Editorial

Is three better than two? The use of 3D scanners in the assessment of aesthetic results in local breast cancer treatment

Aesthetic results of local treatment of breast cancer, comprising surgery and radiotherapy, have always been difficult to evaluate in a concise way.

The obstacles to aesthetical evaluation are familiar to all clinicians working in the field, and since the establishment of conservative breast cancer treatment as an alternative to mastectomy a myriad of methodologies have been used to evaluate aesthetic outcomes. But while oncological results are more easily measurable aesthetic outcomes are difficult to evaluate. Who should evaluate, what needs to be evaluated, when should results be measured and how should this be performed have remained unanswered questions in the topic of aesthetic evaluation.

Subjective appreciation of patients using qualitative scales was the norm until 1985 when Pezner showed the limited usefulness of subjective evaluation due to a very low agreement between observers.[1] Pezner again, in the same year made the first real transition from subjective evaluation to objective measurement of asymmetry, with the introduction of the BRA (Breast Retraction Assessment), demonstrating a good correlation of this asymmetry difference between breasts, in classic breast conservative treatment, with the final aesthetic result evaluated subjectively.[2]

However, either using subjective evaluation and/or objective asymmetry measurements, available methods for evaluation of aesthetic results remained without a gold standard.

To make matters even more difficult, patients' self-evaluation, in spite of its fundamental importance in the process, was very difficult to integrate into overall aesthetic outcome as patients' impressions seldom coincide with evaluation by healthcare professionals.

Until the 21st century the lack of a standard method remained, leading to time consuming and difficult processes that included, in most series, the simultaneous use of several methods: subjective, objective and patients' self-evaluation. In addition, the lack of standardization resulted in the impossibility of comparing outcomes from different centers.

Professionals treating breast cancer were aware of the heterogeneity of aesthetic results in conservative treatment but remained unable to measure outcomes in a standardized way.

By 2005 oncoplastic surgery paved the way trying to improve some of the bad results in breast conservation treatment using techniques familiar to plastic surgeons like breast reduction mammaplasties.

At this point in time it became even more important to have feedback on cosmetic results, not only to evaluate the quality of treatment but, even more important, to be able to predict how a certain technique applied to a certain patient would result, regarding short and long term outcomes.

This need for predicting aesthetic results was also applied in radical surgery because mastectomy with reconstruction became synonymous of several alternatives, like implants or tissue replacement techniques, with different aesthetic outcomes.

The development of oncoplastic surgery along with new radiotherapy techniques was, unfortunately, not parallel to the achievements in cosmetic evaluation methodologies.

In 2007 two papers were published transmitting new insights into objective evaluation of aesthetic results in breast conservative treatment, both using digital face-view images of patients. The BAT software from the Fitzal group in Vienna,[3] using essentially the extraction of symmetry differences from both breasts, and the BCCT.core software from our group in Porto[4] extracting in addition to symmetry, color and scar differences.

During the last five years the BCCT.core software, available for online download, has been progressively used by several groups for the evaluation of aesthetic results in breast cancer local treatment.

More recently, the development and introduction of 3D scanners, reinforced surgeons' ideas that two dimensions are not enough to evaluate the shape of the female breast and as a consequence to evaluate the impact that surgery and radiotherapy have on it.

Is three better than two?

We don't really know because 2D technologies have not been fully evaluated.[5]

In the paper by Eder et al[6] published in this issue of the journal a 3D surface scanner was used to evaluate asymmetry by superimposing the left and right breasts. In 23 post-mastectomy free TRAM reconstructions, 3D evaluation was compared with the BCCT.core software. Results suggest that 3D evaluation is significantly more precise and observer independent than the 2D semi-automatic evaluation.

Another paper by Ahcan et al[7] describes the use of 3D imaging for the construction of a breast replica destined to help the modeling of a new breast in delayed breast reconstruction.

These are promising results for 3D breast imaging but far from a gold standard in aesthetic breast evaluation and prediction. 3D has the clear potential to evaluate the volume and form of the breast more accurately, but several problems remain unsolved. Cost and feasibility, in spite of recent improvements, continue to

be important issues to clinicians. Software algorithms are still in evolution and will probably remain so for some time. Colour and scar evaluations have not been included and these features are traditionally considered important. Ptotic breasts and changes induced by patient movements may pose additional challenges in 3D evaluation.

With the advances in breast cancer local control and prolonged survival, aesthetic results have gained importance, and professionals must join efforts to develop standard methodology that will allow improvement in performance.

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