The Facts about Eating Carbs before Bed

Nutrition will always be at the forefront of discussion amongst personal trainers, exercise enthusiasts, and competitive athletes alike due to the critical role it plays in adaptations and performance. With any fitness goal in mind, nutritional support must be considered as it often plays a large part in overall success. The old concept was to maintain a balance in nutrient intake along with meeting total energy needs. Today, nutrient timing and nutrient mixtures get more attention due to the known relevance of endocrine system involvement, the role hormones play in energy storage and usage, as well as the demands for recovery. Today's exercisers know to maximize gains nutrition must be part of the equation. The key concepts around food timing are:

1. **to optimize storage of necessary provisions for training**
2. **prevent nutrient consumption from functioning ergolytically**
3. **promote recovery for specific adaptations**

The aspects of optimal nutrient timing for protein synthesis and limiting fat storage is likely one of the more common concerns and well understood by the scientific community. Other food timing issues have less systematic recommendations because they are multifactorial in nature. For instance what is the optimal food intake before going to bed (or lack thereof)? Do carbohydrates (CHO) make you fat? This is commonly debated among practitioners; and much

like anything the answers are not truly black and white, but more so subject to interrelated factors such as:

- **An individual's fitness and/or weight management goals**
- **The timing and quantity of other calories consumed throughout the day**
- **Practical aspects including daily schedule and the time of day a training session took place**
- **Personal concerns such as sleep quality or special dietary needs (diabetics)**
- **Confounding factors such as alcohol**

Based on the potential influences above, it is hard to make a blanket statement that eating CHO before bed is "good" or "bad" as everything must be considered in context. This concept can be applied to making most decisions – definitive or "one size fits all" statements are rarely accurate when claimed out of a particular context.

In any case, a majority of individuals are concerned about what impact eating CHO, particularly at night can have on fat mass; and not without merit. It is well known that insulin management throughout the day is key to losing or maintaining weight. Insulin can simply be thought of in the context of this discussion as a "fat-storage promoter" (lipogenic). If smaller meals are eaten throughout the day (grazing) with proper timing, then the glycemic responses (i.e., rise in blood sugar and subsequent rise in insulin) associated with CHO consumption will be optimized in a way that limits insulin's fat-storage potential. Insulin is released after eating a meal to control the consequential increase in blood sugar associated with CHO (and other macronutrients) in the ingested food. This insulin pulls glucose from circulation for storage or to use as fuel; if left circulating it can lead to serious systemic damage as concentrations accumulate (diabetes). The amount of insulin released into circulation depends on the quantity of simple as well as total carbohydrates consumed in the meal (glycemic load); which in turn dictates how optimal the internal environment is for storing fat. Therefore, a sedentary person who consumes simple CHO right before bed is likely to create an internal "fat-storage environment". An individual on the other hand who requires energy support following an evening workout will not have the same concerns because the internal environment will be different.

When asleep, the body should enter a state of vegetation facilitated by elevated parasympathetic nervous system (PNS) activity. This means that the body lowers its metabolism to below 1 MET, and functions for recovery using aerobic metabolism as the preferred energy system. Essentially, the body enters the ideal "fat-burning zone". This means that the body will burn fat at a higher percentage rate when compared with the hours one is awake during the day (to run cellular functions overnight). If, on the other hand, someone eats sweets before going to sleep, the lipid oxidation process is inhibited because the body must contend with insulin-driven glucose management. Consuming CHO before bed will require the body to metabolize more of the sugar content in the meal/snack, depending on how much was digested before falling asleep; limiting fat use overnight. This habit will expressly accelerate fat gain if the calories consumed were a surplus for what the body needed that day.

It is well known that insulin management throughout the day is key to losing or maintaining ***weight.***

On the opposite side of the spectrum there are individuals who require CHO consumption (along with other nutrients) at night to satisfy their need for calories throughout the next day to match their energy demands. Again, everything must be looked at in context. Athletes often burn so many calories that they need to eat at night, and particularly if training occurs in the evening and a practice is early the next day; they must consume CHO (and protein and fat) before bed. Not eating would be worse. If an individual who trains intensely and/or follows a high-volume regimen is constantly in a negative caloric balance; health and performance detriments will soon follow. These detriments can be related to negative metabolic adjustments, catabolism (muscle breakdown), altered hormonal functions and even severe health issues such as reduced bone mineral density (when combined with inadequate micronutrient intake). If adequate calories are not consumed during the day for whatever reason (e.g., schedule difficulties), the individual may need to consume more CHO in a meal later at night, which would not be recommended to another who is seeking weight loss. The cost-to-benefit ratio of reducing the fat-burning potential of sleep compared with getting adequate calories each day must be considered and addressed. In most cases a personal trainer should attempt to help clients modify their eating schedule for optimal metabolic efficiency; but there may be cases where "nutritional strategy perfection" may not be realistic for the individual. For the individual who seemingly must get one of their meals at night just to maintain caloric adequacy, a relatively higher-protein meal may be warranted to limit the effects on insulin

...there are individuals who require CHO consumption (along with other nutrients) at night to satisfy their need for calories throughout the next day to match their ***energy demands.***

and also minimize catabolic effects. In fact, many bodybuilders and fitness enthusiasts do this on a regular basis to try to help ensure a minimal loss of bodily protein. It is recommended to consume a combination of whey and casein protein in the meal (or shake) if possible to limit lipogenesis and optimize protein synthesis.

As a final point, other personalized practicalities must be considered when providing advice to a client asking about the pros and cons of CHO at night. For example, research points to many people having trouble sleeping after they consume a large meal right before bed. This should be considered alongside other studies that show a combination of complex CHO and protein right before bed to actually help an individual fall asleep faster. Put these findings together and a personal trainer might advise a client who likes/needs to consume a meal closer to bedtime to eat something similar to a small bowl of multi-grain cereal with fat-free milk (proper size and macronutrient content) to finalize their intake for the day. Others may suffer from notable sleeping difficulties, or even a disorder such as chronic insomnia, and should therefore be steered from eating before bed altogether. Remember, sleep quality can have a notable impact on health and training adaptations as well.

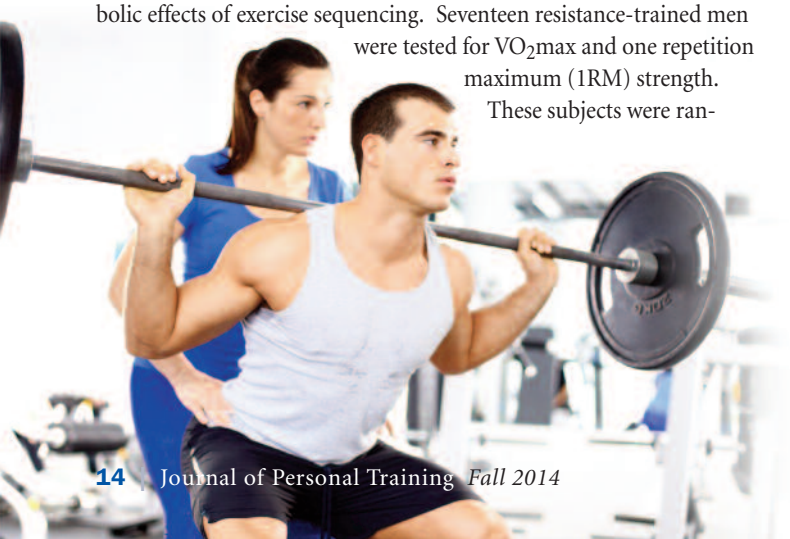
It is recommended to consume a combination of whey and casein protein in the meal (or shake) if possible to limit lipogenesis and optimize ***protein synthesis.***

As mentioned earlier, a daily schedule can have a major impact on when a person can consume quality food throughout the day. Some clients with special dietary needs, such as those with diabetes, must consider the timing and quantity of CHO later in the day with even greater precision due to the potential serious impact(s) on their health. Regardless, the point is to identify individual needs and aid in a structured plan to ensure each person gets the appropriate energy and nutrients to fulfill their respective health needs.

Any aspect of nutrient timing can become an intricate topic of discussion because of all the factors involved. Based on just the few related concepts addressed in this discussion, one can begin to see that food intake before bed must dictated by a comprehensive understanding of the individual's personal needs, limitations, and daily challenges. Personal trainers should be able to make good use of the concepts addressed to provide practical education to clients who will undoubtedly read numerous opinions online concerning the subject – opinions which often mingle fact and myth.

Does VO_2max Impact Upper Body or Lower Body Weightlifting to a Greater Extent?

Maximal aerobic capacity, or VO_2max, is often primarily associated with exercise performance during endurance activities. However, oxygen must be metabolized during (or after) any bout of work whether it is a one-mile run or a set of deadlifts. This would suggest that aerobic capacity has a relative impact on all forms of exercise. A recent study published in the *Journal of Strength and Conditioning Research* investigated this subject by examining the relationship between VO_2max, resistance exercise performance, and the acute metabolic effects of exercise sequencing. Seventeen resistance-trained men were tested for VO_2max and one repetition maximum (1RM) strength. These subjects were randomly-assigned to a group that either performed a squat followed by the bench press, or vice-versa. Each group performed 3 protocols, using 1-, 2-, or 3-minute rest intervals between sets in random order, consisting of 5 sets of each exercise using 75% 1RM for up to 10 reps. Oxygen consumption was measured during all activities. Not surprisingly, the subjects were able to perform the most repetitions when they were given 3-minute rest periods, and the least with 1-minute rest periods. Mean oxygen use (VO_2) followed a reverse pattern with 1-min rest periods expediting the greatest consumption.



The researcher's primary findings:

- **There was a tendency for mean bench press VO_2 to be higher when it was performed after the squat using 1- and 2-minute rest intervals (augmented metabolic response)**
- **VO_2max was significantly correlated to squat repetitions, but not bench press performance**
- **VO_2max seemed to be more related to lower-body resistance exercise performance when short rest intervals are used**

In summary, oxygen capacity seemed to have a greater influence on lower body exercise performance, presumably due to the total muscle mass engaged. Upper body work may also experience an increase in metabolic demands when following lower body work – providing potential programming implications for trainers seeking to maximize the metabolic demands/caloric expenditure of a given workout.

(Journal of Strength of Conditioning Research, 2014)