99mTc-Phosphonate Compounds The rationale for using phosphonate compounds for bone scanning lies in the composition of the bone matrix containing calcium phosphate that can be exchanged with phosphonate compounds.It does not appear to bind to plasma proteins and therefore the plasma clearance is very rapid with two components having half-times of 0.4 and 2.6 h. Its urinary excretion is of the order of 20% in 2 h after injection in normal subjects.About 10% of the injected dosage remains in the blood at 1 h post-injection and less than 1% at 24 h. Urinary excretion is 50% and the remaining 50% is retained by the skeleton in 24 h. Approximately 10-20 mCi (370-740 MBq) 99mTc-MDP or 99mTc-HDP is injected intravenously and scanning is performed with the patient supine 2-3 h after injection.In the hydroxyapatite uptake theory, it has been suggested that hydroxyapatite crystal removes the phosphonate component successfully from 99mTc-phosphate complexes, thus setting the reduced technetium free to bind independently to hydroxyapatite at another binding site.To distinguish between cellulitis and osteomyelitis in the distal extremities, three-phase bone images (flow, blood pool, and bone uptake) are obtained by giving a bolus injection of 30 mCi (1.11 GBq) 99mTc-MDP.18F-Sodium Fluoride 18F-Sodium Fluoride (18F-NaF) was approved for bone imaging in 1972, but with the introduction of 99mTc-phosphonate compounds, it was discontinued in mid-1970s because of its high-energy photons unsuitable for scintigraphic imaging.In the collagen uptake theory, it has been suggested that 99mTc-phosphonate complexes localize in both inorganic and organic matrices of bone, the latter uptake depending on the amount of immature collagen present.Following IV administration of 18F-NaF, 18F rapidly equilibrates in the extracellular space and then is cleared by bone deposition and urinary excre- tion.Static spot images are obtained with a single-head camera, whereas both anterior and posterior scans are obtained simultaneously using a dual-head whole-body camera.Due to hyperemia in cellulitis, the tracer localizes in both the flow and blood pool phases, but disappears in the delayed .bone uptake phase

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