Vitamin D and Probiotics in Oral Lichen Planus: a microbiome and cytokine response study

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Background and aim: Oral lichen planus (OLP) is an underdiagnosed chronic inflammatory condition of the oral mucosa, often linked to immune dysregulation and to a potential risk, yet not well-defined, of malignant transformation. Gut dysbiosis, which is linked to several autoimmune inflammatory disorders, could influence OLP development and progression[1]. As probiotics and vitamin D can also guarantee human oral and systemic health, we investigated whether they could be beneficial for OLP patients currently not under corticosteroid or antibiotic treatments[2].

Methods: A total of 25 adult OLP patients with vitamin D deficiency (10-20 ng/mL) received 2,000 IU/day of vitamin D3 and a selected probiotic mixture (*Limosilactobacillus reuteri* LRE11-DSM33827, *Lacticasebacillus rhamnosus* LR04-DSM16605, *Lacticasebacillus casei* LC04-DSM33400) (Probiotical SpA, Novara, Italy) at ≥1x10⁹ AFU&CFU/g/day for 16 weeks. Clinical assessments, lesion photography, and biological sample (i.e., saliva, serum, oral healthy and OLP lesional mucosa, and stool) collection were performed at baseline (T0) and post-intervention (T1= 16 weeks). Saliva and serum cytokine levels were quantified using Bio-Plex assays. Oral and faecal microbiota composition was analysed through 16S rRNA sequencing.

Results: Following supplementation, significant changes were observed in salivary and serum cytokine levels, indicating potential immunomodulatory effects. Both oral and faecal microbiomes exhibited compositional changes indicative of improved microbial health. Alterations in microbial diversity and composition, with increased abundance of beneficial bacterial taxa, were recorded. Moreover, gut successful colonization by probiotic strains was confirmed through the post-treatment identification of *Limosilactibacillus* and *Lacticaseibacillus* among differentially abundant taxa.

Conclusions: This *in vivo* analysis shows that vitamin D and selected probiotics exert immunomodulatory and microbiome-altering effects in OLP patients. These findings support the potential therapeutic role of combined supplementation in managing OLP-related inflammation and

dysbiosis. Further studies with larger cohorts are warranted to validate these results and elucidate underlying mechanisms.

Bibliography:

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