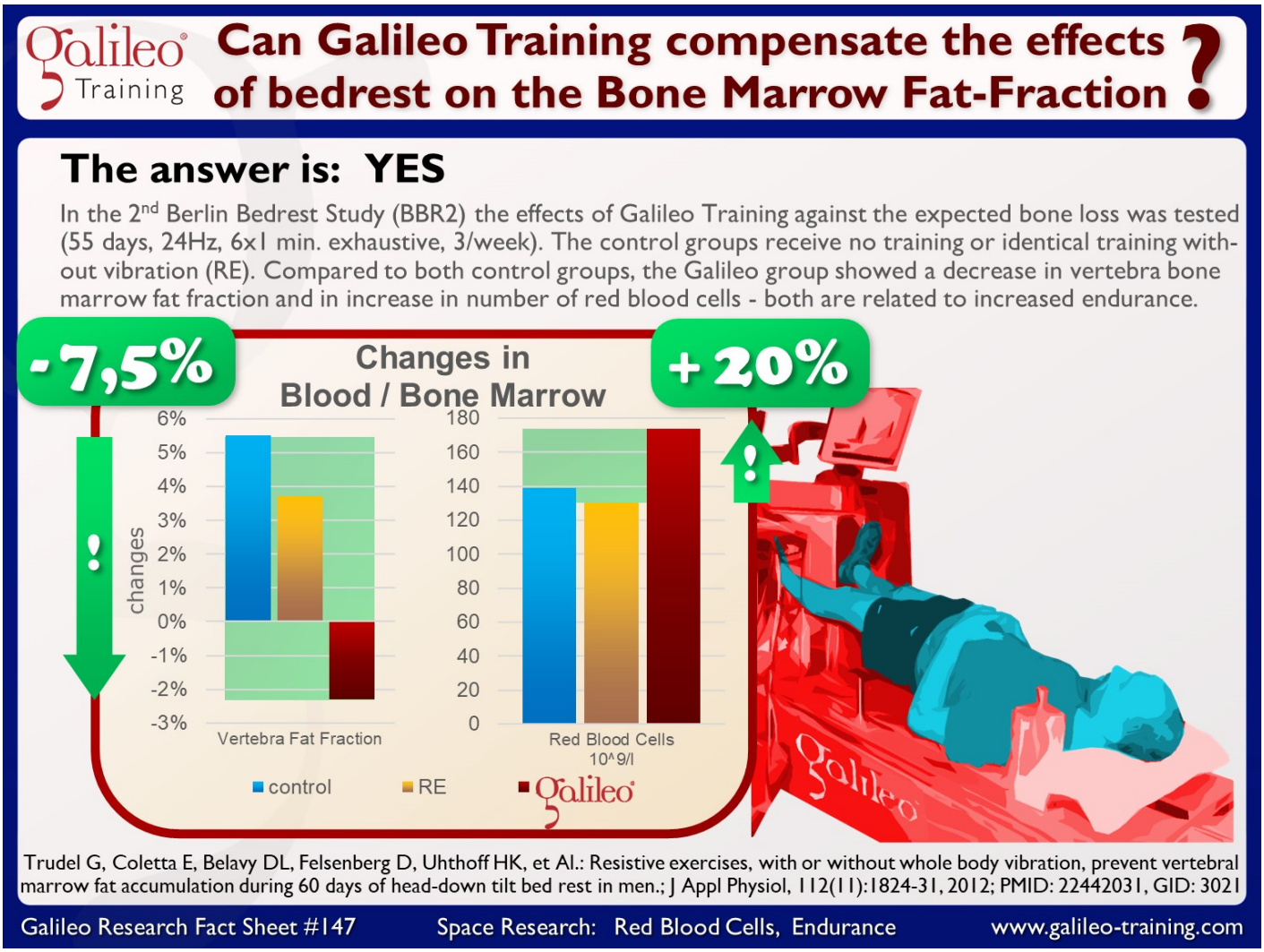

In the context of the 2nd Berlin Bedrest study (# BBR2), the influence of intensive Galileo training on creatine kinase levels was investigated.

In the study, the subjects had to hold 55 days of strict bed rest with a control group performing no training and strength training.

The Galileo group performed identical strength training with vibration but only 6 times 1 minute at 26Hz at 1.5 times body weight but only 3 times a week. This sub-study examined the effects on fat content in the spinal cord and the blood composition.

As a result, during the bedrest phase Galileo Training was able to reduce the amount of fat in the spinal cord as opposed to the two control groups.

At the same time, the increase in the number of red blood cells (erythrocytes) was highest (this effect increased significantly even at 6 and 12 months after the end of bed rest (as yet unpublished)).

Why is this important? An increase in the number of red blood cells is a typical effect of endurance training (eg altitude training), and a reduction in the fat content in the spinal cord is an indication that the proportion of yellow spinal cord is decreasing which typically leads to an increase in the number of red blood cells –

All in all an explanation for the effects of Galileo training on endurance (# GRFS86, # GRFS33, # GRFS12, # GRFS11).

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Resistive exercises, with or without whole body vibration, prevent vertebral marrow fat accumulation during 60 days of head-down tilt bed rest in men.

Trudel G[1], Coletta E, Cameron I, Belavy DL, Lecompte M, Armbrecht G, Felsenberg D, Uhthoff HK.

Fat accumulates in the bone marrow of lumbar vertebrae with bed rest. Exercise with or without whole body vibration may counter this effect.

Our objectives were to measure 1) the vertebral fat fraction (VFF) of men subjected to bed rest who performed resistive exercises with (RVE, n = 7) or without whole body vibration(RE, n = 8) or no exercise (CTR, n = 9) using three MRI techniques; and 2) changes in peripheral blood counts.

Twenty-four healthy men (age: 20-45 yr) underwent -6° head-down tilt (HDT) bed rest for 60 days.

MRI was performed using three techniques (fat saturation, proton spectroscopy, and in and out of phase) to measure the fat fraction of L(3), L(4), and/or L(5) at baseline, mid-HDT, and end-HDT.

Erythrocytes and leukocytes were counted at HDT days 19, 33, 47, 54, and 60. The mean absolute VFF was increased in the CTR group at mid-HDT and end-HDT (+3.9 ± 1.3 and +3.6 ± 1.2%, respectively, both $P < 0.05$).

The RE group had a smaller VFF change than the CTR group at mid-HDT (-0.9 ± 1.2 vs. +3.9 ± 1.3%, $P < 0.05$). The RVE group had a smaller VFF change than the CTR group at end-HDT (-2.6 ± 1.9 vs. +3.5 ± 1.2%, $P < 0.05$).

Erythrocyte counts were increased in all groups at HDT day 19 and HDT day 33 and in the RE group at HDT day 54 (all $P < 0.05$). Bed rest for 60 days at -6° HDT increased lumbar VFF in men beyond natural involution.

RVE and RE regimens effectively prevented VFF accumulation.

Higher erythrocyte counts were not altered by RVE or RE. Whole body vibration, along with RE administered to people with prolonged immobility, may prevent fat accumulation in their bone marrow.

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