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### **Appendix 1**

Search strategies for systematic review

**Benchmark citations:** 19927067[uid] OR 9260614[uid]

### **Complete Search Strategies (copy/paste):**

#### **Embase**

((('brachial plexus'/exp OR 'axillary nerve'/exp OR 'median nerve'/exp OR 'musculocutaneous nerve'/exp OR 'radial nerve'/exp OR 'ulnar nerve'/exp) AND ('surgery'/exp) OR (('brachial plexus' OR 'axillary plexus' OR 'brachial nerve plexus' OR 'plexus brachialis' OR 'axillary nerve' OR 'median nerve' OR 'musculocutaneous nerve' OR 'radial nerve' OR 'ulnar nerve') NEAR/5 (surgery OR surgical OR operation\* OR operative OR repair))) AND ('employment'/exp OR 'unemployment'/exp OR employment OR employed OR unemployment OR unemployed OR underemployment OR occupation\* OR 'return to work')

=440 results

#### **Ovid-Medline**

((exp Brachial Plexus/ OR exp Median Nerve/ OR exp Musculocutaneous Nerve/ OR exp Radial Nerve/ OR exp Ulnar Nerve/) AND (su.fs OR surger\*.mp.)) OR ((brachial plexus.mp. OR axillary plexus.mp. OR brachial nerve plexus.mp. OR plexus brachialis.mp. OR axillary nerve.mp. OR median nerve.mp. OR musculocutaneous nerve.mp. OR radial nerve.mp. OR ulnar nerve.mp.) adj5 (surgery.mp. OR surgical.mp. OR operation.mp. OR operative.mp. OR repair.mp.)) AND (exp Employment/ OR exp Unemployment/ OR exp Return to Work/ OR employment.mp. OR employed.mp. OR unemployment.mp. OR unemployed.mp. OR underemployment.mp. OR occupation\*.mp. OR (return adj2 work))

= 257 results

#### **Scopus**

TITLE-ABS-KEY(("brachial plexus" OR "axillary plexus" OR "brachial nerve plexus" OR "plexus brachialis" OR "axillary nerve" OR "median nerve" OR "musculocutaneous nerve" OR "radial nerve" OR "ulnar nerve") W/2 (surgery OR surgical OR operation OR operative OR repair)) AND TITLE-ABS-KEY (employment OR employed OR unemployment OR unemployed OR underemployment OR occupation\* OR "return to work")

= 120 results

#### **Cochrane Library**

((("brachial plexus" OR "axillary plexus" OR "brachial nerve plexus" OR "plexus brachialis" OR "axillary nerve" OR "median nerve" OR "musculocutaneous nerve" OR "radial nerve" OR "ulnar

nerve”) AND (surgery OR surgical OR operation OR operative OR repair)) AND (employment OR employed OR unemployment OR unemployed OR underemployment OR occupation\* OR “return to work”)

((“brachial plexus” OR “axillary plexus” OR “brachial nerve plexus” OR “plexus brachialis” OR “axillary nerve” OR “median nerve” OR “musculocutaneous nerve” OR “radial nerve” OR “ulnar nerve”) NEAR/5 (surgery OR surgical OR operation OR operative OR repair)) AND (employment OR employed OR unemployment OR unemployed OR underemployment OR occupation\* OR “return to work”)

= 26 results (12 Cochrane Reviews, 3 DARE reviews, and 11 CENTRAL Trials)

### **Dissertations & Theses**

TI,AB(“brachial plexus” OR “axillary plexus” OR “brachial nerve plexus” OR “plexus brachialis” OR “axillary nerve” OR “median nerve” OR “musculocutaneous nerve” OR “radial nerve” OR “ulnar nerve”) AND TI,AB(surgery OR surgical OR operation OR operative OR repair) AND TI,AB(employment OR employed OR unemployment OR unemployed OR underemployment OR occupation\* OR “return to work”)

= 7 results

### **Clinical Trials.Gov**

(brachial plexus OR axillary plexus OR axillary nerve) AND (surgery OR operation OR repair) AND (employment OR employed OR unemployment OR “return to work”)

= 4 results (results will be included in the Excel library, not the Endnote library)

## **Appendix 2**

### **Literature Review - List of Included Articles:**

1. Aziz WA, Singer RM, Wolff TW. Transfer of the trapezius for flail shoulder after brachial plexus injury. *Bone & Joint Journal*. 1990 Jul 1;72(4):701-4.
2. Bentolila V, Nizard R, Bizot P, Sedel L. Complete traumatic brachial plexus palsy. Treatment and outcome after repair. *JBJS*. 1999 Jan 1;81(1):20-8.
3. Bertelli JA, Ghizoni MF. Brachial plexus avulsion injury repairs with nerve transfers and nerve grafts directly implanted into the spinal cord yield partial recovery of shoulder and elbow movements. *Neurosurgery*. 2003 Jun 1;52(6):1385-90.
4. Bertelli JA, Ghizoni MF. Reconstruction of complete palsies of the adult brachial plexus by root grafting using long grafts and nerve transfers to target nerves. *Journal of Hand Surgery*. 2010 Oct 1;35(10):1640-6.
5. Bertelli JA, Ghizoni MF. Transfer of the accessory nerve to the suprascapular nerve in brachial plexus reconstruction. *Journal of Hand Surgery*. 2007 Sep 1;32(7):989-98.
6. Chalidapong P, Sananpanich K, Kraissarin J, Bumroongkit C. Pulmonary and biceps function after intercostal and phrenic nerve transfer for brachial plexus injuries. *Journal of Hand Surgery*. 2004 Feb;29(1):8-11.
7. Chammas M, Goubier JN, Coulet B, Reckendorf GM, Picot MC, Allieu Y. Glenohumeral arthrodesis in upper and total brachial plexus palsy: A comparison of functional results. *The Journal of bone and joint surgery. British volume*. 2004 Jul;86(5):692-5.
8. Chuang DC, Lee GW, Hashem F, Wei FC. Restoration of shoulder abduction by nerve transfer in avulsed brachial plexus injury: evaluation of 99 patients with various nerve transfers. *Plastic and reconstructive surgery*. 1995 Jul;96(1):122-8.
9. Chuang ML, Chuang DC, Lin IF, Vintch JR, Ker JJ, Tsao TC. Ventilation and exercise performance after phrenic nerve and multiple intercostal nerve transfers for avulsed brachial plexus injury. *Chest*. 2005 Nov 1;128(5):3434-9.
10. Dodakundi C, Doi K, Hattori Y, Sakamoto S, Fujihara Y, Takagi T, Fukuda M. Outcome of surgical reconstruction after traumatic total brachial plexus palsy. *JBJS*. 2013 Aug 21;95(16):1505-12.
11. Doi K, Muramatsu K, Hattori Y, Otsuka K, Tan SH, Nanda V, Watanabe M. Restoration of prehension with the double free muscle technique following complete avulsion of the brachial plexus: Indications and long-term results. *JBJS*. 2000 May 1;82(5):652.
12. Dubuisson AS, Kline DG. Brachial plexus injury: a survey of 100 consecutive cases from a single service. *Neurosurgery*. 2002 Sep 1;51(3):673-83.

13. Estrella EP. Functional outcome of nerve transfers for upper-type brachial plexus injuries. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2011 Aug 1;64(8):1007-13.
14. Felici N, Cannatà C, Cigna E, Sorvillo V, Del Bene M. Contralateral spinal accessory nerve: a suitable “new” donor nerve for heterotopic nerve transfer in total brachial plexus palsy. *Handchirurgie· Mikrochirurgie· Plastische Chirurgie*. 2012 Apr;44(02):80-3.
15. Flores LP. Brachial plexus surgery: the role of the surgical technique for improvement of the functional outcome. *Arquivos de neuro-psiquiatria*. 2011 Aug;69(4):660-5.
16. Franzblau LE, Shauver MJ, Chung KC. Patient satisfaction and self-reported outcomes after complete brachial plexus avulsion injury. *Journal of Hand Surgery*. 2014 May 1;39(5):948-55.
17. Ghosh S, Singh VK, Jeyaseelan L, Sinisi M, Fox M. Isolated latissimus dorsi transfer to restore shoulder external rotation in adults with brachial plexus injury. *Bone Joint J*. 2013 May 1;95(5):660-3.
18. Goubier JN, Teboul F. Transfer of the intercostal nerves to the nerve of the long head of the triceps to recover elbow extension in brachial plexus palsy. *Techniques in hand & upper extremity surgery*. 2007 Jun 1;11(2):139-41.
19. Gu YD, Zhang GM, Chen DS, Yan JG, Cheng XM, Chen L. Seventh cervical nerve root transfer from the contralateral healthy side for treatment of brachial plexus root avulsion. *The Journal of Hand Surgery: British & European Volume*. 1992 Oct 1;17(5):518-21.
20. Guan SB, Hou CL, Chen DS, Gu YD. Restoration of shoulder abduction by transfer of the spinal accessory nerve to suprascapular nerve through dorsal approach: a clinical study. *Chinese medical journal*. 2006 May;119(9):707-12.
21. Hentz VR, Narakas A. The results of microneurosurgical reconstruction in complete brachial plexus palsy. Assessing outcome and predicting results. *The Orthopedic clinics of North America*. 1988 Jan;19(1):107-14.
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23. Kawai H, Kawabata H, Masada K, Ono K, Yamamoto K, Tsuyuguchi Y, Tada K. Nerve repairs for traumatic brachial plexus palsy with root avulsion. *Clinical orthopaedics and related research*. 1988 Dec(237):75-86.
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25. Leechavengvongs S, Witoonchart K, Uerpairojkit C, Thuvasethakul P, Ketmalasiri W. Nerve transfer to biceps muscle using a part of the ulnar nerve in brachial plexus injury (upper arm type): a report of 32 cases. *Journal of Hand Surgery*. 1998 Jul 1;23(4):711-6.
26. Leechavengvongs S, Witoonchart K, Uerpairojkit C, Thuvasethakul P. Nerve transfer to deltoid muscle using the nerve to the long head of the triceps, part II: a report of 7 cases 1. *Journal of Hand Surgery*. 2003 Jul 1;28(4):633-8.
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28. Liverneaux PA, Diaz LC, Beaulieu JY, Durand S, Oberlin C. Preliminary results of double nerve transfer to restore elbow flexion in upper type brachial plexus palsies. *Plastic and reconstructive surgery*. 2006 Mar 1;117(3):915-9.
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31. Monreal R, Paredes L, Diaz H, Leon P. Trapezius transfer to treat flail shoulder after brachial plexus palsy. *Journal of brachial plexus and peripheral nerve injury*. 2007 Dec;2(1):2.
32. Rorabeck CH. The management of the flail upper extremity in brachial plexus injuries. *The Journal of trauma*. 1980 Jun;20(6):491-3.
33. Rosson JW. Disability following closed traction lesions of the brachial plexus sustained in motor cycle accidents. *Journal of Hand Surgery*. 1987 Jun;12(3):353-5.
34. Songcharoen P, Mahaisavariya B, Chotigavanich C. Spinal accessory neurotization for restoration of elbow flexion in avulsion injuries of the brachial plexus. *Journal of Hand Surgery*. 1996 May 1;21(3):387-90.
35. Songcharoen P, Wongtrakul S, Mahaisavariya B, Spinner RJ. Hemi-contralateral C7 transfer to median nerve in the treatment of root avulsion brachial plexus injury. *Journal of Hand Surgery*. 2001 Nov 1;26(6):1058-64.
36. Suzuki K, Doi K, Hattori Y, Pagsaligan JM. Long-term results of spinal accessory nerve transfer to the suprascapular nerve in upper-type paralysis of brachial plexus injury. *Journal of reconstructive microsurgery*. 2007 Aug;23(06):295-9.

37. Terzis JK, Barmptsioti A. Axillary nerve reconstruction in 176 posttraumatic plexopathy patients. *Plastic and reconstructive surgery*. 2010 Jan 1;125(1):233-47.
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39. Wellington B. Quality of life issues for patients following traumatic brachial plexus injury—Part 2 research project. *International Journal of Orthopaedic and Trauma Nursing*. 2010 Feb 1;14(1):5-11.
40. Wilson TJ, Chang KW, Yang LJ. Depression and Anxiety in Traumatic Brachial Plexus Injury Patients Are Associated With Reduced Motor Outcome After Surgical Intervention for Restoration of Elbow Flexion. *Neurosurgery*. 2016 Jun 1;78(6):844-50.
41. Zheng MX, Xu WD, Qiu YQ, Xu JG, Gu YD. Phrenic nerve transfer for elbow flexion and intercostal nerve transfer for elbow extension. *Journal of Hand Surgery*. 2010 Aug 1;35(8):1304-9.

Appendix Figure 1. Histogram of age distribution for Monte Carlo simulation model.

