Institution: University of East Anglia

Unit of Assessment: 3B - Allied Health Professions, Dentistry, Nursing and Pharmacy: Allied Health and Nursing

Title of case study:

Challenging traditional practice – cessation of routine night-time splinting following Dupuytren's release can reduce patient discomfort, save money and maintain clinical outcomes

1. Summary of the impact:

Many hand surgical units worldwide have routinely used night-time splints in all patients after Dupuytren's contracture fasciectomy and dermo-fasciectomy, despite the lack of robust evidence to support its use.

Jerosch-Herold's programme of research identified that routine night-time splinting for all patients after fasciectomy or dermo-fasciectomy surgical treatments for Dupuytren's contracture is not beneficial. This finding is changing clinical practice, and informing guidelines and policies in the UK, New Zealand and the USA. As a result, health care organisations are ceasing to prescribe routine night-time splinting. This reduces inconvenience and discomfort for patients, relieves pressure on services and generates financial savings, all whilst maintaining equally good clinical outcomes.

The reach of the research findings impact is high, as Dupuytren's contracture is a common disorder of people of Northern European ancestry which results in surgical interventions for thousands of people annually (13,000 pa in the UK alone).

2. Underpinning research

Dupuytren's disease is a fibro-proliferative connective tissue disorder which involves the palmar fascia of the hand causing nodules and cords, with contractures which cause the fingers to bend towards the palm ("Trigger finger" or Dupuytren's contracture). Dupuytren's disease affects 3-5% of the UK population. Current surgical treatments for Dupuytren's contracture include fasciectomy and fasciotomy which aim to restore full finger extension and hand function. Gerber et al (2011) identified that in the UK admissions were typically 13,000 pa and the total UK Dupuytren's surgical costs for 2010-11 were estimated at more than £40 million.

Historically, the use of static night-splints worn for up to 6 months post-operatively has been advocated since 1831 when Dupuytren himself offered a seminal lecture, whilst performing surgery on a 40 year old male. Night splinting was reported to have achieved an excellent result, despite the persistent pain that was experienced by the participant due to the crudity and vigour of the splint (Elliot, 1990, p.6-7).

Despite the lack of robust evidence to support its use, many hand surgical units worldwide routinely splinted all patients after fasciectomy and dermofasciectomy**.** Splinting remained a common post-operative therapy and Bainbridge et al (2012) showed that in 2008 41% of patients within Europe were routinely provided with a post-operative night-time splint, to be worn for 3 to 6 months. Splinting had been thought to maintain finger extension by preventing scar contracture and recurrence of contracture. However, the efficacy of splinting is questionable and a clinical audit of outcomes following Dupuytren's surgical release conducted in New Zealand (Collis & Collocott, 2009) indicated that of patients prescribed night-splints, 40% lost some degree of finger extension.

In order to examine the effectiveness of routine post-operative splinting the UEA team, in collaboration with the Norfolk and Norwich University Hospital (NNUH), conducted a systematic review in 2005-06 (research reference 1) of research that focussed on the clinical effectiveness of static and dynamic splints used after post-operative hand surgery following Dupuytren's contracture. The review concluded that the quality and quantity of trials was low, with no clear evidence of benefit from splints when used in addition to other hand therapy treatment. A large, robust trial of post-operative splinting was not available at that time to address the conflicting

reports of both positive and negative results.

Splinting is not a benign modality as there may be other unwanted effects which outweigh any benefit (Collis, 2012); possible negative clinical outcomes include increased stiffness, pain and slow recovery of function following Dupuytren's surgery. Additionally, practical disadvantages to patients include the splints being cumbersome to wear, difficult to manage and interruptive to sleep and daily activities. However, traditional healthcare practices can be difficult to challenge, particularly if the practice is benefit neutral. Increasingly though, practitioners and policy makers are becoming aware that over-utilisation of less than effective clinical practices can be just as problematic as under-utilisation of effective clinical practices; both result in less than optimal care and contribute to fragmented, inefficient and unsustainable resource allocation. Disinvestment in ineffective or inappropriately applied practices is a growing priority for health care systems for reasons of improved quality of care and sustainability of resource allocation (Elsaug et al, 2007). A crucial step in this process is research to examine the effectiveness of traditionally-accepted clinical practices which are currently underpinned by little or no evidence.

Following the inconclusive evidence from the systematic review in 2007-10, Jerosch-Herold led the first ever multi-centre, controlled trial studying night-splinting following Dupuytren's corrective surgery (funded by Action Medical Research) (research reference 2) . The study was designed to inform evidence based practice by evaluating the clinical effectiveness of splinting. In the trial 154 patients were randomised from 5 regional centres in East Anglia to receive hand therapy only or hand therapy with a static night splint for 6 months. The primary outcome was patient-reported upper limb disability and function at 12 months. Secondary endpoints were total finger extension deficit, total finger flexion and patient satisfaction.

The data indicated that there were no statistically or clinically significant differences in patient-reported hand function, finger extension, finger flexion, satisfaction or the number of hand therapy session between the splinted and non-splinted group. It was concluded that the routine addition of night-time splinting for all patients after fasciectomy or dermofasciectomy is not recommended except where extension deficits reoccur (research reference 2). Subsequent trials have replicated the key findings of Jerosch-Herold (Kemler et al, 2012; and Collis et al, 2013).

The impact during the REF period from UEA research on post-operative practice following hand surgery for Dupuytren's Contracture is underpinned by three open source publications in BMC Musculoskeletal Disorders. The research programme which produced these publications was led by Christina Jerosch-Herold (currently Reader and NIHR Senior Research Fellow) who has worked in UEA's Faculty of Medicine and Health Sciences since 1993, in collaboration with Lee Shepstone (Professor of Medical Statistics in the Norwich Medical School at UEA).

Adoption of the findings from Jerosch-Herold's programme of research has had national and international impact that challenges old habits and has prompted clinicians to adopt new practices based on mounting robust clinical evidence. Practitioners and policy makers are now able to see that routine night-time splinting delivers less than optimal care whilst using valuable resources. This growing evidence supports policy makers and practitioners to consider disinvesting in this practice to improve quality of care and resource allocation.

3. References to the research

(UEA authors in **bold**):

1) Larson D, **Jerosch-Herold C** (2008). Clinical effectiveness of post-operative splinting after surgical release of Dupuytren's contracture. A systematic review.
BMC Musculoskeletal Disorders **9**:1-7 doi: 10.1186/1471-2474-9-104

The systematic review recommended "the need for well designed controlled trials with proper randomisation to evaluate the short-term and long-term effectiveness of splinting following Dupuytren's surgery". The linear progression from the systematic review led to research reference 2. This paper is cited in patient information sheets in corroborating sources D and E.

2) **Jerosch-Herold C**, **Shepstone L**, Chojnowski AJ, Larson D, **Barrett E, Vaughan S** (2011). Night-time splinting after fasciectomy or dermo-fasciectomy for Dupuytren's contracture: a

pragmatic, multi-centre, randomised controlled trial.
BMC Musculoskeletal Disorders **12**:136 doi: 10.1186/1471-2474-12-136

This publication describes the negative findings of the multi-centre RCT, highlighting the opportunities to save both practitioner time and health resources. The impact has had both national and international reach listed in corroborating sources A, B, C, F and G.

Key peer-reviewed research grant:
Sponsor: Action Medical Research Charity
Title: SCoRD trial (Splinting after Contracture Release for Dupuytren's – a pragmatic, multi-centre, randomized controlled trial)
Value: £174,056
Period: 2007 – 2010
Awarded to: **Jerosch-Herold, C.** (PI), **Shepstone, L.**, Chojnowski, A, Larson, D.

- **UEA personnel:** Jerosch-Herold (Principal Investigator); Shepstone (trial statistician); Barrett and Vaughan. (research assistants).
- **Non-UEA personnel:** Chojnowski is a member of the Department of Orthopaedics at Norfolk and Norwich University Hospitals NHS Foundation Trust (NNUH); Larson is a member of the Department of Occupational Therapy at NNUH.

4. Details of the impact

UEA research has underpinned patient information, policy, service improvement and clinical guidelines within health services in the UK, New Zealand and the USA.

Changes to clinical practice and policy

The findings of the RCT (research reference 2) challenge the traditionally held belief that splints are effective and should be used routinely in all patients after surgical release of Dupuytren's contracture.

- The Counties Manukau District Health Board of New Zealand Guideline for hand therapy following surgical release of Dupuytren's contracture was updated in 2012 [corroborating source A] and now states:

  "Splints will no longer be provided routinely (i.e. for all patients). Night extension splints following surgical release of Dupuytren's contracture have been shown to be no more effective at maintaining extension than hand therapy alone" citing research reference 2, alongside two other sources.

- NHS Trusts in the UK are now amending their protocols for the post-operative management of Dupuytren's release and use a 'wait and watch' policy, whereby only patients who develop a contracture are splinted. For example Poole Hospital Foundation Trust implemented a 'no splint' approach [corroborating source B] on the basis of the findings in research reference 2 which has resulted in:

  "significant efficiency savings which satisfied trust objectives. Additionally, the changes have benefited patients who required fewer attendances and no splint in the majority of cases, without compromise to outcomes".

  The Norfolk and Norwich University Hospitals NHS Foundation Trust clinical management post-operative policy [corroborating source C] is directly informed by the findings in research reference 2:

  "research has demonstrated that a "wait and see" approach to splinting is no different from providing a splint for all patients following Dupuytren's contracture release".

Patient information

The findings from UEA research during the census period are used to underpin patient information resources nationally and internationally. Evidence of early adoption of research findings can be seen in patient information leaflets produced by:

- Individual NHS Trusts e.g. North Bristol NHS [corroborating source D].
- Websites for patients using private healthcare systems such as BUPA [corroborating source E] where the systematic review (research reference 1) is listed in the sources of further

information.

- The International Dupuytren Society, based in Germany, website and forum for patients and medical experts [corroborating source F]. The website is available in 6 languages. As well as being available to patients and other unregistered users, the resource had 2,383 registered users worldwide (June 2013). It notes that:
  "the positive effect of wearing a night splint, though it is generally recommended, has not yet been proven by strict scientific standards, see C. Jerosch-Herold et al" and provides a link to the open access journal article (research reference 2).

To inform patients of the underpinning evidence for health policy

- ***Aetna Inc.*** is a leading USA provider of health care benefits, with more than 18 million members. As part of their services, *Aetna* supplies people with information and resources to help them make better informed decisions about their health care. Their *Clinical Policy Bulletin: Dupuytren's Contracture: Treatments* [corroborating source G] outlines that:
  "*Aetna* considers night-time splinting for all individuals after fasciectomy or dermofasciectomy for Dupuytren's contracture experimental and investigational (unless extension deficits re-occur) because its effectiveness for this indication has not been established"
  and results of the RCT (research reference 2) are given in full, including confidence intervals, alongside the trial conclusion that, given the added expense of therapists' time, splint materials and potential inconvenience to patients, then routine addition of night-time splinting for all patients after fasciectomy or dermofasciectomy is not recommended except where extension deficits re-occur.

5. Sources to corroborate the impact

[A] Counties Manukau District Health Board of New Zealand
Guideline: Hand therapy following surgical release of Dupuytren's contracture (2012)
Clinical guideline based on research reference 2
(copy held on file at UEA)

[B] Poole Hospital NHS Foundation Trust: Bradley S, Ellis B, Cheng C *et al.* (2012)
Evaluating service efficacy and efficiency: the evolution of a hand therapy service for patients post Dupuytren's fasciectomy
Clinical policy based on research reference 2 - see page 102
(copy held on file at UEA)

[C] Norfolk and Norwich University Hospitals NHS Foundation Trust
Dupuytren's Contracture: Post-operative management (2012)
Clinical policy based on research reference 2 - see page 3
(copy held on file at UEA)

[D] North Bristol NHS Trust
Dupuytren's Disease (2010)
Patient information based on research reference 1 - see page 5

[E] BUPA
Dupuytren's contracture surgery (fasciectomy)
Patient information lists research reference 1 as a source for further information

[F] The International Dupuytren Society
Treatment after hand surgery, night splint
Patient and medical expert information, lists research reference 2 as evidence regarding splinting recommendations - see penultimate paragraph

[G] *Aetna Inc.*
Clinical Policy Bulletin: Dupuytren's Contracture
Clinical policy and patient information based on research reference 2 - see Background, paragraph 22