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**Impact of different anti-hyperglycaemic treatments on bone turnover markers and bone mineral density in type 2 diabetes mellitus patients: A systematic review and meta-analysis****Sadman Sakib Saadi**

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Diabetic bone disease (DBD) is a frequent complication in patients with type 2 diabetes mellitus (T2DM), characterised by altered bone mineral density (BMD) and bone turnover marker (BTMs) levels. The impact of different anti-diabetic medications on the skeleton remains unclear, and studies have reported conflicting results; thus, the need for a comprehensive systematic review is of paramount importance. A systematic search was conducted in PubMed and the Cochrane Library. The primary outcomes assessed were changes in BMD in relation to different anatomical sites and BTMs, including mainly P1NP and CTX as well as OPG, OCN, B-ALP and RANK-L. Risk of bias was evaluated using the JADAD score. The meta-analysis of 19 randomised controlled trials comprising 4914 patients showed that anti-diabetic medications overall increased BMD at the lumbar spine (SMD: 0.93, 95% CI [0.13, 1.73],  $p = 0.02$ ), femoral neck (SMD: 1.10, 95% CI [0.47, 1.74],  $p = 0.0007$ ) and in total hip (SMD: 0.33, 95% CI [-0.25, 0.92],  $p = 0.27$ ) in comparison with placebo, but when compared with metformin, the overall effect favoured metformin over other treatments (SMD: -0.23, 95% CI [-0.39, -0.07],  $p = 0.004$ ). GLP-1 receptor agonists and insulin analogues seem to improve BMD compared to placebo, while SGLT2 inhibitors and thiazolidinediones (TZDs) showed no significant effect, although studies' number cannot lead to safe conclusions. For BTMs, TZDs significantly increased P1NP levels compared to placebo. However, no significant differences were observed for CTX, B-ALP, OCN, OPG, and RANK-L between anti-diabetic drugs and metformin or placebo. High heterogeneity and diverse follow-up durations among studies were evident, which obscures the validity of the results. This review highlights the variable effects of anti-diabetic drugs on DBD in T2DM patients, emphasising the need for long-term trials with robust designs to better understand these relationships and inform clinical decisions.

**Biography**

Sadman Sakib Saadi is a researcher and medical professional associated with the Lancashire Teaching Hospital NHS Trust in the United Kingdom. His work focuses on endocrinology, particularly in the context of diabetes management and its effects on bone health. Sadman has made significant contributions to understanding the impact of different anti-hyperglycaemic treatments on bone turnover markers and bone mineral density in patients with type 2 diabetes mellitus. Through his systematic reviews and meta-analyses, he provides valuable insights into how various diabetes treatments influence bone health, an area of growing importance for the long-term well-being of diabetic patients.