The use of medications, whether prescription or over the counter, is common in people with active lifestyles. The health and fitness professional should be aware of how certain medications may affect his or her client’s ability to exercise. It may be counterintuitive, but athletes more frequently use medications than the general population. As our population is aging, it also is important to understand how commonly prescribed medications may affect the older adult who chooses to exercise.

The use of medications in the athletic population is quite common. A survey performed at the Sydney Olympics in 2000 asked athletes about their medication use and revealed that 78% had taken some form of medication in the previous 3 days. This list included vitamins (51%), nonsteroidal anti-inflammatory drugs (NSAIDs) (26%), minerals (21%), amino acids (13%), alternative medications (11%), oral contraceptives (9%), and asthma medications (5%). Twenty percent of these athletes took five or more medications! This survey raised several concerns about NSAID use. Many athletes were taking either too high or too low a dose of these medications, and several were taking more than one at the same time (7).

**ANALGESICS: NSAIDS, ACETAMINOPHEN, AND OPIOIDS**

NSAIDs are one of the most commonly used classes of medications in the United States. As noted above, they are used by 25% of Olympic athletes, and a study in high school football players noted their use in 75% of players (13). Most of these medications are taken over the counter. Names of generic medications in this class include naproxen and ibuprofen. They do have a pain-relieving effect, but their anti-inflammatory effect is overrated. There have been no studies to date showing that NSAIDs have any adverse effect on one’s ability to exercise.

It is important to note that there are theoretical risks of delayed healing in soft-tissue injuries such as sprains and strains in people taking NSAIDs (1). There also is a risk of acute kidney injury with their use in individuals who are dehydrated. As a result, endurance athletes should not take these medications before their event. Gastrointestinal bleeding is a major concern, especially with older clients; between 7,500 and 16,500 deaths from gastrointestinal bleeding in the U.S. annually are attributed to NSAID use (12). This class of medication is being investigated by the U.S. Food and Drug Administration for increasing the risk of heart attacks and should be used with caution in those with existing heart disease. Finally, its use may exacerbate asthma in some athletes with this condition.

Another commonly used over-the-counter pain reliever is acetaminophen. There have been no studies showing adverse effects on exercise with its use. Its main risk is liver toxicity for those who take more than 4 g per day, which is above the recommended maximum dose.

The last class of analgesics is opioids, commonly referred to as narcotics. Medications in this class include codeine, hydrocodone, oxycodone, and morphine. They have been proven to decrease exercise performance by delaying reaction time and causing sedation. They commonly cause constipation and have a high addiction potential. They also are banned by the World Anti-Doping Agency (WADA).
ORAL CONTRACEPTIVES
Oral contraceptives commonly are used by active females to treat amenorrhea and painful menses and for contraception. Concerns over their use with female athletes include fluid retention, weight gain, nausea, headache, and a small risk in developing deep vein thrombosis in those with a genetic predisposition to this condition. Two small studies have shown a slight decrease in VO2max (aerobic capacity) with their use. Larger studies are needed to confirm these results (10, 11).

ANTIBIOTICS
There is concern that antibiotics may be overused in athletic populations. One study of National Football League players in 2005 showed that 60% of the players had taken antibiotics during the previous year. There were 2.6 prescriptions written per player during the preceding year, which was 10 times the national average (8). The main class of antibiotics that may affect active people is the fluoroquinolones. Generic names for these medications include ciprofloxacin, moxifloxacin, and levofloxacin. There is a slight increased risk of tendon injuries in those taking this class of medication. About one half of these tendon injuries have occurred within the first 6 days of treatment (9). This is a rare event occurring in 1 to 3 cases per 1,000 patients; however, it may make sense to cut back on the intensity of resistance training while clients are on this class of antibiotics.

STIMULANTS/SYMPATHOMIMETICS
Stimulants commonly are used by student athletes to treat attention-deficit disorder. Common names of generic medications in this class include amphetamine, dextroamphetamine, and methylphenidate. Stimulants have been controversial in terms of their ability to enhance performance. Some studies have shown enhanced concentration, increased alertness, decreased pain, decreased fatigue, and increased aggression.

There are major concerns, however, about the ability of the body to maintain thermoregulation leading to heatstroke while taking stimulants (4). Several deaths in professional athletes have been attributed to their use. Their misuse also can lead to sudden death from cardiac arrhythmias.

Sympathomimetics commonly are used in cold remedies. These include phenylephrine, pseudoephedrine, and synephrine. Their side effects include elevated heart rate, palpitations, anxiety, insomnia, and predisposition to heat illness.

ANTIHISTAMINES
This is another class of medications commonly used in over-the-counter cold remedies and for the treatment of allergies. Their generic names include diphenhydramine, chlorpheniramine, loratadine, cetirizine, and fexofenadine. They have been shown to decrease exercise performance by causing sedation leading to decreased reaction time and performance (6). They have no known effect on strength and endurance. For allergies, corticosteroid nasal sprays have been shown to be more effective in controlling nasal allergies without the side effects noted above.

ANTIHYPERTENSIVES
Several different kinds of medications are used to treat high blood pressure. Beta-blockers commonly are used to treat this condition, and their generic names include metoprolol, atenolol, nadolol, and propranolol. These medications have been shown to lower the body’s response to exercise by decreasing heart rate and blood pressure. Studies have shown up to a 15% decrease in aerobic capacity (VO2max) in runners and cyclists. There is no known effect on strength (2, 5). This class of medication is banned in some sports by the WADA, including the shooting sports, wrestling, skiing/snowboarding, and sailing.

Calcium channel blockers, such as verapamil and diltiazem, also are used to treat high blood pressure. They work much like beta-blockers to decrease the heart rate response to exercise and also can decrease the strength of cardiac contraction.

Diuretics are another common class of high blood pressure medications. They can cause dehydration, leading to an increased risk of developing heat illness (3). They can cause electrolyte abnormalities, especially low potassium levels, leading to cardiac arrhythmias, as well. They also are banned by WADA because they commonly are used as masking agents in drug screening.

COMPETITIVE ATHLETES
If one is involved in training elite athletes, they should be familiar with the rules and regulations of medication use of WADA. The agency’s Web site (www.wada-ama.org/en) has the latest list of prohibited drugs and therapeutic exemption forms. The National Collegiate Athletic Association and all of the major professional sport leagues in the United States also have policies with regard to medications and their use in athletes.

CONCLUSIONS
Medications, whether prescribed by a health provider or taken over the counter, frequently are used. They commonly are taken by athletes and by older individuals who are pursuing an active lifestyle. Medications can have a negative impact on an individual’s training regimen, and health and fitness professionals involved in training clients should be familiar with these effects.
Medical Report

References


Disclosure: The author declares no conflict of interest and does not have any financial disclosures.

Mark P. Bouchard, M.D., FACSM, is a sports medicine physician at Maine Medical Center in Portland, ME where he teaches in the Family Medicine Residency Program and Sports Medicine Fellowship. He also works with the U.S. Nordic Ski Team as well as athletes at the high school and collegiate levels in Maine. He is currently serving on the Board of Trustees for ACSM.