

# Effect of Multichannel Inverse Scaling Denoising in Detection of Injured White Matter in Fractional Anisotropy Maps

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## Introduction

In research of Parkinson Disease (PD), using VBM on Fractional Anisotropy (FA) maps, the most common preprocessing step used nowadays is Gauss filter. There are more advanced denoising models that can improve the detection of white matter (WM) alterations.

## Aims

To study the effects of a nonlinear multichannel filtering preprocessing step on VBM statistical study over FA maps.

## Material and Methods

Diffusion Weighted Images (DWI) of fourteen subjects with PD diagnosis and fifteen healthy subjects were acquired on a 3T scanner. Prior to diffusion tensor estimation, an iterative process, called 'inverse scale space', was used to filter the DWI. The statistical method used was VBM that was performed with SPM8 package.

## Results

The above process shows an improvement over FA maps (Figure 1.a) and differences at the statistical study were found. Applying the described process, affected WM fibers tracts in PD subjects are better defined (Figure 1.b). Also the cluster level extend and the height peak level thresholds are increased.

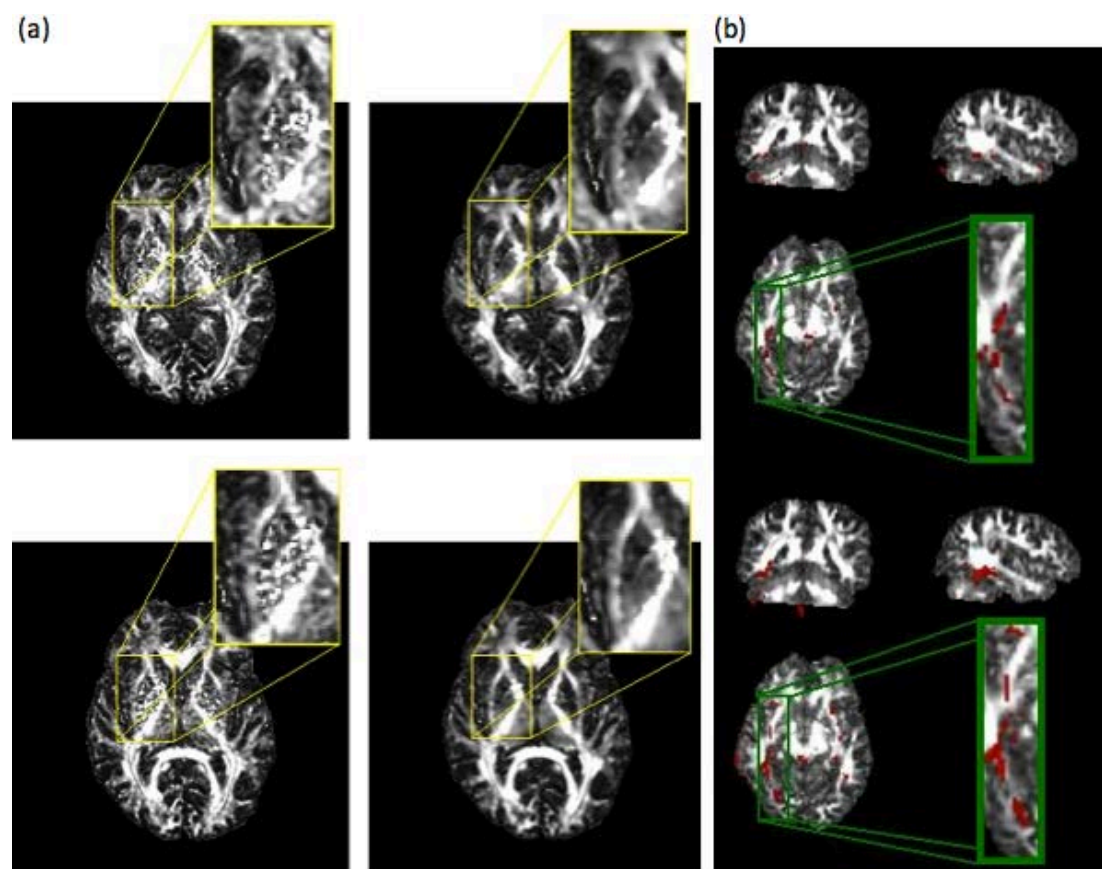


Figure 1. (a) At the left column, FA maps of two slices without preprocessing. At the right, with preprocessing. (b) Injured external capsule WM fibers tracts without DWI preprocessing (above) and with preprocessing (below).

## Conclusions

Using 'inverse scale space' iterative scheme as a preprocessing step improves the results of VBM statistical study over FA.