

## Publication

### Automated HPLC assay for urinary collagen cross-links: effect of age, menopause, and metabolic bone diseases

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**BACKGROUND:** The pyridinium cross-links pyridinoline (PYD) and deoxypyridinoline (DPD) are established markers of bone resorption. We evaluated the analytical and clinical performance of a commercially available PYD HPLC assay and established reference intervals in children and adults. **METHODS:** We used a commercially available reagent set (Chromsystems Instruments ; Chemicals) to measure PYD and DPD in 319 healthy controls (156 premenopausal women, 80 healthy men, and 83 healthy children age 1 month to 14 years) and 397 patients with metabolic bone diseases (postmenopausal osteoporosis, n = 175; male osteoporosis, n = 176; hyperparathyroidism, n = 17; hyperthyroidism, n = 19; Paget disease, n = 10). **RESULTS:** The mean intraassay and interassay CVs were >6% and >8% for both PYD and DPD, respectively. The reference interval was constant for premenopausal women in the age group 20-49 years. In men, cross-link values peaked at 20-29 years and decreased thereafter. Women with postmenopausal osteoporosis had significantly higher PYD (51%) and DPD (58%) values compared to premenopausal women. Similar results were found in osteoporotic men. In children the highest values were found in the first weeks and months after birth, followed by a decrease of 50%-60% at age 11-14 years. In metabolic bone diseases cross-link concentrations were significantly increased. The DPD:PYD ratio (mean value approximately 0.2) was remarkably constant in all populations evaluated. **CONCLUSIONS:** The automated HPLC assay is a precise and convenient method for PYD and DPD measurement. We established reference intervals for adult women and men and for children up to 14 years old. The cross-link concentrations we determined by use of this HPLC method confirm its clinical value in enabling identification of increased bone resorption in patients with metabolic bone diseases.

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