



Trocar for laparoscopic simulation



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Summary

To perform laparoscopic surgery, a patient's abdomen is inflated with carbon dioxide and laparoscopic instruments are...

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To perform laparoscopic surgery, a patient's abdomen is inflated with carbon dioxide and laparoscopic instruments are inserted through small incisions in the abdominal wall. An admission device, the trocar, is fixed into those incisions to minimize gas leakage and tearing of skin. Trocars become the fulcrums for a camera (laparoscope) and surgical instruments.

Learning to work over a fulcrum is a foundational skill for a laparoscopic surgeon. By working over a fulcrum, direction of movement is inverted from handle to tip, and hand movements can become amplified or stilled depending on the ratio of the instruments' stem length before and after the fulcrum.

We designed a 3D printable trocar that can be used to turn any box or container into a laparoscopic simulator. One 3D printable trocar costs about 20 eurocents in material. A commercial, operating room ready trocar costs about 65 euro at minimum. Our design has multiple moving parts, but can be printed as one object with no post-processing necessary.

A step file of the design is included for easy customization (e.g., for laparoscopic instruments with a diameter other than 5mm).

Model files



3in1-poort-2019-04_25562.stl



3in1-poort-2019-04.stl



3in1-sluitring-2019-04.stl



3in1-trocar.step

[Find source .stl files on Thingiverse.com](#)

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