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Plasma medicine has emerged as a new field of research. Over the last few years cold atmospheric plasma (CAP) has been successfully applied in treatment of chronic wounds such as leg ulcers. In this study the clinical application was extended to chronic inflammatory processes of the oral cavity. One common mucocutaneous disease is oral lichen planus (OLP) that is histologically characterized by basal keratinocyte damage and an infiltrate of cytotoxic T-lymphocytes. OLP represent precancerous lesions with a malignant transformation rate ranging from 0 – 10%

In this study 10 patients suffering from OLP were included and donated tissue samples of diseased and healthy mucosa. CAP-related apoptotic cell death was assessed by TUNEL-assay after treatment with kINPen Med® (neoplas tools, Germany). Supernatant culture medium of tissue samples were analysed for 13 different cytokines. In addition, five patients suffering intraoral leucoplakia were treated in vivo by kINPen Med®.

No significant increase in apoptotic rates could be found after CAP treatment within the mucosal tissue. Levels of proinflammatory cytokines were elevated in supernatant culture medium while identification of infiltrating immune cells in tissue samples is still in progress. Strikingly, in patients that underwent in vivo treatment of OLP lesions a reduction of local inflammation as well as pain was achieved.

This investigation reports on the usefulness of CAP as a treatment option for intraoral inflammatory mucosal diseases, especially OLP. Treatment of precancerous lesions such as OLP could prevent the development of cancer. Further investigations on a larger number of patients over a longer period are still required in order to facilitate CAP for treatment of precancerous lesions.