

## Impact of Non Steroidal Anti-inflammatory Drug Administration Pre- or Post-resistance Training on Bone

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### ABSTRACT

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) have been shown to suppress bone formation when administered before, but not if administered after, an acute bout of mechanical load. The effects of giving NSAIDs pre- and post-resistance training over multiple training sessions are not yet well defined. Therefore, the aim of this study was to elucidate the effects of NSAIDs when administered pre and post simulated resistance training (SRT) in a small animal model. We hypothesize that gains in bone mass and increased bone size will be diminished in adult rats given ibuprofen before each training session, but will be enhanced if ibuprofen is given after each exercise bout. Methods: Fifteen 5-month-old virgin female Sprague-Dawley rats completed 9 SRT sessions at 75% peak isometric strength for 4 sets of 5 repetitions; each contraction included 1 sec isometric + 1 sec eccentric contraction. Animals were blocked assigned by body weight to one of three groups: (1) ibuprofen (30mg/kg) before exercise, placebo after (I:P)(n=4), (2) placebo before exercise, ibuprofen after (P:I)(n=5) and (3) placebo before exercise, placebo after (P:P)(n=6). In vivo pQCT scans measured changes in total volumetric bone mineral density (vBMD), cancellous vBMD, and total area at the proximal tibia, and cortical vBMD, cortical bone mineral content (BMC) and total area at midshaft tibia from days -7 and 21. Body weights were measured at days 4, 14 and 21. Results: There were no significant changes in body weight over the course of the study (P:P -2.6%, I:P -2.3% & P:I -3.8%, day 21 vs day 4). Furthermore, there was no significant difference across time in midshaft cortical vBMD, but the P:I group did exhibit a significantly different response in cortical vBMD when normalized to body weight (+5.1%) ( $p < .05$ ) compared to I:P (-1.4%) and P:P (-0.3%). There were no differences among groups for change in cancellous vBMD, total vBMD and total area at the proximal region, as well as cortical BMC and total area at midshaft tibia. Conclusion: These data are preliminary but suggest that ibuprofen given after exercise may produce additional gains in cortical bone following resistance training; we have no evidence thus far that ibuprofen taken before exercise has any effect.

