

Outcome analysis

To address the primary concern of choosing treatment modality it has been found that surgical treatment for CTS is more effective than conservative method or injection technique^{35,36}. Especially with long term benefit the surgical technique fared superior to injection method which gives relief only in short term. While comparing endoscopic to open carpal tunnel release it was found that there is no significant difference in the outcome between the treatment groups however overall satisfaction was lower in the endoscopic patients following 5% rate of revision surgery^{37,38}. Wrist immobilization following carpal tunnel release has not been found to be any benefit and hence active motion exercises of the wrist and fingers are encouraged post-operatively in nearly all patients³⁹.

Various complications have been reported following any method of carpal tunnel release; however the frequencies of each differ depending on the technique used. Commonly encountered complications are injuries to motor and/ or palmar cutaneous branch of median nerve, hypertrophic scar formation, pillar pain, injury to superficial palmar arch, incomplete carpal tunnel release, tendon adhesions, infection, wound hematoma, finger stiffness, reflex sympathetic dystrophy, weak grip strength and recurrence. The most common complication following open carpal tunnel release surgery is pillar pain followed by laceration of the palmar cutaneous branch of median nerve. Incomplete release is the most frequently reported complication of endoscopic release.

Recurrent carpal tunnel syndrome has been reported to occur in 7-20% patients⁴⁰. This is a difficult problem to deal with as compared to the primary CTS and the results are often dismal. Revision surgery involves neurolysis of median nerve, fat or muscle transfer and vein wrapping^{41,42}.

SUMMARY

Carpal tunnel syndrome is a common problem with a reported prevalence of around 5% in general population. The primary etiology is varied but idiopathic form is the most common. A thorough history and physical examination is an absolute requirement to establish the diagnosis and rule out related and unrelated disorders. Neurophysiological studies are often used to confirm the diagnosis and is considered gold standard. Carefully chosen patients for nonsurgical treatment (splinting, medications and steroid injections) and surgical carpal tunnel release yields good results. The results of open carpal tunnel release compared to limited open methods are comparative considering the benefits and disadvantages of each. Endoscopic carpal tunnel release has also yielded comparative results however the rate repeat surgery is higher and definite superiority is yet to be established.

REFERENCES

- Kremer M, Gilliat RW, Golding JSR, Wilson TG (1953) Acroparaesthesiae in the carpal-tunnel syndrome. *Lancet* 2:590-595
- Brain WR, Wright AD, Wilkinson M (1947) Spontaneous compression of both median nerves in the carpal tunnel: six cases treated surgically. *Lancet* 1:277-282
- Phalen GS, Gardner WJ, La Londe AA (1950) Neuropathy of the median nerve due to compression beneath the transverse carpal ligament. *J Bone Joint Surg* 32A:109-112
- Amadio PC (1992) The Mayo Clinic and carpal tunnel syndrome. *May Clin Proc* 67(1):42-48
- Phalen GS, Kendrick JI (1957) Compression neuropathy of the median nerve in the carpal tunnel. *JAMA* 164:524-530
- Cranford CS, Jason Y Ho, David MK, Brian JH. Carpal tunnel syndrome. *J Am Acad Orthop Surg* 2007;15:537-548
- Cobb TK, Dalley BK, Posterato RH (1993) Anatomy of the flexor retinaculum. *J Hand Surg.* 18:91-99
- Lanz U (1977) Anatomical variations of the median nerve in the carpal tunnel. *J Hand Surg* 2: 44-53
- Poisel S (1974) Ursprung und Verlauf des Ramus muscularis des N. digitalis palmaris communis I (N. medianus). *Chir Prax* 18: 471-474
- Kornberg M, Aulicino PL, Du Puy TE (1983) Bifid median nerve with three thenar branches. *J Hand Surg* 8: 553-584
- Gelberman RH, Hergenroeder PT, Hargens AR, Lundborg GN, Akesson WH: The carpal tunnel syndrome: A study of carpal tunnel pressures. *J Bone Joint Surg Am* 1981;63:380-383.
- Rydevik B, Lundborg G, Bagge U: Effects of graded compression on intraneural blood flow: An in vivo study on rabbit tibial nerve. *J Hand Surg [Am]* 1981;6:3-12.
- Lewis T, Pickering GW, Rothschild P (1931) Centripetal paralysis arising out of arrested bloodflow to the limb, including notes on a form of tingling. *Heart* 16: 1-32
- Ekman-Ordeberg G, Sälgeback S, Ordeberg G: Carpal tunnel syndrome in pregnancy: A prospective study. *Acta Obstet Gynecol Scand* 1987;66:233-235.
- Dias JJ, Burke FD, Wildin CJ, Heras-Palou C, Bradley MJ: Carpal tunnel syndrome and work. *J Hand Surg [Br]* 2004;29:329-333.
- Braun RM, Davidson K, Doehr S: Provocative testing in the diagnosis of dynamic carpal tunnel syndrome. *J Hand Surg [Am]* 1989;14:195-197.
- Jablecki CK, Andary MT, Floeter MK, Miller RG, Quartly CA, Vennix MJ, Wilson JR (2002) Practice parameter: Electrodiagnostic studies in carpal tunnel syndrome. *Neurology* 58: 1589-1592
- Atroshi I, Gummesson, Johnsson R, Ornstein E (2003) Diagnostic properties of nerve conduction tests in population-based carpal tunnel syndrome. *BMC Musculoskeletal Disorders* 4: 9 <http://www.biomedcentral.com/1471-2474/4/9>
- Bindra RR, Evanoff BA, Chough LY, Cole RJ, Chow JC, Gelberman RH: The use of routine wrist radiography in the evaluation of patients with carpal tunnel syndrome. *J Hand Surg [Am]* 1997;22:115-119.
- Bordalo-Rodrigues M, Amin P, Rosenberg ZS: MR imaging of common entrapment neuropathies at the wrist. *Magn Reson Imaging Clin N Am* 2004;12:265-279.
- Altink T, Baysal O, Karakas HM, et al: Ultrasonographic assessment of mild and moderate idiopathic carpal tunnel syndrome. *Clin Radiol* 2004; 59:916-925.
- Burke DT, Stewart GW, Cambre A (1994) Splinting for carpal tunnel syndrome: in search of optimal angle. *Archives of Physical Medicine & Rehabilitation*. 75: p. 1241-4
- Marshall S, Ashworth N (2004) Local corticosteroid injection for carpal tunnel syndrome, in *The Cochran Database of Systemic Reviews*. The Cochran Library
- Girlanda P, Venuto C, Manganapane R, Nicolosi C (1993) Local steroid treatment in idiopathic carpal tunnel syndrome: short and long-term efficacy. *Journal of Neurology* 240: p. 187-190
- Gelberman RH, Aronson D, Weisman MH: Carpal tunnel syndrome: Results of a prospective trial of steroid injection and splinting. *J Bone Joint Surg Am* 1980;62:1181-1184.
- Phalen GS (1966) The Carpal Tunnel Syndrome. Seventeen years experience in diagnosis and treatment of six hundred fifty-four hands *J Bone Joint Surg* 48A:211
- Bertolotti P (1993) Sindromi da intrappolamento dell'arto superiore. *Fondazione Savonese per gli studi sulla mano*, 81-121
- Taleisnik J (1973) The palmar cutaneous branch of the median nerve and the approach to the carpal tunnel. *J Bone Joint Surg*. 55A:121
- Crandal RE, Weeks PM (1988) Multiple nerve dysfunction after carpal tunnel release. *J Hand Surg*. 13A: 584-589
- Lee WP, Plancher KD, Strickland JW: Carpal tunnel release with a small palmar incision. *Hand Clin* 1996;12: 271-284.
- Bromley GS: Minimal-incision open carpal tunnel decompression. *J Hand Surg [Am]* 1994;19:119-120.
- Biyani A, Downes E (1993) An open twin incision technique of carpal tunnel decompression with reduced incidence of scar tenderness. *J Hand Surg* 18B:331-334
- Nagle DJ: Endoscopic carpal tunnel release. *Hand Clin* 2002;18:307-313.
- Chow JC: Endoscopic release of the carpal ligament: A new technique for carpal tunnel syndrome. *Arthroscopy* 1989;5:19-24.
- Ly-Pen D, Andréu JL, de Blas G, Sánchez-Olaso A, Millán I: Surgical decompression versus local steroid injection in carpal tunnel syndrome: A oneyear, prospective, randomized, open, controlled clinical trial. *Arthritis Rheum* 2005;52:612-619.
- Hui AC, Wong S, Leung CH, et al: A randomized controlled trial of surgery vs steroid injection for carpal tunnel syndrome. *Neurology* 2005;64:2074-2078.
- Thoma A, Veltri K, Haines T, Duku E: A systematic review of reviews comparing the effectiveness of endoscopic and open carpal tunnel decompression. *Plast Reconstr Surg* 2004;113: 1184-1191.
- Brown RA, Gelberman RH, Seiler JG, et al: Carpal tunnel release: A prospective, randomized assessment of open and endoscopic methods. *J Bone Joint Surg Am* 1993;75:1265-1275.
- Bhatia R, Field J, Grote J, Huma H: Does splinting help pain after carpal tunnel release? *J Hand Surg [Br]* 2000;25:150.
- Botte MJ, von Schroeder HP, Abrams RA, Gellman H: Recurrent carpal tunnel syndrome. *Hand Clin* 1996;12:731-743.
- Koncilija H, Kuzbari R, Worsseg A, Tschabitscher M, Holle J: The Lumbrical muscle flap: Anatomical study and clinical application. *J Hand Surg [Am]* 1998;23:111-119.
- Variatimidis SE, Riano F, Vardakas DG, Sotereanos DG: Recurrent compressive neuropathy of the median nerve at the wrist: Treatment with autogenous saphenous vein wrapping. *J Hand Surg [Br]* 2000;25:271-275.

Next Issue Highlights

- Editorial: Tobacco & Health
- Functional Impairment in Elderly
- Nephrotoxic Potential of Herbal Drugs
- Health-related Quality of Life amongst Sikkim Population
- Symposium : Anorectal Disorders : Current Management