Oamk Journal

Oulun ammattikorkeakoulun julkaisuja

METATIEDOT

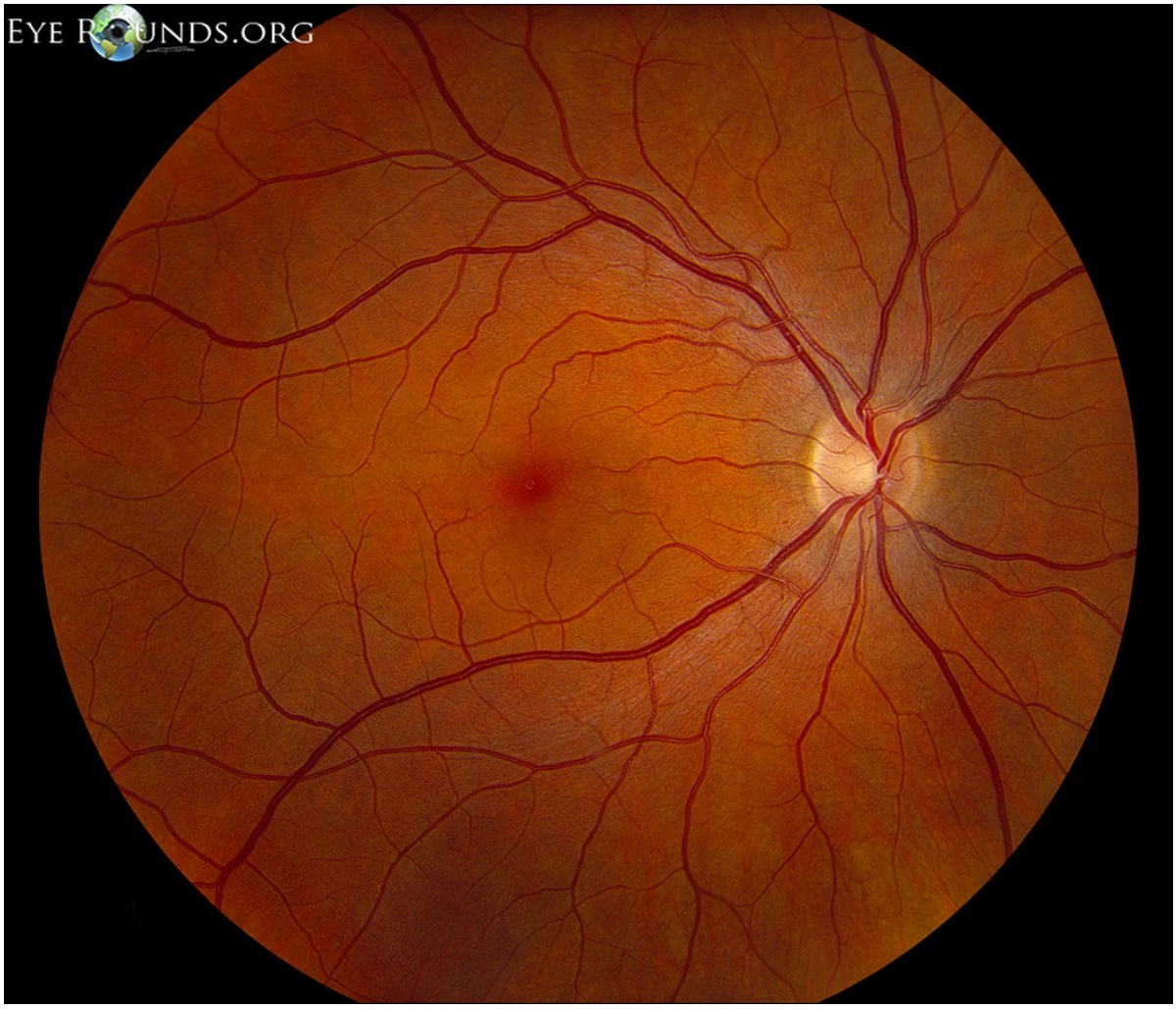
Tyyppi: Artikkeli
Julkaisija: Oulun ammattikorkeakoulu
Julkaisunumero: 61/2025
Julkaisuvuosi: 2025
Tekijätiedot: Käppi Anni, Säynäjäkangas Seija, Elo Satu

Kieli: englanti
Pysyvä osoite: http://urn.fi/urn:nbn:fi-fe2025051645924
Tiivistelmä: SLE is a rare, chronic autoimmune disease, with 90% of affected women being of childbearing age. The disease is variable and multifaceted, and any organ can be affected. Common symptoms include for example rashes, fever, arthritis, hair loss, heart problems, kidney damage, low blood cell counts. Reduced visual acuity and findings in the posterior part of the eye, such as leaks, blockages or swelling, can be presenting sign of the systemic disease. Eye symptoms occur in every third person, ranging from mild to very serious complications. When a balance of treatment is found, hydroxychloroquine and other drugs used play major role in improving visual acuity and redusing other eye symptoms.

Optometrist, do you know the basics, symptoms and possible eyefindings of Systemic Lupus Erythematosus (SLE) during an eye examination?

20.5.2025 - Käppi Anni, Säynäjäkangas Seija, Elo Satu

Systemic Lupus Erythematosus (SLE) is a life-threatening chronic multisystem autoimmune disease, that may affect almost any part of the eye and body. Around a third of patients may have ocular involvement, ranging from relatively mild manifestations to severe, sight threatening disease. Typically, the disease starts between the ages of 15 and 44, and 90% of those affected are women.



Vision problems occur in about 30% of SLE patients and changes may be seen in the posterior part of the eye (image: Toni Venckus, CRA/Ophthalmic Atlas Images by EyeRounds.org, The University of Iowa, CC BY-NC-ND 3.0).

According to several studies, Systemic Lupus Erythematosus is one of the most challenging and at the same time most informative diseases in medicine. The disease is characterized by a wide spectrum of different clinical manifestations, and the clinical course varies in different ways in different people. Each patient's illness and treatment path are different. (David et al., 2022.)

In the disease, the joints, skin, cardiovascular system, kidneys and central nervous system can all be involved (Crow, 2023). According to research, SLE as a disease can affect any organ or system of the body, but the most common symptoms of the disease include a butterfly-shaped rash, also known as malar rash, on the face around the nose. Common symptom also include arthritis in the musculoskeletal system, fatigue, weightloss, and fever, which occur in 50–100% of patients. (Garcia-Garrasco, 2013; David et al., 2022.) Around 18 to 80% of SLE patients suffer from anemia. Hairloss, chest pain and shortness of breath are also typical symptoms. Different kinds of gastrointestinal system, haematological system and musculoskeletal system, nervous system, pulmonary system and renal abnormalities can also occur. (Ameer et al., 2022.)

Joint symptoms occur in more than 90% of SLE patients during the disease. Joint pain is more common than arthritis, which occurs in 70% of patients. The most common effect is on the joints of the hands. Reynald's phenomenon, which means a feeling of coldness and colour changes in the fingers and toes, are generally associated with the disease picture. These symptoms can also precede other features. Symptoms are found in 16–40% of patients. However, in most people, SLE is relatively mild and has little impact on the course of life. On the other hand, there are also serious forms of the disease that are difficult to control. (Garcia-Garrasco, 2013.)

Ophthalmological findings are often associated with the disease picture and can be sight-threatening. Vision problems occur in about 30% of SLE patients. Regarding the disease, the most common finding in the eyes is keratoconjunctivitis sicca, also known as dry eye syndrome (DES) and dry eye disease (DED). Often associated with the disease, other ophthalmological manifestations include scleritis, episcleritis, keratitis, iridocyclitis, various forms of retinopathy, choroidopathy and optic neuropathy. Lupus retinopathy is found in 3–29% of patients with active Systemic Lupus Erythematosus and is reported to be one of the most common manifestations of active disease. Other findings mentioned in the disease picture include eyelid abnormalities, ocular conjunctivitis, uveitis, retinal vasculitis, cotton wool-spots and vaso-occlusive disorder. Retinal and choroidal involvement are

most associated with vision loss. (Garcia-Garrasco, 2013; Silpa-Archa et al., 2016; David et al., 2022.)

Eye findings can be a sign of active SLE disease, and the worst symptoms can lead to serious eye disease or vision loss. Therefore, early diagnosis and rapid treatment of SLE patients are vital, and the disease requires close cooperation with the attending rheumatologist and ophthalmologist. (Shoughy & Tabbara, 2016.)

Prevalence and diagnosis of SLE

For the overall population, the global SLE prevalence and affected population were estimated to be 43.7 (15.87 to 108.92) per 100 000 persons and 3.41 million people, respectively (Tian et al., 2023). In Finland the SLE prevalence is 28 per 100 000 persons. There are about a 2 000 people with SLE in Finland, 90% of them are women. The onset of the disease at an older age is milder than average. (Pettersson, 2022.) The disease occurs three to four times more often in African-American women than in the Caucasian population. (Ameer et al., 2022.)

Diagnosis of the disease is based on symptoms and laboratory tests. In Finland, the latest EULAR/ACR 2019 model is used. (Peltomaa, 2024.) In addition to the classification criteria, there are various indices describing disease activity and disease damage. Since the damage to various organs caused by SLE inflammation is irreversible, the damage is evaluated with these indices. These scoring systems also play a big role in the determination and selection of the drug. (Ameer et al., 2022.)

The classification criteria are not the same as the diagnosis criteria, but the diagnosis is always based on the classification criteria. The diagnosis of SLE rheumatism is always made in specialized medical care, when the patient has enough clinical symptoms, findings and abnormal laboratory results suitable for SLE rheumatism. Biomarkers play a vital role in diagnosing SLE, classifying complications, assessing disease activity and assessing disease response to therapeutic interventions. Biomarkers for SLE in EULAR/ACR 2019 model are proteinuria, hemolytic anemia, white blood cell count, platelet count, anti-Sm antibodies, ANA, anti-dsDNA antibodies, low complement 3 and 4 and anticardiolipin antibodies. This means that laboratory tests may show high inflammatory markers related to the platelet count and CRP, as well as anemia and low white blood cell count. Urine may contain protein or red blood cells, suggesting glomerulonephritis. If the patient also has elevated antinuclear and DNA antibodies, the

diagnosis is usually confirmed. (Ameer et al., 2022.) The disease is divided into mild, moderate and severe disease. (Peltomaa et al., 2024.)

Treatment of SLE and risk of retinal toxicity

SLE patients have a common treatment pathway, which includes medication is always directed according to the organ affected. In the treatment of SLE rheumatism, the aim is to get the symptoms and remission of the disease under control in the best possible way. The goal is also to improve the patient's long-term results, improve the patient's quality of life and prevent organ damage. It is also important to minimize the side effects of the drugs. (Ameer et al., 2022.)

The basic treatment for mild SLE is hydroxychloroquine and it is recommended for all those diagnosed with SLE. This drug relieves skin and joint symptoms and overall disease activity. It also prevents blood vessel blockages and affects blood lipid levels. However, for most patients hydroxychloroquine is not sufficient as the only treatment. Many patients will need glucocorticoids, but treatment periods should be short and doses as low as possible. Often, the need for glucocorticoid dose-sparing immunosuppressive medication such as methotrexate, azathioprine, belimumab or anifrolumab. In severe forms of the disease a strong immunosuppressant is needed at the beginning induction therapy, such as pulse steroids, and further treatment with other drugs such as mycophenolate, cyclophosphamide, rituximab or calcineurin inhibitors corticosteroids. (Lundelin, 2023.)

However, the risk of retinal toxicity associated with long-term treatment requires patient monitoring. The risk of retinal changes increases when the duration of hydroxychloroquine treatment exceeds five years. In several studies, however, the dangerous dose varies, some studies say that the risk of retinal toxicity increases already when the dose exceeds 100 mg per day. (Ameer et al., 2022.) But in some of the studies, 200 mg per day has been outlined as a safe dosage amount (Julkunen, 2021).

The amount of medication should be adjusted in connection with retina, fundus or chronic kidney disease. According to studies, there is evidence that the risk of retinopathy can be minimized if the daily dose is less than 5 mg/kg per kilogram of real body weight in each patient and this amount of medicine is also recommended in the EULAR recommendation. (Ameer et al., 2022.) The most common dosage for an adult is 4–6 mg/kg/day or 200–400mg/day. However, it is known that the drug can cause adverse reactions in the eyes, such as accommodation disorder and blurred vision. Retinopathy has also been found,

which can be asymptomatic at first, but later this can be accompanied by a weakening of color vision, visual field defects and blurred vision. (Julkunen, 2021.)

According to the drug recommendation in Finland, an ophthalmologist should examine the eyes five years after starting the drug and every few years after that. 65-year-olds should always have their eyes examined when starting medication. (Julkunen, 2021.) European guidelines recommend an SD-OCT examination, a fundus image and visual field examinations during the first year of use of the drug. At discretion, Multifocal ERG imaging is also recommended, which is a visual electrophysiology test of the macula that can assess macular dysfunction and monitor the progression of the condition. (Yusuf et al., 2017.) According to recent studies, the new en face OCT and en face OCT-angiography combined with mfERG show the possibility of finding hydroxychloroquine-induced retinopathy in a single image. Fundus autofluorescence (FAF) is also recommended. (Araújo et al., 2024.)

Various eye findings can indicate the disease

This text is based on a master's thesis in clinical optometry from 2025 entitled "Ocular manifestations in systemic lupus erythematosus: Integrative literature review", which studied ocular findings related to the disease. The study included a total of 10 human cases. The results of case studies and findings related to SLE rheumatism and vision were variable. Five people had been previously diagnosed with SLE rheumatism, and five out of ten people were diagnosed with it only after examination, along with these eye symptoms.

The majority had impaired visual acuity and findings in the posterior part of the eye. The most common findings were various types of leaks, blockages or swellings in the retinal and macular area and arterial and venous leaks or blockages. Cotton wool spots were also found in several cases, as well as optic disc abnormalities. In almost all patients, the situation had improved during the follow-up period, also due to finding a treatment balance. The biggest improvement was in visual acuity. Only one patient's condition had worsened regarding the eyes since the first visit.

Systemic Lupus Erythematosus (SLE) is a very complex disease. Although optometrists do not diagnose diseases, it is good for optometrists to know the clinical picture of SLE and the possible effects of the main medication on the eyes. Since vision and eye-related problems can indicate the disease, anamnesis and a careful eye examination play an important role in this case as well. The key is to detect the disease as early as possible.

Ocular complications occur in every 30% of patients and ocular symptoms vary greatly from mild symptoms to severe complications. Symptoms can occur in any part of the eye or in structures in anterior or posterior part of the eye and clearly disease also affects the visual acuity. Eye findings are very important as they can also be the first manifestation of the disease. As studies show, SLE is mostly a disease of young women, most often half of the cases under the age of 30. (Ameer et al., 2022.)

As a summary of these studies, since there were so many eye findings in the end, regular eye examinations should be taken care during the disease. The solution of each study is the co-operation of a multiprofessional team, and the fact that patients would benefit from a professional eye examination when making a diagnosis. Early recognition of the disease is of paramount importance to receive effective treatment and to avoid complications.

SLE eye effects vary greatly depending on the patient. For some, the disease may be milder and for others more severe, and for some, several target organs may be damaged. Depending on the severity of the disease, the amount and quality of the medications also affect the eye symptoms by correlating them. As a conclusion from the studies, all SLE patients should always be examined for the best corrected visual acuity, pupils, fundus image and OCT should be taken from all, examination of the visual field is also recommended and if necessary, FFA (Fundal Fluorescein Angiography) or FAF (Fundus autofluorescence) should also be done.

Anni Käppi
Studies Master of Clinical Optometry in Oulu University of Applied Sciences

Seija Säynäjäkangas
lecturer
Special Fields in Health Care
Oulu University of Applied Sciences

Satu Elo
principal lecturer
Wellbeing and Cultural Field of Expertise
Oulu University of Applied Sciences

The text is based on the Master's Thesis:

Käppi, A. (2025). *Ocular Manifestations in Systemic Lupus Erythematosus: Integrative literature review* [Master´s thesis, Oulu University Applied Sciences, Master Of Health Care in Clinical Optometry]. Theseus. https://urn.fi/URN:NBN:fi:amk-202501261910

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