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Case Report

Impact of a Standardized Black Seed Oil on Oral Lichen Planus: A Case Report

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Abstract

Oral lichen planus (OLP) is a persistent inflammatory condition that may impair the quality of life. Recent research has highlighted the potential of janus kinase (JAK) inhibitors as an effective treatment for OLP. Black seed oil is a natural JAK inhibitor. We report a case of a 58-year-old woman who discovered two OLP lesions about a year ago. Pretreatment with a night guard, topical corticosteroides (gold standard) and acupuncture did not improve the complaints. In December, 2024, we started topical treatment with black seed oil containing 5 mg thymoquinone per 0,5 ml. The complaints decreased and the quality-of-life scores improved from 24 to 8 at eight weeks after start of treatment. Improvement remained until the end of week 20. Unfortunately, the lesions had not healed. Nonetheless, the black seed active principle is a promising option for long-term management of chronic OLP due to its favorable safety profile. However, oil is probably not the optimum preparation and may require adequate co-treatment for OLP healing. Further studies are required to find the optimum galenic formulation for the black seed active principle and to confirm the benefitial effect of black seed preparations in OLP treatment.

Keywords: oral lichen planus; black seed oil; thymoquinone; janus kinase inhibitors; quality of life

Abbreviations

OLP oral lichen planus JAK janus kinase, JAKi janus kinase inhibitors

Introduction

Oral lichen planus (OLP) is classified among the autoimmune diseases and characterized by exacerbations and remissions. Symptomatic OLP causes pain and burning sensation, impairs the patient's quality of life and is considered at risk of malignant transformation with a cumulative transformation rate of 1.4% [14]. OLP predominantly affects individuals over 40 years [12]. Clinically, OLP presents mainly as white reticular lesions with or without atrophic, erosive, ulcerative and/or plaque areas [26]. Erosive-ulcerative OLP may cause severe complaints with food or liquide intake and decrease the quality of life [2, 28]. Overexpression of various pro-inflammatory mediators such the interleukins, interferones and tumor necrosis factor-alpha are involved in the OLP mechanism of action. These mediators were detected in OLP lesion, saliva and blood symples [8, 18]. They activate the januskinase/signal transducers and activators of transcription (JAK/STAT) pathway [7, 20,27]. Therefore, synthetic JAK inhibitors such as baricitinib, tofacitinib, ruxolitinib and upadacitinib have recently been successfully employed in OLP [1].

Black seed oil and its leading compound thymoquinone are natural JAK inhibitors [3-5]. In a recent study, a topical black seed preparation with 1.22 mg TQ/ml was shown to decrease OLP complaints similar to a topical cortisone 0.06% [17]. Likewise, mucoadhesive patches delivering black seed extract 10% to the oral mucosa (TQ content not stated) was as effective as corticosteroids in reducing pain, burning, and lesion severity in patients with OLP [21]. We report here a case with amelioration of erosive OLP with a standardized black seed oil.

Case Presentation

A 58-year-old woman M.H. with diagnosed OLP consulted us for natural treatment of her lesions. The upper buccal erosive lesion was associated with burning sensation and pain depending on liquid or food intake. The gingival lesion on the lower jaw and cheek was less sensitive. The lesions

had occurred about two years ago. M.H. consulted a dentist who started treatment with a night guard (Flexi Orthodontic System) for 3 months. Because this procedure had no impact on the lesions, M.H. was sent to an orthodontic surgeon for biopsies in June 2024. The histological investigation confirmed OLP. Four weeks of treatment with topical triamcinolone acetonide 1 mg/g twice daily in August 2024 (standard treatment, 24) did not improve the complaints. Treatment with the more potent clobetasol propionate 0.5 mg/g applied every evening end of October, 2024 (standard treatment, 24) had to be discontinued after one week due to intolerable adverse events (palpitation, red face). Three months later M.H. started acupuncture therapy over 5 weeks which did not help (Figure 1). We started treatment with a black seed oil with 5 mg TQ/0.5 ml in December 2024. The oil had to be applied in the morning after breakfast und in the evening before going to bed (3 ml on both lesions). Within 8 weeks the German validated short forms of the Oral Health Impact Profile (OHIP-14, 15) had decreased from 24 to 8 (Table 1) and remained improved over the following 12 weeks. In accordance with this, the erosions and the reticular lesions had improved (Figure. 2), but had, unfortunately, not healed.

Figure 1: a) Buccally located erosive lesion at the marginal gingiva of the interdental papilla between the maxillary central incisors and the right lateral tooth; **b)** White, reticular lesion of 3 x 1 cm on the left side of the mouth with typical Wickham stripes and an erosive lesion within that area.

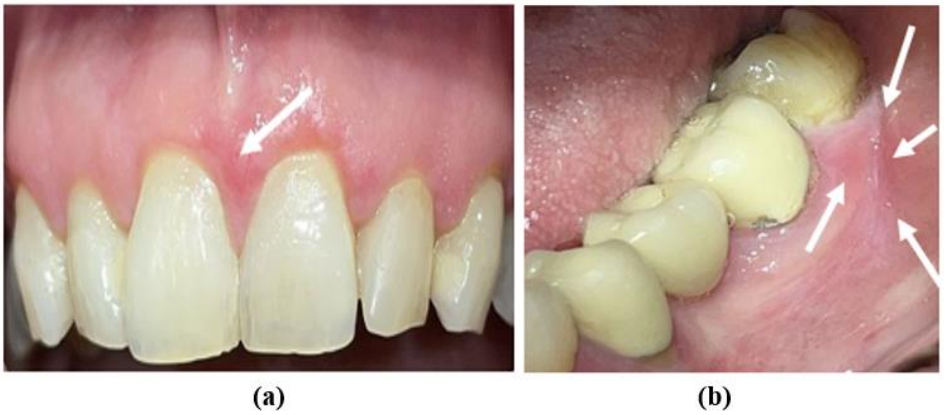

Figure 2: a) Improvement of **a)** the buccal and **b)** the lower jaw OLP lesions after 20 weeks of treatment with a standardized black seed oil: a) 1 ml/day and b) 2 ml/day.

	Before Treatment	after 4 weeks	after 8 weeks	after 12 weeks	after 16 weeks	after 20 weeks
Total Score	**24**	**10**	**8**	**8**	**8**	**8**
Functional limitations (2 questions)	0	0	0	0	0	0
Psychological discomfort 2 questions)	6	1	1	1	1	1
Psychological disability (2 questions)	4	3	2	2	2	2
Physical discomfort (2 questions)	7	1	2	2	2	2
Physical disability (2 questions)	4	3	1	1	1	1
Social disability (2 questions)	2	1	1	1	1	1
Handicap (2 questions)	1	1	1	1	1	1

Table 1: Oral Health Impact Profile before and during treatment over 20 weeks.

Side headings/Subheadings

Black seed oil for oral lichen planus

Discussion

A systematic review in 2017 analysed 55 studies on the therapeutic efficacy against pain and clinical signs of OLP. Topical clobetasol propionate at 0.025-0.05% was recommended as the first therapeutic choice (gold standard) followed by topical calcineurin inhibitors, e.g. 0.1% tacrolimus and 1% pimecrolimus. In case of unsuccessful treatment, systemic corticosteroids and the application of diode lasers may be taken into consideration [11]. An update including 70 studies concluded that based on the estimated cost per month and evidence for efficacy and side-effects, topical steroids (fluocinonide > dexamethasone > clobetasol > triamcinolone) appear to be more cost-effective than topical calcineurin inhibitors (tacrolimus > pimecrolimus > cyclosporine) followed by intra-lesional triamcinolone [24]. However, more studies of good quality are required to definitely assess the cost-effectiveness of OLP treatments including also topical retinoids, aloe-vera gel, photodynamic and low-level laser therapy or interleukin inhibitors (anti-IL-17, anti-IL-23) [9]. Most of these topical treatments are believed to inhibit overexpression of pro-inflammatory mediators and are associated with adverse events. Janus kinase inhibitors (JAKi) are small molecules which prevent the phosphorylation of JAKs, thereby blocking the intracellular phosphorylation cascade required for the transcription of several cytokines. In addition to approved indications including atopic dermatitis, alopecia areata, vitiligo and psoriasis, topical JAKi are also proposed efficacy off-label in several dermatological conditions where standard treatments are often disappointing, such as hidradenitis suppurativa, extensive morphea, cutaneous sarcoidosis and lichen planus [22]. Black seed (Nigella sativa) is one of the oldest traditional medicines [25]. Its leading compound TQ is involved in the regulation of cytokine expression by inhibiting various signal pathways via NF-κB-, aktivator-protein-1-(13) and interferon regulatory transcription factor-3 [6]. In addition TQ inhibits the signal pathways JAK/STAT- and PI3K/Akt/mTOR (4). This explains why one of the domaines of black seed treatment or its oil are allergies [23] and autoimmune diseases [10,19,29]. Our case presentation confirms that a standardized black seed oil has a benefitial on OLP. It may well be that oil is inferior to other galenic formulations. Recently, a gel and a patch standardized on TQ were shown to decrease moderate to severe OLP complaints similar to the gold standard, a standardized topical cortisone [17]. A daily dose of the natural JAK inhibitor with up to 30 mg TQ per day can safely been employed [16]. Further research is now required to study the black seed active principle in OLP due to its preferable benefit-risk ratio.

Conclusion

In our case presentation a standardized black seed oil improved OLP complains. Unfortunately, the oil had no curative effect. Future studies need now to evaluate (i) the optimum galenic formulation for the black seed active principle, (ii) which co-treatment to oil could help to heal OLP and (iii) if a standardized black seed oil can maintain treatment success of other OLP treatments.

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