

This is the first published study evaluating dual-intraosseous needles in a single bone”  
Douma et al (2015).

Abstract:

**INTRODUCTION:** Resuscitation can be delayed, or impaired, by insufficient vascular access. This study examines whether dual-intraosseous needles, inserted into a single porcine humerus, can facilitate rapid and concomitant fluid and medication delivery.

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**METHODS:** After inserting one- and then two-intraosseous needles into the same porcine humerus, we determined the rate of fluid administration using (i) an infusion pump set to 999mL/h, and (ii) a standard pressure-bag set to 300mmHg. Next, we concomitantly infused blood, crystalloid and medications into the same medullary canal, using the two-needle set-up. Humeri were inspected for fluid-leakage, needle-displacement, and bone damage.

**RESULTS:** Using an infusion pump, the mean normal-saline infusion-rate was significantly higher with dual-intraosseous needles compared to a single-intraosseous needle: the infusion-rate was 16mL/min using dual-needles versus 8mL/min for a single needle set-up ( $p < 0.001$ ). In contrast, using the pneumatic pressure-bag, the infusion rate was not statistically different when comparing dual-intraosseous needles versus single-intraosseous: the infusion-rate was 22mL/min versus 21ml/min ( $p = 0.4$ ) for 500mL, and 22ml/min versus 21ml/min ( $p = 0.64$ ) for one-litre, respectively. Blood product could be infused at a mean rate of 20mL/min through one needle while tranexamic acid was simultaneously infused through a second. There were no complications with a dual-intraosseous set-up (no fluid leakage; no needle-displacement; no high-pressure alarms, and no external bone-fractures or internal macrohistological damage) during any of our simulated resuscitation scenarios.

**CONCLUSIONS:** This is the first published study evaluating dual-intraosseous needles in a single bone. Despite limitations, this preliminary study (using a porcine humerus) suggests that dual-intraosseous needles are feasible. For critically-ill patients with limited insertion sites, dual-intraosseous (a.k.a. ‘double-barrelled resuscitation’) may facilitate rapid and concurrent resuscitation.

Reference:

Douma, M.J., Bara, G.S., O'Dochartaigh, D. and Brindley, P.G. (2015) Double-barrelled resuscitation: A feasibility and simulation study of dual-intraosseous needles into a single humerus. Injury. September 11th. .

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