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A Comprehensive Manual of the Shoulder Exercise Machine and an Introduction to the Potential Benefits of the Novel Device

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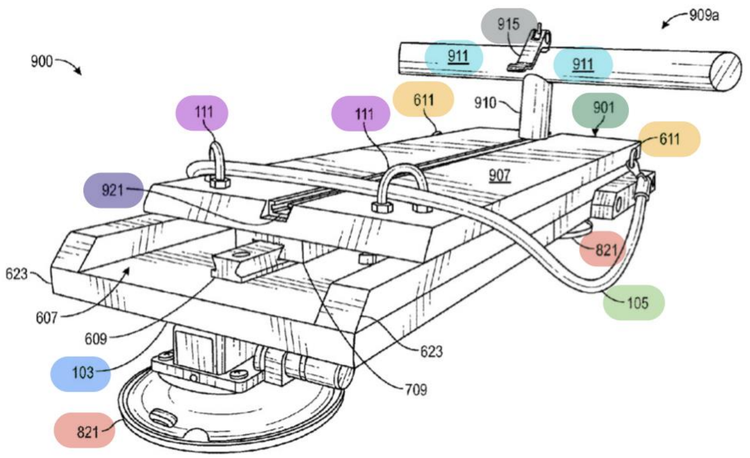
FIRST IN WHOLE PERSON HEALTHCARE

Background



Key
- 103: Stationary lower member
- 105: Resistance bands
- 111: Retainer guide
- 611: Anchors
- 821: Vacuum cups
- 901: Upper member
- 911 and 913: Handles
- 915: Camp clamp
- 921: T-track

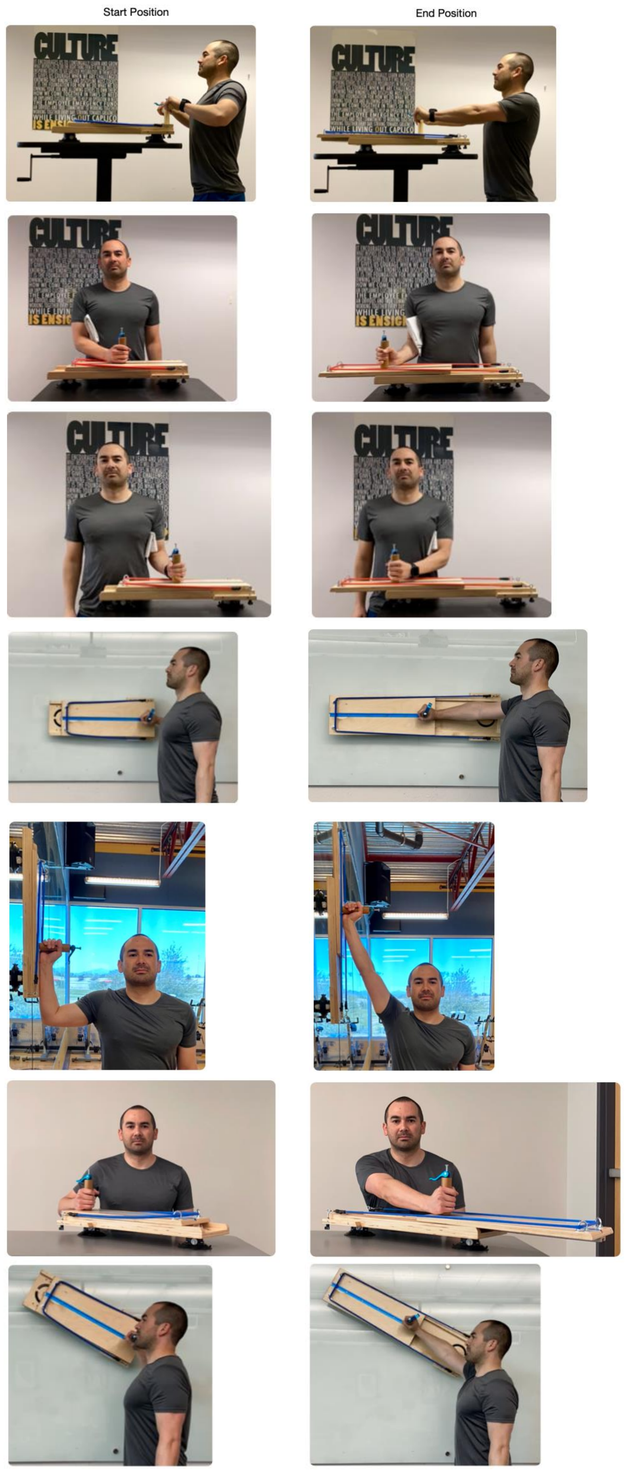
- The shoulder exercise machine is a resistive exercise device that targets the shoulder complex/girdle musculature.
- It was designed to be portable and multifunctional.
- The shoulder exercise machine consists of a stationary lower member (103) that is connected to two vacuum cups (821) that have a redline safety feature to indicate if the vacuum cup is engaged.
- The two powerful vacuum cups secure the device to any non-porous surfaces (horizontal to vertical surface).
- The upper member (901) of the device is connected to the lower member and slides on top of it.
- There are two dedicated stops not shown in the pictures below that prevent the upper member from sliding off the lower member.
- It uses various resistance bands (105) for graded resistance which are interchangeable.
- The resistance bands are attached to the two anchors (611) and are threaded through the retainer guide (111).
- The shoulder exercise machine has a t-track (921) running the entire length of the center of the upper member.
- The t-track functions to retain various types of handles (911 and 913) for bilateral and unilateral hand use.
- The handle(s) can be positioned and secured using a cam clamp (915 and 917) anywhere along the t-track.
- Designed to enhance safety and ease of use when performing therapeutic exercise by providing controlled linear movements and increased upper extremity (UE) support and stabilization via handles connected to the device.

- The shoulder exercise machine targets muscles of the shoulder complex: serratus anterior, trapezius, rhomboids, supraspinatus, infraspinatus, teres minor, subscapularis, teres major, pectoralis major and minor, latissimus dorsi, deltoid.
- Conditions of the shoulder complex musculature that may warrant using the device as part of a treatment protocol: scapular winging, shoulder impingement, shoulder instability, rotator cuff injuries, adhesive capsulitis, glenoid labrum injuries, forward head posture, and forward shoulder posture.
- Optimal Dosage: no gold standard prescriptions or dosages for resistance training but there are generalized parameters that ranged ranged from 2-3 days per week, 2-4 sets, 8-15 repetitions at 40-80% intensity, for 6+ weeks.

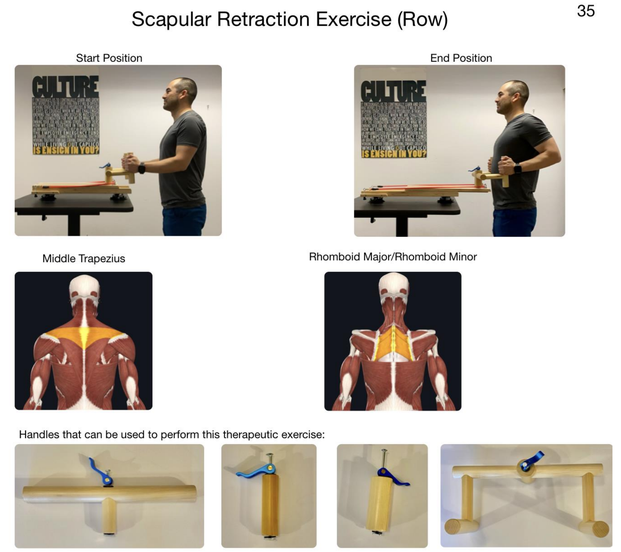
Methods for Creating a Manual

- Relied on examples and experience of building, assembling, building, and fixing various types of furniture, tools, equipment, electronics, etc.
- Used iPad Pro and an app called Notability that allows me to annotate and customize a PDF file.
- Understand my target audience: clinicians (applied science degree to a postgraduate degree).
- What are the attributes of a poorly made manual: unclear instructions, diagrams, and pictures, no diagrams or pictures, diagrams and pictures with no written instructions, multiple steps and instructions condensed into a single step or diagram.
- What are the attributes of a well made manual: clear pictures or diagrams for every step, clearly written instructions, and easy to follow.
- Trialed the device at South Mountain Post-Acute
- Patients received verbal instructions and a visual demonstration for correct technique.

Example Exercises



Example Page from Manual



Results

- During my 14-week rotation, I used the shoulder exercise machine with selected patients that had the ability to move their UEs against gravity, tolerate minimal or higher resistance to movement, and were alert and oriented to person, place, and time.
- The shoulder exercise machine proved useful for patients who presented with decreased coordination, generalized weakness, and conditions involving painful shoulder.
- Two patients reported they were surprised they could successfully use the novel device using mild resistance bands movements due to shoulder discomfort, pain, and weakness.
- Another patient who had Parkinson's disease and presented with deficits in coordination and muscle strength successfully completed exercises using the machine for shoulder protraction and retraction.
  - These patients were unable to perform similar exercises using dumbbells and dowels
- Patients who could tolerate moderate or higher resistance to movement for shoulder retraction performed the exercise with ease.
- Some patients requested increased resistance beyond what is safely recommended for the device.

Discussion

- Creating a comprehensive manual for the shoulder exercise machine is an important step for bringing the novel device to the market so it can be used by clinicians to help patients progress through rehabilitation.
- The initial clinical observation is that the novel device is beneficial for patients with decreased coordination and UE strength.
- Future studies are needed to examine its efficacy for targeting the muscles of the shoulder complex in specific patient populations.

❖ References available upon request.