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Postoperative recovery of carpal tunnel release comparing three surgical techniques: ultrasound-guided, endoscopic, and mini-open

Submission date
13/01/2026

Recruitment status
Recruiting

Registration date
14/01/2026

Overall study status
Ongoing

Last Edited
14/01/2026

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

Plain English summary of protocol
Plain English summary of protocol not provided at time of registration.

Contact information

Type(s)
Principal investigator, Scientific, Public

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Study information

Scientific Title
Recovery profiles after carpal tunnel release: a prospective comparison of ultrasound-guided, endoscopic, and mini-open techniques

Acronym
RECOVER-CTR

Study objectives
Existing comparative studies have mainly compared open and endoscopic releases, with high-quality data lacking for evaluation of the ultrasound-guided technique. Therefore, there is a need for prospective comparative research assessing functional outcomes and safety across all three techniques. We hypothesize that the ultrasound-guided technique might provide faster functional recovery, due to the minimally invasive aspect of the technique, while maintaining equal safety.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 14/07/2025, Ethical Committee AZ Maria Middelares - AZ Sint Vincentius Deinze (Buitenring-Sint-Denijs 30, Gent, 9000, Belgium; +3292464646; ethisch.comite@mijnziekenhuis.be), ref: MMS.2025.027

Primary study design
Observational

Secondary study design
Cohort study

Study type(s)

Health condition(s) or problem(s) studied
Carpal tunnel syndrome

Interventions
Patients will be followed prospectively using standardized questionnaires and clinical examinations at the following postoperative time points: 1, 2, 3 and 4 weeks, 3 months, and 6 months. Clinical follow-up will be performed preoperatively, at 4 weeks, and at 3 months. Outcomes will be measured by Boston Carpal Tunnel Questionnaire (BCTQ), QuickDASH, Patient and Observer Scar Assessment Scale (POSAS) and Visual Analog Scale (VAS) .

Statistical analysis will be performed on anonymized data using IBM® SPSS® Statistics. A two-sided p-value < 0.05 will be considered statistically significant except where multiplicity adjustments are needed. Descriptive and comparative analyses will be performed. All primary analyses will follow an intention-to-treat (ITT) principle: patients analysed in the group corresponding to the technique performed. A per-protocol analysis will be performed as sensitivity analysis.

Power calculation and sample size rationale for the primary outcome (BCTQ-SSS change at 4 weeks) was performed. We plan a pragmatic, prospective, 3-arm study with equal allocation to mini-open, endoscopic and ultrasound-guided carpal tunnel release. Using the literature-derived Minimal Clinically Important Difference (MCID) for the BCTQ Symptom Severity Scale (SSS) of 0.64 points, a total of 32 patients per group would be needed for pairwise comparisons (two-sample t-tests) to obtain 80% power at $\alpha = 0.05$. Considering a 10% drop-out and aiming to increase the reliability of our findings we will aim for 50 patients per group. ANCOVA test will be used to include baseline differences. Since ANCOVA typically increases power the above power calculation should be sufficient.

To address potential confounding due to non-randomized treatment assignment multivariate regression models will adjust for baseline characteristics such as age, sex, symptom duration, hand dominance, diabetes, severity scores, occupation (manual vs administrative). Propensity score matching or weighting may be performed as sensitivity analysis if group imbalance occurs. Results will include estimates, 95% CIs and exact p-values. We will follow STROBE guidelines for observational cohort reporting and provide a flowchart of included/excluded patients.

Intervention Type
Procedure/Surgery

Primary outcome(s)
1. Early functional recovery measured using the Boston Carpal Tunnel Questionnaire (BCTQ) at baseline and 4 weeks

2. Early functional recovery measured using the Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH) at baseline and 4 weeks

3. Early pain perception measured using a Visual Analog Scale (VAS) at baseline and 4 weeks

4. Early functional recovery measured using Grip strength (Kg) at baseline and 4 weeks

Key secondary outcome(s))
1. Early postoperative pain measured using a Visual Analog Scale (VAS) at Daily for the first 2 weeks

2. Scar characteristics and patient satisfaction measured measured using the Patient and Observer Scar Assessment Scale (POSAS) at 4 weeks, 3 months and 6 months

3. Use of analgesics postoperative (duration and cumulative dose) measured using a questionnaire to collect data recorded on dose at 1 week, 2 weeks, 4 weeks, 3 months, 6 months

4. Time to return to daily activities, return-to-work measured using a questionnaire (days) at 1 week, 2 weeks, 4 weeks, 3 months

5. Patient satisfaction measured using a 5-point Likert scale at 1 week, 2 weeks, 4 weeks, 3 months, 6 months

6. Postoperative complication rate, including, but not limited to, nerve injuries, infection, persistent symptoms, etc. measured using data recording (type) at 1 week, 2 weeks, 4 weeks, 3 months, 6 months

7. Revision surgery rate and indications for revisions measured using a questionnaire to record yes/no at 3 and 6 months

8. Longer term functional outcome measured using BCTQ, QuickDASH, grip strength, VAS scales at 3 and 6 months

Completion date
31/12/2026

Eligibility

Key inclusion criteria
1. Age between 18 years and 99 years
2. Receiving surgical treatment for solitary carpal tunnel syndrome
3. Preoperative availability of EMG and/or ultrasound

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 years

Upper age limit
99 years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Concomitant surgical procedures in the same hand
2. Symptomatic osteoarthritis of the hand or wrist
4. Pregnancy
5. Dupuytren's disease with symptomatic MCP or PIP contracture
6. Bilateral carpal tunnel surgery within a 3-month interval
7. Symptomatic (poly)neuropathy confirmed by EMG
8. Active chemotherapy or malignancy
9. Cervical stenosis or herniation with electromyography (EMG) confirmation

Date of first enrolment
15/07/2025

Date of final enrolment
01/06/2026

Locations

Countries of recruitment
Belgium

Study participating centre
VZW AZ Maria Middelares hospital
Buitenring-Sint-Denijs 30
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Belgium
9000

Sponsor information

Organisation
VZW AZ Maria Middelares hospital

Funder(s)

Funder type

Funder Name
Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Data sharing statement to be made available at a later date