

Massage Safety: Injuries Reported in Medline as Related to the Practice of Therapeutic Massage — 1965 to 2003

Keith Eric Grant, Ph.D.

**Head, Sports & Deep Tissue Program
McKinnon Institute, Oakland, CA
keg@ramblemuse.com**

Abstract

Medline citations from 1965 to 2003 were searched for cases relating significant injury to the practice of therapeutic massage. Twelve such cases were found from over 12 million medical citations. While this number is far too small for statistical analysis of injury patterns, six recommendations for training and practice were obtainable from these reports on mechanistic grounds. A conclusion of the general safety of massage follows from the paucity of report injury cases in conjunction with corroborative insurance statistics.

Keywords: massage injury, massage governance, and massage training

Introduction

As part of defining evidence-based guidelines for the teaching and practice of therapeutic massage, it is necessary to examine cases in the medical literature in which the practice of massage has caused or contributed to significant injury. If patterns of repeating injury are found, then the appropriate hazards management protocol is to identify the precipitating factors and to make recommendations for specific changes in training and practice to avoid their recurrence. The effectiveness of the changes would then be monitored to determine if further refinements are required. In the absence of such patterns of injury, it may still be possible to make recommendations on purely mechanistic grounds. This paper, accordingly, examines the number and nature of reports of injury associated with massage in the Medline database with the goal of making this information more easily and generally accessible to instructors, practitioners, and regulators of massage. Further context to the results from Medline is obtained by comparison with liability insurance data for massage and chiropractic.

Method

Via PubMed, the Medline database was searched for cases in which massage therapy was reported to have caused or contributed to injuries. PubMed provided access to over 12 million Medline citations between 1965 and May 2003. Coverage included both US and international health care journals. Cases initially retrieved and cases previously known to the author were combined and examined to define further searches. This process was continued until a set of searches was defined that retrieved all known and previously retrieved cases, some multiple times, and for which no new cases were found. The author was further guided by anatomical knowledge of nerve and organ systems potentially susceptible to trauma. Such systems were often additionally known to the author from martial arts training as susceptible targets. Many cases in which the term massage was used for a medical procedure (e.g. cardiac massage,

resuscitation) or in which massage was referenced as a treatment for injury or pain were eliminated by manual scanning.

Several cases of massage related injury were eliminated from further consideration as being identifiably separate from the normal practice of massage. Liu et al. (1993) reported a case of carotid arterial dissection from use of a Shiatsu machine. Kalinga et al. (1996) reported a case of a popliteal artery pseudoaneurysm from massage in the context of Traditional Chinese Medicine. Mikhail et al. (1997) reported a renal embolism in a patient with aortic occlusion after the patient's wife walked on his back. These reports are specifically mentioned here as they have previously been cited as examples of massage related injuries.

Searches were performed using the following Boolean phrases. The number of hits retrieved and manually scanned is given within parenthesis for each search. An asterisk appended to a prefix term indicates that all suffixes to the prefix were accepted. The appendix "[ti]" indicates that the search for the immediately preceding term was confined to article titles.

- massag* AND injur* NOT perineal NOT cardiac (347)
- massag* AND dissection (26)
- massag* AND liver (95)
- massag* AND kidney (52)
- massag* AND renal (47)
- massag* AND nerve (164)
- massag* AND deep (87)
- massag* AND shiatsu (22)
- massag* AND hematoma NOT cardiac (19)
- massag* AND hepatic (20)
- massag* AND contributing (15)
- massag* AND xiphoid (2)
- massag* AND “vertebral artery” (6)
- massage AND arter* NOT cardiac (106)
- massag*[ti] AND arter* (45)
- massag*[ti] AND vein* (14)
- massag*[ti] AND embolism (33)
- massag*[ti] AND thrombosis (16)

This combination of searches and manual examination of retrieved matches resulted in twelve case reports, each unique. As an additional check on the robustness of the results, several searches were done extending the scope of terminology.

- “soft tissue mobilization” AND injur* (8)
- “soft tissue mobilization” AND injur* (77)
- “soft tissue manipulation” AND injur* (59)
- “manual therapy” AND injur* (43)

The first three topics did not add any additional relevant matches. The topic of manual therapy retrieved articles (in German, without abstracts) by Schmitt (1978) and Wolff (1978) on damage to the vertebral artery via manual therapy to the cervical spine. An additional article by Schmitt (1988) discussed neuropathologic risks of manual therapy of the spine. Another article by West and Gardner (2001) noted injuries incurred by physical therapists rather than clients in the practice of manual therapy.

A subsequent search specific to manual therapy and vertebral artery injury (VAI) produced an incident in physical therapy of forced active rotation of the cervical spine and head retraction on a three-month old infant resulting in fatal damage to the vertebral arteries (Jacobi et al., 2001). An additional search on “soft tissue” and VAI did not produce any applicable matches. One case report specific to massage and VAI is included in the main results of this paper (Pego et al., 1996). Searches combining “vertebral artery” with chiropractic, physiotherapy, and physical therapy resulted in raw article counts of 91, 12, and 19, respectively.

Retrieved Case Reports with Abstracts

1. Danchik JJ, Yochum TR, Aspegren DD 1993 Myositis ossificans traumatica. *Journal of Manipulative and Physiological Therapeutics* 16: 605-614. (8133197)

Objective: To present a case of myositis ossificans traumatica (MOT) in a hockey player. Serial X-ray studies allow the reader an opportunity to observe MOT in its earliest through fulminated stages. **Clinical Features:** A 20-yr-old hockey player was subjected to an acute blow to the lateral thigh. Copious amounts of swelling soon developed. The patient was unable to skate. X-rays were initially performed 4 hr after the injury and demonstrated a huge mass developing in the thigh at that time. Intervention and **Outcome:** The player was inappropriately treated with deep tissue massage and heat at the time of injury. It is believed that this led to the fulmination and advanced degree of MOT development. Immobilization allowed for resorption of the calcific density of the ossified structure. **Conclusion:** Proper care of acute trauma is essential in disorders of this nature. Ice, immobility and recognition of when a possible MOT lesion is developing is essential when dealing with contact sports.

2. Giese S, Hentz VR 1998 Posterior interosseous syndrome resulting from deep tissue massage. *Plastic and Reconstructive Surgery* 102: 1778-1779 (9774065) (No Abstract Available)
3. Herskovitz S, Strauch B, Gordon MJ 1992 Shiatsu massage-induced injury of the median recurrent motor branch. *Muscle & Nerve* 15: 1215 (1406783). (No Abstract Available)
4. Kerr, HD.1997 Ureteral stent displacement associated with deep massage. *Wisconsin Medical Journal* 96: 57-58 (9433179)

A 51 year-old woman with a history of ureteral stenosis and calculi noted recurrence of severe left flank pain while undergoing a deep body massage using the Rolfing method. Displacement of her left ureteral double J stent was noted in the emergency department. The pain and associated incontinence resolved with restoration of the stent to its original position. Practitioners should be aware of this potential complication related to forceful massage pressures.

5. Medvedev EA 1994 Case of acute unilateral neurosensory hearing loss caused by massage of the trapezius muscle. *Vestnik otorinolaringologii* 3: 38-39. Russian. (7846811) (No Abstract Available)

6. Mumm AH, Morens DM, Elm JL, Diwan AR 1993 Zoster after Shiatsu massage. *Lancet* 341: 447 (8094222) (No Abstract Available)
7. Pego R, Marey J, Lopez-Facal MS, Marin-Sanchez M 1996 Eight cases of extracranial vertebral artery dissection. *Revista de Neurologia* 24: 172-175

We present eight cases of extracranial vertebral artery dissection. One of these had traumatic antecedents at the neck level while undergoing massage treatment. Of the rest, in four cases there was only a history of commonplace traumatism at neck level, consisting of twisting or stretching. Most presented pain at this level both before and during symptoms. Five had symptoms compatible with lateral bulbar infarct, two with cerebral infarct and one at the protuberance level. Angiography showed irregular stenosis of the spine on the affected side in five cases, occlusion in three cases. Nuclear magnetic resonance (NMR) was performed on five, with findings compatible with dissection. Six received anticoagulant treatment and two received platelet antiagregants with good recovery except in one patient who died twelve months later without any indication of the existence of dissection. We also carried out a review of the literature with special emphasis on the etiology of spontaneous cases, on clinical and neuroimaging findings and on treatment.

8. Rahman MN, McAll G, Chai KG 1987 Massage-related perforation of the sigmoid colon in Kelantan. *The Medical Journal of Malaysia* 42: 56-57 (3431504) (No Abstract Available)
9. Tachi J, Amino N, Miyai K 1990 Massage therapy on neck: a contributing factor for destructive thyrotoxicosis? *Thyroidology* 2: 25-27 (1715747)

A 57-year-old woman with Hashimoto's disease is described who developed transient destructive thyrotoxicosis subsequently after she underwent physical massage therapy over her shoulder to neck, together with the goiter, for muscle stiffness in that part. This case supports the concept that physical vigorous manipulation might be a contributing factor for thyrotoxicosis in cases predisposed with autoimmune thyroiditis.

10. Trotter JF 1999 Hepatic hematoma after deep tissue massage. *The New England Journal of Medicine* 341: 2019-2020 (10617400)

Common causes of hepatic hematoma include trauma and rupture of a hepatic tumor (adenoma or hepatoma). We report a case of hepatic hematoma that developed after a deep body massage.

11. Tsuboi K 2001 Retinal and cerebral artery embolism after "shiatsu" on the neck. *Stroke* 32: 2241-2242 (No abstract available)
12. Yeo TC, Choo MH, Tay MB 1994 Massive haematoma from digital massage in an anticoagulated patient: a case report. *Singapore Medical Journal* 35: :319-320 (7997915) (No Abstract Available)

Discussion of Case Reports

Danchik et al. (1993) document a case in which deep tissue massage and heat were applied at the time of injury. This would appear to be a violation of current protocols of performing more than lymphatic drainage in the immediate vicinity of such injuries.

Both Giese and Hentz (1998) and Herskovitz et al. (1992) document injury to nerves. Mechanistically, the likely cause is impingement with pressure of superficial nerve tissue directly against underlying bone. Vulnerability of superficial nerves to damage has previously been observed with incautious icing following sports injuries. Barrett et al. (1992) review a number of such cases. The recommendation is made that deep pressure be done slowly and obliquely as per the protocol of Riggs (2002) and with awareness of client response.

Kerr (1997) reports on a ureteral stent displacement in the practice of a Rolfing method. Directly asking clients about the possible presence of medical appliances and implants seems a prudent policy. It can be amazing what pertinent information clients do not volunteer, even on an intake form that asks. The paper's conclusion seems reasonable: "Practitioners should be aware of this potential complication related to forceful massage pressures".

Mumm (1993) reports a case of zoster following a Shiatsu massage. Outbreaks of zoster (shingles) often are correlated with trauma, stress, and weakened immunity. Zoster is a variant of herpes virus and can remain dormant within nerve roots for long periods. While the outbreaks are contagious to those who have not had chicken pox, such persons then contract chicken pox, not the shingles presentation (AAD, 1999). The description in this case is consistent with a triggered outbreak rather than an initial exposure. It is unclear whether Shiatsu was sought because of existing stress or was itself the triggering stress or irritation.

Pego et al. (1996), in a discussion of eight cases of vertebral artery dissection, mention that one case had traumatic antecedents at the neck level while undergoing massage treatment. Although there is a correlation between cervical manipulation and vertebral artery dissection, accurate statistics remain to be determined (Kapral and Bondy, 2001). Pego et al. (1996) also noted cases following very minor trauma of everyday stretching or twisting. They review the literature on spontaneous dissection. It is not discernable whether the role of massage in the case reported by Pego et al. (1996) is comparable to activities of daily life or of the more direct provocation from manipulation. Tsuboi (2001) reported a case of arterial embolism in an 80-year-old man following a shiatsu treatment for headache associated with neck and shoulder stiffness. As noted by Kapral and Bondy (2001) and the results of Medline searches at the end of the methods discussion for this paper, there is a considerable discussion on vertebral artery injuries in chiropractic and physical therapy literature that is not present for massage therapy. Ernst (2002) reviews a number of case reports relating to manipulation of the cervical spine.

Trotter (1999) reports a case of hematoma following a deep body massage that included massage of the abdomen and right upper quadrant. No further details are given of the massage work or its motivation, precluding analysis of why injury resulted in this particular case. Trotter does comment that the patient, a 39-year-old woman, had no history of serious disorders and no liver problems or bleeding disorders and that she was not taking any medications. Trotter cites Mikhail et al. (1997) as a case of injury occurring from massage although, as noted above, the injury was from a family member walking on the patient's back.

The case documented by Yeo (1994) would appear to center on the client being treated with anticoagulants. This case leads to the conclusion that massage practitioners should ask clients about treatment with anticoagulants and consider consulting the client's physician.

The author of this paper has no particular comments or recommendations relating to Medvedev (1994), Rahman et al. (1997), or Tachi (1990) except to note their uniqueness.

Conclusions

This number of cases of injury found is far too small to be statistically meaningful in estimating risk from massage, except to verify that it is negligible. Recurrences of the same or similar injuries are limited to Giese and Hentz (1998) and Herskovitz et al. (1992) both reporting nerve injuries, and Pego et al. (1996) and Tsuboi (2001) reporting arterial injuries. There is no explicit correlation of the occurrence of injuries with technical training or its lack. An apparent correlation does exist with depth and vigorousness of massage, leading to the possibility that hours of didactic training unaccompanied by experience under mentoring or other supervision are leading to over estimation of expertise in kinesthetic / palpatory skills. The conclusion of low incidence of massage related injury is corroborated by liability insurance data. The IMA Group had recently issued the following statement (Green, 2000).

In response to your request about massage insurance claims over the past five years, with 30,040 members to date, we average about one claim per month. Most claims are covered by general liability, as they are claims caused by poor housekeeping, like tripping or falling. We have no record of any claim filed for injuries caused by improper use of techniques on varicose veins, carotid arteries or pregnant women.

Studdert et al. (1998) examined liability claims for massage therapy for 1993 through 1996 based on data from Albert H Wohlers & Co underwriting of the American Massage Therapy Association (AMTA). Data for chiropractic from NCMIC Insurance Company were examined during the same period. The average annual rates of claims per 1000 insured reported for massage and chiropractic over this period were 1.8 and 26.3, respectively. Average paid claims per 1000 were 0.79 and 13.1, respectively. Average claim amounts paid for massage and chiropractic were \$6384 and \$57,120. For massage, 6% of claims were for physical injuries rated above minor, an approximate rate of 0.05 per 1000 insured per year. The extremely low occurrence rates for massage injuries and the lower amounts paid per claim result in liability insurance premiums for AMTA members of \$65 per year. In contrast, 50.7% of the paid chiropractic claims analyzed by Studdert et al. (1998) were from injuries associated with: disks (27.6%), fractures (10.3%), aggravation of existing conditions (9.9%), and cerebral vascular structures (2.9%). The last item is pertinent to the considerations of vertebral dissection above.

There are six recommendations from this study for training and practice, each derived on mechanistic grounds.

1. Practitioners should inquire if clients are being treated with anticoagulants, to avoid using pressure or friction likely to lead to excessive bruising or hematomas.
2. Practitioners should inquire if clients have medical appliances or implants, such as stents, to avoid the risk of displacement or damage.
3. Work done over a contusion or hematoma should be limited to lymphatic drainage, to avoid further tissue damage.

4. Caution should be used not to impinge superficial nerves against underlying bone with excessive pressure or friction.
5. Care should be taken with the vertebral artery as it runs through the transverse foramina of C5/C6 to C2, and particularly with the posteriolateral loop of the artery superior to C2. Although massage therapists do not use high velocity-low amplitude techniques, sudden or extreme cervical hyperextension with rotation that could lead to vertebral artery compression should be avoided. Immediate attention should be paid to symptoms of sudden headache, dizziness, vertigo, slurred speech, or loss of consciousness. Excessively deep or repetitive friction over the posteriolateral loop should be avoided.
6. Training programs should insure that training in anatomical knowledge and technique is interspersed with practical experience sufficient to develop good kinesthetic/palpatory skills, awareness of client response, and clinical humility.

There are extremely few reported cases of injury related to massage within the indexed health care literature. Those that do exist have been written purely as medical reports, lacking in details of massage techniques and treatment protocols. While statements have occurred in newspapers that would seem to indicate that massage has a high potential and probability for causing injury, such anecdotal statements have no support in the medical literature or in insurance statistics. While substantial increases in the estimated rates of injury seem unlikely, it also seems evident that there is a need to educate those in practice to document events of injury and to submit them to indexed journals, such as JBMT, so that they can be used as a basis for formulating evidence-based guidelines for training and practice.

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