Figure 1: a) Histogram showing grey scale frequency distribution for the mouse tibia acquired on instrument 1 for the whole dataset volume using the parameters given in Table 1. P1, 2 & 3 represent the peaks for air, bone and titanium in the reconstructed volume. b) Un-thresholded orthoslice of the reconstructed volume through the tibia, Region 1 is a magnified image of the femoral neck section of the femoral head, while Region 2 shows the fine trabecular structure of the fovea capitis of the femoral head. c) Thresholded volume using the histogram minima method – the threshold range is shown in Figure 1a. d) Thresholded volume using the midpoint between peaks on the histogram – the thresholded range in shown in Figure 1a. e) The bone material thresholded using a locally adaptive technique (see main text).
Figure 2a) Greyscale histogram for the 50kV data series collected in experiment 1 (Table 1); the greyscale peak shown corresponds to the bone material (region B in Figure 1). b) Voxel count variation (the difference in the number of voxels calculated compared to the first data set at time zero) due to greyscale changes for repeated scans at detector projection acquisition rates of 0.5, 1.0 and 2.0 seconds using the static minima based thresholding method (experiment 1).
Figure 3a: Greyscale variations as a function of accelerating voltage for system 1, b) Voxel count variation due to peak shifting for repeated scans at different accelerating voltages (Experiment 2 – table 2) using the static minima based thresholding method.
Figure 4: Voxel count variation due to peak shifting for control scans (Experiment 3) using the static minima based thresholding method. New reference images were applied to scans after 24 hours.
Figure 5: Voxel count variation for the 50kV scan conducted on the XRD 1621 AN3 CT grade detector using the three different thresholding techniques. The static thresholding technique used a threshold range (as shown in Figure 1a) determined from the first scan at time zero, this threshold range was then applied to subsequent scans. The variable minima range used a threshold range as described in Figure 1a, however this was recalculated for each data set. The variable centre threshold was based upon the central points between the air and bone and then the bone and titanium peaks in order to determine the threshold range. The variable centre threshold was then applied to subsequent datasets.