

**Ministry of Higher Education  
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University of Baghdad  
College of Dentistry**



# **Oral Findings and Buccal Micronucleus Cytome Assay in patients with Rheumatoid arthritis on Methotrexate and Etanercept treatments**

**A Thesis Submitted to the Council of the College of Dentistry at  
the University of Baghdad in partial fulfillment of the  
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# *Abstract*

**Background:** Rheumatoid arthritis is an inflammatory and autoimmune disease affecting people at any age, but especially after the age of 16 years with female being affected more than male. It affects small joints of the body with a symmetrical pattern and has multiple extra articular manifestations as well. Disease modifying anti rheumatic drugs are widely used to treat rheumatoid arthritis which are either synthetic type such as methotrexate or biological type such as etanercept, with their combination has been proven its effectiveness in producing an overall disease improvement. Disease modifying anti rheumatic drugs as any other chemicals, may have local and systemic side effects. Buccal micronucleus cytome assay is a simple, quick and non invasive method to study the genotoxicity of different compounds and lifestyle factors, by scoring the genomic damage parameters represented by micronucleated cells and other parameters.

**Aims of the study:** To evaluate the oral findings and to study the ability of both methotrexate and etanercept in producing genotoxicity (genetic material damage) by the mean of buccal micronucleus cytome assay. Also to find out the correlation of the cytological/oral findings with the clinical disease activity index.

**Subjects, Materials and Methods:** Eighty-five rheumatoid arthritis patients were included in this study. Twenty-five patients were on methotrexate, thirty patients were on etanercept and thirty patients were on a combination of methotrexate and etanercept. The rheumatoid arthritis patients matched in age and gender to thirty healthy controls. Each patient was examined to calculate the clinical disease activity index and to detect any oral finding. The buccal micronucleus cytome assay was applied for each buccal smear taken from

normally looking buccal mucosa of 115 participants which stained with Papanicolaou stain for evaluation under the light microscope.

**Results:** The highest percentage (47%) of rheumatoid arthritis patients were presented with a high clinical disease activity index, while the percentage of those with low clinical disease activity index (13%) was the lowest. Oral dryness showed to be the most common oral findings (60%) followed by temporomandibular joint disorders (31.8%) then aphthous ulcerations (9.4%) and glossitis (5.8%). Most of the oral findings were seen in patients treated with etanercept or methotrexate alone, while patients treated with a combination of them had less oral side effects. Rheumatoid arthritis patients exhibited a higher median number of Micronucleated cells, Pyknotic cells and Nuclear buds than the controls where the P-value was ( $<0.001$ ,  $0.001$  and  $0.025$ , respectively), the median of these parameters was higher in patients used methotrexate and etanercept alone more than patients who used a combination therapy. The higher number of rheumatoid arthritis patients with oral findings were with high and moderate disease activity. Micronucleated cells were positively correlated with clinical disease activity index ( $P=0.025$ ).

**Conclusions:** Oral dryness, temporomandibular joint disorders and aphthous ulcerations were the main oral manifestations found in rheumatoid arthritis patients. The biomarkers of genetic damage and cell death were significantly higher in rheumatoid arthritis patients than in controls and higher in those treated with methotrexate and etanercept alone.