

3D Assessment of Hand Function

Introduction

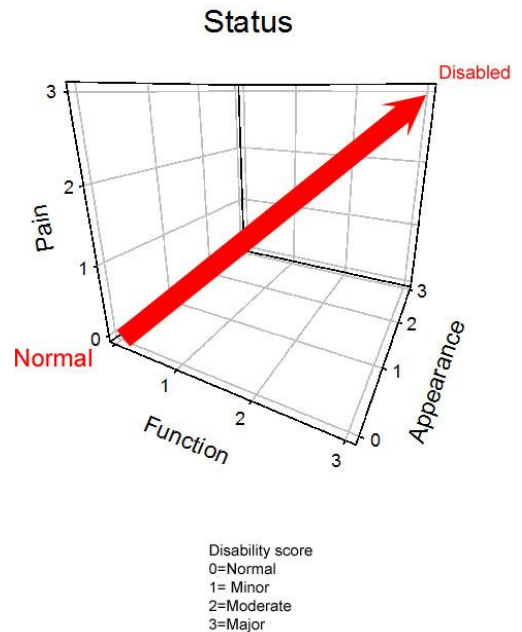
Patient reported outcome measures (PROM) are increasingly central to NHS quality of care assessments. This study investigates the benefit of elective hand surgery by the simultaneous analysis of pain, function and cosmesis.

Please mark three boxes, one for function, pain and appearance to indicate your overall situation. The answer should reflect overall problems; even if only one hand is affected. Some general rather than specific guidance is provided in each box.

Severity (score)	None (0)	Minor (1)	Moderate (2)	Major (3)
Function How well do your hand(s) work?	Normal My hand(s) work and move normally	Minor difficulties Occasional or minor problem Some weakness, stiffness or numbness Clumsy or slower to perform some tasks	Moderate difficulties Restricted use Unable to perform some tasks Substitution of other hand for some tasks	Major difficulties Hand(s) have little or no useful function Other hand used for most or all tasks Assistance required
Pain & tenderness How much pain or tenderness do you have in your hand(s)?	Normal No pain or tenderness	Minor discomfort Minor pain or tenderness Occurs only during heavy work or activities (sport, gardening, DIY)	Moderate discomfort Moderate pain or tenderness Occurs during normal day-time activities (driving, writing, cooking, dressing)	Major discomfort Severe pain or tenderness Occurs when resting and/or disturbs sleep
Appearance Do your hand(s) look normal?	Normal My hand(s) look normal	Minor deformity Not obvious to others in social situations Minor self-consciousness	Moderate deformity Deformity visible in social situations Occasional glances or comments Moderate self-consciousness	Major deformity Obvious deformity visible in any situation Frequent glances, comments or teasing Prefer to keep hand hidden

Methods

252 patients scheduled for surgery were invited to complete a short pre-operative questionnaire grading the severity of their pain, dysfunction and deformity of their hand(s) on a four point scale (0 (normal) - 3 (severe)). This process was repeated at a mean time interval of 8 months post-operatively. Median scores for each parameter were plotted on a 3D graph.



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Results

190 patients completed the study. Diagnostic groups undergoing surgery were: nerve compression (n=53), Dupuytren's disease (n=51), ganglion (n=17), other lumps (n=21), trigger finger (n=20), TMCJ osteoarthritis (n=10), rheumatoid disease (n=5) and miscellaneous (n=13). A significant improvement toward normality was seen after surgery in all but the rheumatoid surgical group (Mann-Whitney).

Group	Pre-op vs. post-op
Compression	p<0.001
Dupuytren's	p<0.001
Ganglions	p<0.05
Other	p<0.05
Other lump	p<0.001
Rheumatoid	NS
Thumb-base OA	p<0.01
Trigger finger	p<0.001

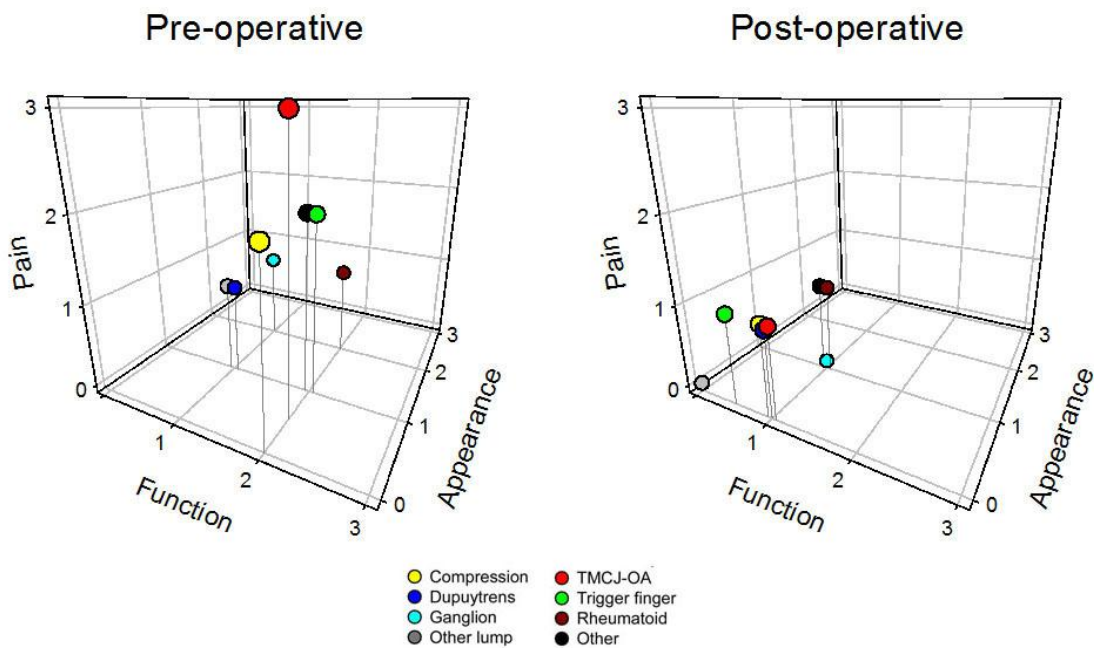


Figure 1. 3D plots of median pre-operative and post-operative patient scores.

Conclusions

This prospective study demonstrates that PROM for pain, dysfunction and appearance can be plotted simultaneously on a 3D graph to provide a simple, visual representation of surgical outcome. The method is both sensitive to the effects of surgery and able to differentiate between pathological entities. It has demonstrated the beneficial effects of surgery on a diverse range of hand conditions.