

partly because it is low enough not to trigger seizures in most individuals afflicted with photosensitive epilepsy. (Approximately one person in 10,000 has photosensitive epilepsy, which is triggered by a number of visual phenomena, including, in most cases, lights flashing

at rates between 15 and 20 Hz.) Preferably, individuals who have any form of epilepsy or any of a number of related disorders should not use this device.

This work was done by M. F. Reschke of Johnson Space Center and Jeffrey T. Somers of Wyle Laboratories.

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Articulating Support for Horizontal Resistive Exercise

Supports can be optimized for a variety of prescribed exercises.

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A versatile mechanical device provides support for a user engaged in any of a variety of resistive exercises in a substantially horizontal orientation. The unique features and versatility of the device promise to be useful in bed-rest studies, rehabilitation, and specialized strength training. The device affords a capability for selectively loading and unloading of portions of the user's body through its support mechanisms, so that specific parts of the body can be trained with little or no effect on other parts that may be disabled or in the process of recovery from injury. Thus, the device is ideal for rehabilitation exercise programs prescribed by physicians and physical therapists. The capability for selective loading and support also offers potential benefits to strength and conditioning trainers and athletes who wish to selectively strengthen selected parts.

The principal innovative aspect of the device is that it supports the subject's weight while enabling the subject, lying substantially horizontally, to perform an exercise that closely approximates a full

standing squat. The device includes mechanisms that support the subject in such a way that the hips are free to translate both horizontally and vertically and are free to rotate about the line connecting the hips. At the same time, the shoulders are free to translate horizontally while the upper back is free to rotate about the line connecting the shoulders.

Among the mechanisms for hip motion and support is a counterbalance that offsets the weight of the subject as the subject's pelvis translates horizontally and vertically and rotates the pelvis about the line connecting the hips. The counterbalance is connected to a pelvic support system that allows these pelvic movements. The subject is also supported at the shoulder by a mechanism that can tilt to provide continuous support of the upper back while allowing the rotation required for arching the back as the pelvis is displaced. The shoulder support also affords a capability for horizontal motion, and acts as the point of attachment of a load that is provided for squat and heel-raise exercises. The

device is compatible with any resistive-exercise machine that provides bilateral loading via a moving cable or other mechanical linkage.

The hip-translation and shoulder-translation and -rotation degrees of freedom of the supports can be locked individually or in combination in order to support the subject as necessary for exercises other than the standing squat. If necessary, for such exercises, the load can be applied directly to the subject by use of various attachments. In addition to the aforementioned heel raise, such exercises include the upright row, leg press, curls, extension of the triceps, front raise, lateral raise, and rear raise.

This work was done by Daniel Gundo of Ames Research Center and Grant Schaffner, Jason Bentley, and James A. Loehr of Wyle Laboratories for Johnson Space Center.

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