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# Conducting a Retrospective Study



## The Vertical Contour Calcaneotomy, an Alternative Approach to Surgical Heel Ulcers: A Case Series

Nicole K. Cates, DPM • Kaihua Wang, DPM • Jered M. Stowers, DPM • Christopher E. Attinger, MD • Paul J. Kim, DPM, MS, FACFAS • John S. Steinberg, DPM, FACFAS

- Abstract
- Clinical Evidence
- Keywords
- References
- Article Info
- Related

## Peripheral Vascular Disease Diagnostic Related Outcomes in Diabetic Charcot Reconstruction

Nicole K. Cates, DPM • Tammer Elmarsafi, DPM, MBBCh • Taylor J. Bunka, DPM • ... John S. Steinberg, DPM, FACFAS • Christopher E. Attinger, MD • Paul J. Kim, DPM, MS, FACFAS

- Abstract
- Level of Clinical Evidence
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## Charcot Reconstruction: Outcomes in Patients With and Without Diabetes

Nicole K. Cates, DPM, AACFAS • Emily C. Wagler, DPM • Taylor J. Bunka, DPM • ... Karen K. Evans, MD • John S. Steinberg, DPM, FACFAS • Christopher E. Attinger, MD

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## Adjunctive lateral ankle stabilization in midfoot Charcot reconstruction for ankle joint preservation

Nicole K. Cates, DPM, AACFAS • Deepal H. Dalal, DPM, MS • Jacob Wynes, DPM, MS, FACFAS

Open Access • Published: August 26, 2021 • DOI: <https://doi.org/10.1016/j.jfas.2021.100078> • PlumX Metrics

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## Evaluation of Peripheral Perfusion in the Presence of Plantar Heel Ulcerations Status After Transmetatarsal Amputation With Achilles Tendon Lengthening

Nicole K. Cates, DPM, AACFAS • Mira Pandya, DPM • Nicholas D. Salerno, DPM • ... Paul J. Kim, DPM, MS, FACFAS • John S. Steinberg, DPM, FACFAS • Christopher E. Attinger, MD

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### Abstract

- Level of Clinical Evidence
- Keywords
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### Abstract

The objective of this study is to evaluate peripheral perfusion in patients who developed plantar heel ulcerations status after transmetatarsal amputation and Achilles tendon lengthening. Peripheral perfusion was assessed via contrast angiography of the 3 crural vessels (anterior tibial, posterior tibial, and peroneal arteries), as well as intact heel blush and plantar arch. The secondary objective is to correlate the arterial flow to time to develop heel ulceration and incidence of minor and major lower-extremity amputation. Diagnostic angiography without intervention was performed on 40% of patients (4/10), and interventional angiography was performed on 60% of patients (6/10). In-line flow was present in 0% (0/10) of the peroneal arteries, 60% (6/10) of the anterior tibial arteries, and 70% (7/10) of the posterior tibial arteries. Heel angiographic contrast blush was present in 60% (6/10), and intact plantar arch was present in 60% (6/10). Patients developed heel ulcerations at a mean time of 7.6 months (range 0.7 to 41.2) postoperatively. The incidence of major lower-extremity amputation was 30% (3/10), with a mean time of 5.2 months (range 3.5 to 8.3) from time of heel wound development. No amputation occurred in 6 patients (60%). Among them, intact anterior tibial in-line arterial flow was present in 3, intact posterior tibial in-line arterial flow was present in 6, and heel blush was present in 5. Our results demonstrate that an open calcaneal branch of the posterior tibial artery is sufficient to heal plantar heel ulcerations to potentially increase rates of limb salvage.

## Complications of Charcot Reconstruction in Patients With Peripheral Arterial Disease

Nicole K. Cates, DPM, AACFAS • Tammer Elmarsafi, DPM, MBBCh, AACFAS • Cameron M. Akbari, MD • ... John S. Steinberg, DPM, FACFAS • Christopher E. Attinger, MD • Paul J. Kim, DPM, MS, FACFAS

- ABSTRACT
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- References
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## A Systematic Review of Angular Deformities in Charcot Neuroarthropathy

Nicole K. Cates, DPM, AACFAS • Jonathan Tenley, DPM • Helene R. Cook, DPM • Paul J. Kim, DPM, MS, FACFAS

- Abstract
- Level of Clinical Evidence
- Keywords
- References
- Article Info
- Related Article

## Retruncalcanal Enthesophyte Resection With Functional Lengthening of the Achilles Tendon and Buried Knot Technique: A Case Series

Nicole K. Cates, DPM, AACFAS • Emily C. Wagler, DPM, AACFAS • Shirley Chen, DPM, AACFAS • Laurence G. Rubin, DPM, FACFAS

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- Abstract
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- References
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## Risk Factors and Outcomes After Surgical Reconstruction of Charcot Neuroarthropathy in Fracture Versus Dislocation Patterns

Nicole K. Cates, DPM, AACFAS • Jonathan Furmanek, DPM • Corey S. Dubois, DPM, AACFAS • Jacob Wynes, DPM, MS, FACFAS

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## Split Anterior Tibial Tendon Transfer to Dorsal Lateral Foot for Cavovarus Deformities With Neuropathic Ulcerations: A Case Series

Nicole K. Cates, DPM, AACFAS • Taylor J. Bunka, DPM • Amber M. Kavanagh, DPM • Jacob Wynes, DPM, MS, FACFAS

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### Abstract

- Level of Clinical Evidence
- References
- Article Info
- Related Articles

### Abstract

Cavovarus deformity leads to increased peak pressure on the plantar lateral foot, which can lead to ulceration, and can potentially progress to amputation. Techniques have been suggested in the treatment of cavovarus deformity, such as peroneus brevis or longus tendon transfer, anterior tibial tendon lengthening, posterior tibial tendon transfer, or boney resection. This case series shows split anterior tibial tendon transfer as a surgical reconstruction of cavovarus pedal deformity. Our technique of split anterior tibial tendon in-phase transfer to the dorsal lateral foot, restores the eversion and dorsiflexory pull necessary to offset peroneal attenuation. The procedure can be performed primarily or staged, in order to achieve infection temporization prior to the transfer. A total of 14 patients underwent split anterior tibial tendon transfer, 57.14% (8/14) of which had preoperative ulcerations, and 42.86% (6/14) of which had preoperative hyperkeratotic pre-ulcerative lesions. The preoperative ulcerations were present for an average of 67.89 weeks (range 2-232), with an average area of 6.09 ± 7.44 cm<sup>2</sup>. The ulcerations healed in 75% (6/8) of the patients, at 19.67 weeks (range 1.57-76), with new ulceration occurrence in 7.14% (1/14) of patients, 7.14% (1/14) rate of ulceration recurrence. None of the patients went on to minor or major amputation. The goal of the tendon transfer is to decrease midfoot plantar pressures on the lateral foot and allow for resolution of pre-existing ulcerations and rebalancing the foot and ankle.

# OVERVIEW

- **Form an Idea**
- **IRB**
- **Datamining**
- **Statistical analysis**
- **Evaluating the results**
- **Writing the manuscript**

# FORM AN IDEA



# FORM AN IDEA

- Cohort: What group are you evaluating?
- Comparison: What are you comparing?
- Factors: What factors are you comparing for?
- Review existing literature to see if study exists:  
*Database like pubmed*

# EXAMPLE FORM AN IDEA

- Cohort: Charcot patients that underwent reconstructive surgery
- Comparison: Comparing Charcot patients with and without diabetes
- Factors:
  - Preoperative risk factors: age, BMI, HTN, PAD, renal disease, smoking history, location of preoperative ulcer, etc.
  - Postoperative outcomes: delayed union, dehiscence, amputation, Charcot recurrence, postoperative ambulation, etc.



# IRB

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# IRB

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PROTOCOL VERSION NUMBER:

PROTOCOL PREPARATION DATE:

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Authorized By:

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Signature \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

PROTOCOL AUTHOR:

PRINCIPAL DIRECTOR:

PRINCIPAL INVESTIGATORS:

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### 2. Protocol Summary

Title	
Sponsor	
Investigators	
Investigative Site	
Study Type	
Study Design	
Primary Efficacy Endpoint	
Secondary Efficacy Endpoint	
Tertiary Efficacy Endpoint	
Quaternary Endpoint	
Exploratory Endpoints	
Safety Endpoint	
Number of Subjects	
Study Synopsis	
Eligibility Criteria	
Statistical Analysis	
Treatment Duration	
Study Duration	
Study Cost	



# DATAMINING

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	B	D	E	F	G	H	J	K	AH	AI	AJ	AK	AL	AO	AP	AQ	AR	AS	AT
	MRN	Age at repair	BMI value at time of repair	Diabetes 1=yes 0=no	CKD 1=yes 0=no	ESRD 1=yes 0=no	HTN 1=yes 0=no	Smoker hx or current 1=yes 0=no	Preop ulcer 1=yes 0=no	Forefoot 1=yes 0=no	Midfoot 1=yes 0=no	Hindfoot 1=yes 0=no	Ankle 1=yes 0=no	Preoperative Soft tissue infection 1=yes 0=no	Preoperative Osteomyelitis 1=yes 0=no	CN forefoot 1=yes 0=no	CN midfoot (TMTJ+CNJ) 1=yes 0=no	CN hindfoot (TNJ+CCJ+S TJ) 1=yes 0=no	CN rearfoot (AJ+calcane us) 1=yes 0=no
1																			
2	6364960	63	24.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
3	824140	47		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
4	7093616	52	39.8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	7189252	64	30.2	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	1
6	710718	53	20.7	0	0	0	0	0	1	0	1	0	1	1	1	0	0	1	0
7	6331115	58	22.7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
8	7022186	52	37.9	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
9	7022186	53	37.9	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
10	798609	47		0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1
11	1094031	61		0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
12	6377648	53		0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
13	6642957	67	29.05	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
14	6354928	71	29	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
15	680498	53	24.5		1	0	1	1	0	0	0	0	0	0	0	0	1	0	0
16	234402	64		0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
17	947123	57		0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0
18	7207977	57	41.34	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1
19	6547008	60	31.6	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0
20	7122523	82	29.33	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0
21	6581433	35		0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0
22	7104092	70	25.16	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1
23	6622103	33	33.32	0	1	0	1	1	1	0	1	1	0	1	1		1	0	0
24	6652583	73	30.52	0	0	0	1	1	1	1	1	0	0	1	0	0	1	0	1
25	6617905	35	37.11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0
26	418301	62			0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
27	6507640	31		0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1

# DATAMINING

- Cohort: Define cohort and determine how to find the patients
  - ICD-10's: If cohort based on diagnosis can pull patients by diagnostic codes
    - Ex) Dr McAteer, patients with PTTD  
“Dr McAteer patients for ICD-10: M76.821 & M76.822 (need left & right codes)”
  - CPTs: If surgical patients can pull patients by surgical codes
    - Determine if you want single surgeon or multiple surgeons
    - Ex) Dr Bradley Lamm's patients who had multiplanar external fixator devices. “Dr Bradley Lamm's patients for CPT 20692”

# DATAMINING

- Inclusion Criteria:
  - Cohort: defined as X
  - Underwent X surgery, surgery defined as
- Exclusion Criteria:
  - <18 years old
  - < 1 year follow up postoperatively

# EXAMPLE DATAMINING

- Inclusion Criteria:
  - Cohort: Charcot joint involvement defined as joint subluxation, dislocation, presence of small osseous fragments, or osseous fracturing consistent with Charcot neuroarthropathy
  - Underwent: Charcot reconstructive surgery which included arthrodesis, osteotomies, or deformity correction of the ankle / hindfoot.
- Exclusion Criteria:
  - < 18 years old
  - < 1 year follow up postoperatively

# DATAMINING

- Define Each Factors:
  - Age: defined as age at time of surgery
  - PAD: defined as non-triphasic doppler signal
  - Renal disease: defined as either CKD or ESRD in medical records
  - Amputation
    - Minor amputation: toe, ray, TMA, symes, choparts amputation
    - Major amputation: below the knee or above the knee amputation
  - Postoperative ambulation: defined as non-ambulatory (wheelchair bound), partially ambulatory (transfers only or assistive devices and fully ambulatory (unassisted ambulation)

# DATAMINING

- Factors:
  - Continuous variable: value is obtained by measuring
    - Example: age, BMI, AIC
  - Categorical variable: variable that can take on one of a limited, and usually fixed, number of possible values
    - Example diabetes yes = 1, no = 0
    - Example postoperative ambulatory status, non=0, partial=1, full=3



# DATAMINING

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	B	D	E	F	G	H	J	K	AH	AI	AJ	AK	AL	AO	AP	AQ	AR	AS	AT
	MRN	Age at repair	BMI value at time of repair	Diabetes 1=yes 0=no	CKD 1=yes 0=no	ESRD 1=yes 0=no	HTN 1=yes 0=no	Smoker hx or current 1=yes 0=no	Preop ulcer 1=yes 0=no	Forefoot 1=yes 0=no	Midfoot 1=yes 0=no	Hindfoot 1=yes 0=no	Ankle 1=yes 0=no	Preoperative Soft tissue infection 1=yes 0=no	Preoperative Osteomyelitis 1=yes 0=no	CN forefoot 1=yes 0=no	CN midfoot (TMTJ+CNJ) 1=yes 0=no	CN hindfoot (TNJ+CCJ+S TJ) 1=yes 0=no	CN rearfoot (AJ+calcaneus) 1=yes 0=no
1																			
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3	824140	47		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
4	7093616	52	39.8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	7189252	64	30.2	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	1
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9	7022186	53	37.9	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
10	798609	47		0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1
11	1094031	61		0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
12	6377648	53		0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
13	6642957	67	29.05	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
14	6354928	71	29	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
15	680498	53	24.5		1	0	1	1	0	0	0	0	0	0	0	0	1	0	0
16	234402	64		0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
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21	6581433	35		0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0
22	7104092	70	25.16	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1
23	6622103	33	33.32	0	1	0	1	1	1	0	1	1	0	1	1		1	0	0
24	6652583	73	30.52	0	0	0	1	1	1	1	1	0	0	1	0	0	1	0	1
25	6617905	35	37.11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0
26	418301	62			0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
27	6507640	31		0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1

# DATAMINING

MRN	Age at repair	BMI value at time of repair	Diabetes 1=yes 0=no	CKD 1=yes 0=no	ESRD 1=yes 0=no	HTN 1=yes 0=no	Smoker hx or current 1=yes 0=no
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Preop ulcer 1=yes 0=no	Forefoot 1=yes 0=no	Midfoot 1=yes 0=no	Hindfoot 1=yes 0=no	Ankle 1=yes 0=no	Preoperative Soft tissue infection 1=yes 0=no	Preoperative Osteomyelitis 1=yes 0=no
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CN forefoot 1=yes 0=no	CN midfoot (TMTJ+CNJ) 1=yes 0=no	CN hindfoot (TNJ+CCJ+S TJ) 1=yes 0=no	CN rearfoot (AJ+calcaneus) 1=yes 0=no
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# STATISTICAL ANALYSIS

## Descriptive Statistics for Non-diabetic versus Diabetic Charcot Neuroarthropathy (Bivariate Analysis)

Post Reconstructive Outcomes	Non Diabetic CN (N=25)	Diabetic CN (N=50)	P-value
Delayed healing	52.0% (13/25)	34.0% (17/50)	0.1336
Dehiscence	36.0% (9/25)	16.0% (8/50)	0.0512
Major lower extremity amputation	16.0% (4/25)	26.0% (13/50)	0.3933
<b>Delayed osseous union</b>	28.0% (7/25)	4.0% (2/50)	<b>0.0051</b>
Recurrence of Charcot	16.0% (4/25)	12.0% (6/50)	0.7186
New Charcot location collapse	0% (0/25)	6.0% (3/50)	0.5481
<b>Return to ambulation</b>	85.7% (18/25)	29.8% (14/50)	<b>&lt;0.0001</b>

# STATISTICAL ANALYSIS

- What to ask the statistician to get p-values
  - “X had statistically higher rates of Y and Z” ( $p=0.002$ )
- What to ask the statistician to get odds ratios
  - “X was 8 times more likely to develop Y than Z  
[OR 8.01 (95% CI (3.5-87.6))]

# STATISTICAL ANALYSIS

- P-values
  - Bivariate analysis: comparing two different groups for a factors
    - Two groups: Charcot patients **WITH** and **WITHOUT** diabetes
    - Factor 1: comparing for Age at time of reconstruction
    - Factor 2: comparing for BMI at time of reconstruction
    - Factor 3: comparing for preoperative diagnosis of renal disease
    - Etc, etc

# STATISTICAL ANALYSIS

- Odds ratios: Multivariate logistic regression
  - A model that is used to predict the probabilities of the different possible outcomes of a variable, given a set of independent variables
  - Need to run separate regressions for preoperative factors and postoperative outcomes
    - Comparing all statistically significant preoperative factors to see which have the biggest impact



# STATISTICAL ANALYSIS

## Charcot Etiology: Diabetic vs non Diabetic

Comparing Charcot Neuroarthropathy with Diabetic vs Non-Diabetic Etiology for pre-operative infection, anatomic location of Charcot breakdown, and outcomes

- a. Pre-operative Infection
  - i. Bivariate analysis comparing "CN DM" and "CN non DM" for:
    1. Pre-op ulcer (column AH)
    2. Forefoot (column AJ)
    3. Midfoot (column AJ)
    4. Hindfoot (column AK)
    5. Ankle (column AL)
    6. Medial (column AM)
    7. Lateral (column AN)
    8. Soft tissue infection (column AO)
    9. Osteomyelitis (column AP)
  - ii. Multivariate logistic regression for the statistically significant factors from above
- b. CN by anatomic location
  - i. Bivariate analysis comparing "CN DM" and "CN non DM" for:
    1. Forefoot collapse (column AQ)
    2. Midfoot collapse (column AR)
    3. Hindfoot collapse (column AS)
    4. Rearfoot collapse (column AT)
  - ii. Multivariate logistic regression for the statistically significant factors from above
- c. Outcomes
  - i. Bivariate analysis comparing "CN DM" and "CN non DM" for:
    1. Delayed/non healing (column BI)
    2. Dehiscence (column BJ)
    3. Major lower extremity amputation (column BK)
    4. Non union (column BL)
    5. Recurrence of Charcot (column BM)
    6. New Charcot location collapse (column BN)
    7. Return to ambulation (column N)
  - ii. Multivariate logistic regression for the statistically significant factors from above

# EVALUATING THE RESULTS

Characteristics	<u>Non Diabetic</u> N=25	Diabetic N=50	P value
Delayed healing	13(52.0)	17(34.0)	0.1336
Dehiscence	9(36.0)	8(16.0)	0.0512
Major lower extremity amputation	4(16.0)	13(26.0)	0.3933
<u>Non union</u>	7(28.0)	2(4.0)	<b>0.0051</b>
Recurrence of Charcot	4(16.0)	6(12.0)	0.7186
New Charcot location collapse	0(0.0)	3(6.0)	0.5481
Return to ambulation	18(85.7)	14(29.8)	<b>&lt;.0001</b>

Multivariate logistic regression for the statistically significant factors from above

Effect	DF	Chi-Square	<u>Pr &gt; ChiSq</u>
<u>osseous delayed non</u>	1	6.5560	<b>0.0105</b>
Ambulator_1_yes	1	12.2075	<b>0.0005</b>

		Odds Ratio	95% Confidence Limits	
<u>Osseous delayed non</u>	1 vs 0	16.4	1.9	139.6
Ambulator	1 vs 0	17.6	3.5	87.6

# EVALUATING THE RESULTS

- What values are statically significant
- What do the these values being statically significant mean?
- Understand the results and what they mean clinically

# WRITING THE MANUSCRIPT

## Sections of the paper

- Title page
- Abstract
- Introduction
- Methods
- Results
- Discussion
- References
- Tables / Figures

# WRITING THE MANUSCRIPT

Order in which I write

1. Title page
2. Methods
3. Tables
4. Results
5. Abstract
6. Introduction
7. Discussion
8. References
9. Figures

# WRITING THE MANUSCRIPT

## TITLE PAGE

- Title
  - *Charcot Reconstruction: Outcomes in Patients With and Without Diabetes*
- Authors
  - *Nicole K. Cates, DPM<sup>1</sup>....Christopher E. Attinger, MD<sup>2</sup>*
  - *First author: author who wrote majority of the manuscript*
  - *Last author: most senior author*
- Affiliations
  - *<sup>2</sup>Attending Physician, Department of Plastic Surgery, MedStar Georgetown University Hospital, 3800 Reservoir Rd NW, Washington DC, 20007*
- Corresponding author
  - *Name, title, affiliation, email, Phone, Fax*
- Financial disclosure statement
  - *Financial disclosures of all authors*



# WRITING THE MANUSCRIPT METHODS

- **Methods:** this helps me define my cohort, and factors
  - IRB approval board
  - How you identified patients for the study (cohort, icd-102 or CPTs, for X surgeons, time frame Y-Z)
  - Inclusion / exclusion criteria
  - Datamining: all factors evaluated: preoperative factors and postoperative outcomes (how each was defined)
  - Any study specific equation / concept (fully define)
  - Statistical analysis (Statistician typically writes this paragraph)

# WRITING THE MANUSCRIPT TABLES

- **Tables:** puts all the results in one area in a clean format
  - Fill in the tables with the data from the statistician
  - Need tables citations (Table I) in the paper to appear in the order they appear at the end of the manuscript
  - Table I: always demographics
  - Following tables: bivariate analysis, multivariate regression, etc

# WRITING THE MANUSCRIPT TABLES

## Tables: Demographics

### Tables

**Table 1:** Demographics of Patients Included in the CN Osseous Reconstruction Cohort

	Number % (N=75), Median
Age at repair	56 (31-86) Median: 58
Body Mass Index (BMI)	32.4 (20.7-45.6) Median: 31.6
Glycosylated hemoglobin A1c (HbA1c)	8.5 (5.0-14.6) Median: 7.4

# WRITING THE MANUSCRIPT TABLES

## Tables: Bivariate

**Table 2:** Descriptive Statistics for Non-diabetic versus Diabetic Charcot Neuroarthropathy (Bivariate Analysis)

Characteristics	<u>Non Diabetic</u> (cases) N=25	Diabetic (Matched controls) N=50	P value
Age at repair	56 (31-82) Median: 57	56 (31-86) Median: 58	0.9886
Body Mass Index (BMI)	30.4 (20.7-41.3) Median: 29.8	33.4 (21.3-45.6) Median: 33.8	0.1098
Hypertension	64.0% (16/25)	64.0% (32/50)	1.0000

# WRITING THE MANUSCRIPT TABLES

## Tables: Multivariate Regression

**Table 4:** Multivariate Logistic Regression, for risk outcome Osseous Delayed Union and Return to Ambulation

Effect	Odds Ratio	95% Wald Confidence Limits	
Return to Ambulation	17.6	3.5	87.6
Osseous Delayed Union	16.4	1.9	139.6

# WRITING THE MANUSCRIPT RESULTS

- **Results:** Use the tables section to write the results section
  - List out all the demographic data
  - Bivariate analysis: solely include statistically significant results (p-values)
  - Multivariate regression solely include statistically significant results (odds ratios)



# WRITING THE MANUSCRIPT ABSTRACT

- **Abstract:** Helps think through the overall message of the paper
  - Primary & secondary aims of the study
  - Methods: what statistical analysis did you perform (bivariate analysis, multivariate regression)
  - Results: only statistically significant variables
  - Conclusion: summarizing clinical significance and meaning of the results

# WRITING THE MANUSCRIPT ABSTRACT

## Abstract

- Primary & secondary aims of the study sentence
  - *The objective of this study is to compare risk adjusted matched cohorts of Charcot neuroarthropathy patients who underwent osseous reconstruction with and without diabetes.*
- Methods sentence
  - *Bivariate analysis was performed for preoperative infection, location of Charcot breakdown, and post reconstruction outcomes, in patients with a minimum of 1 year follow-up period.*

# WRITING THE MANUSCRIPT ABSTRACT

## Abstract

- Results sentence
  - *Through bivariate analysis, presence of preoperative ulceration ( $p=0.0499$ ) was found to be statistically more likely in the patients with diabetes; whereas, delayed osseous union ( $p=0.0050$ ) and return to ambulation ( $p\leq 0.0001$ ) was statistically more likely in patients without diabetes.*
  - *The non-diabetic Charcot patients were 17.6 folds more likely to return to ambulation [OR 17.6 (95% CI (3.5-87.6))], and 16.4 folds more likely to have delayed union [OR 16.4 (95% CI (1.9-139.6))].*

# WRITING THE MANUSCRIPT ABSTRACT

## Abstract

- Conclusion sentence
  - *Our results demonstrate that DM CN patients are more likely to present with preoperative ulcerations compared to non DM CN patients. Though the non DM CN patients show higher rates of delayed union after CN reconstruction, they are more likely to return to ambulation compared to patients with DM.*

# WRITING THE MANUSCRIPT INTRODUCTION

## Introduction

- 1<sup>st</sup> paragraph: Generally introduce the topic
- 2<sup>nd</sup> paragraph: Overview of current literature on the topic
- 3<sup>rd</sup> paragraph: Why this research is relevant. Primary / secondary aims of the study

# WRITING THE MANUSCRIPT DISCUSSION

## Discussion

- **Overview paragraph:** Generally overview the topic. Want to explain why this concept is important
- **Results Paragraph:** Paragraphs explaining each statistically significant results with literature to back up hypothesis of why it is statistically significant
- **Limitations paragraph:** review all the limitations to the study, and how future studies can improve on this study
- **Conclusion paragraph:** overview of the results with a clear take home message for the reading

# WRITING THE MANUSCRIPT RESULTS

- **References**

- Fill in as you go, even if you don't completely format the references put a skeleton list for yourself to work off later
- Within the manuscript don't number until after attending edits, keep citations as (author) or (author-year) if there are duplicates of the same author
  - After final attending edits number in order they appear in the manuscript (1)... Blah blah (2).
  - Have reference citations match order they appear in the manuscripts

# WRITING THE MANUSCRIPT

## FIGURES

- **Figures**
  - Clinical or radiographic figures that highlight and demonstrate key concepts from the paper
  - Can also include algorithms, decision trees, radiographic measurements, etc
  - \*Need figure citations (Figure 1) in the paper to appear in the order they appear at the end of the manuscript



**THANK YOU!**

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