

Design Concepts

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TEAM LUPUS



Lawrence
Technological
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Mission Statement:

To change and improve the lives of patients through high-quality engineered products which extend lives, increase comfort, and improve overall quality of life.

Strategic Focus:

Durable Medical equipment. Non-pharmaceutical and non-FDA Class III solutions. Focus on orthopedic care.

LUPUS

- Patient: Pam Williams, 45 years old, F, Lives with mother.
Health condition: Systemic Lupus erythematosus (SLE),
and scleroderma, 34yrs.

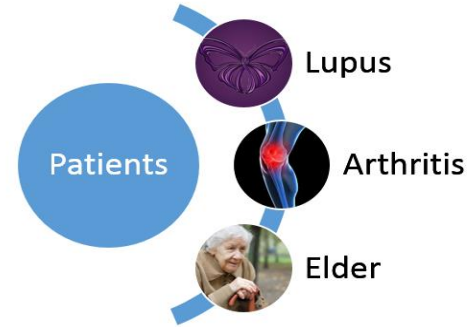
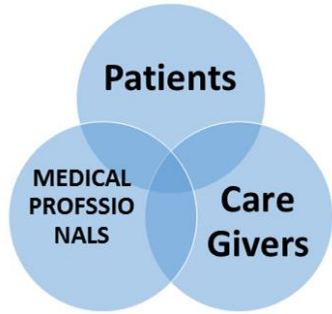


An inflammatory disease caused when the immune system attacks its own tissues.

Need statement :

There is a need for disabled patients to be able to lift heavy objects on their own.

Stakeholders Analysis



Limitations:

1- Cost

2- special need

Market Analysis

- Market Segments
- Existing treatments
 - Growth- Almost none
- Relies on other existing markets
- Target market

Design #1

Method:



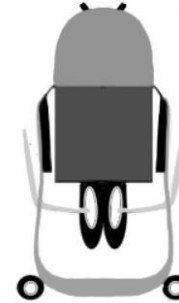
Outcome:

Chair will be light enough for disabled patient to carry



18 weeks

Lightweight composite wheelchair



(Design parameters)

Seat width	Seat Depth	Seat to floor height	overall width	Front wheel size	Rear wheel size
16"	16"	19"	20"	3"	17"

Design #2

Method:



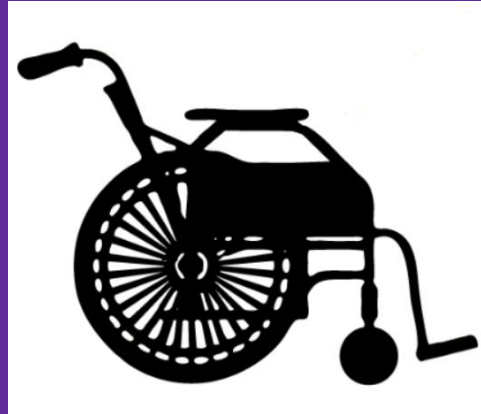
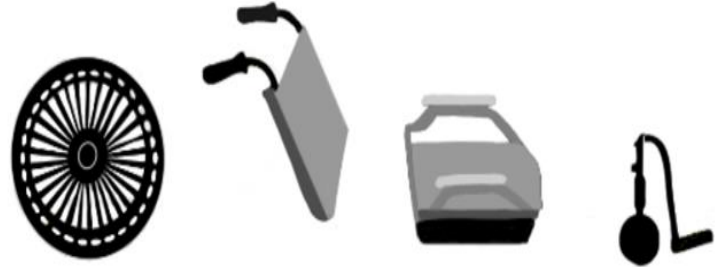
Outcomes:

Mrs. Williams will be able to travel on her own



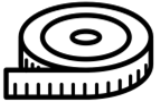
18 weeks

Separable Wheelchair



Design #3

Method:



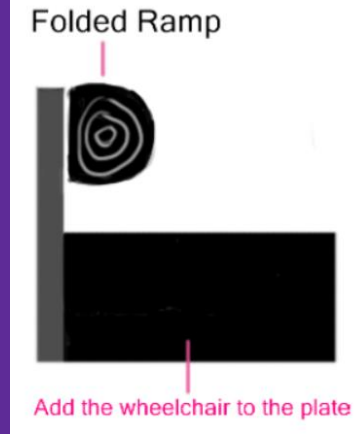
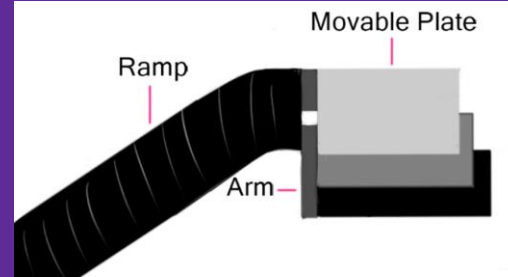
Outcomes:

Need to lift chair into/out of trunk removed



18 weeks

In-Car Ramp and Lift System



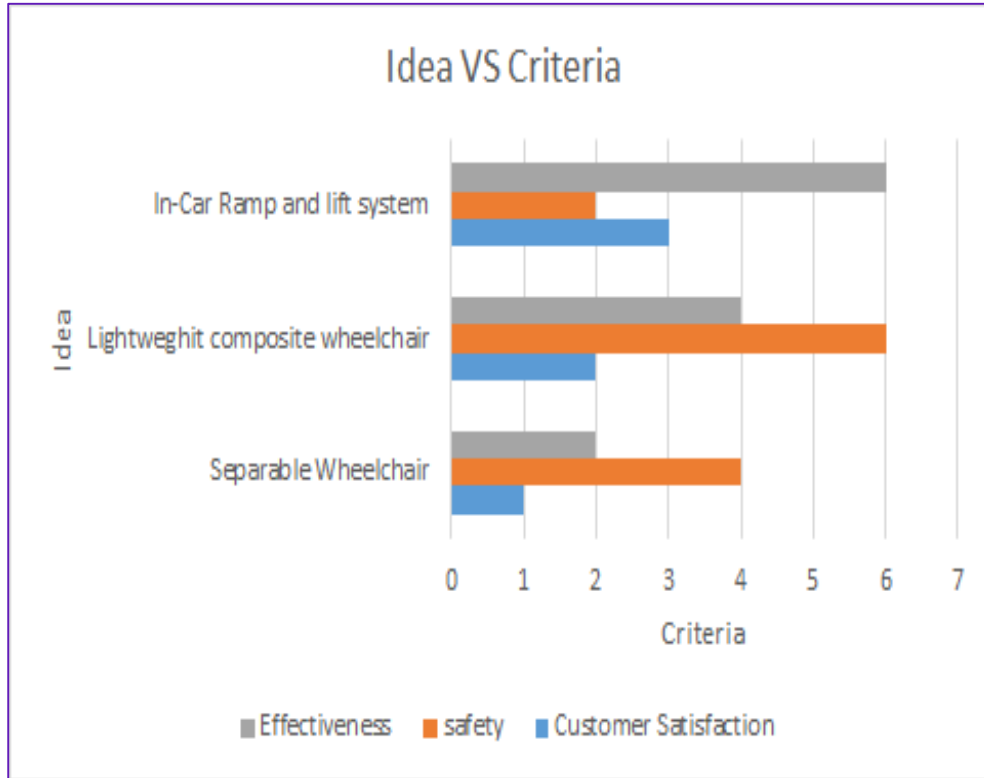
(Design parameters)

	Ramp	Plate	Arm
Length	3.5 m	1.5 m	1 m
Width	1 m	1 m	0.25 m

Decision Matrix

Ideas	Criteria						Totals
	Cost (X*2)	Ease	Simplicity	Effectiveness	Safety (x*2)	Customer satisfaction (x*2)	
Lightweight	1 (2)	2	3	2	3 (6)	2 (4)	19
Separable	3 (6)	3	3	1	2 (4)	1 (2)	19
Ramp+ lift	2 (4)	1	1	3	1 (2)	3 (6)	17

Concept Ranking



1-Lightweight composite wheelchair

2- In-Car Ramp and Lift System

3- Separable Wheelchair

References

1- Manual Wheelchair Materials, carmen P. Digiovine <http://www.spinlife.com/spintips/details/k/Manual-Wheelchair-Materials/a/120/c/2>

2- Quickie Q7 Adjustable Ultralight Wheelchair, Wheelchair.com
<http://www.1800wheelchair.com/product/quickie-q7-adjustable-ultralight-wheelchair/>

3- Systematic design customization of sport wheelchairs using the taguchi method, M. Burton.
<http://www.sciencedirect.com/science/article/pii/S1877705810003024>