COMMON MEDICATIONS THAT LIFTERS OVER 40 TAKE, AND HOW THEY AFFECT EXERCISE AND NUTRITION

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INTRODUCTION

Resistance training is increasingly recommended for a number of health conditions that correlate with age. For those for whom resistance training has become a habit, aging society demographic trends are putting many into the age ranges where senescence-related medications meet a large market. Some who have never been habitual about resistance training are taking it up on the recommendation of physicians as part of a treatment regimen for age-related conditions. The more serious among resistance trainers are perhaps those most at risk from side effects and contraindications. These clients may be concerned about how any medications they are prescribed will interact with their exercise programs, with particular focus on typical goals, such as strength, muscle mass, and body composition. These medications could be prescribed for elevated cholesterol, high blood pressure, and diabetes, but could include other conditions. Each medication will have its own range of effects on physiology, with impacts on exercise performance and nutrition.

This article seeks to offer guidance on such effects, with information that can otherwise be hard to find, contradictory, or ambiguous. Clichés, such as "listen to your body," are sometimes ill-advised; for example, the euphoria associated with release of endogenous opioids is not the best advice from a client's body when it is masking the pain of injury.

Each class of medications has its own mechanism of action, and there are specific ways in which they affect exercise and nutrition. This article explores the topic with a focus on adults participating in resistance training, and more specifically those in early middle age and older. The primary age group of clients seeking such advice are over 40 years old. Many have been prescribed the medications discussed in this article. Especially in view of aging society demographics, the central concern of the personal training profession (within which degreed professionals in medicine or pharmacology are rare) is to help clients balance the meeting of their personal resistance training goals against the health risks of both senescence and the medications often prescribed for senescence-related conditions. An increase in the number of such clients who take these medications poses an increasing challenge to the profession.

This article will offer caution concerning medications, and refrains from blanket recommendations. Both resistance trainers and those who train these clients should continue to consult qualified physicians and pharmacists. The aim of this article is to help make these consultations a better-informed process.

CHOLESTEROL MEDICATIONS (STATINS)

The medications prescribed for high cholesterol fall into several classes. The most common class is statins. These include those that go under generic names such as atorvastatin (Lipitor) and rosuvastatin (Crestor and Ezallor).

It is well known from meta-analyses that statins deplete coenzyme Q10, commonly abbreviated "CoQ10," and even more informally, "Q" (22). CoQ10 is used by the cells for energy, but its effect is only indirect: it is a component of the electron transport chain (13). As a result of CoQ10 deficiency, recovery from strength training can be slower. In rare cases, the deficiency may lead to rhabdomyolysis, a progressive breakdown of damaged muscle tissue (13).

It is worth noting from a strength training perspective that CoQ10 is also a free-radical scavenging antioxidant. Intense exercise causes a substantial increase in free radicals, which serve as a physiological signal for muscle tissue repair. The CoQ10 supplement dosage range beyond which the scavenging begins to inhibit this signaling function has apparently not yet been established. For anaerobic performance, study conclusions vary considerably, but with some indication that CoQ10 "may have the potential to reduce exercise-induced muscular cell damage," (3). What this means for users of statins is that there is less muscle damage, and therefore the potential for faster recovery, during exercise.

Clients may compensate for cholesterol medications in several ways:

1. **Supplement with a 50-mg dose of CoQ10 twice per day**: Note, however, that no large-scale clinical trials have been conducted to confirm an offset to the side effects of statins due to CoQ10 supplementation. Additionally, if the client is also taking a blood thinner, such as warfarin (Coumarin), consultation with a physician is in order. CoQ10 interferes with the action of blood thinners, which can lead to treatment failure (26).
2. **Increase interim performance more gradually**: CoQ10 repletion is possible from endogenous intracellular processes, as well as from diet (29). Reducing the depletion of it during a given episode of exercise should allow more time for dietary and endogenous repletion.
3. **Increase recovery times**: Longer breaks between intensive workouts would tend to give both endogenous and exogenous sources of CoQ10 more repletion time. Lighter workouts with no change in recovery times could also achieve the same repletion goal, although this remains to be investigated.

BETA BLOCKERS

Beta blockers are prescribed for high blood pressure, asthma, unstable angina, and some types of cardiac arrhythmia, among other medical diagnoses. These medications lower blood pressure, and frequently, heart rate. They work by blocking the beta adrenergic receptors in the heart, generally preventing epinephrine (adrenaline) from acting on the autonomic nervous system. Some examples of beta blockers include atenolol (Tenormin), bisoprolol (Zebeta, Confor, and Selecta), propranolol (Inderol and Hemageol), and metoprolol (Lopressor and Toprol).

A typical effect of beta blockers on exercise will be a failure to reach target heart rate in aerobic conditioning. In aerobic training, gains in performance will tend to be lower (21). In racing competition, speeds may be lower (21). If a client needs to take beta blockers, one approach to managing the client's concerns is to change the target from an objective one (e.g., heart rate) to a subjective one (e.g., perceived exertion). For example, this could be done by asking the client to rate the exertion on a 0 – 10 scale.

The following list provides the more common side effects of beta blockers and training-related countermeasures. Clients should be encouraged to consult qualified physicians and pharmacists before taking these countermeasures, especially if there is a chance that one or more side effects could be masking some other, more serious, conditions.

- **Drowsiness, fatigue, and weakness**: This class of drugs can also deplete CoQ10, according to the *Drug-Induced Nutrient Depletion Handbook* (20). *Possible solution*: as with statins, supplementation. However, note the cautions on CoQ10 elsewhere in this article, and also that magnesia deficiency overlaps these symptoms.
- **Dizziness**: Again, potentially an indicator of a condition not under treatment with beta blockers. *Possible solution*: to change the program to use more seated exercises. For example, a client could replace any standing overhead presses with seated overhead presses. The kinds of exercises recommended informally for syncope and postural tachycardia syndrome may also reduce risks of injury from loss of control of weights or loss of balance (7).
- **Insomnia**: Magnesium, as a nutrient, can be depleted by this class of drugs (20). One of the symptoms of magnesium depletion is insomnia, commonly reported as a symptom of overtraining. Magnesium takes part in hundreds of metabolic processes. Insufficiency can be expressed across a wide range of symptoms. If it persists, it can contribute to much more serious diseases. If a client presents symptoms such as tachycardia, muscle spasms and tremors, tingling sensations, and migraines, and diagnosis reveals no other cause, magnesium deficiency may be the root cause. *Possible solution*: supplement with magnesium glycinate using 300 – 1,000 mg/day, after 4:00 PM in divided doses. Note, however, that over supplementation is a concern, since high doses can lead to hypermagnesemia, with a range of symptoms that include weakness, confusion, poor reflexes, and, in extreme cases, cardiac arrest (14). Therefore, medical advice should be attained from a qualified medical professional.

Aside from magnesium depletion, beta blockers complicate nutrition in other ways, especially for clients with body composition goals and those planning to compete in bodybuilding competitions. Moderate adipose tissue weight gain is one of the potential complications (27). Beta blockers reduce metabolic rate, an important variable in weight maintenance. Where this is a concern for a client, modifications of diet and/or increase in aerobic exercise may help to compensate.

ANGIOTENSIN-CONVERTING ENZYME (ACE) INHIBITORS

ACE inhibitors are another group of medications prescribed for high blood pressure. They also lower blood pressure and heart rate, but by a different mechanism than beta blockers. Some examples of ACE inhibitors are lisinopril (Zestril, Prinivil, and Qbrelis), fosinopril (Monopril), and quinapril (Accupril, and multi-ingredient medications such as Accuretic and Quinaretic).

Through an effect called "post-exercise hypotension," a client with high blood pressure may have post-exercise systolic blood pressure lower than before exercise, which may result in post-workout dizziness (6,12,17,23). In this case, we recommend that the client try a longer cool-down than the average client, perhaps 5 – 10 min to avoid dizziness or fainting.

Several studies have shown that ACE inhibitors may cause zinc depletion (4,8,9). Zinc supplementation has become popular for those pursuing strength training, and especially among those who are concerned about a drop in endogenous testosterone levels. Clients taking ACE inhibitors may be less responsive to anabolic stimuli like high-protein diets and strength training due to their effects on zinc. Zinc supplements may be a way to offset the depleting effects of ACE inhibitors, though they should be used with caution (or not at all) if the client is on certain medications, such as the diuretic amiloride (Midamor) or thiazide-based diuretics, such as chlorothiazide (Diuril), among others. A typical dose of 30 – 50 mg per day may be effective, but physician supervision is recommended.

BLOOD SUGAR MEDICATIONS

There are various medications for treating high blood sugar, and they work in different ways. Whether they increase the pancreas' output of insulin, improve the cells' sensitivity to insulin, or decrease the absorption of carbohydrates, the result is more or less the same: lower blood sugar.

For a non-diabetic person who starts to exercise, within a few seconds of warming up, adrenaline is released, followed by a release of cortisol. Both adrenaline and cortisol (among others) raise blood sugar. However, to counteract this rise in blood sugar, the pancreas also releases insulin. Insulin lowers blood sugar levels. The net effect for a healthy, non-diabetic person will still be a lowering of blood sugar levels. People with hypoglycemia are

often advised to eat something to raise their blood sugar levels before exercise. For a diabetic person on blood sugar-lowering medications, the drug may lower blood sugar levels too much, resulting in a hypoglycemic episode. Symptoms of hypoglycemia include shaking, confusion, blurry vision, and, in more extreme cases, fainting.

How should a diabetic client on these medications exercise? Not necessarily all that differently, but this client will need more careful monitoring of their blood sugar levels. They should measure blood sugar levels immediately before exercise, in the middle of the workout, and again at the end of the workout.

Blood sugar levels should be closely monitored during all workouts, to understand how the client specifically reacts to exercise. How much of a drop in blood sugar levels can this specific person safely undergo? Only frequent monitoring can determine this.

If blood sugar levels drops too low in response to workouts, there are several options the client could consider:

1. Switch from full body workouts to body part splits. Intramuscular glycogen is mainly depleted in the muscles worked. For full body workouts, blood sugar levels will drop more than during body part splits.
2. Decrease the number of sets performed.
3. Increase the carbohydrate fraction of any meal taken before exercise (10,28).
4. Consult a qualified physician or pharmacist about using a different medication. Adjusting the dose of the current medication could be another approach.

There are also studies dating back to the 1970s showing that metformin (Glucophage, Glumetza, and Fortamet), one of the most frequently prescribed diabetes medications, can deplete vitamin B12 and folic acid in some patients (2,5). The most well-known roles of both B12 and folic acid is that they are needed for the production of red blood cells. Low B12 and folic acid can lead to a form of anemia in which red blood cells are abnormally large (megaloblastic anaemia), but with little more hemoglobin. Although resistance training is anaerobic, the lower rate of oxygen metabolism is manifested in training-relevant symptoms, such as fatigue, confusion, and depression. One study suggests that supplementation can help with this (25). With vitamin B12, a dose of 1,000 mcg/day should suffice for all training purposes (18). For folic acid, a dose of 500 – 1,000 mcg/day may suffice, with 1,000 mcg/day being near the upper tolerable limit before unmetabolized folate accumulates (18).

ACID BLOCKERS

Those suffering chronic heartburn often take acid blockers. How do these affect training and nutrition? There are different classes of acid blockers (H2 blockers, proton pump inhibitors, foaming agents, and others), but the nutrient depletions are similar among them: vitamin B12, folic acid, iron, and others (15). Although there is almost certainly no harm in taking B12 and folic acid supplements without testing blood levels, there is a chance of harm in taking excessive iron if levels are already normal or high (1).

Common side effects and recommended countermeasures include:

- **Dizziness**: Seek evaluation by a qualified physician. If the effect can be ascribed entirely to necessary medication, the client could do more exercises seated or lying down, or if standing, the client could keep a firm grip on stable structures of the exercise equipment. Avoid exercises where blood pressure could change very quickly (e.g., leg presses, heavy squats, deadlifts, etc.).
- **Drops in blood sugar levels**: Use the strategies from the section above on blood sugar medications.

NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS)

NSAIDs, such as ibuprofen (Advil and Motrin), are occasionally used by clients to reduce pain and inflammation from exercise injuries. As a short-term palliative, NSAIDs can also speed healing. However, these drugs should not be taken on an empty stomach. They can also have serious interactions with other medications (11).

When NSAIDs are taken frequently for conditions such as arthritis, one issue that needs to be considered is that long-term use of ibuprofen (typically beyond six weeks) can cause gastrointestinal (GI) bleeding. The likelihood of GI bleeding increases with dose and duration. With GI bleeding, iron can be lost, causing anemia, with the possible result of a reduction of the number of sets or repetitions achieved (16).

In general, NSAIDs inhibit inflammation. Inflammation within reasonable limits promotes muscular development—it is the stimulus for adaptation. Blocking the inflammation can block the adaptations in strength, size, and endurance (24).

If a client uses NSAIDs on a regular basis, iron levels should be tested to make sure that there are no deficiencies. If iron does tend to be low, consultation with a qualified physician or pharmacist may be in order, about either checking for GI bleeding or supplementing with iron.

CONCLUSIONS AND FUTURE WORK

This article surveyed some of the medications most frequently used for people approaching early middle age and older, from the perspective of supporting decision making about the use of supplements by clients. In a short article, we cannot treat the subject comprehensively. As the subject is somewhat a frontier of research, comprehensive treatment may not be possible. It bears repeating that the suggestions here should be taken as guidance for consultants in concert with consultations with qualified physicians and pharmacists, and in a program of close monitoring of clients' conditions and the symptoms expressed, medications and their side effects, and the intake of supplements.

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