The MOSS NUTRITION REPORT

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Product Review

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IS SARCOPENIA MORE THAN JUST A PROTEIN DEFICIENCY ISSUE?

INTRODUCTION

In relationship to our efforts to assist you in your efforts to improve quality of life in ever more difficult, chronically ill patients, our ever continuing mission at Moss Nutrition has been to emphasize key contributors to chronic illness that, for whatever reason, do not get the attention they deserve from the usual nutritional and functional medicine symposia and published papers. As I have focused on repeatedly over the years, based on both volumes of high-quality published research and anecdotal reports, one of the most important key, often ignored and underappreciated contributors is sarcopenia, or loss of muscle mass and function.

Given all that I have written on the subject, you may wonder what more there is to say that has not already been emphasized. Interestingly, a paper I recently read, "Nutritional status, body composition, and quality of life in community-dwelling sarcopenic and non-sarcopenic older adults: A case-control study" by Verlaan et al (Verlaan S et al. *Clin Nutr,* pp. 267-274, 2017) made it clear to me that much of my writing on nutritional support on sarcopenia was incomplete. As you may recall, I tended to focus on the macronutrient aspect of the problem, highlighting the need for increased protein intake and key protein constituents such as the amino acid, L-leucine. After reading the Verlaan et al paper, though, I was struck by the irony that, even though our muscle support product, **SarcoSelect®**, contains a significant, broad-based complement of micronutrients, I rarely, if ever, discussed these micronutrients in my sarcopenia writings.

As you will see in my review of the Verlaan et al paper, this is a significant omission that needs to be corrected. In fact, it appears that certain micronutrients are just as important as protein and key amino acids such as L-leucine in the nutritional support of the sarcopenic patient.

THE IMPORTANCE OF MICRONUTRIENTS IN THE SUPPORT OF THE SARCOPENIC PATIENT

The paper by Verlaan et al begins by emphasizing the point I have been making for years in my newsletters and lectures, that sarcopenia is a major contributor to reduced quality of life in aging populations:

"The definition of sarcopenia overlaps partially with physical frailty, and the consequences of both syndromes are increased incidence of falls and fractures, loss of independence, and increased rates of hospitalization."

The next quote emphasizes the intimate relationship between diet and sarcopenia:

"Poor dietary intake has been associated with individual components of sarcopenia, possibly due to dietary pattern changes, reduced response of ageing muscle to anabolic stimuli from meals (anabolic resistance), or oxidative stress from aging and co-morbidities."

Next, the authors emphasize the nutrient that has traditionally been considered the most important in relationship to sarcopenia, protein:

"Higher dietary intake of protein has been consistently associated with greater muscle mass in older adults. Consequently, a higher

recommended protein intake of 1.0-1.2 g/kg body weight was recently proposed for healthy maintenance of ageing muscles and up to 1.2-1.5 g/kg body weight/day for older adults with acute or chronic disease."

Verlaan et al go on to point out, though, that emerging evidence is suggesting that micronutrients may also be important for the optimization of muscle health:

"Several serum nutrient deficiencies (or inadequacies) are associated with measures of sarcopenia through pathways that are still not well-understood. The risk of becoming frail increases with the number of micronutrient deficiencies."

To gain more information on the contribution of micronutrient deficiency to sarcopenia, 380 sarcopenic and 66 non-sarcopenic individuals were evaluated. All were at least 65 years of age. None were considered to be malnourished in relationship to micronutrient intake.

What were the results of the study? First consider findings concerning protein intake. Interestingly both the sarcopenic and non-sarcopenic populations ingested the current minimum daily protein intake recommendations mentioned above. However, the intake of the sarcopenic group was at the low end of these recommendations, suggesting that even the higher level (1.0-1.2 g/kg body weight per day) compared to conventional recommendations (0.8 g/kg body weight per day) may still not be enough:

"There was a small, but significant difference in the dietary intake of protein (g/kg body weight/day) between the sarcopenic and non-sarcopenic older adults. Although the mean intake in the sarcopenic group was within the low range of the most recent recommendations for healthy older adults (1.0-1.2 g/kg bw/day), this intake level may still not be adequate to prevent or treat sarcopenia."

What about micronutrients?

"Compared to British daily reference nutrient intakes (RNIs), both groups seemed to have 'adequate' mean micronutrient intakes except vitamin D and selenium. This evident micronutrient 'sufficiency' is not uncommon among the UK's older adults, where the national diet and nutrition survey (2008-2010) found that adults over 65 years met or exceeded all micronutrient RNIs except for vitamin D."

Nevertheless, even though the participants met or exceeded the RNIs for micronutrient intake, an important question needs to be asked. Do the RNIs provide enough intake to assure optimal muscle health? Verlaan et al answer this question with the following:

"…micronutrient sufficiency in terms of the RNI might not be sufficient to preserve functional outcomes of sarcopenia. For example, vitamin B-12 intakes in both groups were above the RNI, but the sarcopenic group had significantly lower intakes than the non-sarcopenic controls, which was reflected in the serum concentrations of vitamin B-12. There was a significantly higher percentage of sarcopenic older adults (26%) below the deficiency cutoff level of 200 pmol/L, versus 11% in the non-sarcopenic controls."

What about vitamin D? As was noted above, both groups were below RNI levels:

"Both groups had mean daily vitamin D intakes below the RNI of 10 µg, which is the same as the newest Institute of Medicine's estimated average requirement (EAR)."

However, there was an interesting difference between the two groups in terms of vitamin D:

"The sarcopenic group in our study had significantly lower vitamin D intakes than the non-sarcopenic group..."

Besides vitamin D, were there any other differences in dietary intake of micronutrients between the two groups and, if so, are they clinically significant? Consider the following:

"The generally lower micronutrient density of the sarcopenic group's diets and the nutrient intakes that were significantly lower (vitamin B-12, vitamin D, magnesium, phosphorus, and selenium) could signal a lower quality diet in the sarcopenic group."

Beyond the suggestion of a difference of dietary quality, does the difference in intake of

several micronutrients between the sarcopenic and non-sarcopenic groups have important clinical implications? The authors answer this question by hypothesizing:

"…a group of nutrients rather than individual nutrients could also contribute to lower muscle mass strength and function of sarcopenia. Scott et al., for example, showed that higher intakes of calcium, magnesium, niacin, phosphorus, potassium, riboflavin and zinc, had positive increasing trends for increased appendicular muscle mass."

Before continuing I would like to expand on the important point made in the above quote. Traditionally, we tend to consider micronutrients as individual, isolated entities in terms of their impact on health. As suggested by Verlaan et al, this may be a mistake. Combinations of micronutrients may have a clinical impact way beyond the sum of the impacts of the individual nutrients. Furthermore, the concept could be further extrapolated to hypothesize that combinations of micro- and macronutrients may have an impact beyond what would be seen when considering the micro- and macronutrients individually. This important yet underappreciated aspect of macro- and micronutrient biochemistry and physiology led the authors to conclude:

"Certain groups of micronutrients and macronutrients and their relationship to sarcopenic parameters suggest that nutrients work in harmony with each other, and that isolating a single 'problem' nutrient for sarcopenic interventions may not adequately address the problem."

SOME FINAL THOUGHTS

In past newsletters I tended to discuss **SarcoSelect®** from a nutritional standpoint purely in terms of its protein and leucine content. As noted by Verlaan et al this was a notable oversight on my part. The fact that **SarcoSelect®** contains a full complement of micronutrients in addition to the macronutrients mentioned above deserves equal consideration in terms of why the product is so effective clinically.

For more information on **SarcoSelect®** and **SarcoSelect® DF**, please go to www.mossnutrition.com or give us a call at 800-851-5444.

SarcoSelect® ingredients:

Supplement Facts

Serving Size: 41.8 grams (1 scoop)
Servings Per Container: 14

	Amount Per Serving	% Daily Value
Calories	150	
Calories from Fat	35	
Total Fat	4 g	6%*
Saturated Fat	2.5 g	13%*
Cholesterol	30 mg	9%*
Total Carbohydrate	17 g	6%*
Dietary Fiber	5 g	20%*
Sugars	<1 g	**
Protein	13 g	
Vitamin C (as calcium ascorbate)	50 mg	83%
Vitamin D (as cholecalciferol)	67.5 IU	17%
Vitamin B1 (as thiamin mononitrate)	5 mg	333%
Vitamin B2 (as riboflavin)	5 mg	294%
Vitamin B3 (as niacinamide)	5 mg	25%
Vitamin B6 (as pyridoxine HCl)	5 mg	250%
Folate (as Quatrefolic® (6S)-5-MTHF acid, glucosamine salt)	50 mcg	13%
Vitamin B12 (as methylcobalamin)	25 mcg	417%
Biotin	50 mcg	17%
Pantothenic Acid (as d-calcium pantothenate)	50 mg	500%
Calcium (as TRAACS® Calcium Bisglycinate Chelate)	150 mg	15%
Phosphorus (from all sources)	55 mg	6%
Iodine (as potassium iodide)	20 mcg	13%
Magnesium (as TRAACS® Magnesium Bisglycinate Chelate)	150 mg	38%
Zinc (as TRAACS® Zinc Bisglycinate Chelate)	2.5 mg	17%
Selenium (as Albion® Selenium Glycinate Complex)	13.5 mcg	19%
Manganese (as TRAACS® Manganese Bisglycinate Chelate)	0.5 mg	25%
Chromium (as TRAACS® Chromium Nicotinate Glycinate Chelate)	11 mcg	9%
Molybdenum (as TRAACS® Molybdenum Glycinate Chelate)	16 mcg	21%
Potassium (as Albion® Potassium Glycinate Complex)	200 mg	6%
Tapioca maltodextrin (non-GMO)	3 g	**
L-leucine	2 g	**
Organic Golden Flaxseed powder (non-GMO)	2 g	**
Inulin	2 g	**
Isomalto-Oligosaccharide Mixture (soluble fiber)	1.8 g	**
Medium Chain Triglycerides	1.75 g	**
HMB (calcium B-hydroxy B-methyl butyrate)	1.5 g	**
Organic Coconut Oil powder	400 mg	**
Meriva® Curcumin Phytosome (*Curcuma longa* root extract & phospholipid complex)	250 mg	**
Choline (as choline bitartrate)	50 mg	**
Inositol	50 mg	**
L-Taurine	50 mg	**
Mixed Tocopherols	30 mg	**
L-Carnitine HCl	11 mg	**

* Percent Daily Values are based on a 2000 calorie diet.
** Daily Value not established.