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# THE OUTCOME OF SURGICAL TREATMENTS FOR PRIMARY DUPUYTREN'S DISEASE – A SYSTEMATIC REVIEW

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**There is no consensus on the most effective operation for primary Dupuytren's contracture. This systematic review evaluates the reported rates of recurrence and complications, as well as the strength of evidence, for individual procedures. The PubMed and EMBASE databases were searched for papers in English containing 'Dupuytren' in the citation. The initial search produced 2155 references, of which 69 papers met the study inclusion criteria. There was wide disparity in scoring systems, definition of recurrence and recording of complications. Follow-up ranged from 3 weeks to 13 years, and recurrence from 0 to 71%. There are only three Level I studies comparing surgical techniques for the treatment of primary Dupuytren's contracture, and the evidence does not support one procedure above another, other than to show a particularly high recurrence rate after needle fasciotomy. We propose a minimum data set for future studies.**

**Keywords:** Dupuytren's surgery, systematic review, hand

## INTRODUCTION

In 1614 the Swiss physician Felix Plater described the flexion contracture of the fingers, which was subsequently eponymously attributed to Baron Guillaume Dupuytren (Tubiana et al., 2000). Since then there has been debate regarding the best way to treat this condition. Various non-surgical measures have been suggested, including vitamin E, radiotherapy and steroid injections, but these have been mostly discounted as ineffective or inferior to surgery.

Operative procedures for correction of flexion contractures due to Dupuytren's disease can be broadly divided into four categories: simple fasciotomy, either percutaneously (Dupuytren, 1834) or through small incisions (Luck, 1959); limited or partial fasciectomy with removal of only the diseased areas of tissue (Hamlin, 1952); total or radical fasciectomy (Skoog, 1948); and dermofasciectomy (Hueston, 1984). Within these broad categories there is further variation, with palmar wounds being left open to heal secondarily (McCash, 1964), longitudinal incisions closed by Z-plasty (McGregor, 1967) or zig-zag incisions closed directly (Bruner, 1967).

This study evaluates the literature supporting individual procedures for the treatment of primary Dupuytren's contracture, and assesses their reported rates of recurrence and complications, to determine whether a particular technique appears more favourable than the remainder.

## METHOD

There were two literature searches. One used the software Reference Manager (V11, Thomson Reuters, New York, USA) and the other Ovid to search the PubMed and EMBASE databases respectively. The words 'Dupuytren' or 'Dupuytren's' were searched for in all English language citation fields from 1950 to July 2009. The citations identified from these two searches were combined and duplicates excluded. All citations for papers clearly referring to a topic other than Dupuytren's disease of the hand were excluded, as were others whose title clearly showed that the paper was not relevant to the present study. Full copies of the remaining papers were obtained and assessed, and any referring only to recurrent disease were excluded. Papers concerning both primary and recurrent surgery were included only if the data for the primary operations could be extracted. Papers reporting data on the treatment of primary Dupuytren's disease in the hand were included.

Data, when available, were collected on the type of study (e.g. retrospective case series), the mean and range of the ages of patients, the number of subjects (patients, hands, rays), the mean and range of the follow-up period, the type of surgical procedure, the grade of operating surgeon, the recurrence rate, complication rates (specifically vascular and nerve injury, haematoma, complex regional pain syndrome (CRPS), infection, skin necrosis, wound dehiscence and skin breach) and outcome measures.

Individual study bias was not assessed and detailed statistical analysis was not possible, given the wide variety of surgical options.

## RESULTS

The searches of PubMed and EMBASE produced 1045 and 1895 references respectively. After exclusion of duplicates there was a combined total of 2155 references, of which only 676 referred to Dupuytren's disease. A large proportion of the excluded papers originated from the Hôpital Dupuytren in Limoges. Of the 676 citations, 233 had no abstract, and 139 of these had titles suggesting they did not refer to treatment of Dupuytren's contracture, leaving 94 possible articles. Of the 443 citations with abstracts, 354 clearly did not concern the treatment of primary Dupuytren's disease, leaving 89 possible articles. The 183 possible papers were obtained and examined, revealing that 67 fulfilled the criteria for inclusion in this study. Two further papers were added from 1946 and 1948 (prior to the search period), having been found in reference lists from included papers.

The final dataset comprised 69 articles, published between 1946 and 2009. There were 57 retrospective case series, seven prospective case series, two prospective quasi-randomized controlled clinical trials and three prospective randomized controlled clinical trials. One of the two prospective quasi-randomized controlled clinical trials used pseudo-randomization by alternating cases (Citron and Hearnden, 2003), the other comprised two sequential groups (Skoff, 2004). Thus the 69 studies comprised three Level I, two Level II, two Level III and 62 Level IV studies (Howick, 2009).

Forty-six (67%) of the 69 papers presented the mean age at surgery and 23 (33%) of these also reported the age range. Eighteen (26%) gave no average age (two of these reported the age range) and five (7%) quoted a median or modal age.

Fifty-nine papers (86%) reported the number of patients included, 31 (45%) the number of hands and 17 (25%) the number of digits. Five (7%) papers gave all three. Fifty-five (80%) papers gave a clear average follow up length of time, 29 (42%) provided a range and 24 (35%) papers included both. Four (6%) gave a measure of 'greater than' or 'less than' a time period. Two (3%) papers simply described 'late' follow-up.

Fifty (72%) papers reported the results of a single technique: 28 (41%) limited (regional) fasciectomy; nine (13%) percutaneous fasciotomy; six (9%) total fasciectomy; three (4%) segmental fasciectomy; three (4%) open fasciotomy and one dermofasciectomy. Six (9%) gave a comparison of two techniques and the remaining 14 (20%) had reviewed a combination of procedures. Forty-one papers (59%) did not report the number or experience level of the operating surgeons. Fifteen (22%) reported operations performed by a single, senior surgeon and seven (10%) had all cases performed, or directly supervised by, a senior surgeon. The remaining six (9%) papers had more than one surgeon, but their experience level was not specified.

### Recurrence

There was no agreed definition of recurrence, and not all papers stated the standard they were using. The commonest definition was the 'reappearance of Dupuytren's tissue in a zone previously operated on' (Tubiana et al., 2000). Reported rates of recurrence ranged from 0 to 71%. Fifty-one (72%) papers gave a clear rate of recurrence, 16 (23%) gave no rate, one gave a rate of 'failure' (defined as recurrence, CRPS, a limitation to activities of daily living or less than 80% of total active movement), one combined recurrence with extension, and one reported the recurrence rate as 'negligible'.

### Complications

Forty-three (62%) papers quoted rates for specific complications: haematoma in 24 (35%) papers, nerve injury in 27 (39%), CRPS in 22 (32%) and infection in 17 (25%). One reported the number of cases requiring further plastic surgery input (for skin necrosis), and one presented a rate of 'wound problems', without expanding further.

### Outcome measures

Thirty-five papers (51%) reported the improvement in extension and seven (10%) reported the results as excellent, good, fair or poor: in five papers (7%) this was according to their own criteria and in two (3%) it was according to published criteria (Einarsson, 1946; Honner et al., 1971). Six articles (9%) reported the improvement in the Tubiana score from its preoperative level. Three (4%) reported two point discrimination, four (6%) the total range of motion and two (3%) the rate of recovery or time to return to work. Eight (12%) used a functional or subjective patient-based assessment, but not all were validated measures.

### Papers comparing two procedures

Six papers reported a comparison between two groups undergoing different operative procedures:

1. Matton and Beck (1982) treated their first group (55 hands) with either longitudinal palmar incisions which were closed by Z-plasty or Bruner's incisions

which were closed directly. The second group (119 hands) underwent palmar surgery through a transverse incision. They did not specify the follow-up period, but reported recurrence requiring reoperation rates of 4% and 2% in the two groups respectively. No statistical analysis was undertaken.

2. Citron and Hearnden (2003) prospectively compared open fasciotomy using direct closure of a transverse palmar incision (14 patients) with a longitudinal incision closed by Z-plasty (13 patients) in two pseudo-randomized groups. They found statistically different recurrence rates of 50% for the former, and 15% for the latter, at a mean follow-up period of 2.2 years. They defined recurrence as the reappearance of Dupuytren's tissue in the operative field.
3. Skoff (2004) prospectively studied limited fasciectomy in two pseudo-randomized groups. The first had an 'open palm' technique in which diseased tissue is excised through a transverse palmar incision which is left open to heal secondarily (10 patients). The second used the same incision but covered it with a full-thickness hypothenar skin graft (20 patients). After average follow-up periods of 3.5 years and 2.7 years for the two groups, he found a statistically significant difference between recurrence rates of 50% for those treated without a skin graft, and 0% for those treated with a graft. He did not define recurrence.
4. Citron and Nunez (2005) randomized two groups to undergo limited fasciectomy through either a longitudinal incision, which was closed by Z-plasty (33 patients), or a Bruner's incision, which was closed with Y-V plasties (46 patients). They found recurrence rates of 33% for the longitudinal incision and 18% for the Bruner's incision, which were not significantly different. Recurrence was defined as any new nodule of disease in the operative field under the flaps.
5. Van Rijssen et al. (2006) reported two prospectively pseudo-randomized groups. The first underwent percutaneous needle fasciotomy (88 rays) and the other limited fasciectomy (78 rays). They were examining early functional improvement, and gave no recurrence data. At 6 weeks, the improvement in extension was statistically better in the limited fasciectomy group (79% vs. 63%), and patient satisfaction was higher.
6. Ullah et al. (2009) prospectively randomized two groups to receive either a 'firebreak' full thickness skin graft (44 fingers) or direct Z-plasty closure (46 fingers) after limited fasciectomy. By 3 years, they found recurrence rates of 13.6% for the former group and 10.9% for the latter, with no statistical difference in their functional result or complications.

## DISCUSSION

Although an abundance of papers have been published about this common disease, critical comparison of techniques or results is impossible due to major inconsistencies in reporting. Patient demographics are not standardized, and there is no agreement on the timing of follow-up appointments for the study of postoperative recovery of function or the detection of complications of surgery or disease recurrence. The lack of standardized follow-up times or definitions of disease recurrence and extension means that authors define criteria themselves, precluding any comparison of data.

The outcomes of surgery are also reported inconsistently, using a variety of objective measurements of functional improvement. Few authors have used a patient-based reporting method to analyse the functional outcome of surgery.

In order to produce meaningful data we recommend that future studies report a minimum dataset to include the mean and range of patient age; the number of patients, hands and rays operated upon; a clear and agreed definition of recurrence (future papers might assess recurrence according to several definitions and produce "recurrence rates" based on each, but our preference would be the presence of any Dupuytren's tissue in an area previously operated upon, which causes a contracture greater than that present after the previous surgery); minimum and narrow follow-up intervals, rates of the common complications and both objective and subjective measurements of operative outcome. Shaw et al. (1996) used a Kaplan–Meier survival curve to record time-points of failure, and we would support this as a sensible method of examining recurrence.

We would suggest that scoring questionnaires (e.g. Disabilities of the Arm, Shoulder and Hand (DASH) and Patient Evaluation measure (PEM)) and a standardized clinical examination including skin quality and objective range of motion measurements are completed preoperatively and postoperatively at 2, 6 and 12 weeks, and again at 1 and 5 years to fully assess the impact of the surgery on activities of daily living and the time taken to regain function, as well as to accurately detect complications, disease recurrence and extension.

Given the current push for evidence-based practice, there seems little need for further (even comparative) retrospective case series; rather, well designed, adequately powered, properly randomized controlled studies should be the sole aim of future researchers.

### Conflict of interests

None declared.

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