

Development of Cvision Plus C-arm Table

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1. Introduction

In recent years, the field of X-ray TV has seen increasing demands placed on digital radiography and multi-purpose functionality. The C-arm table provides an X-ray system that can be used for examinations in a variety of different areas, from orthopedic surgery, which requires diagnostic images taken from many different directions, to vascular and non-vascular IVR. In this way, the C-arm table is contributing to increased examination efficiency in hospitals.

In this article, we describe our new, compact, multi-functional C-arm table, Cvision PLUS, which was developed through the pursuit of further improvements in examination workflow, higher image quality, and lower radiation exposure.

2. Features

2.1 Compact Design

Cvision PLUS has an original “double C-arm structure” that delivers both compactness and safety. (Fig. 1)

The Cvision PLUS C-arm table boasts the smallest

installation space in the world. This ensures a spacious working area around the table in the examination room and makes it easier to install equipment and provide room for bringing in stretchers.

It also allows treatment requiring the table's angle of inclination to be changed (e.g., IVR examinations and ileus tube insertions) to be performed without changing the overall table height and so examinations and treatment can be performed safely.

2.2 Large Examination Range and Smooth Movement

While keeping the space required for all the various movements to an absolute minimum, the stroke for each of the parts is as large as possible. Each detail of the structure and mechanisms has been carefully considered to ensure that the region of interference between parts, such as the C-arm and the table, is kept to a minimum.

The result of this is a large effective imaging range, making it possible to get a sufficient field of view for all the various examinations. (Effective imaging range: 175 × 68 cm max. for AP; 200 × 68 cm max. for PA.)



Fig. 1 External Appearance of Cvision PLUS

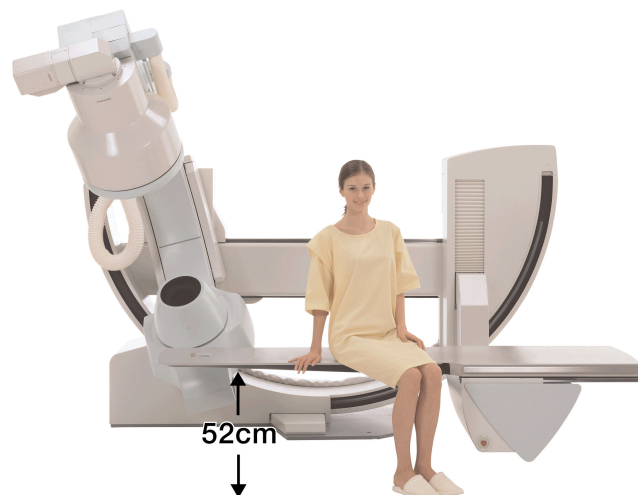


Fig 2

The C-arm's large inner diameter (85.5 cm) allows rotation about the body axis even if the table is in a lower position. This makes it possible to maintain an appropriate field of view when, for example, performing frontal and lateral imaging for cranial angiography.

All of the C-arm table's movements can be made at high speed and the speed can be controlled by changing the angle of the operation handles. This enables smooth positioning.

The table can be lowered to a height of 52 cm above the floor. This makes it easier for patients to get on and off the table, or to be transferred to a bed. (Fig. 2)

2.3 Examination Efficiency Improved with Geometry APR Function

In order to improve examination efficiency, the C-arm table has been equipped with a function (the geometry APR function) that presets its initial position in accordance with the imaging technique. The table, the C-arm, and other relevant parts are raised, lowered, or rotated to the ideal position for the purpose, minimizing interference and allowing smooth examinations and treatment.

2.4 Operation Panel Allows User to Concentrate on Examination

To allow the operator to focus on just one console during examinations, controls for all the table operation functions and functions for the digital radiography and high-voltage generator have been integrated onto one operation panel. (Fig. 3)



Fig. 3 External Appearance of Operation Panel

2.5 High Image Quality and Reduced Radiation Exposure

Cvision PLUS uses SOIC (Shimadzu Optimized Imaging Chain), an imaging system that was developed by investigating and optimizing all the factors in the entire image signal system affecting image quality. (Table 1 and Fig. 4)

Consideration has been given to the rotational structure of the C-arm so as to reduce the amount of radiation exposure to the operator when taking lateral fluoroscopic images (as recommended by ICRP).

	SOIC*1	
	High quality	Low exposure
Triple-gun monitor	○	
TV camera with high S/N	○	
Optical system with distortion correction	○	
Optimum image intensifier output size, 42 dia. mm	○	
Fiber grid	○	○
Iris collimator	○	○
X-ray beam hardening filter		○
Pulsed fluoroscopy		○

Table 1 *1: SOIC: Shimadzu Optimized Imaging Chain

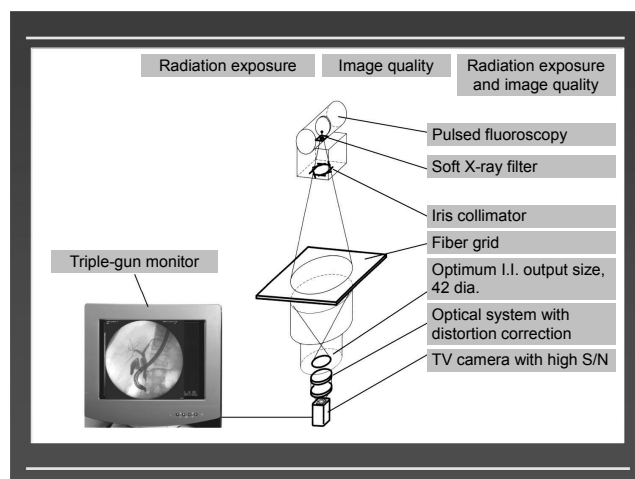


Fig. 4 Conceptual Diagram of SOIC

3. Summary

The Cvision PLUS represents the next step in the evolution of C-arm tables. We believe that its ability to ensure the optimum positioning for each type of examination will, when used in combination with the latest applications such as RSM-DSA, contribute to greater precision in examinations related to X-ray diagnosis and treatment as well as greater examination efficiency.