

Matrix remodelling in Dupuytren's Disease – the cause for progressive contracture

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INTRODUCTION:

It is uncertain whether Dupuytren's contracture is purely a result of matrix deposition or whether cellular contractility also plays a role. We determined the relative contributions made by cells and matrix remodeling in an in-vitro model.

METHODS:

Fibroblasts explanted from Dupuytren's nodule, cord and control carpal ligament were seeded into three dimensional collagen matrices and the force generated by their contraction was measured using a culture force monitor. At 8 hours, 24 hours and 48 hours cytochalasin-D was added to inactivate the actin cytoskeleton and the residual force exerted by the collagen matrix was measured.

RESULTS:

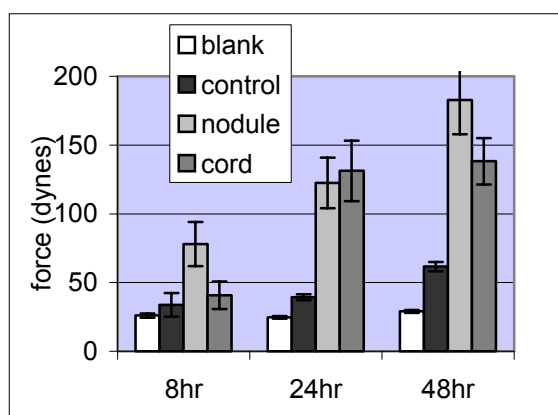


Figure 1. Maximal force generated for $n=3$ blank gels; $n=3$ control cell lines; $n=5$ Dupuytren's nodule cell lines, and $n=4$ Dupuytren's cord cell lines (error bars = standard error of the mean)

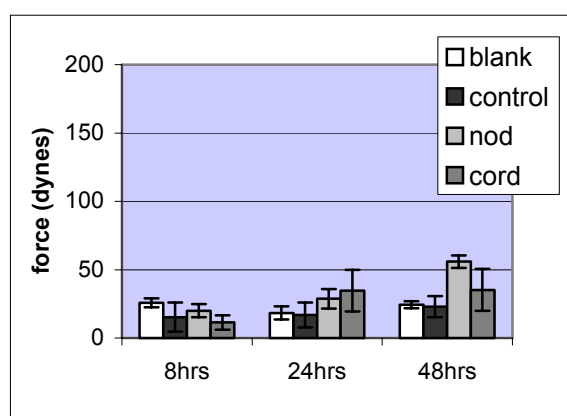


Figure 2. Residual force within collagen matrix after addition of cytochalasin-D at 8, 24 and 48 hours for $n=3$ blank gels, $n=3$ control cell lines, $n=5$ Dupuytren's nodule cell lines and $n=4$ Dupuytren's cord cell lines. (error bars = standard error of the mean)

Dupuytren's fibroblasts generate significantly greater contractile force than control fibroblasts ($p=0.008$), and in the case of nodules retain a significantly greater residual force ($p = 0.027$).

DISCUSSION & CONCLUSIONS:

These results indicate that whilst cellular contraction is the main cause for the progression of the contracture in Dupuytren's disease, remodeling of the matrix is the reason the contracture is sustained.