Reducing potential for needle-stick injuries in the operating room: Efficacy of wound closure with Operative Armour as compared with traditional methods

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Introduction/Purpose: The CDC estimates that at least 385,000 sharps injuries occur annually among US healthcare workers, which may even be as high as 800,000. Traditionally, wound closure demands the OR scrub tech to pre-load suture needles onto needle drivers that are presented to the surgeon and then passed back once the needle has been used. With frequent passing of contaminated needles, needle-stick injuries occur commonly in the OR. Operative Armour (Sharp Fluidics®, LLC) incorporates a novel needle trap that enables surgeons to independently self-secure and self-dispense suture needles during closure (Fig. 1). We hypothesized that the use of Operative Armour as compared to the standard technique of sequentially passed needles would reduce the number of sutures passes.

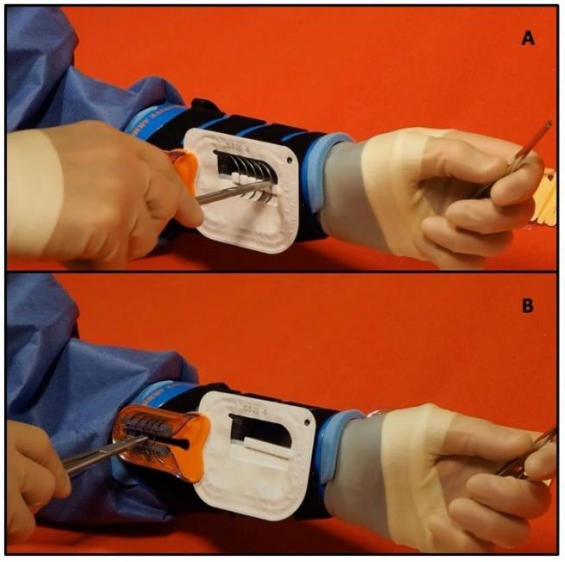
Methods: Three cadaveric specimens were dissected in this study. A 12cm long incision was made through an anterior and posterior approach to the ankle joint in each specimen. The incisions were cross-hatched at 1cm intervals with a surgical marking pen to indicate closure points. Two layers, subcuticular and skin, were closed. All three participants were orthopedic foot and ankle fellows at our institution. All wound closures were done with interrupted suture technique using 2-0 vicryl pop-off suture (Covidien), containing 5 needles per pack. Group A used traditional suture passing from the scrub tech vs the Operative Armour in Group B. The participants completed three trials for each group first through the anterior and then through the posterior approach. Outcome measures included number of needle passes, dropped needles, and closure time.

Results: Suture passes averaged 52±8.9 for Group A compared to 5.3±0.7 in Group B ($p<0.05$). There were 24 needle handoffs in Group A, in Group B only three suture packs were passed. Overall closure time was 16:35±0.2 minutes in Group A and 16:33±0.1 minutes for Group B ($p= 0.8$). No needles were dropped in either group. For the anterior incision, suture passes averaged 56±11.3 in Group A compared to 5.6±0.9 in Group B ($p<0.05$). The closure time for Group A was 16:51±0.2 minutes and 16:13±0.1 minutes for Group B ($p<0.05$). For the posterior incision, suture passes averaged 48±0.0 in Group A compared to 5±0.0 in Group B ($p<0.05$). The closure time for Group A was 16:18±0.2 minutes and 16:53±0.1 minutes in Group B ($p=0.05$).

Conclusion: Use of the Operative Armour compared to standard technique demonstrated a statistically significant decreased number of suture passes, but no change in total closure time. Given the large reduction in sutures passes, the use of the Operative Armour could lead to a significant reduction in the number of needle sticks in the OR during wound closure. Also, while not measured in this study, the use of Operative Armour could reduce the demand on the scrub tech for assistance with wound closure and could thus decrease OR turnaround time and enhance operating room efficiency.

Figure:

Figure 1. A: Demonstration of Operative Armour self-secured suture**. B:** Demonstration of the Operative Armour self-disposal container for contaminated suture



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