• **TITLE:**

Continuous subcuticular versus interrupted suture technique for skin closure in open carpal tunnel decompression surgery – A Systematic review and a service evaluation of the local NHS Trust

• **BACKGROUND:**

Carpal tunnel decompression is the most common hand surgical procedure performed (The Musculoskeletal Services Framework 2006). Several suture materials and techniques are currently used in skin closure following decompression. Carpal tunnel decompression is being performed in the hospitals by doctors, advanced healthcare practitioners (Newey 2006) and in the primary sector by GPs, community nurses (Nursing Standard 2013). As more carpal tunnel services are being commissioned into the primary sector, it is important to have specific guidance on a robust and reproducible surgical technique than can be adhered to in order to minimise complication rates. Carpal tunnel syndrome and surgical management has been extensively investigated but concrete advice on suturing techniques and materials is lacking (Guruswamy 2014). Closure of the wound post decompression can be performed through a continuous subcuticular or interrupted technique. Suture materials can be absorbable or non-absorbable with advantages in each group. Use of absorbable sutures would mean fewer visits to the healthcare provider. However, if not performed well this can hypothetically lead to more wound related problems such as dehiscence, haematoma and infection. The overall infection rate following an elective day case hand surgical procedure has been quoted to be up to 4% (Grogaard 2001). There is a lack of consensus in this aspect and all the above-mentioned options are used in daily practice. Other vital factors such as theatre and surgical instrument sterility along with surgical attitudes (tissue handling) also play a key role in the incidence of post-operative complications. Several studies have been published comparing various suture materials and techniques in open carpal tunnel decompression (Dosani et al. 2013, Bolster et al. 2013, Grogaard et al. 2001, Kharwadkar et al. 2005, Menovsky et al. 2004). In their Cochrane systematic review Gurusamy et al (2014) compared continuous versus interrupted skin sutures for non-obstetric surgery (mainly appendicectomies) and found need for high quality evidence in the present literature. Hence, there is a need to analyse if there is any significant advantage of a particular suturing technique or material in open carpal tunnel decompression.

• **AIM & OBJECTIVES**

**Aim:**

The aim of this study is provide guidance for the healthcare professionals performing open carpal tunnel decompression regarding the best suturing technique and material.

**Objectives:**

1. To assess wound complication rates in various suturing techniques and materials in open carpal tunnel decompression surgery.
2. To identify if a specific technique is more economical to the healthcare provider.
3. To collect patient feedback on wound complications and correlate with suture materials and techniques.
4. To recommend a standardised surgical technique for wound closure in open carpal tunnel decompression.

• PROJECT APPROACH & METHODS

The research question:

“What is the best surgical technique and suture material available to perform skin closure in open carpal tunnel decompression surgery?”

Methodology:

A systematic review explores the current evidence and performs a comprehensive methodical investigation of the best evidence available on a particular topic (Aveyard 2012, p.14). The review thus performed has a robust, reproducible and transparent protocol, which strives to eliminate any bias and formulate a data synthesis. This is applicable in daily clinical practice epitomising the body of evidence-based medicine (Sackett et al. 1996) This review will perform a thorough evaluation, critical analysis of the evidence available and formulate an answer to the predefined question. This systematic review will be registered with PROSPERO (Centre for Reviews and Dissemination, University of York).

The systematic review will be performed using the following MESH terms

<table>
<thead>
<tr>
<th>Databases</th>
<th>MESH terms</th>
<th>Limits</th>
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<tbody>
<tr>
<td>Medline</td>
<td>Carpal Tunnel Syndrome</td>
<td>Level 1 and 2 studies</td>
</tr>
<tr>
<td>Embase</td>
<td>Decompression, surgical</td>
<td></td>
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<tr>
<td>Cochrane</td>
<td>Sutures</td>
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<td></td>
<td>Suture techniques</td>
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Population: Patients undergoing open carpal tunnel decompression.

Intervention: Continuous subcuticular suture technique using an absorbable suture material

Comparison: Interrupted suture technique using an absorbable or non-absorbable suture material

Outcome measures: Patient reported – wound dehiscence, infection, scar problems, DASH (Appendix 2)

Clinician reported – Number of postoperative visits

Service Evaluation:

All the patients who have had open carpal tunnel decompression performed at our local hospital will be reviewed via questionnaires (Appendix 1) at two weeks stage in nurse led clinics. There are no validated questionnaires published specific to the research question.
Hence the questions have been formulated focussing on the aim of the research project. Information regarding suture technique and material will be collected from the operation notes. A specialist will again review them at eight weeks stage for a clinical review. Postoperative wound or scar related problems along with a validated questionnaire (DASH) will be collected at these visits.

**Sample size:**

As this is the commonest hand surgical procedure, the goal is to have an adequate sample size to identify both common (wound dehiscence, infection) and rare (CRPS, nerve injury) complications and reflect the general population. The target is to collect information until July 31st 2015.

Data collection will be piloted for the first two weeks. After the first two months, projection figures for the final sample size will be calculated. If the numbers are thought to be less, then a case of retrospective data collection will be discussed with the supervisor.

**Cost Benefit Analysis:**

The local Trust charges a tariff for performing carpal tunnel decompression. Trust business management team will be involved to understand the cost distribution of the tariff paid by the patient’s GP. It would be ideal for the hospital to have as less postoperative visits as possible, with no wound complications and successful outcomes from the surgery.

**ETHICAL CONSIDERATIONS**

Systematic review will not require ethical approval as this involves studies that have been published in accordance with the guidance provided by the National Research Ethics Service.

It is the current practice of the Trust to collect patient feedback through DASH questionnaires. Service evaluation does not require NHS Research Ethics Committee (NHSREC) approval. All the patient questionnaires will be collected by independent nurse practitioners. Data will be anonymised and stored in a NHS Trust computer with password protection.

**TIMESCALE**

<table>
<thead>
<tr>
<th>Month</th>
<th>Systematic Review</th>
<th>Service Evaluation</th>
<th>Supervisor meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2015</td>
<td>1. Register with PROSPERO 2. Literature search and inclusion + exclusion of studies</td>
<td>1. Commence data collection 2. Register with Clinical Audit team</td>
<td>✓</td>
</tr>
<tr>
<td>Feb 2015</td>
<td>1. Final list of studies 2. Commence critical analysis</td>
<td>Continue data collection</td>
<td>✓</td>
</tr>
</tbody>
</table>
• **RESOURCES**

Warwick University OVID resource will be used to perform literature search in the key databases and identify studies for the purpose of systematic review. University library will be approached for articles that cannot be accessed. Cochrane risk bias tool and CONSORT statement will be used to stratify the evidence, data synthesis and conclusions.

Clinical governance team will be approached to register the service evaluation with the local Trust. The patients will be followed up in the clinics by occupational therapists, nurse practitioners and doctors. The multidisciplinary team will be informed regarding the study and their co-operation will be requested in data collection via the questionnaires.

• **LIKELY BENEFITS OF PROPOSED PROJECT**

Clear guidance will be available for nurse practitioners that may perform open carpal tunnel compression in primary health sector. There will be evidence to justify a certain suture technique or material.

Service evaluation in the Trust will also provide a feedback to the hand unit at the NHS Trust regarding the potential correlation of suture techniques and materials with patients’ complications.

• **DISSEMINATION**

Project submission to University of Warwick towards a Masters degree.

Presentation at the local NHS trust regarding the results of service evaluation and propose any measures for improvement.

Presentation at the British Society of Surgery of Hand (BSSH) conference.

• REFERENCES

• APPENDICES

Appendix 1.

As a part of our post-operative follow up, we are interested in knowing if you have had any wound related problems. Please answer the following questions for us to identify this.

1. Did you have your sutures removed?
   Yes  No

2. Have you had any wound problems since the operation
   Yes  No

3. If yes, when did you first notice these?
   Within the first week
   In the second week
   Between three and six weeks
   After six weeks
   Not applicable

4. Did you visit your GP surgery or the hospital for wound problems?
   GP  Hospital  Not applicable

5. If so, how many visits. Please fill the box with a number

6. Did you have antibiotics for wound infection?
   Yes  No  Not applicable

7. Did you have any problems with stiches viz. retained stiches or stich abscess?
   Yes  No

8. Please use the following box for any ongoing issues or further comments.

Thank you very much for taking time to fill this form.
Appendix 2.

DASH – As a separate file (Issues in pasting the word format)