

Thoracic DDR Bibliography

General Technique and Review Articles

Tanaka R. Dynamic chest radiography: flat-panel detector (FPD) based functional X-ray imaging. *Radiol Phys Technol.* 2016;9(2):139-153. doi: [10.1007/s12194-016-0361-6](https://doi.org/10.1007/s12194-016-0361-6)

Tanaka R, Sanada S, Sakuta K, Kawashima H, Kishitani Y. Low-dose dynamic chest radiography combined with bone suppression technique. ECR 2015 EPOS. Published March 4, 2015. Accessed March 31, 2021. <https://epos.myesr.org/poster/esr/ecr2015/C-0239>

Robinson R e., Mclenaghan D, Agarwal H, et al. Assessing the Inter-Operator Variability in Dynamic Chest Radiography Image Interpretation. In: A66. A SHARPER IMAGE: NOVEL IMAGING METHODOLOGIES. American Thoracic Society International Conference Abstracts. American Thoracic Society; 2020:A2344-A2344. doi:[10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2344](https://doi.org/10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2344)

Pulmonary Function

Tanaka R, Sanada S, Suzuki M, et al. Breathing chest radiography using a dynamic flat-panel detector combined with computer analysis. *Medical Physics.* 2004;31(8):2254-2262. doi:[10.1118/1.1769351](https://doi.org/10.1118/1.1769351)

Tanaka R, Samei E, Segars P, et al. Dynamic chest radiography for pulmonary function diagnosis: A validation study using 4D extended cardiac-torso (XCAT) phantom. In: *Medical Imaging 2019: Physics of Medical Imaging.* Vol 10948. International Society for Optics and Photonics; 2019:109483I. doi:[10.1117/12.2512332](https://doi.org/10.1117/12.2512332)

FitzMaurice TS, McCann C, Nazareth D, Walshaw MJ. P237 Dynamic chest radiography: a novel tool for the assessment of diaphragm palsy. *Thorax.* 2021;76(Suppl 1): A217-A217. doi:[10.1136/thorax-2020-BTSabstracts.381](https://doi.org/10.1136/thorax-2020-BTSabstracts.381)

Raghunath S, Ambrose M, Agarwal H, et al. Dynamic Chest Radiography Measured Postretoanterior Total Lung Area Correlates with FEV1 in Healthy Volunteers and COPD Patients. *European Respiratory Journal.* 2019;54(suppl 63). doi:[10.1183/13993003.congress-2019.PA3937](https://doi.org/10.1183/13993003.congress-2019.PA3937)

O'Sullivan M M., Singh A, Prime D, Moore J, Zink S. A Whole New Chest X-Ray. In: D60. Pulmonary Function And Exercise Testing And Training. American Thoracic Society International Conference Abstracts. American Thoracic Society; 2019:A6900-A6900. doi:[10.1164/ajrccm-conference.2019.199.1_MeetingAbstracts.A6900](https://doi.org/10.1164/ajrccm-conference.2019.199.1_MeetingAbstracts.A6900)

FitzMaurice TS, Mccann C, Bedi R, Nazareth D, Walshaw MJ. Assessing Diaphragm Motion Using Dynamic Chest Radiography: A Case Series. European Respiratory Journal. 2020;56(suppl 64). doi:[10.1183/13993003.congress-2020.3368](https://doi.org/10.1183/13993003.congress-2020.3368)

Ohkura N, Kasahara K, Watanabe S, et al. Assessment of Exercise Capacity and Pulmonary Function in Interstitial Lung Disease Using Dynamic Digital Radiography. In: A66. A Sharper Image: Novel Imaging Methodologies. American Thoracic Society International Conference Abstracts. American Thoracic Society; 2020:A2330-A2330. doi:[10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2330](https://doi.org/10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2330)

Ambrose M, Agarwal H, Masharani K, et al. Dynamic chest radiography measurements correlate with conventionally measured lung volumes. *European Respiratory Journal*. 2019;54(suppl 63). doi:[10.1183/13993003.congress-2019.PA796](https://doi.org/10.1183/13993003.congress-2019.PA796)

Tanaka R. Dynamic chest radiography: flat-panel detector (FPD) based functional X-ray imaging. *Radiol Phys Technol*. 2016;9(2):139-153. doi:[10.1007/s12194-016-0361-6](https://doi.org/10.1007/s12194-016-0361-6)

Hata A, Yamada Y, Tanaka R, et al. Dynamic Chest X-Ray Using a Flat-Panel Detector System: Technique and Applications. *Korean Journal of Radiology*. 2021;22(4):634-651. doi:[10.3348/kjr.2020.1136](https://doi.org/10.3348/kjr.2020.1136)

Tanaka R, Sanada S, Okazaki N, et al. Evaluation of Pulmonary Function Using Breathing Chest Radiography With a Dynamic Flat Panel Detector: Primary Results in Pulmonary Diseases. *Investigative Radiology*. 2006;41(10):735-745. doi:[10.1097/01.rli.0000236904.79265.68](https://doi.org/10.1097/01.rli.0000236904.79265.68)

Hino T, Hata A, Hida T, et al. Projected lung areas using dynamic X-ray (DXR). *European Journal of Radiology Open*. 2020;7. doi:[10.1016/j.ejro.2020.100263](https://doi.org/10.1016/j.ejro.2020.100263)

Tanaka R, Tani T, Nitta N, et al. Pulmonary function diagnosis based on diaphragm movement using dynamic flat-panel detector imaging: an animal-based study. In: Medical Imaging 2018: Biomedical Applications in Molecular, Structural, and Functional Imaging. Vol 10578. International Society for Optics and Photonics; 2018:105781V. doi:[10.1117/12.2293078](https://doi.org/10.1117/12.2293078)

Tanaka R, Tani T, Nitta N, et al. Pulmonary Function Diagnosis Based on Respiratory Changes in Lung Density With Dynamic Flat-Panel Detector Imaging: An Animal-Based Study. *Investigative Radiology*. 2018;53(7):417-423. doi:[10.1097/RLI.0000000000000457](https://doi.org/10.1097/RLI.0000000000000457)

Yamada Y, Ueyama M, Abe T, et al. Time-Resolved Quantitative Analysis of the Diaphragms During Tidal Breathing in a Standing Position Using Dynamic Chest Radiography with a Flat Panel Detector System (“Dynamic X-Ray Phrenicography”): Initial Experience in 172 Volunteers. *Academic Radiology*. 2017;24(4):393-400. doi:[10.1016/j.acra.2016.11.014](https://doi.org/10.1016/j.acra.2016.11.014)

Robinson R e., Mclenaghan D, Masharani K, et al. Quantifying the Changes Observed Throughout Respiration Using Dynamic Chest Radiography. In: A66. A Sharper Image: Novel Imaging Methodologies. American Thoracic Society International Conference Abstracts. American Thoracic Society; 2020:A2343-A2343. doi:[10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2343](https://doi.org/10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2343)

Hida T, Yamada Y, Ueyama M, et al. Time-resolved quantitative evaluation of diaphragmatic motion during forced breathing in a health screening cohort in a standing position: Dynamic chest phrenicography. *European Journal of Radiology*. 2019;113:59-65. doi:[10.1016/j.ejrad.2019.01.034](https://doi.org/10.1016/j.ejrad.2019.01.034)

COPD

Hida T, Yamada Y, Ueyama M, et al. Decreased and slower diaphragmatic motion during forced breathing in severe COPD patients: Time-resolved quantitative analysis using dynamic chest radiography with a flat panel detector system. *European Journal of Radiology*. 2019;112:28-36. doi:[10.1016/j.ejrad.2018.12.023](https://doi.org/10.1016/j.ejrad.2018.12.023)

Yamada Y, Ueyama M, Abe T, et al. Difference in diaphragmatic motion during tidal breathing in a standing position between COPD patients and normal subjects: Time-resolved quantitative evaluation using dynamic chest radiography with flat panel detector system (“dynamic X-ray phrenicography”). *European Journal of Radiology*. 2017;87:76-82. doi:[10.1016/j.ejrad.2016.12.014](https://doi.org/10.1016/j.ejrad.2016.12.014)

Prime D, Santibanez V, O Sullivan M, et al. A New Technology: The Dynamic Image of a Forced Breath Compared to a Tidal Breath Uncovers a Physiological Phenomenon in COPD. In: B64. COPD: Lung Function, Imaging and Pathophysiology. American Thoracic Society International Conference Abstracts. American Thoracic Society; 2018:A3907-A3907. doi:[10.1164/ajrccm-conference.2018.197.1_MeetingAbstracts.A3907](https://doi.org/10.1164/ajrccm-conference.2018.197.1_MeetingAbstracts.A3907)

Yamada Y, Ueyama M, Abe T, et al. Difference in the craniocaudal gradient of the maximum pixel value change rate between chronic obstructive pulmonary disease patients and normal subjects using sub-mGy dynamic chest radiography with a flat panel detector system. *European Journal of Radiology*. 2017;92:37-44. doi:[10.1016/j.ejrad.2017.04.016](https://doi.org/10.1016/j.ejrad.2017.04.016)

Ohkura N, Kasahara K, Watanabe S, et al. Dynamic-Ventilatory Digital Radiography in Air Flow Limitation: A Change in Lung Area Reflects Air Trapping. *RES*. 2020;99(5):382-388.
doi:[10.1159/000506881](https://doi.org/10.1159/000506881)

Ohkura N, Kasahara K, Tamura M, et al. Assessment of Health Status of COPD Patient Using Dynamic Digital Radiography(DDR): Correlation Between COPD Assessment Test (CAT) Score and Change Ratio of Lung Area During Deep Breathing. In: B64. COPD: Mechanism and Treatment. American Thoracic Society International Conference Abstracts. American Thoracic Society; 2019:A3858-A3858. doi:[10.1164/ajrccm-conference.2019.199.1_MeetingAbstracts.A3858](https://doi.org/10.1164/ajrccm-conference.2019.199.1_MeetingAbstracts.A3858)

FitzMaurice TS, Mccann C, Shackcloth M, et al. Using Dynamic Chest Radiography to Assess the Impact of Endobronchial Valve Treatment on Lung Volumes and Diaphragm Motion in Severe Emphysema. *European Respiratory Journal*. 2020;56(suppl 64).
doi:[10.1183/13993003.congress-2020.3362](https://doi.org/10.1183/13993003.congress-2020.3362)

Raghunath S, Ambrose M, Agarwal H, et al. Dynamic Chest Radiography Measured Postretoanterior Total Lung Area Correlates with FEV1 in Healthy Volunteers and COPD Patients. *European Respiratory Journal*. 2019;54(suppl 63). doi:[10.1183/13993003.congress-2019.PA3937](https://doi.org/10.1183/13993003.congress-2019.PA3937)

Ventilation/Perfusion

Yamasaki Y, Abe K, Hosokawa K, Kamitani T. A novel pulmonary circulation imaging using dynamic digital radiography for chronic thromboembolic pulmonary hypertension. *European Heart Journal*. 2020;41(26):2506-2506. doi:[10.1093/eurheartj/ehaa143](https://doi.org/10.1093/eurheartj/ehaa143)

Tanaka R, Sanada S, Oda M, et al. “Circulation map” projected on functional chest radiography with a dynamic FPD. ECR 2013 EPOS. Published March 7, 2013. Accessed March 31, 2021. <https://epos.myesr.org/poster/esr/ecr2013/C-0279>

Tanaka R, Matsumoto I, Tamura M, et al. Comparison of dynamic flat-panel detector-based chest radiography with nuclear medicine ventilation-perfusion imaging for the evaluation of pulmonary function: A clinical validation study. *Medical Physics*. 2020;47(10):4800-4809.
doi:<https://doi.org/10.1002/mp.14407>

Tanaka R, Sanada S, Okazaki N, et al. Detectability of Regional Lung Ventilation with Flat-panel Detector-based Dynamic Radiography. *J Digit Imaging*. 2007;21(1):109.
doi:[10.1007/s10278-007-9017-8](https://doi.org/10.1007/s10278-007-9017-8)

Tanaka R, Tani T, Nitta N, et al. Detection of Pulmonary Embolism Based on Reduced Changes in Radiographic Lung Density During Cardiac Beating Using Dynamic Flat-panel Detector: An Animal-based Study. *Academic Radiology*. 2019;26(10):1301-1308.

doi:[10.1016/j.acra.2018.12.012](https://doi.org/10.1016/j.acra.2018.12.012)

Miyatake H, Tabata T, Tsujita Y, Fujino K, Tanaka R, Eguchi Y. Detection of Pulmonary Embolism Using a Novel Dynamic Flat-Panel Detector System in Monkeys. *Circulation Journal*. 2021;85(4):361-368. doi:[10.1253/circj.CJ-20-0835](https://doi.org/10.1253/circj.CJ-20-0835)

Tanaka R, Sanada S, Fujimura M, et al. Development of pulmonary blood flow evaluation method with a dynamic flat-panel detector: quantitative correlation analysis with findings on perfusion scan. *Radiol Phys Technol*. 2010;3(1):40-45. doi:[10.1007/s12194-009-0074-1](https://doi.org/10.1007/s12194-009-0074-1)

Tanaka R, Sanada S, Fujimura M, et al. Dynamic chest radiography with a flat-panel detector (FPD): ventilation-perfusion study. In: *Medical Imaging 2011: Biomedical Applications in Molecular, Structural, and Functional Imaging*. Vol 7965. International Society for Optics and Photonics; 2011:79651Y. doi:[10.1117/12.877603](https://doi.org/10.1117/12.877603)

Tanaka R, Sanada S, Fujimura M, et al. Pulmonary blood flow evaluation using a dynamic flat-panel detector: feasibility study with pulmonary diseases. *Int J CARS*. 2009;4(5):449-455. doi:[10.1007/s11548-009-0364-4](https://doi.org/10.1007/s11548-009-0364-4)

Yamamoto S, Hasebe T, Tomita K, et al. Pulmonary perfusion by chest digital dynamic radiography: Comparison between breath-holding and deep-breathing acquisition. *Journal of Applied Clinical Medical Physics*. 2020;21(11):247-255. doi:<https://doi.org/10.1002/acm2.13071>

Yamasaki Y, Hosokawa K, Tsutsui H, Ishigami K. Pulmonary ventilation-perfusion mismatch demonstrated by dynamic chest radiography in giant cell arteritis. *European Heart Journal*. 2021;42(2):208-209. doi:[10.1093/eurheartj/ehaa443](https://doi.org/10.1093/eurheartj/ehaa443)

Tanaka R, Sanada S, M.d NO, et al. Quantification and visualization of relative local ventilation on dynamic chest radiographs. In: *Medical Imaging 2006: Physiology, Function, and Structure from Medical Images*. Vol 6143. International Society for Optics and Photonics; 2006:61432Y. doi:[10.1117/12.652646](https://doi.org/10.1117/12.652646)

Tanaka R, Sanada S, Fujimura M, et al. Ventilatory impairment detection based on distribution of respiratory-induced changes in pixel values in dynamic chest radiography: a feasibility study. *Int J CARS*. 2011;6(1):103-110. doi:[10.1007/s11548-010-0491-y](https://doi.org/10.1007/s11548-010-0491-y)

Hanaoka J, Yoden M, Hayashi K, et al. Dynamic perfusion digital radiography for predicting pulmonary function after lung cancer resection. *World Journal of Surgical Oncology*. 2021;19(1):43. doi:[10.1186/s12957-021-02158-w](https://doi.org/10.1186/s12957-021-02158-w)

ILD

Ohkura N, Kasahara K, Watanabe S, et al. Assessment of Exercise Capacity and Pulmonary Function in Interstitial Lung Disease Using Dynamic Digital Radiography. In: A66. A Sharper Image: Novel Imaging Methodologies. American Thoracic Society; 2020:A2330-A2330.
doi:[10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2330](https://doi.org/10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A2330)

Therapy/Intervention Planning or Follow-up

Tanaka R, Samei E, Segars WP, et al. Assessment of pleural invasion and adhesion of lung tumors with dynamic chest radiography: A virtual clinical imaging study. *Medical Physics*. n/a(n/a). doi:<https://doi.org/10.1002/mp.14750>

Tamura M, Matsumoto I, Saito D, et al. Dynamic chest radiography: Novel and less-invasive imaging approach for preoperative assessments of pleural invasion and adhesion. *Radiology Case Reports*. 2020;15(6):702-704. doi:[10.1016/j.radcr.2020.02.019](https://doi.org/10.1016/j.radcr.2020.02.019)

Hanaoka J, Yoden M, Hayashi K, et al. Dynamic perfusion digital radiography for predicting pulmonary function after lung cancer resection. *World Journal of Surgical Oncology*. 2021;19(1):43. doi:[10.1186/s12957-021-02158-w](https://doi.org/10.1186/s12957-021-02158-w)

Tanaka R, Samei E, Segars WP, et al. Prediction of pleural invasion of lung cancer with dynamic chest radiography: a simulation study. In: *Medical Imaging 2020: Physics of Medical Imaging*. Vol 11312. International Society for Optics and Photonics; 2020:113122Z.
doi:[10.1117/12.2547464](https://doi.org/10.1117/12.2547464)

FitzMaurice TS, Mccann C, Shackcloth M, et al. Using Dynamic Chest Radiography to Assess the Impact of Endobronchial Valve Treatment on Lung Volumes and Diaphragm Motion in Severe Emphysema. *European Respiratory Journal*. 2020;56(suppl 64).
doi:[10.1183/13993003.congress-2020.3362](https://doi.org/10.1183/13993003.congress-2020.3362)

Trachea Function

Watase S, Sonoda A, Matsutani N, et al. Evaluation of intrathoracic tracheal narrowing in patients with obstructive ventilatory impairment using dynamic chest radiography: A preliminary study. *European Journal of Radiology*. 2020;129. doi:[10.1016/j.ejrad.2020.109141](https://doi.org/10.1016/j.ejrad.2020.109141)

Cardiac

Tanaka R, Sanada S, Tsujioka K, Matsui T, Takata T, Matsui O. Development of a cardiac evaluation method using a dynamic flat-panel detector (FPD) system: a feasibility study using a cardiac motion phantom. *Radiol Phys Technol*. 2008;1(1):27-32. doi:[10.1007/s12194-007-0003-0](https://doi.org/10.1007/s12194-007-0003-0)

Cystic Fibrosis

FitzMaurice TS, McNamara PS, Nazareth D, et al. Utility and validity of dynamic chest radiography in cystic fibrosis (dynamic CF): an observational, non-controlled, non-randomised, single-centre, prospective study. *BMJ Open Respiratory Research*. 2020;7(1):e000569. doi:[10.1136/bmjresp-2020-000569](https://doi.org/10.1136/bmjresp-2020-000569)

Fitzmaurice, Thomas & Bedi, R. & Hawkes, Scott & Peat, Rob & Lomax, S. & McCann, C. & Nazareth, Dilip & Walshaw, M.. (2020). S04.6 Dynamic Chest Radiography (DCR) in cystic fibrosis: initial experience. *Journal of Cystic Fibrosis*. 19. S8. doi:[10.1016/S1569-1993\(20\)30188-0](https://doi.org/10.1016/S1569-1993(20)30188-0).

AI and Advanced Image Processing Techniques

Matsuda H, Tanaka R, Sanada S. Computerized method to compensate for breathing body motion in dynamic chest radiographs. In: Medical Imaging 2017: Biomedical Applications in Molecular, Structural, and Functional Imaging. Vol 10137. International Society for Optics and Photonics; 2017:101371Q. doi:[10.1117/12.2254359](https://doi.org/10.1117/12.2254359)

Ishihara N, Tanaka R, Segars WP, Abadi E, Samei E. Estimation of lung volume changes from frontal and lateral views of dynamic chest radiography using a convolutional neural network model: a computational phantom study. In: Medical Imaging 2021: Physics of Medical

Imaging. Vol 11595. International Society for Optics and Photonics; 2021:115953H.
doi:[10.1117/12.2579948](https://doi.org/10.1117/12.2579948)

Kitahara Y, Tanaka R, Roth HR, et al. Lung segmentation based on a deep learning approach for dynamic chest radiography. In: Medical Imaging 2019: Computer-Aided Diagnosis. Vol 10950. International Society for Optics and Photonics; 2019:109503M. doi:[10.1117/12.2512711](https://doi.org/10.1117/12.2512711)

Tanaka R, Matsuda H, Sanada S. Time-series analysis of lung texture on bone-suppressed dynamic chest radiograph for the evaluation of pulmonary function: a preliminary study. In: Medical Imaging 2017: Biomedical Applications in Molecular, Structural, and Functional Imaging. Vol 10137. International Society for Optics and Photonics; 2017:101371R.
doi:[10.1117/12.2254377](https://doi.org/10.1117/12.2254377)