Upper Extremity Dynamic Sling

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Client: Mrs. Karen Blaschke, OTR/L, CHT
Advisor: Dr. John P. Puccinelli, PhD

UW BME Design

Agenda

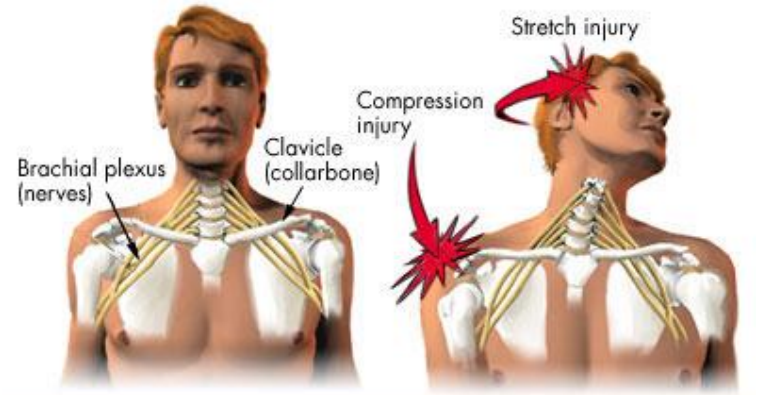
- Problem Statement
- Background
- Project Design Specifications
- Existing Designs
- Designs for Arm Portion
- Designs for Anchor
- Final Design
- Future Work

Problem Statement

- Client: Karen Blaschke, OTR/L, CHT, Rehabilitation Medicine, UW Hospital and Clinics
- Sling to support upper extremities during running post brachial plexus injury
- Possibly applied to rotator cuff injuries as well as other impact injuries

Background

- The brachial plexus is a network of nerves
  - Conducts signals to the shoulder, arm, and hand
- Injury most commonly caused by trauma
- Many levels of severity
- Treated with therapy and/or surgery

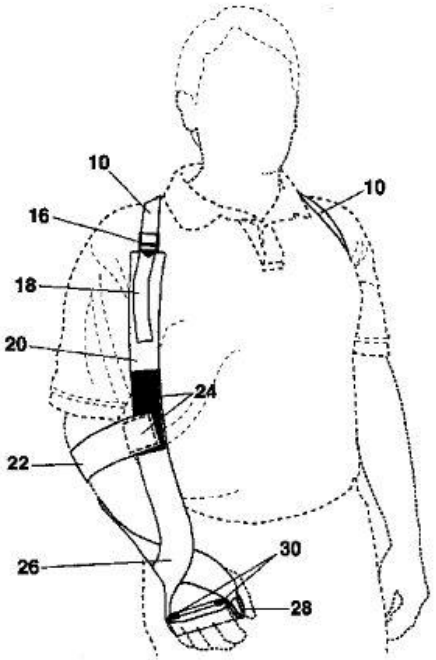


Project Design Specifications

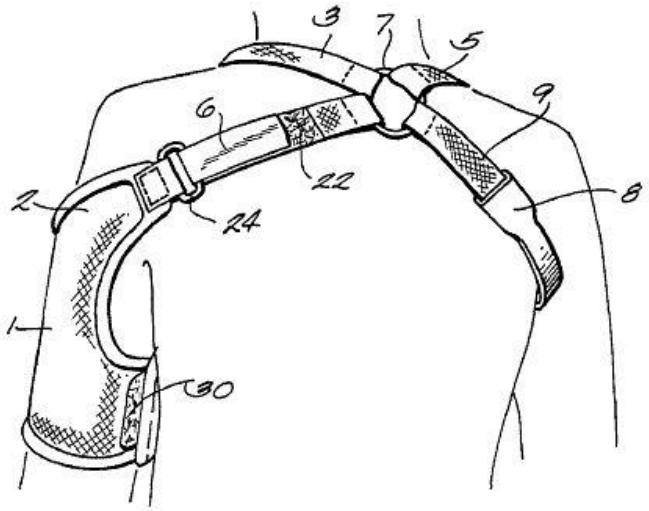
- Support shoulder, prevent subluxation/slouching
- Assist user while running or during exercise
- Adjust to different body types
- Comfortable, breathable, no abrasion or chaffing
- Easy to assemble
- Secure properly to body

Existing Designs

GivMohr Sling



Roylan Humerus Cuff



Highlights of Previous Design

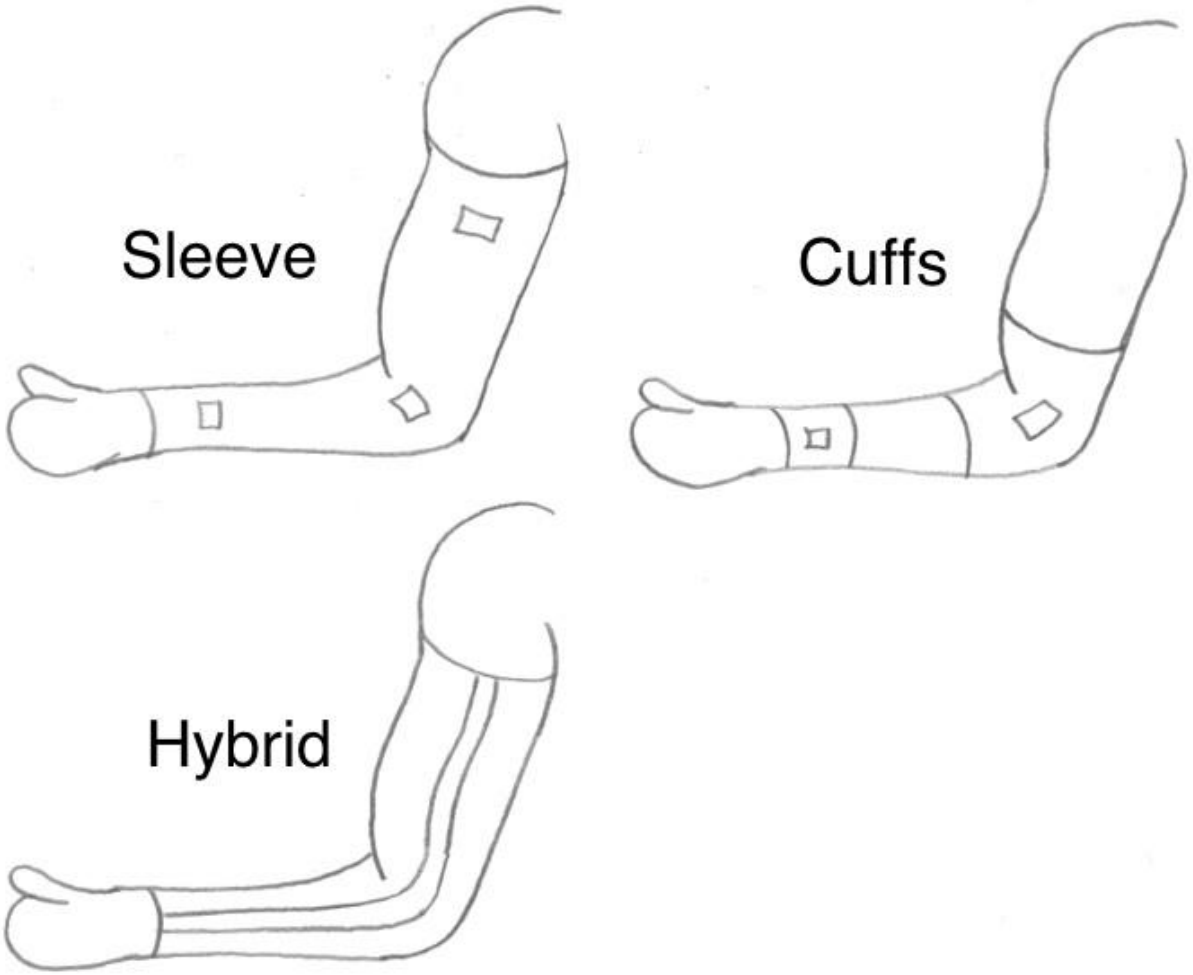
Thera-Band for
dynamic movement

Elbow Sleeve

Wrist Brace

Thera-Band for
Elbow Support

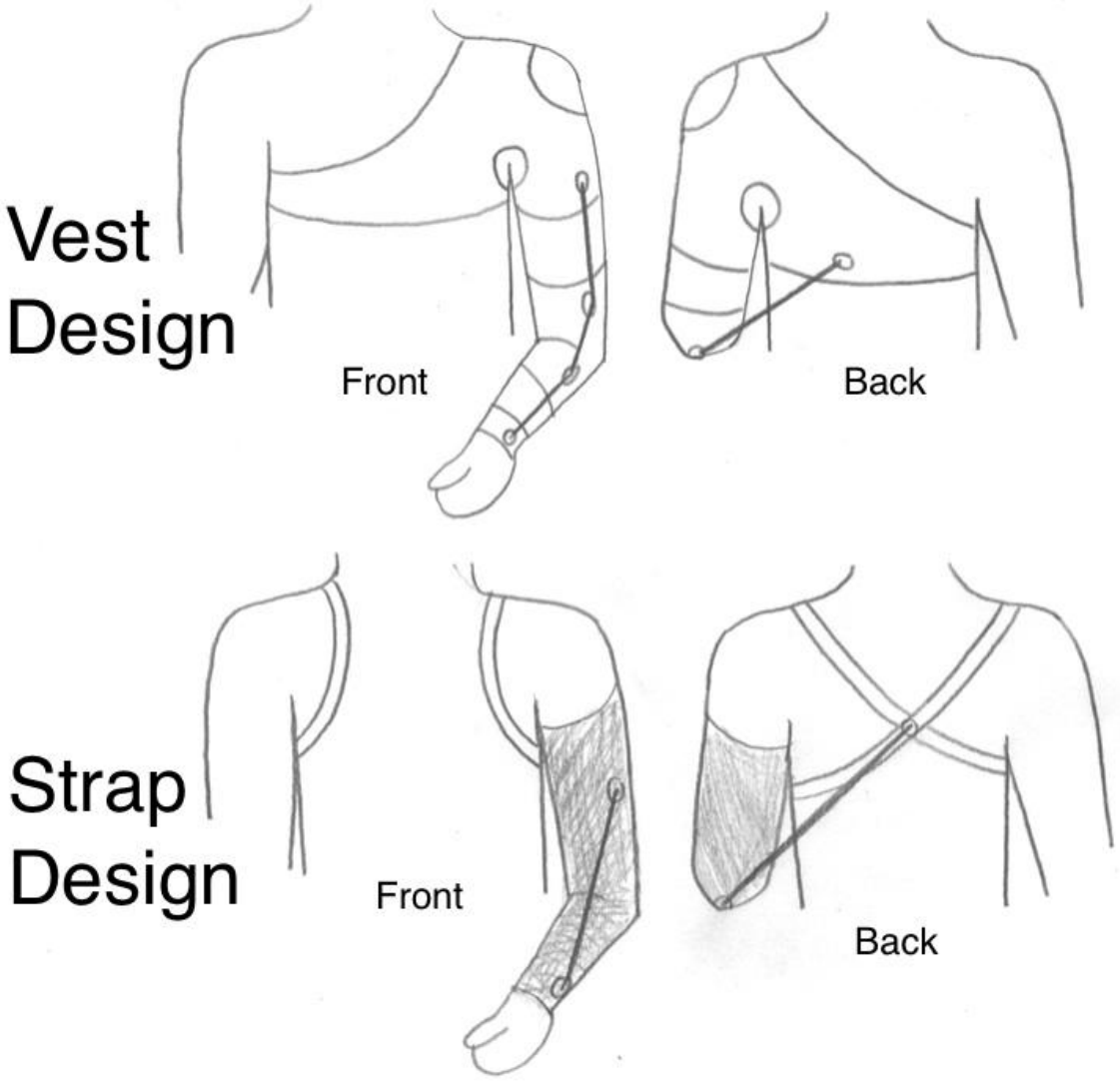
Designs - Arm



Arm Matrix

Category	Weight	Full Sleeve	Cuffs	Hybrid
Cost	10%	7	8	7
Ease of Manufacturing	15%	6	7	5
Ease of Use	15%	5	4	8
Universality	15%	4	7	8
Mechanics	25%	5	7	8
Ergonomics	20%	7	4	8
Total Out of 10		5.6	6.05	7.3

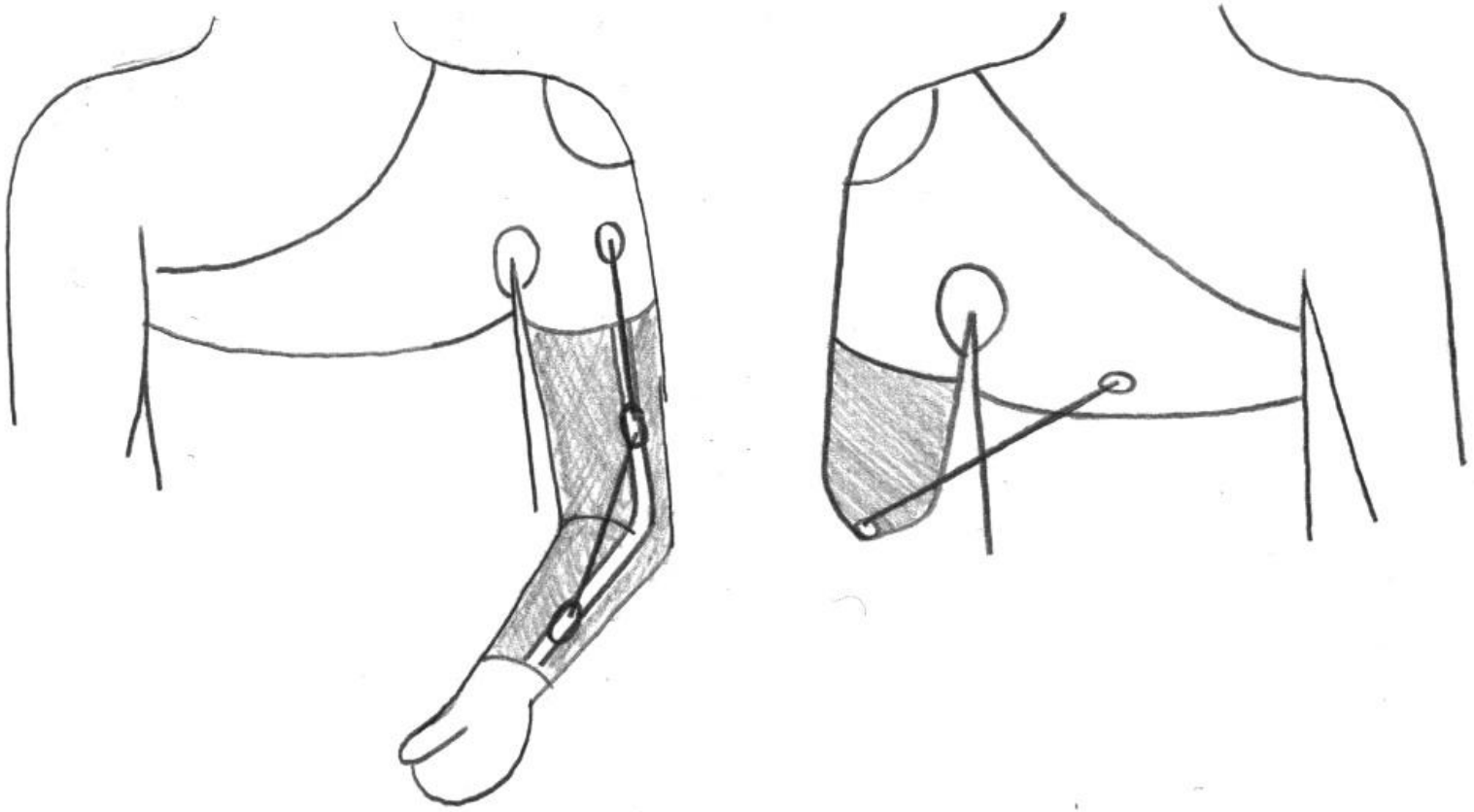
Designs - Anchor



Anchor Matrix

Category	Weight	Strap Design	Vest Design
Cost	10%	8	5
Ease of Manufacturing	15%	7	5
Ease of Use	15%	4	7
Universality	15%	6	8
Mechanics	25%	6	8
Ergonomics	20%	6	8
Total Out of 10		6.05	7.1

Final Design



Future Work

- Biomechanic analysis of forces carried by arm
- Analysis of forces during running motion
- Determination of sufficient anchoring and locations
- Material Determination
- Active testing

Acknowledgements

- Dr. John P. Puccinelli, *Advisor*
- Karen A. Blaschke OTR/CHT, *Client*

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Questions?