



Singapore Healthcare Management 2015

Acrylic adaptor and headrest on breast board: an improved head and neck position for breast patients

Tan Wan Wei, Lim Li hoon, Florence Wong, Eric Pang, Chew Wai Chiong



National Cancer Centre Singapore
SingHealth



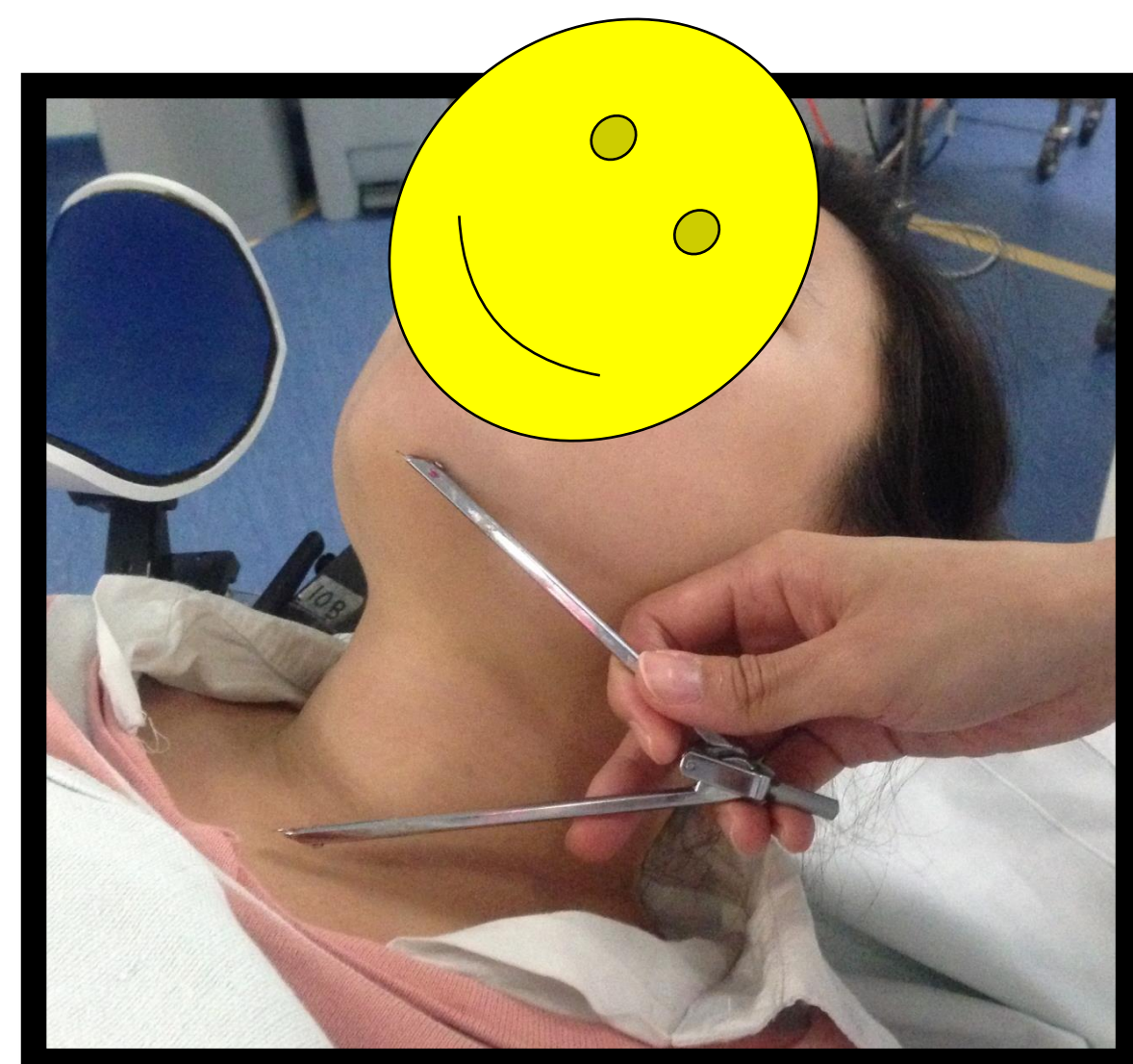
PROJECT BACKGROUND

Commercialised supine breast boards are used to immobilise and reproduce patient's treatment position during radiotherapy of breast cancer treatment (Figure 1). However, these often result in sub-optimal patient positioning due to lack of customisation to cater to specific centres.

Problems encountered:

- 1) Patient's head tilt position is not adequately hyperextended and maintained during treatment which potentially result in undesirable chin within the supraclavicular treatment field
- 2) There are inherent uncertainties in the head tilt and chin position due to lack of neck support during treatment especially when there is spinal cord shielding.

The uncertainty in setup can lead to increased normal tissue radiation exposure which may potentially increase the risk of late complications. Therefore, we aim to inject new ideas to improve the current treatment setup and reproducibility of patient positioning.



Measurement of distance from SSN to chin using compass

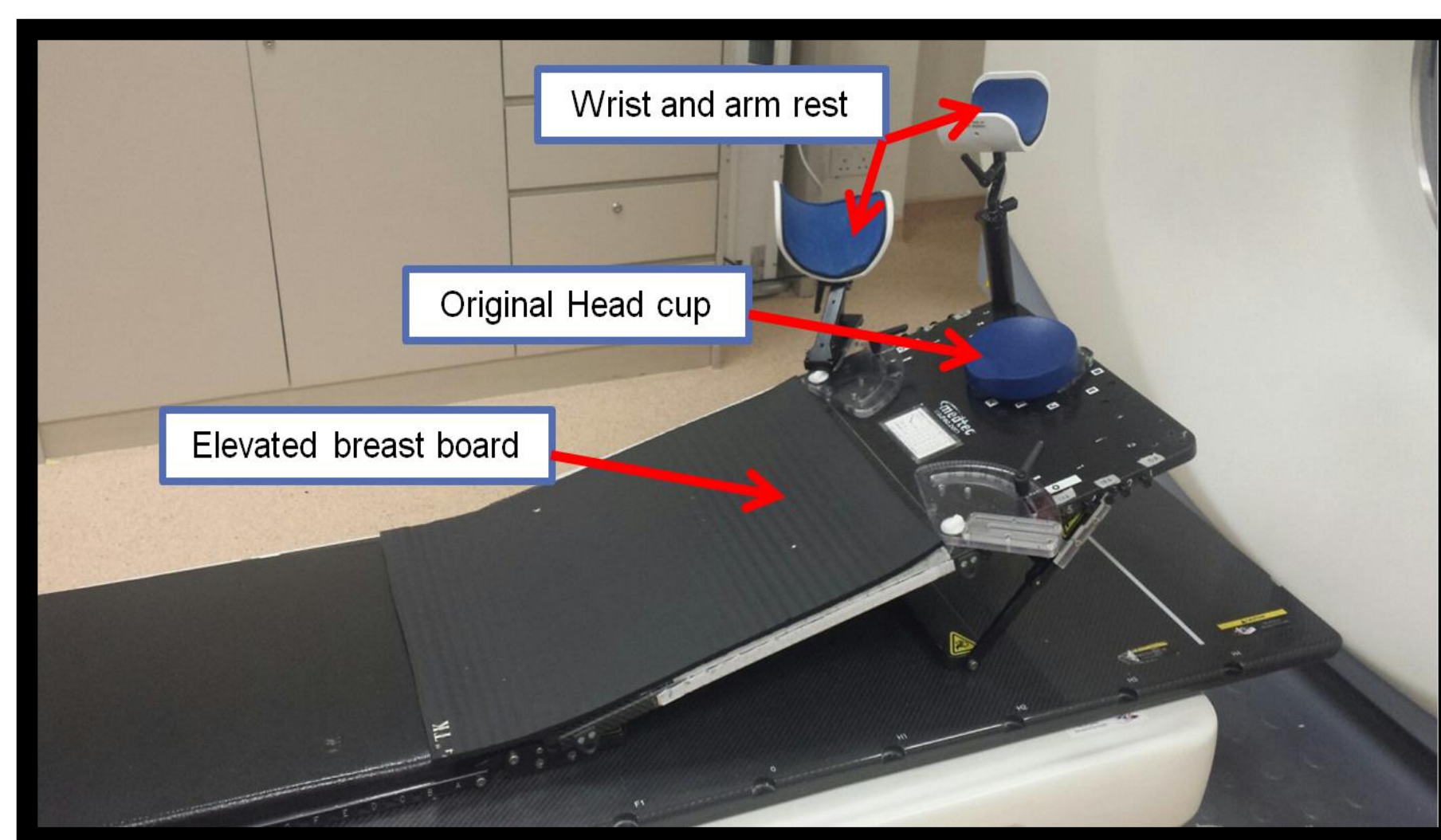


Figure 1: Commercial Supine Breast Board used in the department with original set-up

METHODOLOGY

Using available materials (i.e. fabrics, thermoplastic, acrylic), there were proposal of 3 new designs to improve the current treatment setup and reproducibility of patient positioning. A prospective pilot project was then conducted by measuring 10 patients using each of the alternative interventions.

Prospective Pilot Project:

- Intervention 1: 10 patients using Head Strap
- Intervention 2: 10 patients using Chin Strap
- Intervention 3: 10 patients using Headrest and **acrylic adaptor**

To compare the effectiveness of the 3 designs, the distance from suprasternal notch (SSN) to the chin is measured using compass at three time points (before intervention, after intervention but before treatment and after treatment with intervention).

SAVINGS

Due to the use of existing headrests and acrylic materials, there were no additional costs involved in the designing and fabrication of the acrylic adaptor. Otherwise, a typical set of headrest for the six different sizes will cost \$2700.

INTERVENTION



Intervention 1: Head Strap with velcro



Intervention 2: Chin strap with velcro and thermoplastic



Intervention 3: Acrylic adaptor to secure headrest



Headrest with varying levels of neck support

BEFORE & AFTER IMPLEMENTATION

Before implementation, problems faced were,

1. Patient's head tilt position was not adequately hyperextended and maintained during treatment which potentially result in undesirable chin within the supraclavicular treatment field.
2. There were inherent uncertainties in the head tilt and chin position due to lack of neck support during treatment especially when there is spinal cord shielding.

From the our prospective pilot project, the measurements taken were,

Head strap:

- 7/10 patients' chin tilted down by 0.3-1cm. No changes for 3/10 patients.

Chin strap:

- 9/10 patients' chin tilted down by 0.5-1.5cm. No changes for 1/10 patient.

Headrest on acrylic adaptor:

- 1/10 patient's chin tilted down by 0.5cm. No changes for 9/10 patients.

All interventions are shown to be effective in allowing patient's chin to hyperextend but only the use of in-house fabricated acrylic adaptor to secure headrest is effective in maintaining the position of the chin. The in-house fabricated acrylic adaptor to secure headrest is used in the radiotherapy for breast cancer since 22nd September 2014 and is currently still in use as optimal results are sustainable.

The use of acrylic adaptor to secure headrest has thus allowed,

1. Patient to benefit from more accurate treatment and potentially more favourable treatment outcome.
2. Radiation therapists executing the treatment to have increased confidence with the use of a more robust immobilisation.

However, due to the high specificity of the gadget to be used for radiotherapy treatment, this intervention is only used in NCCS DRO.