

UNDERSTANDING LICHEN SCLEROSUS

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WHAT IS LICHEN SCLEROSUS?

Lichen Sclerosus (LS) is a chronic genital skin condition caused by an autoimmune (self-) attack of small blood vessels called capillaries. Classic symptoms in women include mild to severely debilitating itching and/or burning and pain, particularly if the skin is torn by friction (from scratching, washing, sexual or clothing friction). In appearance, the genitals may exhibit white, thinned patches on the inner lips (labia minora) and clitoral hood of the vulva, perineum, and anus. Less commonly, white patches can extend to the outer lips (labia majora), but never into the vagina itself. Men with LS may experience itching, burning or pain of the foreskin or tip of penis, and have signs of white, thinned patches on an uncircumcised foreskin and tip of the penis. Men may receive a diagnosis of balanitis xerotica obliterans, which is now known to be the same as LS. Depending on the severity, either sex can have pain with sexual play, or vaginal or penile penetration (dyspareunia). Some people have few or no symptoms.

When not treated, the skin often scars and tightens, causing genital structures to disappear completely (loss of normal inner vulva lip architecture), or to trap the clitoris under the clitoral hood (clitoral hood phimosis, or foreskin phimosis in men). Cracks in the skin (fissures) can form, become very painful when fluids come into contact (water, urine, semen, or stool), and heal reluctantly. Unlike other genital skin disorders, LS *never* affects the skin of the hands or feet, and can rarely occur on the mouth, back, chest or abdomen where the patches are usually not as itchy. When patches occur in non-genital areas, the diagnosis may be changed to localized morphea, or localized scleroderma.

An LS diagnosis can be very difficult to make medically. Multiple biopsies are often needed, and it is useful to send multiple (3-6) biopsies to help a pathologist to make a clear diagnosis.

WHAT CAUSES LICHEN SCLEROSUS?

Science has not yet determined exactly what causes this inflammatory condition, but it has been discovered that:

- Although often related to a **low** level of **estrogen** production in women (pre-pubertal, surgical or medical menopause, or postmenopausal status), the relationship is due to the loss of estrogen's **blood flow** and **anti-inflammatory** benefits, and not estrogen's hormonal effects per se. Genital skin is particularly sensitive to inflammation, because the neurotransmitter responsible for sexual arousal (nitric oxide) can also participate in inflammatory processes. This is why men can have LS, because low estrogen is not the only precipitating cause.
- Lichen sclerosus is commonly found in people who have **other inflammatory disorders**, such as localized morphea, systemic sclerosis, scleroderma, pernicious anemia, thyroid disease (Hashimoto's Thyroiditis), vitiligo, and alopecia areata. All of these inflammatory disorders are associated with a particular genetic marker known as HLA-DQ7. Some other conditions associated with HLA-DQ7 are pulmonary arterial hypertension (PAH), essential hypertension, and coronary artery disease (CAD), systemic lupus erythematosus, rheumatoid arthritis, pemphigoid (a blistering skin condition), and celiac disease. There is also some suggestion that

DETAILS: BIOCHEMICAL PATHOLOGY OF HLA-DQ7

Human leukocyte antigen (HLA) is the designation for antigen proteins that are products of genes located on chromosome 6. These genes, collectively named the major histocompatibility complex (MHC), are major determinants of immune response. A variety of different forms of each gene are possible, and each person receives two co-dominant genes from each parent. An individual's unique HLA combination **plus** their dietary, environmental and toxic exposure circumstances determine if or when an autoimmune condition will occur.

Some antigen proteins are located within cells, while others (like HLA-DQ7) are located on the surface of cells, including those lining the inside of blood vessels. During inflammation, DQ7 surface antigens are attacked by a person's own immune system, because the antigen is similar biochemically to a similar protein.

Cells that line the lumen of capillaries are called endothelial cells. Healthy capillaries self-regulate their blood flow by balancing endothelial production of different chemicals that vary depending on current circumstances. When capillaries **stop** being able to self-regulate, *blood flow is restricted to the tissue bed supported by those capillaries*. Although all tissues are sensitive to a loss of capillary blood flow, genital skin is particularly at risk, because the unique biochemical processes that allow for sexual arousal (nitric oxide production), can be misrouted and facilitate inflammatory destruction of tissues.

Some of the chemical factors endothelial cells produce include **prostacyclin** (PGI₂), which increases blood flow by relaxing the wall of blood vessels, but also keep the endothelial wall buff and healthy by inhibiting smooth muscle cell growth and platelet-related blood clots. By contrast **endothelin** is also produced by the endothelium, and is a potent constrictor of blood vessels and promotes cell proliferation. In a normal healthy state, prostacyclin helps counter-balance the actions of endothelin.

However, in disease conditions production of **prostacyclin** is impaired, which reduces blood flow and allows scarring. Biopsies of LS show inflammatory cells (called T cells) attacking endothelial cells. As blood flow diminishes, the new skin cell production area (called the basement membrane) dies (and is removed by immune cells), and *scar formation replaces healthy skin*.

some cancers are also related (renal cell carcinoma, head and neck cancers, vulvar and penile cancers). These conditions do not necessarily all occur in one person, but there may be significant overlap of conditions in some affected people.

- Studies have shown that HLA-DQ7 antigen proteins can become targets of **attack to blood vessel lining cells** (endothelial cells) during inflammatory periods (see box, above). When an anti-endothelial antibody latches on to an endothelial cell, it activates the cell to produce constricting molecules (endothelin), which also causes growth and build-up of extra endothelial cells (proliferative vasculopathy), production of scar tissue (increasing collagen synthesis), and eventual death of the blood vessel lining cell. This directly mimics the pathology of LS.

Early on in LS, the capillary inflammatory attack causes itching which can be severe and debilitating. More damage occurs when nails scratch away skin, which can happen even while someone sleeps. As the capillary disease continues, the skin loses nourishing capillary blood flow and becomes incapable of making new, flexible skin cells. The skin thins and is very easily torn and easily damaged by stretching or friction, such as often happens with sexual activity. As the old cells die, they are replaced by tight scar tissue which is thicker than the original skin, but still easily torn. Over time, normal healthy flexible skin is replaced by white, thick, inflexible skin, and the itch may remain or fade.

WHY DO I HAVE LICHEN SCLEROSUS?

Science has not completely determined the cause of LS, but some risk factors are known or suspected:

- Genetically susceptible HLA inheritance (DQ7).
- Trauma that begins a cycle of inflammation that subsequently leads to LS.
- Other event or condition (such as low estrogen in women), diabetes, celiac disease, or Vitamin D deficiency), that predisposes someone to develop LS.
- Dietary deficiency of omega 3 fatty acids (particularly EPA, found in fish oil)

WHAT ISN'T LICHEN SCLEROSUS?

- Lichen Sclerosus is **not** caused by a sexually transmitted infection and cannot be transmitted to someone else. It is **not** related to genital warts (HPV), nor parasites such as *Borrelia*.
- Lichen Sclerosus has **nothing** to do with poor genital cleaning practices, and *can be made worse by misguided cleaning practices*.

Genital skin should only be washed with a bare hand and warm water, and never scrubbed with a washcloth, luffa, or abrasive pad. Special genital cleaners, or products containing benzocaine such as Vagisil®, should be specifically avoided as they often cause severe contact dermatitis.

WHY DO SYMPTOMS OF LICHEN SCLEROSUS SEEM TO COME AND GO?

It is very common for symptoms of LS to seem to go away, only to return at other times of life. The question isn't as much "why did my LS come back" but rather "what has happened/have I changed in my life to cause more inflammation"? Western lifestyle is highly inflammatory, both in terms of the foods we eat and drink (and don't eat and drink), and the level of muscle building and aerobic exercise we get daily. So if symptoms return, it's important to see your health care provider to evaluate whether:

1. ... you have another condition that has occurred. People with LS need to be followed by a health care provider with **yearly** exams to be evaluated for early skin cancers on the vulva that rarely occur in conjunction with LS.
2. ... you aren't having a **side effect** from your steroid ointment or contact dermatitis from other medications or medication bases (a base is a compound into which a medication is mixed).
3. ... you have come into contact with a **sexually transmitted infection** which reactivates your LS symptoms. Don't just retreat "yeast infections" without documented evidence of an infection, since commonly used anti-yeast medications often cause contact dermatitis.
4. ... you are in an **estrogen change** that you haven't experienced before. Changing oral contraceptives, adding topical estrogen, and avoiding topical progesterone creams may make a difference.
5. ... your blood level of **Vitamin D** has changed. Your health care provider can retest your blood level to make sure.
6. ... you have changed your **metabolic status**—with relation to diabetes or glucose metabolism. Worsening blood glucose control is a very serious promoter of inflammation, and can worsen your overall health status.

Fortunately, with a firm diagnosis (often through biopsy) and complete medical therapy, nearly everyone with LS does well. It's important to understand the natural fluctuations of the condition, and how to manage your specific circumstances.

WHY SHOULD I TREAT MY LS?

Beyond relief from discomfort and itching, you can prevent and often reverse anatomical changes of your genitals due to scarring. There is also a theoretical prevention of cancerous changes of the skin, since chronic inflammation leads to further genetic changes that promote cancer (inflamed endothelial cells change to a proliferative phenotype with a higher expression of the oncogene p53).

HOW CAN I TREAT MY LS SYMPTOMS?

Begin by healing from the outside. Stop the inflammation. Then begin to heal from the inside.

Heal the outside, for women:

1. **Use topical steroid ointments.** Heavily suppress any active genital itching with ultra-potent topical steroid ointment (applied to the vulva or penis, not to the anus). Itching should subside, and can be used to monitor therapy.
 - a. When first using a steroid ointment (like clobetasol), use the smallest amount possible. If the skin feels greasy after you've applied some ointment, then you're using **too, too much**. You want to use a very thin layer only on the sections of skin that itch.
 - b. With the correct amount of topical steroid, the itching and irritation should subside within a few days, and the natural color and flexibility of the skin should begin to be noticeably better within one month.
 - c. As symptoms subside, your health care provider will reduce the strength of the topical steroid, because you should only use the strength actually needed, and no more. They may switch types (to triamcinolone) and/or to lower percentages of medication in the ointment. Topical steroids may thin genital skin, and so should be used when needed, and discontinued as soon as possible.
 - d. **You are an individual, and you deserve individually-tailored therapy.** Getting the right dosage and a minimal application is a PROCESS, so expect to fine tune your treatment.
2. **Use occlusive barrier ointments.** Skin affected by LS cannot protect itself from common fluids, such as water, urine, semen or menstrual blood. Beyond the stinging/burning sensation, the skin can be further traumatized with these fluids. Occlusive barrier ointments (usually with petrolatum) prevent damaging liquids coming in contact with the hurt skin, and help to hold healing moisture inside.
 - a. Apply a thin layer of ointment with a patting motion (rather than a rubbing stroke). Carry a small container with you, and re-apply after urination.
 - b. Keep your genital skin moist, but not wet.
 - i. For severe dryness, consider using Critic-Aid, or other petrolatum-based moisture barrier ointments. This will help trap moisture near the skin, but contains zinc which the skin needs to regenerate.
 - ii. For moderate dryness, consider using Liquid Silk, which moisturizes and seals, but is not as occlusive as the Critic-Aid. Liquid Silk is safe for barrier use, and often soaks into the skin.
 - c. You may want to rinse your genitals with water after you urinate, rather than rubbing with toilet paper.
 - d. This is a **special case** where petrolatum products are the key to healing and comfort. Although we never recommend petrolatum ointments for healthy skin (because it damages healthy skin), they ARE indicated for people with LS.
3. **Use topical estrogen ointment** (women only). Estrogen applied to the skin is very helpful for LS, and should be prescribed in a petrolatum ointment form, not a cream (which contains skin-irritating creams which are alcohol-based).
 - a. Optimal estrogen levels are key to helping many women overcome LS. Although there is some systemic absorption, LS can be disabling and deserves full treatment. There is no need for oral estrogen therapy.
4. **Non-hormonal contraception:** If you take oral contraceptives, consider stopping and switching to another non-hormonal contraceptive method.
 - a. Oral contraceptives that are heavy on the progesterone dose are designed to suppress natural estrogen production, and can have a severely negative effect on vulvar skin disorders.
 - b. Both estrogen and steroid ointments can break down latex and polyisoprene condoms. If you are preventing pregnancy, look for polyurethane barrier products. You also should prevent these ointments from coming in contact with your sexual partner's genital skin with barriers, as well.

Heal the outside, for men:

1. **Surgery.** If you are an uncircumcised **man**, surgical removal of the foreskin may completely resolve genital LS in men. See a urologist for an evaluation.
2. **Use topical steroid ointments.** Heavily suppress any active genital itching with ultra-potent topical steroid ointment (applied to the vulva or penis, *not to the anus*). Itching should subside, and can be used to monitor therapy.
 - a. When first using a steroid ointment (like clobetasol), use the smallest amount possible. If the skin feels greasy after you've applied some ointment, then you're using too, too much. You want to use a very thin layer only on the sections of skin that itch.

- b. With the correct amount of topical steroid, the itching and irritation should subside within a few days, and the natural color and flexibility of the skin should begin to be noticeably better within one month.
 - c. As symptoms subside, your health care provider will reduce the strength of the topical steroid, because you should only use the strength actually needed, and no more. They may switch types (to triamcinolone) and/or to a lower percentages of medication in the ointment. Topical steroids may thin genital skin, and so should be used when needed, and discontinued as soon as possible.
 - d. **You are an individual, and you deserve individually-tailored therapy.** Getting the right dosage and a minimal application is a PROCESS, so expect to fine tune your treatment.
3. **Use occlusive barrier ointments.** Skin affected by LS cannot protect itself from common fluids, such as water, urine, or semen. Beyond the stinging/burning sensation, the skin can be further traumatized with these fluids. Occlusive barrier ointments (usually with petrolatum) prevent damaging liquids coming in contact with the hurt skin, and help to hold healing moisture inside.
- a. Apply a thin layer of ointment with a patting motion (rather than a rubbing stroke).
 - b. Keep your genital skin moist, but not wet.
 - i. For severe dryness, consider using Critic-Aid, or other petrolatum-based moisture barrier ointments. This will help trap moisture near the skin, but contains zinc which the skin needs to regenerate.
 - i. For moderate dryness, consider using Liquid Silk, which moisturizes and seals, but is not as occlusive as the Critic-Aid. Liquid Silk is safe for use with barriers like condoms, and often soaks into the skin.
 - ii. Carry a small container with you, and re-apply after urination.
 - c. You may want to rinse your genitals with water after you urinate, rather than rubbing with toilet paper.
 - d. This is a **special case** where petrolatum products are the key to healing and comfort. Although we never recommend petrolatum ointments for healthy skin (because it damages healthy skin), they ARE indicated for people with LS.
4. **Contraception:**
- a. steroid ointments can break down latex condoms. If you are preventing pregnancy, look for polyurethane or polyisoprene (non-latex) barrier products. You also should prevent these ointments from coming in contact with your sexual partner's genital skin with barriers, as well.

Other recommendations:

1. Undergo screening for common sexually transmitted infections. Cure the curable and treat the treatable both of which reduce your body's inflammation level.
2. DO NOT USE topical or oral antifungal medications. The bases of these creams and ointments can cause skin damage and are not helpful for LS.
3. DO NOT USE topical progesterone preparations. This hormone suppresses estrogen production thereby reducing blood flow. Although the base ointment may give some relief, the progesterone is not good therapy for LS and often makes symptoms, and the underlying skin condition, worse.
4. DO NOT USE topical testosterone preparations. Studies show no usefulness.
5. DO NOT USE over-the-counter genital or pain medications, like Vagisil®, which contain pain-killers like benzocaine, lidocaine or xylocaine. These medications commonly cause contact dermatitis, giving you **two** skin problems which you will have to then heal.

WHAT ABOUT SCARRING FROM LS?

Scarring from LS is a very serious issue, and for people of long standing or undertreated LS, scarring can negatively impact personal comfort and sexual activities. Scars form in the skin because the body is trying to cover over open sections of skin where the cell-producing skin was traumatically torn or removed. The scar tissue is formed by collagen, which feels thicker than skin, and is far less flexible. The scarred section also forms without very good blood supply, so healing and remodeling the scar takes time and involves slowly stretching and repairing the scar.

Surgery is rarely recommended for LS, because new surgical scars heal very slowly, and bigger scars often form later. However, for men with foreskins circumcision can cure LS, and women whose clitoris has become trapped can have the clitoral hood separated and lifted away from the clitoris. Fortunately, people with all sorts of skin problems, including those who lose major portions of their skin from full-thickness burns, can regain flexibility of their skin.

Address scar formation directly:

1. Moisture in the scar tissue is critical for healing. You may need to seal moisture in place after you take a shower to keep the water (from the shower) in the skin (with an ointment).
2. When skin has thickened from scar formation, it can trap other structures. Rolling the scar with your fingers, or applying vibration (using a vibrator or a vibrating wand) can gently loosen the scar, as well as bring new blood flow to the area. Scars take time to develop, and it will take time to gently coax the scar to a healthier, more flexible state.
3. Women: Check with a pelvic floor physical therapist to see whether you've developed over-tightness of your pelvic floor muscles (aka High Tone Pelvic Floor Dysfunction). This can happen because of a lack of use, but also if pain ever developed during sexual activity or attempted sexual penetration, because your body will unconsciously protect you from anticipated pain during future penetration attempts.
4. Women: If you are willing to do yoga, some women find that sitting cross-legged on a pillow with a tennis ball pressed against their vulva helps stretch the scar.

WILL MY LICHEN SCLEROSUS EVER GO AWAY?

We may never know why you are susceptible to symptoms of LS. Other people get diabetes, obesity and other conditions in response to inflammation. You expressed yourself with LS. But remember, even if you have a genetic predisposition for LS, our diet and lifestyle choices can CHANGE how our genes express themselves. Genes, and medical conditions related to genetic influences, are modifiable. *How you live influences your medical status.*

You can help reduce recurrent episodes and your exposure to steroid medication long term by “healing from the inside”.

Lower your overall inflammation profile.

- Take a complete picture of your diet, exercise and hygiene.
 - Floss your teeth daily.
 - Splurge on a Sonicare® toothbrush, and use it twice daily.
 - Check to see whether you have sexually transmitted infections which can be cured.
 - Get 8 hours of sleep per night.
 - Stop drinking alcoholic beverages.
 - Stop smoking.
- Perhaps you've heard all of these messages before. The question is: why aren't you taking this much care of yourself? You're the only one of you there is.

Eat as though food **is medicine.**

- Diet can make a HUGE difference in your genital health. We strongly advocate for you to eat the AWT Good Sex Diet (a low carb, Mediterranean diet), which was developed with sexual health as a priority. Of particular importance to people with LS, the AWT Good Sex Diet focuses the diet on low-grain or no-grain food choice, which is very good for lowering grain and carbohydrate-sourced inflammation.
- Regarding carbohydrates: keep your blood sugar in control.
 - High blood glucose is an indicator that inflammation is very high in your body. Controlling blood sugar (through diet and exercise, without using extra insulin), is very good for your skin.
 - High blood glucose ruins some of the benefits of aspirin therapy, which can be used for pain control and to increase blood flow to your skin.
- Omega 3 oils high in EPA are specifically helpful for restoring the health of your capillaries, and improving blood flow.
 - Research has shown that the capillaries show less immunological reaction when the diet is supplemented with 1.5gm of EPA per day over a period of months to experience benefit.
 - You'll have to read the labels, however: just because something says it has “fish oil” doesn't mean it has high levels of EPA. You might need to take 3 gm of fish oil to get 1.5 gm of EPA. Ask your health care provider if there is purified oil available to you.
 - The effects don't happen quickly, as the immune system is a big ship that is only steered clear of disaster over a longer period of time than a couple of weeks.
- Avoid Omega 6 oils: direct benefit of GLA (borage oil), or omega 6 fatty acids, has not been reliably shown. Given the increased proportion of omega 6's in our current diets, we advise against the therapeutic use of omega 6 oils despite their theoretical benefit.
- Eat garlic and onions in small amounts regularly. The sulfur compounds in alliums helps to support a major anti-oxidation system in the body (called glutathione).

Monitor your Vitamin D blood values, and supplement as needed.

- Vitamin D levels change:
 - with the seasons (because we get less sunshine skin exposure in the winter, or
 - when we heavily use sunscreen),
 - with our weight (thinner need less Vitamin D because Vitamin D is fat soluble), and
 - when we have other inflammatory conditions (colds, flu) that use up Vitamin D in your body.
- Begin Vitamin D3 2000IU daily.
 - There is a beneficial effect if you take your omega 3 fish oil at the same time.
 - Supplement with Calcium Citrate 250mg daily, because calcium is the tool that Vitamin D uses. Don't take more supplemented calcium, and don't take calcium carbonate (unabsorbable).
 - Have your health care provider check your blood level 1 month after starting. You need to know that your blood level "number" is between 50-60ng/ml.
- Once stable, your levels should be checked every 2-3 years routinely.

Expect change.

Stuff happens. Lichen Sclerosus isn't something that will go away on its own: there will always be the potential for symptoms to return. If treated intensively, you can recover from individual episodes, and may never have another. However, if a flare returns, say a quick swear word (!), then get started on your recovery.

REFERENCES

- Azurdia RM, et al. Lichen sclerosus in adult men: a study of HLA associations and susceptibility to autoimmune disease. *BJD* 1999; 140(1):79-83.
BJD 2010. 163, pp672-682.
- Calder PC. Omega-3 fatty acids and inflammatory processes. *Nutrients*. 2010 Mar;2(3):355-74.
- Carlson JA, et al. Vulvar lichen sclerosus and squamous cell carcinoma: a cohort, case control, and investigational study with historical perspective; implications for chronic inflammation and sclerosis in the development of neoplasia. *Hum Pathol*. 1998 Sep;29(9):932-48.
- Chi CC, et al. Topical interventions for genital lichen sclerosus. *Cochrane Database of Systematic Reviews* 2011, Issue 12. Art. No.: CD008240.
- DeLuca HF. Evolution of our understanding of vitamin D. *Nutr Rev*. 2008 Oct;66(10 Suppl 2):S73-87.
- Diamantopoulos EJ, et al. HLA phenotypes as promoters of cardiovascular remodelling in subjects with arterial hypertension. *J Human Hypertension* (2003) 17, 63-68.
- Edwards L, Lynch P. *Genital Dermatology Atlas*, 2nd ed. 2011. Lippincott Williams & Wilkins.
- Fernandez-Arquero M, et al. HLA-linked genes acting as additive susceptibility factors in celiac disease. *Hum Immunol*. 1995 Apr;42(4):295-300.
- Gordon-Thomson C, et al. 1 α ,25 Dihydroxyvitamin D(3) enhances cellular defenses against UV-induced oxidative and other forms of DNA damage in skin. *Photochem Photobiol Sci*. 2012 Nov 19;11(12):1837-47.
- Miles EA, Calder PC. Influence of marine n-3 polyunsaturated fatty acids on immune function and a systematic review of their effects on clinical outcomes in rheumatoid arthritis. *Br J Nutr*. 2012 Jun;107 Suppl 2:S171-84.
- Paul M, Hassoun, et al. Inflammation, Growth Factors, and Pulmonary Vascular Remodeling. *Am Coll Cardiol*. 2009;54(1s1):S10-S19.
- Ronger S, et al. Oral calcitriol: a new therapeutic agent in cutaneous lichen sclerosus. *J Drugs Dermatol*. 2003 Jan;2(1):23-8.
- Patterson E, et al. Health implications of high dietary omega-6 polyunsaturated Fatty acids. *J Nutr Metab*. 2012;2012:539426.
- Russo I, et al. High Glucose Inhibits the Aspirin-Induced Activation of the Nitric Oxide/cGMP/cGMP-Dependent Protein Kinase Pathway and Does Not Affect the Aspirin-Induced Inhibition of Thromboxane Synthesis in Human Platelets. *Diabetes*. 2012 Nov;61(11):2913-21
- Succaria F, et al. Clinicopathological study of 81 cases of localized and systemic scleroderma. *J Eur Acad Dermatol Venereol*. 2012 May 23.
- Tasker GL, Wojnarowska F. Lichen sclerosus. *Clin Exp Dermatol*. 2003 Mar;28(2):128-33.