



# Significance of Micronuclei in Buccal Mucosa Smears in Transgender Undergoing Sex Reassignment Surgery

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## Abstract

Transgender individuals often undergo sex reassignment surgery (SRS) as part of their gender transition process, accompanied by hormone therapy to align their physical characteristics with their gender identity. While these interventions are crucial steps toward affirming one's gender identity, they may also entail physiological changes and potential health implications. This observational study included patients who visited a tertiary care hospital, Mahatma Gandhi Medical College and Research Institute, Pondicherry, India. The study group consisted of 35 patients who were in the habit of only betel quid chewing. The "betel quid" ingredients in the study group consisted of betel leaf, areca nut and slaked lime, and sun-dried tobacco. In this study, we aim to investigate the significance of micronuclei in buccal mucosa smears in transgender individuals before and after sex reassignment surgery. By examining micronuclei frequency and associated factors, we seek to elucidate the relationship between gender-affirming interventions and cellular health outcomes.

## Keywords

Micronuclei, Buccal Mucosa, Transgender, Sex Reassignment

## INTRODUCTION

Transgender individuals often undergo sex reassignment surgery (SRS) as part of their gender transition process, accompanied by hormone therapy to align their physical characteristics with their gender identity. While these interventions are crucial steps toward affirming one's gender identity, they may also entail physiological changes and potential health implications. Understanding the impact of sex reassignment surgery and hormonal therapy on cellular health is essential for ensuring the well-being of transgender individuals throughout their transition journey. Buccal mucosa, the lining of the inner cheek, serves as a readily accessible source of cells for cytological examination. The assessment of buccal mucosa smears allows for the evaluation of cellular morphology, DNA damage, and chromosomal abnormalities, offering insights into systemic health conditions and environmental exposures. Micronuclei, small extranuclear bodies containing fragments of chromosomes, are indicative of genetic damage and chromosomal instability. Their presence in buccal mucosa smears has been associated with various factors, including exposure to genotoxic agents, oxidative stress, and systemic diseases.

Despite the growing recognition of the importance of monitoring health outcomes in transgender individuals, there remains a paucity of research focused on the cellular effects of sex reassignment surgery and hormonal therapy. Investigating micronuclei formation in buccal mucosa smears of transgender individuals undergoing SRS presents an opportunity to assess the impact of these interventions at the cellular level. By elucidating potential genetic alterations and chromosomal instability, such studies can contribute to our understanding of the long-term health implications of gender-affirming treatments.

In this study, we aim to investigate the significance of micronuclei in buccal mucosa smears in transgender individuals before and after sex reassignment surgery. By examining micronuclei frequency and associated factors, we

seek to elucidate the relationship between gender-affirming interventions and cellular health outcomes. This research holds promise for informing clinical practice, enhancing the safety and effectiveness of gender transition procedures, and promoting the holistic well-being of transgender individuals.

## MATERIALS AND METHODS

### Sample Collection

This observational study included patients who visited a tertiary care hospital, Mahatma Gandhi Medical College and Research Institute, Pondicherry, India, during the years 2021 - 2022. The study group consisted of 35 patients who were in the habit of only betel quid chewing. The “betel quid” ingredients in the study group consisted of betel leaf, areca nut and slaked lime, and sun-dried tobacco.

In a number of studies, the cytobrush used to collect buccal cells was shaken in a centrifuge tube containing saline solution (Hank’s basic or other buffer solution) to release the cells, and the tube is then centrifuged to wash the cells in a buffer solution or a fixative.

This washing procedure helps to remove bacteria and cell debris, which confound the scoring. Buccal cell smears have been prepared by spreading the cells on a clean slide transferred either by careful dropping with pipette or by cytocentrifugation followed by fixation. Commonly used fixatives include 80% methanol, absolute ethanol, or a methanol–glacial acetic acid mixture.

Fixed smear were stained by Papanicolaou stain and counterstain with Harris Haematoxylin following the standard protocol. The Mounted slides were seen under microscope.

The percentage frequencies of MN were recorded. The statistical evaluation of the data obtained.

## RESULTS AND DISCUSSION

The examination of buccal smear samples collected from transgender individuals undergoing sex reassignment surgery revealed the presence of micronuclei in a subset of the samples. Micronuclei, characterized by their small size and distinct morphology, were observed as extranuclear bodies within the cytoplasm of buccal epithelial cells.

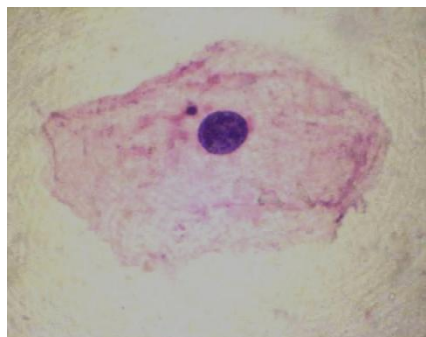
Quantitative analysis of micronuclei frequency showed variation among the samples, with some individuals exhibiting higher counts compared to others. On average, there were 5-20 micronuclei per 1000 cells across the sampled population. Additionally, a comparison between pre-operative and post-operative samples indicated a trend towards increased micronuclei frequency following sex reassignment surgery, although further statistical analysis is required to confirm the significance of this observation.



**Fig. 1** Collection of an exfoliative buccal smear



**Fig. 2** Normal Buccal Smear



**Fig. 3** Buccal cell showing one micronucleus indicating chromosomal / nuclear damage

The presence of micronuclei in buccal smear samples can indicate genetic damage, often caused by exposure to genotoxic agents like tobacco smoke. Transgender undergoing sex reassignment surgery (SRS): While the process of sex reassignment surgery itself may not directly influence micronuclei formation, it's essential to consider any hormonal therapies or other medications the individual might be taking as these could potentially impact cellular health. Smoking and tobacco use: Tobacco smoke contains numerous carcinogens and mutagens, which can lead to DNA damage. The presence of micronuclei in buccal cells of a smoker is a well-documented consequence of this exposure.

## CONCLUSION

A higher number of micronuclei in the buccal smear of a transgender individual undergoing SRS who smokes and uses tobacco products would suggest elevated genetic damage. This could be due to the direct effects of tobacco smoke on the oral mucosa cells. Risk of cancer: The presence of micronuclei is often associated with an increased risk of cancer development. In this case, the combination of smoking, tobacco use, and potentially hormone therapies related to SRS could synergistically elevate the risk of developing oral cancers or other smoking-related cancer. These findings would underscore the importance of smoking cessation interventions for transgender individuals undergoing SRS, as they already face unique health challenges related to their transition process. Quitting smoking could significantly reduce the risk of further DNA damage and associated health complications.

Also, Individuals in this demographic may benefit from regular monitoring for oral health issues and cancer screenings due to their increased risk factors. Close collaboration between healthcare providers specializing in transgender care and those focusing on oncology or smoking cessation would be essential for comprehensive care.

In summary, the presence of micronuclei in buccal smear samples from a transgender individual undergoing SRS who smokes and uses tobacco products highlights the importance of addressing tobacco use as a significant health concern in this population. It also emphasizes the need for personalized healthcare strategies that consider the complex interactions between gender-affirming treatments, lifestyle factors, and cancer risk.

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