**Human Tools: Knife and Cutting Board**

The original human tools that I will be redesigning for animal use are the knife and cutting board. The tools are used for food preparation tasks. The cutting board provides a sanitary space for the food to sit and protects the surfaces underneath from getting scratched. The knife is used to slice the food. There are different types of knives that are better suited for slicing a certain type of food, and this is something that will be taken into consideration in the animal tool design.

**Animal in Mind: Dog**

The animal that will be performing the task is a dog. A dog is a 4-legged mammal that is a domesticated descendant of wolves. There are a couple hundred breeds of dogs that come in all shapes and sizes. However, they mainly use their mouths to grasp and carry objects, and this is the trait that will drive the tool design. Pictured below is my shih-tzu Buddy.

A dog sitting in the grass

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**New Tool Design**

The tool I am proposing is be a mouth actuated knife and cutting board. This tool consists of several components. The first would be a handle connected to a spring tensioned pulley system. The handle could be designed to mimic dog-friendly things like a bone or chew toy, to afford that the dog should bite it. The dog would grasp the handle with its mouth, and pull it a short distance, then release it. The pulley system is double action, meaning that 2 actions are performed for one pull. Pulling the handle brings the knife down like a guillotine, but with a sideways motion to mimic a human pushing and pulling the knife as they cut. The second action will occur upon release of the handle. The cutting board is attached to a ratchet gear, so when the handle is pulled the gear doesn’t engage and the board remains stationary. When the handle is released, the gear engages, and it moves the board a small amount to advance the piece of food for the next slice. The knife also retracts when the handle is released. There will also be adjustability for this tool. There would be a “paw pedal” for the dog, which when stepped on changes the ratchet gear ratios like a bike. This would change how far the board advances after each cut, effectively giving the dog a selection of slice thickness. The second adjustment would be knife selection. Two knives would be mounted on a barrel. There would be a second “paw pedal” for the dog to press, which rotates the knife barrel allowing the dog to select a serrated or flat edge knife. There is little skill involved with using this tool if the dog has human level intelligence. It’s in a dog’s nature to use their mouth, and they generally tug and pull when playing with toys and ropes. I believe that any dog could perform this task. Even if the dog didn’t have teeth, you could attach the pulley to a harness and the dog could use their body to do the pulling. It’s quite adaptable.

**Human/Dog Tool Differences and Implications**

There is not a lot of difference in the actual knife and cutting board than what a human would use. The main difference is how to allow the dog to perform the task as if they were able to grip with hands and had the range of motion of a human arm. I believe the pulley system is suited for dogs because it is in their natural range of motion. They wouldn’t have to go out of their way to learn anything out side of their instinctual habits. Designing this tool has also given me insight on how to think about how people are going to use our interface. The accessibility plays a big role in how I think of design now. I have big hands, but other people may not, and I’d need to consider if important buttons and interaction points are within reach of everyone during one-handed use. It’s also important to consider shorting processes as much as possible. For example, making the dog’s tool double action makes me think of how I can automate more processes for our user’s so there’s fewer inputs required.

Diagram

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