THE PALEO DIET

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SUMMER FRUIT

PROTECTING YOUR BONES

PALEO ATHLETE SNACK IDEAS

LOREN CORDAIN, PH.D.

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PREGNANCY, YOUNG CHILDREN, AND THE PALEO DIET

Loren Cordain, Ph.D., Professor Emeritus

With the growing popularity of the Paleo Diet, we've received questions about adapting this diet for pregnancy, particularly with regard to the low fat aspect of the diet. Others are also asking for more information about adapting the Paleo Diet to the growth and nutritional needs of infants and young children. With a little modification, the Paleo Diet can meet these needs, help children escape the growing childhood obesity problem, build life-long eating habits to lower the risk of disease, and generate healthful, vital longevity. Here are some recommendations for using the Paleo Diet to optimize nutrition during pregnancy, infancy and childhood.

WHAT ABOUT PREGNANCY?

Due to the metabolic changes that occur in the liver during pregnancy, women cannot tolerate protein levels as high as they normally could. This has been documented in both the anthropological and clinical literature. To accommodate this, higher fat meats, higher fat vegetables, and more carbs can be included in the Paleo Diet during pregnancy than most people eating the typical Paleo Diet will need.

Numerous studies have shown that fetal and infant cognitive development requires sufficient omega-3 fatty acids during pregnancy and nursing. Our ancestors got most of their dietary fat from leaner meat, which was a richer source of monounsaturated and omega-3 polyunsaturated fatty acids, than the meat from feedlot animals today. The Paleo Diet is high in mono-unsaturated fats, such as olive oil, and omega-3 polyunsaturated fats from fish. It also avoids feedlot meat to increase the omega-3 in our diet, and enhance the omega-6/omega-3 ratio to more closely resemble the healthful diet of our ancestors.

INFANCY: THE FIRST TWO YEARS

Hunter-gatherer children were typically introduced to solid food later than what is considered normal in the Western world. Studies of five hunter-gatherer societies (Kung, Ache, Inuit, Australian Aborigines, and Hadza) have revealed the average age of weaning to be 2.9 years.[1] Hence, the early nutrition of hunter-gatherer infants is highly dependent upon mother's milk. Because hunter-gatherers typically consumed a diet higher in omega-3 fatty acids, mother's milk likely would also have been higher in omega-3 fatty acids than milk from the typical nursing Western mother. This difference is important in light of the studies indicating the importance of sufficient omega-3 fatty acids during pregnancy and nursing for cognitive development. For the Western mother, weaning at age 3 is impractical, but weaning should be delayed as long as possible (preferrably at least 1-1.5 years). After weaning, I recommend that infants be given a formula that is enriched with both docosahexaenoic acid (DHA) and arachidonic acid (AA). Infants should not be given eicosapentaenoic acid (EPA) in the form of fish oil because it competes with AA metabolism and can result in impaired motor development and growth.

Human milk contains very little iron, but infants are born with iron stores sufficient to last 9-12 months. Pediatricians typically recommend that infants' first solid foods be iron-fortified cereals. Commercial baby foods, such as beef, pork, or chicken, are a better alternative to this. Hunter-gatherer mothers introduced their infants to solid foods by thoroughly chewing meat, marrow, nuts, seeds, fruits, etc. If you do give cereal to your infant, I recommend rice and not

either wheat or oats.

Virtually all pediatricians recommend that cow's milk and other dairy products, such as yogurt, cheese, etc., be excluded from infant diets during their first year. Early exposure to dairy products has been implicated in increased risk of a number of autoimmune diseases, particularly type 1 diabetes.

WHAT ABOUT WHEN SOLID FOODS ARE INTRODUCED?

When switching to solid foods, I recommend focusing upon the same basic food types that I recommend for adults, such as fresh fruits and vegetables, fresh meats and seafood. There is evidence that the children's livers are less able to deal with high levels of protein (~30-40% total energy). Hence, higher fat meats and fish should not necessarily be restricted to the same extent as with adults because this will help balance the protein levels. Higher fat plant foods, such as nuts and avocados, and healthful oils are also useful, but monitor for nut allergies. Omega-3 enriched eggs should be the egg of choice, and they are a source of DHA.

I don't advocate completely restricting processed food from children because eating involves behavioral issues. The best way to get a child to eat junk food is to completely forbid it. In our house, we serve typical Paleo foods in every meal. We stock very little processed food, so if our children are hungry, their choices are primarily healthy foods. We don't allow unlimited access to TV, computers or electronic games, but we do encourage outdoor play. For active children, I don't think that certain high glycemic load foods may be harmful. We do not restrict dried fruit, such as raisins and dates, and we encourage them to eat bananas, yams and sweet potatoes.

Finally, while societies often view being tall positively, it has a downside. It increases the adult risk for a number of cancers, particularly breast cancer in women. The nature of this relationship remains obscure, but our research group thinks that the relationship between stature and cancer risk involves the consumption of high glycemic load carbohydrates during childhood, along with an otherwise healthy diet that is high in protein.[2]

For sources see References: Section I

SUMMER FRUIT: COLORFUL & BOUNTIFUL

Nell Stephenson, BS USC EXSC

Now that summer is just around the corner, you may have already noticed that local produce sections seem more colorful and are offering more kinds of fruit! Take advantage of this and let the food experimentation begin because with fruit, the sky's the limit!

With the exception of a few higher glycemic fruits and dried fruits (which are best eaten in moderation, or with some healthy protein or fat to lower the glycemic index), have at it!

While fruits can be enjoyed the same way you've always eaten them, such as an apple for a snack, or

some berries for dessert, now's your chance to be creative. Top off your mixed green salad with freshly sliced organic strawberries (strawberries are one fruit that you'll want to opt for the organic variety). Add some mango to a platter of sautéed greens. How about a blueberry coulis to drizzle atop some grilled chicken breast? Or, how about a pineapple, tomato (unless you're following an autoimmune diet), cilantro and avocado topping on that fresh salmon you picked up from the fish monger?

The idea is to keep it as varied as possible. Consider it a mix and match of food and see how many different dishes you can create! If the meal that you prepare looks colorful and is well presented, you're that much more likely to keep the kids (or spouse, roommate or significant other) engaged in your ongoing Paleo lifestyle.

MAINTAINING BONE HEALTH

Pedro Bastos MA, MS, Ph.D.

Although people in the United States have one of highest calcium intake rates worldwide, they still have one of the highest rates of bone de-mineralization. A reduction in bone mineral density or osteoporosis not only increases the risk of bone fracture, but has also been associated with many other diseases and disorders.[1] The National Osteoporosis Foundation estimates that 44 million Americans, or 55 percent of the people over 49, are at risk for osteoporosis. It's true that osteoporosis largely affects seniors, but it can be present at any age. It's been called the silent disease since no pain or symptoms accompany it.

Most of the nutritional guidelines for osteoporosis rely on calcium supplementation or the consumption of calcium-rich foods such as milk, but, as Americans have proven, bone mineral content is not just dependent upon calcium intake.

Bone mineral health depends upon vitamin D status,[2] physical activity,[3] micronutrient intake[4-7] (including not just calcium, but also magnesium, zinc, copper, folic acid and vitamin K, B2, B6 and B12), protein intake (it increases intestinal calcium absorption[8,9] and has an anabolic effect on bone,[8] particularly in the context of a net base yielding diet),[10] omega-6/omega-3 ratio,[11,12] and the glycemic load/insulinotropic effect of the diet (high blood insulin levels cause calcium loss).[13]

Moreover, when we talk about calcium balance, it should be pointed out that calcium intake is only part of the equation. We also have to consider calcium excretion, which can be increased by a diet that chronically elevates blood insulin levels[13] (such as a diet composed of high glycemic load foods, such as sugar containing foods, potatoes and many grain based products,[14] and by milk and fermented milk).[15-19]

Calcium excretion is also increased when people eat a net acid yielding diet, which is key to bone health. After the nutrients in the foods we eat are metabolized, they report to the kidneys as either acid or base.[20] If the diet yields a net acid load, the acid must be buffered by the alkaline stores of base in the body,[21] such as calcium salts,[22] which are released from bone and then eliminated in the urine, gradually leading to osteopenia[21] (low bone mineral density) and eventually to osteoporosis.

Acid producing foods include hard cheeses, cereal grains, meats, fish, eggs[20] and salted foods.[23] Fruits and vegetables are the only alkaline, base-producing foods.[20,21] Energy-dense, nutrient-poor foods (such as separated fats and oils and refined sugars), although they have a neutral effect in terms of acid-base balance, displace fruits and vegetables, and hence contribute to the diet's net acid load.[24]

Because the average American diet is overloaded with grains, cheeses, salted processed foods, fatty meats, refined sugars and separated fats and oils at the expense of fruits and vegetables, virtually everyone in the U.S. consumes a net acid yielding diet,[24] which leads to bone de-mineralization.[21,22]

Replacing hard cheeses, cereal grains, processed foods and refined sugars and separated fats and oils with plenty of vegetables and fruits can bring the body back into acid/base balance,[24] which naturally brings it back into calcium balance, and has numerous other health benefits.[21] The Paleo Diet recommends an appropriate balance of acid yielding and base yielding foods, including lean meats, fish, seafood, nuts, fruits, and vegetables. We believe that this way of eating combined with proper exercise[3] and optimization of vitamin D status[2] (either through sun exposure or supplementation) affords protection from osteoporosis in otherwise healthy individuals, because it:

*Provides all the micronutrients[25] (including calcium, which can be obtained from green leafy vegetables of the large genus Brassica, in the mustard family. This includes broccoli, Brussels sprouts, cabbage, cauliflower, kale, kohlrabi and mustards);

*Encourages the intake of plenty of fruits and vegetables to become net-base yielding. It is important to mention that green leafy vegetables are net base yielding and milk, yogurt and cheese are net acid yielding;[20,24]

*Is high in protein;

*Provides a high intake of omega-3 fatty acids and warns against excessive omega-6 intake;

*Has a low glycemic load and avoids dairy products. Remember that milk, fermented milk and yogurt elevate plasma levels of insulin as much as white bread,[15-19] making green leafy vegetables (again) a safer source of calcium.

This summer, you have another reason to enjoy your bone-building garden greens more than ever!

For sources see References: Section II

PALEO ATHLETE SNACKS: FUEL FOR TRAINING

Nell Stephenson, BS USC EXSC

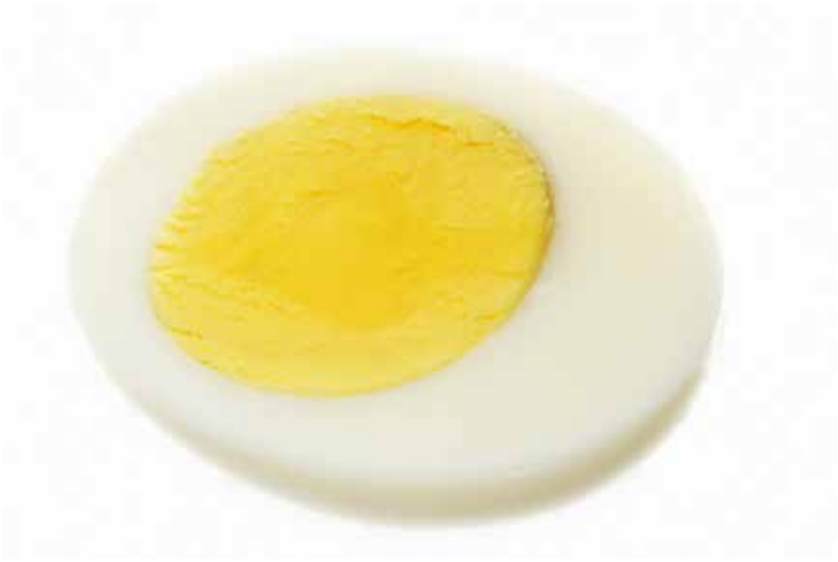
Having just completed our first round of The Paleo Diet Implementation Program, it's become very clear to me how many athletes there are who've begun to eat a Paleo Diet, but are concerned that it may not provide enough fuel for training.

Being an endurance athlete myself, I can promise firsthand that it does! It will require more preparation since you're not likely to find baked yams with salt in your local mart. You'll fare much better in your training, racing and recovering than if you were to default to the commonly available sports bars, made with whey, grains and all sorts of other "interesting" non-Paleo food ingredients.

The following are some of my favorites. For a complete listing of why these are favorites, review sections on what to eat before, during and after training around the time of a training session in *The Paleo Diet For Athletes.*

*Natural, unsweetened applesauce with plain egg white protein powder and a sprinkle of salt

*Baked yam with hard-boiled egg whites (I'll give the yolks to the dogs as I prefer a light meal



of protein and carbs only if workout session is going to follow immediately and I don't have time to digest the fat).

*Bananas - either fresh or sliced, and then frozen. There's not a time I enjoy a banana more than after a workout session!

*Pineapple - again, right after a workout is a perfect time for this fruit. Pineapple (and papaya and mango) contain bromelain, an enzyme that aids in digestion and helps to settle the stomach. That's quite handy for those hard sessions when you've pushed your limits, and ended up feeling a touch of nausea!

*Dried fruit - the best time to eat this higher-in-sugar snack is right after a session when your muscles are screaming for carbohydrate to repair and refuel for your next session.

*Cantaloupe - a great source of potassium, even higher than bananas!

*Finally, I can't omit the essential: the recovery drink recommended in *The Paleo For Athletes*, "Homebrew." It's superior to anything you're going to find commercially available, and it contains fruit and protein. You'll never tire of it, as you can always vary which fruits you use to keep it interesting.

If you haven't committed to being 100% Paleo for fear that it won't support your athletic endeavors, again, I promise you, it will.

Train hard Paleo Athletes!

THE DEBATE OVER THE SAFETY OF LEGUMES

Loren Cordain, Ph.D., Professor Emeritus

Legumes, such as beans, lentils, peanuts, and peas are ubiquitous in modern society. Even the Mayo Clinic's website labels legumes as "among the most versatile and nutritious foods available." As many readers already know, though, the Paleo Diet does not include legumes. To explain why, we'd like to share the following thoughtful question regarding whether legumes could have been a nutritional resource for our Paleolithic ancestors that would have been incorporated into our evolutionary heritage.

"Dear Dr. Cordain,

I have read your Paleo Diet books and some interviews with you as well, but I have a question the answer to which continues to evade me. If we are to eat as our ancestors, i.e. as nature designed (with which I completely agree), would they not have eaten legumes as long as they didn't experience immediate discomfort from doing so? I understand how raw peanuts or cashews (or their evolutionary predecessors) would not have been eaten as they were poisonous until cooked and would have caused distress, but what about such things as string beans or sugar- snap peas? These can be eaten raw with no immediate ill effect, regardless of lectin content, so wouldn't the

ancestral equivalent of these foods have been eaten by Paleolithic man?

What would have dissuaded him? And as such, shouldn't we now be able to handle them? (As you can tell, I miss my beans. I'm also assuming there were Paleolithic equivalents). I've been kind of going on the theory that if you can eat it raw it's okay (because they would have)."

Holly Schmaling

Dear Holly:

My feeling is that pre-agricultural hunter-gatherers would have been opportunists and would have consumed virtually all-edible foods. However, optimal foraging theory suggests that they would have tried to hunt, gather and fish foods that supplied the greatest energy input per energy expended. They also would have preferred readily digestible carbohydrate when animal foods were lean with little fat. Because legumes are only available seasonally, they would not have provided a staple food source until the development of agriculture. This means that humans would not have evolved the ability to cope with the "dark side" of legumes.

In general, most legumes are concentrated sources of both lectins and saponins. These toxic compounds serve to prevent predation by insects, fungi, bacteria and other organisms. The problem that saponins present for people is that saponins bind cholesterol in the gut membrane to create pores in the gut (intestinal permeability). While most dietary lectins are not toxic to humans, legumes and grains are the primary exceptions because legume and grain lectins can bind to gut tissue. While the entry of dietary lectins into peripheral circulation has been sparsely examined, is quite likely that all lectins capable of binding gut epithelial tissue can also enter into lymph/circulation.[1-5]

Intestinal permeability allows toxins and bacteria, from which the body needs to be protected, to breach the gut barrier and gain chronic access to the immune system. This abnormal situation may stimulate the confused response seen in autoimmune diseases when the body's immune system indiscriminately attacks healthy tissues and organs. It appears that the immune system has lost the ability to distinguish between the body and foreign invaders, such as microbe or food antigens. Approximately 33% of autoimmune diseases present with a leaky gut, and most autoimmune diseases have yet to be tested. An in-depth presentation of immune system activation by lectins is available in our published research section in the following article:

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For sources see References: Section III

SPEEDY & DELICIOUS PALEO BREAKFAST OPTION

Nell Stephenson, BS USC EXSC

Need a quick snack that you can literally eat on the go? I need a meal most weekdays that fits that description, such as a breakfast on the road as I drive into the gym to meet my 6 AM clients. The easiest thing I've come up with is a homemade smoothie.

Please note that I emphasize *homemade*. If you buy a commercially available smoothie, whether it's from a juice shop or in a can, you're not likely to find one that's as nutritionally sound and Paleo friendly. Even if you come across a brand that's just juice, you'll notice that many are extremely high in sugar and therefore not a great option, especially if you're monitoring your blood glucose.

By making your own, you'll know exactly what you're getting, and can ensure that all three macronutrients (fat, protein and carbohydrate) are represented.

Here's my favorite smoothie recipe (and it's certainly not just for breakfast!):

PRIMAL IN THE KITCHEN

POWER SMOOTHIE

8 oz brewed green tea (I brew the tea ahead of time and let it chill in the fridge)

1 T raw almond butter

1 T freshly ground flax seed

1 scoop plain egg white protein powder (as long as you're not following the Paleo autoimmune plan, this is fine to use)

***FRUIT! - Here's where you can keep it VERY VARIED! Some of my faves include frozen berries or peaches or even organic pumpkin, just to name a few!**

*Blend together all the ingredients and get ready for an enjoyable, easy-to-transport meal. Enjoy!

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