

Product Design Specification

Function: To develop a method of modifying the existing monkey restraint device to effectively restrain a monkey's head or neck to simplify the administration of eye drops.

Client Requirements:

- Restrain the head of the monkey
- Be compatible with existing restraint device
- Work with various sized monkeys
- Not harm the monkey physically
- Be stationary and not require one to hold it while giving treatment

Design Requirements:

1. Physical and Operational Characteristics

- a. Performance Requirements: It will be used at least 10 times a day for the whole year. It must be flexible; it should be able to hold and restrain monkeys of various sizes. The height of the monkeys can range anywhere from 65 to 100 cm and they can weigh anywhere from 3.5 to 11 kg. The device should not hinder the treatment and should be small as possible. **Material should be resistant to monkey claws.**
- b. Safety: The device should be comfortable for the monkey otherwise the monkey may react negatively and compromise the treatment process. It

should be strong and have no sharp edges that may cause physical harm to the monkey. As witnessed, monkeys at times can be very aggressive and strong. The device should follow the “animal humane” requirements and must not be harmful physically or psychologically to the monkey.

c. Accuracy and Reliability: The device needs to be compatible with various monkeys, so it should be adjustable for monkeys of various sizes (65-100 cm) and weights (3.5-11 kg).

d. Life in Service: The device will be used on a regular basis. It will be used daily for at least five hours a day and five days a week. It will be kept in one place, the treatment room.

e. Shelf Life: The device must operate under extreme forces and loads. The monkeys may at times be aggressive, so it is imperative that the device is capable of withstanding monkey’s force. Since it will be used regularly, the device must be made of durable material.

f. Operating Environment:

i. Temperature Range: 25 degrees Celsius

ii. Pressure Range: 4 GPM at 20 PSI

iii. Dirt or Dust: very dirty environment.

iv. User: Must be user friendly to people of all sizes and strengths.

g. Ergonomics: The device must be very flexible. It should be compatible with monkeys of various sizes. The device must not need more than a one person to operate. It should be easily adjusted while

wearing latex gloves.

h. Size: The size of the device must correlate with the pre-existing monkey restraint cage. Additionally, it should accommodate 3.5-11 kg monkeys. The device must fit through the treatment cage and removed easily at the end of the treatment.

i. Weight: It should not weigh more than three pounds.

j. Materials: The materials used must be non-toxic, rigid (able to withstand strength of monkeys), tough (able to withstand scratching from monkeys), easily sanitized and nonabrasive.

k. Aesthetics: No bright colors that will scare the monkey. Device must fit around the upper region of the monkey easily.

2. Production Characteristics

a. Quantity: Only one unit is needed.

b. Target Product Cost: The device must cost less than \$200.

3. Miscellaneous

a. Standards and Specifications: Probably need some type of approval from the animal rights activists (RARC). Since the device is being used to restrain the monkeys, it must be checked to see whether it is humane or not.

b. Customer: Because this monkey restraint device can be used only with the treatment cage used by our client, it would be impossible to market to other customers.

- c. Animal-related concerns: Confidentiality of all processes occurring in Ophthalmology Department involving monkeys is extremely important to our client. Public discussion of this device and the monkeys must be restricted.
- d. Competition: No current comparable product has been found or used.