

The Effects of Antiepileptic Drugs on Bone Health: A Systematic Review

INTRODUCTION: Epilepsy may be treated with antiepileptic drugs (AEDs), which have been reported to decrease bone mineral density (BMD). Current data is conflicting with regard to how AED duration or specific AEDs, such as CYP-450 enzyme-inducing (EIAEDs) versus non-enzyme inducing (NEIAEDs) drugs affect BMD.

METHODS: PubMed, EMBASE, and Cochrane databases were queried for peer-reviewed articles reporting on BMD measurements and AEDs. Included studies were limited to cross-sectional, prospective, and randomized controlled designs. They were broken down into English language, human data, and outcome measure of BMD articles. Additional inclusive studies accounted for patient age and antiepileptic therapy. The final exclusion and inclusion criteria were fulfilled by 26 studies, for a total of 10,263 patients. Data was systematically reviewed in terms of BMD reduction with AED type and class, BMD reduction with AED treatment density and duration, and AED-induced changes in biochemical markers of bone metabolism.

RESULTS: Long-term therapy was shown across multiple well-controlled studies to have the most significant BMD loss. The AED, carbamazepine, had the most frequent reporting of unfavorable effects on bone health while lamotrigine seemed to show the most bone-protective qualities. Serum biochemical markers of bone turnover did not significantly correlate with measured BMD changes.

DISCUSSION: This present study provides evidence that long-term AED therapy is the most significant risk factor for BMD loss. Furthermore, there was little compelling evidence to support that EIAEDs, as a class, were more harmful to bone than NEIAEDs, which has been previously suggested in multiple studies. Early clinical concern for significant loss of BMD may not be warranted as lower BMD was less likely to be observed during the initial years of AED therapy. Furthermore, serum markers of bone turnover are not clinically reliable in assessing BMD changes in patients taking AEDs.