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FUNCTIONAL BONE PERFORMANCE MEASUREMENTS AND ADAPTATIONS USING NOVEL SELF-APPLIED BONE-LOADING EXERCISE APPARATUS

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Objective: To determine valid functional bone performance metrics and adaptations from multiple-of-bodyweight (MOB) compressive force loading using an impact level loading exercise apparatus from a population of 2380 adult males and females.

Materials and Methods: Forces that compress bone stimulate adaptive response of BMD growth, in accordance with Wolff's Law; bone that can tolerate more load is of greater density [1]. Further, clinical fracture risk assessment is determined by a combination of BMD analysis and level of general physical function (i.e., age/ability) [2]. A novel apparatus that allows for these compressive forces to the level required to have an effect on osteoblastic function has been shown to produce osteogenic effect. This was confirmed in subset test with pre-post DXA in both hip and spine with 14 subjects ($P < 0.001$), who adapted to comfortably tolerate forces of both spine and lower extremity loading with 3.13 and 9.18 MOB respectively [3]. Globally

networked osteogenic loading (OL) systems provide standardized protocols. Query for data analysis included patients/subjects who utilized the OL apparatus for 12 or more sessions; partaking in the therapy at a clinically focused, supervised facility for one year.

Results: The MOB force/loading levels in the DXA subset was correlated to the MOB forces seen with the larger population ($N = 2380$) showing spine and lower extremity loading with 2.89 ± 1.02 SD and 9.67 ± 3.68 SD MOB, respectively.

Conclusion: These data present a new metric of functional bone performance, and an opportunity to consider a supplementary treatment option for ambulatory individuals with low BMD.

References:

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Conflict Disclosure:

J. Jaquish has ownership/financial interest in Performance Health Systems, LLC., manufacturer of OL apparatus. Data shared by physicians whose patients were using the OL apparatus.