

Ring Removal Device

Product Design Specifications

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Function : Design a device that removes the rings from patient's fingers before surgery. Two devices are being designed. One will work in conjunction with a ring cutter to aid in removal of ring after it is cut. The second device will be a non destructive device that compresses the finger to remove the ring.

Client requirements:

- Device must not cause excessive patient discomfort
- Device must work efficiently
- Device must be ergonomically designed
- Device must be adaptable to all shapes and sizes of fingers
- Device must be inexpensive
- Device must be easy to use
- One device with a destructive method, and another with a nondestructive method

Design requirements:

1. Physical and Operational Characteristics

a. Performance requirements: The device must be able to remove the ring by either means of destruction or coercion. The device should also be self explanatory.

b. Safety: The device must not cause any injury or pain to the patient when being applied.

c. Life in Service: The destructive device should function indefinitely. The non-destructive method will most likely be either disposable or used several times before it is disposed.

d. Operating Environment: The device will be used in a surgical, hospital setting. Sterility is an issue as the device must not spread infectious diseases.

e. Ergonomics: The device must be easy to use and the technique for using should be self-explanatory and easily reproducible. The device must also minimize pain on the patient.

f. Size and Weight: There are no particular size requirements, but it must not be so large that the device becomes cumbersome.

g. Materials: The materials being used should be biocompatible. For the nondestructive method both Nitinol and polyurethane are both biocompatible, and are currently being used in medical devices. The nondestructive will also have to be made out of a strong biocompatible material.

2. Product Characteristics

a. Quantity: Only one unit will be necessary to meet the requirements of a successful design.

b. Target Product Cost: The device should cost approximately \$300 to develop and manufacture both of the devices.

3. Miscellaneous

a. Competition: The current techniques for ring removal include destruction of the ring and a suture method that is mundane and time-consuming.

b. Patient-related concerns: The device should not cause further injury to the finger. Both the nondestructive and destructive devices will be design to be disposable or easily sterilized.