

## Further Evidence that Botox® Injections Cause Bone Loss in the Jaw

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An article published online in the journal *Bone*<sup>1</sup> by a team of French investigators confirms that injecting Botox® into jaw muscles leads to significant bone loss in adult rats. Two jaw-closing muscles—the right masseter and right temporalis, were treated, and the rats were compared with control animals that had salt solution (saline) injected into the same muscles. The authors were primarily interested in the mandible and whether it would lose bone when these muscles were injected with Botox®, which is a neurotoxin that causes temporary muscle paralysis. (This is similar to the bone loss experienced by astronauts in spaceflight conditions because bone is not subject to normal gravitational forces.) The Botox® rats evidently had some trouble chewing, because they lost a little weight, whereas the saline animals gained during the study.

The mandibles were examined in detail one month after the Botox® or saline injections. Saline injection had no effect, with right and left sides of the mandible the same in all measurements. The uninjected left sides of the Botox® rats remained in the normal range, but on the injected right sides, substantial bone loss occurred. About 20% of bone was lost from a part of the mandible that supports the teeth while 35% was lost from the head of the mandible (the condyle). It is particularly striking that the loss was so rapid, taking place in only 4 weeks. Another finding of interest was that on the Botox® side, a lump of bony tissue formed where another muscle (the digastric) attaches to the mandible. The authors speculate that the digastric had become overactive in an attempt to compensate for the paralyzed muscles.

The authors point out that if bone losses of this scope occur in the human mandible after Botox® treatment, patients might be at serious risk of jaw fractures.

With this paper, mandibular bone loss (osteopenia) following Botox® injection into jaw muscles has now been demonstrated in two different animal species. A previous study on rabbits (Rafferty et al. *Bone* 50:651-662, 2012) also showed extensive bone loss in both the condyle and tooth-supporting region one month after masseter injection. That study also showed that the condyles were still osteopenic after a 3-month recovery period, and it is not clear whether full recovery ever takes place. This confirmation of bone loss in an unrelated mammal (rabbits are not rodents) strongly implies that the phenomenon must affect humans as well. [A preliminary study \(Raphael et al., 2014\) in which members of the TMJ Association participated indicated that humans do indeed lose condylar bone after Botox® treatment of the jaw muscles.](#) Patients and practitioners need to be aware that jaw muscle activity is an important element of jaw bone health, and that removing muscle activity with paralytic agents like Botox® has a deleterious effect.

Reference:

<sup>1</sup>[Kun-Darbois, J.-D., Libouban, H., Chappard, D. Botulinum toxin in masticatory muscles of the adult rat induces bone loss at the condyle and alveolar regions of the mandible associated with a bone proliferation at a muscle enthesis. Bone 77: 75-82, 2015 Aug.](#)