

Histological Validity and Clinical Evidence for Use of Fractional Lasers for Acne Scars

A timely article appears in this journal on various fractional laser devices, which while using a number of disparate wavelengths all have the central aim of improving the lot of patients suffering the effects of post acne scarring.

The article attempts to compare the depth of beam penetration and the factors that relate to and produce this penetration depth. It is presumed that this depth is responsible for the perceived improved effects on scarring vis-à-vis older style resurfacing broader but more superficially damaging techniques (fully ablative laser skin resurfacing, dermabrasion, and chemical peeling), even though the evidence is still scant.

The article is excellent in giving insights into, and asking questions about, aspects that are missing in our literature and the authors are to be congratulated on being able to piece together any conclusions at all from this disparate information.

Indeed the authors were faced with a situation where we have little cohesion or agreement in:

1. An agreed scale of categorizing post acne scarring. If everybody uses different scales for description,^[1-6] there is little hope to compare outcomes with different operators, using different techniques on different populations on different scar types and different levels of severity. A standardized approach is suggested as necessary by the authors and I would certainly agree it is time for interested people in the production of literature on post acne scarring to reach a consensus on approach to description as first base.

2. What depth of penetration means to the result. Although intuitive that depth of penetration may be important for deep scar types, is it so for more superficial rolling or discolored scars. Going for depth may mean that less of the surface can be targeted to keep the bulk heating to safe levels. This may mean that paradoxically the superficial scar types are not as much affected, as we would hope. The article rightly questions whether these fractional devices are the ideal for scar types such as ice pick scars? I would add dystrophic scars with tunnels and bridges and atrichial scars in the middle of male bearded areas where surgical approaches such as punch and surgical scar removal techniques may be required^[5] or strong focal trichloroacetic acid treatments^[7] may be necessary for optimal results in combination with these fractional laser treatments. Fractional lasers are certainly not going to substitute for severe volume loss and for the effects of movement on scarred skin where other technologies such as fillers and neurotoxins may be required.^[8] So we are left with box car type scarring and deep rolling scarring as the main targets for deep fractional devices which may be a narrow market if that is our only approach.
3. What histological studies mean when trying to interpret depth effects if they are not performed on the face or to actual areas of post acne scarring? I found this aspect of the article a fascinating and useful summary. Certainly off the face skin and *in vitro* studies being used as a depth gauge for the lasers is pertinent for an understanding of what the lasers are capable of producing in terms of cutaneous wound but the question raised by the article is whether this is referable to sebaceous facial and extra-facial skin (let alone scarred skin). Similarly, using periorbital unscarred but wrinkled skin as the substrate makes it difficult to make pertinent assessments as to its effects on facial scarring. However, this is not our greatest impediment and the studies do allow us to make

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certain assumptions about the depths achieved by different lasers and allows the authors their ability to compare these machines in their effects on skin. However, we still do have issues with comparing other effects of the laser beam besides depth, such as the more horizontal effects of the bulk heating effects of CO₂ versus Erbium or the thermal effects of non-ablative fractional devices versus those of the ablative machines.

4. How to best assess subjectively without an agreed patient-reported outcome measure. It is so unscientific of us to ask our patients to quantify improvement in their scarring with treatment from memory or photography. There are so many variables here – the timing of the asking, the memory of the patient, the ability of the patient to judge, their willingness to please, or otherwise. If they are staring at a pretreatment photo, the quality of the photo, the lighting, and the angle of the photo, their ability to “see” themselves objectively. I do not know the answer here but we do need a better patient-reported outcome measure. I must confess that as soon as I see a paper with a patient-reported outcome technique like “mild, moderate, and significant” (or similar scales) improvement used subjectively as the only measure, one can often dismiss the study no matter how useful the technique may appear to be.
5. How to objectively gauge and assess scarring and its improvement objectively is similarly difficult as discussed in the article. As the authors lament a three-dimensional issue is being addressed using two-dimensional techniques largely. This may just be waiting for technology to catch as 3D photography and measurement systems are slowly evolving. Maybe this is our hope for objectivity of analysis, together with better classification of scar types and disease burden.

I am not sure that the authors finally answered their intriguing question posed at the end of their methods

section “to arrive at an unbiased opinion on the superiority, if any, between the two technologies in relation to acne scars” but the journey was very worthwhile and we have learnt a lot along the way.

It would appear from the data presented that each of the technologies is adequate. It probably is more important that an understanding of the parameters specific to the equipment you are using with an understanding of the scar type you are treating is more important than choosing a holy grail of make of machine or that machine’s wavelength.

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