Fracture Risk Association with Vitamin D Levels in Pediatric Patients: A Systematic Review

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Introduction. A question often asked by physicians or caregivers when children sustain fractures is "Why did this happen?". They are searching for an intervention they can make, so that the child does not sustain additional injuries. This systematic review considers the potential for vitamin D deficiency to increase the risk of fractures in children, the global incidence of which is increasing.

Methods. PubMed and Embase were systematically searched by two independent reviewers for case-control studies comparing the vitamin D levels of children (aged 0-18) with fractures to those of controls without fracture. Included articles were systematically reviewed and their conclusions synthesized according to a defined composite outcome measure and by structured summary.

Results. Twenty studies were included in the review. Eleven studies, including significantly more subjects (4,101) met the composite outcome measure, indicating a relationship between low vitamin D and fracture. Nine studies, including significantly fewer subjects (2,639), failed to meet the composite measure ($p < 0.001$). Secondary analysis included significantly more subjects in studies demonstrating a difference in mean vitamin D between fracture patients and control than those finding no mean difference ($p < 0.001$).

Conclusions. There is potentially a relationship between lower vitamin D and increased risk of fracture in children. The mean serum vitamin D of fracture patients may be lower than that of children without fracture. The review is limited by heterogeneity of the available data and the low level of evidence provided by case-control studies. Additional prospective studies are required to validate findings.