**Investigating the Effects of Fasciotomy Timing on Amputation and Infection in the Management of Traumatic Injury**

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**Purpose:** Current recommendations suggest fasciotomy within 6-8 hours of diagnosis of compartment syndrome. In cases of acute limb ischemia, a prophylactic fasciotomy can be considered with limb revascularization. Due to conflicting results on the effect of fasciotomy timing, we sought to further investigate its effect on both amputation and infection. We assessed a large trauma database to provide more definitive recommendations regarding fasciotomy timing as well as identify comorbidities that could affect patient outcome. We hypothesize that a delayed fasciotomy will increase the likelihood of both amputation and infection.

**Methods:** The American College of Surgeons (ACS) Trauma Quality Improvement Program (TQIP) database was queried from 2017-2021. ICD-10 codes were used to identify fasciotomy patients, patient characteristics, limb amputations, and number of infections.

**Results:** 22,004 patients analyzed within the database received a total of 30,380 fasciotomies. Of the fasciotomies performed there were 1625 (5.35%) corresponding amputations. Rate of amputation was significantly lower in patients receiving fasciotomies 1-4 hours compared to 4-8 hours ($P<0.0001$, odds ratio [OR] = 0.6088, 95% confidence interval [Cl] = 0.5180-0.7156) after presentation. There was no significant change in rate of amputation from 4-24 hours, only showing a significant increase after 48 hours. Deep surgical site infection (SSI) rates showed a similar decrease from the 1-4 hour to the 4-8 hour time frame ($P = 0.0354$, OR = 0.6794, 95% Cl = 0.4742-0.9736) with a significant increase after 12 hours ($P = 0.0283$, OR = 1.823, 95% Cl = 1.095-3.033).

**Conclusion:** Although there was no correlation with fasciotomy timing and amputation within the first 24 hours, there was a significant increase in deep SSI and sepsis after the 8-hour time frame, suggesting that fasciotomy be performed within 4-8 hours of presentation. Interestingly, fasciotomy within the first 4 hours showed significantly elevated risk of both amputation and infection. This could be due to increased injury severity, increasing the patient's risk or further morbidity. This shows that initial management of patients requiring fasciotomy within the first 4 hours provides opportunities for more optimal outcomes.