Free Deoxypyridinoline (fDPD)/Creatinine ratio	
Description	Urinary marker of bone resorption. Usually measured along with free Pyridinoline (fPYD)/Creatinine(Creat) ratio.
Indication	Bone resorption assessment (osteoporosis, Paget's disease of bone, Vitamin D deficiency, hyperparathyroidism, corticosteroid therapy, etc).However, plasma ß-CTX preferred as a routine test for the above conditions. Diagnosis of Ehlers Danlos syndrome TypeVI
Additional Info	fDPD and fPYD are released from Type I collagen, which is present mainly in bone. The majority of urine fDPD and fPYD are derived from bone matrix degradation and thus are relatively specific markers of bone resorption. They are excreted in the urine and elevated levels correlate with increased bone resorption. In contrast, when bone resorption is inhibited by bisphosphonate, oestrogen, or calcitonin therapy, the excretion of fDPD and fPYD is decreased.
Concurrent Tests	fPYD
Dietary Requirements	Early morning urine(EMU) - Ideally Fasting sample 24 hour urine-no dietary restrictions
Interpretation	fDPD/Creat and fPYD/Creat ratios are increased above the reference range in conditions resulting in increased osteoclast activity : osteoporosis , Paget's disease of bone, metastatic cancer, hyperparathyroidism, osteomalacia, thyrotoxicosis immobilisation, fracture and several inflammatory conditions. The main application for fDPD/Creat and fPYD/Creat is in assessing and monitoring response to osteoclast inhibitory treatment (mainly bisphosphonates) in osteoporosis and Paget's disease of bone. A baseline pre-treatment measurement is required if assessing response to anti-resorptive therapy. A decrease >30% in value obtained pre-treatment is indicative of a good response in osteoporosis. Normalisation of fDPD and fPYD is the ultimate goal when treating Paget's disease of bone. In Ehlers Danlos Type VI there is increased secretion of fDPD but fPYD is unchanged or low such that the ratio of fPYD/fDPD is abnormal.
Collection Conditions	24 hour samples preferred however EMU samples also acceptable. Samples should be protected from direct sunlight. **EMU samples**: a fasting second void urine should be collected into a sterile universal container with no preservative between 08:00 and 10:00. Minimum sample requirement - 10 mL. **24 hour urine samples:** should be collected into a clean 2.5 litre container(s). **Samples from other hospitals :** Send by first class post avoiding weekends.

Frequency of testing	Usually 1-2 times per year. More frequent testing rarely required.

Investigation : **Deoxypyridinoline (free)/ Creatinine ratio**
Specimen type : **Urine**

Spec container : **24 hour urine bottle - plain , no preservative or**
EMU universal container – plain , no preservative

Volume required : **EMU - Min 10 ml**
24 urine- all urine passed over 24 hours

Turnaround : **<28 days**

Reference interval

	free Pyridinoline\Creatinine Ratio		free Deoxypyridinoline\Creatinine Ratio	
	Reference Range	**Units**	**Reference Range**	**Units**
Male	5.0 - 21.8	nmol/mmol	0.4 - 6.4	nmol/mmol
Pre-menopausal	7.8 - 21.2	nmol/mmol	1.8 - 6.7	nmol/mmol
Post-menopausal	7.1 - 31.8	nmol/mmol	1.5 - 8.6	nmol/mmol

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Clinical Use*: Free PYR and DPD are normally excreted in the urine, and larger quantities are excreted when bone resorption is increased. In contrast, when bone resorption is inhibited by bisphosphonate, oestrogen, or calcitonin therapy, the excretion of fPYR and fDPD is decreased. All available data indicate that fPYR and fDPD derive only from bone matrix degradation and thus are markers of bone resorption, not bone formation. The assay for pyridinium collagen cross-links is useful as a sensitive and specific marker in the diagnosis and management of bone loss in osteoporosis. The cross-links assay is also useful in measuring bone resorption in other metabolic bone diseases such as primary hyperparathyroidism and Paget's disease.*

Patient preparation*: fPYD and fDPD have a marked circadian rhythmn, with highest values seen between 02:00 and 08:00 and reaching a nadir between 14:00 and 23:00. A fasting second void urine should be collected between 08:00 and 10:00 and the result reported*

corrected for urine creatinine. A baseline pre-treatment measurement is required if assessing response to antiresorption therapy.

***Sample requirements**: Collect urine in a sterile universal container with no preservative. Send by first class post avoiding weekends. Minimum sample requirement - 10 ml urine.*