



# **Multi-purpose Arm Ergometer Design (20140266, Dr. Gary Goldish)**

Technology No. 20140266

## **Arm Exercise for Bedridden Patients**

A new, multi-purpose arm ergometer design improves patient access to exercise in many situations. The system was initially designed for patients lying supine in a hospital bed, providing upper extremity exercise for bedridden persons. The device uses a lightweight arm ergometer with a self-contained mobile frame that safely provides access to arm exercise. The device is mobile, for easy transport between patients, and has locking wheels on a large base positioned under the bed for stability.

## **Converts for Sitting or Standing Exercise**

The multi-purpose arm ergometer can also be rotated to allow arm exercise for patients in seated or standing postures. The system has a gas spring counterbalance that holds the arm ergometer in place. The gas springs are releasable with a single lever, allowing the clinician to quickly and easily alter the position for a large variety of exercises.

## **Gamification Offers Interactive Experience, May Increase Patient Compliance**

Of the many arm ergometers (upper body ergometers or UBE) currently available, none are designed for patients lying supine (on their back) in a hospital bed. This multi-purpose arm ergometer was designed especially for supine patients, but also allows seated and standing exercise. Gaming enhancements to the design provide a more interactive experience for the patient: A display monitor/screen provides feedback during use, and presents trivia questions to the patients in a fun, interactive game. The game is easily programmable by the clinician to ensure that the patient exercises at an appropriate pace. If the patient cycles too fast or too slow, the game tells the patient to slow down or speed up and pauses the game. An app was also developed that allows the therapist to conduct a six-minute arm test, counting the rotations achieved in six minutes, and providing a metronome to pace the patient during the test.

## **BENEFITS AND FEATURES:**

- Provides upper extremity exercise for supine, seated, or standing patients
- Benefits bedridden patients in a hospital setting
- Mobile and easily transported from patient to patient
- Locking wheels on a large base, positioned under the bed, add stability

## **APPLICATIONS:**

- Spinal cord injury (SCI) patients
- Rehabilitation technologies
- Hospitals with inpatient rehabilitation
- Physical therapy for bedridden or wheelchair-bound patients

## **Phase of Development** - Prototype development

System developed and being used in IRB-approved research study.

## **Researchers**

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## **Publications**

[Upper Limb Cycle Ergometer for Supine Exercise](#)

*Journal of Medical Devices*, 7(2), 020910 (Jun 05, 2013); doi: 10.1115/1.4024325

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