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Introduction. Treatment of burn scars with traditional surgical techniques is challenging due to recurrent contractures. The use of fat grafting in thermal injury has been previously reported only in small clinical series and results are often biased by simultaneous surgical procedures and lack of scientific methods of validation.

Materials and Methods. Our study prospectively evaluates outcomes in 9 patients treated with the "SUFA" technique (Subcision and Fat Grafting) for debilitating contracted burn scars limiting range of motion. Results are evaluated clinically with the Vancouver scale and by range of motion through the affected joints at 1, 3, 6 and 12 months. Scientific validation of the outcomes is performed evaluating dermal thickening and scar remodeling by high definition ultrasound and histology examination with hematoxylin-eosin and monoclonal antibodies staining.

Results. Results show clinical improvement, thickening of dermis and redistribution and reorientation of the collagen fibers within the dermis. Statistical significance ($p<00.5$) has been obtained for all analyzed data. Fat reabsorption occurred with a mean of 40%.

Conclusion. Our study gives scientific validation of the efficacy of subcision and fat grafting in contracted scar. New surgical and diagnostic techniques are illustrated. Our clinical and diagnostic outcomes suggest dermis regeneration secondary to the new fat grafting technique

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