



3D PRINTABLE SCALPEL

Designing a 3D printable scalpel for long-term space missions, as well as far-flung areas of the Earth, comes with a number of challenges.

1. The potential advantages and disadvantages of current solutions must be taken into account.
2. The parts that can effectively be printed must be decided.
 - a. For a scalpel, the metal blade cannot be printed effectively with current technologies, but the blades themselves can be packed efficiently in a small volume, and as such can be included on a mission in a large number.
3. The design should allow the scalpel to work near/or as effectively as current terrestrial versions.
4. The design should be simple to print and use.

The solution to these challenges came from modifying an existing mockup found online (GrabCAD, <https://grabcad.com/library/scalpel>) by thickening the handle, creating deeper hold ridges, and strengthening the connection to the blade. A critical advantage of our system is that it is not difficult to print for current 'off the shelf' 3D printers.

The 3D printing process allows for the fabrication, and re-fabrication, of the medical kit when supplies present on the mission at the start begin to run low. An added benefit of the re-fabrication (melting and reusing) of the 3D printed part is the temperature at which the process needs to take place is hot enough to completely sterilize the material. Thus, making it safe for an infinite number of reuses. This also allows for creating the exact number of medical components that are needed in a potential medical emergency.

