Dupuytren’s disease shows profound hematopoietic and mesenchymal stem cell abnormalities involving palmar fat and skin in addition to fascia:

Novel implications for pathogenesis and therapy

Hindocha S¹
Iqbal SA¹
Farhathullah S¹
McGrouther DA¹,³,⁴
Paus R²,³
Bayat A¹,³,⁴

¹ Plastic & Reconstructive Surgery Research, Manchester Interdisciplinary Biocentre, Manchester. M1 7DN.
² Department of Dermatology, University of Luebeck, Luebeck, Germany.
³ Epithelial Sciences Research Group, School of Translational Medicine, University of Manchester, Manchester, UK.
⁴ Department of Plastic & Reconstructive Surgery, South Manchester University Hospital Foundation Trust, Wythenshawe Hospital, Manchester, UK.

Keywords: Dupuytren’s disease, Dupuytren contracture, nodule, cord, fibroblasts, fat, adipose tissue, stem cells, palmar fascia, skin overlying nodule.
Abstract

**Background:** DD is a common fibroproliferative disease affecting the hand. Myofibroblasts found in the DD palmar fascia are responsible for digital contracture. However, their exact source is unknown. Palmar skin and fat-derived cells as a potential origin of abnormal cells remains underexplored.

**Objective:** To characterise hematopoietic and mesenchymal stem cells in Dupuytren’s disease (DD) fascia, fat and skin compared to carpal tunnel control.

**Methods:** Nine DD patients with digital fixed flexion deformity were enrolled, and biopsies taken from the diseased cord, nodule, peri-nodular fat, distant palmar fat and the skin overlying the nodule. Fluorescence Activated Cell Sorting (FACS), immunohistochemistry and quantitative real time polymerase chain reaction (QRT-PCR) were used to identify expression of five mesenchymal (CD’s 13, 29, 44, 90, 166) and two haematopoietic (CD’s 34,117) stem cell markers.

**Results:** There was a significantly higher expression of CD13 in all examined DD tissue sites compared to controls ($p=0.02$). In addition CD44 was significantly over expressed in the cord and nodule ($p=0.02$), while CD34 was over expressed in the skin overlying DD nodules ($p=0.008$). The mean number of positive cells expressing all stem cell markers were significantly greater in the DD cord compared to carpal tunnel fascia ($p=0.003$).

**Conclusions:** This study provides the first detailed characterization of mesenchymal stem cells in DD which are predominantly located in the cord. DD appears to represent a benign
tumour that may potentially result from abnormal mesenchymal progenitor cell expansion than a primary inflammatory disorder. If confirmed, adipodermofasciectomy may be a potentially important primary therapy.