Predictors of improvement following physiotherapy for patients with subacromial impingement syndrome / rotator cuff tendinopathy

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Care of patients with SIS/RCT

- What are the optimal (combination of) treatment approaches for SIS/RCT?
- What are the optimal primary and secondary care pathways for SIS/RCT?
- Where patients with SIS/RCT are treated with physiotherapy, which are more likely to respond?

Potential predictors

- Demographics
- Structural pathology
- Patient reported: Psychological symptoms
- Patient reported: Shoulder function
- Pain
- Clinical measure: Shoulder ROM
- Clinical measure: Scapular control
- Clinical measure: Shoulder strength
Study design

Pragmatic, clinician-guided physiotherapy: clinically meaningful treatment. Development of bespoke treatment collection tool; face validity established.

Readily defined stage in patient care pathway: SIS/RCT patients referred for physiotherapy in secondary care. n=76; no post-surgical patients.

What are the optimal (combination of) treatment approaches for SIS/RCT?

Where patients with SIS/RCT are treated with Physiotherapy, which are more likely to respond?

Finite resources

Change in function and pain determined by Oxford Shoulder Score (OSS) performed at baseline, upon discharge following pragmatic treatment (model 1) and 3 months post discharge (model 2).

Point of care Diagnostic Ultrasound. Lead researcher completed Royal College of Radiology training; now qualified Musculoskeletal Sonographer. Inter-rater reliability study performed.

Ethics approval: REC reference 10/MRE09/28

Number of candidate variables trimmed using sequential decision process of methodological, conceptual and statistical methods; aligning with sample size to avoid over-fitting.
Results

Pragmatic physiotherapy treatment was highly varied and a substantial source of ‘background noise’ within the study.

Multivariate regression analysis comprising forward selection and backward elimination:

Baseline shoulder function (measured by the total SPADI) and age predicted 15.7% of the outcome from baseline to discharge.

Total SPADI predicted 9.6% of the outcome from baseline to three months post-discharge

Data considerations:

- Comparison of those recruited and not-recruited to the study: no statistically significant difference for age, gender or source of referral.
- Over 80% of those recruited to the study were educated to college or university level: skewed sample?
- Descriptive analysis of any difference in potential prognostic variables between those lost to follow-up and those available for analysis: disproportionate number of those unavailable for the 3 months post-discharge model were younger patients and had lower total SPADI scores (lower pain and disability) at baseline. These variables were the only ones identified as predictors.
- Tests of the fit for the regression model and diagnostics:
  ✓ Independence of observations
  ✓ Linearity and homoscedasticity of the residuals
  ✓ Absence of collinearity
  ✓ Normal distribution of the residuals
Interpretation and discussion

Evidence that...

... predict outcome in patients with SIS/RCT following physiotherapy. Specifically....

... at discharge, greater age was associated with less improvement in OSS whilst a higher total SPADI (greater pain and disability) was associated with a greater improvement in OSS and...

... at 3 months post discharge, a higher total SPADI (greater pain and disability) was associated with a greater improvement in OSS.

However...

... no predictive role for clinical history, structural pathology, psychological symptoms or any clinical measure....

... and the ability to predict outcome in SIS/RCT patients in this prospective cohort study was very limited......

... with almost 85% (at discharge) and 90% (at 3 months post discharge) of the variability in the outcome not predicted by the regression models.

Potential reasons for limited predictive capacity

Highly heterogenous treatment (physiotherapy) introduces ‘background noise’
The research conundrum can partially accommodate this

Multi-factorial nature of SIS/RCT
Note: multivariate regression

Sub-optimal measurement tool robustness
Scapular Dyskinesis test poor reproducibility and diagnostic ultrasound inherently subjective

Highly varied individual response –
Note: no control group, so uncertainty regarding normal course of condition