

Review: A critical overview of limitations CFD Modeling in nasal airflow.

ABSTRACT

Computational fluid dynamics (CFD) modeling of nasal airflow has been carried out by several researchers. Virtual surgical treatment and aerosol deposition studies have also been conducted. However, the appropriateness of such modeling practices with regards to modeling and medical constraints needs careful consideration. The current numerical models for the study of nasal airflow, developed from the scanned images obtained from computed tomography or magnetic resonance imaging, are influenced by postural changes. These models neglect the mucous layer, other vital anatomical features, and nasal cycle effects, CFD studies make numerous assumptions that seriously limit their usefulness. Unless these constraints can be addressed, the interpretation of results from a CFD output cannot be considered as an appropriate definition of the flow behavior. This review provides a critical overview of the limit actions of the CFD modeling of nasal air-flow. Some of the limitations and constraints associated with CFD modeling are reviewed and possible studies that could be carried out in the future to ascertain the effect of neglecting these parameters are discussed. This study also proposes a standard station of the computational modeling procedure, which is necessary for studying airflow inside the nasal cavity.

Keyword: CFD; Posture; Gender.