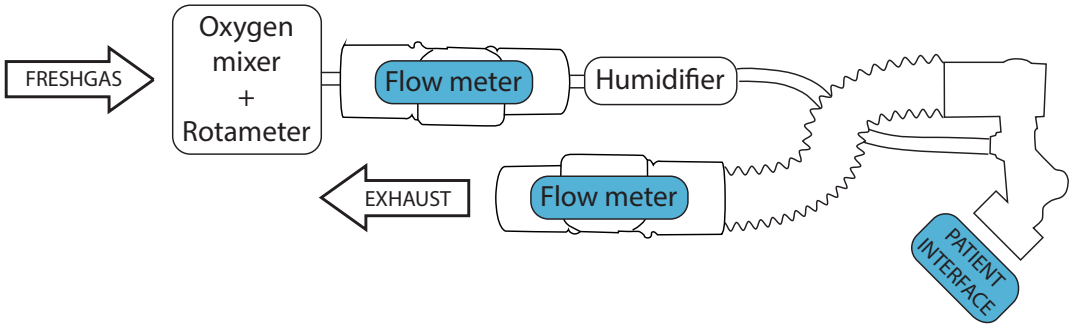
Supplemental file 1

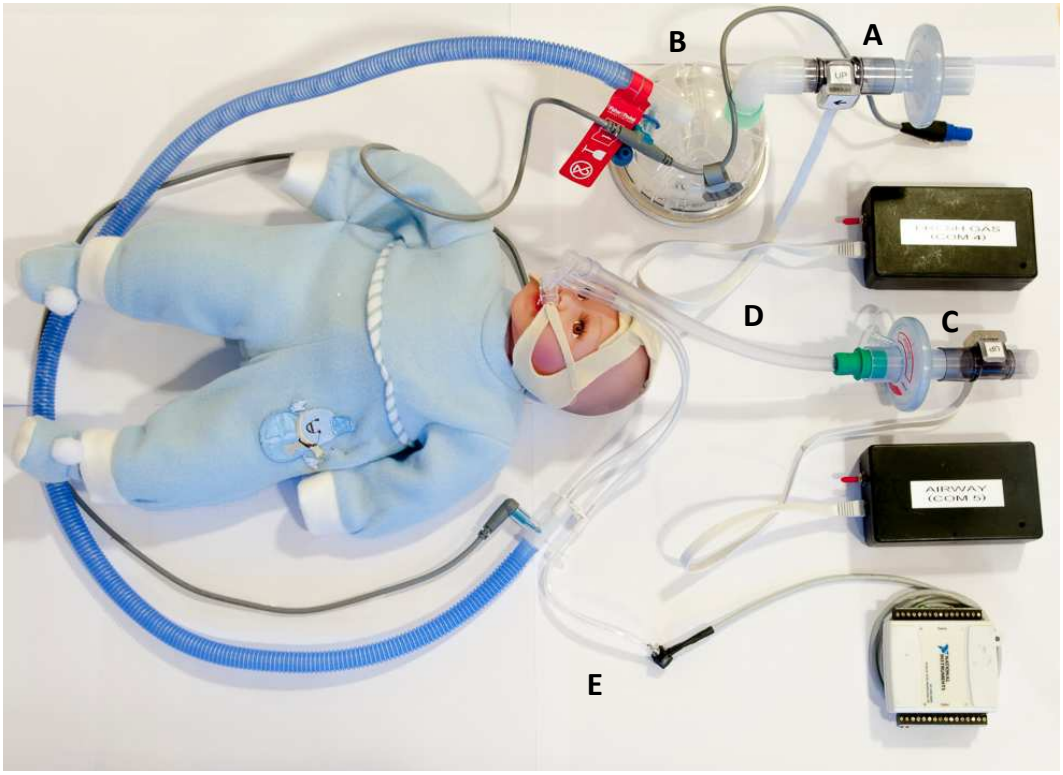
Equipment setup with flow through flow meters

The CPAP driver was replaced with an oxygen mixer and a rotameter to avoid automatic changes in flow with leakage compensation. The fresh gas was humidified using a MR850 humidifier (Fisher & Paykel, New Zealand) and connected to an Infant Flow design device. Two custom SFM-3200-60-AW flow meters (Sensirion AG, Staefa, Switzerland) were added to the patient circuit enabling flow-through measurements; one on the fresh-gas supply and the second on the patient expiratory limb. The configuration added no dead space and minimal resistance.

The flow meters were calibrated with the correct oxygen level and conditioned gas. A calibrated Honeywell pressure sensor (40PC001B1A; Honeywell, Freeport, IL, USA) was used to set the prescribed CPAP. For each interface, connectors were checked for leakage and the flow meters zeroed against each other.



Supplemental figure 2a: Drawing of flow through setup. The fresh gas flow meter (top) is situated on the inspiratory limb and the exhaust flow meter (bottom) is situated on the expiratory limb. The patient interface is positioned between the two flow meters. The same flow meter layout (positioned on inspiratory and expiratory limb) is common in ventilators. By subtracting the expiratory limb flow from the fresh gas flow, the patient flow can be determined. The patient flow represents both leakage and breathing. Illustration published as supplement in the ToNIL trial.(1)



Supplemental figure 2b: The components and layout. The fresh gas flow meter (A) is situated on the inspiratory limb before the humidifier (B). The exhaust flow meter (C) is situated on the expiratory limb (D). The pressure transducer is connected to the CPAP device (E).

1. Falk M, Gunnarsdottir K, Baldursdottir S, Donaldsson S, Jonsson B,Drevhammar T. Interface leakage during neonatal CPAP treatment: a randomised, cross-over trial. *Arch Dis Child Fetal Neonatal Ed*. 2021;**106**:663-7 doi: 10.1136/archdischild-2021-321579.