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**Title:** Particle content in exhaled air depending on breathing maneuver

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**Body:** The airway opening generates particles in the distal airways. At high exhalation flows, particles can be formed due to dynamic compression in more central airways. The aim with the present study was to compare particle number and size distributions as well as concentrations of SpA in PEx formed during tidal breathing, airway opening and dynamic compression using forced exhalations. Ten healthy volunteers performed three different types of breathing maneuvers in randomized order; Reference maneuver (R): no airway closure and no dynamic compression (slow expiration), Dynamic compression (DC): maximal exhalation and no preceding airway closure, Airway opening (AO): slow expiration preceded by an inspiration from tidal lung volume. PEx were counted, sampled and analyzed for surfactant protein A (SpA) content using ELISA. Compared to the R maneuver; the DC maneuver doubled the particle concentration and the AO maneuver gave a ten times increase in the amount of particles per liter exhaled. Flow volume curves indicated that dynamic compression was limited by the back pressure in the instrumentation. The mass ratio of Sp-A in the PEx were highest in PEx using the R manoeuvre; 13% v.s 5%DC ( $p<0.001$ ) and 3%AC ( $p<0.001$ ), DC to AC difference was not significant ( $p=0.1$ ). The size distributions were similar in all maneuvers. Conclusion In conclusion, fast exhalation flows generates more particles than slow exhalation flows, but probably not by the dynamic compression mechanism.