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The use of fibroblast populated collagen lattice as an *in vitro* model for post burn hypertrophic scar wound healing

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Hypertrophic scars are a common problem in the clinic and in surgery daily practice. Despite their relevance, there is a lack of knowledge about their mechanism of formation and alternatives for prevention and treatment. In 1979, Bell et al. showed that culturing fibroblasts in hydrated collagen gels (fibroblast populated collagen lattice, FPCL) led to gel reorganization. This study investigated the differences in matrix reorganization with normal and hypertrophic scar fibroblasts. Fibroblast cultures were initiated from full thickness normal human skin (NHF–n=10) and from hypertrophic scars (HSHF–n=10). Subcultures were seeded in a collagen lattice and then assayed for contractile activity. After, 24 h and 48 h, dishes were photographed and analyzed using image analyzer software. Results were statistically analyzed using generalized estimating equations. There was a significant increase of lattice contraction in the HSHF group when compared to the NHF group. From zero to 24 h, HSHF exhibited a 33% reduction in contraction while NHF contraction was 26%. After 24 h, there was no statistically significant increase in lattice contraction ($p<0.0001$).

In the present study we observed that the maximum contraction occurred during the first 24 h. Despite FPCLs were still visually contracting; the GEE statistical analysis showed no difference in FPCL areas between 24 h and 48 h in both HSHF and NHF lattices. The data obtained in these experiments indicate that this model could be used in hypertrophic scar wound healing studies.