

Literature

- Abdi S, Datta S, Trescot A.M, Schultz D.M, Adlaka R, Atluri, SL, Smith HS, Manchikanti L (2007) Epidural steroids in the management of chronic spinal pain: A systematic review. *Pain Physician* 10: 185–212
- Abdou SM, Hardy, RW (1999) Epidural fibrosis and the failed back surgery syndrome: History and physical findings. *Neuro Res* 21 [Suppl 1]: 5–8
- Abel R, Gerner, HJ, Mariss G (1998) *Wirbelsäule und Rückenmark*. Blackwell Wissenschafts-Verlag, Berlin, Vienna
- Akbarpour D, Seeliger A, Schütze G (2005) Invasive Therapieverfahren. In: Junker U, Nolte T (eds) *Grundlagen der speziellen Schmerztherapie Medizin und Wissen*. Urban & Vogel, Munich, pp 211–230
- American Society of Interventional Pain Physicians (2005) Evidence-Based Practice Guidelines, 2005, under Epidural Adhesiolysis; Percutaneous Adhesiolysis. In: *Interventional Techniques in the Management of Chronic Spinal Pain (Pain Physicians 8:1–47)*
- Amirikia A, Scott IU, Murray TG, Halperin LS (2000) Acute bilateral visual loss associated with retinal hemorrhages following epiduroscopy. *Arch Ophthalmol* 118: 287–289
- Arthur J, Racz GB, Heinrich R, Diede JH, McCann M, Wilson E, Heavner JC, Noe C (1993) Epidural space: Identification of filling defects and lysis of adhesions in the treatment of chronic painful conditions. In: *Abstracts 7th World Congress of Pain*, p 1485
- Askanazi J, Fulton-Peacock P, Nichols M, Gil KM (1996) Lysis of epidural adhesions in the treatment of chronic back pain. *Reg Anesth* 21 [Suppl 2S]: 91
- Babar S, Saifuddin A (2002) MRI of the post-discectomy lumbar spine. *Clin Radiol* 57: 969–981
- Bader L, Blumenstock G, Birkner B, Leib O, Heesemann J, Riemann J, Riemann JF, Selbmann H-K (2002) HYGEA (Hygiene in der Gastroenterologie-Endoskop-Aufbereitung): Studie zur Qualität der Aufbereitung von flexiblen Endoskopen in Klinik und Praxis. *Z Gastroenterol* 40: 157–170
- Balmelli C, Iffenecker A, Pittet D, Ruef C (2003) Risiko der Prionenübertragung in der Epiduroskopie: Aktueller Stand der Reinigung und Desinfektion von flexiblen Endoskopen in Europa und Empfehlungen der Swiss-NOSO-CJD-Task Force für die Schweiz. *Swiss-NOSO-CJD-Task Force*, Bd 10, Nr. 4
- Barsa JE, Charlton JE (1984) Diagnosis of epidural scarring and its possible contribution to chronic low back pain syndrome. *Pain* 18: 376
- Battaggia C, Salar G, Ori C (1987) Effects of hyaluronidase in patients with spinal arachnoiditis and peripheral entrapment neuropathies. *Pain* 24: 277
- Becke K (2007) Stellungnahme: S(+)-Ketamin als Supplement zur Kaudalanästhesie im Kindesalter. *Anästhesiol Intensivmed* 48: 299
- Bennett G, Al-Rashed S, Hoult JR, Brain SD (1998) Nerve growth factor induced hyperalgesia in the rat hind paw is dependent on circulating neutrophils. *Pain* 77: 315–322
- Benzon HT (1986) Epidural injections for low back pain and lumbosacral radiculopathy. *Pain* 24: 277–295
- Bloch HJ, Hawelski S, Benini A (1997) Kyste du ligament jaune lombaire: description de 6 cas. *Schweiz Med Wochenschr* 127: 728–732
- Blomberg R (1985) A method for spinal canal endoscopy and spinaloscopy: Presentation of preliminary results. *Acta Anaesthesiol Scand* 21: 113–116
- Blomberg R (1986) The dorsomedian connective tissue band in the lumbar epidural space of humans: An anatomical study using epiduroscopy in autopsy cases. *Anesth Analg* 65: 747–752
- Blomberg R (1987) The lumbar subdural extra-arachnoid space of humans: An anatomical study using spinaloscopy in autopsy cases. *Anesth Analg* 66: 177–180
- Blomberg R (1988) Technical advantages of the paramedian approach for lumbar epidural puncture and catheter introduction. A study using epiduroscopy in autopsy subjects. *Anesthesia* 43: 837–843
- Blomberg R (1991) The lumbar epidural space. Anatomical findings in epiduroscopy with reference to technical aspects of lumbar epidural anesthesia. Brochure published by Astra Pain Control: AB
- Blomberg R (1995) Fibrous structures in the subarachnoid space: A study with spinaloscopy in autopsy subjects. *Anesth Analg* 80: 875–879
- Blomberg R, Olsson SS (1989) The lumbar epidural space in patients examined with epiduroscopy. *Anesth Analg* 68: 157–160
- Boden SC, Wiesel SW (1992) The multiply operated low back patient. *Spine* 3: 1899–1906
- Boden SD, Davis DO, Dina TS (1990) Abnormal magnetic resonance scans of the lumbar spine in asymptomatic subjects. *J Bone Joint Surg* 72A: 403–408
- Bodian CA, Freedmann G, Hossian S (2001) The visual analog scale for pain: Clinical significance in postoperative patients. *Anesthesiology* 95: 1356–1361
- Bogduk N, Twomey LT (1996) *Clinical anatomy of the lumbar spine*, 2nd edn. Churchill Livingstone, New York: 107–110
- Boswell MV, Shah RV, Everett CR et al. (2005) Interventional techniques in the management of chronic spinal pain: Evidence-based practice guidelines. *Pain Physicians* 8: 1–47
- Boswell MV, Trescot AM, Datta S, et al. (2007) Interventional techniques: Evidence-based practice guidelines in the management of chronic spinal pain. *Pain Physician* 10: 7–111
- Bradley WG, Bydder G (1989) *Magnetic resonance imaging atlas of the brain*. Taylor & Francis, London
- Braun W, Demirel T (1982) *Einführung in die Schmerzchirurgie*. Hippokrates, Stuttgart
- Breivik H, Collet B, Venafriida V (2006) Survey of chronic pain in Europe: Prevalence, impact on daily life and treatment. *Eur J Pain* 10: 287–333
- Bronfort G, Goldsmith Ch, Nelson CF, Boline PD, Anderson AV (1996) Trunk exercise combined with spinal manipulative or NSAID therapy for chronic low back pain: A randomized, observer-blinded clinical trial. *J Manipulative Physiol Ther* 19: 570–82
- Brookoff D (2006) Neurophysiological underpinnings of electrophysiological analgesic neuromodulation for dummies. *Pain Med* 7: 103–120

- Bromm B (2007) Der Infrarot-Laser in der Schmerzdiagnostik. *MedReport* 13: 9
- Brown JH (1960) Pressure caudal anesthesia and back manipulation. *Northw Med* 59: 905–909
- Brune K, Beyer A, Schäfer M (eds) (2001) *Schmerz. Pathophysiologie – Pharmakologie – Therapie*. Springer, Berlin Heidelberg New York
- Buchner M, Neubauer E, Barie A, Schiltenswolf M (2007) Komorbidität bei Patienten mit chronischen Rückenschmerzen. *Schmerz* 21: 218–225
- Bues G (1990) *Endoskopie*. Deutscher Ärzte-Verlag, Cologne
- Burman MS (1931) Myelography or the direct visualization of spinal cord. *J Bone Joint Surg* 13: 695–696
- Burn JN, Guyer PB, Langdon L (1973) The spread of solutions injected into the epidural space. *Br J Anaesth* 45: 338–345
- Burton CV, Kirkaldy-Willis WH, Yong-Yong-Hing K, Heithoff KB (1981) Causes of failure of surgery on the lumbar spine. *Clin Orthop Rel Res* 157: 191–199
- Carpenter RL, Hogan QH, Liu SS, Crane B, Moore J (1998) Lumbosacral cerebrospinal fluid volume is the primary determinant of sensory block extent and duration during spinal anesthesia. *Anesthesiology* 89: 24–29
- Carr DB, Gaudas LC (1999) Acute pain. *Lancet* 353: 2051–2058
- Casper GD (1996) Results of a clinical trial of the holmium: yag laser in disc decompression utilizing a side-firing fiber: A two year follow-up. *Laser Surg Med* 19: 90–96
- Cathelin F. (1901) Une nouvelle voie d'injection rachidienne: methode des injections epidurales par le procede du canal sacre-applications a l'homme. *Compt Rend Soc De Biol*;53:452–3
- Cauchoux J, Ficat C, Girard B (1978) Repeat surgery after disc excision. *Spine* 3: 256–259
- Choi YK, Tan MH, Barbella JD, Grubb WR (2001) Epiduroscopic analysis of persistent back and leg pain and the efficacy of epiduroscopy in the treatment of failed back pain syndrome. *Reg Anesth Pain Med [Suppl]*: 26, 2: 90
- Collier BC (1998) *An Atlas of Epidurograms. Epidural Blocks Investigated*. Harwood Academic publisher, Amsterdam.
- Conradt M (1997) *Sternstunden der Medizin*. Einhorn, Reinbek
- Consensus Statement of the Second Consensus Conference on Neuraxial Anesthesia and Anticoagulation. Internet: www.asra.com/consensus-steatments/2.html. Accessed March 2007
- Coulter PD, Anne H (1994) Percutaneous Laser Disc Decompression (PLDD). *J Clin Laser Med Surg* 12: 181–182
- Cork RC, Kryc JJ, Vaughan RW (1980) Ultrasonic localization of the lumbar epidural space. *Anesthesiology* 52: 513–516
- Corvino BG, Scott DB (1988) *Epidurale Anästhesie und Analgesie*. VCH Verlagsgesellschaft, Weinheim
- Dashfield AK, Taylor MB, Cleaver JS, Farrow D (2005) Comparison of caudal steroid epidural with targeted steroid placement during spinal endoscopy for chronic sciatica: A prospective, randomized, double-blind trial. *Br J Anaesth* 94: 514–519
- Day P (2001) Arachnoiditis: A brief summary of the literature. *NZHTA Report*, <http://nzhta.chmeds.ac.nz>
- Davidson JT, Robin CC (1961) Epidural injections in the lumbosacral syndrome. *Br J Anaesth* 33: 595–598
- Delgado-López PD, Martín-Velasco V, Castilla-Díez JM, Velasco-Oses A (2007) Symptomatic cervical stenosis due to calcification of the ligamentum flavum after mild cervical trauma. *Neurocirugía* 18: 141–146
- Devulder J, Bogaert L, Moerman A, Rolly G (1995) Relevance of epidurography and epidural adhesiolysis in chronic failed back surgery patients. *Clin J Pain* 11: 80–90
- Deyo RA, Weinstein JN (2001) Low back pain. Primary care. *N Engl J Med* 344: 363–370
- Deyo RA (2007) Back Surgery – Who needs it? *N Engl J Med* 356: 2239–2243
- Diener HC, Maier C (2003) *Schmerztherapie*. Urban & Fischer, Munich Jena
- Dittmann M (1982) *Thorakale Epiduralanalgesie (TEA)*. Springer, Berlin Heidelberg New York
- Dittmann M, Reina MA, López García A (1998) Neue Ergebnisse bei der Darstellung der Dura mater spinalis mittels Rasterelektronenmikroskopie. *Der Anaesthesist* 47: 409–413
- Dvorak J, Grob D (2004) Epidurale Injektionen. *Orthopäde* 33: 591–593
- Dzelzitis J, Warnke JP, Morgela S, Aide H (2002) Thecaloscopy: operative technique, instrumentation and approach to lower back, cadaver studies. Internet: http://www.dgnc.de/dgnc02/poster/Abstract_poster1504_091.pdf
- El-Khoury GY, Ehara S, Weinstein JN, Montgomery WJ, Kathol MH (1988) Epidural steroid injection: A procedure ideally performed with fluoroscopic control. *Radiology* 168: 554–557
- Errando CL, Sifre C, Moliner S, Valía JC, Gimeno O, Mínguez A, Boils P (1999) Subarachnoid ketamine in swine – pathological findings after repeated doses: Acute toxicity study. *Reg Anesth Pain Med* 24: 146–152
- Evans VV (1930) Intracanal epidural injection in the treatment of sciatica. *Lancet* 2: 1225–1229
- Fager CA, Friedberg SR (1980) Analysis of failures and poor results of lumbar spine surgery. *Spine* 5: 87–94
- Farrar T, Young JP Jr, LaMoreaux L (2001) Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain* 94: 149–158
- Figdor P (2002) Philipp Bozzini. Endo-Press, Tuttlingen
- Finnegan WJ, Fenlin JM, Marvel, Nardini RJ, Rothman RH (1979) Results of surgical intervention in the symptomatic multiply-operated back patient. *J Bone Joint Surg* 61 (A): 1077–1082
- Fredman B, Ben Nun B, Zohar E, Iraqi G, Shapiro M, Gepstein R (1999) Epidural steroids for treating »failed back surgery syndrome«: Is fluoroscopy really necessary? *Anesth Analg* 88: 3667–3672
- Freyhagen R, Baron R, Koroschetz J, Rehm S, Ziegler D (2007) Die Pharmakotherapie neuropathischer Schmerzen. Individuell ausgerichtet, aber eingebettet in ein interdisziplinäres und multimodales Konzept. *Klinikerzt. Medizin im Krankenhaus* 5: 271–278
- Friedrich M, Gittler G, Arendasy M, Friedrich KM (2005) Long-term effect of a combined exercise and motivation pro-

- gram on the level of disability of patients with chronic low back pain. *Spine* 30: 995–1000
- Fudickar A, Maurer E, Lindstedt U, Dinkel M, Scholz J, Tonner PH (2007) Elektroencephalogramm und evozierte Potentiale in der Intensivmedizin. *Anästhesiologie* 48: 251–260
- Fujimoto T, Giles BP, Replogle RE, Fujimoto H, Miller SL, Purdy PD (2005) Visualization of sacral nerve roots via percutaneous intraspinal navigation (PIN). *Am J Neuroradiol* 26: 2420–2424
- Gerdesmeyer L, Wagner K, Rechl H, Ulmer M, Göbel M (2003) Einfluss der minimal-invasiven perkutanen Neurolyse nach Racz auf das Low-back-pain-Syndrom. *German Medical Science: Doc03dgu09-7*
- Gerdesmeyer L, Lampe R, Veihelmann A, Burgkart R, Göbel M, Gollwitzer H, Wagner K (2005) Chronische Radikulopathie. Einsatz der minimal-invasiven perkutanen epiduralen Neurolyse nach Racz. *Schmerz* 19: 285–295
- Geurts JW, Kallewaard JW, Richardson J, Groen GJ (2002) Targeted methylprednisolone acetate/hyaluronidase/clonidine injection after diagnostic epiduroscopy for chronic sciatica: a prospective, 1-year follow-up study. *Reg Anesth Pain Med* 27: 343–352
- Gill JB, Heavner JE (2005) Visual Impairment following Epidural Fluid Injections and Epiduroscopy: A Review. *Pain Medicine* 6 (5): 36–374
- Göbel H (2001) Epidemiologie und Kosten chronischer Schmerzen: Spezifische und unspezifische Rückenschmerzen. *Schmerz* 15: 92–98
- Gogarten W, Van Aken H, Büttner J (2003) Rückenmarksnahe Regionalanästhesien und Thromboembolieprophylaxe/antithrombotische Medikation. *Anästhesiologie* 44: 218–230
- Gourie-Devi M, Satish P (1980) Hyaluronidase as an adjuvant in the treatment of cranial arachnoiditis (hydrocephalus and optochiasmatic arachnoiditis) complicating tuberculous meningitis. *Acta Neurol Scand* 62: 368–381
- Gourie-Devi M, Satish P (1984) Intrathecal hyaluronidase treatment of chronic spinal arachnoiditis of noninfective etiology. *Surg Neurol* 22: 231–234
- Grau T (2005) Ultraschallgestützte Bildgebungsverfahren für neuroaxiale Blockaden Internet: <http://www.degum.de>
- Grau T, Leipold RW, Delorme S, Martin E, Motsch J (2002) Ultrasound imaging of the thoracic epidural space. *Reg Anesth Pain Med* 27: 200–206
- Grau T, Leipold RW, Conradi R, Martin E, Motsch J (2002) Die Darstellung von Duraperforationen und Bloodpatches mit Ultraschall. *Anästhesiologie* 48: 149–153
- Grau T, Fatehi S, Delorme S, Motsch J (2004) Präzisionsanalysen von Ultraschall und MRT in der Bildgebung des lumbalen Epiduralraumes. *Ultraschall Med* 25 (S1): WS 26–04
- Graziotti P (2007) DVD EPIDUROSCOPY. Spine-aligna Pty Ltd, 91 Circle Circle, Dalkeith, West Australia Internet: <http://www.ipmt.net>
- Grond S, Tamke B, Gaul C, Meyer O (2007) Tumorschmerztherapie – ein Update. *Anästhesiologie* 48: 261–278
- Gupta RC, Gupta SC, Dubey RK (1984) An experimental study of different contrast media in the epidural space. *Spine* 9: 778–781
- Haddad C, Blomstein A (1985) Diagnosis and treatment of epidural adhesions causing spinal pain. *Schmerz-Pain-Douleur* 4: 156–152
- Hamid M, Fallet-Bianco C, Delmas V, Plaisant O (2002) The human lumbar anterior epidural space: Morphological comparison in adult and fetal specimens. *Surg Radiol Anat* 24: 194–200
- Hankemeier U, Hildebrandt J (1998) Neurodestruktive Verfahren in der Schmerztherapie. Springer, Berlin Heidelberg New York
- Harrison GR, Parkin IG, Shah JL (1985) Resin injection studies of the lumbar extradural space. *Br J Anaesth* 57: 333–336
- Hatten HP Jr (1980) Lumbar epidurography with metrizamide. *Radiology* 137: 129–136
- Hägg O, Fritzel P, Oden A (2003) The clinical importance of changes in outcome scores after treatment for chronic low back pain. *Eur Spine J* 12: 12–20
- Heavner JE, Chokhavata S, Kizelshteyn G (1991) Percutaneous evaluation of the epidural and subarachnoid space with the flexible fiberscope. *Regional Anesthesia* 85: 1551
- Heavner JE, Racz G, Randolph P, Diede J (1996) Prospective evaluation of lysis of epidural adhesions in the management of pain. Abstract, International Association for the Study of Pain, 8th World Congress on Pain
- Heavner JE, Bosscher H, Dunn D, Lehman T (2004) Xanthosis in the spinal epidural space – an epiduroscopy finding. *Pain Pract* 4: 39–41
- Hellinger J, Stern S, Hellinger S (2003) Nonendoscopic Nd-YAG 1064 nm PLDN in the treatment of thoracic discogenic pain syndromes. *J Clin Laser Med Surg* 21: 61–66
- Hellwig D, Tirakotai W, Riegel T, Heinze S, Bertalanffy H (2007) Endoskopische Verfahren in der Neurochirurgie. *Dtsch Arztebl* 104: A 185–191
- Hertz H, Schabus R, Wunderlich M (1985) Endoskopie des Spinalkanals – experimentelle Untersuchungen an Leichen. *Unfallchirurgie* 11 6: 275–277
- Higuchi H, Hirata J, Adachi Y, Kazama T (2004) Influence of lumbosacral cerebrospinal fluid density, velocity and volume on extent and duration of plain bupivacaine spinal anesthesia. *Anesthesiology* 100: 106–114
- Hildebrandt J (2005) Die Versorgung von Schmerzpatienten durch den Anästhesisten. *Klinikarzt* 34: 299–305
- Hilger C (2003) Flexible Endoskope – Belastungsmerkmale und Beanspruchungsparameter. *Medizintechnik* 123: 182–190
- Hitchcock E (1967) Hypothermic subarachnoid irrigation. *Lancet* 1: 1330
- Hitchcock E (1969) Osmolytic neurolysis for intractable facial pain. *Lancet* 1: 434–436
- Hodgson MC BJ, Sheehan HM (1994) Atlas of intravascular ultrasound. Raven Press, New York
- Hoffman RM, Wheeler KJ, Deyo RA (1993) Surgery for herniated lumbar discs: A literature synthesis. *J Gen Intern Med* 8: 487–496
- Hogan QH (1991) Lumbar epidural anatomy. A new look by cryomicrotome section. *Anesthesiology* 75: 767–775

- Holstrom B, Rawal N, Axewlson K, Larsson U, Amilon A, Dolk T, Nydahl PA (1991) Epiduroscopic study of risk of catheter migration following dural puncture by spinal and epidural needles: A video presentation. *Reg Anesth* 15: 86
- Holstrom B, Rawal N, Axelsson K, Larsson U, Amilon A, Dolk T, Nydahl PA (1995) Risk of catheter migration during combined spinal epidural block: Percutaneous epiduroscopy in autopsy cases. *Anesth Analg* 80: 747–753
- Horlocker TT, Wedel DJ, Benzon H, Brown DL, Enneking FK, Heit JA, Mulroy MF, Rosenquist RW, Rowlingson J, Tryba M, Yuan CS (2003) Regional anesthesia in the anticoagulated patient: Defining the risks (the second ASRA Consensus Conference on Neuraxial Anesthesia and Anticoagulation). *Reg Anesth Pain Med* 28: 172–197
- Hübler M, Koch T (2003) Thorakale epidurale Anästhesie und Analgesie. Arcis, Munich
- Husemeyer RP, White DC (1980) Topography of the lumbar epidural space. *Anaesthesia* 35: 7–11
- Igarashi T, Hirabayashi Y, Shimizu R, Saitoh K, Fukuda H, Mitsuhashi H (1997) The lumbar extradural structure changes with increasing age. *Br J Anaesth* 78: 149–152
- Igarashi T, Hirabayashi Y, Saitoh K, Fukuda H (1998) Thoracic and lumbar extradural structure examined by extraduroscope. *Br J Anaesth* 81: 121–125
- Igarashi T, Hirabayashi Y, Shimizu R, Saitoh K, Fukuda H (1999) The epidural structure changes during deep breathing. *Can J Anaesth* 46: 850–855
- Igarashi T, Hirabayashi Y, Shimizu R, Saitoh K, Fukuda H, Suzuki H (2000) The Fiberscopic Findings of the Epidural Space in Pregnant Women. *Clinical Investigations. Anesthesiology* 92: 1631–1636
- Igarashi T, Hirabayashi N, Seo K, Saitoh H, Fukuda H, Suzuki H (2004) Lysis of adhesions and epidural injection of steroid/local anaesthetic during epiduroscopy potentially alleviate low back and leg pain in elderly patients with lumbar spinal stenosis. *Br J Anaesth* 93: 181–187
- Ivanic GM, Pink TP, Homann NC, Scheitza W, Goyal S (2001) The post-discectomy syndrome. Etiology, diagnosis, treatment, prevention. *Arch Orthop Trauma Surg* 121: 494–500
- Jensen MC, Brant-Zawadzki MN, Obuchowski N, Modic MT, Malkasian D (1994) Magnetic resonance imaging of the lumbar spine in people without back pain. *NEJM* 331: 69–73
- Jewett DL, King JS (1971) Conduction block of monkey dorsal rootlets by water and hypertonic saline solutions. *Exp Neurol* 33: 22–237
- Jerosch J, Grönemeyer D, Gewargez A, Filler TJ, Peucker ET (1999) Möglichkeiten der Spinaloskopie im Rahmen der minimal invasiven Intervention – eine experimentelle Untersuchung. *Biomedizinische Technik* 44: 243–246
- Junker U (2004) Chronische Schmerzen: Das »mixed pain concept« als neue Rationale. *Dtsch Arztebl* 101: A-1393/B-1158/C-1115
- Katz J (ed) (1985) *Atlas of Regional Anesthesia*. Appleton-Century-Crofts, Norwalk, CT
- Kawanishi M, Kawase A, Kumagaya K (2006) Equipment for epiduroscopy and its clinical applications. *Masui* 55: 1112–1117
- Kawauchi Y, Yone K, Sakou T (1996) Myeloscopic observation of adhesive arachnoiditis in patients with lumbar spinal canal stenosis. *Spinal Cord* 34: 403–410
- Kefalianakis F (2006) *Leitfaden Sonografie für Anästhesisten*. Thieme, Stuttgart New York
- Kelsey JL, White A (1980) Epidemiology and impact of low back pain. *Spine* 5: 133–142
- Kepes ER, Duncalf D (1985) Treatment of backache with spinal injections of local anesthetics, spinal, and systemic steroids: A review. *Pain* 22: 33–47
- Kindler C, Seeberger MD, Staender SE (1998) Epidural abscess complicating epidural anesthesia and analgesia. An analysis of the literature. *Acta Anaesthesiol Scand* 42: 609–613
- King JS, Jewett DL, Sundberg HR (1972) Differential blockade of cat dorsal root C-fibers by various chloride solutions. *J Neurosurg* 36: 569–583
- Kitamura A, Sakamoto A, Aoki S, Ogura A, Kawahara T, Inoue T, Ogawa R (1996) Epiduroscopic changes in patients undergoing single and repeated epidural injections. *Anesth Analg* 82: 88–90
- Kizelshteyn G, Heavner JE, Levine S (1991) Epidural balloon catheter system lysing epidural adhesions. *Reg Anesth* 15: 87
- Klakow-Franck R, Rheinberger P (2003) Stellenwert der minimal-invasiven Wirbelsäulenkathetertechnik nach Racz. *Dtsch Arztebl* 100: A 1022–1023
- Koes BW, Scholten RJ, Mens JM, Bouter LM (1995) Efficacy of epidural steroid injections for low-back pain and sciatica: A systematic review of randomized clinical trials. *Pain* 63: 279–288
- Korsten HH, Ackerman EW, Grouls RJ, Van Zundert AA, Boon WF, Bal F, Crommelin MA, Ribot JG, Hoefsloot F, Sloof JL (1991) Long-lasting epidural sensory blockade by n-butyl-p-amino benzoate in the terminally ill intractable cancer pain patient. *Anesthesiology* 75: 950–960
- Krämer J (1994) *Bandscheibenbedingte Erkrankungen*. Thieme, Stuttgart New York
- Kukita F, Yamagishi KF (1979) Excitation of squid giant axons in hypotonic and hyper tonic solutions. *Jpn J Physiol* 20: 669–681
- Kuslich SD, Ulstrom CL, Michael CJ (1991) The tissue origin of low back pain and sciatica. *Orthop Clin North Am* 22: 181–187
- Lake DA, Barnes CD (1980) Effects of changes in osmolality on spinal cord activity. *Exp Neurol* 68: 555–567
- Lang T (personal communication) Epiduroscopy for longterm pain reduction in low back pain: A prospective randomized trial
- Leipold RW (2003) Die sonographische Darstellung des thorakalen Epiduralraums – Nichtinvasive bildgebende Diagnostik vor thorakaler Epiduralanästhesie. Heidelberg Internet: www.ub.uni-heidelberg.de/archiv/4033
- Lerch K, Völk M, Neumann C, Nerlich M (2002) Intraoperative Sonographie des Myelons. *Spinalkanalstenose durch Fraktur oder Tumor. Ultraschall Med* 23: 113–118
- Lessl W-D (2004) Untersuchung zum Effekt der minimal invasiven Neruolyse mittels Epiduralkatheter in der Behand-

- lung lumbaler Wurzelreiz/kompressionssyndrome sowie einer speziellen Form des pseudoradikulären Schmerzsyndroms. Indikationen, Technik und Ergebnisse einer retrospektiven Patientenstudie. Dissertation, Technische Universität München
- Leu HJ (1993) Percutaneous techniques: Decompression and intradiscal laser in discoscopy, external pedicular fixation, percutaneous interbody fusion, peridural endoscopy with discoscopy. 12th course for percutaneous endoscopic spinal surgery. Balgrist, Zurich
- Levandowski EM (1997) The efficacy of solutions used in caudal neuroplasty. *Pain Digest* 7: 323–330
- Lipov E (2007) Stellate ganglion block may relieve hot flashes by interrupting the sympathetic nervous system. *Med Hypotheses* 69: 758–763
- Lorinson D, Kogler J, Größlinger K (2006) Perkutane Epiduroskopie beim Hund: Anatomische und technische Grundlagen. *Wien Tierärztl Mschr* 93: 278–282
- Lubenow T, Keh-Wong E, Kristof K, Ivankovich O, Ivankovich AD (1988) Inadvertent subdural injection: A complication of an epidural block. *Anesth Analg* 67: 175–179
- Luehmann D, Burkhardt-Hammer T, Borowski C, Raspe H (2005) Minimal-invasive Verfahren zur Behandlung des Bandscheibenvorfalls, HTA-Bericht 17. Deutsche Agentur für Health Technology Assessment des Deutschen Instituts für Medizinische Dokumentation und Information, Cologne
- Luyendijk W (1979) The plica mediana dorsalis of the dura mater and its relation to lumbar peridurography (canalography). *Neuroradiology* 11: 147–149
- Luyendijk W, Van Voorthuisen AE (1966) Contrast examination of the spinal epidural space. *Acta Radiol Diagn* 5: 1051–1066
- Macnab I (1972) The mechanism of spondylogenic pain. In: Hirsch C, Zotterman Y (eds) *Cervical pain*. Pergamon, Oxford, pp 89–94
- Malinovsky JM, Lepage JY, Cozian A, Mussini JM, Pinaud M, Souron R (1993) Is ketamine or its preservative responsible for neurotoxicity in the rabbit? *Anesthesiology* 78: 109–115
- Manchikanti L (2000) Epidemiology of low back pain. *Pain Physician* 3: 167–192
- Manchikanti L, Pampati V, Bakht CE, Pakanati RR (1999) Non-endoscopic and endoscopic adhesiolysis in post-lumbar laminectomy syndrome: A one-year outcome study and cost effectiveness analysis. *Pain Physician* 2: 52–58
- Manchikanti L, Pakanati RR, Pampati VS (2000) The value and safety epidural endoscopic adhesiolysis. *Am J Anesthesiol* 27: 275–279
- Manchikanti L, Singh V (2002) Epidural lysis of adhesions and myelography. *Curr Pain Headache Rep* 6: 427–435
- Manchikanti L, Rivera J, Pampati V, McManus CD, Brandon D, Wilson SL (2004) One day lumbar epidural adhesiolysis and hypertonic saline neurolysis in treatment of chronic low back pain: A randomized, double-blind trial. *Pain Physicians* 7: 177–186
- Manchikanti L, Boswell MV, Rivera J, Pampati V, Damron KS, McManus CD, Brandon DE, Wilson SR (2005) A randomized, controlled trial of spinal endoscopic adhesiolysis in chronic refractory low back and lower extremity pain. *BMC Anesthesiology* 5: 10
- Marhofer P, Koinig H, Kapral S (2003) Kaudalanästhesie: Die Wahl der Medikamente für die Kaudalanästhesie bei Kindern. *Anaesthesist* 52: 55–67
- Marshall LL, Trethewie CC (1987) Chemical radiculitis. A clinical, physiological and immunological study. *Clin Orthop* 129: 760–764
- Mayer TG, Gatchel RJ (1998) *Functional restoration for spinal disorders*. Lea & Febiger, Philadelphia
- McCarron RF, Wimpee MW, Hudkins PG, Laros GS (1987) The inflammatory effect of the nucleus pulposus: A possible element in the pathogenesis of low back pain. *Spine* 12: 760–764
- McLeod A, Roche A, Fennelly M (2005) Ultrasonography may assist epidural insertion in scoliosis patients. *Can J Anaesth* 52: 717–720
- Mense S (2007) Muskelverspannungen als Ursache von Rückenschmerzen. *MedReport* 31: 7–8
- Merrid U, Sogaard IB (1986) Sciatica caused by perifibrosis of the sciatic nerve. *J Bone Joint Surg* 68: 706
- Mesrian A, Neubauer E, Schiltewolf M (2007) Gutes Therapieergebnis nach Behandlung chronischer Rückenschmerzen. *Schmerz* 21: 212–217
- Meyers MA (1997) Visual Loss as a Complication of Spine Surgery – A review of 37 cases. *Spine* 22: 1325–1329
- Mizuno J, Gauss T, Suzuki M, Hayashida M, Arita H, Hanaoka K (2007) Encephalopathy und rhabdomyolysis provoquées l'iotrolan durant l'epiduroscopie. *J Anaesth* 54: 49–53
- Modic MT, Ross JS, Obuchowski NA, Browning KH, Cianflocco AJ, Mazanec DJ (1995) Contrast enhanced MR imaging in acute lumbar radiculopathy: A pilot study of the natural history. *Radiology* 195: 429–435
- Möllmann M, Holst D, Enk D, Filler T, Lübbesmeyer H, Deitmer T, Lawin P (1992) Spinaloskopie zur Darstellung von Problemen bei der Anwendung der kontinuierlichen Spinalanästhesie. *Anästhesist* 41: 544–547
- Möllmann M, Holst D, Lübbesmeyer H, Lawin P (1993) Continuous spinal anesthesia: Mechanical and technical problems of catheter placement. *Reg Anesth* 18: 469–472
- Moore DC (1951) The use of hyaluronidase in local and nerve block analgesia other than spinal block. 1520 cases. *Anesthesiology* 12: 611–626
- Myers RR, Katz J (1990) Neuropathology of neurolytic and semidestructive agents. In: Cousins MJ, Bridenbaugh PO (eds) *Neural blockade*. 2nd edn. Lippincott, Philadelphia, pp 567–568
- Naseri A, Blumenkranz MS, Horton JC (2001) Terson's syndrome following epidural saline injection. *Neurology* 57: 364
- North RB, Campbell JN, James CS, Conover-Walker MK, Wang H, Piantadosi S, Rybock JD, Long DM (1991) Failed back surgery syndrome: 5-year follow-up in 102 patients undergoing repeated operation. *Neurosurgery* 28: 685–690
- Obata K, Tsujino H, Yamanaka H, Yi D, Fukuoka T, Hashimoto N, Yonenobu K, Yoshikawa H, Noguchi K (2002) Expression of neurotrophic factors in the dorsal root ganglion in a rat model of lumbar disc herniation. *Pain* 99: 121–132
- Odendaal CL, Van Aswegen A (1993) Determining the spread of epidural medication in post laminectomy patients by

- radiculopathic admixture. Abstracts 7th World Congress of Pain, 487
- Ogon M, Maurer H, Wimmer C, Landauer F, Sterzinger W, Krismer M (1997) Minimally invasive approach and surgical procedures in the lumbar spine. *Orthopäde* 26: 553–561
- Oh WS, Lee SJ, Hong KH (2000) Fulminant Headache after Epiduroscopy. *Korean J Pain* 13: 130–133
- Olinger CP, Olhaber RL (1974) Eighteen Gauge Microscopic-Telescope Needle Endoscope with Electrode Channel: Potential Clinical and Research Application. *Surg Neurol* 2: 151–160
- Olmaker K, Rydevik B, Holm S (1989) Edema formation in spinal nerve roots induced by experimental, graded compression: An experimental study on the pig cauda equina with special reference to differences in effects between rapid and slow onset of compression. *Spine* 14: 569–573
- Olmaker K, Rydevik B (1998) Pathogenesis of sciatic pain: Role of herniated nucleus pulposus and deformation of spinal nerve root and dorsal root ganglion. *Pain* 78: 99–105
- Ooi Y (1981) Myeloscopy (in Japanese). *Orthop Traum Surg* 24: 659–669
- Ooi Y, Morisaki N (1969) Intrathecal lumbar endoscope (first report in Japanese). *Clin Orthop Surg* 4: 295–297
- Ooi Y, Satoh Y, Morisaki N (1972) Myeloscopy. *Igakuno Ayumi (Jpn)* 81: 209–212
- Ooi Y, Satoh Y, Morisaki N (1973) Myeloscopy. *Orthop Surg (Jpn)* 24: 181–186
- Ooi Y, Satoh Y, Hirose K, Mikanagri K, Morisaki N (1973) Myeloscopy, possibility of observing lumbar intrathecal space by use of an endoscope. *Endoscopy* 5: 90–96
- Ooi Y, Satoh, Sugawara S, Mikanagi K, Morisaki N (1977) Myeloscopy. *Int Orthopedics I*: 107–111
- Ooi Y, Satoh Y, Inoue K, Mikanagi K, Morisaki N (1978) Myeloscopy. *Acta Orthop (Belgium)* 44: 881–894
- Ooi Y, Mita F, Satoh Y (1990) Myeloscopic study on lumbar spinal canal stenosis with special reference to intermittent claudication. *Spine* 15: 544–549
- Parris WCV (1999) What is new and on the horizon in Pain Management. *American Society of Anesthesiologists* 63: 10
- Payne JN, Ruff NY (1951) The use of hyaluronidase in caudal block anesthesia. *Anesthesiology* 12: 162–172
- Peek RD, Thomas JC (1993) Diagnosis of lumbar arachnoiditis by myeloscopy. *Spine* 18: 2286–2289
- Perez-Cruet MJ, Foley KT, Isaacs RE, Rice-Wyllie L, Wellington R, Smith MM, Fessler RG (2005) Microendoscopic discectomy: technical note. *Neurosurgery* 51 (Suppl 2): 129–135
- Peul WC, Van Houwelingen HC, Van den Hout WB (2007) Surgery versus Prolonged Conservative Treatment for Sciatica. *N Engl J Med* 356: 2245–2256
- Pfingsten M, Hildebrandt J (2001) Die Behandlung chronischer Rückenschmerzen durch ein intensives Aktivierungskonzept (GRIP) – eine Bilanz von 10 Jahren. *Anästhesiol Intensivmed Notfallmed Schmerzther* 36: 580–589
- Pheasant HC (1975) Sources of failure in laminectomies; symposium on the lumbar spine. *Orthopedic Clinic of North America* 6: 319–329
- Pick CF, Bockhorn J (1980) Endoscopic examinations and computed tomography concerning cervical spine positioning intreatment of acute cervical spine injuries. *Archives of Orthopedic Trauma Surgery* 97: 43–49
- Polyanalgesic Consensus Panel (ed) (2007) Polyanalgesic Consensus Panel Issues New Guidelines for Pain Management via Intraspinal Infusion. *Business Wire*
- Pool JL (1938) Direct visualization of dorsal nerve roots of cauda equina by means of a myeloscope. *Arch Neurol Psychiatry* 39: 1308–1312
- Pool JL (1938) Myeloscopy: Diagnostic inspection of the cauda equina by means of an endoscope. *Bull Neurol Inst New York* 7: 178–189
- Pool JL (1942) Myeloscopy: Intraspinal endoscopy. *Surgery* 11: 169–182
- Price CM, Rogers PD, Prosser ASJ, Arden NK (2000) Comparison of the caudal and lumbar approaches to the epidural space. *Ann Rheum Dis* 59: 879–882
- Racz GB, Haynsworth RE, Lipton S (1986) Experiences with an improved epidural catheter. *Pain Clinic* 1: 21–27
- Racz GB, Heavner JE, Singleton W (1988) Hypertonic saline and corticosteroid injected epidurally for pain control. In: Racz GB (ed) *Techniques of Neurolysis*. Kluwer Academic, Boston, pp 73–86
- Racz GB, Kline WN (1988) New epidural adapter and epidural needle. In: Racz GB (ed) *Techniques of Neurolysis*. Kluwer Academic, Boston
- Racz GB, Holubec JT (1989) Lysis of adhesions in the epidural space. In: Racz GB (ed) *Techniques of Neurolysis*. Kluwer Academic, Boston, pp 57–72
- Racz GB (1995) Letter to the Editor. In response to article by Devulder et al. *Clin J Pain* 11: 151–158
- Racz G, Heavner JE, Diede J (1996) Lysis of Epidural Adhesions Utilizing the Epidural Approach. In: Waldmann SD, Winnie AP (eds) *Interventional pain management*, 1st ed. W.B. Saunders, Philadelphia, pp 339–359
- Racz GB, Heavner JE (1996) Aristocort and Depo-Medrol passage through a 0.2 μ filter. *Reg Anesth* 15: 25
- Racz GB, Heavner JE, Raj PP (1997) Epidural neuroplasty. *Semin Anesth* 16: 302–312
- Racz GB, Heavner JE, Raj PP (1998) Nonsurgical management of spinal radiculopathy by the use of lysis of adhesions (neuroplasty). Evaluation and treatment of chronic pain, 3rd ed. Williams & Wilkins, Philadelphia, pp 533–542
- Raffaelli W (1999) Periduroscopy: preliminary reports-technical notes. *Pain Clinic* 11: 209–212
- Raffaelli W, Righetti D (2005) Surgical radio-frequency epiduroscopy technique (R-ResAblator) and FBSS treatment: preliminary evaluations. *Acta Neurochir Suppl* 92: 121–125
- Raj PP, Lou L, Erdine S, Staats PS (2003) Radiographic imaging for regional anesthesia and pain management. Elsevier Science, Churchill Livingstone
- Rapp HJ, Grau T (2004) Ultrasound imaging in pediatric regional anesthesia. *Can J Anaesth* 51: 277–278
- Rapp HJ, Folger A, Grau T (2005) Ultrasound-guided epidural catheter insertion in children. *Anesth Analg* 101: 333–339

- Regan JF, McAfee PC (1995) Atlas of endoscopic spine surgery. Quality Medical Publishing, St. Louis
- Reihsaus E, Waldbaur H, Seeling W (2000) Spinal epidural abscess: a meta-analysis of 915 patients. *Neurosurg Rev* 23: 175–204
- Reina MA, Lopez Garcia A (1998) Novedades sobre la Arachnoides Humana. II. Jornadas de Anestesia Loco-Regional, Madrid
- Richardson J, McGurgan P, Cheema S, Prasad R, Gupta S (2001) Spinal endoscopy in chronic low back pain with radiculopathy. A prospective case series. *Anaesthesia* 56: 454–460
- Rizor RF (1994) Epiduroscopy: Technique for examination of the lumbar epidural space. Presented at the 19th meeting of the American Society of Regional Anesthesia, Chicago
- Roberson GH, Hatten HP jr, Hesselink JH (1979) Epidurography: Selective catheter technique and review of 53 cases. *AJR* 132: 787–793
- Rompe JD, Eysel P, Zöllner J, Heine J (1999) Intra- und postoperative Risikoanalyse nach lumbaler Bandscheibenoperation. *Z Orthop* 137: 201–205
- Roohani M (2007) Epiduroskopie – eine vergleichende Studie des diagnostischen Stellenwertes gegenüber der Magnetresonanztomographie. Inauguraldissertation (unpublished)
- Rosenberg PH (1996) Fiberoptic epiduroscopy: Current research [Abstract]. *Int Pain Clin* 7: 124
- Rosenberg AD (2006) Scientific and Educational Exhibits/Medically Challenging Cases. *ASA Newsletter* 70: 7
- Ross JS, Robertson JT, Fredrickson RCA, Petrie JL, Obuchowski N, Modic MT, Detribolet N (1996) Association between peridural scar and recurrent radicular pain after lumbar discectomy: magnetic resonance evaluation. *Neurosurgery* 38: 855–863
- Roth-Brons M, Roth C (2007) Handbuch Schmerz. Medizinische Medien Informations GmbH, Neu-Isenburg
- Ruetten S, Meyer O, Godolias G (2002) Application of holmium: YAG laser in epiduroscopy: Extended practicabilities in the treatment of chronic back pain syndrome. *J Clin Laser Med Surg* 20: 203–206
- Ruetten S, Meyer O, Godolias G (2002) Epiduroscopische Diagnostik und Therapie epiduraler Adhäsionen beim chronisch lumbalen Schmerzsyndrom des voroperierten Patienten: Erste Ergebnisse von 26 Interventionen. *Z Orthop* 140: 171–175
- Ruetten S, Meyer O, Godolias G (2003) Endoscopic surgery of the lumbar epidural space (epiduroscopy): results of therapeutic intervention in 93 patients. *Minim Invas Neurosurg* 46: 1–4
- Sabdi S, Datta S, Trescot AM, Schultz DM, Adlaka R, Atluri SL, Smith HS, Manchikanti L (2007) Epidural steroids in the management of chronic spinal pain: A systematic review. *Pain Physician* 10: 185–212
- Saberski LR (1996) Spinal endoscopy: Current concepts. In: Winnie & Waldman (eds) *Evaluation of the patient in pain*, Textbook. W. B. Saunders, Philadelphia
- Saberski LR (1996) Comment of epiduroscopic changes in patients undergoing single and repeated epidural injections. *Anesthesia, Letters to the Editor*
- Saberski LR (2000) A retrospective analysis of spinal canal endoscopy and laminectomy outcomes data. *Pain Physicians* 3: 193–196
- Saberski LR, Brull SJ (1995) Spinal and epidural endoscopy: A historical review. *Yale J Med* 68: 7–5
- Saberski LR, Brull SJ (1995) Epidural endoscopy-aided drug delivery: A case report. *Yale J Biol Med* 68: 17–18
- Saberski LR, Kitahata L (1995) Direct visualization of the lumbosacral epidural space through the sacral hiatus. *Anesth Analg* 80: 839–840
- Saberski LR, Kitahata L (1996) Persistent radiculopathy diagnosed and treated with epidural endoscopy. *J Anesthesia* 10: 292–295
- Sairyo K, Biyani A, Goel VK, Leaman DW, Booth R jr, Thomas J, Ebraheim NA, Cowgill IA, Mohan SE (2007) Lumbar ligamentum flavum hypertrophy is due to accumulation of inflammation-related scar tissue. *Epidemiology. Spine* 32: E340–E347
- Sakai T, Hojo M, Aoki H, Higashijima U, Sumikawa K (2005) Epiduroscopy improves the pain and the sensory nerve function in the patients with lumbar spinal stenosis. *Anesthesiology* 103: A 1003
- Samanta A, Beardsley J (1999) Sciatica: Which intervention? *BMJ* 319: 302–303
- Sandkühler J, Bromm B, Gebhart GF (2000) Nervous system plasticity and chronic pain. *Progress in brain research* 129, Elsevier, Amsterdam
- Sasaki N, Kikuchi S, Konno S, Sekiguchi M, Watanabe K (2007) Anti-TNF-[alpha] antibody reduces pain-behavioral changes induced by epidural application of nucleus pulposus in a rat model depending on the timing of administration. *Spine* 32: 413–4170
- Satoh Y, Hirose K, Ooi Y, Mikanagi K (1978) Myelography in the diagnosis of low back pain syndrome. Presented at the Third Congress of International Rehabilitation Medicine Association, Basel, Switzerland
- Satoh Y, Hirose K, Ooi Y, Mikanagi K (1981) Myelography, with special reference to blood flow changes in the cauda equina during Lasegue's test. *Int. Orthopedics* 4: 307–311
- Savolaine ER, Pandya JB, Greenblatt SH, Conover SR (1988) Anatomy of the human lumbar epidural space: New insights using C.T. epidurography. *Anesthesiology* 68: 217–220
- Scott BD (1996) *Techniken der Regionalanästhesie*. Chapman & Hall, Weinheim
- Scherer R, Giebler R (2003) Thorakale Epiduralanästhesie. *Anästhesiologie Intensivmedizin Notfallmedizin Schmerztherapie* 38: 168–190
- Schneiderhahn R (2003) Racz-Katheter bei chronischen Schmerzen. *Schmerztherapeutisches Kolloquium* (19) 4: 21–24
- Schöps P, Hildebrandt J (2001) Schmerzen im Bereich der Wirbelsäule. In: Brune K, Beyer A, Schäfer M (eds) *Schmerz: Pathophysiologie-Pharmakologie-Therapie*. Springer Berlin Heidelberg New York, pp 79–89
- Schütze G (1996) Epiduroscopically guided percutaneous implantation of spinal cord stimulation electrodes. Management of pain a world perspective II. In: Raj P, Erdine S, Niv (eds) *Management of pain*. Monduzzi Editore S.p.A, Bologna, pp 301–304

- Schütze G (2000) Techniken und Technologien zur Therapie chronischer Schmerzen. Grünenthal GmbH, Wissenschaftliche Verlagsabteilung, Aachen
- Schütze G (2004) Epiduroskopie eröffnet neue Wege gegen Rückenschmerzen. *Schmerztherapie* 4: 12–13
- Schütze G (2004) Spinale Endoskopie, Rückenmarksnahe Therapie, DGS, ISBN 3-00-014548-6
- Schütze G (2006) EPIDUROSCOPY. Multilingual DVD-ROM, Karl Storz GmbH, Germany, ISBN 3-89756-757-1
- Schütze G (2006) Epiduroscopy for diagnosis and treatment of spinal pain syndromes. 12th International Pain Clinic World Society of Pain Clinicans. MEDIMOND, Turin (Italy), pp 215–221
- Schütze G (2007) Update 2007: Invasiv-Interventionelle Schmerztherapie (Teil 1). *ZNS & Schmerz* 3: 2–8
- Schütze G, Kurtze H (1985) Direct observation of the epidural space with a flexible catheter-secured epiduroscopic unit. *Reg Anesth* 19: 85–89
- Schütze G, Kurtze G, Groll O (1996) Endoscopic method for the diagnosis and treatment of spinal syndromes. *Anesthesiologie Reanimatol* 4: 62–64
- Schütze G, Kurtze H (1993) Percutaneous investigation of the epidural space using a flexible endoscope: A contribution to epiduroscopy. *Reg Anesth* 18: 24
- Schütze G, Kurtze H (1994) Perkutane endoskopische Untersuchung des Epiduralraums-Epiduroskopie. *Endoskopie heute* 4: 221–224
- Schütze G, Kurtze G, Groll O (1995) Epiduroskopie – Ein endoskopisches Verfahren für Diagnostik und Therapie rückenmarksnaher Schmerzsyndrome. *Medizin im Bild* 2: 7–13
- Schwartz FW, Bitzer EM, Dörning H (1999) Gesundheitsausgaben für chronische Krankheit in Deutschland. Pabst Science Publishers, Lengerich
- Sekiguchi M, Yabuki S, Satoh K, Kikuchi S. (2004) An anatomic study of the sacral hiatus: a basis for successful caudal epidural block. *Clin J Pain*; 20: 51–4
- Serpell MG, Coombs DW, Colburn RW, DeLeo JA, Twitchell BB (1993) Intrathecal pressure recordings due to saline instillation in the epidural space. Abstracts of the Seventh World Congress on Pain, Raven Press, Paris, Abstract 1535
- Serrano SC, Morales EM (1997) Una tecnica para visualizacion endoscopica del espacio epidural lumbo-sacro. 3rd Panamerican Symposium. Mexico Sociedad Mexicana de Anestesiologia, Cancun
- Shah RV, Heavner JE (2003) Recognition of the subarachnoid and subdural compartments during epiduroscopy: Two cases *Pain Practice* 3: 321–325
- Shimoji K, Fukuda S, Fujioka H, Fujiwara N, Kawashima M (1988) Development of fine fiberscopes for subarachnoid and epidural spaces (in Japanese). *J Japan Soc Clin Anesth* 8: 215–220
- Shimoji K, Fukuda S, Fujioka H, Onodera M, Hokari T, Hatori T, Fujiwara N (1991) Observation of spinal canal and cisternae with the newly developed small-diameter, flexible fiberscopes. *Anesthesiology* 75: 341–344
- Sicard A. (1901) Les injections medicamenteuses extra-durales par voie sacrococcygienne. *Compt Rend Soc De Biol*; 53:396–8
- Sommer C (ed) (2006) Therapie neuropathischer Schmerzsyndrome, 2. Aufl. UNI-MED, Bremen
- Squire AW, Calvillo O, Bromage PR (1974) Painless intrathecal hyper tonic saline. *Canad Anaesth Soc J* 21: 308–314
- Stark DD, Bradley WG (1998) Magnetic resonance imaging. Mosby, New York
- Stern EL (1936) The spinascope: A new instrument for visualizing the spinal canal and its contents. *Medical Record (NY)* 143: 31–32
- Stern S (2005) Perkutane Neurotomie des Ramus medialis beim chronischen Lumbalen Facettengelenkschmerz durch Laser und deren Nachbehandlung mit der Tigges-Lumbalorthese. *MOT* 5: 84–87
- Stern S, Evermann H (1994) Experiences after lumbar laser nucleotomy in 280 patients with disc protrusion and disc prolapse since May 1993. Scientific conferences and practical workshops at the First Congress of IMLAS (Intern. Musculo-skeletal Laser Society). Neuchatel, Switzerland, pp 15–17
- Stern S, Evermann H (1997) Three years follow up non-endoscopic percutaneous laser disc decompression (PLDD). Abstracts of the 4th International Congress of the IMLAS, Nov. 1997, Kyoto, Japan
- Stevens WR (1997) Ophthalmic Complications after Spinal Surgery. *Spine* 22: 1319–1324
- Stewart HD, Quinell RC, Dann N (1987) Epidurography in the management of sciatica. *Br J Rheumatol* 26: 424–429
- Stith WJ, Judy MM, Hochschuler SH, Guyer RD (1991) Choice for Lasers for Minimally Invasive Spinal Surgery. *Orthopedic Review* 20 (2): 137–142
- Stoessel W. (1909) Ueber sakrale Anästhesie. *Zentralbl Gynaekol*; 33:1
- Swerdlow M (1980) Complications of neurolytic neural blockade. In: Cousins MJ, Bridenbaugh PO (eds) *Neural Blockade*. J.B. Lippincott, Philadelphia, pp 543–553
- Tachihara H, Kikuchi S, Konno S, Sekiguchi M (2007) Does facet joint inflammation induce radiculopathy? An investigation using a rat model of lumbar facet joint inflammation. *Spine* 32: 406–412
- Taylor RS, Damm Hieu P, Fowo S et al. (2007) Cost effectiveness of spinal cord stimulation for failed back surgery syndrome: A four country survey. Poster, 4th World Congress, World Institute of Pain – WIP Budapest, Hungary
- Tegeder I, Costigan M, Griffin RS et al. (2006) GTP cyclohydrolase and tetrahydrobiopterin regulate pain sensitivity and persistence. *Nature Medicine*, Advance Online Publication, October 22, 10.1038/nm 1490
- Tilscher H, Thomalske G (1989) Rücken- und Kreuzschmerz. Edition medizin, CVH Verlagsgesellschaft mbH, Weinheim
- Trescot AM, Chopra P, Abdi S, Datta S, Schultz DM (2007) Systematic review of effectiveness and complications of adhesiolysis in the management of chronic spinal pain: an update. *Pain Physician* 10: 129–146
- Trotter, M. (1947) Variations of the sacral canal: Their significance in the administration of caudal analgesia. *Curr. Res. Anesth. Analgesia* 26:192–202
- Trotter M, Gleser GC (1952) Estimation of stature from long bones, *Amer J Phys Anthropol*, 10: 463–514

- Uchiyama S, Hasegawa K, Homma T, Takahashi H, Shimoji K (1998) Ultrafine flexible spinal endoscope (myeloscope) and discovery of an unreported subarachnoid lesion. *Spine* 23: 2358–2362
- Veihelmann A, Devens C, Birkenmaier C, Trouillier H, Refio HJ (2003) Signifikante Überlegenheit der Epiduralkathetertherapie nach Racz gegenüber Krankengymnastik – Eine prospektiv randomisierte Studie bei chronischem radikulärem Schmerzsyndrom. *German Medical Science: Doc03dgu09-8*
- Ventafridda V, Spreavice R (1974) Subarachnoid saline perfusion. *Adv Neurol* 4: 477–484
- Vranken JH, Troost D, DeHaan P, Pennings FA, Van der Vegt MH, Dijkgraaf MG, Hollmann MW (2006) Severe toxic damage to the rabbit spinal cord after intrathecal administration of preservative-free S(+)-ketamine. *Anesthesiology* 105: 813–818
- Vroomen PCAJ, De Krom MCT, Slofstra PD, Knottnerus JA (2000) Conservative treatment of sciatica: A systematic review. *J Spinal Disord* 13: 463–469
- Wagner KJ, Sprenger T, Pecho C, Kochs EF, Tölle A, Berthele L, Gerdesmeyer L (2006) Schwerwiegende Risiken und Komplikationen der epiduralen Neurolyse nach Racz. Eine Übersicht mit Fallbericht. *Anästhesiol Intensivmed Notfallmed Schmerzther* 41: 213–222
- Waldmann S (1998) *Atlas of Interventional Pain Management*. W. B. Saunders, Philadelphia
- Warnke JP, Mourgela S (2007) Lumbale adhesive Arachnoiditis. Endoskopische Subarachnoepidurostomie als neue Behandlungsmöglichkeit. *Adhesive lumbar arachnoiditis: Endoscopic subarachnoepidurostomy as a new treatment. Der Nervenarzt* 78(10): 1182–1187
- Watkins RG, Edward S (1995) *Spinal Endoscopy. Atlas of Endoscopic Spine Surgery*. Quality Medical Publishing, St. Louis
- Wheatley RG, Schug SA, Watson D (2001) Safety and efficacy of postoperative epidural analgesia. *Br J Anaesth* 87: 47–61
- White AH, Derby R, Wynne G (1980) Epidural injections for diagnosis and treatment of low-back pain. *Spine* 5: 78–86
- Winnie AP, Hartmann JT, Meyers HL Jr (1972) Pain clinic II: Intradural and extradural corticosteroids for sciatica. *Anesth Analg* 51: 990–999
- Witte H, Hellweg S, Witte B, Grifka J (1997) Epiduroscopy with access via the sacral canal. Some constructional equipment requirements from the anatomic and biochemical viewpoint. *Biomedizinische Technik* 42: 24–29
- Wittenberg RH, Greskötter KR, Steffen R, Schoenfeld BL (1990) Ist die epidurale Injektionsbehandlung mit hypertoner Kochsalzlösung beim Bandscheibenvorfall sinnvoll? (Die Wirkung von NaCl auf Bandscheibengewebe) *Z Orthop* 128: 223–226
- Woolf CJ, Allchorne A, Safieh-Garabedian B, Poole S (1997) Cytokines, nerve growth factor and inflammatory hyperalgesia: The contribution of tumour necrosis factor alpha. *Br J Pharmacol* 121: 417–424
- World Initiative on Spinal Endoscopy (WISE) (ed) (2007) *Epiduroscopy. Consensus Decision, March 2006*. Endo-Press™, Tuttlingen
- Zenz M (2007) Rückenschmerz. Viele Fragen und immer noch zu wenig Antworten. *Schmerz* 3: 199–201
- Ziegler K (1990) *Endosonographie*. Perimed Fachbuch-Verlagsgesellschaft, Erlangen
- Zoller WG, Gresseter U, Zöllner N (1994) *Einführung in die Ultraschalldiagnostik*. Karger, Basel

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