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Biomechanics of the diabetic foot amputation

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According to the International Diabetes Federation, it has been estimated that approximately 463 million adults are living with diabetes mellitus (DM), a number projected to increase to 700 million by 2045. A diabetic foot ulcer will occur in approximately 15 percent of them. Multiple factors contribute to the development of those wounds including diabetic peripheral neuropathy (DPN), biomechanical imbalances, trauma, and peripheral vascular disease. 85% of all lower limb amputations in patients with diabetes are preceded by a DFU resulting in significant biomechanical challenges for these patients, many of who never become ambulatory again.

Prior to surgical intervention, patients come with inherited and acquired biomechanical imbalances or weaknesses such as equinus, severe pronation/supination, mid and forefoot deformities, and muscle weakness unrelated to their other diseases. Surgeons often don't take these into consideration when making decisions about amputation level. Choosing the wrong level of amputation in an attempt to "preserve the foot" often dooms the patient to future failure and multiple amputations until a final resolution of their problem. The purpose of this review is to discuss specific bio mechanical, and quality of life (QoL) issues associated with lower extremity amputations and identify the most functional levels for lower extremity amputation in compromised DFU patients. By reviewing recent data on these amputations, we hope to aid surgeons in choosing the appropriate level for intervention and highlight certain areas of weakness in the literature requiring further investigation.

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