



The Journal of Bone & Joint Surgery

Journal club: 29 August 2012

Chair: Mr L. Rymaszewski, Consultant Orthopaedic Surgeon, Glasgow Royal Infirmary

Attendees: Consultant Panel - Mr G Sianos, Mr D MacDonald. Trainees – Mr M McLean, Mr D Russell, Mr RI Bhattacharyya, Mr T McMillan

Organiser: Mr David Russell, StR 5 West of Scotland Rotation
West of Scotland Orthopaedic Journal Club

Theme: Surgery of the Elbow and Hand

Systematic review of flexor tendon rehabilitation protocols in zone II of the hand

Chesney A, Chauhan A, Kattan A, Farrokhyar F, Thoma A
Plast Reconstr Surg 2011;127:1583-92.

Reviewer: Mr Michael McLean, StR1, West of Scotland Rotation

Aim

To determine which flexor tendon rehabilitation protocol yields the best outcome after surgical repair in zone II of the hand.

Study Type

Systematic review of existing randomised controlled trials and observational studies on repair of flexor tendon injuries in zone II of the hand.

Materials & Methods

Titles were identified through online databases: CINAHL, Cochrane, EMBASE, Health-star, MEDLINE, PEDro, and PubMed were examined by two independent reviewers. A third reviewer was available decide where agreement could not be reached.

Inclusion Criteria: Injury to one or both flexor tendons in zone II, patients aged >5 years, all protocols (and permutations of classic protocols), follow up time of minimum 3 months, published in English between 1970-2009.

Exclusion Criteria: patients aged <5 years, immobilization protocols, associated injuries (excluding digital nerve/artery), injuries outside zone II, Non-English language, full article not available.

Groups:

1. Passive flexion and active extension (Kleinert type)
2. Controlled passive motion (Duran Type)
3. Combined 1. & 2.
4. Early active movement

Outcomes:

1. Rate of tendon rupture post-operatively
2. Range of movement in injured digit
3. Quality of life.

Results

15 studies included (3 randomized controlled trials & 9 observational studies) from a total of 79.

1. No significant difference in re-rupture rate comparing core strands used in repair or protocol type.
 - Combined type 2.3% (n=244)
 - Duran type 3.8% (n=101)
 - Early active motion 4.1% (n=275)
 - Kleinert type 7.1% (n=245)
2. Range of Motion
 - Strickland – Early active motion achieved statistically significant improved results with 94% good/excellent mean results (p<0.001).
 - Modified-Strickland – Early active motion (94%) and combined protocols (93%) provided statistically improved mean results compared with Kleinert (52%) and Duran (68%) type (p<0.001)
 - Buck-Gramcko – No statistically significant difference and no studies using Early active motion.
 - Total Active Motion System – No valid data to compare.
3. Quality of life – No valid data to compare.

Conclusion

There is weak evidence to support early active motion and combined passive mobilization with active extension protocols as providing a greater range of movement following zone II flexor tendon repair. In addition there was not found to be any statistically significant difference in re-rupture rates. No real conclusions can be drawn from this study regarding quality of life measured by patient reported outcomes. There is still a requirement for a multi-centre randomized controlled trial comparing rehabilitation protocols measuring post-operative range of motion, quality of life and cost analysis to answer the aim of this paper.

Study Critique**Strengths**

- Independent reviewers
- Extensive inclusion/exclusion criteria
- Inclusion of previously excluded observational study data to systematic review.
- Focused review of literature relevant to zone II injuries only when comparing rehabilitation protocols.
- Assessment of methodological quality using validated tools.
- Attempts to account for variance in surgical technique.
- Use of multiple validated systems for assessing range of motion post-operatively.
- Robust statistical analysis.
- No conflict of interest noted

Weaknesses

- Limited number of studies identified.
- No study identified directly compares any 2 rehabilitation protocols.
- Broad grouping of different rehabilitation protocols together.
- Skewed primary outcome data for re-rupture using Kleinert protocol.
- Very limited data regarding number of epitendinous sutures used in comparison of surgical technique.
- No data for comparison for Duran type protocols using Strickland system, early active motion in Buck-Gramcko and quality of life assessment.

Clinical Relevance

This study includes previously unused data from observational studies to systematically review existing clinical information regarding the outcomes of common rehabilitation protocols in zone II flexor tendon injuries. The results suggest that there is weak evidence supporting early active motion and combined rehabilitation protocols in such cases. It is already generally accepted that early active motion provides superior results compared to immobilization in all but the youngest of patient groups. It is unlikely that this current body of evidence will markedly change clinical practice, but it does help highlight a need for further research.

Pyrocarbon proximal interphalangeal joint arthroplasty: outcomes of a cohort study

McGuire DT, White CD, Carter SL, Solomons MW.

J Hand Surg Eur 2012;37:490-96.

Reviewer: Mr. Rahul Bhattacharyya, StR1, West of Scotland Rotation

Background

Proximal Inter-Phalangeal Joint (PIPJ) arthroplasty was first introduced by Swanson in 1968 using silicone implants. Although it provided satisfactory results, there were substantial complications such as bone resorption, silicone synovitis, dislocation and decreased range of motion. Pyrocarbon was first introduced in 2000 and was used successfully for small joint arthroplasty such as the Metacarpophalangeal (MCP) joint. Thus far, only a few studies have been done on Pyrocarbon PIPJ arthroplasty.

Aim

To assess the results of Pyrocarbon PIPJ arthroplasty.

Study type

Retrospective cohort study.

Materials and Methods

This was retrospective review of 57 consecutive pyrocarbon PIPJ arthroplasty performed in 46 patients between 2002 and 2011. 2 senior authors performed all surgical procedures. Initially, a dorsal Chamay approach was used for the first 4 patients. Thereafter, a modified central-slip splitting technique was performed. Patients underwent early active post-operative rehabilitation. Follow-up: Reviewed by surgeon and therapist weekly for the first 4 weeks, then with radiographs at 3, 6 and 12 months. Outcome was assessed by arc of motion, Likert satisfaction scores, complications, radiographs (fracture, alignment and subsidence) and need for secondary surgical intervention. Statistical analysis: paired student t-test.

Results

The mean arc of motion increased by 32 degrees at 6-months (30; 62) and by 36 degrees at final follow-up (30; 66). The mean likert satisfaction score was 4.2/5. In 88% of the cases the patients scored 4 or 5 on the scale. Radiological subsidence was observed in 40% of the joints but there was no correlation with the arc of motion or function. Complications: 6 joints developed stiffness, 11 developed swan neck deformity, 3 developed a Boutonniere deformity. 2 patients had a fracture at insertion of the implant. 5 joints required revision. 2 joints developed a squeaking noise after insertion of the implant.

Conclusion

This study concluded that Pyrocarbon arthroplasty is a safe and effective method of treatment for PIPJ osteoarthritis. There was good pain relief and high rate of satisfaction amongst patients who underwent this procedure. The arc of motion improved significantly in this study, which was not reported in previous studies presumably due to the accelerated active flexion protocol. The rate of complications was fairly high but most of these did not require further treatment. This study recommended the use of pyrocarbon implant for the treatment of PIPJ osteoarthritis.

Study Critique**Strengths**

- Surgical technique and rehabilitation protocol appropriately described.
- Radiological measurements and subsidence well explained.
- Good numbers used which have provided statistically significant results.
- Study highlights reasons for possible improvement in arc of motion compared to previous studies.

Weaknesses

- This was a retrospective study, therefore prone to selection and information bias.
- They report excellent pain relief without the mention of any pain scores.
- The first four patients had a different surgical approach and post-operative rehabilitation regime.
- No formal outcome scores were used.
- Short minimum follow up period reported.
- Wide range of final follow-up 12-70 months, which reduces uniformity of results.

Clinical Relevance

This study has shown favourable results with the use of pyrocarbon implant for PIPJ osteoarthritis. This certainly provides an alternative to silicone implants for PIPJ arthroplasty. There have been some retrospective studies, which have showed more favourable results with pyrocarbon compared to silicone, however prospective randomized controlled trials are required to provide a higher level of evidence in this area.

A randomised controlled trial of absorbable versus non-absorbable sutures for skin closure after open carpal tunnel release

Theopold C, Potter S, Dempsey M, O'Shaughnessy M
J Hand Surg Eur 2012;37-E:350-353

Reviewer: Tristan McMillan, CT1, West of Scotland Rotation

Background

Traditionally, wounds of the palmar aspect of the hand have been closed with non-absorbable suture material. Over the last two decades there has been an increase in the consideration of absorbable sutures for the closure of such wounds. This has been aided by publications by Al-Qattan, Erel et al, Howard et al, Kundra et al and Shetty et al. Despite this existing literature, it was felt that there was a lack of evidence assessing aesthetic outcome and a number of the previous studies had not used a standardised palmar wound.

Aims

Primary Outcome – aesthetic outcomes following closure of a standardised palmar wound using 4-0 Vicryl Rapide or 4-0 Novafil with simple interrupted sutures

Secondary Outcomes – pain perceived with suture removal and incidence of post operative infection

Materials and Methods

The authors performed a randomised controlled trial of patients undergoing elective carpal tunnel decompression with a straight palmar incision at Cork University Hospital. Patients were excluded if this was repeat surgery, they had known suture material allergy, they had previous hypertrophic or keloid scars, concurrent chemotherapy, and steroid or immunomodulatory treatment.

The remaining patients (n=38) were randomised into two groups; non absorbable (n=20) and absorbable (n=18) suture for wound closure. 4.0 vicryl rapide was used in the absorbable group and 4.0 Novafil was used in the non-absorbable group. Each patient was then followed up for a total of 6 weeks post operatively. They underwent a wound review for signs of infection at day 5, suture removal (Novafil group) and pain scoring at day 14 and finally a scar assessment at 6 weeks with a modified Patient and Observer Scar Assessment Scale (POSAS).

Results

Comparison of modified POSAS scores and sub-group analysis showed no statistical significant difference between the two suture materials. No wound infections were documented in either group. There was a statistically significant difference ($p = 0.039$) between the pain scores for the VR group (0.2) and the NF group (1.3).

Conclusion

The results of this paper have found there to be no difference in wound infection rates and minimal difference in scar outcomes between Vicryl Rapide and Novafil, for the closure of elective palmar wounds. The authors subsequently recommend the use of Vicryl Rapide for the closure of palmar hand wounds as it 'offers significant cost and time savings to both patients and healthcare providers.'

Study Critique**Strengths**

- Effective wound standardisation

- Important exclusion criteria
- Randomisation and blinding where possible
- Use of pre-validated scoring system
- Incorporation of patient opinion

Weaknesses

- Relatively small cohort
- Variation in operating surgeon
- Scar review at 6 weeks felt to be too early for final scar evaluation
- Study not powered to assess wounds infection rates

Clinical Relevance

In conclusion, this was a simple yet effective paper that will increase reader awareness of the potential of absorbable suture materials in the closure of palmer wounds. Evidence supporting the cost effectiveness of such a material may further support its use in clinical practice.