Scottsdale Magnesium Study: Absorption, Cellular Uptake and Clinical Effectiveness of a Timed-Release Magnesium Supplement in a Standard Adult Clinical Population

Key Points

A recent study published in the *Journal of the American College of Nutrition (JACN)* evaluated the absorption, cellular uptake and clinical effectiveness of MagSRT™ in a standard adult population.[1] The authors reported that:

- MagSRT™ was well-tolerated by most individuals, with 91% of participants completing the 30-day trial. Individuals who continued the trial for 90 days, reported no side effects.

- Overall symptomatology, evaluated using a magnesium status questionnaire, improved 28% over 30 days and 63% over 90 days.

- Red blood cell (RBC) magnesium increased 6% and 30% over 30 and 90 days, respectively.

- 96% of all trial participants had baseline magnesium status within lab normal ranges; however, 79% and 89% had suboptimal serum and RBC magnesium status at baseline, respectively.

Study Objective

The objective of the study was to evaluate the efficacy of MagSRT™ in a real-world cross section of patients with clinically normal magnesium status. Primary clinical outcomes included:

1. Assessment of magnesium absorption by measuring changes in serum magnesium levels at four and eight hours after initial supplementation;

2. Examination of cellular uptake using RBC magnesium values after 30 and 90 days of supplementation; and

3. Evaluation of patient symptomatology shifts using a magnesium status questionnaire after 30 and 90 days of supplementation.
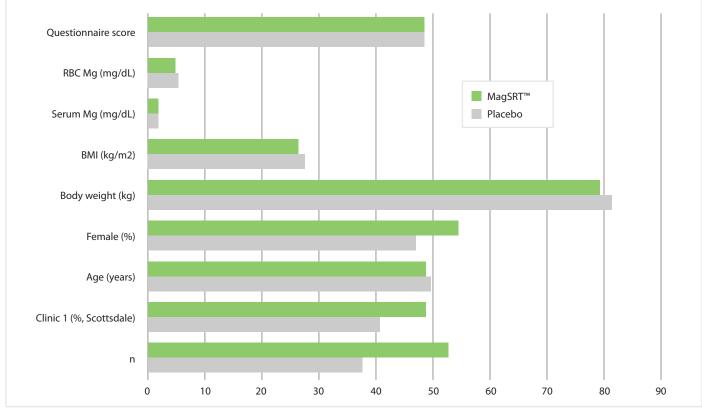
A secondary objective was to evaluate the percentage of recruited patients with suboptimal, versus normal, magnesium status based on serum, RBC, and questionnaire results. Data from the 1999 - 2000 National Health and Examination Survey (NHANES) indicate that at least 68% of Americans consume less than the RDA for magnesium.[2] However, normal lab ranges are determined based on values from 95% of the population, most of whom are not consuming enough magnesium.

Approach

Ninety-one adults participated in a placebo-controlled study at two clinics; 53 individuals received MagSRT™, containing 500 mg dimagnesium malate and Vitamins B6, B12 and folate, with remaining individuals receiving a placebo. Participants were asked to take 2 tablets twice a day with meals. Baseline serum magnesium, RBC magnesium and magnesium status questionnaire scores were collected before trial initiation. To evaluate magnesium absorption, serum magnesium was measured 4 and 8 hours after participants ingested 2 supplemental tablets (250 mg magnesium, half of the recommended dose) or 2 placebo tablets. After 30 days, RBC magnesium was evaluated and participants completed the magnesium status questionnaire. Twenty-four MagSRT™ participants continued the trial for 90 days; RBC magnesium and questionnaire scores were again evaluated after 90 days.

Results

Figure 1 summarizes the baseline characteristics of the trial participants. There were no significant differences in location, age, gender, body weight, BMI or magnesium status between MagSRT™ and placebo participants.

Figure 1: Demographics and baseline magnesium status for MagSRT™ and placebo participants.

Magnesium Absorption

Serum magnesium increased 22% four hours after taking two tablets of MagSRT™, then decreased 5% after an additional four hours (Figure 2). The initial increase in serum magnesium suggests that magnesium was absorbed through the small intestine into the bloodstream.
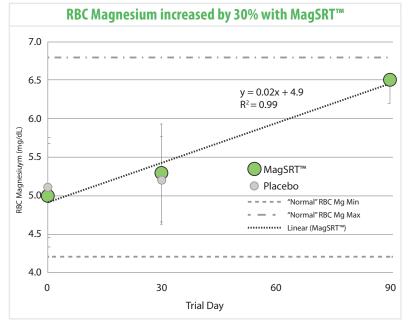
The slight decrease at 8 hours may have captured the body in the process of regulating serum magnesium concentration, either by incorporating it into cells or releasing it into the urine. Serum magnesium did not increase in those taking the placebo.
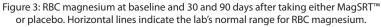
The laxative effects of magnesium are greatly diminished when magnesium is well absorbed. Ninety-one percent of trial participants completed the 30-day trial and 75% reported no side effects. Of those individuals who continued the trial for 90 days, none reported side effects.

Uptake of Magnesium into Red Blood Cells

RBC magnesium levels increased 6% and 30% over 30 and 90 days, respectively, in the MagSRT™ group. Both increases are statistically significant (p <0.001). RBC magnesium levels increased 2% in the placebo group after 30 days. Although significant (p = 0.035), it is unlikely that this increase is clinically relevant. RBC magnesium values as a function of time are summarized in Figure 3.

Red blood cell magnesium is a better measure of
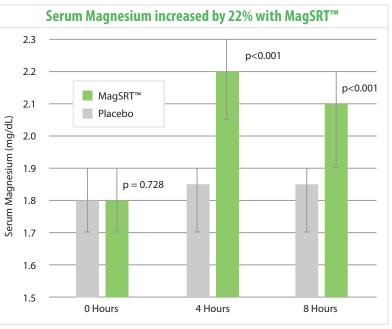
Serum Magnesium increased by 22% with MagSRT™

Figure 2: Serum magnesium at baseline 4 and 8 hours after taking a half dose (2 tablets) of either MagSRT™ or placebo.
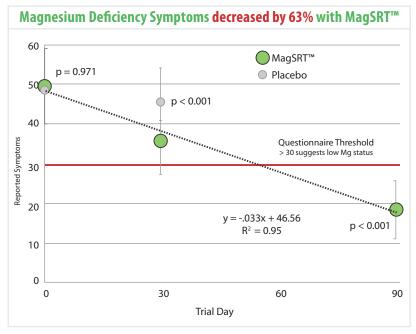
magnesium stores than serum magnesium and values exceeding 6.0 mg/dL are considered optimal.[3]

Symptom Reduction

Participants in the MagSRT™ group reported a 28% improvement in questionnaire symptoms after 30 days, with 19 participants (40%) having scores less than the threshold value of 30. Placebo subjects reported a 6% improvement in symptoms, with one participant (3%) scoring less than the cutoff value of 30. Symptom scores for the 24 MagSRT™ participants who continued with the trial decreased a total of 63% over 90 days. Ultimately, all 24 (100%) of the 90-day MagSRT™ participants achieved a score less than the questionnaire threshold value of 30. Figure 4 summarizes reported symptoms (as questionnaire scores) as a function of trial day for both the MagSRT™ and placebo groups.

Symptoms showing significant improvement after 30 days of MagSRT™ supplementation included (ranked from smallest to largest p value): memory, carbohydrate/chocolate cravings, sexual energy, blood pressure, fatigue, concentration, asthma/wheezing, anxiety,

RBC Magnesium increased by 30% with MagSRT™

$$y = 0.02x + 4.9$$
$$R^2 = 0.99$$

Figure 3: RBC magnesium at baseline and 30 and 90 days after taking either MagSRT™ or placebo. Horizontal lines indicate the lab's normal range for RBC magnesium.

and gagging/choking from esophageal spasms. These results suggest that MagSRT™ may provide a safe, highly effective clinical tool for addressing these particular symptoms. However, because the supplement contains significant amounts of methyl folate, B12 and B6 in addition to magnesium, we cannot conclude that magnesium alone is responsible for the improvement in symptomatology. A future trial evaluating the effect of dimagnesium malate alone on the magnesium status questionnaire scores is necessary to further validate the magnesium status questionnaire used in this study.

Figure 4: Reported symptoms on the magnesium status questionnaire at baseline and 30 and 90 days after MagSRT™ or placebo.

Magnesium Status

There is no recent published data on magnesium status among Americans; therefore, evaluating baseline magnesium status and the impact of magnesium supplementation on status was a secondary objective of this study. Figure 5 summarizes the change in serum and RBC magnesium status after supplementing with MagSRT™ for 30 days.
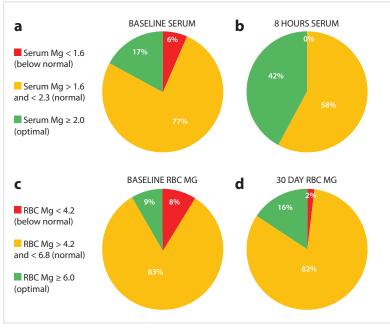

Figure 5: (a, b) Serum magnesium at baseline and 8 hours after taking a half dose of MagSRT™; (c, d) RBC magnesium at baseline and 30 days after taking MagSRT™.

The normal range for serum magnesium is between 1.6 and 2.3 mg/dL; however, optimal serum magnesium status is expected at values ≥ 2.0 mg/dL.[4] At baseline, 17% of MagSRT™ participants had serum magnesium values ≥ 2.0 mg/ dL, indicating that 83% had suboptimal serum magnesium status. Eight hours after ingesting 250 mg of dimagnesium malate, 42% of MagSRT™ participants had serum magnesium values ≥ 2.0 mg/dL.

The normal range for RBC magnesium is between 4.2 and 6.8 mg/dL. There is some debate around optimal intracellular magnesium levels. One source suggests that an optimal RBC magnesium would be ≥ 6.0 mg/dL.[5] At baseline, 9% of MagSRT™ participants had RBC magnesium values of 6 or greater, indicating that 91% had low RBC magnesium status. After 30 days, 16% in the MagSRT™ trial had a RBC magnesium value ≥ 6 mg/dL. Of those who continued the MagSRT™ trial for 90 days, 48% reached optimal magnesium status.

According to these ranges for both serum and RBC magnesium, roughly 80 - 90% of this trial population may have had suboptimal magnesium status at baseline. These findings correlate well with the results from the magnesium status survey, which indicated that 100% of participants had a score ≥ 30 at baseline, suggesting low magnesium status.

Conclusion

A standard adult clinical population presented with both qualitative and quantitative evidence of compromised magnesium status at the beginning of the trial. Supplementation with MagSRT™ for at least 30 days significantly improved magnesium status symptoms and increased RBC magnesium with minimal gastrointestinal symptoms.

References

1. Weiss, D., Brunk, D. K., & Goodman, D. A. (2018). Scottsdale Magnesium Study: Absorption, Cellular Uptake, and Clinical Effectiveness of a Timed-Release Magnesium Supplement in a Standard Adult Clinical Population. Journal of the American College of Nutrition, 1–12. https://doi.org/10.1080/07315724.2017.1398686
2. King, D. E., III, A. G. M., Geesey, M. E., & Woolson, R. F. (2005). Dietary Magnesium and C-reactive Protein Levels. Journal of the American College of Nutrition, 24(3), 166–171.
3. Dean, C. (2017). The Magnesium Miracle (2nd ed.). Ballantine Books.
4. Weatherby, D., & Ferguson, S. (2002). Blood Chemistry and CBC Analysis. Jacksonville, OR: Bear Mountain Publishing.
5. Dean, C. (2017). The Magnesium Miracle (2nd ed.). Ballantine Books.

MagSRT™
MAGNESIUM SUPPLEMENT

America's #1 Time-Release Magnesium Supplement*

CLINICALLY TESTED

MagSRT™ now
clinically shown to:

✔ **Increase** Serum Magnesium (**+22%**)

✔ **Increase** RBC Magnesium (**+30%**)

✔ **Reduce** Magnesium Deficiency Symptoms (**-63%**)

✔ **Well-tolerated** at high dosage! (**+91%**)

Supplement Facts

Serving Size - 4 Tablets
Servings Per Container - 60

	Amt per Serving	% Daily Value
Vitamin B6 (as Pyridoxal 5-Phosphate Monohydrate)	5 mg	294%
Folate (as Quatrefolic® 5-Methyl Tetrahydrofolic Acid Glucosamine Salt)	200 mcg	50%
Vitamin B12 (as Methylcobalamin)	6 mcg	250%
Magnesium (as Dimagnesium Malate)	500 mg	119%
Malic Acid (as Dimagnesium Malate)	1436 mg	†

† Daily Value not established.

Other Ingredients: Microcrystalline Cellulose, Hydroxypropyl Cellulose, Croscarmellose Sodium & Hydroxypropyl Methylcellulose (Plant-based insoluble fibers used to achieve Sustained Release Technology); L-Leucine (Essential amino acid used as lubricant), Silicon Dioxide (Anti-caking agent) and Micro Wax (Exterior coating).

Suggested Use: As a dietary supplement, take 4 tablets per day with food. Divide doses if desired, or use as directed by your health care provider.

LABEL CLAIM VERIFIED

Every batch is tested by a 3rd party laboratory to ensure purity and potency:
What's on the label is in the bottle.

JigsawHealth.com • 1-888-352-5050

*MagSRT™ has 5 times more 5 star reviews on Amazon than the next time release magnesium brand as of September 2017.