EARLY INTENSIVE STRENGTH TRAINING WITH FIXED OVERHEAD RESISTANCE BANDS FOR PERSONS ON BEDREST

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Description
Immobility has severe health consequences. It increases not only the risk of pulmonary and pressure ulcer complications but also induces loss of muscle mass and muscle strength, which influences life functions. Older persons have a relatively low reserve capacity due to sarcopenia and statistics show that many elderly patients fail to regain their prior levels of function and self-care after hospital admissions. Therefore, a great incentive exists to counteract loss of muscle mass and strength and promote meaningful movement during hospitalizations. Strength training has shown to be effective in improving and maintaining muscle strength and preventing muscle atrophy. Strength training has been accomplished via use of accessible exercise equipment, such as, resistance (elastic) band, as they’re easily applied and studies have demonstrated effectiveness compared to dumbbells.

Importance to Members
To our knowledge this is the first reported use of a fixed point above the bed to assist performance of resistance band exercises in bed. This attachment is unique and quite useful to achieve resistance in the motions of shoulder, elbow and hip extension. This, in combination with voluntary electrical activation (VME) for each muscle. Individual 8 and 15 Repetition Max (RM) was pre-defined by a combination of elastic band resistance and length of elastic band.

Results
The figures show the three different exercises and mean EMG in percentage of VME for 15RM and 8RM. Shoulder and elbow extension primarily activated m. triceps brachii, biceps brachii, rectus abdominis and latissimus dorsi muscles. Hip extension movement with the bands activated the biceps femoris, rectus femoris, external oblique, and biceps brachii muscles. No significant difference between 15RM and 8RM was found for any of the three exercises.

Summary of use
Using resistance bands, we have activated specific muscle groups and some important stabilizing muscles with persons in bed, using a fixed point above the bed for the resistance bands. An attachment to an overhead, in-room patient lift provided the basis for the point of fixation for the bands.

Design
Seven healthy females (mean age 46, range 27-56 yrs., mean BMI 24, range 20-29) volunteered.
Three elastic band strength exercises (shoulder extension, elbow extension and hip extension) using Thera-Band™ were evaluated.
Electromyography (EMG) was measured on 8 relevent muscles (5 upper and 3 lower body muscles) with wireless MYON 320 (Myon AG Switzerland) and shown as mean EMG activity in percentage of Maximum Voluntary Electrical activation (MVE) for each muscle.
Individual 8 and 15 Repetition Max (RM) was pre-defined by a combination of elastic band resistance and length of elastic band.

Special Thanks
From The Regional Hospital in Horsens,
Physical therapist’s Caroline Darville, Gitte Bertelsen, Signe Omann Lynge, Thomas Døttler and Chief Therapist for inspiration and assistance with development of product, exercises and feasibility studies during the development phase. Nurse manager Lisaeth Hansen for the commitment and support during the process. A special thank you to the patients who have participated in feasibility studies during the development phase.
From The University of Southern Denmark, Odense
Thanks to MSc Tina Dalager, Professor Karen Sogaard and professor Gisela Sjogard from the Department of Sports Science and Clinical Biomechanics for assistance with study design, data collection and data processing in the EMG study.
From V. Guldmann A/S,
Thanks to MSc Tina Dalager, Professor Karen Sogaard and professor Gisela Sjogard from the Department of Sports Science and Clinical Biomechanics for assistance with study design, data collection and data processing in the EMG study.
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From V. Guldmann A/S,
Thank you to the research and development team at Guldmann for innovative thinking and commitment to realize the GH Positioning Lock.
Thanks to Catherine Perez Mikkelsen from The Regional Hospital in Horsens for poster design.