

## Magnesium and the Body's Nutrient Mineral System

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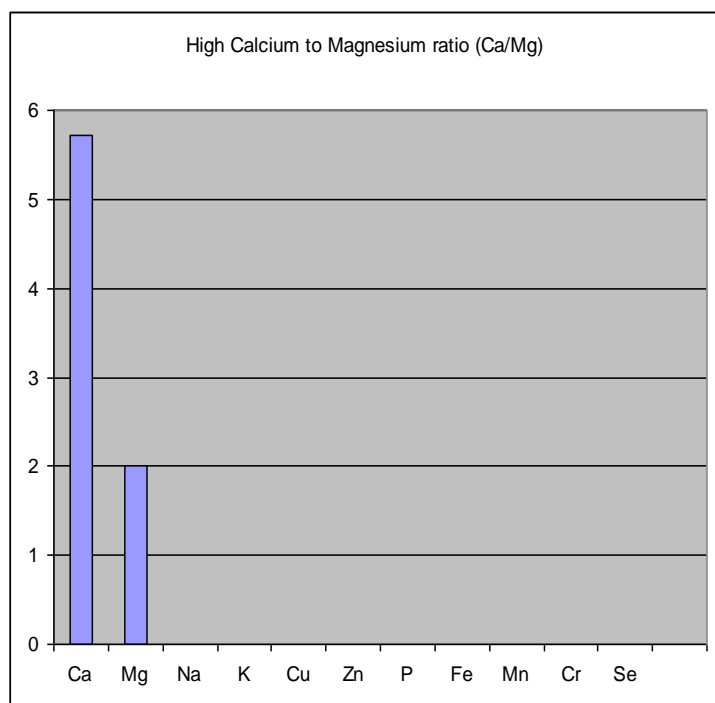
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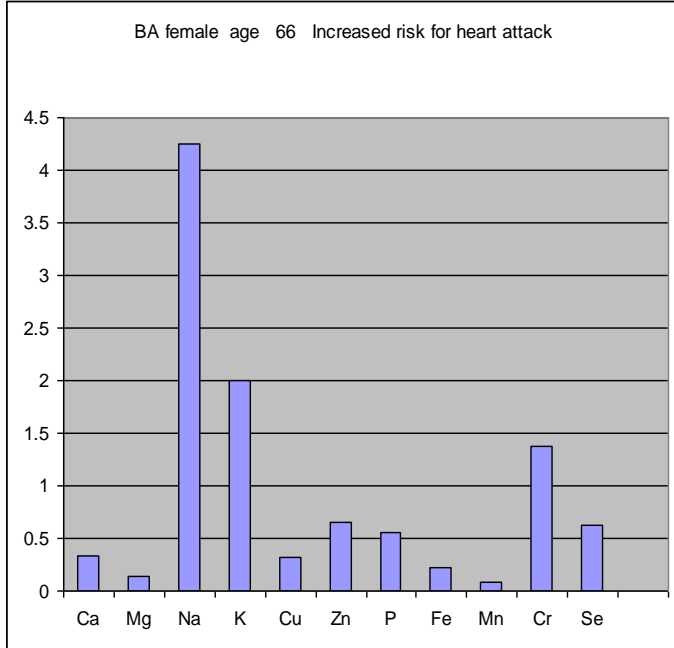
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As more and more people learn about magnesium and its vital role in so many aspects of good health – physical and mental, the intake of magnesium has increased substantially. Regardless of the mode of taking in magnesium, whether it is through oral supplements, magnesium oil applied transdermally, or Epsom salt baths, it is important that people taking magnesium learn the primary effects of magnesium on the body's nutrient mineral system. Magnesium's effect on the adrenal glands that regulate sodium levels is especially important in this context. There are clearly established relationships between magnesium and other nutrient minerals. These relationships are reflected in nutrient mineral ratios involving magnesium, primarily the calcium/magnesium (Ca/Mg) ratio and the sodium/magnesium (Na/Mg) ratio. These relationships are most apparent in a hair mineral analysis.

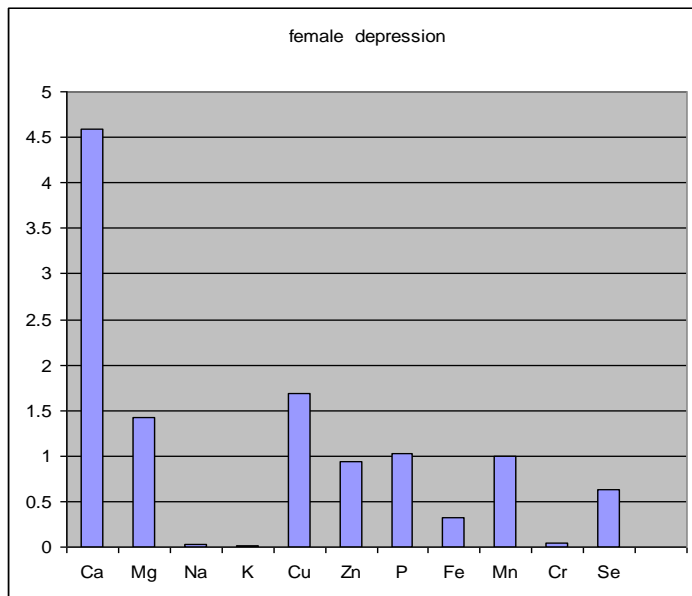
Magnesium's relationship with calcium is reflected in the calcium/magnesium ratio (Ca/Mg). The Ca/Mg ratio is involved in regulating blood sugar because of the calcium and magnesium effect on the pancreas' release of insulin. A significant magnesium deficiency and/or a high Ca/Mg ratio result in the release of too much insulin producing a drop in blood sugar. The Ca/Mg ratio is also involved in muscle tone since calcium contracts muscles and magnesium relaxes them. This is why a magnesium deficiency and/or a high Ca/Mg ratio results in muscle spasms or twitches. This is also a factor relating blood sugar problems to cardiac problems including arrhythmias and heart attacks. Estrogen and copper both contribute to a high Ca/Mg ratio by raising calcium above magnesium.



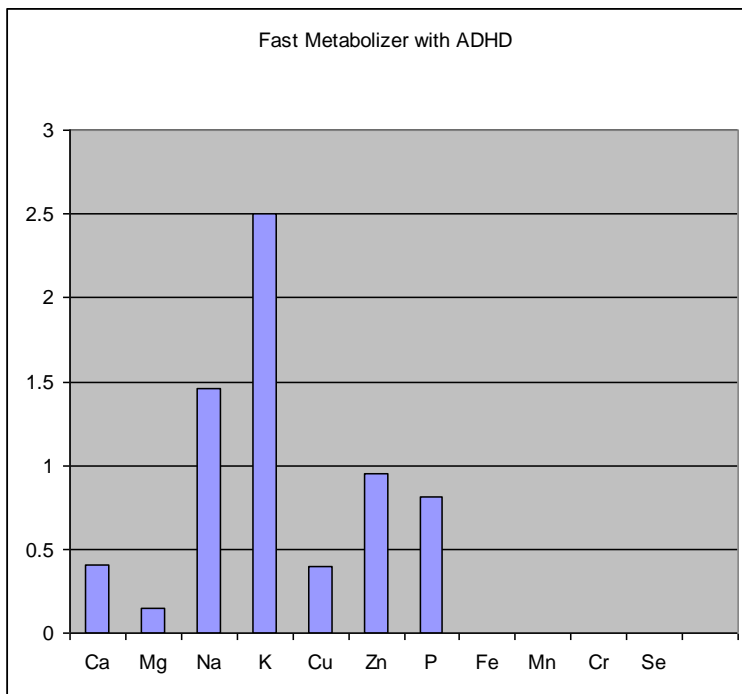
Magnesium's relationship with sodium is reflected in the sodium/magnesium ratio (Na/Mg). This has been designated as the adrenal gland ratio and is a very important consideration when doing magnesium supplementation. When this ratio is high, it usually indicates an intense adrenal gland response that depletes magnesium levels and requires an increase in magnesium intake.



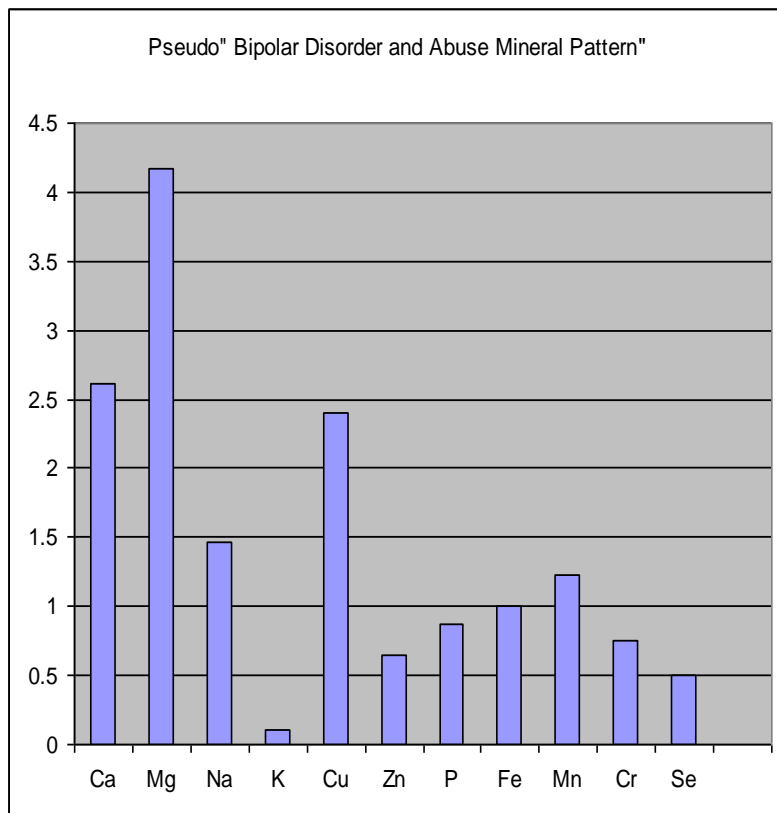
On the other hand, when the Na/Mg ratio is very low, it usually indicates that the adrenal glands are drained and unable to maintain adequate sodium levels because the adrenals are not producing enough aldosterone, the sodium retaining hormone. A very low Na/Mg ratio presents a challenge when there is a high Ca/Mg ratio and magnesium supplementation is needed to balance the Ca/Mg ratio. The low Na/Mg ratio warrants adrenal gland nutrition support. However, if the adrenals respond too intensively to nutrition support and raise the sodium level, more magnesium will be depleted and the Ca/Mg ratio increases. Then, more magnesium is needed when the adrenals are stimulated whether by stress, stimulating nutrients, or stimulant drugs. This is the challenge to bring about an adequate balance between Na and Mg as well as Ca/Mg and sodium to potassium (Na/K). These vital minerals are all interrelated as essential parts of a dynamic metabolic system that changes over time. These electrolyte minerals are closely related to functioning of the neuro-endocrine system.



Another mineral pattern involving magnesium and sodium has a **low magnesium level** and a **low ratio** between sodium and potassium even though there is a high ratio of sodium to magnesium. The dilemma with this mineral pattern is that taking magnesium will result in lowering the sodium level in relation to a higher potassium level. The sodium/potassium ratio then drops further. Even though the low ratio of Na/K indicates a trend towards adrenal insufficiency, adrenal nutrition support is not recommended here to bring about a better balance between Na and K. This is because adrenal stimulation will tend to reduce the low magnesium level even more. This principle applies regardless of whether the adrenal stimulation is provided by nutrition support to the adrenals or by means of a stimulant drug such as Ritalin, Adderall, or cocaine. What this hair mineral pattern suggests is that re-balancing the low Na/K ratio may also be achieved by lowering the potassium level rather than trying to raise the sodium level. Calcium, copper, and/or vitamin D may be taken to reduce the high potassium level and that will also raise the Na/K ratio. As the Na/K ratio is brought into a better balance, then more magnesium is likely to be absorbed and retained. Also, more magnesium may be taken with this approach since the Na/K ratio is being raised by calcium, copper, and/or vitamin D.



Hair mineral analysis data can reveal a unique stress and magnesium loss mineral pattern that shows the impact of intense stress associated with abusive relationships. In this particular mineral pattern, there is a high sodium to potassium ratio indicating intense stress, but the magnesium level is unusually high, especially in relation to calcium. In other words, the hair calcium/magnesium ratio is low and the sodium/potassium ratio is high. It is a well-established fact that stress depletes magnesium which is lost from inside of cells. When large quantities of magnesium are lost from inside of cells under conditions of intense stress, a large amount of magnesium may be excreted via the hair as a pathway of excretion. The resulting hair mineral pattern is shown here. Symptoms related to intense stress and magnesium loss are usually experienced by a person with this mineral pattern.



There is still one more mineral pattern involving magnesium supplementation that is important to consider. This usually occurs in someone who has taken large quantities of magnesium over an extended period of time. In some individuals, they will build up large magnesium reserves to a level that significantly exceeds the calcium level, resulting in a low ratio of calcium/magnesium. The person will not be experiencing magnesium loss and deficiency symptoms. They will usually be experiencing signs of a diabetic trend. In this particular type of mineral pattern, the hair magnesium level is being retained in the cells and not lost from the cells. This mineral pattern warrants a cessation of magnesium supplementation and instead adding calcium supplementation. It is known that calcium releases insulin from the pancreas and magnesium stops the release of insulin. Therefore, in this particular mineral pattern, the excess magnesium prevents the release of insulin and the blood sugar level rises.

A very important factor to consider when using magnesium supplementation is that, depending on the person's starting mineral pattern, the magnesium supplementation may eventually initiate some fundamental mineral changes that can result in one of these imbalanced mineral patterns or make the mineral pattern worse. This is because magnesium and the mineral system of which it is a vital part is a dynamic system that changes over time. The hair mineral analysis puts magnesium in the context of this dynamic system and shows the possible effects of magnesium on this system of interacting minerals. Having a basic understanding of this dynamic mineral system is important for anyone using magnesium supplementation in order to be aware of its short-term and long-term effects.