Optimizing Donor Reconstruction: A Safer, Faster Alternative to the Standard Running Suture Technique

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Background

During donor reconstruction post-tissue recovery, it has been the routine practice of most recovery agencies to perform varying running sutures using a large handheld needle and string along the entire length of the incision site on the extremities, which will be referred to as the Standard Reconstruction Method (SRM). While this is an ethical practice, it poses several challenges, including an increased risk of accidental needle sticks to the recovery staff, excessive holes in the skin that funeral homes have to undo and redo for body preparations, thus presenting challenges to the funeral homes to handle fluid leaking potential, and added time to the case. We sought to mitigate these challenges by increasing staff safety during reconstruction, reducing the time spent on reconstruction, ensuring funeral home accommodations, and performing reconstruction diligently and ethically. We introduced a new method, the point-suture method (PSM).

Hypothesis

We believed that performing a point-suture method on the extremities, followed by wrapping them with an absorbent layer, would increase staff safety by minimizing skin punctures and needle handling and reduce time spent during donor reconstruction.

Method

We gathered insights from funeral homes on body preparation practices and inquired about challenges encountered post-tissue recovery. We are aware that the historical running stitches on the donor's legs and arms have resulted in numerous skin holes. The funeral homes undo these sutures, only to replace them with their own, creating more holes and increasing the risk of leakage. It was concluded that less suturing on the extremities would be beneficial for the funeral homes for body preparation purposes. Additionally, we wanted to increase staff safety during donor reconstruction and minimize accidental needle sticks.

The process requires that the recovery staff perform only a few sutures along the leg – one at the ankle, one at the mid-lower leg, one at the knee, and one at the mid-thigh. You would then only need to perform running sutures on the upper thigh. Once the sutures are in place, we wrap the leg with an absorbent pad. The pad is then secured with Coban to keep it in place (*see illustration A*). A similar practice is performed on the arm, in which only a few points are sutured, such as the elbow, mid-arm, and shoulder. The arm is then wrapped in an absorbent pad and secured with Coban (*see illustration B*).

We timed the point-suture-method (PSM) reconstruction, photographed the reconstruction, and shared this information with our funeral home liaison to understand the concept and communicate practices with our funeral home partners.

We arrived at a 12-minute benchmark for the point-suture method (PSM) through a combination of observed timing data, pilot-case averaging, and operational validation. The 12-minute benchmark was established through preliminary observational timing of multiple donor reconstructions performed using the point-suture method across varying case conditions and personnel.

Results

These are the results for staff performing the Standard Reconstruction Method (SRM) (see also *Figure 1. Boxplot of Reconstruction Times*).

- Sample size (n): 12
- Mean time: 21.1 minutes
- Median time: 19.0 minutes
- Standard deviation: 8.85 minutes

We performed a one-sample t-test comparing the SRM to 12 minutes for the PSM.

- Null hypothesis (H_0): Mean = 12 minutes
- Alternative hypothesis (H_1): Mean ≠ 12 minutes
- T-statistic: 3.25
- P-value: 0.00997

Conclusion

The standard reconstruction method (SRM) takes, on average, substantially longer than the 12-minute point-suture method benchmark, with fairly high variability between technicians.

Since $p < 0.05$, the result is statistically significant, and the difference is very unlikely to be due to chance. The SRM time is significantly and operationally longer than the point-suture-method (PSM) benchmark of 12 minutes. The average increase per case using the SRM is 9.1 minutes, a 76% increase in time. There is high variability (Standard Deviation ≈ 8.85 min), suggesting that differences in skill level, experience, and case complexity may influence outcomes.

The findings suggest that the point-suture method (PSM) may offer meaningful operational benefits through improved reconstruction efficiency. Future research should evaluate whether equivalent quality outcomes could support increased throughput, reduced technician fatigue, and improved case turnaround times.

The PSM method was well-received among funeral home partners due to fewer holes in the skin, thereby reducing the potential for leaks after body preparation.

Keywords: Donor Reconstruction, Tissue Recovery, Needlestick Injury Prevention, Process Improvement

Clinical Trial Registry: N/A

Data Deposition: N/A

Competing Interests: The authors declare no competing interests.

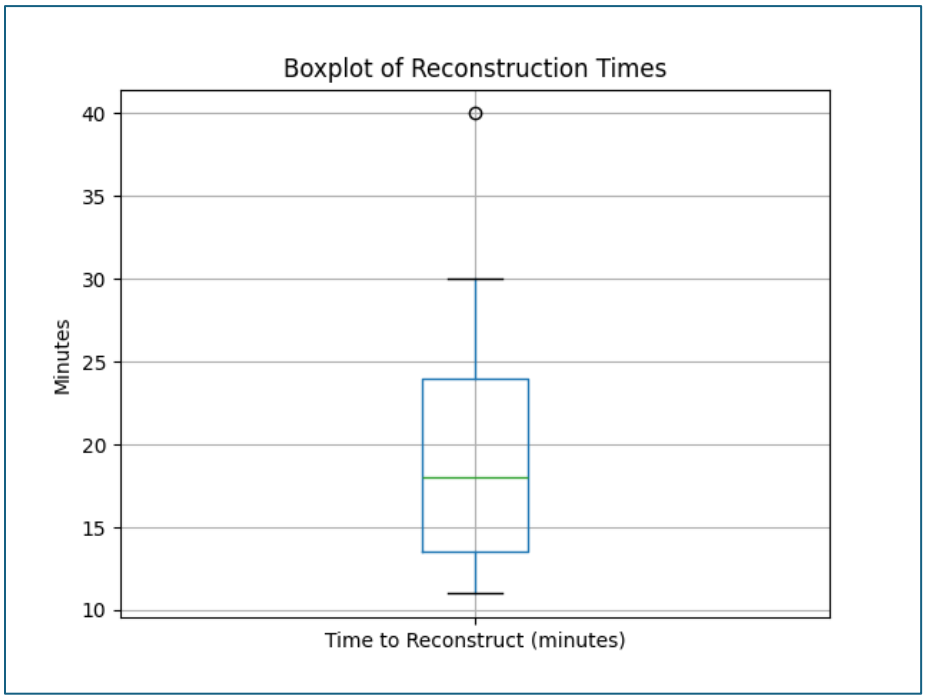
Ethical Approval: The study was conducted in accordance with relevant AATB and FDA standards and regulations.

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References: None

Figure 1. Boxplot of Reconstruction Times



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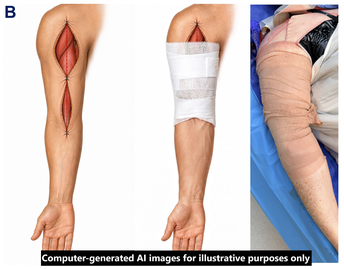
METHODS

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Computer-generated AI image for illustrative purposes only



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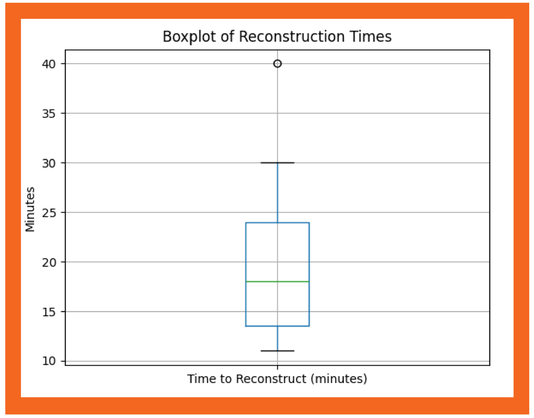
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Disclosure: The authors declare no competing interests.

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