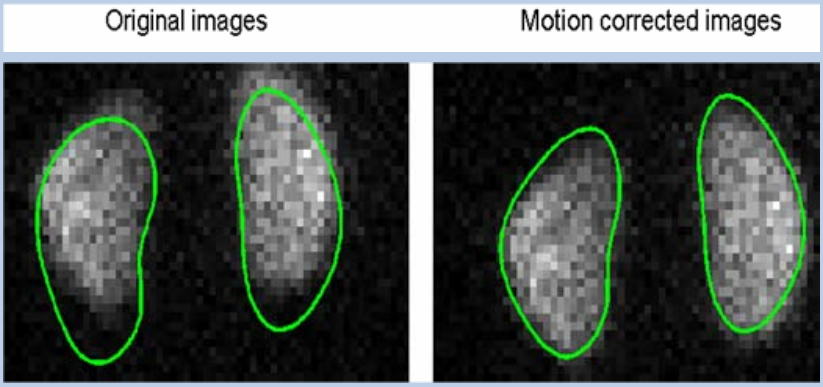
Automated Quantitative Analysis of DMSA images – Reference values for Renal Length

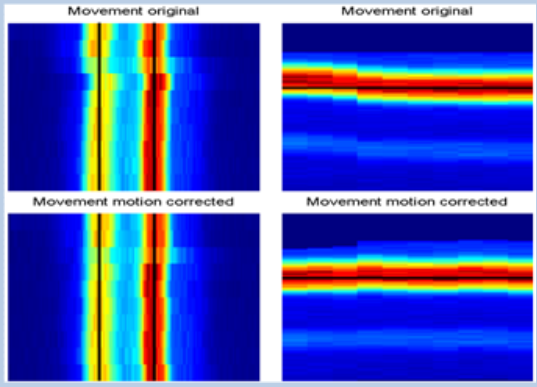
Margareta Anicin[1], Ammar Daoud[1], Matilda Landgren[1], Karl Sjöstrand[2], Rune Sixt[3], Lars Edenbrandt[1,2]
[1]Clinical Physiology and Nuclear Medicine, Skåne University Hospital, Lund University, Malmö, Sweden
[2]EXINI Diagnostics AB, Lund, Sweden. [3]The Queen Silvias Childrens Hospital, Clinical Physiology, Gothenbourg, Sweden

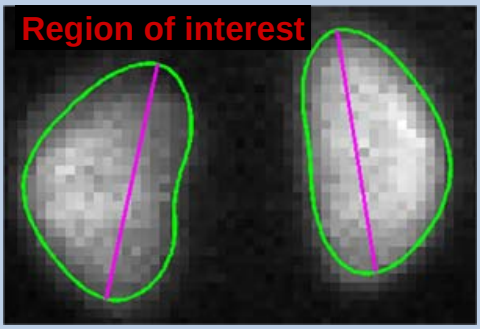
Aim: To develop a method for automated quantitative analysis of DMSA images and to establish reference values for renal length in children up to 14 years of age.

Material & Method: 203 patients, 1 month to 16 years of age were studied retrospectively. The delineation of the kidneys by the automated method was analysed by two experienced technologists and the quantitative results were compared to those of a manual method. 97 DMSA scans were interpreted as normal and these cases were used to establish reference values for renal length in relation to age.

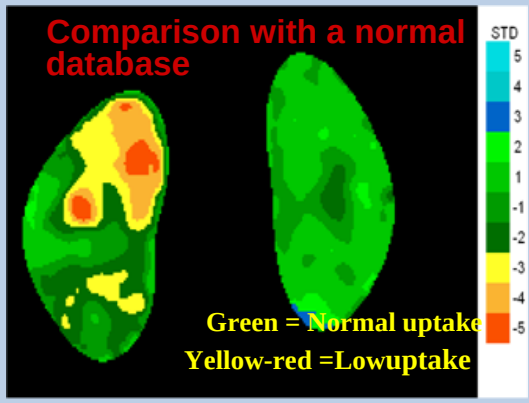
Motion correction: Applied to raw images acquired in dynamic mode. Left image shows summed image without and right image with the use of motion correction.

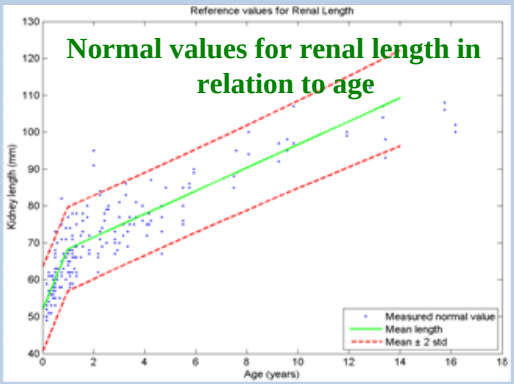






After detection and delineation of the kidneys renal regions of interest ”ROI” are applied for the calculation of relative uptake and renal length.





Results: The automated method successfully analyzed 94% of the cases and showed in these cases a good correlation with the manual method for relative function (r=0.94) and renal length (r=0.99).

Conclusion: Our new automated method was able to quantify DMSA images and create reference values for renal length in ranges that are in agreement with previous studies based on manual methods.

Regression algorithm for the first year of life was
renal length (mm) = 51 + 1.5 x age (months).
In children 1-14 year years it was
renal length (mm) = 66 + 3.3 x age (years).

LUND UNIVERSITY
Faculty of Medicine

NUMEMA
NUCLEAR MEDICINE IN MALMÖ