The safety of massage therapy

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Objectives. After many years out of the limelight, massage therapy is now experiencing a revival. The aim of this systematic review is to evaluate its potential for harm.

Methods. Computerized literature searches were carried out in four databases. All articles reporting adverse effects of any type of massage therapy were retrieved. Adverse effects relating to massage oil or ice were excluded. No language restrictions were applied. Data were extracted and evaluated according to predefined criteria.

Results. Sixteen case reports of adverse effects and four case series were found. The majority of adverse effects were associated with exotic types of manual massage or massage delivered by laymen, while massage therapists were rarely implicated. The reported adverse events include cerebrovascular accidents, displacement of a ureteral stent, embolization of a kidney, haematoma, leg ulcers, nerve damage, posterior interosseous syndrome, pseudoaneurism, pulmonary embolism, ruptured uterus, strangulation of neck, thyrotoxicosis and various pain syndromes. In the majority of these instances, there can be little doubt about a cause–effect relationship. Serious adverse effects were associated mostly with massage techniques other than ‘Swedish’ massage.

Conclusion. Massage is not entirely risk free. However, serious adverse events are probably true rarities.

KEY WORDS: Complementary and alternative medicine, Massage, Adverse effects, Safety, Risk.

Massage can be defined as the systematic manipulation of soft tissues of the body for pain reduction or other therapeutic purposes. Manual palpation involved can also be used for diagnostic purposes. ‘Classic’ (‘Swedish’) massage comprises effleurage (stroking and gliding), petrissage (kneading), and tapotement (percussion) [1]. Various forms of massage originate from different parts of the world (Table 1).

Until the early parts of the twentieth century, massage was widely accepted in Europe and elsewhere as an effective treatment for a range of conditions [2]. Even though most of its indications are still not backed up by convincing evidence [e.g. 3, 4], massage is making a comeback. Between 1990 and 1997, the 1-year prevalence of use of massage by the US general population increased from 6 to 12% [5] and massage belongs to the three most popular complementary therapies, both in the US [6] and in the UK [7]. The majority of physicians (83%) feel that massage provides a useful adjunct to their own practice and many (71%) refer patients to massage therapists [8–10].

The aim of this systematic review is to evaluate all published data about adverse effects of massage therapy.

Methods

Computerized literature searches were carried out using Medline, Embase, The Cochrane Library and AMED (January 1995 to December 2001). The search terms used were adverse events, complications, lymph drainage, manual therapy, massage, risk, Rolfing, safety and shiatsu. In addition, my own files were searched, and other experts (n=21) as well as professional organizations of massage therapy (n=18) were consulted. The bibliographies of articles thus located were also searched.

All reports (irrespective of language of publication) with original data on adverse effects following any type of massage therapy were included. Treatments not typically carried out by a massage therapist were excluded, for example cardiac
Thirty-one relevant articles were located [13–43]. All adverse effects are summarized in Table 2; exemplary reports are also detailed below.

**Results**

**Massage by professionals**

A 45-yr-old man presented with acute extensor paralysis of the metacarpophalangeal joints and was referred to the neurologist. The history described a sudden onset of pain and weakness in the affected hand after a deep tissue massage on the affected side. The patient was diagnosed with posterior interosseous syndrome. The cause was deemed to be the direct and persistent pressure applied laterally, compressing the posterior interosseous nerve against the interosseous membrane causing neuropraxia.

A 39-yr-old healthy woman, who had no relevant medical history and was taking no medication, had a deep tissue massage that included the abdomen. Within 24 h, she experienced abdominal discomfort, shoulder pain and nausea. Seventy-two hours after the massage, she was admitted to hospital. On admission, she was anaemic (haematocrit = 23 l/ul), and an abdominal CT scan showed a large (14 cm x 18 cm) haematoma in the right hepatic lobe. There was no evidence of haemangioma, adenoma or other intrahepatic lesions. A diagnosis of hepatic haematoma was made and the most likely cause was thought to be the forceful abdominal massage. Over the subsequent 6 months, the patient received 2 units of packed red cells, lost 10.4 kg of body weight due to persistent nausea, and developed a low-grade fever. Eventually she made a full recovery.

**Clinical trials of massage therapy**

Six normal volunteers and two patients with post-thrombotic venous oedema were treated with manual lymphatic massage with an external pressure of 70–100 mmHg [37]. The authors noted a significant decrease in oedema. However, a small temperature drop after massage and noted that the technique may expose the infant to a slight heat loss.

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**German otolaryngologists published a series of four patients with adverse reactions to conventional massage therapy** [32]. These individuals all suffered from neck pain and were prescribed massage therapy. Subsequently they noted an acute deterioration of hearing, which was verified audiographically in all cases. The authors feel that the time sequence of events renders a causal relationship likely and report that they have seen 'several more cases' of this type.
### Table 2. Reports of adverse events associated with massage therapy

<table>
<thead>
<tr>
<th>First author (year)</th>
<th>Patient</th>
<th>Type of massage</th>
<th>Therapist</th>
<th>Site of massage</th>
<th>Indication</th>
<th>Adverse event</th>
<th>Causality</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thambua (1971)</td>
<td>30-yr-old Malay pregnant woman</td>
<td>Urut</td>
<td>Traditional Malay healer</td>
<td>Abdomen</td>
<td>Pregnancy</td>
<td>Ruptured uterus</td>
<td>Certain</td>
<td>Surgery and subsequent full recovery</td>
</tr>
<tr>
<td>Warren (1978)</td>
<td>72-yr-old woman</td>
<td>Vigorous massage for ~10 min</td>
<td>Relative</td>
<td>Calf muscle</td>
<td>Leg pain</td>
<td>Pulmonary embolism</td>
<td>Likely</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Tachi (1990)</td>
<td>57-yr-old woman with Hashimoto's disease</td>
<td>Vigorous massage</td>
<td>Not mentioned</td>
<td>Neck</td>
<td>Muscle pain and stiffness</td>
<td>Transient destructive thyrotoxicosis</td>
<td>Possible</td>
<td>Full recovery after 6 months</td>
</tr>
<tr>
<td>Herskovitz (1992)</td>
<td>61-yr-old man</td>
<td>Shiatsu massage with strong digital pressure</td>
<td>Shiatsu therapist</td>
<td>Base of his palm and thenar muscles</td>
<td>Not mentioned</td>
<td>Painless weakness of left thumb without sensory symptoms</td>
<td>Certain</td>
<td>Full recovery over next 2 months</td>
</tr>
<tr>
<td>Sorensen (1993)</td>
<td>38-yr-old diabetic man with peripheral neuropathy</td>
<td>Vacuum boot foot massage with mechanical device</td>
<td>'Alternative therapist'</td>
<td>Feet</td>
<td>Peripheral vascular disease</td>
<td>Ulceration and infection</td>
<td>Certain</td>
<td>Amputation of leg</td>
</tr>
<tr>
<td>Liu (1993)</td>
<td>52-yr-old man</td>
<td>Self-massage with 'massage balls'</td>
<td>Self-treatment</td>
<td>Neck</td>
<td>Chronic neck pain</td>
<td>Tapered stenosis of the extracranial internal carotid artery</td>
<td>Possible</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Mumm (1993)</td>
<td>64-yr-old woman</td>
<td>Shiatsu massage</td>
<td>Shiatsu therapist</td>
<td>Not mentioned</td>
<td>Not mentioned</td>
<td>Pain in left pericervical and suprascapular areas</td>
<td>Possible</td>
<td>Full recovery after surgical intervention</td>
</tr>
<tr>
<td>Ram (1994)</td>
<td>1-day-old neonate</td>
<td>'Traditional' with sand bag</td>
<td>Relative</td>
<td>Testes</td>
<td>Hydrocele</td>
<td>Large haematoma</td>
<td>Likely</td>
<td>Full recovery within 2 weeks</td>
</tr>
<tr>
<td>Yeo (1994)</td>
<td>62-yr-old anticoagulated patient</td>
<td>Manual massage</td>
<td>Relative</td>
<td>Back</td>
<td>Back pain</td>
<td>Large haematoma, slight anaemia</td>
<td>Likely</td>
<td>Full recovery after 6 months</td>
</tr>
<tr>
<td>Kalinga (1996)</td>
<td>16-yr-old boy with exostosis on femur</td>
<td>Traditional Chinese massage, 5 sessions</td>
<td>Practitioner of traditional Chinese medicine</td>
<td>Right thigh</td>
<td>Pain in right thigh</td>
<td>Pseudoaneurysm of popliteal artery</td>
<td>Likely</td>
<td>Full recovery after arterial reconstruction</td>
</tr>
<tr>
<td>Kerr (1997)</td>
<td>51-yr-old women with ureteral stent</td>
<td>Deep body massage using Rolfing technique</td>
<td>Rolfing therapist</td>
<td>Abdomen, pelvis, lower back</td>
<td>Not mentioned</td>
<td>Displacement of ureteral stent, a pin embolization of the left kidney</td>
<td>Likely</td>
<td>Full recovery after repositioning of stent</td>
</tr>
<tr>
<td>Mikhail (1997)</td>
<td>59-yr-old man with aortofemoral bypass</td>
<td>Deep tissue massage including walking on back</td>
<td>Relative</td>
<td>Back</td>
<td>Back pain</td>
<td>Embolization of the left kidney</td>
<td>Likely</td>
<td>Full recovery with anticoagulation and new aortofemoral bypass</td>
</tr>
<tr>
<td>Giese (1998)</td>
<td>45-yr-old man</td>
<td>Deep tissue massage including pressure applied with elbow</td>
<td>Massage therapist</td>
<td>Forearm</td>
<td>Pain in right forearm</td>
<td>Posterior interosseous syndrome</td>
<td>Likely</td>
<td>Full recovery after 3 weeks</td>
</tr>
<tr>
<td>Trotter (1999)</td>
<td>39-yr-old woman</td>
<td>Deep tissue massage</td>
<td>Not mentioned</td>
<td>Abdomen</td>
<td>Not mentioned</td>
<td>Large hepatic haematoma</td>
<td>Likely</td>
<td>Full recovery after 6 months</td>
</tr>
</tbody>
</table>
was verified by electron microscopy. It affected initially the endothelial lining and subsequently also lymphatic collectors. The pressures applied were in excess of those used in manual lymphatic drainage [38].

**Massage by laymen**

A 72-yr-old woman was admitted to hospital with thrombosis of the right middle cerebral artery [14]. She later complained of discomfort in the left calf and a diagnosis of deep-vein thrombophlebitis was made. The leg was raised and intravenous heparin was started. The patient’s husband massaged her leg vigorously for about 10 min in an attempt to relieve her discomfort. Subsequently, the patient became short of breath and a pulmonary embolus was diagnosed.

A 62-yr-old Chinese male on warfarin with stable INR readings was admitted for an acute swelling over his left back [21]. His wife had given him a vigorous manual back massage for musculoskeletal pain in that area 2 days before. The patient was diagnosed to suffer from a large (20 cm x 12 cm) haematoma, orthostatic hypotension and slight anaemia. Both INR and platelet count were normal. The patient’s warfarin medication was temporarily reduced and a blood transfusion was administered. The haematoma gradually resolved over the next 2 weeks and the patient made a full recovery. The most likely cause for the haematoma was the vigorous manual massage combined with the warfarin-induced bleeding tendency.

A 59-yr-old man with an aortobifemoral bypass was admitted after his wife had treated him for back pain with a manual massage, which included walking on his back [24]. The patient subsequently experienced severe left loin pain. The bypass had been performed 18 months previously; it had initially been successful but had occluded later. The massage had dislodged the thrombus in the graft into the left kidney. The patient was anticoagulated, and later a new aortobifemoral graft was implanted. A further abdominal CT scan 4 months postoperatively showed no defect in the left kidney.

**Massage using apparatus**

A 38-yr-old man was treated by an ‘alternative therapist’ with a mechanical leg massage (vacuum boot) for peripheral vascular disease in the presence of peripheral diabetic neuropathy [17]. The patient subsequently developed an infected leg ulcer. The leg became gangrenous and had to be amputated. The authors warn that ‘patients of this kind [should not] receive treatment from any person without medical experience’.

A 56-yr-old woman placed an electric roller massage device on her bed under her head to treat her neck pain before retiring for the evening [27]. Later, when her husband went to bed he noted that she was in the supine position and the device was apparently functioning normally. The husband was awoken early next morning by a clicking noise and found his wife in the same position. Her blouse had become entangled in the roller of the massage device and was constricted around her neck. The husband called the paramedics who verified her death.
Exotic forms of manual massage

A 61-yr-old man received a shiatsu massage from a trained therapist with strong digital pressure in the region of the base of his palm and the thenar muscles [16]. The procedure was accompanied with ‘notable transient pain’. The next day he noticed a weakness of the left thumb without sensory symptoms. On examination, he exhibited moderate isolated weakness of the abductor pollicis brevis muscle without atrophy or sensory dysfunction. Tinel’s and Phalen’s signs were negative and nerve conduction studies yielded normal findings. Mild active denervation and reduced motor unit recruitment were noticed electromyographically. The authors diagnosed a mononeuropathy caused by the manual compression of the recurrent motor branch of the median nerve. The patient made an uneventful recovery over the next few months.

Hawaiian authors report the case of a 64-yr-old woman admitted to hospital for suspected myocardial infarction [19]. She complained of increasing pain in the pericervical and suprascapular areas. Myocardial infarction was not confirmed but the pain increased. A typical rash along the left eighth cervical dermatome led to the diagnosis of herpes zoster, confirmed through antibody titres. The patient revealed that she had been treated with ‘an overtly vigorous shiatsu massage’ 3 days before the onset of pain. The authors speculate that ‘zoster resulted from either direct trauma to the nerve or nerve root during the massage, or to subsequent tissue inflammation causing swelling or immunological injury to the nerve’.

A 51-yr-old American woman had undergone placement of a left ureteral double-J stent to relieve flank pain associated with ureteral stricture [23]. Six days later she consulted a ‘Roler’ and received a deep body massage according to the Rolfing technique, which she had enjoyed previously on a regular basis. The massage was applied to the abdomen, pelvis and lower back. Towards the end of the session, the patient experienced severe flank pain and urinary incontinence. She was admitted to hospital where a visible protrusion of the tip of the stent was noted 1 cm beyond the ureteral orifice. Distal migration of the stent was confirmed by radiographic examination. The patient’s stent was repositioned, and she subsequently made a full recovery.

An 80-yr-old Japanese man with a history of transient ischaemic attacks and anticoagulant therapy received a shiatsu massage on the neck in prone position to treat a mild headache [28]. Immediately after rising, the nasal half of his right visual field was impaired. He also showed slight left hemiparesis dominant in the upper extremity. Further investigations showed multiple branch occlusions of the central artery and multiple small infarctions in the right frontal lobe. The patient was treated with urikinase for 7 days. Subsequently there was full recovery of the hemiparesis but only minimal improvement of ocular symptoms.

References

US authors reviewed the question of whether back massages are contraindicated after an acute myocardial infarction [39]. They found elevation of blood pressure and decrease of heart rate following back massage in normal volunteers. Thus they caution that ‘heart rate and blood pressure should be monitored before and after the procedure to identify patients at risk for sympathetic stimulation’. Other reviews of massage therapy for specific indications [40–42] fail to address any safety aspects. A recent Cochrane review of massage therapy for pre-term infants states that ‘no adverse effects of touch or massage were reported in any study’ [43].

Discussion

Sixteen case reports and four case series (Table 2) of adverse events after massage therapy were found. Massage was frequently used for rheumatological conditions. In the majority of these cases causality is established convincingly, for instance, through the sequence or nature of events. Some of the adverse effects relate to serious complications.

Considering the popularity of massage therapy, the number of reported adverse events seems minute. However, this could be due to under-reporting. In a related area (spinal manipulation) we have, for instance, shown that under-reporting of serious adverse events is close to 100% [44].

Clearly, one should differentiate between various approaches. The above findings suggest that massage by non-professional and forceful techniques like shiatsu, urut and Rolfing are relatively often associated with adverse events. The reports reviewed above are often incomplete. For instance, the background of the therapist and the type of massage therapy are not always described. This further limits the conclusiveness of the evidence.

Several systematic reviews of controlled clinical trials testing the effectiveness of massage therapies have been published and have arrived at cautiously positive conclusions [e.g. 45–47]. However, too few clinical trials of massage therapy exist and many of its claims are not backed up by evidence [3, 4]. Thus adequate risk–benefit evaluations are not feasible.

In conclusion, massage therapies are not totally devoid of risks. The incidence of adverse events is unknown, but probably low.

References


