



# VOLUMETRIC ANALYSIS OF THE MAXILLARY SINUS IN RHINOSINUSITIS PATIENTS

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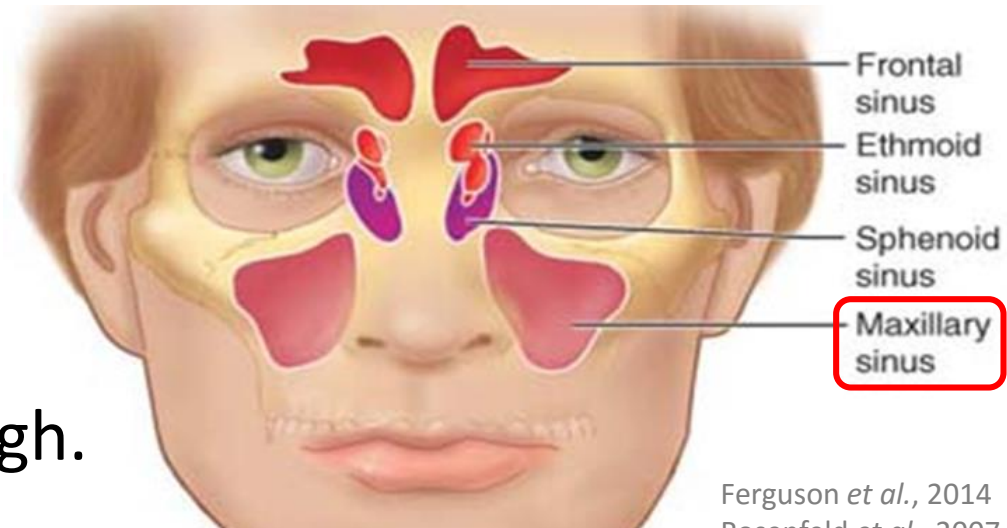
## INTRODUCTION:

- **Rhinosinusitis (RS):** inflammation of the paranasal sinuses, extremely common condition.



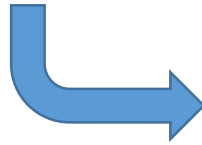
It causes significant physical symptoms, negatively affects quality of life

- RS incidence in the maxillary sinus (MS) is high.

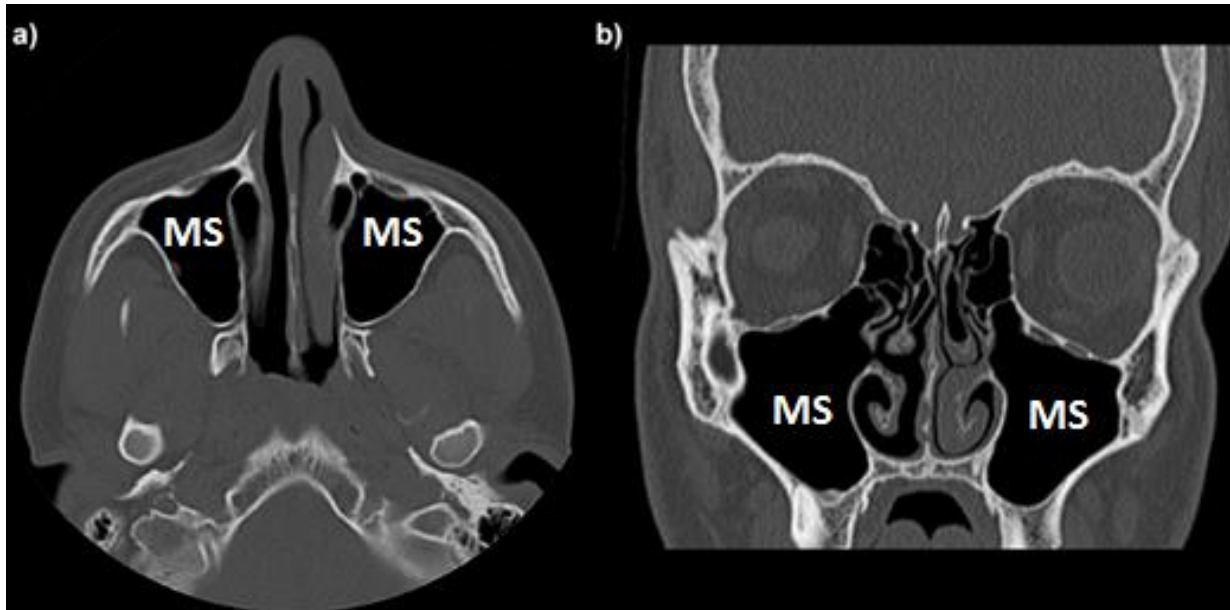


## INTRODUCTION:

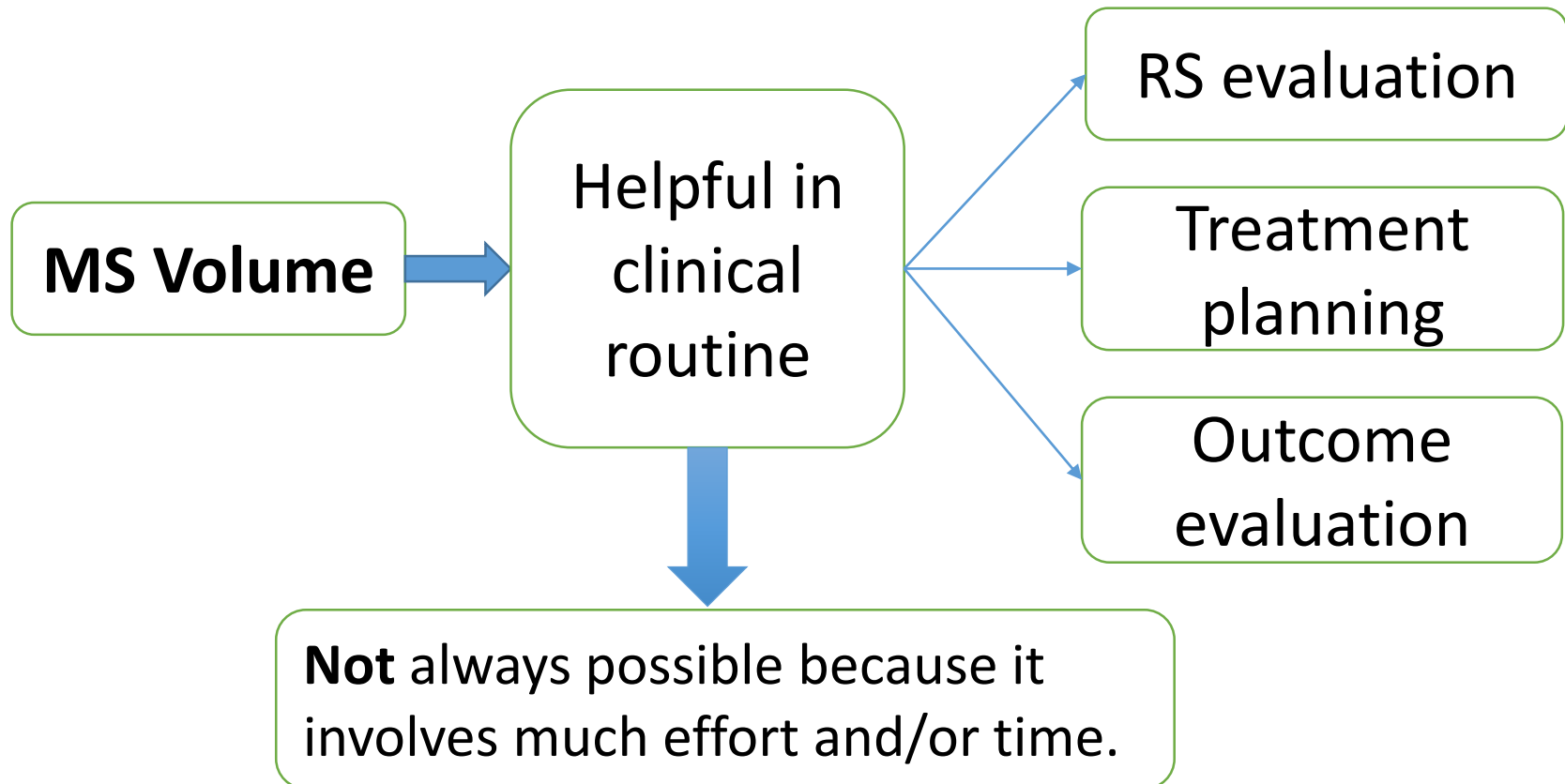
- Computed Tomography (CT) of the sinuses



Recommended for **diagnostic** and **management** purposes.



## INTRODUCTION:

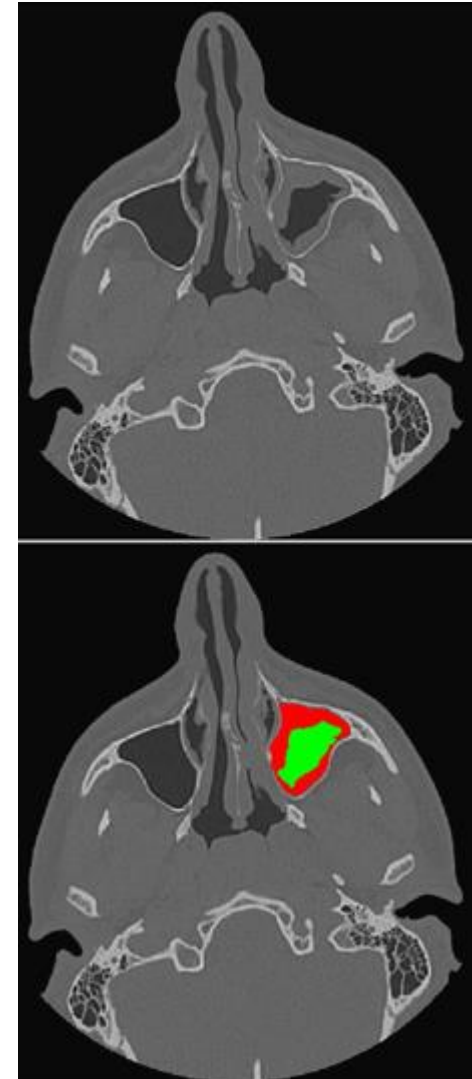


## OBJECTIVE

- The of this study was to develop **an automatic tool** to quantity the **volume** of MS and MS free air in CT exams of patients with rhinosinusitis.

## METHODOLOGY

- 30 patients with confirmed RS.
- Tool for automatic MS quantification,
  - Developed in Matlab;
  - Hybrid method (**Watershed** and **Region Growing** techniques).
- Comparison between radiologist manual segmentation.
  - Linear Regression
  - Bland-Altman



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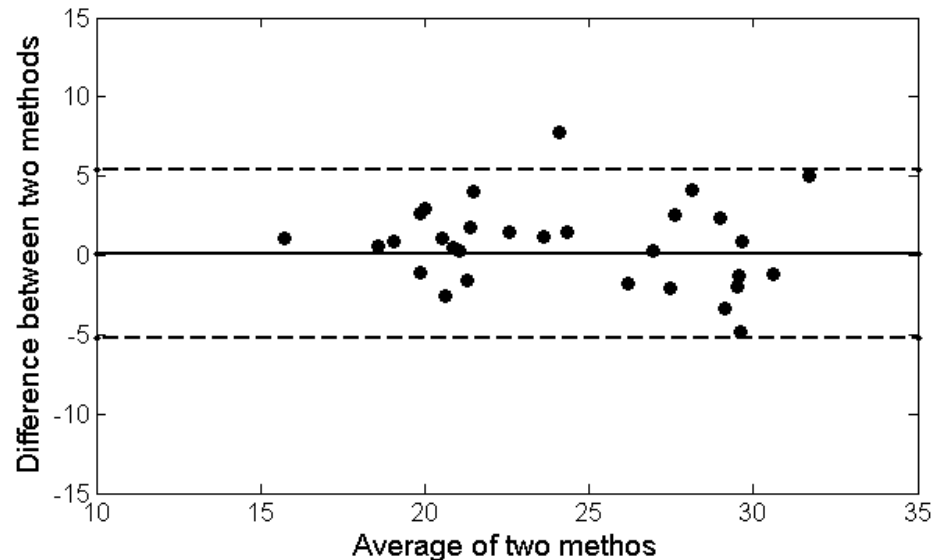
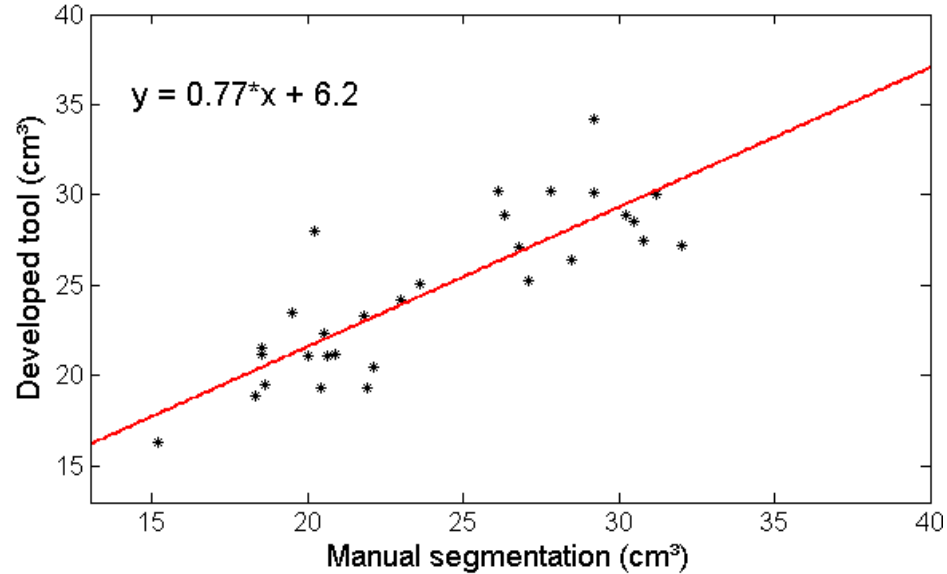
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## RESULTS

MS Total volume

Mean percentage difference = 9.2%



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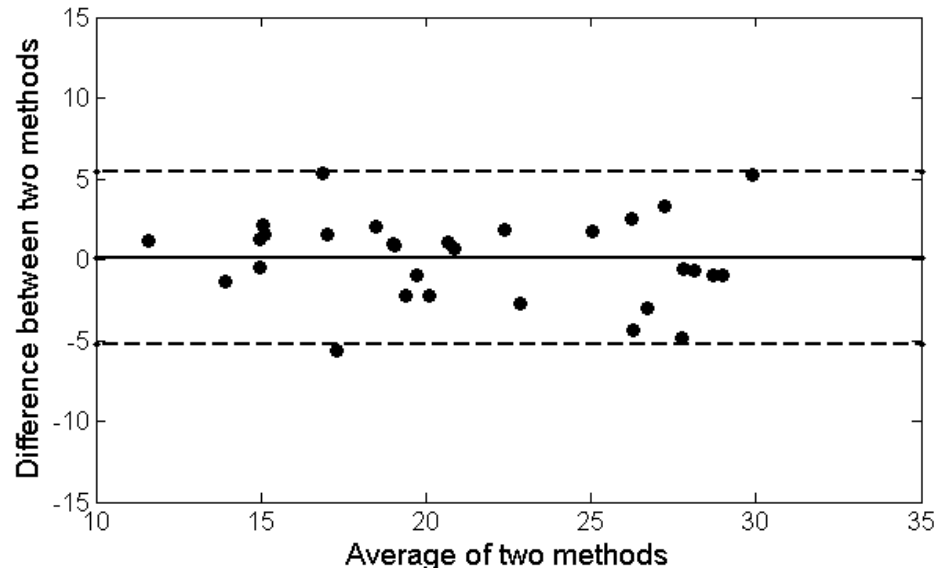
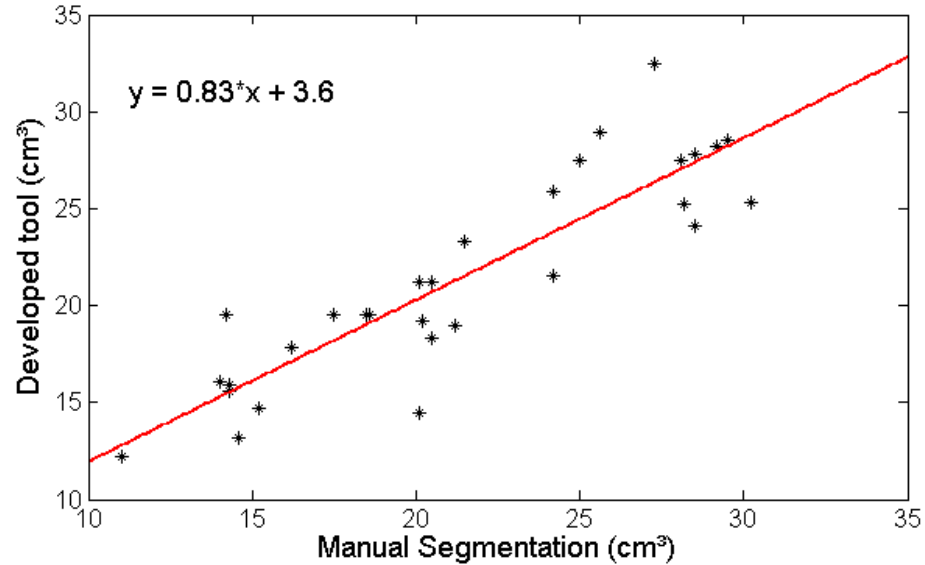
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## RESULTS

MS free air volume

Mean percentage difference = 10.4%





## CONCLUSION

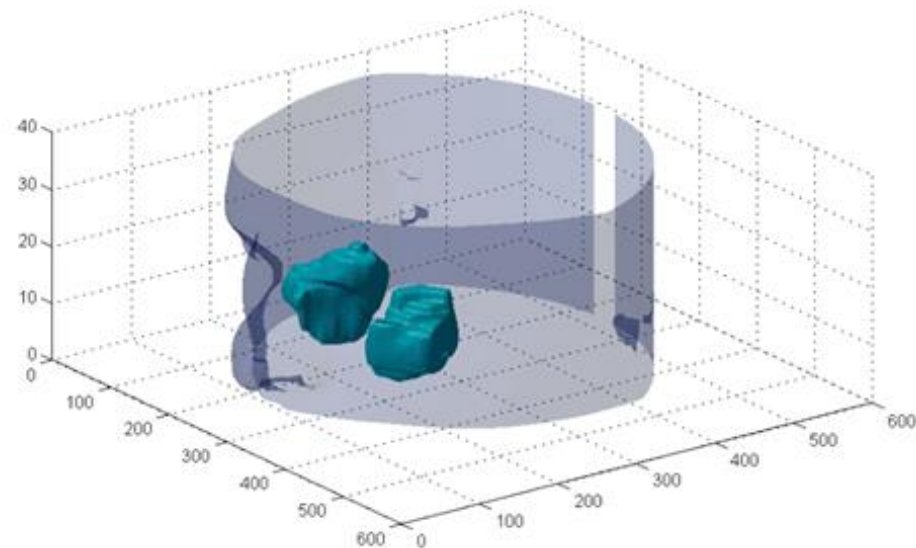
Developed tool to quantify MS volume

- Robust;
- Fast;
- Efficient;
- Avoids intra and inter-observer variations.

Useful for **diagnosis** and **treatment determination** of RS



Provide additional information to physician.



## REFERENCES

- Adoga A A and Ma'an N D 2011 The Epidemiology and Economic Impact of Rhinosinusitis in North Central Nigeria *J Clin Res Bioeth* **2**
- Ferguson M 2014 Rhinosinusitis in oral medicine and dentistry *Aust Dent J* **59** 289-95
- Rosenfeld R M, Andes D, Bhattacharyya N, et al. 2007 Clinical practice guideline: adult sinusitis *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery* **137** S1-31
- Shi H J, Scarfe W C and Farman A G 2006 Maxillary sinus 3D segmentation and reconstruction from cone beam CT data sets *Int J Comput Ass Rad* **1** 83-9