

Purpose

To compare the differences between physician contours and contours done by Radformation's AutoContour for the supraclavicular lymph nodes, axilla lymph nodes and breast.

Methods and Materials

To determine the useability of the supraclavicular lymph nodes, axilla lymph nodes, and breast contours done by Radformation's AutoContour software, a retrospective comparison between them and contours done by physicians at the University of Nebraska Medical Center was done. AutoContour is a easy to use application that can be run either as a standalone executable or as a plugin through the Eclipse Treatment Planning System Scripting API. This contour comparison looked at 15 patients that were treated to the breast, supraclavicular and axilla lymph nodes. These 15 patients were previously contoured by their treating radiation oncologist. AutoContour was used to re-contour the supraclavicular lymph nodes, axilla lymph nodes, and the treated breast. The volume of the three physician drawn contours, the volume of the three AutoContour contours, and the overlapping volume was recorded. To compare the similarity of the manual physician contours and the ones done with AutoContour, the Dice Coefficient was calculated for each of the three volumes, for all 15 patients. The formula used to calculate the Dice Coefficient was 2 times the area of overlap divided by the total volume of the physician contour and the AutoContour contour.

Results

The average Dice Coefficient for the supraclavicular lymph nodes, axilla lymph nodes, and breast was .65, .58, and .83, respectively. If the two patients with the lowest Dice Coefficient for each volume were removed, the Dice Coefficients improved slightly to .66, .64, and .86, respectively.

Conclusion

AutoContour is a easy to use, convenient contouring tool that has several lymph node chains and possible "target" volumes within its available library of contours. When comparing AutoContour volumes to physician drawn volumes, specifically supraclavicular lymph nodes, axilla lymph nodes, and the breast, large discrepancies were observed. Careful review of these contours should be performed before using them for clinical use.

Physician vs AutoContour Results

Patient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Orig SCV vol.	29.4	25.5	34.6	48.4	39.2	23.3	21.3	21.8	47.9	32.1	22.8	24.6	28.6	43.2	27.6
AC SCV vol.	57.5	37.4	42	65	59.6	36.5	35.4	49.8	55	42.5	34.5	41.9	36.7	49.6	36.5
vol. overlap	24.9	18.6	25.2	42.4	32.4	16.1	17.6	21	34.1	32.1	18	20.8	23	30.9	19.5
Dice	0.573072	0.591415	0.657963	0.747795	0.65587	0.538462	0.620811	0.586592	0.662779	0.86059	0.628272	0.625564	0.704441	0.665948	0.608424
Orig AX vol.	58.7	69	112.8	48.1	163.9	99.6	133	137.3	164.8	122.8	69.4	112	128.2	79.3	35.2
AC AX vol.	95.7	171	120.4	209.4	152.7	78.8	140.3	134.2	207.9	113.2	165.5	181.4	95.4	161.7	0.2
vol. overlap	38.8	61.2	81.5	42.8	109.3	58.3	100	102.2	134.5	79	60.3	95.9	77.5	65.9	0.1
Dice	0.502591	0.51	0.698971	0.332427	0.690461	0.653587	0.731797	0.752855	0.72176	0.669492	0.51341	0.653715	0.693202	0.546888	0.00565
Orig Breast vol.	558.7	486.9	411	1542.3	738.6	484.5	1267.2	424	486.2	576.9	1086.8	768	427.4	507.3	164.9
AC Breast vol.	615.6	694.3	403.3	1988.2	1051.7	544	1321.5	495.3	603.4	646	1352	1051.3	475.6	626.4	48.8
vol. overlap	519.9	463.7	334.9	1500.5	715.8	464	1120.8	389	454.1	575.4	1058.1	753.2	397.8	477.8	46.8
Dice	0.885464	0.785134	0.822547	0.850021	0.799643	0.902285	0.865917	0.846296	0.833517	0.941042	0.867722	0.828011	0.881063	0.842904	0.437997

Figure 1: The patient specific (1-15) results comparing the original physician drawn volumes (Orig) and the AutoContour drawn volumes (AC) for the supraclavicular lymph nodes (SCV), axilla lymph nodes (AX), and the breast (Breast).

Physician and AutoContour Comparison

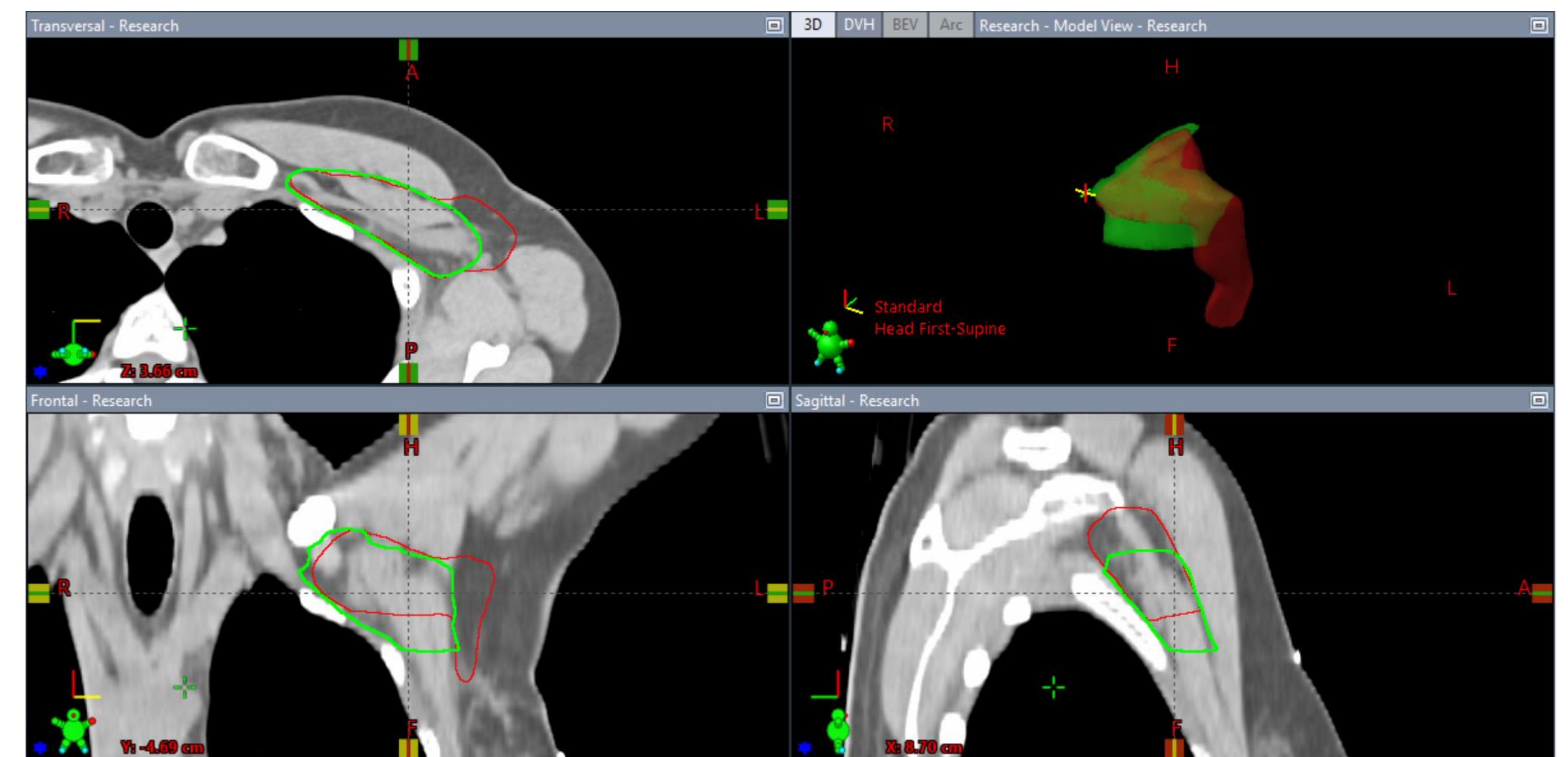


Figure 2: Patient 1. Comparison of the original physician drawn axilla nodes (green) and the AutoContour drawn axilla nodes (red).

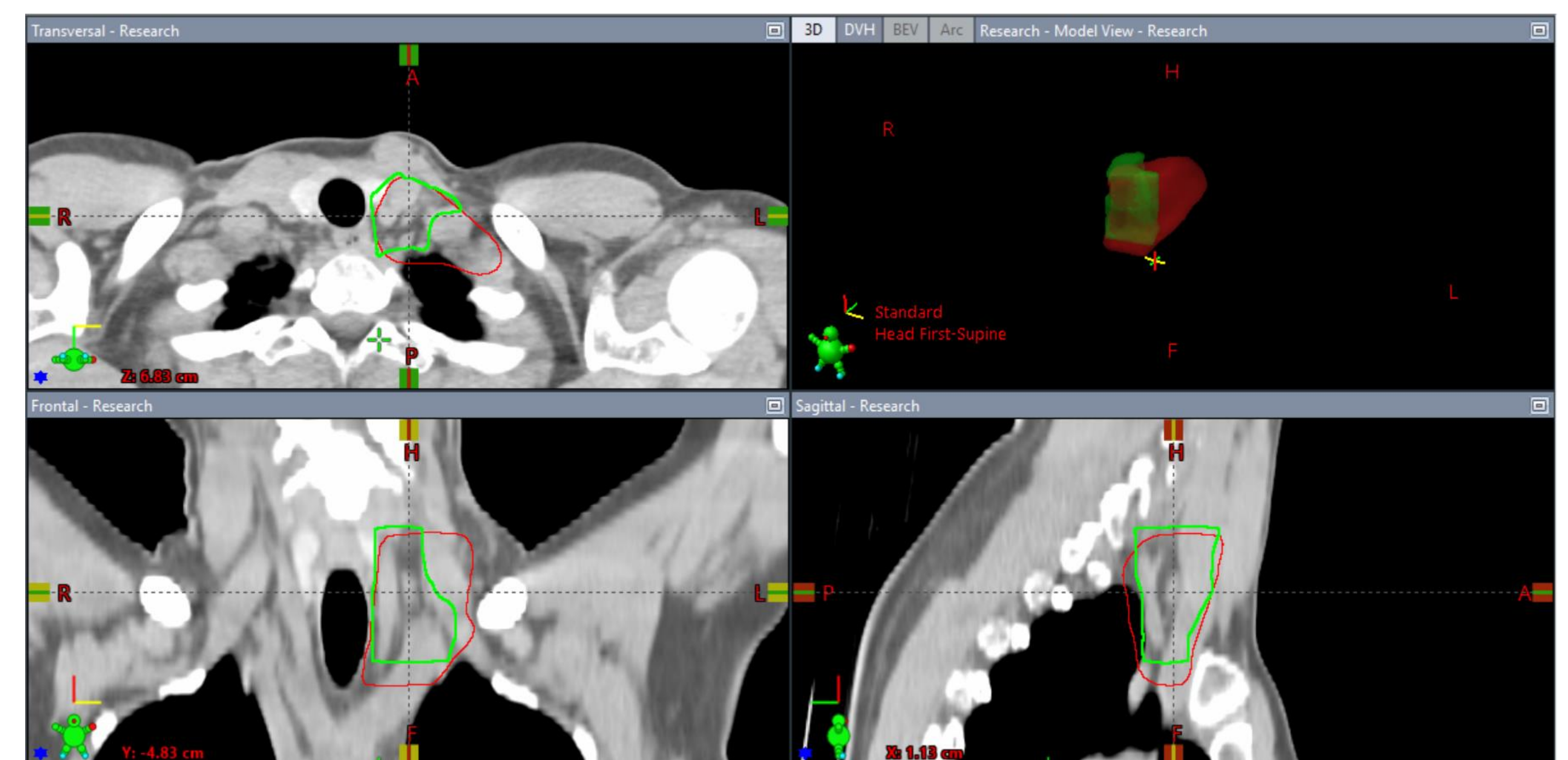


Figure 3: Patient 1. Comparison of the original physician drawn supraclavicular nodes (green) and the AutoContour drawn supraclavicular nodes (red).

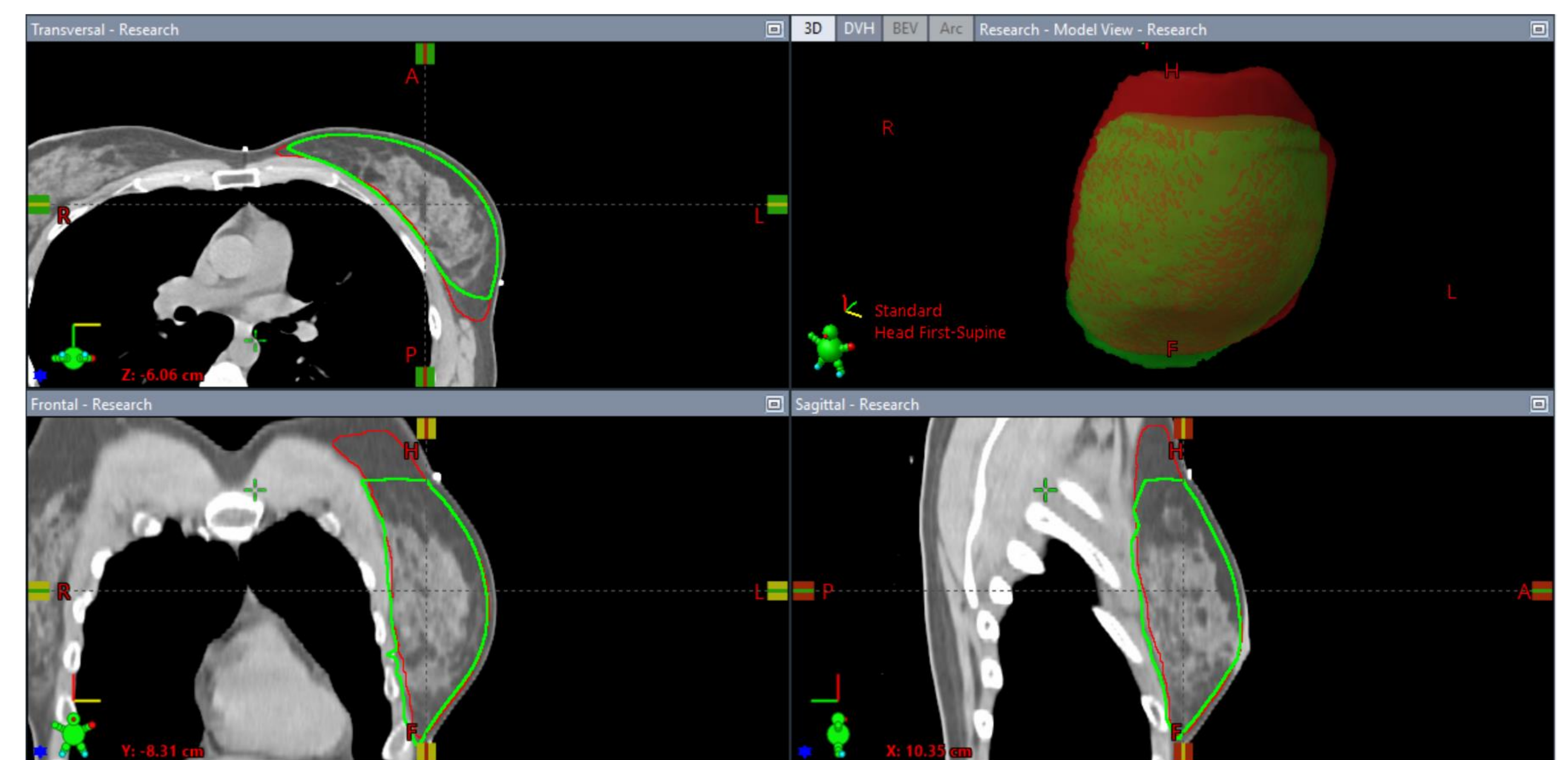


Figure 4: Patient 1. Comparison of the original physician drawn breast (green) and the AutoContour drawn breast (red).