

Supplementary table 7. Outcome details for studies comparing imaging vs. palpation guidance at peripheral nerves (PICO1)

AUTHOR, DATE	DISEASE	SITE	OUTCOME CATEGORY	OUTCOME DETAIL	OUTCOME EXPLANATION (UNIT) ¹	TIME POINT	RESULTS ²	OVERALL ROB ³
ULTRASOUND vs. PALPATION GUIDANCE								
Eslamian et al., 2017	CTS	carpal tunnel	Safety	Symptom severity Function	Total BCTQ score	BSL, 3m	no difference	some concern
			Efficacy	Electrophysiological parameter	compound motor action potential latency (amplitude, mV)	BSL, 3m	no difference	some concern
			Efficacy	Electrophysiological parameter	median sensory nerve action potential latency (amplitude, mcV)	BSL, 3m	3m: better for US	some concern
Vahdatpour et al., 2019	CTS	carpal tunnel	Safety	Symptom severity	BCTQ – SSS	BSL, 4w, 12w	no difference	high
			Safety	Adverse events	Complications ⁴	BSL, 4w, 12w	no difference	high
			Efficacy	Function	BCTQ – FSS	BSL, 4w, 12w	no difference	high
			Efficacy	Electrophysiological parameter	sensory nerve action potential (latency)	BSL, 4w, 12w	no differences ⁵	high
			Efficacy	Electrophysiological parameter	sensory nerve action potential (amplitude, mcV)	BSL, 4w, 12w	4,12w: worse for US	high
			Efficacy	Electrophysiological parameter	sensory nerve action potential (conduction velocity, m/s)	BSL, 4w, 12w	no differences ⁶	high
			Efficacy	Electrophysiological parameter	compound muscle action potential (latency)	BSL, 4w, 12w	no difference	high
Roh et al., 2019	CTS	carpal tunnel	Safety	Symptom severity	BCTQ – SSS	BSL, 4w, 12w, 24w	4w: better for US	high
			Safety	Adverse events	Complications ⁷ (%)	24w	no difference ⁸	high
			Efficacy	Function	BCTQ – FSS	BSL, 4w, 12w, 24w	no difference	high
			Efficacy	Function	Grip strength using a dynamometer (kg)	BSL, 4w, 12w, 24w	no difference	high

			Efficacy	Treatment failure	Patients undergoing surgery (%)	24w	no difference ⁹	high
Chen et al., 2018	CTS	carpal tunnel	Safety	Symptom severity	BCTQ – SSS	BSL, 1m, 3m, 6m	no difference	some concern
			Safety	Adverse events	Complication Numbness (%)	1w	no difference	some concern
			Safety	Adverse events	Complication Swelling (%)	1w	no difference	some concern
			Safety	Adverse events	Complication pain (%)	1w	no difference	some concern
			Safety	Adverse events	Complication weakness (%)	1w	1w: better for US	some concern
			Efficacy	Treatment response	Hand weakness (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Constant numbness (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Daytime numbness (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Tinel's sign (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Flick sign (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Phalen's sign (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Reverse Phalen's sign (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Wrist compression test (%)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Semmes-Weinsteinmonofilament test - Light touch sensation at the index finger (%)	BSL, 1m, 3m, 6m	no differences ¹⁰	some concern
			Efficacy	Treatment response	Grip strength using a dynamometer (kg)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Treatment response	Lateral pinch strength using a dynamometer (kg)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Function	BCTQ – FSS	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	QoL Symptom Severity	PGA	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Electrophysiological parameter	Distalmotor latency (%)	BSL, 1m, 3m, 6m	no difference	some concern

			Efficacy	Electrophysiological parameter	Compound muscle action potential (mV)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Electrophysiological parameter	Sensory distal latency, peak latency (ms)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Electrophysiological parameter	Sensory distal latency, onset latency (ms)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Electrophysiological parameter	Sensory nerve conduction velocity (m/s)	BSL, 1m, 3m, 6m	no difference ¹⁰	some concern
			Efficacy	Electrophysiological parameter	Sensory nerve action potential amplitude (μ V)	BSL, 1m, 3m, 6m	no difference	some concern
			Efficacy	Electrophysiological parameter	Digit4 comparison study (ms)	BSL, 1m, 3m, 6m	no difference ¹⁰	some concern
Makhlouf et al., 2014	CTS	carpal tunnel	Safety	Pain	Patient Pain VAS (cm)	BSL, 2w, 6m	2w,6m: better for US	high
			Safety	Pain	Needle introduction VAS (cm)	During procedure	During procedure: better for US	high
			Safety	Pain	Signifcant Needle VAS \geq 5cm	During procedure	During procedure: better for US	high
			Safety	Pain	Injection VAS (cm)	During procedure	During procedure: better for US	high
			Safety	Pain	Signifcant Injection VAS \geq 5cm	During procedure	During procedure: better for US	high
			Safety	Pain	Reduction in pain from baseline VAS	2w	2w: better for US	high
			Safety	Adverse events	Complications ¹¹ (%)	at study end ¹²	no difference	high
			Efficacy	Treatment response	Pain VAS < 2cm	2w	2w: better for US	high
			Efficacy	Duration of therapeutic effects	Until VAS \geq 2 cm (months)	Up to 6m	6m: better for US	high
			Efficacy	Time to next intervention	Reinjection/Surgery (months)	Up to 12m	12m: better for US	high
			Cost/Time	Costs	Cost/patient/year - physisican's office (U.S. Dollar)	at study end ¹²	at study end: worse for US	high
			Cost/Time	Costs	Cost/patient/year - hospital outpatient (U.S. Dollar)	at study end ¹²	no difference	high

				Cost/Time	Costs	Cost/responder/year - physician's office (U.S. Dollar)	at study end ¹²	no difference	high
				Cost/Time	Costs	Cost/responder/year - hospital outpatient (U.S. Dollar)	at study end ¹²	at study end: better for US	high
Omar et al., 2018	CTS	carpal tunnel	Safety	Symptom severity	BCTQ – SSS	BSL, 4w	no difference	Serious	
			Safety	Adverse events	Complications ¹³ (%)	BSL, 4w	no difference	Serious	
			Efficacy	Treatment response	Paresthesia (%)	BSL, 4w	no difference	Serious	
			Efficacy	Treatment response	Night awakening (%)	BSL, 4w	no difference	Serious	
			Efficacy	Treatment response	Tingling/numbness (%)	BSL, 4w	4w: worse for US	Serious	
			Efficacy	Treatment response	Hand-forearm pain (%)	BSL, 4w	no difference	Serious	
			Efficacy	Treatment response	Hypo/hyperesthesia (%)	BSL, 4w	no difference	Serious	
			Efficacy	Treatment response	Tinel sign (%)	BSL, 4w	no difference	Serious	
			Efficacy	Treatment response	Phalen test (%)	BSL, 4w	no difference	Serious	
			Efficacy	Function	BCTQ – FSS	BSL, 4w	no difference	Serious	
			Efficacy	Electrophysiological parameter	Sensory nerve conduction velocity and distal motor latency (m/s & ms) semiquantitative scale	BSL, 4w	4w: better for US	Serious	
Efficacy	Anatomical differences	Decrease in CSA of the median nerve (mm ²)	BSL, 4w	4w: better for US	Serious				
Efficacy	Anatomical differences	Flattening ratio ¹⁴ (mm ²)	BSL, 4w	no difference	Serious				
Ustun et al., 2013	CTS	carpal tunnel	Safety	Symptom severity	BCTQ – SSS	BSL, 6w, 12w	no difference	some concern	
			Safety	Adverse events	Complications ¹⁵ (%)	6w	no difference	some concern	
			Efficacy	Function	BCTQ - FSS	BSL, 6w, 12w	no difference	some concern	
			Efficacy	Treatment response	Time until symptom relieve (d)	6w	6w: better for US	some concern	
Rayegani et al., 2019	CTS	Carpal Tunnel	Safety	Pain	Improvement in Patient Pain VAS from BSL (cm)	BSL, 10w	no difference	some concern	

Safety	Pain	Pain free grip strength per kg using a dynamometer	BSL, 10w	no difference	some concern
Safety	Symptom Severity	Improvement in BCTQ - SSS	BSL, 10w	no difference	some concern
Efficacy	Function	Improvement in BCTQ - FSS	BSL, 10w	no difference	some concern
Efficacy	Anatomical differences	cross sectional area median nerve (mm ²)	BSL, 10w	no difference	some concern
Efficacy	Electrophysiological parameter	improvement in sensory nerve action potential latency (ms)	BSL, 10w	no difference	some concern
Efficacy	Electrophysiological parameter	improvement in sensory nerve action potential amplitude (uV)	BSL, 10w	no difference	some concern
Efficacy	Electrophysiological parameter	improvement in compound motor action potential latency (ms)	BSL, 10w	no difference	some concern
Efficacy	Electrophysiological parameter	improvement in compound motor action potential amplitude (mV)	BSL, 10w	no difference	some concern
Efficacy	Electrophysiological parameter	improvement in nerve conduction velocity (m/s)	BSL, 10w	no difference	some concern

The abbreviation BSL (baseline) refers to the time point before the intervention happened

BCTQ, Boston Carpal Tunnel Questionnaire; CSA, cross sectional area; CTS, carpal tunnel syndrome; d, day(s); FSS, Function severity score; m, month(s); PGA, patient global assessment; SSS, Symptom severity score; U.S. dollars, United States of America dollars; US, ultrasound; VAS, visual analogue scale; w, week(s);

¹ The outcomes "Complications" are usually only presented in descriptive manner by the respective authors. Statistical tests were not performed by the authors, unless stated otherwise.

² No difference = at none of the give time points a difference was found between the groups. If differences were found, the time point for the differences is depicted.

³ For details on RoB, see Supplementary table 3

⁴ There were no complications associated with the injection of corticosteroid in the carpal tunnel in both groups

⁵ Significantly better results for the US group after 4w. However difficult to interpret due to significant baseline differences.

⁶ Nerve conduction velocity was longer in the palpation guidance group compared to the US group at 4 and 12 weeks. However difficult to interpret due to significant baseline differences.

⁷ median nerve irritation, skin discoloration, subcutaneous fat atrophy, steroid flare, superficial infection

⁸ 25% of patients and 8% of patients in the US group had complications (no test performed).

⁹ Throughout the study, 12 patients (24%) in the palpation guidance injection group and 9 patients (18%) in the US-guided group had carpal tunnel surgery owing to persistent or recurrent symptoms after the injection. A statistical test between the groups was not performed.

¹⁰ In both groups there was a significant improvement over time. However, the results are difficult to interpret due to significant baseline differences.

¹¹ No complications in this trial, including infections, patient injuries, nerve injuries, vascular complications, unintended needlesticks

¹² Not described by the authors

¹³ No complications in this trial, including tingling sensation, tendon rupture, nerve injuries, bleeding and infection

¹⁴ Defined as the ratio of the nerve's transverse axis to the anteroposterior axis and was assessed at the level of the pisiform bone

¹⁵ No complications in this trial, including nerve or blood vessel damage or pain during the procedure

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