



Element I

Problem Statement

One in six women are a victim of sexual assault. Women from the ages 18 to 24 who don't have the physical means to fight back are the ones most commonly attacked. The victims afterwards then suffer mentally, physically, and financially for something that they weren't responsible for.

Introduction and Background Information

Women and people in general in today's society are too much at risk for sexual assault and abuse. This is causing a lot of people to be afraid to just walk outside of their own homes. Our research has shown that every 98 seconds someone is sexually assaulted and more than half of those sexually assaulted don't report it. In a lot of these cases, the sexual assaults can't be stopped because even if the women have something to defend themselves they can't reach it or it doesn't work. Some statistics are that an american being sexually assaulted every 98 seconds. Out of all of these attacks over 65% are not reported due to fear or victim shaming. just 3% of rapes result in a criminal conviction.

Test #1 - Compact/ Discrete

Purpose: One of the most important things that the ring knife needs to be is compact and discrete. The ring knife needs to be small/compact so that it can always be carried on your person. Another important aspect that we need to address is that our product needs to be hard to identify as a weapon. That way no matter where a woman is, or what she is doing, she can have our product on her in the event of an attack.

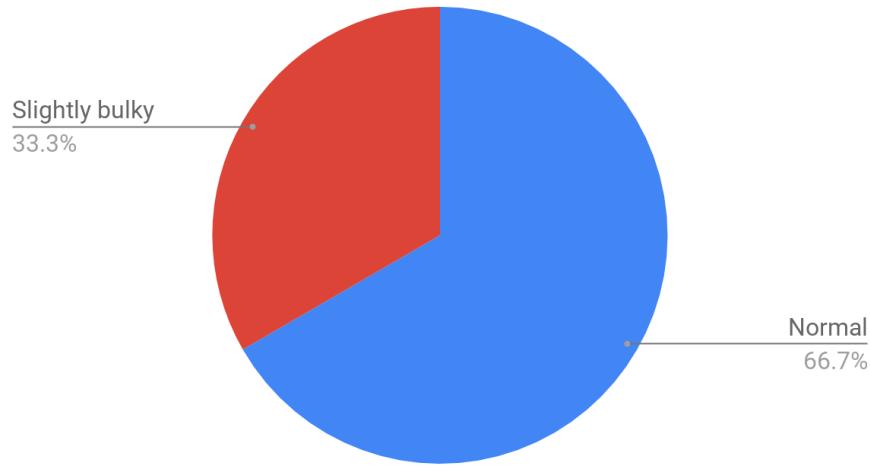
Pass/Fail Criteria: In order to test this requirement, we're going to go into a room of people and ask them how noticeable they think our ring prototype is. In order for our ring to pass this test, we want to at least half of the people to just think that it's a normal ring.



Pre/Testing

Description: Eighteen people were surveyed for the test. All eighteen agreed that the ring looked like a normal ring. The only exceptions were that six people thought the ring looked slightly too tall but that if a metal cap was made for the metal prototype it would look normal.

Points scored



Conclusion: Test 1 concluded that the prototype is discrete. No one would have ever guess for the prototype to be anything other than a normal or slightly tall ring, especially once made out of metal.

Test #2 - Easily Accessible

Purpose: Another important criteria that the ring knife needs to meet is being easily accessible at all times. This way no matter what position a woman is in, she should hopefully be able to reach the ring and be able to defend herself.

Pass/Fail Criteria: The ring needs to be able to have the lid removed and prepared for defense in less than 5 seconds. This will be done by three of us wearing the prototype and testing the time it takes us to remove the lid with it at varying distances from us.

Pretest images



Test Images



Description: There were a set of five trials with three people doing a set. The trials had each person wear the prototype and hold their hands at different places (first arms at sides, above head, in pockets, stretched out, and then in lap). Then they were timed as to how long it took them to get the cap off the lid in preparation for defense.

	Trial 1- arms next to sides	Trial 2- arms above head	Trial 3- hands in pockets	Trial 4- arms stretched out	Trial 5- hands in lap	Average
Testee 1	1.6	1.81	2.37	1.86	1.00	1.728
Testee 2	1.27	1.33	1.32	1.26	1.13	1.262
Testee 3	1.58	1.80	1.32	1.86	1.20	1.552
					Test average	1.484

Conclusion: Test 2 concluded that the prototype is very easily accessible. The passing time for the prototype was 5 seconds. The average time to reach the prototype no matter where it is is 1.484 seconds, making it greatly succeed the test criteria.

Test #3 - Durable

Purpose: Our product needs to be durable as well. In the event of an attack, the product should be durable enough so that the attacker cannot break the product easily. We need it to be able to withstand things such as being stepped on or thrown on the ground.

Pass/Fail Criteria: In order to test the durability of the product we need to put pressure on the 3D printed ring and see if it breaks. There is no pass or fail as the prototype is made of plastic and will most likely break. The metal prototype will not break by human strength.



Pretest



During Test



Post-test

Description: Three different prototypes had pressure put on them in some way in order to test their durability. The first ring was hit with a hammer, the second stomped on, and the third was thrown.

Conclusion: The test concluded that the 3D printed prototype is easily breakable which makes sense because it is plastic. In contrast though the metal prototype and the actual prototype would not be as breakable. The actual product would be made out of stainless steel and the metal prototype is made out of steel. Steel takes 40,000 pounds per square inch to break, making it impossible for someone to break the prototype without machinery.

Test #4 - Harmful

Purpose: The product needs to be something that can harm an attacker. The purpose of the product is to help the user defend themselves from an attack by causing harm to the attacker. The product needs to cause enough harm to get someone to back off but not enough to be lethal.

Pass/Fail Criteria: The product will need to make scratches and dents in cardboard to show it can have some harmful effects. Since this is a prototype it does not need to slash through because for safety reasons the prototype is not as sharp as the actual product would be.

Materials needed:cardboard and the prototype.



Pre-test



During Test



Post-Test

Description: We took three plain pieces of cardboard and the metal prototype. One one piece each of us used the metal prototype to slash across. The second was punctured repeatedly with the ring. The last piece was slashed in different ways with the ring.

Conclusion: Test 4 concludes that the ring is harmful. Without even being as sharp as the actual product would be it can make scrapes and minor cuts. Justifying that the prototype will be harmful to an attacker without being lethal.

Conclusion

Overall the ring performed well with the given circumstances. It was discrete, very easily accessible, extremely durable, and can be harmful. The safety concern of the prototype made it to where the tests could not be as accurate as possible but they did justify that the solution is reasonable. The ring is a viable solution because it allows a women to fight back at any given time. The criteria that weren't tested (inexpensiveness and easy to use) would not have been helpful in testing because there is no scientific value to them. The expensiveness of the product depends on its manufacturing and the usefulness of it varied from person to person, making them not helpful in a testing scenario.