BIOMEDICAL ENGINEERING

BIOMEDICAL ACTIVITY

Clear your own path to the heart
Part 1 – the blockage

Materials

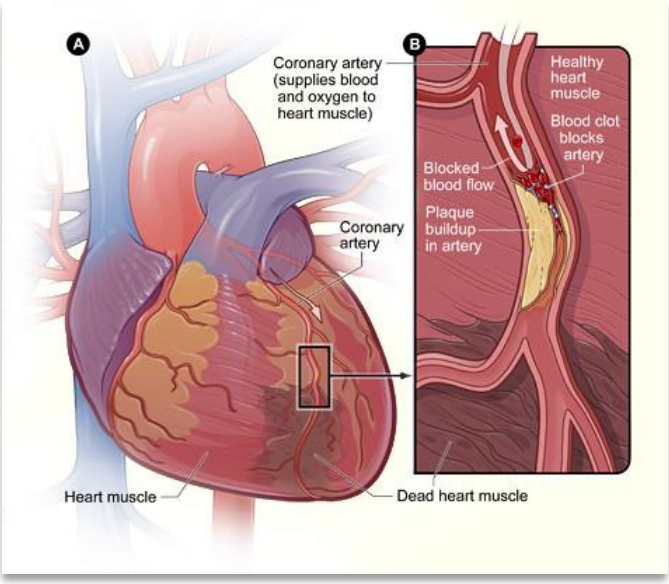
- plastic tubing (approx. 3cm dia. and 10cm long) to act as the blood vessel
- plastic container to catch the water
- 2L bottle to test water flow through the tube
- Masking tape and ruler to hold the artery in place over the plastic container
- play-dough to act as the clogging material that will line the inside of the tubing

Link

Original source link: teacherengineering.org

Instructions

Arteries and major blood vessels can get clogged – increasing the risk of heart attack or strokes. The heart needs a constant supply of blood to function and keep the rest of your body alive. This activity looks at different methods to clear clogged material out of a tube.



Credit: National Heart, Lung and Blood Institute, National Institutes of Health. CC BY-NC 2.0

1. Attach a ruler to the edge of a plastic container so that it points down into the container. Tape a short length of tubing (which represents an artery) to the ruler.
2. Time with a stopwatch how long it takes 1L of water to flow through the clear artery – note this time down.
3. Now, line the inside of the tube with play dough, tape it back to the ruler and time how long 1L will flow through the clogged artery. Compare the results to the clear artery.

ACTIVITY

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Clear your own path to the heart
Part 2 – clearing the blockage

Materials

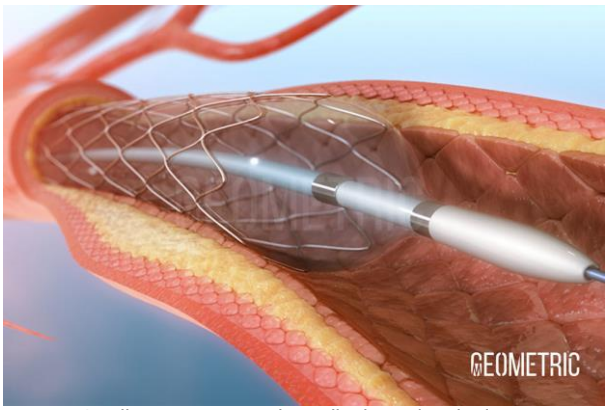
Catheter device

- mesh
- paperclips
- foil
- clown balloons (long party ones) + air pump
- pipe cleaner
- rubber bands
- straws
- wire
- a device to track time (stopwatch or phone app)

Instructions

A catheter is a device that can clear plaque from a blood vessel.

For example, blown up balloons can be used to push or pull the clogged material or wires can be used to scrape the material out.



Credit: www.geometricmedical.com/angioplasty

Using the tube clogged with playdough, design a catheter to remove the playdough without putting your fingers into the tube.

Try out a few designs using different materials such as wire, balloons or rubber bands.

Discuss your findings with the class.

- What worked well?
- What didn't work well?
- Why was one design better than another?
- Which design was the best?

ACTIVITY