

# INNER SPACES Edited by Dr. Bhavin Jankharia

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Unfolded Rib View -by Dr. Nidhi Doshi Bhansali, Dr Parang Sanghavi

Volumetric Computed Tomography (CT) supplemented with multiplanar reconstructions is the most useful modality for evaluation of any rib or thoracic cage pathology. However counting and tracking each rib individually to localize pathology on standard axial or reformatted views requires multiple 'back and forth' scrolls, which is both tedious and time consuming in the emergency setting or any busy radiology practice.

The Syngo CT Bone Reading application is one of the several Machine Learning based applications that have found utility in the field of radiology.. The software automatically identifies all the voxels in a volumetric CT data set that represent bony structures which are subsequently formatted, labelled and unfolded into a planar straightened view (Fig 1). This unfolded view and automated numbering of ribs and vertebrae enables visualisation of all these structures in a single frame and thus efficient detection and localisation of abnormalities (Fig. 2). When there is multifocal involvement (e.g. polytrauma, infection or metastases), simultaneous depiction of all the areas of interest accelerates interpretation and reporting (Fig. 3). Abnormalities identified on the unfolded view can also be cross referenced to the corresponding standard multiplanar images (Figs 1-3).

Mis-numbering or mis-registration of the ribs may occur when there are anatomic variations, supernumerary or bifid ribs, scoliosis, crowding of ribs and beam hardening or motion artefacts. However manual correction and correlation with standard views help prevent misinterpretation.



Fig 1 (A-C): Fracture. 45-years old lady with a history of trauma and chest pain. A linear non-displaced fracture of the right 9th rib is seen on the axial (A) and coronal (B) images. This fracture is apparent on the unfolded rib view (C) which gives added advantage of simultaneously screening all other ribs as well for additional fractures, if any (not present in this case).

## Unfolded Rib View



## At a glance:

Unfolding of ribs is now possible using machine learning software
The unfolded image is automatically labelled and makes interpretation easy and quick
The unfolded rib view allows easy depiction of pathology for clinical reference



Fig 3 (A-C). Multifocal tuberculosis. 73-years old man with fever, cough and weight loss. Axial (A) and coronal (B) images show an osteolytic lesion with soft tissue component involving the right 7th. The unfolded rib view (C) shows the right 7th rib lesion as well as another similar lesion in the left 3rd rib. Thus multiple lesions can be simultaneously recognised and localised. Fig 2 (A-C): Fibrous dysplasia. 29-years old man with gradually increasing localised right chest wall pain. A mixed osteolytic-sclerotic lesion is seen involving the right 9th rib on the axial (A) and coronal (B) images. The unfolded rib view (C) shows the entire extent of involvement of the rib in a single plane.



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