Squeeze for Speed

While watering our garden with water coming out of a flexible pipe we often press the end of the pipe to get a higher velocity of the water (see Figure). An application of Bernoulli’s equation shows that in both cases a and b in Figure, the velocity of the water coming out of the pipe is

\[ v = \sqrt{2gH}, \]

where \( H \) is the height of the water level in the tank above the pipe exit.

Then, how can we explain that a reduction of the exit area increases the velocity of the water coming out? Is there a difference in the two flow rates?

![Diagram showing the connection of a flexible pipe to an overhead tank. (a) Water coming out of an unsqueezed pipe. (b) When the end is pressed, water coming out has a higher velocity.](image)