CST: CONSORCI SANITARI DE TERRASSA

INTERFRACTIONAL SETUP CORRECTIONS USING HEXAPOD ROBOTIC COUCH FOR VMAT HEAD AND NECK TREATMENTS

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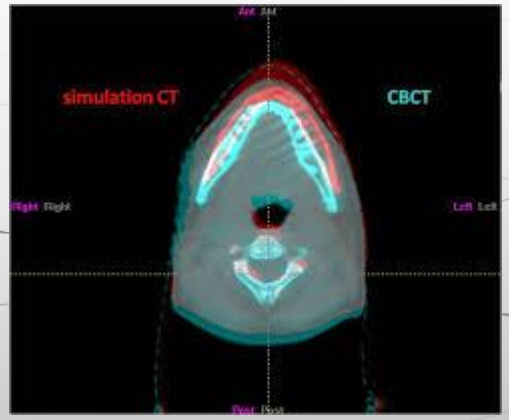
1st EUROPEAN CONGRESS OF MEDICAL PHYSICS

September 1-4, 2016
Eugenides Foundation
Athens-Greece

Introduction

Inaccurate alignment of the radiation beam with the patient can lead to critical organs to receive an unwanted high dose or the tumor to receive a reduced dose producing a loss in tumor control.



Introduction

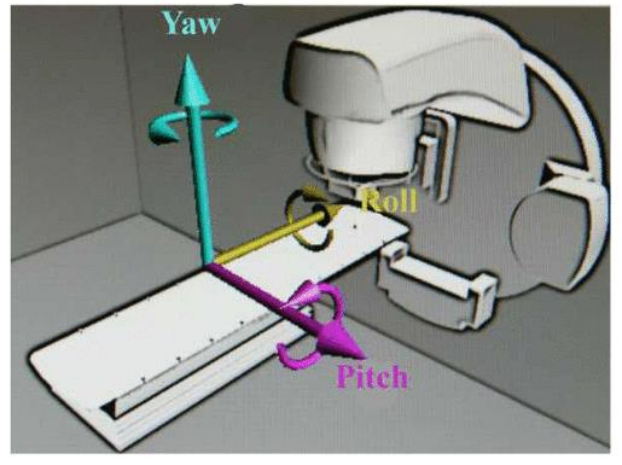
The purpose is to establish the interfractional setup error, for VMAT head and neck patients, using a kilovoltage cone beam CT (CBCT) and a robotic treatment couch (HexaPOD) for accurate patient positioning in six degrees of freedom (6-DOF).

Methods and materials

A total of 315 fractions from 10 H&N patients were evaluated.

The HexaPOD corrected the misalignments in 6-DOF and a pre-treatment CBCT verification was obtained.

Methods and materials



For each patient the daily variations of the three principal axes (X, Y and Z) and three rotational movements (pitch, roll, and yaw) were extracted from the CBCT software.

Methods and materials

The following parameters were calculated:

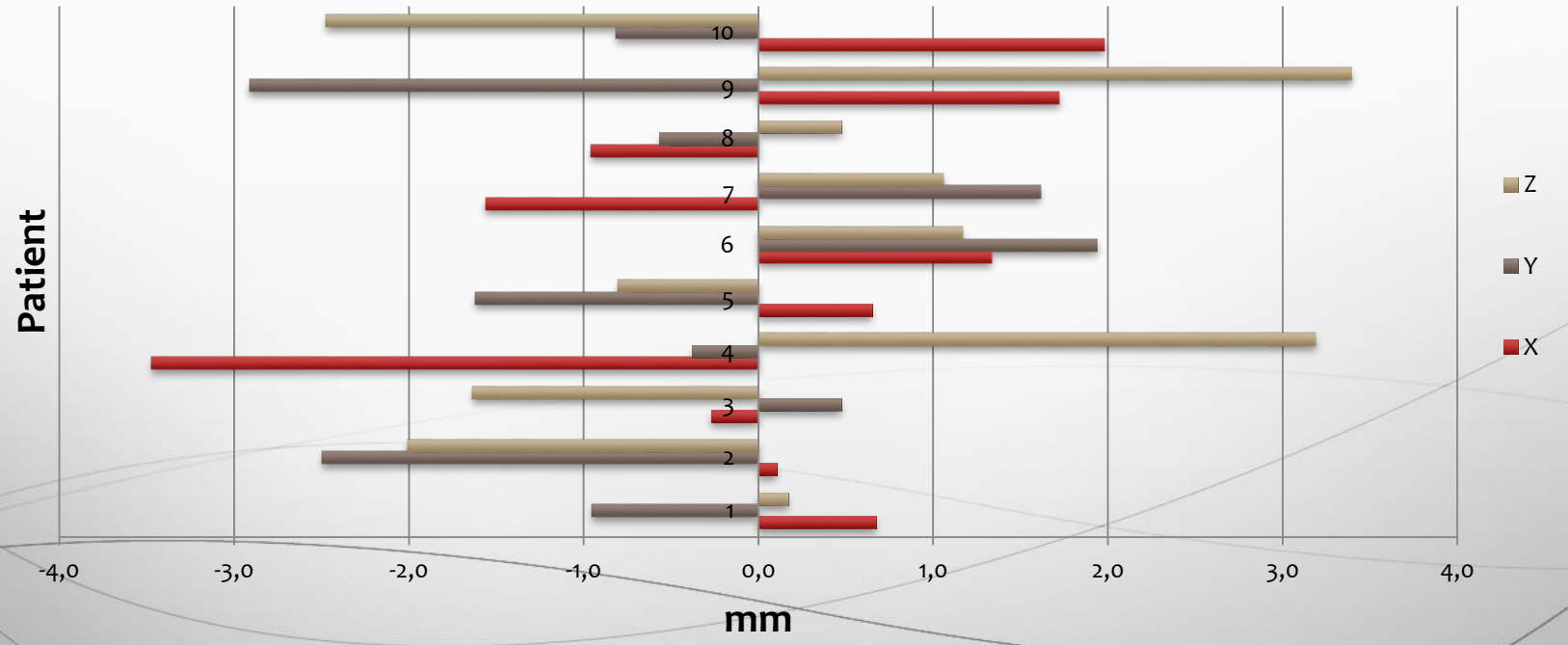
* Overall mean error (M), defined as the mean of all individual means.
* The systematic error (Σ), defined as the standard deviation (SD) of all individual means.
* The random error (σ), calculated as the root mean square of the individual SD deviations of all patients .

Results

	L/R (mm)	A/P (mm)	C/C (mm)	Pitch (º)	Roll (º)	Yaw (º)
Overall mean error, M	0.0	-0.5	0.3	0.60	0.45	0.11
Random error, σ	2.2	2.3	2.6	1.29	1.35	1.28
Systematic error, Σ	1.7	1.6	2.0	0.86	1.01	0.98

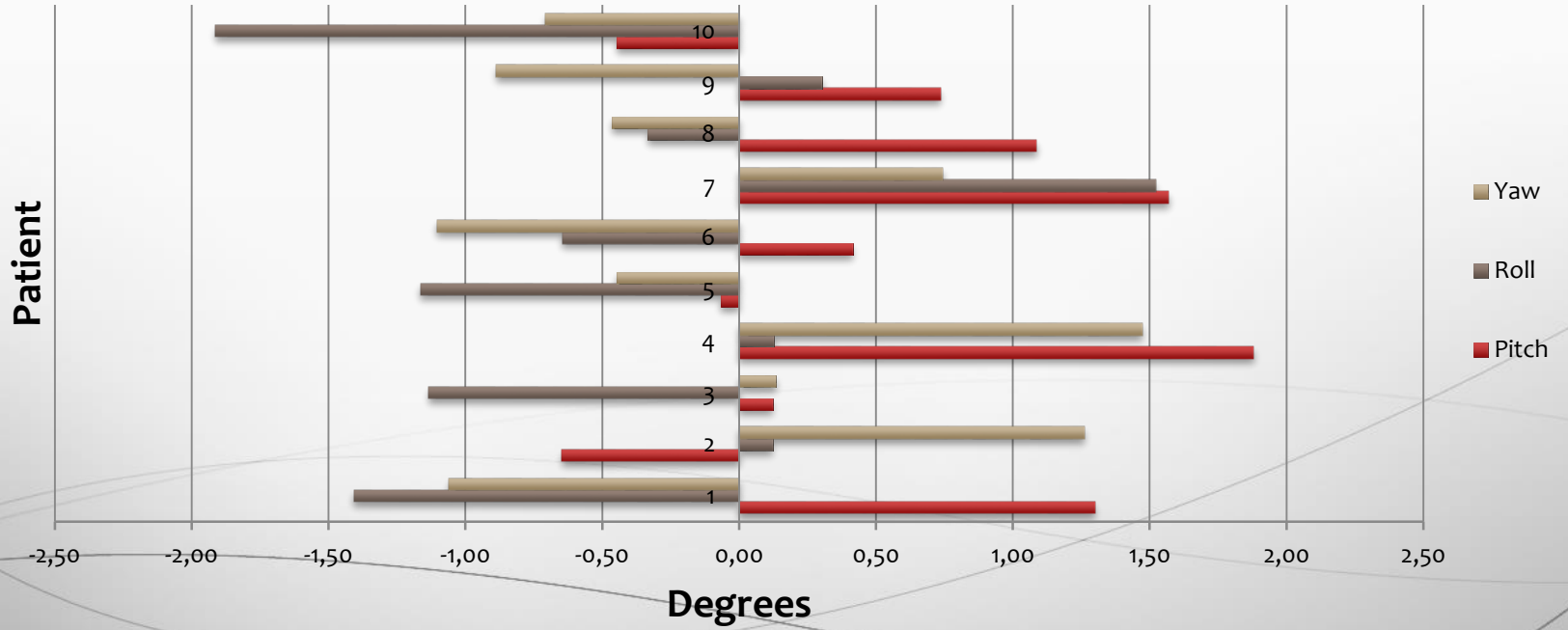
Results

Translational mean errors for each patient



Results

Rotational mean errors for each patient



Conclusions

The mean error (M) values were equal or less than 0.5mm for the translational axes. We obtained relatively larger random errors than systematic errors in both translational and rotational movements.

This result agrees with the literature for head and neck displacements.