

DYNAMIC SLING TO SUPPORT UPPER EXTREMITY POST BRACHIAL PLEXUS INJURY

Group Members

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Clients

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Overview



- Client Description
- Problem Statement
- Current Methods
- Product Design Specifications
- Design Alternatives
- Design Matrix
- Future Work

Client Description

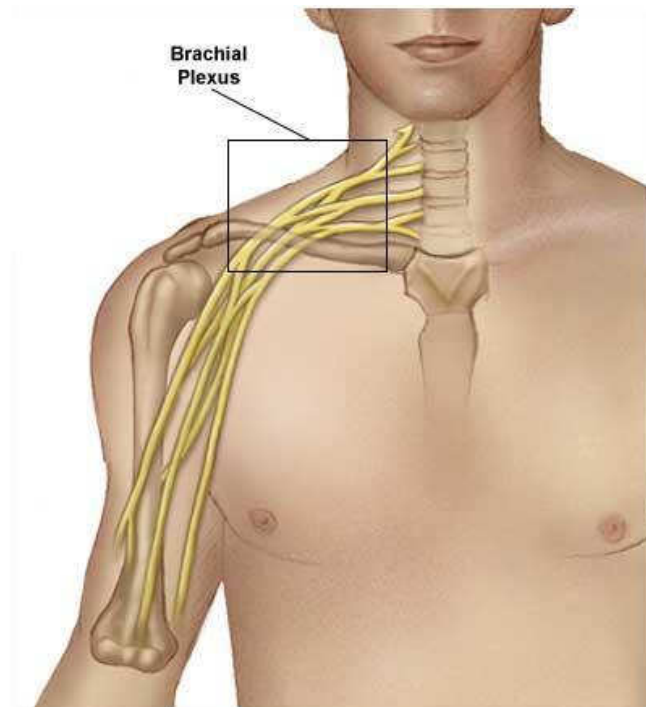


- **Karen Blaschke, OTR**
 - Rehabilitation Medicine at UW Hospitals
- **Meg Overstake**
 - Suffered brachial plexus injury
- **Proposal:** Create a dynamic sling allowing someone with a brachial plexus injury to return to an active lifestyle

Problem Definition

Brachial plexus: network of nerves leading to arm and shoulder

- Injury by detachment or laceration
- Loss of motor control and sensory perception
- One to five year recovery



http://www.medicallook.com/human_anatomy/organs/Brachial_nerve_plexus.html

Current Methods



GivMohr Sling

- Standard dynamic sling available on the market

Allows shoulder movement

Counteracts shoulder subluxation

<http://www.givmohrsling.com/>

Meg's Sling

Thera Band wraps around wrist, elbow, and opposite shoulder

Elbow sleeve

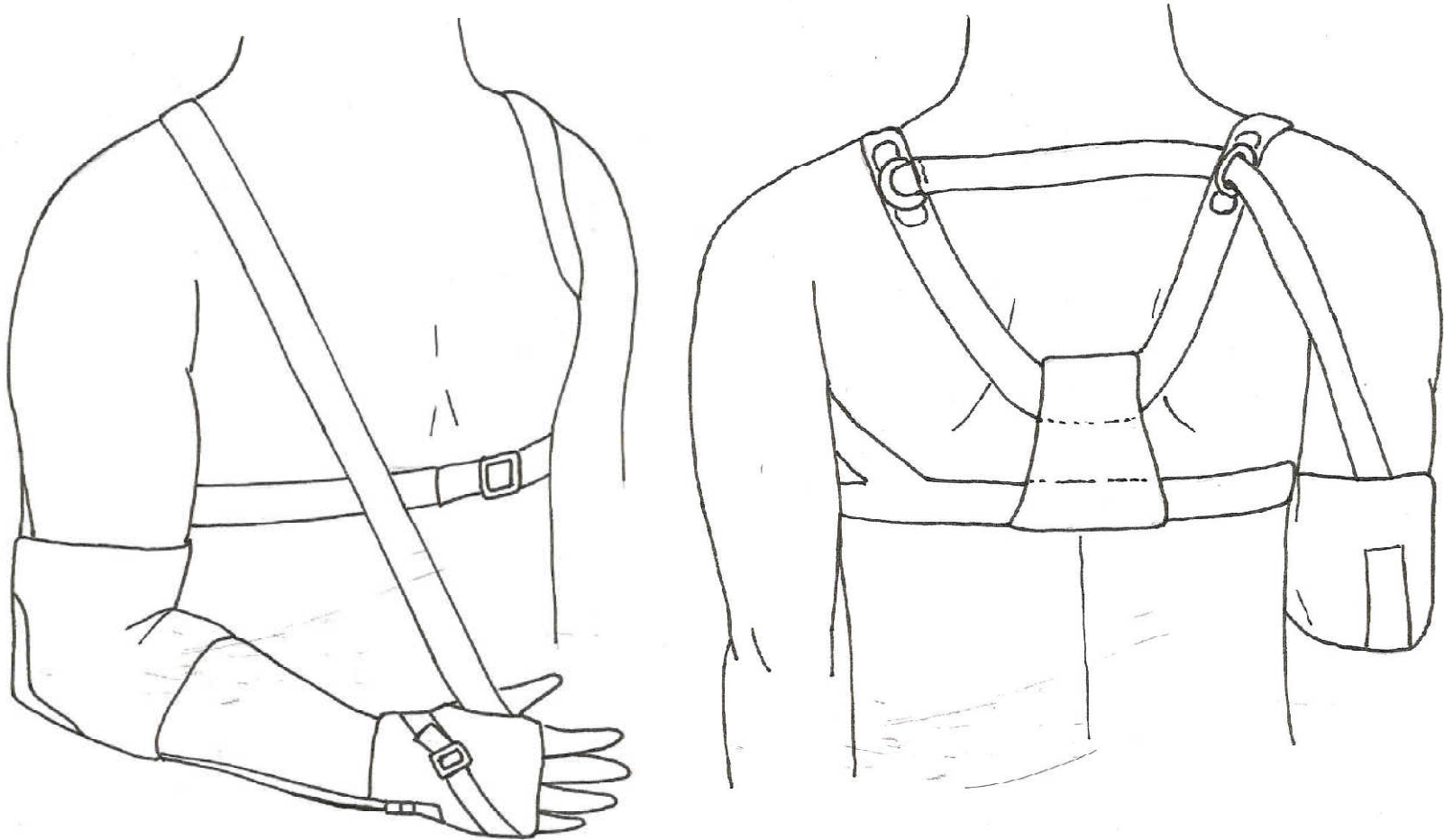


Product Design Specifications

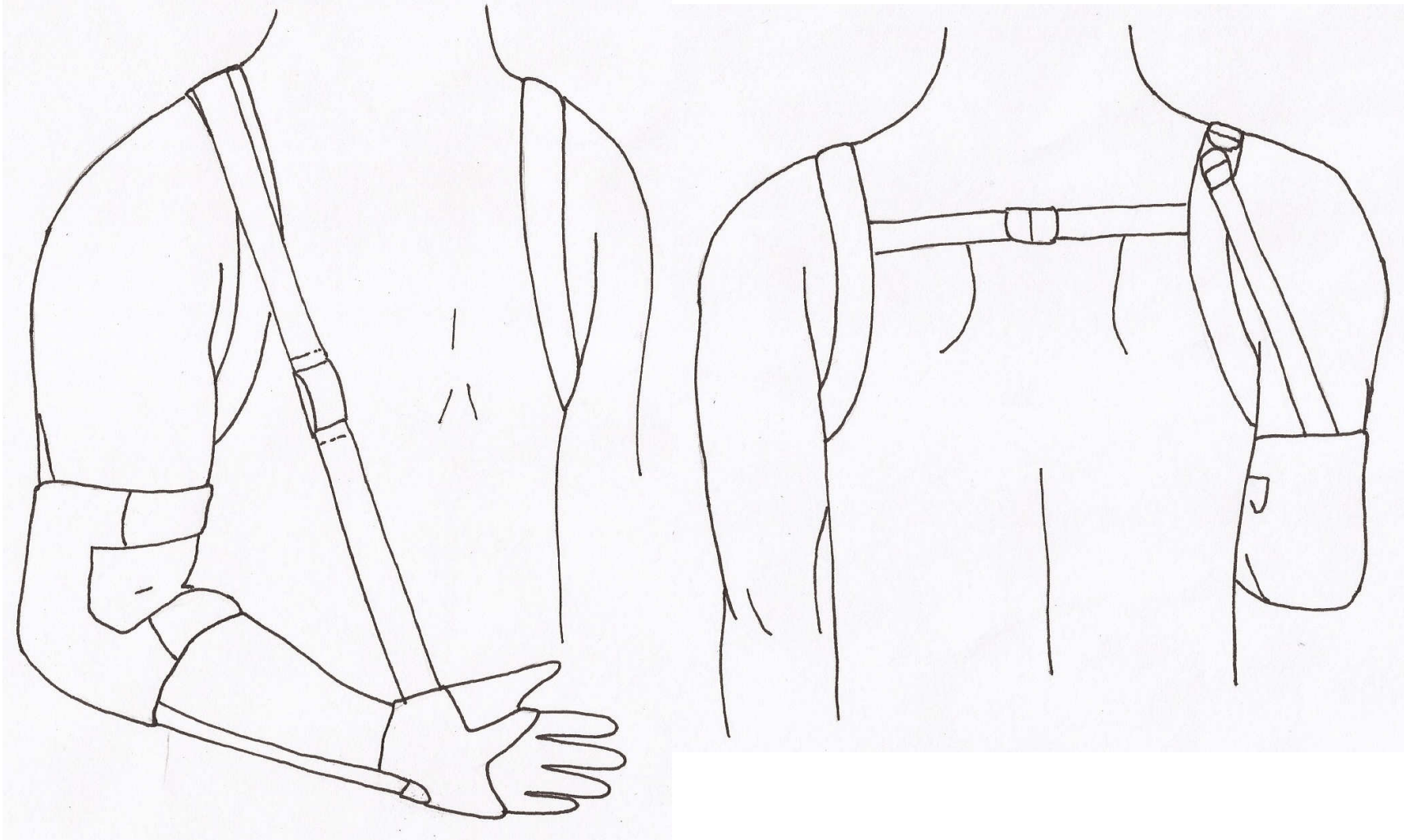


- **Performance Requirements:** not restrict movement in shoulder joint and comfortable for a minimum of 3 hours of use
- **Ergonomics:** easy to put on with one arm and adjustable in size and resistance
- **Materials:** washable and breathable material that will not cause chaffing or discomfort

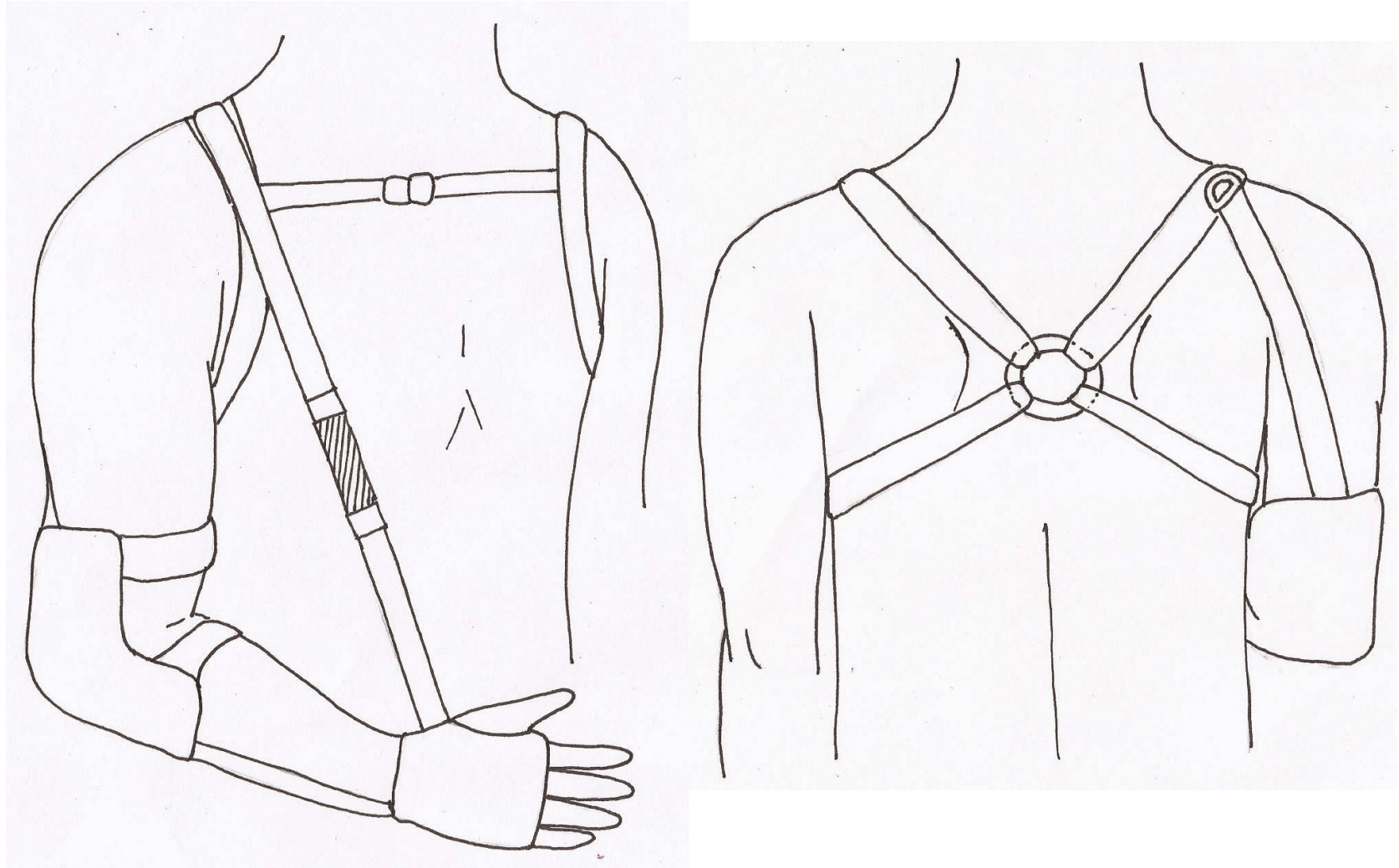
Design Alternatives - One Strap



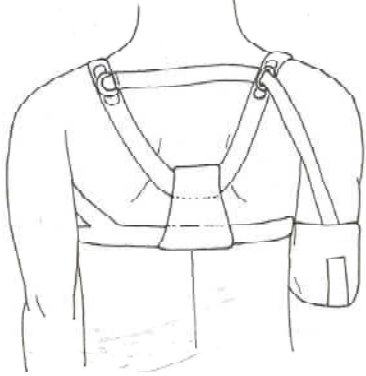
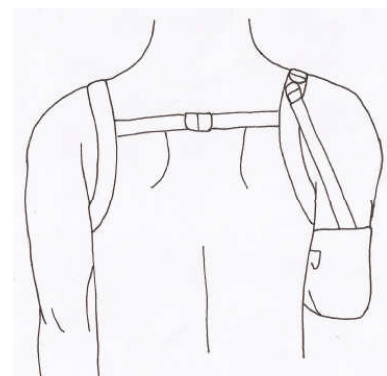
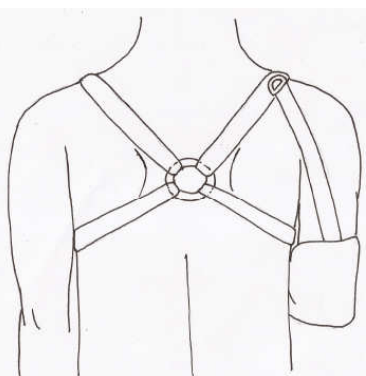
Design Alternatives - Backpack



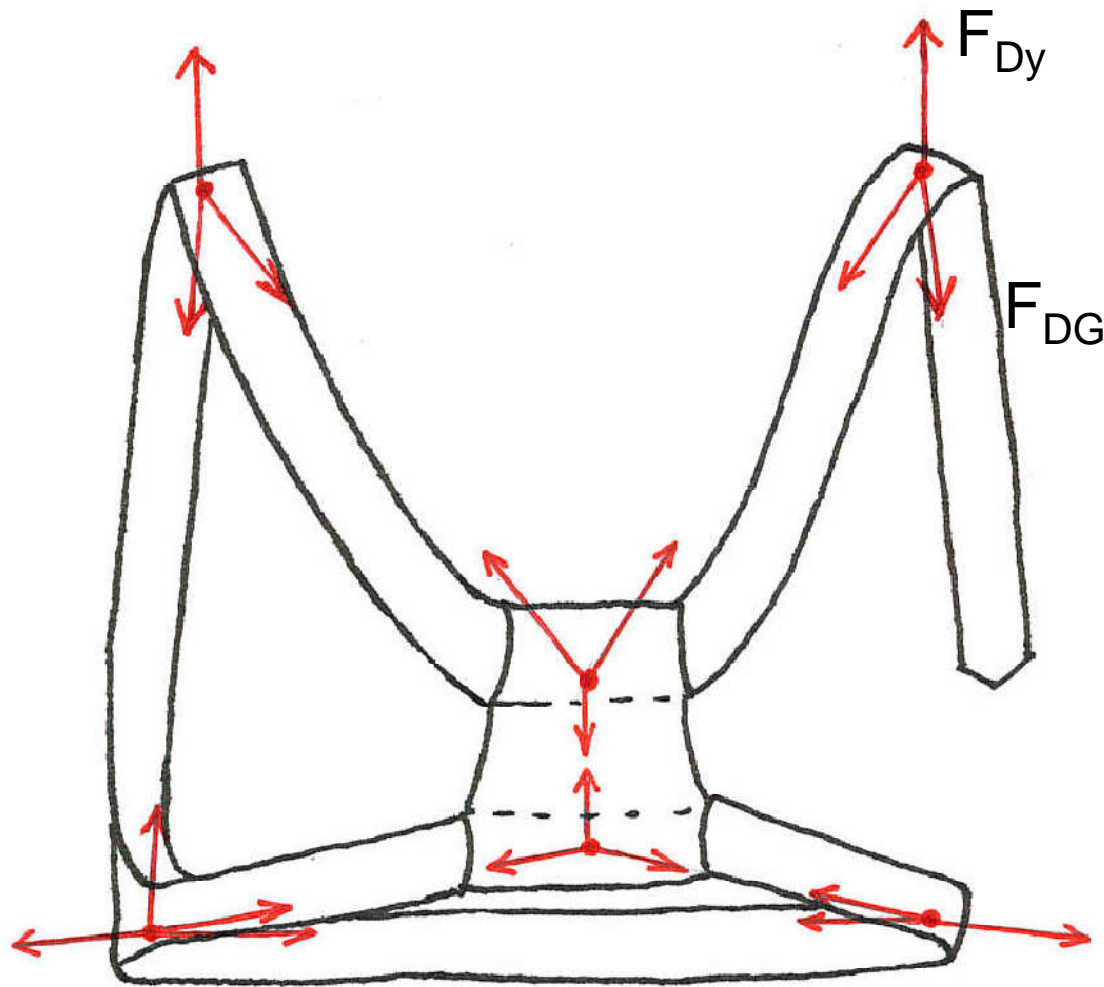
Designs Alternatives - Ring



Design Matrix

Criteria	One Strap 	Backpack 	Ring 
Patient Comfort (25)	22	18	20
Effectiveness (20)	18	12	15
Ease of Use (20)	13	17	16
Adjustability (15)	13	9	11
Safety (10)	8	6	7
Cost (10)	7	8	6
Total (100)	81	70	75

Free Body Diagram - Analysis



$$F_{Dy} = 1.29 F_{DG}$$

Future Work



- **Meeting with Orthotics Lab**
- **Ordering materials and fabricating**
- **Testing**
 - Strength Test: durability of materials
 - Team Test Run: comfort and effectiveness
 - Client Test Run: comfort, ease of use, functionality, and support

Acknowledgements



- Dr. John Puccinelli
- Karen Blaschke, OTR
- Margaret Overstake
- Dr. James Lewallen

References



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GivMohr Sling: Flaccid Upper Extremity
Positioning Device. (2012).
www.givmohrsling.com