Institution: Teesside University
Unit of Assessment: 3; Allied Health Professions, Dentistry, Nursing and Pharmacy
Title of case study: Development of national guidelines for the diagnosis, assessment and physiotherapy management of contracted (frozen) shoulder

1. Summary of the impact

We have developed the first ever physiotherapy guidelines (2008–) for contracted (frozen) shoulder (CFS). CFS is painful and disabling, affects c.9% of the UK working-age population,[1] and costs the NHS ≥ £13.5 million annually.[2] Appropriate physiotherapy could improve outcomes and reduce costs by up to £2,000 per case.[b]

Endorsed by the Chartered Society of Physiotherapy (CSP), the guidelines have generated great interest and already influenced practice and will improve the quality and cost-effectiveness of clinical management, as well as patients' experiences. They will also provide a better framework for research into the condition and, as a 'live', electronic document, will evolve with future research.

2. Underpinning research

Systematic reviews by the guideline development group (GDG; 2008–2010) [1,2], led by Teesside University's Health & Social Care Institute (HSCI), and a separate, overlapping National Institute of Health Research (NIHR) Health Technology Assessment (HTA) review group (2009–2012; see below) [3] found research interest in diverse interventions and, implicitly, poor consensus on which of these most warrant investigation. There are numerous variants of diagnostic criteria,[1] often complex, with little justification. In addition, it is standard to modify interventions according to the stage of the condition.[2] But the stages are defined inconsistently; and few research studies modify interventions by stage (however defined), or recruit or group their samples accordingly, limiting the clinical usefulness of much of the evidence.

Addressing identified knowledge gaps, we (the GDG) developed a simple, dichotomous stage classification system that is comprehensible to patients and physiotherapists alike and provides a practical guide to physiotherapy treatment choices, classifying CFS as either 'pain predominant' or 'stiffness predominant'. We developed and piloted a questionnaire on the diagnosis and treatment of CFS to test the usefulness of our classification before targeting members of the CSP with an anonymous online survey (2008–2009). The 300 responses revealed confusion about the traditional diagnostic criteria of a 'capsular pattern' (disproportionate limitation of three movements). Our proposed pain-predominant/stiffness-predominant classification of CFS was considered clinically meaningful. More than 90% of respondents included 'advice and education' among their preferred interventions for both stages. Other interventions were mostly used either for one stage or the other. The survey responses contextualised the guidelines and enabled us to map research to practice. This showed underuse of some stage-specific effective treatments.

The guidelines address these and other issues with capacity for important impacts. They:

- are predicated on a systematic review and meta-analysis;
- recommend an evidenced, simplified approach to diagnosis, based on identifying limited outward rotation of the arm;
- recommend routine use of validated, region-specific outcome measures (not yet adopted fully by physiotherapists);
- use systematic, stringent and transparent processes to develop treatment recommendations, accounting for care setting and the stage of the disorder.

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[1] Based on a large survey and clinical examination of symptomatic respondents, the prevalence of contracted (frozen) shoulder has been estimated as 9% in the general UK working-age population.[3] The majority of these patients will not seek medical care.[4]

[2] Based on data from a tertiary care setting Bunker (2009)[5] estimates the incidence of (i.e. first consultation for) contracted (frozen) shoulder in the UK as 0.75%. Irrespective of their tertiary care management, these patients will all have consulted their GPs at least once. Thus the cost of contracted (frozen) shoulder to the UK NHS per year is at least 50 million (the approximate adult population of the UK) x £36.00 (the approximate cost of a GP consultation[6]) x 0.75% = £13.5 million. The cost of managing the condition varies widely. E.g. a conservative care package of six physiotherapy sessions including active mobilisation and two guided steroid injections by a hospital-based physiotherapist costs approximately £160. On the other hand, failed conservative treatment necessitating capsular release surgery costs around £2,200 for the surgery and follow-up care alone [3]. This argues strongly for delivering optimal conservative care in the first instance.

The treatment recommendations:

- are framed in terms of pain-predominant and stiffness-predominant stages, to embed this dichotomy in evidence-based clinical practice; and
- highlight the likely benefits of combining steroid injection, physiotherapy and home exercises and, in the stiffness-predominant phase, of augmenting stretches with shortwave diathermy.

Also recommended is that researchers adopt the 'pain-predominant' and 'stiffness-predominant' terminology, and recruit and sub-group on this basis.

HSCI also contributed expertise to an NIHR HTA systematic review and decision analytic model for the management of frozen shoulder [1]. This indicated an absence of research into CFS patients' perceptions and treatment priorities, although such research would better align clinicians' and patients' expectations and satisfaction. Towards addressing this deficiency, a group utilising HSCI's qualitative research expertise conducted a pilot study into patients' perceptions and treatment priorities [5]. With follow-up studies, this will enable development of a patient-completed outcome questionnaire tailored to CFS, directly benefiting patient care and informing future iterations of the guidelines.

Teesside-led guideline development group (GDG)		
N. Hanchard	Senior Lecturer in Physiotherapy	Clinical background at the primary/secondary care interface. Experience in guidelines development
S. Mtopo	Specialist physiotherapist: upper limb and hand	Secondary care
L. Goodchild	Extended scope practitioner in physiotherapy specialising in the upper limb	Secondary/tertiary care
T. O'Brien	Musculoskeletal specialist physiotherapist with a special interest in the shoulder	Primary care
J. Thompson	Extended scope practitioner in physiotherapy with a special interest in the shoulder	Primary care
D. Davison	Clinical specialist physiotherapist in general musculoskeletal management	Primary care. Experience in guidelines development.
C. Richardson	Musculoskeletal specialist physiotherapist	Primary care
M. Scott	Clinical specialist physiotherapist (shoulder)	Secondary/tertiary care
H. Watson	Extended scope practitioner in physiotherapy specialising in the shoulder	Secondary/tertiary care
M. Wragg	Extended scope practitioner in physiotherapy specialising in the shoulder	Secondary/tertiary care
HTA systematic review and decision analytic model for the management of frozen shoulder (Teesside contributors)		
L. Dennis	Research Fellow	HSCI
L. Goodchild	See above	Secondary/tertiary care
N. Hanchard	See above	HSCI
J. Robertson	GP with special interest in musculoskeletal conditions	Primary care
A. Rangan	Consultant shoulder surgeon	Secondary/tertiary care, HSCI
Research into patient perceptions of CFS as a basis for a condition-specific outcome measure		
S. Jones	Qualitative research associate with a background in nursing	HSCI
N. Hanchard	See above	HSCI
S. Hamilton	Reader in nursing with a strong background in qualitative research	HSCI
A. Rangan	See above	HSCI

Background references (citations in superscript)

1. Schellingerhout JM, Verhagen AP, Koes BW. (2008) Lack of uniformity in diagnostic labeling of shoulder pain: time for a different approach. *Manual Ther*, 13, 6, 478-83.
2. NHS.UK. http://www.nhs.uk/Conditions/Frozen-shoulder/Pages/Treatment.aspx
3. Walker-Bone KBM, Palmer KT, Reading I, Coggon D, Cooper C. (2004) Prevalence and impact of musculoskeletal disorders of the upper limb in the general population. *Arthritis Rheum*, 51, 4, 642–651.
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5. Bunker T. (2009) Time for a new name for frozen shoulder: Contracture of the shoulder. *Shoulder & Elbow*, 1, 1, 4-9.
6. PSSRU (2009) Unit Costs of Health & Social Care. http://www.pssru.ac.uk/pdf/uc/uc2009/uc2009.pdf.

3. References to the research

[1] **Hanchard** N, Goodchild L, Thompson J, O'Brien T, Richardson C, Davison D, Watson H, Wragg M, Mtopo S, Scott M. (2011) Evidence-based clinical guidelines for the diagnosis, assessment and physiotherapy management of contracted (frozen) shoulder *v*.1.7, 'standard' physiotherapy. Endorsed by the Chartered Society of Physiotherapy. www.csp.org.uk/skipp.

[2] **Hanchard** NCA, Goodchild L, Thompson J, O'Brien T, Davison D, Richardson C. (2011) A questionnaire survey of UK physiotherapists on the diagnosis and management of contracted (frozen) shoulder. *Physiotherapy*. 97, 115-125. **Cited 3 times on Scopus database.**

[3] Maund E, Craig D, Suekarran S, Rae Nielsen A, Wright K, Brealey S, Dennis L, Goodchild L, **Hanchard** N, Rangan A, Richardson G, Robertson J, McDaid C. (2012) Management of frozen shoulder: a systematic review and cost-effectiveness analysis. *Health Technol Assess,*16, 11, i **Cited 9 times on Scopus database. Available in REF 2.**

[4] **Hanchard** NCA, Goodchild L, Thompson J, O'Brien T, Davison D, Richardson C. (2012) Evidence-based clinical guidelines for the diagnosis, assessment and physiotherapy management of contracted (frozen) shoulder: Quick reference summary, *Physiotherapy*, 98, 118-121.

[5] Jones S, **Hanchard** N, **Hamilton** S, Rangan A. (2013) A qualitative study of patients' perceptions and priorities when living with primary frozen shoulder, *BMJ Open*, e003452, doi: 101136/bmjopen-2013-003452. **Available in REF 2.**

4. Details of the impact

'Rheumatic' types of shoulder pain, including CFS, cause more GP consultations than any other musculoskeletal condition except spinal pain;[A] and in a primary care physiotherapy setting, May (2003) reported a prevalence of 11–14%.[B] The commonness of such pain is matched by its potential severity. CFS is extremely debilitating and typically associated with disturbed sleep (often the reason for consultation), as well as daytime pain and major functional deficits.[C] Despite conventional wisdom that the condition is self-limiting in 1 to 3 years, a recent study of patients referred to tertiary care found that over a third had persistent mild symptoms, usually pain, at 4.4 years (range 2–20 years).[D]

Development of guidelines

Meeting the challenge of this condition will require evidence-based interventions, so it is crucial that evidence is presented in a form accessible to clinicians. **We have developed physiotherapy guidelines for the diagnosis, assessment and management of CFS**. The Guidelines Development Group (GDG) included strong representation of clinicians from across the spectrum of care settings, and this **ensured clinical relevance and usability**. In addition, we engaged our diverse target audience as expert panellists in the development process, which used the Delphi approach to reach consensus. This early, formative engagement of stakeholders is a vital improvement on the norm in guidelines development. Engagement of the guidelines' target users was secured throughout, by means of two separate panels. The first was a `Delphi panel' in which orthopaedists, rheumatologists, general practitioners and managers were represented, as well as service users. The latter were included because we intended that the guidelines should be accessible to patients, and incorporated identifiable lay sections for this purpose. The Delphi panel advised on the guidelines' direction at an early stage in the development process. On completion, the submitted document underwent external review by a second panel of independent experts,

commissioned by the CSP, using the validated AGREE instrument, available at http://www.agreetrust.org/resource-centre/the-original-agree-instrument/

Dissemination and impact of the guidelines

These have been endorsed by the CSP on the basis of extensive expert peer review, targeting physiotherapists and other health care professionals. They were advertised in January 2011 in the CSP's e-news bulletin and *Physiotherapy Frontline*, the CSP news magazine. An independently peer-reviewed quick-reference summary[E] facilitated implementation and enhanced interest in the full-text, online version. There have been > 18,000 downloads from our research repository, with c.12,000 of these in the UK (TeesRep data).[1] Considering that chartered physiotherapists and students number fewer than 50,000 (this figure includes physiotherapy assistants), and assuming that half of qualified physiotherapists do not treat frozen shoulders, this spread is impressive, and suggests that the guidelines are considered a valuable resource. Large numbers of downloads have also been made in the Australia, Canada, Egypt, Germany, India, Ireland, the Netherlands, the USA and other countries.[1]

We **evaluated 366 CSP members' implementation of the guidelines 12-18 months post-publication**.[2] The median recommendation-practice correspondence was 66%, reflecting some validation of existing practice and some change of practice into line with our recommendations. Change was especially evident among some diagnosis-assessment recommendations. Thus 75% of responders said they used passive external rotation as the primary diagnostic test, and in a quarter of these this represented change. Our novel pain-predominant/stiffness-predominant classification had been adopted by 66% and, crucially, 88% of those who had discussed this with their patients said that they too found the terminology meaningful. Change in response to the other diagnosis-assessment recommendations and to the treatment recommendations was smaller, but evident. The extent to which our recommendations for research have been acted upon will become clear from future research reports of interventions. A key issue concerns whether researchers will better characterise the stage of the condition. Their uptake of the 'pain-predominant' and 'stiffness-predominant' classifications would simplify interpretation of research and aid translation into practice. It is too early to judge the success of this element, as implementation requires the criteria to be built into project design, but awareness is developing among researchers.[3,4]

Background references (citations in superscript capitals)

A. McCormick A, Fleming D, Charlton J (1996). OPCS RD. Morbidity statistics from general practice. Fourth national study 1991–92. London, HMSO, 55.
B. May S (2003). An outcome audit for musculoskeletal patients in primary care. *Physiotherapy Theory Pract*, 19, 189–98.
C. Jones S, Hanchard N, Hamilton S, Rangan A.(2013) A qualitative study of patients' perceptions and priorities when living with primary frozen shoulder, *BMJ Open*, e003452, doi: 101136/bmjopen-2013-003452
D. Hand C, Clipsham K, Rees JL, Carr AJ. (2008) Long-term outcome of frozen shoulder. *J Shoulder Elbow Surg*, 17, 231–6.
E. Hanchard NCA, Goodchild L, Thompson J, O'Brien T, Davison D, Richardson C. (2012) Evidence-based clinical guidelines for the diagnosis, assessment and physiotherapy management of contracted (frozen) shoulder: Quick reference summary. *Physiotherapy*, 98, 118-121.

5. Sources to corroborate the impact

1. http://tees.openrepository.com/tees/displaygastats?handle=10149%2F119765&submit_simple=View+Statistics.
2. Hanchard NCA, Goodchild L, Thompson J, O'Brien T, Richardson C, Watson H (2013). Evaluation of clinical guidelines for contracted (frozen) shoulder 12 to 18 months after publication. *International Journal of Therapy & Rehabilitation,* 20, 11, 543-549. Available at http://www.ijtr.co.uk/cgi-bin/go.pl/library/article.cgi?uid=101678;article=IJTR_20_11_543_549.
3. Dattani R, Ramasany V, Parker R, Patel VR (2013) Improvement in quality of life after arthroscopic capsular release for shoulder contracture. *Bone Joint J*, 95-B, 942-946.
4. Russell SL (2011) A randomised clinical trial investigating the most appropriate conservative management of a frozen shoulder. http://clok.uclan.ac.uk/5311/. Presented at the British Elbow & Shoulder Society Annual Meeting, Leicester, 19 June 2013.