Sleep Is Anabolic

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There are a lot of factors that impact on body composition including the two that are uppermost in most of our minds, the right kind of training and nutrition.

While training and nutrition are important, they're not going to do much for your body composition if your body's not in a position to make the best use of them.

That's where getting the proper amount of sleep comes in.

Body Composition Pipeline

My body composition pipeline will help us put sleep in context and make its role easier to understand.

Effort is a combination of enthusiasm, motivation, genetic ability, etc. It makes up the physiological and psychological foundation for success in sports and in life. But it's not enough to give us the body composition results we want. For that we have to optimize our lifestyle, training, diet and nutritional supplement use.

If everything is in synch then we'll achieve our goals, as long as they are realistic.

A weak section in the pipeline will decrease the end results.

Thus reaching your body composition goals takes a structured approach that looks at lifestyle, exercise, diet and nutritional supplements.

Lifestyle

The first section of the pipeline is Lifestyle and if this section isn't optimized then some or all of your efforts will be wasted.

In order to achieve maximum progress and make full use of any supplement, the bodybuilder first must bring his lifestyle under control. Reducing stress and dealing positively with any emotional difficulties in your life is a big factor here.[1]

Stress can result in decreased levels of testosterone and increased cortisol levels in the body[2]. Testosterone, the hormone that stimulates sexual development and growth in males, helps to build muscle mass. Cortisol, secreted by the adrenal glands, breaks it down. It makes sense that, to go for optimum growth, you've got to have your life in order.

You need adequate sleep to build muscle and reduce body fat. More on that below.

Recreational drug use must also be curtailed for maximum muscle gains and performance. Marijuana[3,4] and cocaine[5,6] have been shown to decrease serum testosterone and so does alcohol.[7,8,9] And though a social beer or two isn't going to do too much damage, any spree or chronic usage will.

Nicotine is also used by some athletes in the belief that it will increase performance but there has, of yet, been little in the research to support such a claim. Smoking is especially harmful and, along with its many general health risks, it's been shown to have a negative effect on athletic performance[10].

As for smokeless tobacco products, though better than cigarettes, you'd still be better to avoid them. While nicotine can aid in weight loss, it is highly addictive and dramatically increases the chances of oral cancer and other disease[11]. It's hardly worth the risk for any small possible benefit it could provide.

Stages of Sleep

The central feature of sleep is an alteration in brain function that’s associated with changes in the rest of our bodies. Just what effects the alterations and changes have on us both physically and mentally are still topics of intensive investigations.

There are two types of sleep in humans and these are described as differences in the frequency and amplitude of brain (EEG) waves. In healthy adult human non-rapid eye movement or NREM sleep (made up of 4 stages ranging from light sleep to slow wave sleep (SWS) or deep sleep phases), and rapid eye movement or REM (dreaming phase) sleep succeed each other in 90-110 min intervals. A prominent view is that SWS is involved in restorative functions and that REM sleep is involved in information processing.[12] However, recent studies show that it’s not that simple.[13]

This ultradian pattern of NREM/REM succession is cyclical, although the amount of time spent in each phase may vary throughout the night. Early in the night light sleep alternates with SWS sleep while later on light sleep alternates mainly with REM sleep. This cyclical pattern may have its roots in danger detection throughout the night and thus is felt to have survival value.[14]

The alternation of phases can be influenced by a variety of factors, including age and gender..[15,16]

Problems Sleeping Can Be Counter Productive

Recent research has given us new insights into the regulation of sleep and wakefulness and how this regulation might relate to energy homeostasis, the control of hunger and satiety, and body composition.[17,18]

We know that the amount of energy we have and the amount of exertion we can put out is strictly limited. And if we don't "recharge" adequately at night we won't have our full complement to be used during the day.

Chronic sleep loss causes excessive sleepiness and decreased mental and physical performance. It also has a negative effect on mood, autonomic and immune functions and increases the risk of physical and mental health problems.[19,20] These effects by themselves, by increasing our risk of getting viral and bacterial infections,[21,22] and other health problems, are enough that they would impact on your ability to train effectively.

But that's not all. Sleep deprivation has also been shown to reduce anabolic and fat burning hormone levels, including thyroid, testosterone, growth hormone, insulin-like growth factor I (IGF-I) and leptin, and to increase the catabolic hormone cortisol.[23,24]

For example, sleep deprivation adversely affects testicular function and this leads to lower levels of serum testosterone in the body[25]. Cortisol impairs sleep. In healthy young and old subjects cortisol (and IL-6) plasma concentrations were positively associated with total wake time and negatively with rapid eye movement (REM – dreaming phase) sleep; and in turn, insomnia is associated with an overall increase in ACTH and cortisol secretion.[26]

As well, sleep deprivation disturbs the levels and effects of ghrelin and leptin.[27] While the details and specific effects on both of these hormones has yet to be detailed,[28] it's a sure bet that the changes in their levels and interplay has profound effects on fat metabolism.

While the specifics of ghrelin regulation and functions are still being worked out, it is know that it is involved in sleep regulation, increases food intake in both rodents and humans, and conserves fat by reducing fat utilization.[29,30,31] It would appear that the result of increased levels of ghrelin is an increase in appetite, body weight and body fat.

In contrast to ghrelin, leptin, which is reduced in sleep deprivation,[32] is an anorexigenic (decreases appetite) factor[33] and it is thought that ghrelin and leptin regulate the energy balance in a reciprocal fashion.

Several studies have found that sleep deprivation is a risk factor for obesity[34] and for insulin resistance and diabetes.[35]

One study looked at the effects of sleep duration on body weight and metabolism.[36] The authors concluded that in persons sleeping less than eight hours increased BMI and obesity was proportional to decreased sleep. Several other studies have backed up these claims.[37]

A recent paper summarized the metabolic and endocrine effects of sleep deprivation as follows:[38]

- Sleep deprivation has multiple physical and psychological effects.
- Sleep restriction is accompanied by increased cortisol levels in the afternoon and early evening
- Sleep restriction is associated with an increase in insulin resistance and may increase the risk for diabetes.
- Sleep plays an important role in energy balance. Partial sleep deprivation was found to be associated with a decrease in plasma levels of leptin and a concomitant increase in plasma levels of ghrelin; subjective ratings of hunger and appetite also increased.
- Moreover, a correlation was found between the increase in hunger and the increase in the ghrelin:leptin ratio.
- Thus, the neuroendocrine regulation of appetite and food intake appears to be influenced by sleep duration, and sleep restriction may favor the development of obesity.

The bottom line is that all of these negative hormonal changes impacts on your ability to maximize body composition even if your training and diet are up to par.

How Much Sleep Do You Need?

Because it varies it's important to find out what is enough for you. For most of us it's at least 8 hours, and likely between 8 and 10 hours of relatively uninterrupted sleep. This can be done either straight through at night or with 7-8 hours at night supplemented by a nap in the afternoon (see below under Siesta).

The amount of sleep you need may also depend on your training. For example, you may want to sleep more after a heavy training session to increase recuperation. Not getting enough sleep when you're training hard is counter productive.

Over the last five decades I've had personal experience with how lack of sleep can affect your body composition, strength and performance.

In training for powerlifting competions I'd often run into a wall where no matter how hard I trained or how well I ate, I just wasn't getting anywhere. The first time it really hit home was when I was interning. I was stressed out and sleep deprived for a few months straight during which nothing went right as far as my training. In fact even though I still trained hard and ate well (and no I didn't eat much of the hospital food, which at that time was pretty horrific) I was going backward.

I then changed to a ward where there really wasn't a lot to do so I was under less stress and able to get a full night's sleep. In fact things were so lax that I didn't even use an alarm clock to wake up. I woke up whenever I woke up.

Lo and behold, without changing my diet and training appreciably, I began to get stronger, put on some muscle and get leaner at the same time. Even the people around me noticed and began to wonder what anabolics I was using.

It turns out the anabolics were my own, uncovered as I reversed the negative hormonal changes that occurred secondary to my sleep deprivation.

The lesson learned was my performance and body composition depended not just on my training and diet, but on my ability to get enough sleep to allow my body to recuperate and to keep my hormonal status positive.

And it was a lesson well learned since it's allowed me to keep in tune with my body so as to maximize the effects of my training and diet, and has allowed me to counsel people about one of the things that might be wrong when they ask me why they're not getting what they should from their training and diet.

Getting a Good Night's Sleep

For most of us just getting to bed earlier will insure that we get a reasonable night's sleep. However, for one reason or another, some people may find it difficult to get to sleep, have difficulty staying asleep, or wake up too early.

My usual advice to patients who are having problems sleeping is as follows:

1. Use the bedroom as a bedroom and not as an office or entertainment center.

2. The bedroom should be at a comfortable temperature so that you're not too warm or too cold. Keeping the humidity just right also helps.

3. It should be quiet. Cut out as much noise as you can in the home, and if possible from outside the home. Traffic noise is steadily increasing and can be a major factor in reducing sleep quality.[39] If it's noisy and there's not much you can do about it, then wear ear plugs. There are several inexpensive ones available that are made of a foam material and which are comfortable and effective against low level noise.

4. The bedroom should be very dark as it's likely that any amount of light, especially short wave length, colored light, can cause circadian and sleep disruption and suppress melatonin production.[40,41,42] Having the bedroom as dark as possible means getting light blocking shades, lined drapes, something to block the light getting in under doors, getting rid of all the small lights that emit light, however small, including the displays from radios, VCRs, clocks, etc. Turn them all off or put something over them. When you can't see your hand in front of your face then the room is dark enough for restful sleep. If a certain amount of light is unavoidable then a comfortable sleep, eye mask may be useful.

5. Don't watch TV, read the newspaper, surf the net, or anything else that might agitate you before you go to sleep. Any activities that relax you are OK and in fact you may want to develop some sort of relaxing routine, including say a hot bath or shower, listening to soothing music, reading, etc.) before you go to bed.

6. Avoid alcohol and caffeine at least a few hours before bed as both can disrupt sleep quality.[43][44] Some are so sensitive to caffeine that it will keep them awake if they use it 6 or more hours before bed.

7. Keep your clock out of your line of sight. You don't need to be watching it as it just increases sleep time tension.

8. Don't eat too much before you go to bed. A small protein snack or shake is OK but a big meal isn't. I formulated a night time protein (Myosin Protein) that not only helps keep bedtime hunger at bay, but also helps you with your body composition goals.

9. If you can get away with it, don't use an alarm clock to wake up. Or set it as late as possible to give you the chance to wake up naturally.

On the nutrition side, it's a good idea to use a good multivitamin/mineral supplement to make sure you're not running into any marginal deficiencies that might affect your sleep. Choose one with more than the RDA of the B vitamins, and a good amount of metabolically active B12 (methylcobalamin is the best – avoid the synthetic cyanacobalamin in you can).

Increase your dietary and supplemental calcium and magnesium since even though there no real proof, some people feel that they will help you get a better sleep. In some cases it may be because the L-tryptophan intake with dairy products rather than the calcium and magnesium.

What To Do When You Can't Sleep

For some the simple measures I've outlined above just don't work. At that point you likely have a sleep disturbance that needs to be dealt with. I often tell people that having the occasional sleeping problems is nothing to worry about. The important factors to consider are duration and severity:

How long has it been going on? Does it interfere with your daily functioning? Most sleep researchers agree that people develop insomnia from a tangled interplay of psychological, emotional, biological, medical, and environmental factors. It is important to remember that insomnia is not a disease, but a symptom of a problem.

We've all had an occasional bad night, when we can't stop our minds from racing, or we're sick with a cold or a have some aches and pains. This occasional insomnia is annoying but not too serious and usually lasts no more than a few nights or, at most, a few weeks. It can

be triggered by almost anything that upsets our status quo including relationship problems, jet lag or almost any other physical or emotional stress. This "acute" insomnia is self limiting and effectively treated by making some changes in your lifestyle and if need be by the use of over the counter medications.

Ongoing psychological stress, such as bereavement, divorce, or relocation can result in longer periods of insomnia that may be more troublesome. Chronic insomnia is usually defined as lasting more than three weeks and can last for months or years. Both these types of insomnia are more serious and should be treated with the help of your physician who can help you sort out and if necessary treat your sleeping problem.

According to national statistics, at least one half of all instances of insomnia are caused by psychological problems. Waking up too early is common for people who are depressed, and difficulty falling asleep is often caused by anxiety. Medical causes, such as chemical imbalances, hormone upsets, infections, allergies, arthritis, pain, headaches, and coughing can cause you to sleep poorly. Insomnia is a side effect of many medications. Alcohol and drug addiction can also interfere with sleep.

Your doctor and if needed sleep professionals, can suggest the best way to deal with your sleeping problems including medications for stress and depression and any diseases, biofeedback, stress management, psychotherapy, and sleep hygiene techniques.

As science gains a new understanding of sleep, your doctor has more weapons than ever to tame insomnia. And with these new weapons, physicians are employing a more aggressive "nip it in the bud" plan of attack. When your sleep schedule is seriously thrown out of whack, doctors now realize, it's vital that you get it back in synch right away.

For those of us with the occasional common garden variety, can't shut the mind off type of insomnia, when your body refuses to sleep, over-the-counter nighttime sleep-aids, containing antihistamines and/or herbal products are a viable option. Used appropriately, these sleep-aids can help provide a better, sounder sleep and get you through short term sleeping problems.

Most of the herbal preparations and even the antihistamines won’t interfere with natural sleep cycles or leave you groggy in the morning.[45] If they do you should either decrease the amount you’re taking or change to something else.

Certain herbs have been used to improve sleeping problems. Among these are valerian root, St. John's wort, skullcap, passionflower, chamomile, Jamaican Dogwood, Siberian ginseng, hyssop peppermint and devil's claw root.

Although there is little information on most of these herbs and their effects on sleep, valerian has been shown to be an effective mild sleeping aid that generally allows people to fall asleep faster and get a better nights sleep without morning drowsiness.[46,47] Valerian root contains two substances of pharmacologic interest: valepotriates and sesquiterpenes. Both substances have sedative effects.

As well, valerian has been found to be useful to improve sleep in those who are in withdrawal after the use of prescription sleeping pills.[48]

Besides the herbs there are other safe and effective sleeping aids including kava root, melatonin and tryptophan. In the various studies on these compounds, and in my experience, the occurrences of adverse effects are rare if used in appropriate doses.

Kava is made from the root of the pepper plant, Piper mesthysicum, found in Polynesia, Melanesia, and Micronesia. A number of compounds referred to as kava pyrones (kawain, dihydrokawain, methysticin, and dihydromethysticin) are thought to be responsible for kava-kava's sedative effects. It is used by many as a remedy for stress and restlessness, and is useful as a hypnotic (sleeping aid).[49,50,51]

L-Tryptophan is a naturally occurring amino acid that is used for the production of serotonin and melatonin, two vital brain chemicals necessary for sleep and mood regulation.

L- Tryptophan supplements were unavailable for several years due to safety concerns arising from a contaminated batch produced in Japan. It's now available again. For those that don't want to use L-tryptophan, 5-hydroxytryptophan, the immediate precursor to tryptophan, is an effective substitute.

L-Tryptophan rich foods or L-tryptophan supplements before bed can help insure restful sleep.[52] The best sources of tryptophan are turkey, milk, tuna, eggs, fish, almonds, bananas or peanut butter. Important co-factors (things to take with the tryptophan to aid its utilization) are Vitamins B3, B6, C and magnesium.

Melatonin can be useful as a sleeping aid especially in older people. The pineal gland normally secretes the highest levels of melatonin at night, when most people sleep. However, melatonin production decreases dramatically with age, and may contribute to the increasing sleeping problems most people encounter as they age. A small dose of melatonin taken before bed is cleared by the next morning, although long term use may result in storage in fat tissue.

A recent study found that melatonin primes sleep-associated brain activation patterns in anticipation of sleep[53] and as such can be useful in mild insomnia. The study found that the effects of melatonin on sleep were felt about 2 hours after endogenous melatonin production. I would suspect the same 2 hours would be needed after taking melatonin supplements.

Some people find a combination of L-tryptophan and melatonin taken a few hours before bedtime extremely effective for times when getting to sleep is a problem because of something stressful that's happening in your life.

People using these sleeping aids on their own, however, should be wary about using them for prolonged periods of time. If their sleeplessness continues for more than two weeks they should see their doctors because persistent insomnia may be a symptom of an underlying problem or illness.

And if self-help and the usual medical care fail, insomniacs can call on sleep centers for treatment. These centers have experts such as neurologists, psychiatrists, and pulmonary specialists working as a team to diagnose and treat the causes of insomnia.

The bottom line is that you don't have to suffer through sleepless nights. By taking an approach such as I've outlined above you can solve your sleep problems and reap the benefits from having both good nights and days.

The Siesta

Daytime naps, usually lasting from a few minutes to a few hours, are a mainstay of some countries, and in others it's practiced by a large part of the population. For example, in 2005, a survey found that 55% of the respondents napped once a week and 35% napped two or more times a week.[54]

Why we nap has yet to be worked out but for most nappers it obviously serves a biological purpose. For some if may be related to disturbed sleep at night, secondary to some problem such as sleep apnea.[55] However, in my opinion, these are in the minority. For the rest of us naps help relieve symptoms of physical and mental fatigue and stress.

The pros and cons of daytime naps are still being debated with no real solid consensus. Some believe that any napping will affect the quality of sleep at night and as such should be avoided. It appears, however, that napping doesn't affect sleep at night.[56]

For example, in healthy adults aged 55-85 years an opportunity to nap for 2 h in the afternoon did not influence the duration or quality of subsequent nighttime sleep so that the 24-h total sleep time was increased.[57] A nap was associated with improved cognitive and psychomotor performance after the nap and throughout the next day.

Others that napping a few hours is counter productive as far as productivity and quality of life.

Others feel that naps are healthy and productive, and don't interfere with sleep as long as they're not longer than 30 minutes. While still others feel that naps should be at least an hour and a half to two hours long so as to involve the deep sleep cycle, which is the cycle that invokes the anabolic, hormonal environment mentioned above.

A recent review[58] concluded:

"Daytime naps can promote wakefulness and health. The restorative effects of a daytime nap are well recognized and are supported by scientific evidence. Longer and frequent naps during the day could have adverse long-term health consequences; however, individuals requiring such naps probably have an unrecognized sleep disorder or are sleep deprived for other reasons. The art of napping is in restricting the duration of naps to less than 30 min each day, as short naps appear to be especially beneficial. Training the body

and mind to awaken after a short nap requires practice. The old axiom 'practice makes perfect' could well apply to daytime naps!"

My feeling is that if you're not getting your quota of sleep at night, and even if you are, then a nap is in order and will have beneficial effects all round. How long you nap depends on your needs. If you're sleeping at night is in order, then a 30 minute nap may work best for you. If you're not sleeping well or long enough for one reason or another, a longer nap of at least an hour and a half might be more useful in that it may well restore the anabolic effects of sleep.

Building on the Foundation

Getting your proper amount of sleep will help keep you in an anabolic state and allow you to recuperate from your workouts. Now you need to work on some of those other lifestyle factors that that may be impeding your progress and that I mentioned at the beginning of this article.

The next step is to make sure that build on your anabolic lifestyle foundation by optimizing your training, diet and nutritional supplement use.

We'll cover my anabolic/fat burning phase shift diets, including the Metabolic Diet, the Anabolic Diet, the Anabolic Solution, and the Radical Diet in the next installment.

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