viduals who carried out most of the previous studies of the device were not specifically looking for fat atrophy, however, and subtle degrees of change could have been missed in many of the studies published to date.

The Thermacool TC device protects the epidermis from the effects of radiofrequency energy with a cryogen, and focuses the greatest amount of energy on the dermal layer. Heat would be expected to gradually dissipate with distance from the primary area at which the energy is focused. Localized heat from the device is reported to be generated up to 8 mm from the epidermal surface. This could clearly expose the superficial subcutaneous fatty layer to a significant amount of heat energy. It appears, therefore, to be a realistic possibility that subcutaneous fat damage and atrophy could occur as a result of treatment with the device.

The likelihood of this complication could conceivably vary with the handpiece utilized, the pressure with which the handpiece is applied to the skin, the anatomic area being treated, and the relative thickness of the patient's skin. As use of the device expands and more long-term results become available, the true incidence of this complication and the factors that contribute to it will, it is hoped, become better defined. I hope that Dr. Youn's letter will encourage future researchers to pay particular attention to this potential complication.

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An Objective System for Measuring Facial Attractiveness

Sir:

Dr. Guyuron[1] addressed several problems in the way of analyzing facial attractiveness in the article by Dr. Bashour.[2] We also tried to apply the facial mask as a facial analyzing tool since Marquardt[3] introduced the golden facial mask on the Internet, but our efforts were in vain. We encountered some contradictory examples when using the facial or phi mask to analyze facial attractiveness in subjects of different ethnic backgrounds. For example, when the mask was tested on

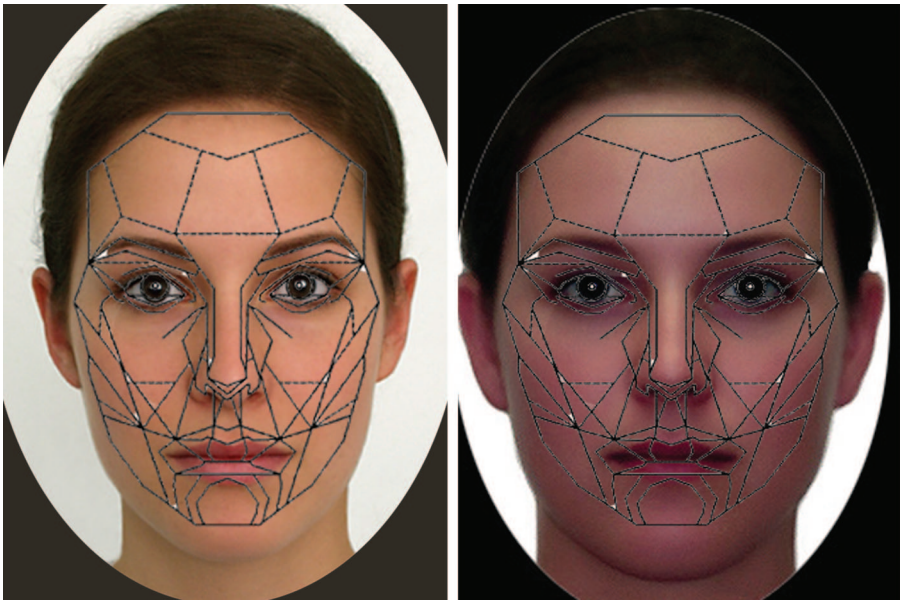

Fig. 1. Application of the Phi mask to an average or attractive composite face. It is possible to extract the Phi mask from Bashour's article using Adobe Photoshop 8.0 (Adobe Systems, San Jose, Calif.) to overlap and freely transform the Phi mask on a facial image. (*Left*) The Phi mask applied to an attractive German face. (Original photograph reprinted with permission from Martin Gruendl, Prototypic female face of high attractiveness. Available at http:// www.beautycheck.de/. Accessed May of 2006.) (*Right*) The Phi mask applied to an average Caucasian face. (Original photograph reprinted with permission from Rhodes, G., Lee, K., Palermo, R., et al. Attractiveness of own-race, other-race and mixed race faces. *Perception* 34: 319, 2005.)

average or attractive composite morphing faces created by Chung,[4] Gruendl,[5] and Rhodes et al.,[6] we found hardly any facial features that explained the relationship of the mask to attractiveness among races (Fig. 1). Bashour wrote that the phi mask method relies on the hypothesis that attractiveness is averageness, but there is controversy regarding the significance of *average* and *attractive*. Perrett et al.[7] insisted that highly attractive facial configurations are not average. It was proved that attractive faces are very different according to race.[7,8] The concept of facial beauty is not a fixed one, and it differs according to time, generation, age, sex, and racial or ethnic background. There is no golden key to open every door for analysis of facial attractiveness among races.

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Reply

Sir:

I am thankful for the opportunity to respond to Drs. Rhee and Koo's letter. I, too, tried to apply Marquardt's phi mask to sample faces when it first became available and could only find poor correspondence in many cases where the face was clearly attractive. However, the mathematical modeling system I created using the phi mask as a template is in no way the same thing as applying the mask to an individual face and seeing how well it fits. Eyeballing two or even 60 or more individual faces with superimposed masks without attempting mathematical correlations is a futile and useless exercise.

I, too, disagree with Dr. Marquardt's assertions[1] that by simple application of the phi mask a determination of the attractiveness of a subject can be made. I proved this directly in the research when I showed that, in its rudimentary form, the phi mask at best describes only 25 percent of the variance in attractiveness in a two-dimensional neutral repose photograph of a white European female face.[2] Marquardt originally stated that the phi mask could be used for any race and either sex to determine attractiveness—that it was in fact, to use Drs. Rhee and Koo's words, "a golden key to open every door for analysis of facial attractiveness among races." Indeed, one of my original intentions on starting this research more than 8 years ago was to discredit the sweeping, almost mystical properties Dr. Marquardt attributed to the phi mask, which had caught the attention of the media and the public.

I took pains in both my doctoral dissertation[3] on the subject and my recent articles[2,4] to make clear that (1) I was using the mask to analyze only faces of white European extraction, (2) the mask was created by Dr. Marquardt using white European female models from fashion magazines, (3) the mask mathematical model generated does not work well for male faces, and (4) it likely (even though we did not test this) would not work well for faces of other races.

Finally, when talking about "average," "averaged," "averageness," attractiveness, and/or beauty, it is important to be clear about definitions. The major problem with the literature on the subject is a lack of defined terminology.

The old controversy with the term "averageness" in the literature stemmed from confusion in the definitions each author was using; this controversy has since been sorted out.[5] It is now largely accepted by researchers in the field that averageness can "explain how and why we prefer attractive faces," that it is "a necessary fundamental characteristic of perceived attractiveness in the human face," and that it "is the only characteristic discovered to date that is both necessary and sufficient to ensure facial attractiveness."[6] Drs. Rhee and Koo's statement that "[i]t was proved that attractive faces are very different according to race" is categorically false. In fact, quoting from the article they cite by Perrett et al.,[7] "Caucasian and Japanese subjects showed the same pattern of preferences with the same face stimuli. This is consistent with previous findings of greater similarities than differences in cross-cultural judgments of facial attractiveness,"[8] and "the similarity of attrac-

tive facial characteristics across two cultures is consistent with the claim that such characteristics are functionally significant." Please refer to my dissertation for citations too numerous to list here showing that attractive faces are much the same according to races.

Attractiveness and beauty are also not interchangeable terms. I could not agree more with Drs. Rhee and Koo's statement that "[t]he concept of facial beauty is not a fixed one, and it differs according to time, generation, age, sex, and racial or ethnic background." However, facial attractiveness as defined in our works (i.e., "The time-static visual properties of a face in a photographic two-dimensional frontal repose image that are pleasing to the visual sense of an observer") is not beauty and can indeed be objectively measured, as we have conclusively shown.
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The author has no financial interest in any of the information disclosed in this communication.

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Age as an Exclusion Criterion for Breast Reconstruction

Sir:

I read with interest the article by Bowman and colleagues in the July 2006 issue of the *Journal* entitled "Breast Reconstruction in Older Women: Should Age be an Exclusion Criterion?"[1] The article draws our attention to the need to engage our patients in an early discussion of the reconstructive options open to them after primary breast surgery for benign and malignant conditions.

The authors conclude that all types of breast reconstruction can be performed in healthy women over the age of 60 years with an acceptable complication profile and high patient satisfaction. However, several features of the study require the conclusions to be approached with a degree of caution.

Women over the age of 60 were asked if age should be considered before breast reconstruction is offered. Fifty-six of 61 respondents (of a total of 75 patients) agreed that it should not. Fifty-four (88.5 percent) said that they would opt for the same treatment again. However, a sample bias is inevitable because most of these patients were, at the time of the survey, survivors of oncological and subsequent reconstructive surgery. Hence, they were likely to have a positive view of the treatment option provided for them. Since the average follow-up time was only 3.8 years, a longer follow-up period would be necessary to encounter any change in attitude should a recurrence or long-term surgical complication occur.

The authors site Godfrey et al.[2] when they describe fungating lesions and tumors fixed to the chest wall as absolute contraindications to reconstructive breast surgery, but they do not provide information about the diagnoses and tumor staging of their patient sample, which would have influenced the type and timing of reconstruction and may have therefore influenced subsequent patient satisfaction.

The authors support the conclusion that the time to offer a reconstruction is at the time of planning the primary surgical procedure. The evidence cited for this is that all of the respondents who were not consulted about the option of immediate reconstruction felt that they should have been. However, the results of the survey[1] showed that neither the type nor the timing of surgery made any significant difference to patient satisfaction. Hence, this was of less importance to patients than other outcome measures.

To provide a control for the general health of the respondents, the authors use a Short Form-12 survey, comparing results in eight domains of health with the average for patients between the ages of 65 and 74 years. Although the authors concede that the respondents scored higher than did the general population control, they point out that only the physical health summary score was significantly better. However, as the mean age of respondents was 66.6 years, a control group aged between 65 and 74 years seems to be in-