

Changes in Body Composition from weekly Magnetic Mitohormesis

(Initial Report at 4 weeks)

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Between June to July 2022, QuantumTX conducted a study to assess the effects of brief weekly Magnetic Mitohormesis (MM) sessions on the body composition.

MM has been shown in prior clinical and scientific studies to upregulate mitochondria activity improve muscle energetics, facilitating recovery and regeneration. In addition, MM-activated muscles have been shown to upregulate myokine signals that can influence muscle mass gain and body fat reduction.

In this study, the InBody 770 multi-frequency BioImpedance Analysis (BIA) device was used to measure the changes of Skeletal Muscle Mass (SMM) and Body Fat Mass (BFM) over one month and saw significant changes.

Amongst 35 new users attending weekly BIXEPS MM sessions, there was a significant increase in their Skeletal Muscle Mass by 0.363kg (+1.17%, $p < 0.01$) and significant reduction in their Body Fat Mass by 0.711kg (-4.3%, $p < 0.01$). There were 15 males and 20 females amongst this cohort and the average age of the users was 69.8 years,

Notably, SMM & BFM changes were more pronounced amongst the older individuals. The gains in Skeletal Muscle Mass and reduction in Body Fat Mass were most pronounced in the oldest group above 80 years of age, where gains or losses were more than 30% higher than the youngest seniors (between ages 60 – 69 years).

Seniors Changes in Skeletal Muscle Mass (kg) by Age Group				
Age Group (Yrs)	SMM Before (kg)	SMM Changes (kg)	SMM % Diff	p-value
60-69	21.60	+0.32	1.60%	0.0061
70-79	21.34	+0.36	1.72%	0.0087
80 & above	18.94	+0.44	1.52%	0.2755

Seniors Changes in Body Fat Mass (kg) by Age Group				
Age Group	BFM Before (kg)	BFM Changes (kg)	BFM % Diff	p-value
60-69	21.01	-0.72	-4.20%	0.0006
70-79	19.22	-0.81	-4.74%	0.0003
80 & above	16.84	-0.96	-5.48%	0.0795

When comparing the difference between seniors of different functional aptitudes, weekly MM session created more pronounced changes amongst more frail individuals. Users were assessed based on the standardised Short Physical Performance Battery (SPPB), which assessed their functional capabilities like walking, balance or lower limb strength. Those who scored less than a total of 9 in the SPPB were placed in the Frail category (n=8), and the rest categorised as Normal (n=27). Changes measured by gains in Skeletal Muscle Mass and reduction in Body Fat Mass were most pronounced in the Frail cohort. Gains in Skeletal Muscle Mass in the Frail cohort was more than double that of the Normal cohort. Losses in Body Fat Mass amongst the Frail Cohort was ~130% larger than that of the Normal Cohort.

Seniors Changes in Skeletal Muscle Mass (kg) by Functional Aptitude				
Function	SMM Before (kg)	SMM Diff (kg)	SMM % Diff	p-value
Normal	21.93	+0.29	1.62%	0.0146
Frail	22.00	+0.60	2.25%	0.0655

Function	BFM Before (kg)	BFM Diff (kg)	BFM % Diff	p-value
Normal	23.01	-0.54	-2.57%	0.0062
Frail	15.80	-1.28	-8.66%	0.0166

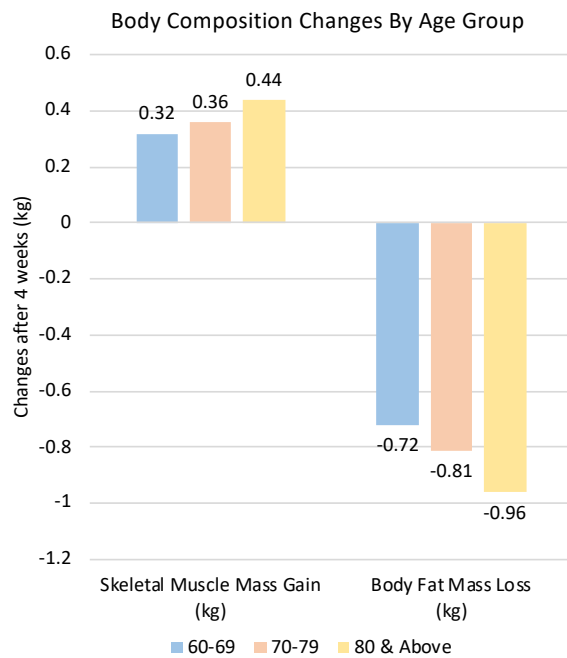
Discussions

Initial data from the InBody 770 multi-frequency BioImpedance Analysis (BIA) device suggest that there is significant changes in the Skeletal Muscle Mass and Body Fat Mass with regular use of BIXEPS MM sessions. This holds promise for seniors in the community as the loss of muscle and gain in body fats result in increased risk of age-related chronic diseases.

It is worth noting that age-related Sarcopenia (the involuntary loss of skeletal muscle mass and strength) may starting around the age 40, with an estimated 8% loss of muscle mass per decade. After age 70, this loss accelerates further to an estimated 15% per decade. Loss in skeletal muscle mass causes individuals to be physically weaker, become less active and increases their risk of falls and injuries. Often further resulting in seniors reducing the amounts of physical activity needed to maintain their muscle mass.¹ This decline in muscle mass and physical activity, increases the risk of acute and chronic disease states, increased insulin resistance, fatigue, falls, and mortality².

Sarcopenia is caused by multiple factors, including decline in activity and nutritional intake, as well as age-related biological change, such as hormonal changes as well as the decrease in the number of neuromuscular junctions and skeletal muscle stem cells. Interventions for sarcopenia are mainly focused on increasing activity and adequate nutrition. However, many elderly, especially the frailer individuals, may find it challenging to partake in physical activity due to age-related aches and pains and risks of falls related to illnesses or an aging body³.

These initial results suggest that BIXEPS treatment could in fact be a potent supplement to existing strategies for reducing sarcopenia. Initial results shows especially interesting potential for improving gains amongst the older or frailer portions of the elderly cohort.



¹ S. Ross, "Prevent Age-Related Muscle Loss, Frailty and Risk Factors for Falls," *Life Extension Magazine*, Nov. 2018. [Online]. Available: <https://www.lifeextension.com/magazine/2018/11/prevent-muscle-loss-and-frailty>. [Accessed: Jul. 27, 2022].

² J. D. Walston, "Sarcopenia in older adults," *Curr Opin Rheumatol*, vol. 24, no. 6, pp. 623–627, Nov. 2012. [Online]. Available: doi: 10.1097/BOR.0b013e328358d59b. [Accessed: Jul. 27, 2022].

³ K. Åhlund, B. Öberg, N. Ekerstad, and M. Bäck, "A balance between meaningfulness and risk of harm – frail elderly patients' perceptions of physical activity and exercise – an interview study," *BMC Geriatrics*, vol. 20, no. 1, p. 490, Nov. 2020, doi: [10.1186/s12877-020-01868-2](https://doi.org/10.1186/s12877-020-01868-2).

Already previous work amongst elderly show that Magnetic Mitohormesis has been able to improve the functional strength, balance and walking of seniors in the community. Previous data amongst a cohort of n=180 seniors showed that 12 weeks of weekly MM sessions improved gait-speed, balance and lower limb strength by: 24.9%, 16.3% and 14.2% respectively. Functional gains were realised by 74% - 85% of the population and enabled 43% with high risk of falls (as measured by Timed-Up and Go dynamic balance tests) to move into low fall-risk categories.

This initial data showing improvements in skeletal muscle mass shows a similar trend where weekly MM enables seniors, especially those who are elderly and frail to become fitter and healthier.

Additional work will be done as QuantumTX continues to evaluate:

1. How much more improvements can be seen with longer-term weekly sessions?
2. Will there a tapering-off of benefits after several months of weekly sessions?
3. How does weekly MM sessions integrate with other sarcopenia interventions?
4. How long lasting are the effects of MM sessions?

We look forward to additional data in the months ahead, as well as growing participation amongst seniors in the community.

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