INTRODUCTION: Breast cancer is the most common cancer among women in the United States, and the skeleton is the most common site for metastatic spread of the cancer beyond the breast. Skeletal metastasis weakens the affected bone to such an extent that the bone will fracture even when subjected to forces encountered during activities of daily living. These fractures can cause considerable pain and loss of function.

RESULTS: Seven rats incurred femur fractures under normal stresses (no external forces applied). Chi-squared analysis of independence showed significant difference (p<0.05) between CONT and CAN groups. Treatment may have provided some protection against fracture, but was not statistically significant (p>0.05). Average X-ray analysis scores from two independent observers indicate progression of lytic femoral bone lesion over time (shown with standard error bars). Repeated measures ANOVA with groups (CONT, CAN, IBAN and PAC) as a between-subjects factor yielded no significance (p=0.390). Time and group (CONT, CAN, IBAN, PAC) had no effect on DEXA generated BMC at metaphysis or diaphysis (Repeated Measures ANOVA, p=0.40).

DISCUSSION: QCT structural analysis tracks changes in bone structure as a function of time and location. Analysis is sensitive to changes induced by tumor progression and/or regression in response to treatment. DXA and plain radiographs are unable to quantify treatment or healing response. The fracture healing response observed in the cancer animals has been observed clinically. Fracture callus with concomitant periosteal expansion associated with the fracture callus [Figure 1]. EI rigidity increased to at least to that of the contralateral side because of the periosteal expansion associated with the fracture callus [Figure 1]. EI rigidity dropped 30% at the site of the lesion by week 4. After treatment, by week 8 the rigidity at the lesion increased to that of the contralateral side. The lesion visible at week 4 is not visible at week 8 radiographically [Figure 2].