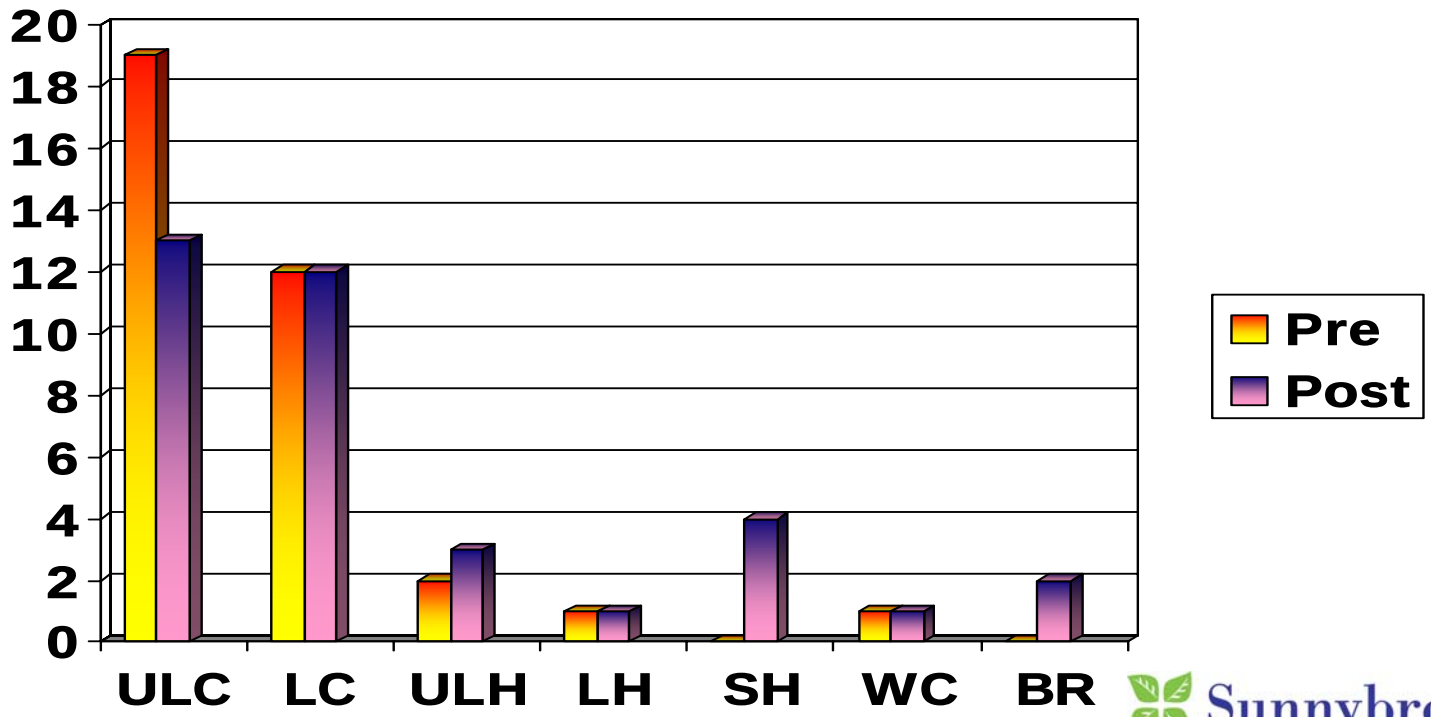
Final Appearance

Results: Ambulatory status (By Level)

- Transtibial



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Summation

- **All Transfemoral-Transfemoral (7/12)**

  Dropped 1 or more level

- **All Transfemoral–Hip Disarticulation (5/12)**

  All became wheelchair users or bedridden

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Summation: Ambulatory Status

- **All Transtibial Local Revisions (21/36)**

  3 improved (14%), 13 Unchanged (62%), 5 lost minimum of 1 grade ambulatory status (24%)

- **Transtibial-Transfemoral (10/36)**

  9 lost at least 1 grade ambulatory status (90%)

- **Transtibial-Knee Disarticulation (5/36)**

  2 Improved (40%), 3 lost minimum of 1 grade ambulatory status (60%)

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Heterotopic Ossification (HO)

- 6/54 (11%) had HO requiring revisions
- 4 Males / 2 females
- 4 Transtibial / 2 Transfemoral
- Etiology- Trauma(3)
  PVD(2),
  Unclear (1)
- 4 Local Revisions; 2 Proximal (Transtibial to Transfemoral)

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Re revisions

- 5/54 (9%) underwent re revisions
- 1 Local and 4 Proximal(2 Transtibial to Transfemoral, 1 Transtibial to Knee Disarticulation,1Transfemoral to Hip Disarticulation)
- Complications: Wound necrosis 2, 1 infection, Poor soft tissue cover 1, HO 1, Occlusion of vascular graft 1.

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Discussion

- Indications: The indications are those recommended by Wood et al 1987
- Perioperative morbidity (~50%) and mortality (13%)similar to those reported
- 81% had complete relief of symptoms and remaining 19% had partial relief of symptoms
- Ambulatory status: majority decreased at least 1 level of function when revised to a more proximal level
- Mortality 13%

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Discussion

- Weaknesses:
  - Single surgeon
  - Selected population
  - Retrospective study

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Discussion

- Strengths:
  - Included all etiologies including dysvascular and diabetic patients
  - Moderate sized sample for transtibial level
  - Follow up

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Conclusions

- Revision of Amputation can provide symptomatic relief when surgical goal is clear
- The perioperative morbidity (~50%) and mortality rates (13%) are significant
- The general effect is a decline in ambulatory status except for transtibial amputees suitable for local revisions

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Research is a Team Sport

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