



## Review Article

# A Scoping Review of the Scientific Literature on Dietary Modifications in Lichen Sclerosus Amidst Anecdotal Claims

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Lichen sclerosis (LS) is a chronic, inflammatory skin condition characterized by thinning and scarring of the genital and perianal areas. Although the incidence of LS is rising, its etiology remains poorly understood. However, autoimmune dysfunction and hormonal imbalances have been suggested to play a role in its progression. While high-potency steroids have replaced testosterone as the primary treatment, there remains a significant gap in maintenance therapy protocols. Popular media and support groups often suggest dietary modifications as potential strategies for managing LS, though scientific evidence remains sparse. This scoping review follows PRISMA-ScR guidelines to evaluate the existing literature on the role of dietary factors in LS incidence and progression. Studies were selected based on their focus on nutritional interventions, excluding those solely involving non-oral supplements or prescription medications. Our search identified 51 potential articles, of which 9 met the inclusion criteria after screening and review. The review highlights mixed evidence regarding dietary influences on LS. Meat-based diets, particularly pork consumption, may exacerbate symptoms, while plant-based diets rich in carotenoids and supplements like avocado and soybean extracts show potential benefits. However, the studies varied in methodological rigor, with many being case reports or small cohort studies, limiting their generalizability. The findings underscore a significant gap between anecdotal recommendations and evidence-based practice. Robust, large-scale randomized controlled trials are needed to clarify the impact of dietary modifications on LS. This review calls for more comprehensive research to develop scientifically validated dietary guidelines for LS management, addressing the widespread reliance on anecdotal evidence in patient communities.

## INTRODUCTION

Lichen sclerosis (LS) is a chronic, inflammatory skin disorder that primarily affects the genital and perianal areas, leading to thinning and scarring of the skin.<sup>1</sup> The incidence of LS doubled in women between 1991 and 2011, and while the exact cause of LS is still unknown, it may be associated with autoimmune dysfunction, hormonal imbalances, and chronic localized irritation.<sup>2-4</sup> Recent evidence specifically highlights urinary incontinence as a significant clinical association, suggesting that chronic exposure to moisture and irritants may play a role in the development or persistence of the disease. Diagnosis of LS is typically diagnosed based on clinical features. There are various emerging therapeutic strategies under development to potentially improve clinical management. Testosterone was historically the primary treatment, but high-potency steroids are now favored.<sup>1</sup> Recent randomized controlled trials (RCTs) have demonstrated testosterone's ineffectiveness and associated side effects.<sup>5,6</sup> However, protocols for follow-up and maintenance therapies remain inadequately defined.

The literature on the effect of dietary changes on LS suggests that certain dietary modifications may be beneficial in managing symptoms and disease progression.<sup>5</sup> However,

popular media and anecdotal reports in particular present a comparable abundance of information purporting the role of various dietary interventions in LS. Many support groups for individuals with LS and commonly referenced online forums and medical webpages, such as Healthline, Mayo Clinic Connect, and Livestrong are replete with personal anecdotes and recommendations concerning dietary changes.<sup>7-10</sup> Reports suggest dietary elimination of gluten, dairy, and processed sugars, in addition to incorporating anti-inflammatory foods and supplements. These forums also discuss various dietary regimens for symptom management, such as the autoimmune protocol diet, Mediterranean diet, and others. Due to the prevalence of such anecdotal reports, we present the need to assess the scope of existing evidence.

The pathophysiology, clinical characteristics, and current management of LS have been extensively reviewed elsewhere.<sup>1</sup> By evaluating the current studies on the role of dietary factors in LS incidence and progression, this review seeks to illuminate the current gap between anecdotal recommendations and evidence-based practice.

**Table 1. Search Query Table**

Concept 1: Diet & Nutrition	(diet) OR (dietary modification) OR (nutrition) OR (supplements) OR (food) OR (oral supplement)
Concept 2: Condition Terms	(lichen sclerosus) OR (balanitis xerotica obliterans) OR (vulvar leukoplakia) OR (lichen sclerosis) OR (lichen plan atrophique) OR (lichen plan scléreux) OR (Kartenblattförmige Sklerodermie) OR (lichen albus) OR (lichen planus sclerosus et atrophicus) OR (dermatitis lichenoides chronica atrophicans) OR (kraurosis vulvae)
Final Combined Search	(Concept 1) AND (Concept 2)

## METHODS

Following the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) guidelines we performed a scoping review on the role of dietary factors in LS.<sup>11</sup>

### ELIGIBILITY CRITERIA

Studies were included based on three initial inclusion criteria. Due to the sparsity of previous research, as well as the goal to provide a comprehensive overview of the limited literature, retrieved articles were not restricted by publication date or language. Studies were selected if they contained the phrase lichen sclerosus/Lichen sclerosis/balanitis xerotica obliterans/kraurosis vulvae in the title, keywords, or abstract. Studies were included only if they dealt directly with dietary interventions including food changes and oral supplements.

Studies were excluded if they did not match the overall objectives of the review. Interventions consisting solely of the use of non-oral intake supplements such as topical vitamin application were discarded. Likewise, studies were excluded if they used oral, intravenous, or any other systemic form of prescription medications deemed not to be nutritional supplements. Finally, studies needed to directly evaluate the effects of any dietary change and not solely involve other medical treatments. The best studies were those that involved studying the effects of whole diet changes on the progression of LS.

### STUDY IDENTIFICATION AND SELECTION

A search was performed on PubMed using the advanced search tool on June 15th, 2024. The years included were unrestricted. The review strategy was performed with adaptation from a previous scoping review, and the guidelines of Levac et al, and Arksey and O'Malley.<sup>12-14</sup> Key terms were selected and included in the search using the advanced search tool (Table 1).

After the initial search, each paper's title, abstract, and keywords were screened to identify papers matching the inclusion criteria. Included papers were then subjected to a full paper review and excluded based on exclusion criteria outlined in the protocol. Papers removed during the full paper review had their exclusion reason noted.

The remaining papers were then categorized into three groups by one reviewer: evidently excludable, perhaps excludable, includable. A second reviewer screened the perhaps excludable and includable group and made suggestions. The initial reviewer accepted the suggestions or, if suggestions are rejected, entered a deliberation period with the second reviewer. If no agreement was reached, a third party arbiter settled the disagreements.

### DATA EXTRACTION AND MANAGEMENT

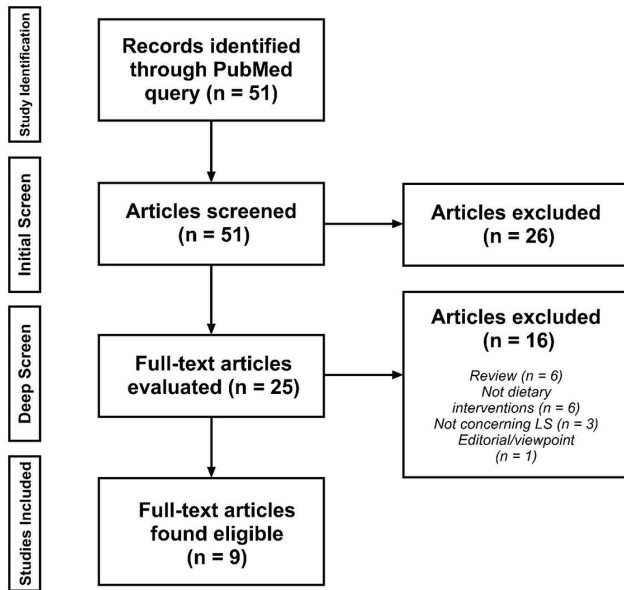
Items of interest to be extracted from the included studies were then approved by the project team. Items of interest were extracted to a Google sheet for ease of data synthesis. The items of interest were authors, year of publication, study type, dietary factors, study subjects, study duration, outcomes, and evaluation of evidence. Evaluation of evidence was based on the National and Medical Research Council guidelines.<sup>15</sup> Outcomes were limited to those attributed to dietary factors.

## RESULTS

Our initial PubMed query identified 51 potential articles for inclusion. Title, abstract, and keyword screening excluded 26 articles that did not meet the inclusion criteria. The deep screen phase, which included a comprehensive paper review and team discussion, led to the exclusion of 16 additional papers for reasons outlined in Figure 1. The study characteristics and effects of diet on LS were subsequently evaluated in the 9 remaining articles (Table 2).

### MEAT-BASED DIETARY MODIFICATIONS

Several studies have investigated the impact of meat-based dietary modifications on LS. A retrospective cohort without concurrent controls observed that a significant proportion of women with LS reported a worsening of symptoms following the consumption of pork and pork derivatives, such as sausage and ham, with 26% of symptomatic patients citing these foods as aggravating factors.<sup>16</sup> However, age greater than 50 years at the time of diagnosis, menopause, urinary incontinence, and dyspareunia demonstrated a stronger relative risk of symptomatic LS. In contrast to the potential aggravation from pork, other studies have explored the protective role of diet. Sideri et al investigated



**Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) flowchart of the study retrieval, identification, and selection algorithm.**

the intake of preformed vitamin A (retinol) found in high concentrations in liver and animal meats.<sup>17</sup> The authors hypothesized that because vitamin A and its precursors had been previously linked to a reduced risk of several epithelial cancers and various skin disorders, a higher intake might similarly offer protection against vulvar lichen sclerosus (VLS). However, the study found no significant association between the intake of these nutritional retinoids and a reduced risk of developing vulvar lichen sclerosus (VLS).<sup>17</sup>

#### PLANT-BASED DIETARY MODIFICATIONS AND VITAMIN SUPPLEMENTATION

Plant-based dietary modifications appear to have varying effects on LS. A case-control study by Sideri et al reported an inverse association between carotenoid intake, found in foods like carrots and green vegetables, and the risk of developing LS.<sup>17</sup> However, the study collected a limited number of dietary variables, focusing on major sources of dietary vitamin A in the Italian diet. Moreover, the study did not include detailed histories regarding autoimmune disorders, which are known to be associated with VLS. In a non-comparative prospective cohort study in 23 patients, Borghi et al found that a dietary supplement containing avocado and soybean extracts (ASE), along with vitamin E and para-aminobenzoic acid, significantly improved symptoms in 70.5% of patients with mild-to-moderate VLS.<sup>18</sup> The dietary supplement was administered in combination with a topical product containing ASE, which may limit the conclusions that can be drawn regarding dietary supplementation alone.

In a case study of one patient with LS, MacKenna and Russell reported that lesions appeared to be “more supple” following daily oral supplementation with vitamin E (3 mg),

although biopsied lesions showed no significant histological changes.<sup>19</sup> Hyams and Bloom found low gastric acidity using gastric fractional analysis and, concurrently, low plasma vitamin A levels in a cohort of 18 patients with leukoplakia vulvae. They recommended vitamin A supplementation as a therapeutic alternative based on this association, though no causal link was identified.<sup>20</sup>

#### CHRONIC INFLAMMATION AND PRO-INFLAMMATORY DIETS

The role of chronic inflammation and pro-inflammatory diets in LS has also been explored. Tang et al highlighted that women with a preference for spicy food had a 2.1 times higher risk of developing vulvar leukoplakia compared to those without such preferences, indicating that spicy foods may exacerbate inflammatory conditions in the vulvar region.<sup>21</sup> However, a detailed dietary history of these patients was not collected and the self-report study design may limit the validity of these findings. In a case-control study comparing 1770 patients with biopsy-confirmed vulvar lichen simplex chronicus and VLS to 1209 control patients, Wei et al found no significant differences between these populations in spicy food intake and caffeinated drink consumption.<sup>22</sup> Given a potential connection between chronic inflammatory skin conditions and autoimmune disease, Jacobs et al described three pediatric cases of concomitant celiac disease and LS. Although adherence to a gluten-free diet resolves gastrointestinal symptoms in celiac disease, it did not appear to affect LS lesions in these cases.<sup>23</sup>

#### DISCUSSION

There is evidence that some skin conditions, such as acne, can be influenced by diet. For instance, high-glycemic-index foods can elevate serum insulin levels, leading to stimulation of sebaceous glands and oil production in the skin.<sup>24</sup> This has encouraged research into the inflammatory properties of various foods, supporting the idea that dietary modifications can play a role in managing LS. Diets high in refined sugars, trans fats, and processed foods are linked to increased inflammatory markers, whereas those rich in fruits, vegetables, nuts, and whole grains are associated with reduced inflammation.<sup>25</sup> Our scoping review suggests that the consumption of pork derivatives may exacerbate LS symptoms,<sup>16</sup> while plant-based diets rich in carotenoids and specific supplements such as avocado and soy bean extracts, vitamin E, and vitamin A may offer protective benefits.<sup>17-20</sup> However, these studies were limited in their scope and, in some cases, contradicted by findings from other reports.

Despite the lack of known mechanisms, diet has long played a role in the lives of people living with LS. Anecdotal evidence from popular medicine blogs and LS-specific help forums often suggest dietary changes as a management strategy for LS.<sup>7-10</sup> Typical recommendations include eliminating gluten, dairy, and processed sugars, while incorporating anti-inflammatory foods such as fruits, vegetables, and omega-3 fatty acids. The wealth of anecdotal evidence

underscores a significant interest in these dietary interventions, yet the scientific community has not adequately addressed these claims through controlled, large cohort studies.

The current evidence on the effects of diet on LS is notably limited and constrained by several factors. A significant portion of the studies are dated, with many being conducted decades ago. Moreover, a substantial fraction of these studies—specifically, 44%—are case reports or case series, which inherently limits their generalizability. The studies included in this review also exhibit significant variation in methodological rigor and the strength of evidence they provide. To date, all studies on diet and LS are at an evidential level of III-2 or below as defined by the National and Medical Research Council guidelines.<sup>15</sup>

While this scoping review failed to identify any robust findings sufficient to form generalized dietary recommendations for LS patients, it highlights a significant gap in the scientific understanding of the diet-LS paradigm. This lack of scientific literature stands in sharp contrast to the abundance of dietary advice circulating in popular media. Conducting well-designed RCTs with larger sample sizes and longer follow-up periods would be needed to establish the efficacy of specific dietary modifications in LS management. These studies should track dietary habits and LS symptoms over extended periods to capture the temporal relationship between diet and LS accurately. By controlling for potential confounding factors and implementing validated dietary assessment tools, these studies would provide more robust data on the long-term effects of dietary changes on LS.

## CONCLUSIONS

LS can have a devastating impact on a patient's quality of life, often causing significant discomfort, pain, and emo-

tional distress.<sup>26-28</sup> Given the challenges posed by this condition, it is understandable that numerous popular media sources and blogs promote alternative management strategies, including dietary modifications. However, the evidence is sparse and there are notable flaws in the current scientific literature regarding the impact of diet on LS. Much of the available research is dated, consists of small sample sizes, and often lacks robust control groups, leading to inconclusive and sometimes conflicting results. While we do not discount the lived experiences of individuals with LS, whose accounts of dietary changes may provide valuable insights, more rigorous, large-scale studies are needed. Such research is essential to better understand the potential role of diet in managing LS and to provide evidence-based recommendations that can benefit those suffering from this condition.

## LIMITATIONS

This review was conducted following the PRISMA-ScR methodology; however, it relied on a single database, PubMed. A fraction of the extracted data lines were qualitative, which could introduce potential errors in comprehensive extraction. To minimize these errors, three reviewers were involved in the process.

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## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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