



Computer Aided-Detection of sacroiliitis on MRI with Dynamika: pilot study



Strouhal P¹, Roettger D², Hagoug R², Kubassova O²

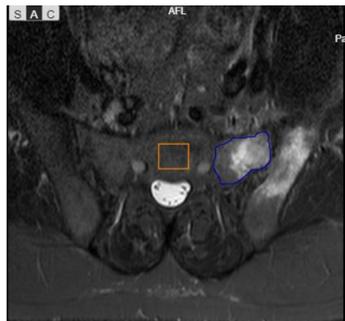
1. Royal Wolverhampton NHS Trust
2. Image Analysis, 272-274 Vauxhall Bridge Rd, London, SW1V 1BA; www.imageanalysis.org.uk

AIMS

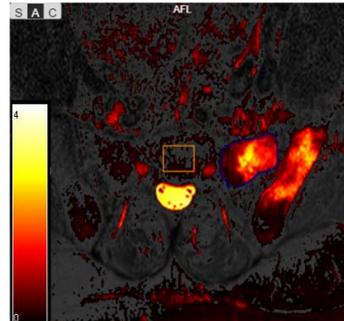
Sacroiliitis is difficult to diagnose and harder still to quantify or monitor in response to disease. Dynamika is a stand-alone, cloud-based software using complex algorithms to allow real-time, user-defined analysis of regions of interest (ROI) in 3D and allows quantification of signal intensity (and/or contrast enhancement) apparent within regions of interest on scans. The ROI evaluation technique in its simplest guise was used to evaluate isotope imaging as proof of principle but we aim to show similar/better success with this software on STIR MR images.

CONTENT

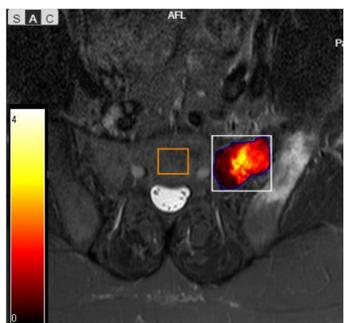
50 MRI and 30 bone scans were analysed to evaluate initial validity of this software, including some follow-up imaging - giving insight into how disease monitoring could be undertaken. Dynamika analysis was benchmarked in bone scans against standard peak-trough algorithm analysis.



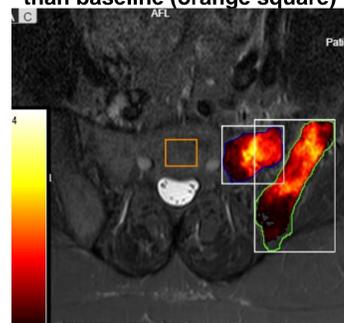
MRI STIR



Normal map highlighting pixels with intensities higher than baseline (orange square)



Visual assessment of SIJ ROI intensities and comparison to baseline



SIJ ROI quantification: Norml-based ROI statistics (volume and intensity) available in Dynamika software

IMPACT

Potential to diagnose and grade disease and also monitor response with MRI, as well as show its superiority compared with bone scanning - though show utility of the software with bone scans also.

OUTCOMES

	Positive	Negative	Total
Bone scan	5	25	30
MRI scan (visual)	13	37	50
MRI (+Dynamika)	21	29	50
Clinical picture	19	31	50

QUANTITATIVE ASSESSMENT

	“Positivity” of result: visual v ‘score’
Score rating	Mild/ Moderate/ Severe
MRI result	11 mild; 1 moderate; 1 severe
MRI Dynamika outcome	7 mild; 7 moderate, 7 severe
Dynamika clinical correlation	2 false positive, no false negative: 100% sens; 94% spec; NPV 100%

DISCUSSION

Needs validating in bigger studies but initial results of Dynamika software are promising and simple to reproduce in evaluating sacroiliitis, with some correlation between results and the clinical scenario in a way not applicable to bone scintigraphy without the penalty of ionising radiation or contrast administration.