We consider the local perturbation of a Bose gas by an immobile impurity. We start with the simplest case of a non-interacting gas, for which the Schrödinger equation can be solved explicitly. A new method is provided, which allows to obtain many-body observables such as the spectral function. If time permits, we will eventually discuss ongoing work on the interacting gas, where a Jastrow-like ansatz hints at an anomalous scaling of the ground-state energy.