

ORIGINAL

Updated digital bibliography on radiographic techniques for the digestive system and abdomen

Bibliografía digital actualizada sobre técnicas radiográficas del sistema digestivo y abdomen

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ABSTRACT

This digital bibliography is an up-to-date academic resource for studying the digestive system and the abdomen. It presents accurate anatomical representations and details of relevant pathologies in both systems, facilitating the understanding and interpretation of medical studies from a didactic and structured approach. Through clear, organized, and contextualized illustrations, students reinforce their knowledge of internal structures and functional alterations, establishing an effective link between theory and practice in the learning process. This resource allows students to consolidate fundamental concepts related to digestive radiographic anatomy, as well as to familiarize themselves with the main radiographic techniques used to evaluate this region of the human body. Its organization promotes a training experience focused on progressive learning, fostering analytical, reflective, and critical skills in future health professionals. Among its most enriching elements is the inclusion of English for specific purposes, which contributes to the mastery of international medical terminology and facilitates access to up-to-date literature. This linguistic integration significantly expands students' academic and professional opportunities, improving their preparation to perform effectively in globalized and multidisciplinary clinical settings. Its objective is to share content that contributes to a digital bibliography of some of the radiographic techniques of the digestive system and abdomen, thus strengthening the learning of future health professionals through a dynamic, contextualized, and effective educational experience. This tool represents a valuable contribution to professional technical education, integrating key knowledge in a clear, accessible, and coherent manner.

Keywords: Radiographic Techniques; Digestive System and Abdomen; Anatomy.

RESUMEN

Esta bibliografía digital constituye un recurso académico actualizado para el estudio del sistema digestivo y el abdomen. Presenta representaciones anatómicas precisas y detalles de patologías relevantes en ambos sistemas, lo cual facilita la comprensión e interpretación de estudios médicos desde un enfoque didáctico y estructurado. A través de ilustraciones claras, organizadas y contextualizadas, los estudiantes refuerzan sus conocimientos sobre estructuras internas y alteraciones funcionales, estableciendo un vínculo efectivo entre teoría y práctica en el proceso de aprendizaje. Este recurso permite afianzar conceptos fundamentales relacionados con la anatomía radiográfica digestiva, así como familiarizarse con las principales técnicas radiográficas utilizadas para evaluar esta región del cuerpo humano. Su organización favorece una experiencia

formativa centrada en el aprendizaje progresivo, promoviendo habilidades analíticas, reflexivas y críticas en los futuros profesionales de la salud. Entre sus elementos más enriquecedores destaca la inclusión del inglés con fines específicos, lo cual contribuye al dominio de terminología médica internacional y facilita el acceso a literatura actualizada. Esta integración lingüística amplía significativamente las oportunidades académicas y profesionales de los estudiantes, mejorando su preparación para desempeñarse con eficacia en entornos clínicos globalizados y multidisciplinarios. Se plantea como objetivo: socializar los contenidos que tributan a una bibliografía digital de algunas de las técnicas radiográficas del sistema digestivo y el abdomen, fortaleciendo así el aprendizaje de los futuros profesionales de la salud mediante una experiencia educativa, dinámica, contextualizada y efectiva. Esta herramienta representa un valioso aporte para la enseñanza técnica profesional, integrando saberes clave de manera clara, accesible y coherente.

Palabras clave: Técnicas Radiográficas; Sistema Digestivo y Abdomen; Anatomía.

INTRODUCTION

Historically, in Cuba, training in Imaging has been carried out at different educational levels. The subject of Integrated Radiographic Technique studies radiological procedures that enable radiographic images of the entire human body, including its internal structures, to be obtained, providing information on the state of the different organs.

Currently, the new design of the Imaging and Medical Radiophysics degree program requires a subject that integrates knowledge, enabling students to master technical procedures and radiological anatomy to study the human body. The subject overlaps with most of the subjects in the governing discipline. It is essential because it is the central axis around which the mid-level technician and the graduate perform their work.

There are countless digital bibliographies related to the degree program worldwide, and artificial intelligence (AI) can even find everything students request, though sometimes with occasional errors. In Cuba, there is also some handwritten bibliography, but it is somewhat outdated given the technological revolution in imaging. In the special municipality of Isla de la Juventud, there is no bibliography supporting preparation and training in imaging and medical radiophysics.

Taking the above into account, the authors propose to present a helpful teaching tool for both undergraduate and graduate students in digital format, consisting of a bibliography that includes, in addition to the technical algorithm, digital images with anatomical details and pictures of the execution of some techniques of the digestive system and the abdomen to improve the teaching-learning process to socialize the contents that contribute to a digital bibliography.

METHOD

This work is based on the dialectical-materialist method of research, which focuses on the relationships within a system and seeks explanations in terms of the transformation and evolution of phenomena. It applies it to analyze social, economic, and natural processes, taking into account their internal contradictions and historical development. To achieve the objective proposed in this research, the following scientific research methods were also used:

Descriptive Method: Technical procedures and equipment were analyzed, with their characteristics, applications, and improvements documented.

Historical-Logical Method: Evolution of radiographic techniques and their impact on current medical practice.

Comparative Method: Highlight advantages and limitations.

Supervised Machine Learning Method for Radiological Diagnosis: Based on showing artificial intelligence models of labeled medical image sets, identifying patterns and anomalies in X-rays with great precision.

DISCUSSION AND RESULTS

Currently, the main textbook for the Integrated Radiographic Technique course lacks high-quality images and a detailed overview of the techniques used in the digestive system and abdomen. Below is a sample of the digital bibliography, sharing four of the techniques: three from the digestive system and one from the acute abdomen with its technical algorithm, execution of the technique, and anatomy demonstrated with the inclusion of English for specific purposes in order to encourage language learning.^(1,2,3,4,5)

Digestive System

Name of Technique: Lateral cervical esophagus.

Synonym: None.

Patient position: Lateral upright, with hands extended along the body. A lateral projection (including the oral region, pharynx, larynx, and proximal portion of the esophagus).

Position of the part to be X-rayed: Place the part to be X-rayed in the center of the midline of the table

or Potter-bucky. At the time of exposure, the patient should ingest a spoonful of barium sulfate made into a paste or, alternatively, in a more dissolved form (magma) swallowed continuously through a tube or absorbent material.⁽¹⁾ This contrast material coats the lining of the esophagus and makes it visible on X-rays.⁽²⁾

Preparation: patients are usually asked to refrain from eating or drinking for 8-12 hours before the test. This ensures that the stomach and esophagus are empty, allowing for better imaging.^(6,7,8,9)

Measurement of the area to be X-rayed: at the level of the cervical region.

Landmarks: hyoid bone at the center of the frame.

Central ray: perpendicular to the center of the film.

Film size 18 x 24 cm or 24 x 30 cm.

Marker: the date, medical record number, and laterality are located at the anterior edge and end of the frame.

Electrical factors: 20 mAs, 90 cm distance FP. Kilovoltage according to the equipment constant. Use a thick focus, which can be done with or without bucky.⁽¹⁾

Radiological protection: collimate the X-ray beam to the maximum and use the appropriate filter.⁽¹⁾

Radiographic anatomy: cervical esophagus in its entirety in lateral projection.

A barium esophagram helps diagnose a variety of conditions affecting the esophagus and is often recommended when a patient experiences difficulty swallowing (dysphagia).⁽³⁾

Performing the Lateral Cervical Esophagus Technique



Figure 1. Lateral Cervical Esophagus Technique

Image Gallery



Figure 2. Lateral cervical esophagus radiograph⁽¹⁰⁾

Some of the most common abnormalities in the cervical esophagus.



Figure 3. Foreign body⁽¹¹⁾

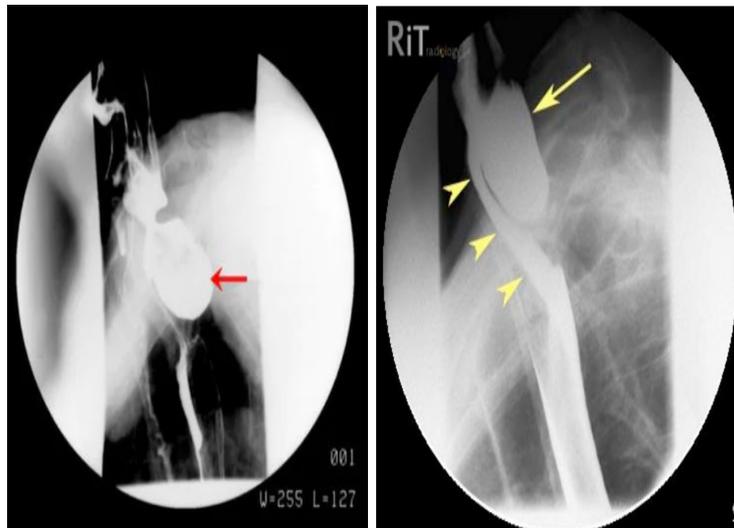


Figure 4. Zenker's diverticulum⁽¹²⁾

The cotton ball technique is performed when a patient arrives at the emergency room after swallowing a foreign body. This technique is accomplished by placing the patient on their side, using a method similar to that for the lateral esophagus. A Bariopac container is prepared with a small amount of barium, and a cotton ball is placed in the barium. The patient is then asked to swallow it, and a lateral view of the esophagus is obtained to confirm that the cotton ball remains on the foreign body and to indicate the level of the cervical esophagus at which it is located.

The symptoms of Zenker's diverticulum can vary and include those of a respiratory complication or malnutrition, especially in elderly patients. That is why its treatment must always be surgical. Surgery can be performed transcervically or endoscopically (rigid or flexible endoscope). The first group includes cricopharyngeal myotomy alone, used for small diverticula, and diverticulopexy or diverticulectomy, performed with cricopharyngeal myotomy. The second group comprises transoral diverticulostomy with mechanical sutures, laser, or coagulation, which is used primarily in high-risk or elderly patients.⁽⁴⁾

Name of the Technique: oblique projection of the thoracic esophagus.

Synonym: none.

Adult patients must fast for 6-8 hours.⁽⁵⁾

Patient position: patient in prone or supine position; can also be performed in an upright position.

Position of the part to be X-rayed: the body is placed in a 45° oblique position on the right side. Extend the arm on the same side along the body, and the other arm along with the leg on that side, bending them so that the elbow and knee rest on the table, in such a way that they support the body. The same methods as for the frontal view are used for contrast.

Measurement of the area to be X-rayed: at the level of the intermammary line.

Reference points: intermammary line at the center of the frame.

Central ray: perpendicular to the center of the film.

Film size: 14 x 17 cm in the vertical bucky.

Marker: at the outer edge of the frame, 3 cm below the armpits, marking both sides.⁽⁵⁾ Electrotechnical factors: 50 mAs, 90 cm distance FP. The equipment constant determines the kilovoltage. Use a thick focus and bucky.

Radiological protection: collimate the X-ray beam to the maximum and use the appropriate filter.⁽¹⁾

Radiographic Anatomy: thoracic esophagus in its entirety in oblique projection.⁽¹⁾

Execution of the Thoracic Esophagus Technique in Oblique Projection



Figure 5. Thoracic Esophagus Technique in Oblique Projection

Image Gallery



Figure 6. Thoracic esophagus in oblique projection

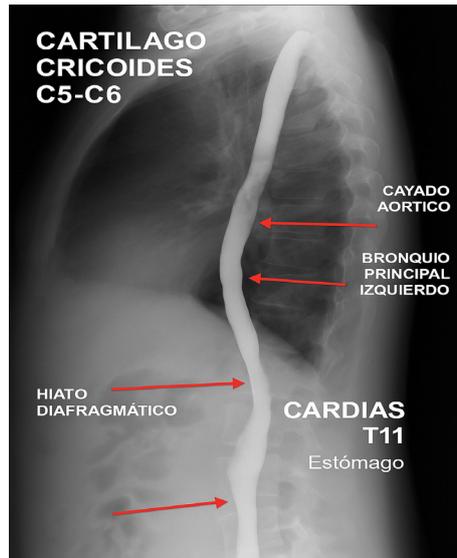


Figure 7. Physiological portions and narrowings of the thoracic esophagus

Name of the Technique: Axial Rectosigmoid.⁽¹⁾

Synonym: Rectosigmoid in Chassard-Lapine projection.⁽¹⁾

Previous preparation of the patient⁽⁶⁾

First day

- Soft diet: chicken broth soups, fat-free purées.
- Do not consume dairy products such as yogurt, cheese, etc.
- Drink plenty of clear liquids such as water, juice, tea, or beverages that do not contain a high amount of coloring.
- Do not smoke.

Second day

- Liquid diet.
- Take the laxative or bowel cleansing solution that was given to you prior to your medical appointment.
- Perform a Fleet enema.

Third day

- Before going to your appointment, perform a Fleet enema.
- Attend on an empty stomach.
- The patient should arrive 15 minutes before the scheduled time.

A barium enema is a radiological examination performed by introducing a contrast medium rectally through a tube, allowing visualization of the large intestine.⁽⁷⁾

Patient position: seated at one end of the table.

Position of the area to be X-rayed: the patient sits at one end of the table with their legs hanging down, and is instructed to spread their legs wide and lower their chest to reduce the thickness between the pelvis and the chest.

Measurement of the area to be X-rayed: once the patient is in position, the thickness is measured, taking into account the pelvis and chest, as this is an axial view.⁽¹⁾

Reference points: the greater trochanter at the center of the table and the center of the frame.⁽¹⁾

Central ray. Perpendicular to the center of the film.⁽¹⁾

Frame: measures 14 x 17

Marker: right outer edge of the frame.⁽¹⁾

Electrical factors: 50 mAs, 90 cm distance FP. Kilovoltage according to the equipment constant. Use a thick focus and bucky.⁽¹⁾

Radiological protection: collimate the X-ray beam to the maximum and use the appropriate filter.⁽¹⁾

Radiographic anatomy: an axial projection of the sigmoid rectum.

Execution of the Axial Rectosigmoid Technique



Figure 8. Axial Rectosigmoid Technique

Image Gallery

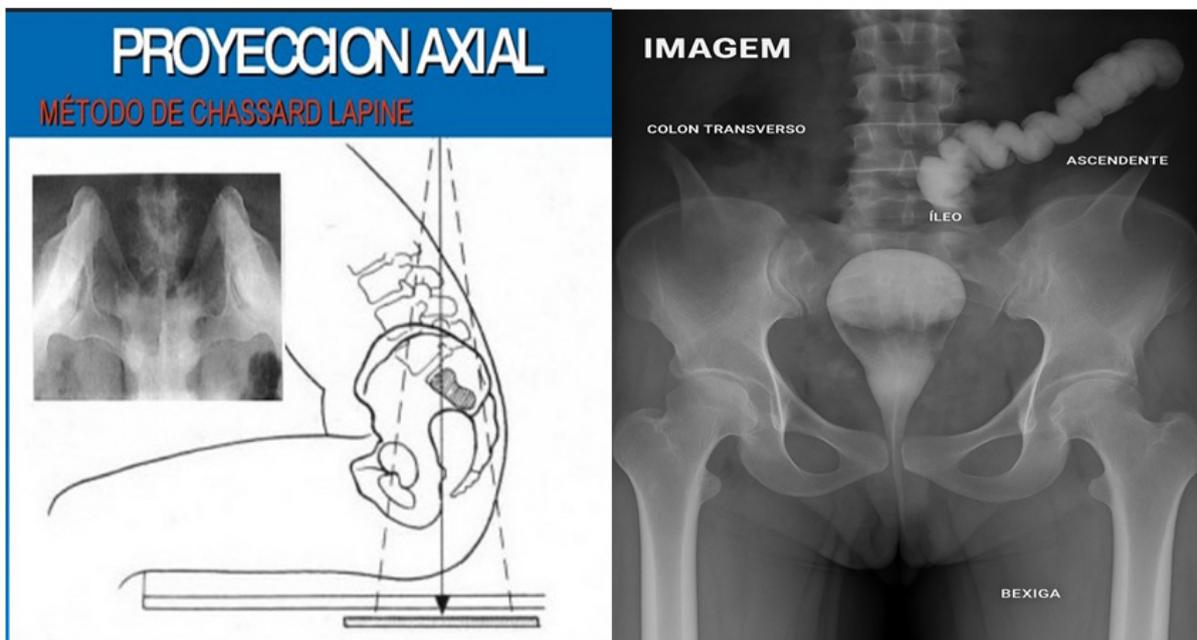


Figure 9. Axial sigmoid rectum⁽¹³⁾

Abdomen

Name of Technique: Standing Abdomen.⁽¹⁾

Synonym: none.

Definition of the Procedure:⁽⁸⁾ examines the shadow of internal organs, intestinal gas distribution, and bone structures.

It is indicated for the identification of obstructive and inflammatory intestinal processes, malformations, tumors, pneumoperitoneum, calcifications, and foreign bodies. There are no risks, complications, or contraindications.

Patient position: standing on the vertical bucky.

Position of the part to be X-rayed: the midline of the body to the center of the bucky.

Measurement of the area to be X-rayed: at the level of the umbilical region.

Reference points: the iliac crest at the center of the film.

Central ray: perpendicular to the center of the film.⁽¹⁾

Marker: lower right edge of the chassis.⁽¹⁾

Electrical factors: 50mAs, 90 cm distance FP. Kilovoltage according to the equipment constant. Use a thick focus and bucky.⁽¹⁾

Radiological protection: collimate the X-ray beam to the maximum and use the appropriate filter.⁽¹⁾

Quality criteria⁽⁹⁾

- Complete visualization of the diaphragm.
- It is not necessary to include the entire pelvis.
- Must allow observation of intestinal air-fluid levels, if present.
- No rotation.

Radiographic anatomy: simple abdomen in its entirety. Performed to view air-fluid levels.⁽¹⁾

Abdominal radiography offers a number of important clinical and diagnostic benefits. It allows for early, rapid, and accessible detection that aids in diagnosis or serves as a subsequent tool in more advanced imaging studies, such as computed tomography (CT) or magnetic resonance imaging (MRI).⁽⁹⁾

Its low radiation dose and low cost make abdominal radiography play an essential role in medicine by providing an initial view of abdominal conditions and directing treatment and medical care efficiently and accurately. However, it is important to remember that its usefulness depends on the clinical situation and that it can be supplemented with other imaging studies when necessary to obtain a complete and accurate diagnosis.⁽⁹⁾

Performing the Standing Abdominal Technique



Figure 10. Standing Abdominal Technique

Image gallery

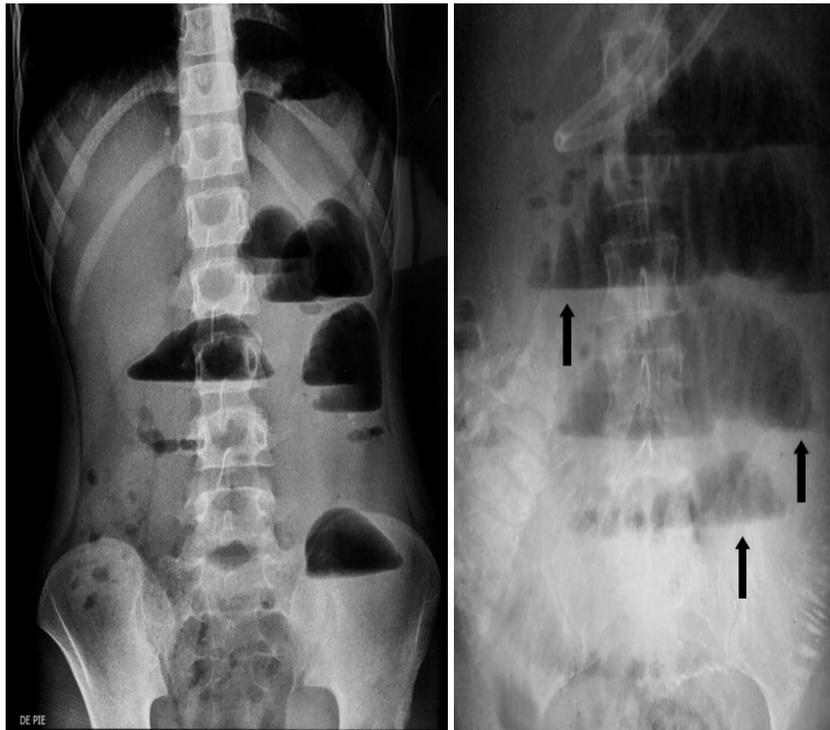


Figure 11. Standing abdomen, to observe air-fluid levels⁽¹⁴⁾

CONCLUSIONS

A sample of the updated digital bibliography on the digestive system and the abdomen was shared, with a view to improving and supporting the teaching-learning process at the undergraduate level and the professional development of the Imaging and Medical Radiophysics degree program. This material is currently under development.

BIBLIOGRAPHIC REFERENCES

1. Mulkay-Moreno JO, Fernández-Suárez JA, Rosell-Vega R, Pérez-López M. Rayos X. Tomo III. 1987. (Descripción del algoritmo técnico único libro de autores cubanos)
2. Cozcolluela-Cabrejas MA, Moreno-Ochoa I, Romina-Zalazar L, Pérez-del-Barrio A, Amaya Iturralde-Gárriz A, Oliver-Arriazu E, Gallego-Beuth J, Doiz-Luzán MC. 37 congreso internacional, Centro de convenciones internacionales. Barcelona: Hospital Reina Sofía. 2024.
3. Hospitales Apollo. 2025. <https://www.apollohospitals.com/es/diagnostics-investigations/esophagram>
4. Hallazgos radiológicos más frecuentes en estudios con bario del tubo digestivo alto. Revista sanitaria de investigación. 2024. <https://revistasanitariadeinvestigacion.com/hallazgos-radiologicos-mas-frecuentes-en-estudios-con-bario-del-tubo-digestivo-alto/>
5. Raditec.org sobre radiografía especializada. 2023. <https://www.raditec.org/2023/08/radiografia-especializada-esofagograma.html>
6. Universidad Central del Ecuador <https://www.studocu.com/ec/document/universidad-central-del-ecuador/imagenologia-y-radiologia/grupo-7-colon-por-enema/80481752> 2021-2022
7. Servizo Galego de Saúde, 5Técnicas y/o pruebas diagnósticas 2014-2025. https://www.sergas.es/gal/documentacionTecnica/docs/GuiasClinicas/Rectorragia/tecnicas_pruebas.pdf
8. La Guía de Procedimientos Radiográficos del Instituto Nacional de Salud del Niño - San Borja. 2024. <https://portal.insnsb.gob.pe/docs-trans/resoluciones/archivopdf.php?pdf=2024/GP%20radiografia.pdf>

9. 36 Congreso Nacional Málaga, Palacio de Ferias y Congresos. 2022 <https://piper.espacio-seram.com/index.php/seram/article/download/8951/7417/8858>

10. Estudios contrastados y proyecciones radiológicas. SlideShare Examen de esófago contrastado en ResearchGate. 2025

11. ChatGPT. Radiografía con cuerpo extraño en esófago cervical con contraste “mota de algodón”. OpenAI. 2025.

12. Estudios contrastados y proyecciones radiológicas. SlideShare Examen de esófago contrastado en ResearchGate Radiografía de divertículo de Zenker. 2014.

13. Estudios contrastados y proyecciones radiológicas SlideShare. 2025

14. Estudios de abdomen en radiología convencional. Revista Sanitaria de Investigación. 2023. <https://revistasanitariadeinvestigacion.com/estudios-de-abdomen-en-radiologia-convencional/>

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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