

**FASST**   
 FOOT & ANKLE SYMPOSIUM & SURGICAL TECHNIQUES  
**DIABETIC DILEMMAS**  
 FEBRUARY 12-14, 2021

BROUGHT TO YOU IN PARTNERSHIP BY  
 DES MOINES UNIVERSITY   
 MEDICINE & HEALTH SCIENCES 

**Maximizing Results of a TMA**  
 Sean T. Grambart, DPM FACFAS

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**Disclosures**

- Partner, BESPA Global
- Medical Design Team, Orthosolutions
- Speaker, ACFAS, Depuy-Synthes

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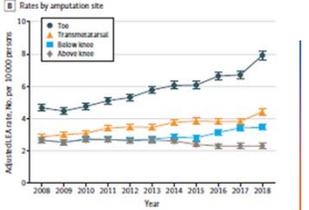
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What is the latest on TMAs?

*Temporal Trends in Incidence Rates of Lower Extremity Amputation and Associated Risk Factors Among Patients Using Veterans Health Administration Services From 2008 to 2018*  
 Miao Cai, PhD; Yan Xie, MPH; Benjamin Bowe, MPH; Andrew K. Gibson, MPH; Mohamed A. Zayed, MD, PhD; Tingting Li, MD, MSCI; Ziyad Al-Aly, MD  
 JAMA Network Open. 2021;4(1)



Year	Toe	Transmetatarsal	Below knee	Above knee
2008	4.5	2.5	2.5	2.5
2009	4.5	2.5	2.5	2.5
2010	4.5	2.5	2.5	2.5
2011	4.5	2.5	2.5	2.5
2012	4.5	2.5	2.5	2.5
2013	4.5	2.5	2.5	2.5
2014	4.5	2.5	2.5	2.5
2015	4.5	2.5	2.5	2.5
2016	4.5	2.5	2.5	2.5
2017	4.5	2.5	2.5	2.5
2018	4.5	2.5	2.5	2.5

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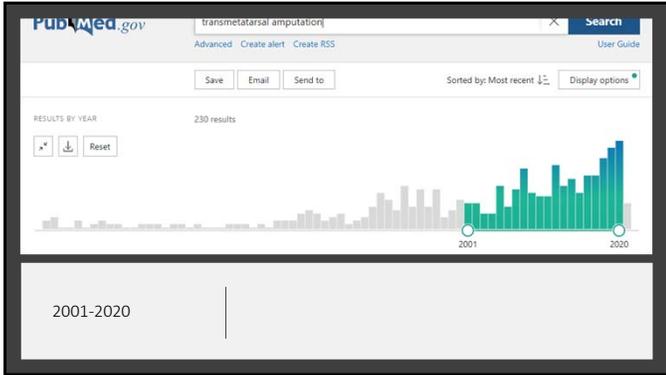
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**Maximizing Expectations of a TMA**  
Sean T. Grambart, DPM FACFAS

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*"Doc, it can't be any worse than this, right??"*

- TMA does not heal
- Recurrent Infection
- Major Amputation
- Death

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**A meta-analysis of mortality after minor amputation among patients with diabetes and/or peripheral vascular disease.**  
 Yammine K, Hayek F, Assi C.  
*J Vasc Surg.* 2020 Dec;72(6):2197-2207.

"Comparison with cancer mortality rates. Our results showed that the survival of patients who had undergone a minor LEA has been worse than that for patients with many common cancers, such as Hodgkin disease and breast, oropharynx, kidney, prostate, and, even, colon cancer."

- Systematic literature search was performed to identify studies that had reported the survival or mortality rates after **minor LEA**
- Primary outcomes: mortality rate at 30 days, 1 year, 3 years, 5 years, 6 to 7 years, or 8 to 9 years
- Secondary outcomes were the mortality rates according to the anatomic location
- 28 studies with 17,325 subjects
- Meta-analytical results of the mortality rates were as follows:
  - 3.5% at 1 month
  - 20% at 1 year
  - 28% at 3 years
  - 44.1% at 5 years
  - 51.3% at 6 to 7 years
  - 58.5% at 8 to 9 years
- Independent Risk Factors:
  - Diabetic patients, age, chronic kidney disease, PAD, and coronary artery disease
- Conclusions: "Mortality after minor amputation for patients with diabetes and/or PAD was found to be very high. Compared with the reported cancer data, **survival was worse than that for many cancers.** Just as in the case of major amputations, minor amputations should be considered a pivotal event in the life of these patients."

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**Transmetatarsal amputation: A 12 year retrospective case review of outcomes.**  
 Joyce A, Yates B, Cichero M.  
*Foot (Edinb).* 2020 Mar;42:101637.

- Retrospective review of outcomes was performed on patients who underwent TMA
- Healing rate and time to healing, mortality, duration of hospital admission and incidence of revision surgery was evaluated
- 47 patients (54 TMA's)
- Results
  - 78% healing rate
  - 6 patients (11%) died before healing
  - 11% did not heal and resulted in major limb amputation
- No further surgery to the same foot was required after the TMA healed
- Median healing time of 83 days was identified
- Duration hospital admission was 24 days
- 5-year mortality was 43%, and demonstrated an association with renal and/or vascular pathology

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**Failed Healing or Major Amputation**



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*Transmetatarsal Amputation Outcomes When Utilized to Address Foot Gangrene and Infection: A Retrospective Chart Review*  
 R.C. Harris, W. Fang  
*The Journal of Foot & Ankle Surgery* 00 (2020) 1–7

- The purpose of this review was to evaluate TMA healing and to explore if there were associated variables correlating with healed vs. failed to heal TMA sites
- 39 patients (41 procedures) TMAs
- Median postoperative follow-up period was 617 (range 199-3632) days
- TMA mortality data revealed 0 deaths at 30 days, 2 (5.1%) at 1 year, 8 (20.5%) at 5 years.
- 29 (70.7%) of the TMAs would achieve primary healing at a median of 31 days
- **Neuropathy** and **positive bone margin** were found to be significant in univariate logistic regression analysis
- Neuropathy was present in 17 (58.6%) of the healed TMAs and in 12 (100%) of the failed to heal TMAs

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*Present-day analysis of early failure after forefoot amputation.*  
 Zambetti BR, Stiles ZE, Gupta PK, Stickley SM, Brahmabhatt R, Rohrer MJ, Kempe K  
*Surgery*. 2020 Nov;168(5):904-908.

- Determine risk factors and outcomes for a more proximal amputation after forefoot amputation **with closure**
- Patients requiring **early (within 30 days) more proximal amputation after transmetatarsal amputation** were compared with those **who did not need further amputation**
- 1,582 transmetatarsal amputation were identified
- More proximal amputation occurred in 4.2% of patients within the first 30 days postoperatively
- Early failure was associated with:
  - **Greater hospital stays postoperatively (10 days vs 7 days)**
  - **More wound complications (29% vs 11%)**
  - **Pneumonia (8% vs 2%)**
  - **Stroke (3% vs 0.1%)**
  - **Overall complications**
- Marked increase in unplanned readmission for those undergoing reamputation (59% vs 14%)
- Preoperative systemic inflammatory response, sepsis, or septic shock were independent predictors of more proximal amputation

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*Risk Factors for Wound Complications Following Transmetatarsal Amputation in Patients With Diabetes.*  
 Kantar RS, Alfonso AR, Rifkin WJ, Ramly EP, Sharma S, Diaz-Siso JR, Levine JP, Ceradini DJ.  
*J Surg Res*. 2019 Nov;243:509-514.

Risk factors for wound complications in patients with diabetes mellitus undergoing transmetatarsal amputations (TMAs)

**Materials and methods:**

- SQIP database

**Results:**

- A total of 2316 patients with diabetes mellitus who underwent TMA were identified.
- Overall wound complications occurred in 276 (11.9%) of patients...

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Conclusion

- Mortality Rate is MUCH Higher
- Comorbidities and Neuropathy
- Clean Margins
- Patient/Family Expectations

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Thank You!

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