

Objective cosmetic analyses after breast surgery with the breast analyzing tool (BAT)

correlates with subjective and objective scores: A new tool for prospective trials

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Abstract

Objective: Objective cosmetic analyses are important to reproducibly evaluate cosmetic outcome after oncoplastic surgery, breast conserving surgery or new radiotherapy methods such as partial breast irradiation. We developed a novel objective scoring software, the breast analyzing tool (BAT©), to measure cosmesis using a single frontal picture. **Method:** Images from 129 breast cancer patients after breast-conserving therapy and radiotherapy were analysed with the software. Distances from the breast border to the nipple, from the jugulum to the nipple and the breast circumference of one breast were subtracted from the other. The difference in pixels translated to a breast symmetry index (BSI) by using a mathematic formula. This results in a BSI ranging between 0 (excellent cosmesis) and 11 (bad cosmesis). The results were correlated with the subjective Harris scale ranging from 1-4 (excellent, good, fair and poor cosmesis) and another objective tool, the breast cancer conserving treatment cosmetic result (bcct.core) software. Subjective analyses were done by students (n=4), surgeons (n=10) and experts in breast surgery (n=2) as well as by international experts using a Delphi procedure (n=13). **Results:** All subjective scores correlated significantly (p<0.05) with the BAT score with a Pearson correlation coefficient of 0.719 (students), 0.697 (surgeons), 0.760 (experts local) and 0.60 (experts international). There was also a significant correlation between the bcct.core and the BAT software with a correlation coefficient of 0.581. **Conclusion:** The BAT software is ready to be used for prospective and retrospective trials in local breast cancer therapy.

Background and AIM

The use of new techniques such as partial radiotherapy and oncoplastic surgery may improve cosmetic outcome. Objective tools to reproducibly evaluate cosmetic outcome are necessary for prospective trials. We aimed to develop a simple, easy-to-use and globally applicable software to analyze cosmesis after breast-conserving therapy.

Materials & Methods

Digital pictures from patients' frontal view are taken and uploaded into the software (breast analyzing tool = BAT©). Landmarks such as the jugulum and the nipple are marked (Fig.1) and distances between these landmarks are measured, introduced into a formula resulting in a breast symmetry index from 1 to 11 (1-2 excellent, 3-5 good, 6-8 fair, 8-9-11 poor). This score has been used in 60 patients and correlated with subjective analyzing scores using the Harris scale (excellent to poor)

Results I

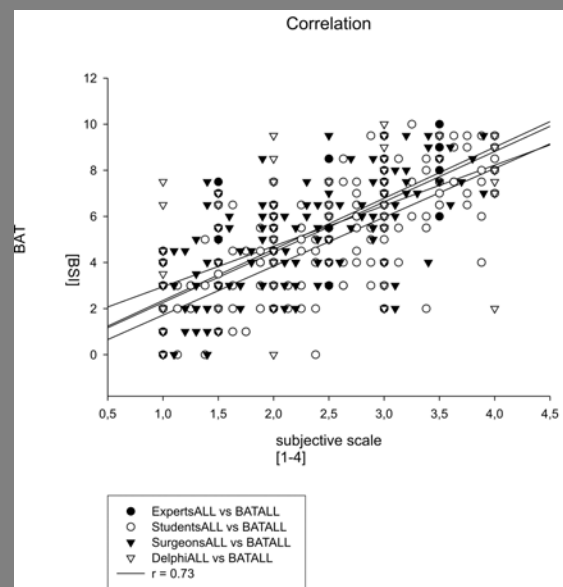


Fig 2

There is a significant correlation between subjective Harris scale and objective BAT scores (Spearman p<0.05)

Material & Methods

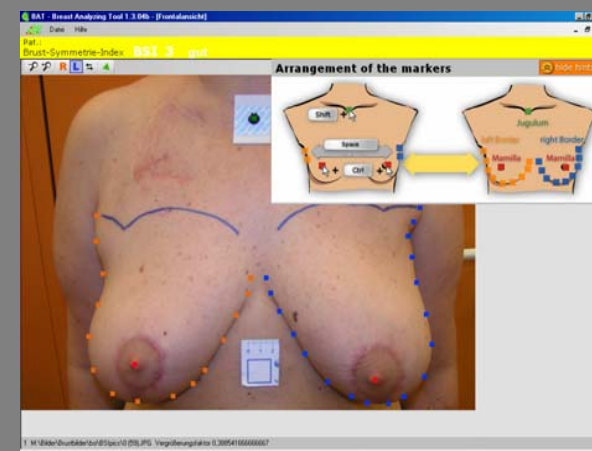


Fig 1

Frontal picture after oncoplastic surgery scanned into the software program

Result 3 indicates good symmetry

Results II

		Linear Regression	Pearson Correlation
		r	p
Analyses comparing between different observers	A vs B	0.913	8.0x10 ⁻¹¹
	A vs C	0.979	2.4x10 ⁻¹⁷
	A vs D	0.984	7.9x10 ⁻¹⁹
	B vs C	0.854	5.5x10 ⁻⁸
	B vs D	0.868	1.8x10 ⁻⁸
Analyses from the same	C vs D	0.987	9.0x10 ⁻²⁰
	A day 1 vs 2	0.967	0.8x10 ⁻¹⁶
Observer comparing two different days	B day 1 vs 2	0.911	0.1x10 ⁻⁸
	C day 1 vs 2	0.992	2.5x10 ⁻²³
	D day 1 vs 2	0.969	5.0x10 ⁻¹⁶

Table 1

Comparison between different observers (A, B, C, D) measuring objective analyses with the BAT from 27 different patients. The linear regression shows a very close similarity between the values of different observers and between different days which correlated significantly demonstrated by the Pearson Correlation test

Summary

This objective breast cosmetic analyzing tool is very straight forward, easily applicable and highly reproducible. Agreements between different observers using the BAT software as well as correlation between subjective scales and the objective BAT scales are excellent and thus, this objective tool should replace subjective analyses in future trials.

References

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