

Dimmen S, Nordsletten L, Engebretsen L, Steen H, Madsen JE. Negative effect of parecoxib on bone mineral during fracture healing in rats. *Acta Orthop.* 2008;79:438-44.

The problem stated in the article is that Cox-2 specific inhibitors are used to treat pain in patients with fractures, but may cause problems in fracture healing because cox-2 is required for intramembranous and endochondral bone formation after fracture. The purpose of the study was to investigate the effects of parecoxib, a cox-2 specific inhibitor, on fracture healing. The study used 52 adult female rats and split them into 2 groups, a control and an experimental group. The right tibia was fractured midshaft by fracture forceps on all rats. The rats in the experimental group were given 0.05mg/100g body weight of parecoxib intraperitoneally in the morning and in the evening for 7 days. The rats in the control group followed the same protocol but were injected with saline intraperitoneally instead of parecoxib. At 2, 3, and 6 weeks after fracture bone mineral density was measured using the dual energy x-ray absorptiometry. The BMD was taken twice at each time during measuring and the average BMD was calculated. After 6 weeks the remaining rats were mechanically tested using an MTS machine until fracture measuring ultimate bending moment, ultimate energy absorption, bending stiffness and deflection. On each animal the left and right tibia were fractured to compare the affected and non-affected bone. Statistacl analysis included an unpaired t test with a Bonferroni adjustment and a significance level of .05. At the end of the study because of complications only 30 rats were used for the testing at 6 weeks and for the mechanical testing. The results found that at each time point the parecoxib group had less BMD compared to the control group, but the differences became less with time. At 2 weeks there was a 22% reduction in BMD in the parecoxib group. At 3 weeks there was a 11% reduction in BMD in the parecoxib group and at 6 weeks there was a 9% reduction in BMD in the parecoxib group. There were no significant differences in mechanical testing at 6 weeks between control and experimental group. 2 non union fractures were still present in 2 rats in the parecoxib group at 6 weeks. There was a 16% decrease in bending moment, 18% decrease in total energy to fracture, 22% decrease in stiffness, and a 44% increase in deflection from control to experimental group, although none of these results were significant.

Using the AAOS the level of evidence of this article was graded as a level 3 study, since it is an animal study and it has some problems with its power. Using the SORT the strength of recommendation for this article was graded as a C because it is an animal study.

The clinical relevance taken from this study is not that applicable since the study was done on rats and not on humans. Some application could be taken as athletic trainers should be weary of athletes with fractures taking NSAIDs and in specific Cox 2 specific inhibitors, since the study suggests that BMD decreases in fracture healing when the rats were on parecoxib. The patients should be educated about the use of any drugs after a fracture. Even though the study was done on rats, drugs are taken after fractures to predominantly deal with decreasing pain. Pain can be decreased using acetaminophen and other non-NSAIDs that do not affect Cox-2. Patients should be educated on the possible effects of NSAIDs on their fracture healing.