

# Push Lever Propulsion Wheelchair

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## Needs

- ❖ 3.3 million wheelchair users in US
- ❖ Subacromial Impingement Syndrome (SAIS) - leading cause of shoulder pain due to glenohumeral joint inflammation
- ❖ Aging population - demand increase



## Benefits

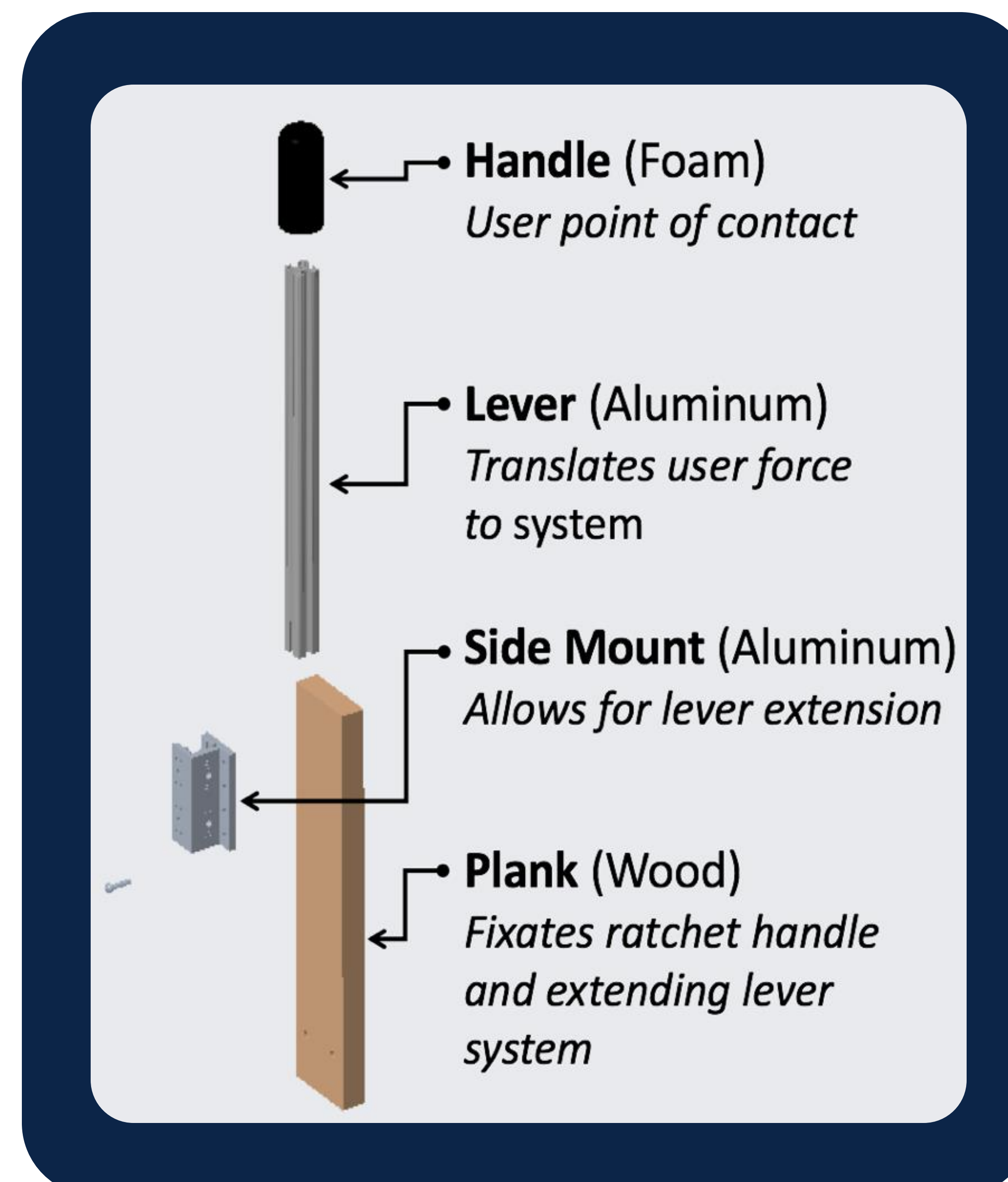
- ❖ Reduces pain- and fatigue-induced SAIS caused by compressive forces of current models
- ❖ Increase ease of use and quality of life
- ❖ Cost effective (\$800)
  - ❖ NuDrive (competitor) - \$2000



## Market

- ❖ Pushrim Propulsion
  - ❖ Mechanically inefficient
  - ❖ High risk of upper-extremity injuries
- ❖ Push Lever Propulsion
  - ❖ Additional weight of 14kg
  - ❖ Requires whole wheelchair purchase

Technique	Work Done by Shoulder
Pushrim	0%
Push Lever	25.5%
Rowing (Transverse)	-59.0%
<b>Rowing (Sagittal)</b>	<b>-61.7%</b>



## Current State

- ❖ Cheaper, lighter, better alternative to current options
- ❖ Simple design
- ❖ Can be attached to existing manual wheelchairs
- ❖ A rowing motion in the sagittal plane will reduce the moment on the glenohumeral joint the most



## Constraints

- ❖ Weight < 6.8 kg
- ❖ Minimum door width - 36"
- ❖ Compatibility with K3 wheelchair - market as a wheelchair attachment
- ❖ RESNA: WC-1 Wheelchairs - Volume 1



## Value

- ❖ Improves efficiency and ease of use
- ❖ Reduces productivity loss (wages)
- ❖ Reduce costs of:
  - ❖ Presurgery Costs (Physical therapy, Pain Medications, Braces)
  - ❖ Shoulder arthroscopy - \$8000 with 3 month recovery
  - ❖ Open surgery - \$18,000 with 6 month recovery
  - ❖ Arthroplasty - \$21,000 with 9 month recovery