

Identifying best practice through the unification of guidelines for patient preparation, immobilization and imaging in four radiotherapy centers in two countries

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PURPOSE

The purpose of this project is to create unified guidelines for the preparation, immobilization and imaging of patients that will undergo radiation therapy in four centers in two countries, in order to ensure safe and best practice.

METHOD

A working group comprising of one medical physicist (MP) and one radiation therapy technologist (RTT) from each center was formed. The following categories were defined for the scope of the project:

- I Head and head & neck: for brain, head and neck and craniospinal irradiation
- II Pelvis: for gynecological, anus, rectum and genitourinary system irradiation
- III Chest: for lung, breast, pancreas, gastric system and esophagus irradiation
- IV Limbs: for lower and upper limbs irradiation
- V Individual: for the construction of individual immobilization vacuum mattresses

A template table was created and distributed to the centers to provide information for the process followed for patient preparation, immobilization and computed tomography (CT) scanning protocol parameters used for each of the above categories, including reference point and radiopack markers position. Collected data was analyzed and the best guidelines for each category were determined taking into account differences in immobilization devices and imaging, as well as radiation therapy equipment of individual centers.

RESULTS

Following the information obtained from individual centers, a unified technical instruction was created for each category, detailing the immobilization and imaging process to be followed:

	IMMOBILIZATION & IMAGING INSTRUCTIONS FOR LIMBS					
Preparation		Remove clothes (lower part of the body)				
		Remove underwear				
		Remove jewelry				
	Devices	Vacuum Bag				
		HeadSTEP				
		Pillow and knee support				
Immobilization	Technique	Prone / supine				
mmobilization		Head first (arms)				
		Feet first (legs)				
	Fixation/Indexing	Fixed or indexed immobilization				
	Reference point	Center of PTV				
	Protocol	• Limbs				
Imaging		• 120kV				
		3mm or less for radical patient				
	CT markers	Radio-opaque markers at reference point (cross points)				
	Scanning range	Treated region with margin				
		All tissues to be irradiated must be included in CT scans				

			INSTRUCTIONS FOR PELVIS	
	(Gynecological,	Anus, Rectum, Genitourinary System, Bladder Cancer) • Remove clothes (lower part of body)		
Preparation		Remove underwear		
		Remove any jewelry		
Bladder preparation		Gynecological, Anus,	Ask patient to empty bladder	
		Rectum,	Ask patient to drink 500ml water	
		Genitourinary	Ask patient to wait for 30-60min	
		Bladder	Empty bladder	
	Devices	Pillow under the head		
Immobilization		Knee and feet support		
		Belly board (when prone position is used for rectum/anus)		
		Vacuum bag (optional)		
	Technique	Arms on chest		
		Secure patient comfort to avoid movement		
		Ask patient to stay relaxed, calm and to breath normally		
	Fixation/Indexing	Fixed or indexed immobilization where avilable		
	Reference point	Sagittal: in the middle of patient		
		Axial: between superior anterior iliac spine and pubic symphysis		
		Coronal: at the level of femoral head or at the level of the iliac crest		
Imaging	Protocol	Pelvic protocol		
		• 120kV		
		Large FOV		
		• 2.5 - 3.0mm slice t	hickness	
	CT markers	Radio-opaque markers at reference point (cross points)		
	Scanning range	From L3 to end of pelvic region		

	IMMC	DBILIZATION & IMAGING INSTRUCTIONS FOR HEAD & NECK		
		(Oropharynx, larynx, hypopharynx, nasopharynx)		
		Remove any jewelry		
Preparation		Remove prosthetic/artificial teeth		
		Remove clothes (upper part of the body)		
		5-point mask		
	Devices	Head support		
		Blocks & wedges		
		Vacuum cushion (optional)		
	Technique	Arms down		
		Prepare mask		
Immobilization		Mask hole for the nose		
		Relaxed shoulders		
		Retractor belt (optional)		
	Fixation/Indexing	Fixed and indexed immobilization		
	Reference point	Sagittal & Axial Lasers: At the planning area		
		Coronal Laser: set in position that the immobilization device is visible in images		
	Protocol	Head protocol		
		• 120kV		
Imaging		• 2.0 – 3.0mm slice thickness		
iiiiagiiig	CT markers	Radio-opaque markers at reference point (cross points)		
	Scanning range	The whole head adding 2 slices above and under		
		Scan the immobilization device and the table top.		
	IIV	MOBILIZATION & IMAGING INSTRUCTIONS FOR CHEST		
		(Lung, Pancreas, Stomach, Esophageal Cancer) • Remove clothes (upper part of the body)		
Preparation		Remove jewelry and artificial objects		
. reparation		Remove wig		
	1	Supine position		
	Devices Technique	Chest immobilization device with pillow and arms support		
		Knee support		
Immobilization		Arms above the head		
		Normal breathing		
	Fixation/Indexing	Fixed or indexed immobilization		
		Sagittal midline of patient		
	Reference point	Axial crossing xiphoid		
		Coronal in midaxillary line		
		Chest		
	Protocol	• 120kV		
		- IZUKV		

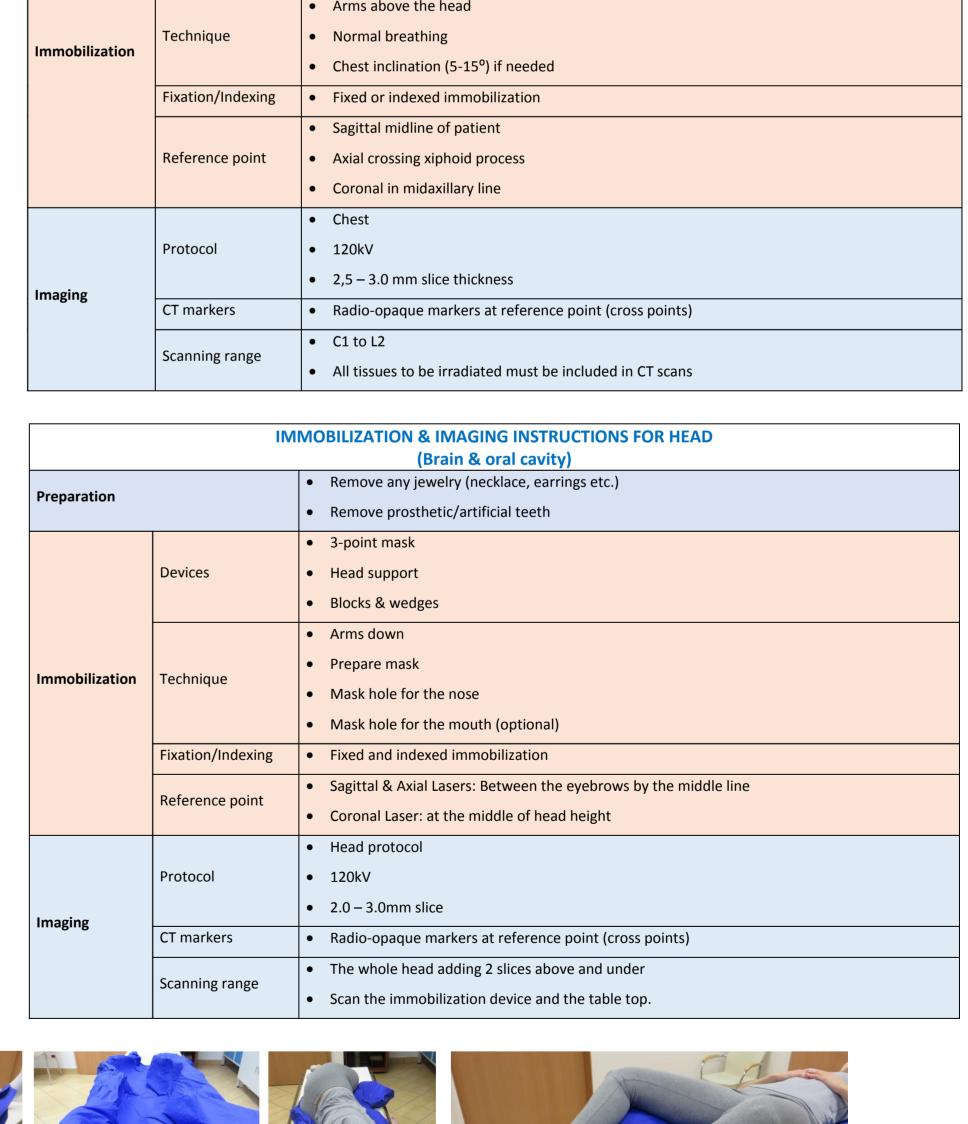
• 2,5 – 3.0 mm slice thickness

Radio-opaque markers at reference point (cross points)

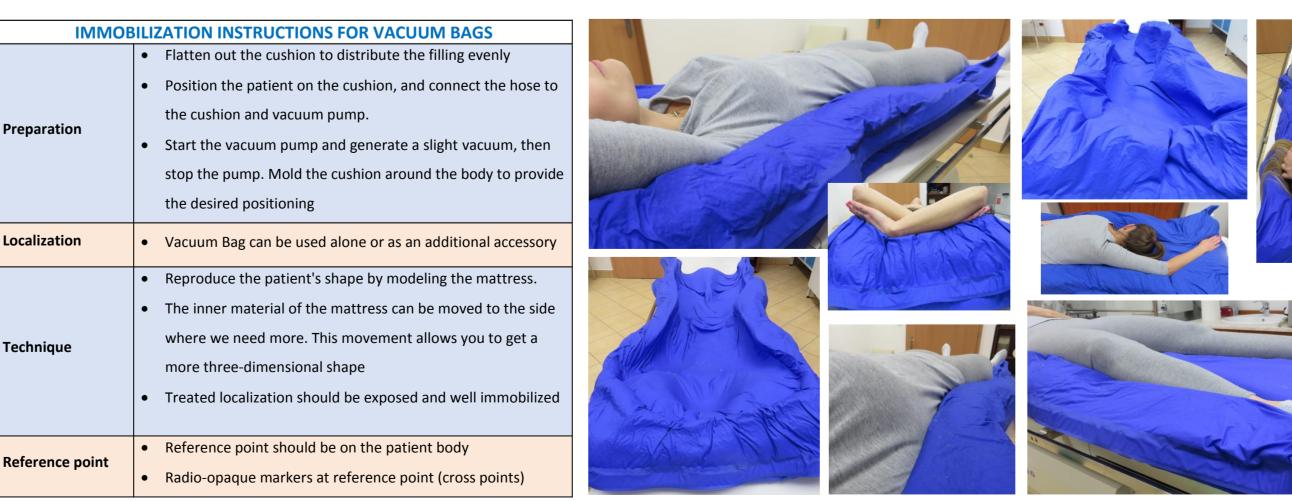
All tissues to be irradiated must be included in CT scans

CT markers

Scanning range



Breast immobilization device with pillow and arms suppor



CONCLUSIONS

Despite the differences resulting from the use of various equipment for patient immobilization, imaging and treatment and the different practice of teams working in distant centers, a unified process was successfully introduced and adopted by all centers.