



MESSAGE CONTRAINDICATIONS REVIEW

Contraindications for therapeutic massage: do sources agree?

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Abstract Objectives: To explore the extent to which professional sources agree on contraindications (CIs) and precautions for therapeutic massage. **Methods:** Textbook and peer-reviewed journal sources containing CIs on therapeutic massage in English within the past 10 years were searched (January 1992–July 2002). Descriptive statistics and stacked bar graphs were employed to illustrate agreement of categorical data. **Results:** Twenty-one sources listed anywhere from 3 to 86 CIs and precautions for therapeutic massage. Over half of the sources failed to indicate a CI or precaution for the majority of patient conditions. Seventy-six percent of the sources failed to cite references to support CI claims. **Conclusion:** Sources markedly varied regarding what conditions were considered contraindicated for massage. Advisory panels and greater reliance on evidence-based data may help to enhance consistency when documenting future CIs.

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Introduction

With the modern patient-safety movement gaining considerable momentum over the past decade, health care professions are becoming increasingly vigilant to minimize medical errors that lead to adverse events in patient care (Leape et al., 1991, 2002; Kohn et al., 2000; Thomas et al., 2000). One means of protecting patients within the health care system is to institute screening procedures that preclude them from receiving therapies that expose them to unacceptable risk (Wilding, 2000). Contraindications (CIs) serve to specify patient conditions that render a therapy undesirable or

improper whereas precautions serve as protective measures that are implemented in advance to minimize the chance of injury to the patient (Miller and Keane, 1997). These screening procedures allow clinicians to weigh the risks of exposing patients to procedures and help the clinician to determine whether to institute precautionary steps, withhold treatment, or recommend alternative therapies that can safely be applied to patients.

For some therapies, explicit guidelines have been developed for high-risk groups by expert panels (e.g. exercise during a high-risk pregnancy) (Eddy, 1996; Franklin, 2000). For other therapies, no such panel-driven guidelines exist. Instead, experts within their field of specialty publish their own guidelines, such as CIs, within the professional

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literature. Based on unpublished observations, the present investigator questioned whether these expert sources within the physical rehabilitation specialties consistently documented contraindicated medical conditions for commonly employed therapies. Literature has failed to address this issue in a systematic manner. Guidelines that vary from source to source can result in clinicians applying incomplete sets of selection criteria to patients depending on what expert source (e.g. textbook) is consulted. In some cases, administering treatment to improperly screened patients may be deleterious (e.g. massage over neoplastic tissue). Beyond this, inconsistently developed guidelines can have both legal and fiscal (reimbursement) implications when experts fail to agree.

The research question posed in this descriptive study was the following: to what extent do professional sources agree on CIs and precautions cited for therapeutic massage? Because of the importance of using evidence to guide clinical decisions, the frequency of cited references, rationales, and treatment alternatives were also examined.

Therapeutic massage was the focus of the present study because it represented a well-established manual technique, currently recognized and employed by physical rehabilitation specialists (Burns and Burns, 2000; American Physical Therapy Association, 2001). Because of possible adverse events associated when mobilizing the circulation and soft tissues of medically compromised patients (e.g. thrombi, cancers, infections), CI guidelines for massage were considered of particular interest.

Method

Data sources

The investigator searched all textbooks and peer-reviewed journal articles on therapeutic massage, published in the English Language within the past 10 years, for medical/health care professionals. For this study, therapeutic massage was defined as Swedish techniques (i.e. effleurage, pétrissage, and friction). Sources that were either published prior to 1992, omitted a dedicated section of text to CIs, or had multiple publications offering similar information by the same author, were excluded from analysis. Sources that failed to primarily address a health care audience such as physiatry or nursing (i.e. Chinese healing arts, bodywork, reflexology, shiatsu, aromatherapy, or massage

therapists) or addressed cardiac, gingival, or sports massage were also excluded.

Search strategies

Textbooks were computer searched using the Library of Congress Online Catalogs, Books in Print, and the AcqWeb's Directory of Publishers and Venders. Journal articles were searched on HealthSTAR, CINAHL, Medline, and Embase (January 1992–July 2002) (Smith and Altman, 2001). In both searches, keywords included massage, therapeutic massage, Swedish massage, CIs, precautions, adverse reactions. Manual searches were performed and reference lists and bibliographies were examined. Recent editions, not found locally, were accessed via interlibrary loans. A second round of searches was conducted the following month to identify any additional sources.

Data extraction

The investigator extracted the following information from sources: type and number of CIs (CIs, relative CIs, absolute CIs, precautions, or CIs & precautions), type of audience, year of publication, number of references and rationales, and proposed alternative treatment strategies. Medical dictionary sources were consulted when deciding to combine redundant patient conditions (Stedman's Medical Dictionary, 2000; Taber's Cyclopedic Medical Dictionary, 2001). A condition was deemed both *CIs & precautions* when a source mentioned both terms but failed to distinguish between them. A relative CI was noted if the source listed it as such or when it is designation depended on the severity of the condition (i.e. stable vs. unstable condition). Categorical data for massage concerns were reported in percentages and presented using stacked bar graphs to illustrate:

- (1) the number of CIs and precautions cited by each source, and
- (2) the number of sources identifying a particular CI condition.

Results

Sources

Forty-six sources were initially identified. Of these, 25 sources were excluded because of redundant publications by the same author (Rechtien et al., 1994; Atchison et al., 2000), no dedicated section or table on CIs (Maklin, 1994; Turchaninov, 1996;

Garofano, 1999; Burns and Burns, 2000), a specific population focus (Turchaninov and Cox, 1998; Drehobl and Fuhr, 2000; Hedrickson, 2002; Whitehill and Gustman, 2002), or a non-medical health-care oriented audience (Callaghan, 1993; Rattray, 1994; Benjamin and Lamp, 1996; Rosser, 1996; Holey and Cook, 1997; Downing, 1998; Loving, 1998; Salvo, 1999; Beck, 1999; Fritz, 2000, 2002; Archer, 2001; Ashton and Cassel, 2002; Rich, 2002; Rice, 2002). The 21 remaining sources *that specifically targeted medically related audiences* met the criteria for the study and were retained for analyses.

Inclusions

Eight textbooks, 8 articles, 4 book chapters and 1 lab manual, published between 1993 and 2002 were identified.

- Five physiatry (Rechtien et al., 1998; Tan, 1998; Braverman and Schulman, 1999; Cotter et al., 2000; Craig and Kaelin, 2000).
- 10 physical therapy (Liston, 1995; Quillen and Underwood, 1995; Domenico and Wood, 1997; Hollis, 1998; Tappan and Benjamin, 1998; Brown, 1999; Storkey, 1999; Jain, 2000; Andrade and Clifford, 2001; Prentice and Lehn, 2002).
- 4 nursing (Trevelyan, 1993; McConnell, 1995; Zuberbeuler, 1996; Huebscher, 1999).
- 1 occupational (Westland, 1993).
- 1 alternative medicine source (Vickers and Zollman, 1999).

Sources listed anywhere from 3 to 86 CIs and precautions for therapeutic massage. Figure 1 illustrates the extensive variability in the number of CIs and precautions listed from the 21 sources. The largest and smallest number of CI and precautionary conditions were cited by two physical therapy sources (Quillen and Underwood, 1995; Andrade and Clifford, 2001). Of the 21 sources, the majority (62%) identified CIs more frequently than other types of CIs or precautions.

Contraindicated patient conditions

One hundred and fifty-one patient's conditions, derived from the 21 sources, were documented as contraindicated, or required precautionary measures for massage. Redundant terms with overlapping meaning (e.g. bruising, bleeding, hemorrhaging) were identified and consolidated to create 114 discrete patient condition groupings. Conditions were specified as a diagnosis, signs and symptoms, or history 57%, 25%, and 18% of

the time, respectively. These 114 conditions were ranked and graphed under one of seven broad categories contained in Figs. 2(A)–(G):

- cardiovascular (25 conditions),
- neoplasms (2 conditions),
- integumentary (10 conditions),
- musculoskeletal (19 conditions),
- infection (10 conditions),
- neurologic/psychiatric (18 conditions),
- miscellaneous (30 conditions).

Sources varied greatly with regard to what patient conditions were considered contraindicated or precautionary (see Figs. 2(A)–(G)). Over half of the sources failed to indicate a CI or precaution for 96% of the 114 patient conditions. In addition, for 38% of the conditions, sources failed to agree on the level of concern (i.e. whether a thrombus should be classified as a precaution, CI, or an absolute CI?) (see Fig. 2A).

Even when conditions were collapsed into broader problem categories (e.g. bruising, bleeding or hemophilia), some sources still failed to identify a patient problem as a possible CI for therapy:

- 24% of sources did not list infection or neoplasm,
- 28% of sources failed to list open wounds,
- 33% of source did not mention bleeding, bruising, anticoagulation disorders or therapies,
- 48% of sources failed to identify problems at any stage of pregnancy or labor,
- 62% of sources did not mention fractures,
- 86% failed to list endangerment sites (vulnerable tissue structures that are susceptible to pressure).

The number of references, rationales, and alternative treatments cited by sources also varied in this study. The majority of the sources (76%) failed to cite specific references to support their claim of a CI. Of the remaining 5 sources, 4 referenced less than 15% of their conditions (3%, 8%, 9%, 14%, and 100%). One third of the sources (7 of 21) failed to provide a clinical rationale for their CIs, and 76% (16 of 21) of sources failed to offer alternative treatment strategies for conditions deemed precautionary or contraindicated.

Discussion

The present study found the number of CI guidelines listed by different sources varied widely. One physical therapy source listed 3 CIs whereas another listed as many as 86 (Fig. 1). In addition, at least half of the therapeutic massage sources

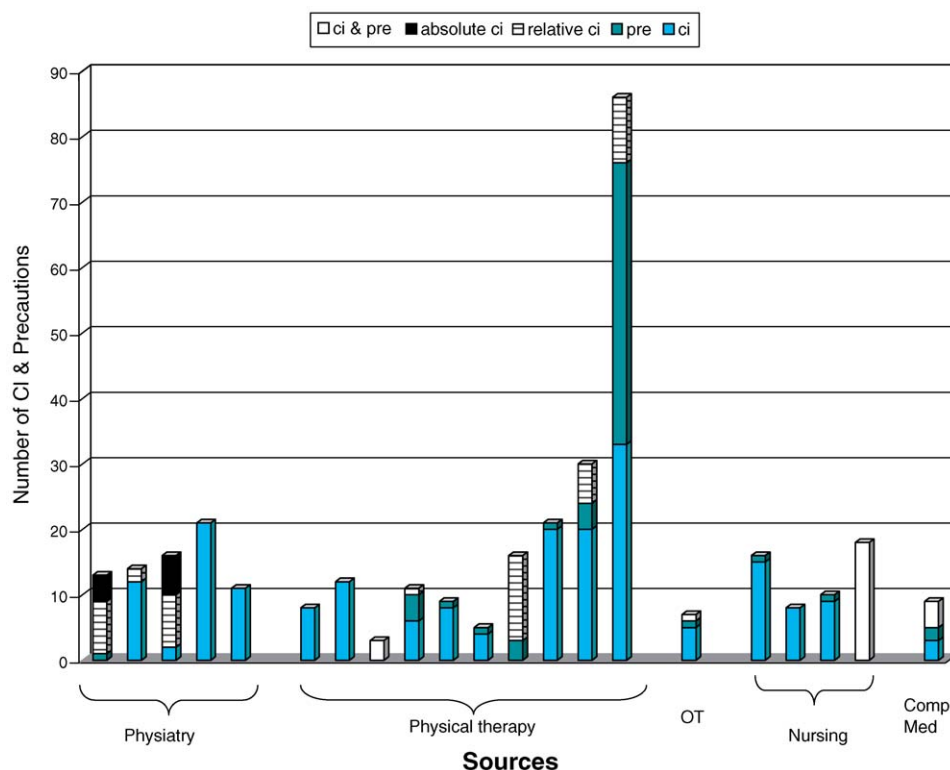


Figure 1 Sources for massage CIs. Number of CIs cited by each source are contained within each bar graph (bar graphs are arranged by specialty). ci = contraindication; pre = precaution; OT = occupation therapy; Compl Med = complementary medicine.

failed to identify the vast majority (96%) of patient conditions contained in Figs. 2(A)–(G). The findings suggest that for massage, clinician practice patterns used to screen patients for CIs can potentially vary depending on what guideline is ultimately consulted.

The low frequency of sources that cited any references (only 24%) appears to support the contention that many CIs for massage lack a scientific basis. This is particularly startling considering the current influential movement of evidence-based practice for patient care in Europe and the US (Sackett et al., 2000; Kamwendo, 2002). While some sources listed a few general references to broadly address their entire list of CIs, these citations were often secondary sources, grounded more in opinion, theory, or common sense than actual data. A greater use of evidence-based citations, CI rationales, and alternative strategies (to explain why a CI was included as a guideline and what to do if treatment is contraindicated) can serve to enhance critical thinking, clinical decision making abilities, and evidence-based practice patterns in the clinic.

Ironically, few CIs were based on adverse reactions reported from the literature. For example, of the 10 case reports of manual or mechanical

massage-related injuries (Tachi et al., 1990; Herkovitz, 1992; Liu et al., 1993; Mumm, 1993; Medvedev, 1994; Kalinga et al., 1996; Kerr, 1997; Mikhail, 1997; Geise, 1998; Elliott and Taylor, 2002), most were attributed to either massaging tissue *too deeply* or massaging a *vulnerable area*. Despite this knowledge, most (86%) of the sources in the present study failed to include these endangerment sites (vulnerable tissue structures that are susceptible to pressure) as a CI.

The findings of this study apply to professional medically oriented sources, published in English within the past 10 years. Dated sources (> 10 years) were excluded from this study because they failed to reflect current knowledge (Erickson, 1951, p. 31) and treatment guidelines (Braddom, 1990). Massage therapy sources were also excluded from this review for two reasons. First, although some of these sources were primarily written for massage school practitioners or students, others were difficult to distinguish from lay publications. Inadvertently including the latter would have affected the overall validity of the review, making it difficult to interpret the results or generalize the findings to a specific group of practitioners. Second, some massage therapy sources failed to adequately address CI issues and instead, deferred judgments

about patient pathology to the medical community. A follow up study that targets *only* professional massage therapy school audiences would be useful.

One limitation in this study was the reliance on a single investigator during data collection and synthesis. The investigator took steps to control for potential biases by implementing unambiguous inclusion and exclusion criteria, consulting dictionary definitions to consolidate redundant patient conditions, and performing a second round of literature searches using multiple search engines

to capture all relevant sources. Replication by others can further confirm this report's findings.

A need for consensus

Based on the findings in this study, there is a need for a consensus regarding what CIs and precautions should comprise therapeutic massage guidelines in the health field. The amount of agreement is too small and number of conditions ($n = 114$) too numerous for use as a practical classification.

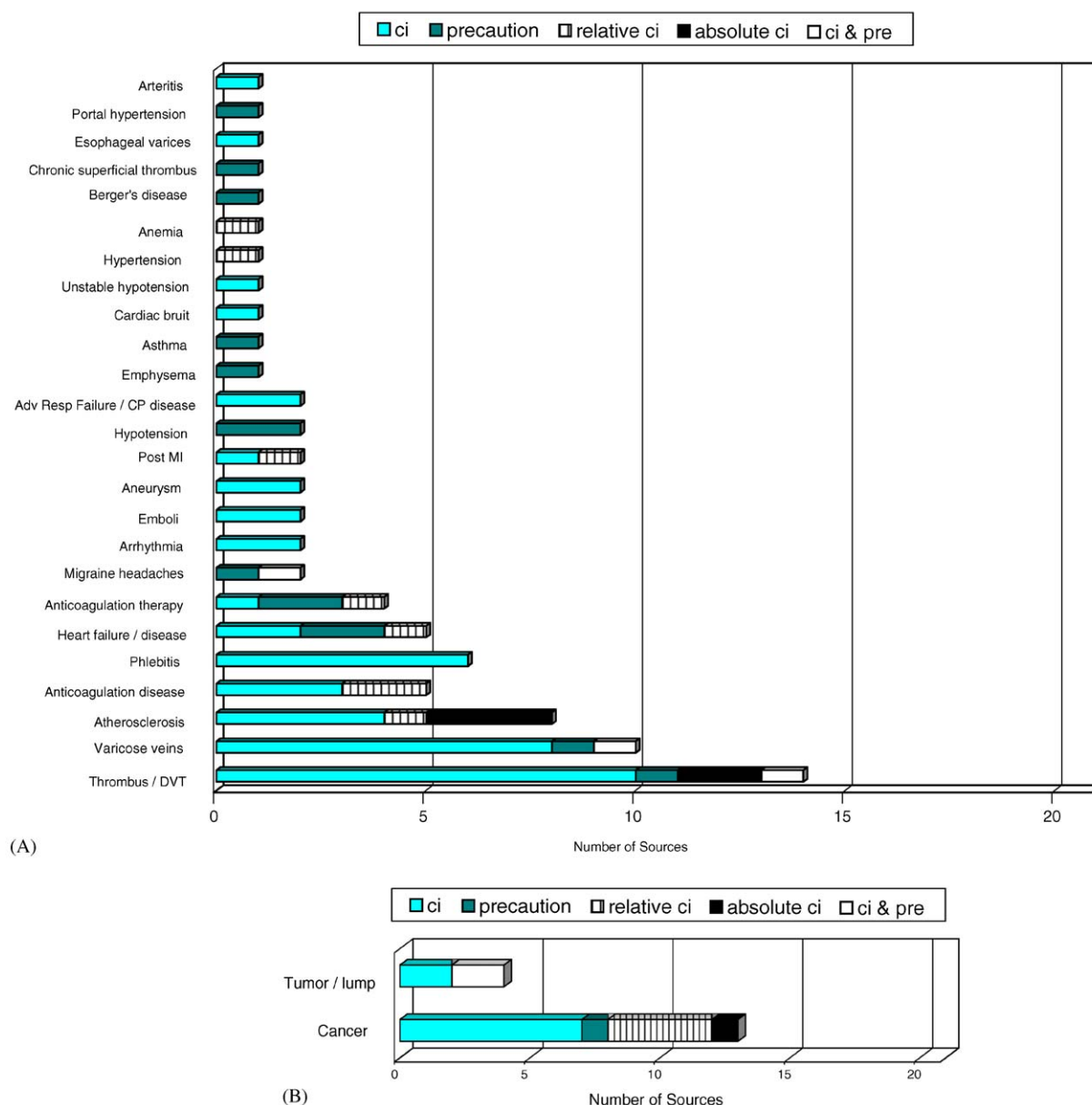


Figure 2 (A–G) Contraindicated condition categories. The number of sources citing a contraindicated or precautionary patient condition are contained within each stacked bar graph. (A) Cardiovascular; (B) neoplasms; (C) integumentary; (D) musculoskeletal; (E) infections; (F) neurologic/psychiatric; (G) miscellaneous. ci = contraindication; pre = precaution; Adv Resp = advance respiratory; CP = cardiopulmonary; DVT = deep venous thrombosis; F = Fahrenheit; CVA = cerebral vascular accident; GI = gastrointestinal.

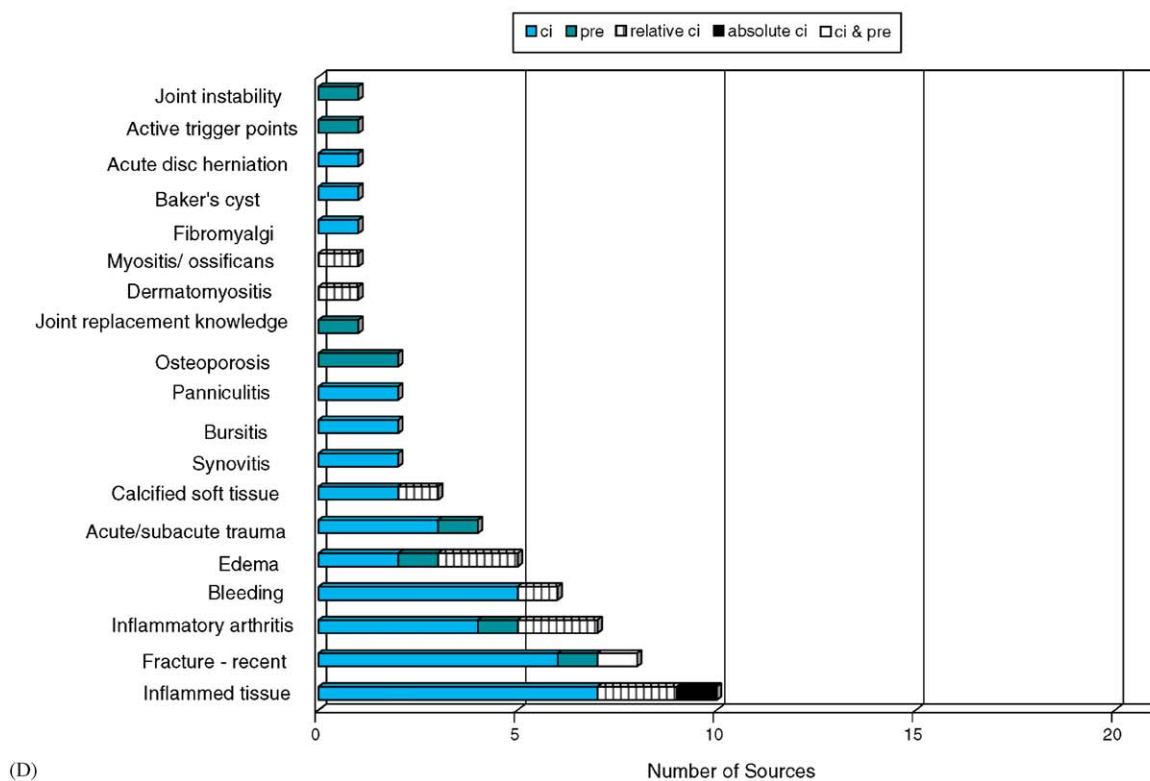
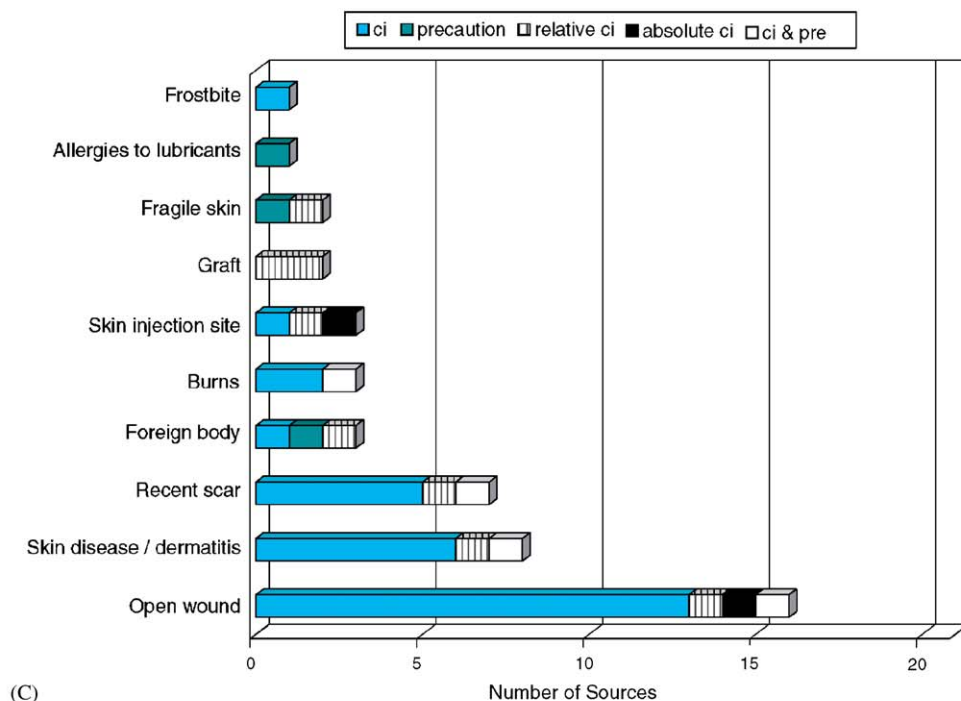


Figure 2(continued).

Expert panels that rely on the best available evidence can address the following issues:

- Empirical evidence
What evidence exists that massage will result, under certain circumstances, in an adverse

event? In other words, if a CI is based solely on traditional or theoretical grounds, should it still be included in a guideline? In this study, 76% of sources failed to cite specific references (with empirical data) to support a CI claim.

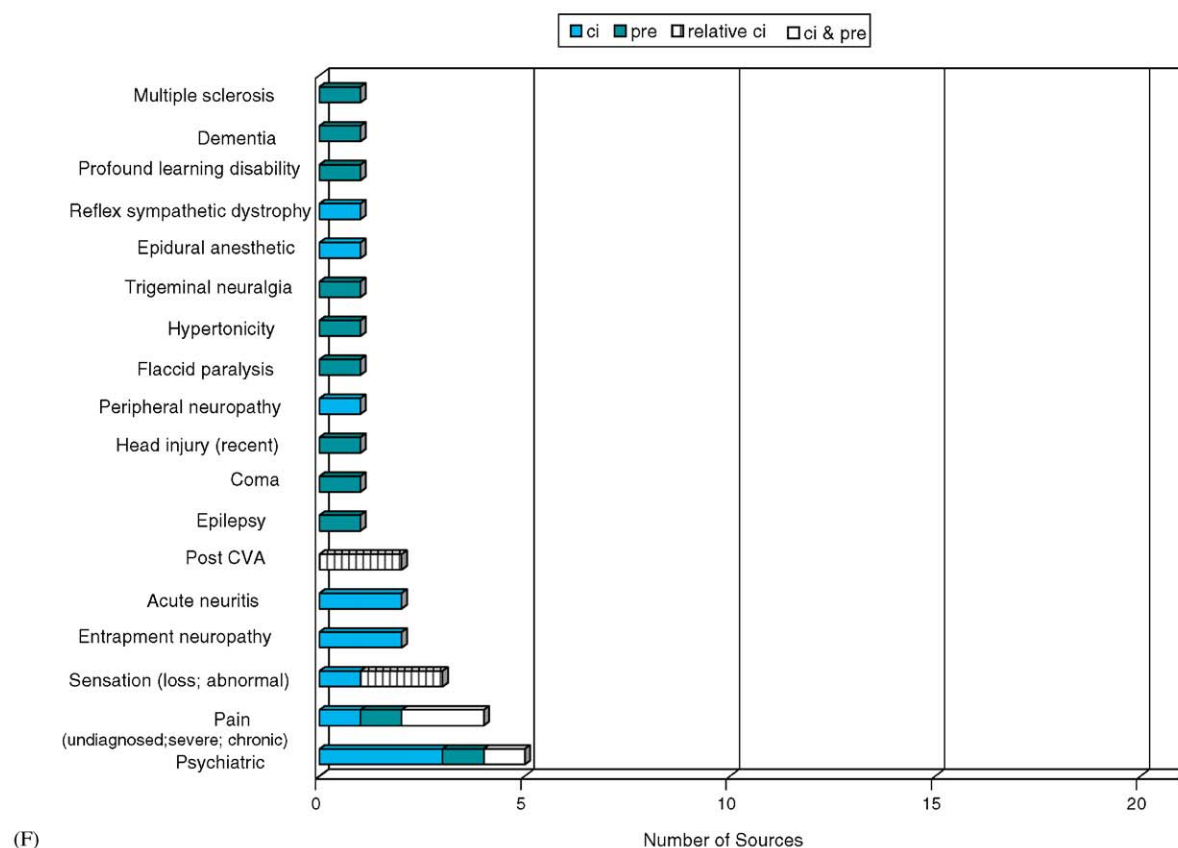
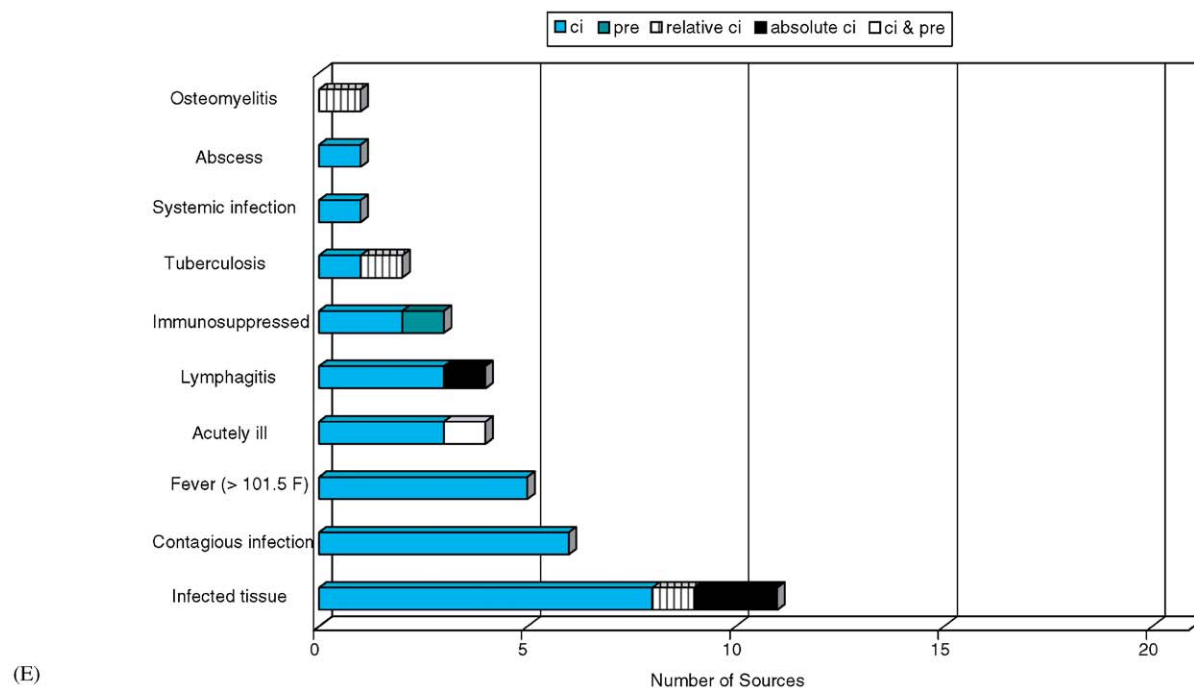


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- Consistent terminology
What terminology should be used to identify CIs? (i.e. diagnoses [e.g. acute muscle strain], signs

and symptoms [e.g. inflammation], medical histories [e.g. recent trauma] or some combination). On the one hand, specific diagnostic

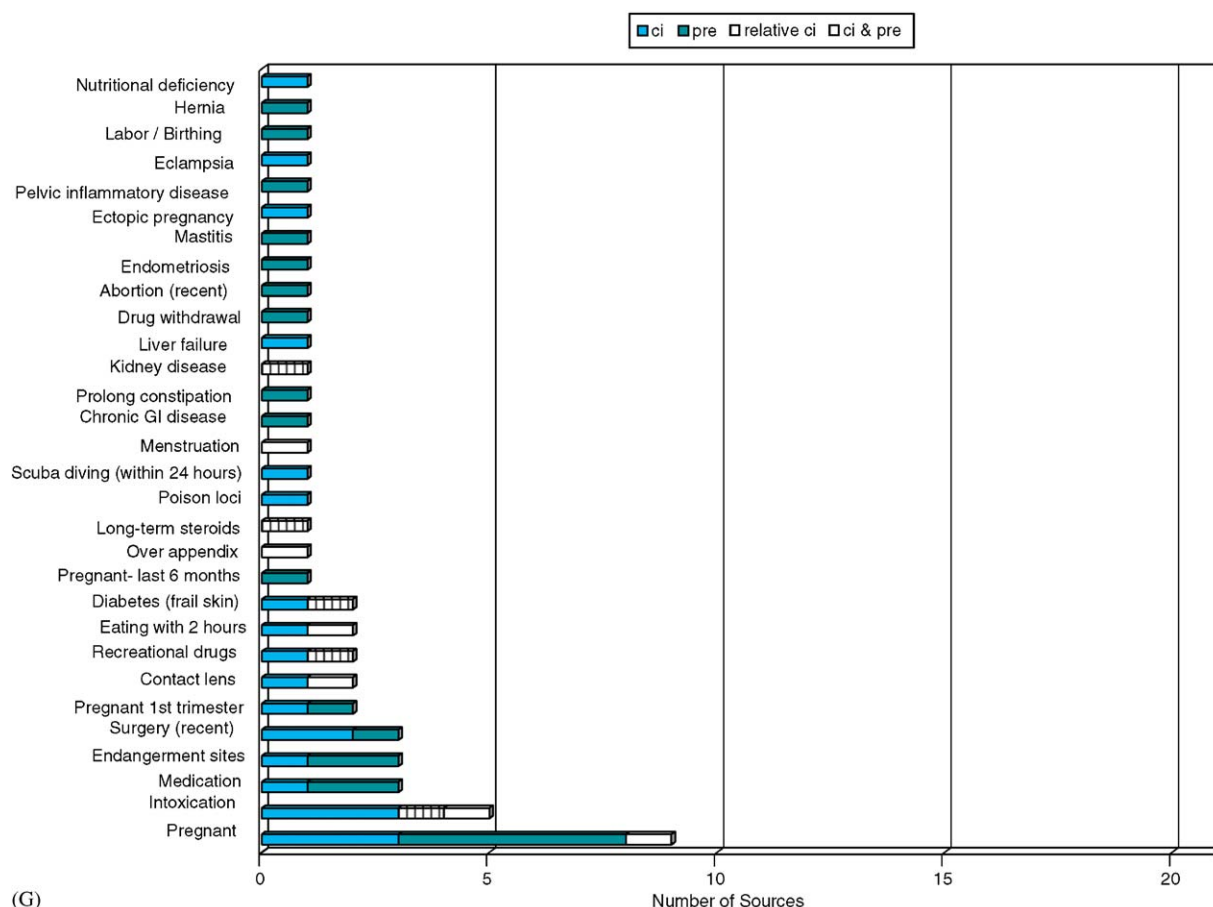


Figure 2(continued).

categories can produce inordinate laundry lists (41) of CIs that would challenge even the best clinician's memory. Also, important related medical conditions can be missed if they do not make it on the diagnostic "list." On the other hand, clinicians who rely mostly on diagnoses and medical history for screening can miss important new signs and symptoms encountered during a thorough clinical exam.

- **Continuous vs. dichotomized classification**
Should CIs be viewed on a relative continuum that depends on the severity of the condition or should they instead be dichotomized into discreet levels (i.e. precautions vs. CIs vs. absolute CIs)? Conditions rigidly categorized into discreet levels such as absolute CIs (e.g. "never do this!") can hamper a clinician's ability to exercise judgment base on the patient's unique and often-complex clinical presentation. On the other hand, strict adherence to unambiguous guidelines can serve to protect the public from tyros in the field. In this study, although some absolute CIs are clearly justifiable (i.e. DVT),

few sources invoked absolute guidelines, and many varied with regard to level of concern for a particular condition.

- **Localized vs. general classification**
Should local CIs be consistently differentiated from more general medical concerns so that practitioners understand which body regions are off limits? (e.g. massaging near a phlebotic site; massaging over a pregnant abdomen). Several sources in this study failed to distinguish local from general concerns, leaving it up to the practitioners to decide if, where, and when they should refrain from massage.

Conclusion

The number of CIs and precautions vary markedly among therapeutic massage sources. Advisory (consensus) panels that rely on evidence-based data can help to provide more consistent guidelines for screening patient.

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References

- American Physical Therapy Association, 2001. Guide to Physical Therapist Practice. What Types of Interventions do Physical Therapists Provide? *Physical Therapy* 81(1), 105–138 (Chapter 3).
- Andrade, C.-K., Clifford, P., 2001. Outcome-Based Massage. Lippincott, Williams & Wilkins, Philadelphia.
- Archer, P., 2001. *Therapeutic Sports Massage*. Slack, Thorofare, NJ.
- Ashton, J., Cassel, D., 2002. Review Therapeutic Massage and Bodywork Certification. Lippincott, Williams & Wilkins, Philadelphia.
- Atchison, J.W., Stoll, S.T., Cotter, A., 2000. Manipulation, traction, & massage. In: Braddom, R.L. (Ed.), *Physical Medicine and Rehabilitation*, 2nd Edition. WB Saunders, Philadelphia, pp. 413–439.
- Beck, M.F., 1999. *Milady's Theory and Practice of Therapeutic Massage* 3rd Edition. Milady Publishers, Albany, NY.
- Benjamin, P.J., Lamp, S.P., 1996. *Understanding Sports Massage*. Human Kinetics, Champaign, IL.
- Braddom, C.L., 1990. A framework for writing and/or evaluating research papers. *American Journal of Physical Medicine and Rehabilitation* 69, 333–335.
- Braverman, D.L., Schulman, R.A., 1999. Massage techniques in rehabilitation medicine. *Physical Medicine and Rehabilitation Clinics of North America* 10 (3), 631–649, ix.
- Brown, D.W., 1999. *Therapeutic Massage: A Practical Introduction*. Thunder Bay Press, San Diego, CA.
- Burns, S.B., Burns, J.L., 2000. Massage therapy. *Journal of Alternative and Complementary Medicine* 6 (3), 217–218.
- Callaghan, M.J., 1993. The role of massage in the management of the athlete: a review. *British Journal of Sports Medicine* 27 (1), 28–33.
- Cotter, A.C., Bartili, L., Schulman, R.A., 2000. An overview of massage and touch therapies. *Physical Medicine and Rehabilitation: State of the Art Reviews* 14 (1), 43–64.
- Craig, E.J., Kaelin, D., 2000. Physical modalities. In: Grabis, M. (Ed.), *Physical Medicine & Rehabilitation: The Complete Approach*. Blackwell Publishers, Houston, TX, pp. 440–457.
- Domenico, G.D., Wood, E.C., 1997. *Beard's Massage* 4th Edition. WB Saunders, Philadelphia.
- Downing, G., 1998. *The Massage Book*. Random house, New York.
- Drehobl, K.F., Fuhr, M.G., 2000. *Pediatric Massage for the Child with Special Needs*. Therapy Skill Builders, San Antonio, TX.
- Eddy, D.M., 1996. *Clinical Decision Making From Theory to Practice: A Collection of Essays from the Journal of the American Medical Association*. Jones & Bartlett Publishers, Sudbury, MA.
- Elliott, M.A., Taylor, L.P., 2002. Shiatsu sympathectomy: ICA dissection associated with a shiatsu massager. *Neurology* 58 (8), 1302–1304.
- Erickson, D.J., 1951. Therapeutic uses of massage. In: Krusen, F.H. (Ed.), *Physical Medicine and Rehabilitation for the Clinician*. WB Saunders, Philadelphia, pp. 27–31.
- Franklin, B.A., 2000. *ACSM's Guidelines for Exercise Testing and Prescription* American College of Sports Medicine 6th Edition. Lippincott, Williams & Wilkins, Philadelphia.
- Fritz, S., 2000. *Mosby's Fundamentals of Therapeutic Massage*. Mosby, St. Louis.
- Fritz, S., 2002. *Mosby's Massage Therapy Review*. Mosby, St. Louis.
- Garofano, J.S., 1999. *Therapeutic Massage and Bodywork: 750 questions & answers*, 2nd Edition. Appleton & Lang, Stamford, CT.
- Geise, S., 1998. Posterior interosseous syndrome resulting from deep tissue massage. *Plastic and Reconstructive Surgery* 102 (5), 1778–1779.
- Hedrickson, T., 2002. *Massage for Orthopedic Conditions*. Lippincott, Williams & Wilkins, Philadelphia.
- Herkovitz, S., 1992. Shiatsu massage-induced injury of the median recurrent motor branch. *Muscle and Nerve* 15 (10), 1215.
- Holey, E.A., Cook, E.M., 1997. *Therapeutic Massage*. WB Saunders, London.
- Hollis, M., 1998. *Massage for Therapists*, 2nd Edition. Blackwell Science, Malden, MA, pp. 30–46.
- Huebscher, R., 1999. Massage therapy: Part II. *Nurse Practitioner Forum* 10 (1), 1–2.
- Jain, S., 2000. Massage therapy. In: Shankar, K., Randall, K.D. (Eds.), *Therapeutic Physical Modalities*. Hanley & Belfus, Philadelphia, pp. 143–160.
- Kalinga, M.J., Lo, N.N., Tan, S.K., 1996. Popliteal artery pseudoaneurysm caused by an osteochondroma—a traditional medicine massage sequelae. *Singapore Medical Journal* 37 (4), 443–445.
- Kamwendo, K., 2002. What do Swedish physiotherapists feel about research? A survey of perceptions, attitudes, intentions and engagement. *Physiotherapy Research International* 7 (1), 23–34.
- Kerr, H.D., 1997. Ureteral stent displacement associated with deep massage. *Wisconsin Medical Journal* 96 (12), 57–58.
- Kohn, L.T., Corrigan, J.M., Donaldson, M.S., 2000. *To Err is Human: Building a Safer Health System*. National Academy Press, Washington, DC.
- Leape, L.L., Brennan, T.A., Laird, N., et al., 1991. The nature of adverse events in hospitalized patients. Results of the Harvard Medical Practice Study II. *New England Journal of Medicine* 324 (6), 377–384.
- Leape, L.L., Epstein, A.M., Hamel, M.B., 2002. A series on patient safety. *New England Journal of Medicine* 347 (16), 1272–1274.
- Liston, C.B., 1995. Massage. In: Zuluaga, M., et al. (Ed.), *Sports Physiotherapy: Applied Science and Practice*. Churchill Livingstone, New York, pp. 223–232.
- Loving, J.E., 1998. *Massage Therapy: Theory & Practice*. Appleton & Lange, Stamford, CT.
- Maklin, K., 1994. Use of massage in clinical practice. *British Journal of Nursing* 3 (6), 292–294.
- McConnell, A., 1995. Practical massage. *Nursing Times* 91 (suppl 36), 2–14.
- Medvedev, E.A., 1994. Case of acute unilateral neurosensory hearing loss caused by massage of trapezius muscle. *Vestn Otorinolaringol* 3, 38–39.
- Mikhail, A., 1997. Renal artery embolization after back massage in a patient with aortic occlusion. *Nephrology Dialysis Transplantation* 12 (4), 797–798.
- Miller, B.F., and Keane, C.B., 1997. *Encyclopedia & Dictionary of Medicine, Nursing, & Allied Health*, 6th Edition. WB Saunders, Philadelphia.
- Mumm, A.N., 1993. Zoster after shiatsu massage. *Lancet* 341 (8842), 447.

- Liu, J.S., Tsai, T.C., Chang, Y.Y., 1993. Extracranial internal carotid artery dissection secondary to neck massage: massage visualization of mural hematoma by MRI. *Gaoxiong Yi Xue Ke Xue Za Zhi* 9 (5), 322–327.
- Prentice, W.E., Lehn, C., 2002. Therapeutic massage. In: Prentice, W.E. (Ed.), *Therapeutic Modalities for Physical Therapists*, 2nd Edition. McGraw-Hill, New York, pp. 415–446.
- Quillen, W.S., Underwood, F.B., 1995. *Laboratory Manual to Accompany Therapeutic Modalities in Sports Medicine* 3rd Edition. Mosby, St. Louis.
- Rattray, F.S., 1994. *Massage Therapy: An Approach to Treatments*. Maverick Consultant, Toronto, CA.
- Rechtien, J.J., Andary, M., Holmes, T.G., Weiting, J.M., 1994. Manipulation, massage, & traction. In: Richardson, J.K., Iglarsh, A. (Eds.), *Clinical Orthopaedic Physical Therapy*. WB Saunders, Philadelphia, pp. 521–543.
- Rechtien, J.J., Andary, M., Holmes, T.G., Weiting, J.M., 1998. Manipulation, massage, & traction. In: Delisa, J.A., Gans, B.M. (Eds.), *Principles and Practices: Rehabilitation Medicine*, 3rd Edition. Lippincott-Reven Publisher, Philadelphia, pp. 521–552.
- Rice, B., 2002. *Prentice-Hall's Health Outline Review of Massage Therapy*. Prentice-Hall, Upper Saddle River, NJ.
- Rich, G.J., 2002. *Massage Therapy: The Evidence for Practice*. Mosby, Edinburgh.
- Rosser, M.O., 1996. *Body Massage: Therapy Basics*. Hodder & Stoughton, Agincourt, ON, Canada.
- Sackett, D.L., Haynes, R.B., Straus, S.E., Richardson, W.S., Rosenberg, W., 2000. *Evidence-Based Medicine: How to Practice and Teach EBM*, 2nd Edition. Churchill Livingstone, Edinburgh.
- Salvo, S.G., 1999. *Massage Therapy: Principle & Practice*. WB Saunders, Philadelphia.
- Smith, G.D., Altman, D.G., 2001. *Systematic Reviews in Health Care: Meta-Analysis in Context*, 2nd Edition. BMJ Publishing Group, London, pp. 23–42.
- Stedman's Medical Dictionary, 2000. 27th Edition. Lippincott, Williams & Wilkins, Philadelphia.
- Storkey, C., 1999. *Therapeutic Modalities*. FA Davis, Philadelphia.
- Taber's Cyclopedic Medical Dictionary, 2001. 18th Edition. F.A. Davis, Philadelphia.
- Tachi, J., Amino, N., Nyaik, K., 1990. Massage therapy on neck: a contributing factor for destructive thyrotoxicosis. *Thyroidology* 2 (1), 25–27.
- Tan, J.C., 1998. *Practical Manual of Physical Medicine and Rehabilitation: Diagnostics, Therapeutics, and Basic Problems*. Mosby, St. Louis.
- Tappan, F.M., Benjamin, P.J., 1998. *Tappan's Handbook of Healing Massage Techniques: Classic, Holistic, & Emerging Methods*. Appleton & Lange, Stamford, CT.
- Thomas, E.J., Studdert, D.M., Burstin, H.R., et al., 2000. Incidence and types of adverse events and negligent care in Utah and Colorado. *Medical Care* 38 (3), 261–271.
- Trevelyan, J., 1993. Massage. *Nursing Times* 89 (19), 45–47.
- Turchaninov, R., 1996. *Therapeutic Massage: A Scientific Approach*. Aesculapius Books, Phoenix, AZ.
- Turchaninov, R., Cox, C.A., 1998. *Medical Massage*. Stress Less Publishers, Phoenix, AZ.
- Vickers, A., Zollman, C., 1999. ABC of complementary medicine: massage therapies. *British Medical Journal* 319 (7219), 1254–1257.
- Westland, G., 1993. Massage as a therapeutic tool, Part 2. *British Journal of Occupational Therapy* 56 (5), 177–180.
- Whitehill, W., Gustman, B., 2002. Massage and skin conditions: indications and contraindications. *Athletic Therapy Today* 7 (3), 24–28.
- Wilding, J., 2000. Mechanical spinal traction. In: Hayes, K.W. (Ed.), *Manual for Physical Agents*, 5th Edition. Prentice-Hall Health, Upper Saddle River, NJ, pp. 91–102.
- Zuberbeuler, E., 1996. Massage therapy: an added dimension in terminal care. *American Journal of Hospice & Palliative Care* 13 (2), 50.