

Module 5, Lesson 4 Handout:

Thyroid & Cholesterol: LDL, HDL & Triglycerides

There's no shortage of cardiovascular health research and reports on what you should and shouldn't eat for heart health. We know cholesterol and triglyceride levels matter for our hearts. What we don't often talk about is the connection between cholesterol levels and the thyroid. When clients come to you to discuss thyroid issues or concerns, you'll want to be aware of how to assess cholesterol levels alongside other factors that you've learned about in the Thyroid & Hormones module.

Cholesterol & Triglycerides Review

To help your clients better understand cholesterol, you need to have a clear understanding of what lipoproteins and lipids are and their roles in the body. Let's review low-density lipoprotein (LDL), high-density lipoprotein (HDL) and triglycerides before jumping into the thyroid and cholesterol connection.

LDL

LDL is often referred to as "bad" cholesterol. In Level 1, you learned that saturated fats increase LDL cholesterol, that there are four basic forms of LDL and that not all LDL is necessarily bad. You also learned that the size of LDL varies from large, medium, small to very small. The smallest forms of LDL are known as very low density lipoprotein, or **VLDL**, which transport triglycerides in the blood. The smaller and denser forms of LDL are more dangerous, and have been linked to high sugar and high carbohydrate diets. The larger forms of LDL increase with intake of saturated fats, but actually aren't linked to increased risk for heart disease. If you need a refresher on how saturated fats and trans fats contribute to increased LDL cholesterol, refer back to the Fats handout in Level 1, Lesson 2. Remember that while trans fats should be avoided entirely, not all saturated fats are bad and they're actually important for cardiovascular, bone, liver, immune system and neurological functioning. Your clients are likely getting saturated fats in their diets, so there isn't a huge need to encourage the consumption of more saturated fats.

LDL levels are measured by a blood test and can be increased or decreased by a number of factors. LDL levels below 100 mg/dL are optimal. Some factors that may raise LDL levels are medications (such as steroids and blood pressure meds), genetics, being older and/or being male, being overweight, smoking, lack of exercise and a diet high in saturated fat and trans fat. On the other

hand, some factors that may help lower LDL levels are a heart healthy diet you learned about in Module 3, losing excess weight and sweating often with increased exercise.

HDL

Think of HDL as the “good” cholesterol, the one you want your clients to have higher levels of (not all high cholesterol readings are bad). HDL levels above 60 mg/dL are optimal. HDL protects the heart by carrying LDL to the liver to be broken down and excreted from the body. Your clients can raise their HDL cholesterol by following many of the Nutritious Life recommendations like sweating often, eating empowered and adopting healthy habits to stress less. HDL levels may decrease if your clients are taking certain medications, such as steroids and progestins (found in some birth control pills and hormone replacement treatments).

Triglycerides

Triglycerides are classified as lipids (a type of fat); they are the long term storage form of energy (from fat calories) in humans. Their structure is what makes them unique. They’re made up of a glycerol molecule and 3 fatty acid molecules. Triglycerides are different from cholesterol because triglycerides are storage forms of energy, whereas cholesterol plays a role in cell permeability and hormone, bile acid and lipoprotein synthesis. Like HDL and LDL, triglycerides can also be measured by a blood test and there are several factors that can alter your clients’ levels of triglycerides. Normal triglyceride levels are 150 mg/dL or lower. High levels of triglycerides can be caused by and are a risk factor for heart disease, atherosclerosis, stroke, obesity and metabolic syndrome. It’s no surprise that on the other hand, working with your clients to incorporate Nutritious Life recommendations into their day can help lower triglyceride levels and decrease risk for the above conditions and diseases.

Thyroid & Cholesterol

As you’ve learned, the thyroid gland is stimulated by TSH to release hormones T3 and T4, which play a role in cell metabolism and growth, gene expression and a variety of other functions, including cholesterol production and utilization. Let’s discuss the basics behind the connection between thyroid hormone, cholesterol and heart health.

Thyroid hormone is the primary regulator of lipid metabolism in the liver, controlling both the breakdown and mobilization of lipids in the liver, as well as production of new lipids including cholesterol. T3 improves cholesterol synthesis in the liver by increasing the flow of bile acids, which help break down lipids for digestion and absorption or excretion. This helps the liver take in more cholesterol from the blood to be excreted from the body while maintaining cholesterol homeostasis. On the flip side, when T3 levels are low, bile acid flow decreases, which slows the rate of cholesterol

secretion into the bile and ultimately decreases the amount of cholesterol the liver takes out of the blood. The most important thing to know is that balanced thyroid hormones are essential for balancing cholesterol levels in the blood and liver, meaning balanced thyroid hormones are essential for heart health.

Studies show that patients with hypothyroidism (an underactive thyroid and low levels of thyroid hormones) have elevated LDL levels, decreased HDL levels and elevated triglyceride levels which contribute to an increased risk for cardiovascular events. When thyroid hormone levels are low, the liver does not breakdown and excrete LDL from the body causing a buildup of LDL and increased cardiovascular risk. Hypothyroidism was found to be prevalent in up to 13% of patients with hyperlipidemia (high levels of lipids in the blood). This imbalance in lipid levels is caused by increased synthesis and decreased excretion or breakdown of LDL and triglycerides. On the other hand, patients with hyperthyroidism (an overactive thyroid and excess levels of thyroid hormones) may experience abnormally low cholesterol levels. These low levels are associated with raciness, shaking, nervousness, weight loss, trouble sleeping and heat intolerance.

TSH has also been linked to heart health. In a study, TSH levels were positively associated with patients' cardiometabolic profiles, meaning when TSH levels were high, the risk factors associated with coronary heart disease were also increased. It's been found that TSH itself independently interacts with cholesterol and triglyceride levels, regardless of whether thyroid hormone levels are normal or not.

Bottom Line

When working with clients who have thyroid issues, recommend they get bloodwork to check their cholesterol levels and work with their cardiologist or endocrinologist for treatment. They will likely put the client on the proper medication depending on the severity of their thyroid issue and cardiovascular risk. It's your job to help your client incorporate healthy habits including a balanced diet and exercise into their routine to help manage cholesterol levels due to their thyroid condition.