# Chapter 9:
# Physiotherapy Modalities:
# Ancillary and Preparatory to the Chiropractic Adjustment

**Introduction**

Physical modalities utilized in healthcare can be traced back from Hippocrates around 400BC, and Galen, who was considered the "Father of Sports Medicine", as he treated the Roman gladiators circa 200AD (6). Since, the dichotomy within the healing arts between physical modalities of treatment and chemical modalities has taken turns in dominance throughout history.

The introduction of physiotherapy within the United States can be best associated with to two phenomena within American history. The first of these events being the epidemics of poliomyelitis during the 1800's through the 1950's, and the onset of World War I and World War II (4). These two events left patients with unique symptoms and impairments that responded in a superior manor to physical modalities such as exercise, hydrotherapy and massage; rather than the conventional medical treatments at that time.

Chiropractic Physiotherapy is defined as such:

> "Chiropractic physiologic therapeutics encompasses the diagnosis and treatment of disorders of the body using the natural forces of healing, such as air, cold, electricity, rest, exercise, traction, heat, light, massage, water and other forces of nature."(This is the ACA definition so may want to replace with an ICA or more neutral one)(2).

The use of physical modalities within chiropractic, as well as within the physical therapy profession, has occurred concomitantly. Within chiropractic, physiotherapy modalities can be seen early in the profession's history. While some postulate that physiotherapy in chiropractic practice can be traced back to D.D. Palmer's magnetic healing practice which incorporated a sort of "massage"(5). A more deliberate union was made in 1914 when National Chiropractic College incorporated physiotherapy in its program(1). Photos of the B.J. Palmer Chiropractic Research Clinic, circa 1945, show a state of the art rehabilitation lab containing the latest physiotherapy equipment of the time(5). Since, chiropractic has enjoyed the benefit of including physiotherapy into their scope of practice.

The types of modalities utilized in physiotherapy have been scrutinized for their lack of "evidence" in the past. As a result the American Physical Therapy Association (APTA) has created "Hooked on Evidence". This program, in association with "Vision 2020", and 187 Doctor of Physical Therapy (DPT) programs countrywide are an attempt by the physical therapy profession to gain autonomy and direct access privileges in the ever-growing market for physical medicine utilization(3). It is critical that the chiropractic profession stakes its claim to this area of professional overlap in a way that that is defined and substantiated.

In the new era of "evidence-based" chiropractic practice, it is imperative that the profession remain vigilant in the appraisal of the scientific literature as it pertains to chiropractic practice. This is especially crucial when ascribing validity to the various modalities.

Several decades ago, the Board of Directors of the International Chiropractors Association (ICA) voted to include a variety of physiotherapy modalities as used by chiropractors. These procedures were accepted if their use was "ancillary or preparatory" to the chiropractic spinal adjustment. While the major method of chiropractic care, recognized by the ICA, is the chiropractic spinal adjustment, the ICA realizes that certain modalities, when used in conjunction with the adjustment, may enhance healing and reduce the suffering of chiropractic patients.

While it is difficult to determine the current evidence for each modality used by chiropractors, several of the most common physiotherapy modalities were searched within the Medline Database. As discussed in previous chapters, there are four major levels of evidence recognized by the United States Department of Health and Human Services:

- **Level 1**. *Randomized controlled/clinical trials*—includes quasi-randomized processes such as alternate allocation.
- **Level 2.** *Non-randomized controlled/clinical trial*—a prospective (pre-planned) study, with predetermined eligibility criteria and outcome measures.
- **Level 3.** *Observational studies with controls*—includes retrospective, interrupted time series (a change in trend attributable to the intervention), case-control studies, cohort studies with controls, and health services research that includes adjustment for likely confounding variables.
- **Level 4.** *Observational studies without controls* (e.g., cohort studies without controls, case series without controls, and case studies without controls).

Before discussing the Levels of Evidence for each common modality, Table 1 is provided as a summary of the evidence for each one.

**Table 1**

| | Modalities | Level I | Level II | Level III | Level IV | Total Number of References | Rating |
|---|---|---|---|---|---|---|---|
| 1. | Cold/Cryotherapy + | 4 | 0 | 0 | 2 | 6 | **A** |
| 2. | Cold/Cryotherapy - | 2 | 1 | 0 | 0 | 3 | **A** |
| 3. | Superficial Heat + | 7 | 0 | 0 | 2 | 9 | **B** |
| 4. | Superficial Heat - | 1 | 0 | 0 | 0 | 1 | **A** |
| 5. | Therapeutic Exercise + | 73 | 10 | 6 | 44 | 133 | **A** |
| 6. | Therapeutic Exercise - | 3 | 0 | 0 | 1 | 4 | **A** |
| 7. | Low Level Laser + | 27 | 1 | 1 | 7 | 36 | **A** |
| 8. | Low Level Laser - | 12 | 0 | 0 | 0 | 13 | **A** |
| 9. | TENS + | 41 | 1 | 1 | 34 | 77 | **A** |
| 10. | TENS - | 12 | 0 | 0 | 1 | 13 | **A** |
| 11. | Whole Body Vibration + | 10 | 0 | 2 | 1 | 13 | **B** |
| 12. | Whole Body Vibration - | 1 | 0 | 0 | 0 | 1 | **A** |
| 13. | Yoga + | 19 | 1 | 2 | 9 | 31 | **A** |
| 14. | Yoga - | 2 | 0 | 0 | 0 | 2 | **A** |
| 15. | Extension Traction + | 4 | 3 | 0 | 17 | 24 | **A** |
| 16. | Extension Traction - | 0 | 0 | 0 | 0 | 0 | **A** |
| 17. | Scoliosis Specific Exercises + | 1 | 11 | 2 | 2 | 16 | **A** |
| 18. | Scoliosis Specific Exercises - | 0 | 0 | 0 | 0 | 0 | **A** |



Discussion:

Cold/Cryotherapy:

Positive:
Level 1: References:

C. E. Gibbons, M. C. Solan, D. M. Ricketts, and M. Patterson. Cryotherapy compared with Robert Jones bandage after total knee replacement: a prospective randomized trial. *Int.Orthop.* 25 (4):250-252, 2001.

J. Hochberg. A randomized prospective study to assess the efficacy of two cold-therapy treatments following carpal tunnel release. *J.Hand Ther.* 14 (3):208-215, 2001.

A. Holmstrom and B. C. Hardin. Cryo/Cuff compared to epidural anesthesia after knee unicompartmental arthroplasty: a prospective, randomized and controlled study of 60 patients with a 6-week follow-up. *J.Arthroplasty* 20 (3):316-321, 2005.

O. K. Jensen, F. F. Nielsen, and L. Vosmar. An open study comparing manual therapy with the use of cold packs in the treatment of post-traumatic headache. *Cephalalgia* 10 (5):241-250, 1990.

Level 2-3: (0 references)

Level 4:

C. R. Green, A. M. de Rosayro, and A. R. Tait. The role of cryoanalgesia for chronic thoracic pain: results of a long-term follow up. *J.Natl.Med.Assoc.* 94 (8):716-720, 2002.

E. Morsi. Continuous-flow cold therapy after total knee arthroplasty. *J.Arthroplasty* 17 (6):718-722, 2002.

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Cold/Cryotherapy:

Negative:

Level 1:

W. L. Healy, J. Seidman, B. A. Pfeifer, and D. G. Brown. Cold compressive dressing after total knee arthroplasty. *Clin.Orthop.Relat Res.* (299):143-146, 1994.

H. E. Hirvonen, M. K. Mikkelsson, H. Kautiainen, T. H. Pohjolainen, and M. Leirisalo-Repo. Effectiveness of different cryotherapies on pain and disease activity in active rheumatoid arthritis. A randomised single blinded controlled trial. *Clin.Exp.Rheumatol.* 24 (3):295-301, 2006.

Level 2:

B. Kullenberg, S. Ylipaa, K. Soderlund, and S. Resch. Postoperative cryotherapy after total knee arthroplasty: a prospective study of 86 patients. *J.Arthroplasty* 21 (8):1175-1179, 2006.

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Superficial Heat:

Positive:

Level 1:

B. Kettenmann, C. Wille, E. Lurie-Luke, D. Walter, and G. Kobal. Impact of continuous low level heatwrap therapy in acute low back pain patients: subjective and objective measurements. *Clin.J.Pain* 23 (8):663-668, 2007.

J. M. Mayer, L. Ralph, M. Look, G. N. Erasala, J. L. Verna, L. N. Matheson, and V. Mooney. Treating acute low back pain with continuous low-level heat wrap therapy and/or exercise: a randomized controlled trial. *Spine J.* 5 (4):395-403, 2005.

J. M. Mayer, V. Mooney, L. N. Matheson, G. N. Erasala, J. L. Verna, B. E. Udermann, and S. Leggett. Continuous low-level heat wrap therapy for the prevention and early phase treatment of delayed-onset muscle soreness of the low back: a randomized controlled trial. *Arch.Phys.Med.Rehabil.* 87 (10):1310-1317, 2006.

S. F. Nadler, D. J. Steiner, G. N. Erasala, D. A. Hengehold, R. T. Hinkle, Goodale M. Beth, S. B. Abeln, and K. W. Weingand. Continuous low-level heat wrap therapy provides more efficacy than Ibuprofen and acetaminophen for acute low back pain. *Spine* 27 (10):1012-1017, 2002.

S. F. Nadler, D. J. Steiner, G. N. Erasala, D. A. Hengehold, S. B. Abeln, and K. W. Weingand. Continuous low-level heatwrap therapy for treating acute nonspecific low back pain. *Arch.Phys.Med.Rehabil.* 84 (3):329-334, 2003.

S. F. Nadler, D. J. Steiner, S. R. Petty, G. N. Erasala, D. A. Hengehold, and K. W. Weingand. Overnight use of continuous low-level heatwrap therapy for relief of low back pain. *Arch.Phys.Med.Rehabil.* 84 (3):335-342, 2003.

X. G. Tao and E. J. Bernacki. A randomized clinical trial of continuous low-level heat therapy for acute muscular low back pain in the workplace. *J.Occup.Environ.Med.* 47 (12):1298-1306, 2005.

Level 2-3: (0 references)

Level 4:

B. Curkovic, V. Vitulic, D. Babic-Naglic, and T. Durrigl. The influence of heat and cold on the pain threshold in rheumatoid arthritis. *Z.Rheumatol.* 52 (5):289-291, 1993.

A. Lloyd, D. A. Scott, R. L. Akehurst, E. Lurie-Luke, and G. Jessen. Cost-effectiveness of low-level heat wrap therapy for low back pain. *Value.Health* 7 (4):413-422, 2004.

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Superficial Heat:

Negative:

Level 1:

Y. Saeki. Effect of local application of cold or heat for relief of pricking pain. *Nurs.Health Sci.* 4 (3):97-105, 2002.

Level 2-4: (0 references)

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Therapeutic Exercise:

Positive:

Level 1:

F. Avraham, S. Aviv, P. Ya'akobi, H. Faran, Z. Fisher, Y. Goldman, G. Neeman, and E. Carmeli. The efficacy of treatment of different intervention programs for patellofemoral pain syndrome--a single blinded randomized clinical trial. Pilot study. *ScientificWorldJournal.* 7:1256-1262, 2007.

M. D. Bang and G. D. Deyle. Comparison of supervised exercise with and without manual physical therapy for patients with shoulder impingement syndrome. *J.Orthop.Sports Phys.Ther.* 30 (3):126-137, 2000.

H. Bentsen, F. Lindgarde, and R. Manthorpe. The effect of dynamic strength back exercise and/or a home training program in 57-year-old women with chronic low back pain. Results of a prospective randomized study with a 3-year follow-up period. *Spine* 22 (13):1494-1500, 1997.

O. H. Bjarnadottir, A. D. Konradsdottir, K. Reynisdottir, and E. Olafsson. Multiple sclerosis and brief moderate exercise. A randomised study. *Mult.Scler.* 13 (6):776-782, 2007.

L. Bunketorp, M. Lindh, J. Carlsson, and E. Stener-Victorin. The effectiveness of a supervised physical training model tailored to the individual needs of patients with whiplash-associated disorders--a randomized controlled trial. *Clin.Rehabil.* 20 (3):201-217, 2006.

T. T. Chiu, T. H. Lam, and A. J. Hedley. A randomized controlled trial on the efficacy of exercise for patients with chronic neck pain. *Spine* 30 (1):E1-E7, 2005.

T. Cochrane, R. C. Davey, and S. M. Matthes Edwards. Randomised controlled trial of the cost-effectiveness of water-based therapy for lower limb osteoarthritis. *Health Technol.Assess.* 9 (31):iii-xi, 1, 2005.

G. E. Djavid, R. Mehrdad, M. Ghasemi, H. Hasan-Zadeh, A. Sotoodeh-Manesh, and G. Pouryaghoub. In chronic low back pain, low level laser therapy combined with exercise is more beneficial than exercise alone in the long term: a randomised trial. *Aust.J.Physiother.* 53 (3):155-160, 2007.

K. J. Dodd, N. F. Taylor, and H. K. Graham. A randomized clinical trial of strength training in young people with cerebral palsy. *Dev.Med.Child Neurol.* 45 (10):652-657, 2003.

V. E. Drory, E. Goltsman, J. G. Reznik, A. Mosek, and A. D. Korczyn. The value of muscle exercise in patients with amyotrophic lateral sclerosis. *J.Neurol.Sci.* 191 (1-2):133-137, 2001.

P. Duncan, L. Richards, D. Wallace, J. Stoker-Yates, P. Pohl, C. Luchies, A. Ogle, and S. Studenski. A randomized, controlled pilot study of a home-based exercise program for individuals with mild and moderate stroke. *Stroke* 29 (10):2055-2060, 1998.

K. Dziedzic, J. Hill, M. Lewis, J. Sim, J. Daniels, and E. M. Hay. Effectiveness of manual therapy or pulsed shortwave diathermy in addition to advice and exercise for neck disorders: a pragmatic randomized controlled trial in physical therapy clinics. *Arthritis Rheum.* 53 (2):214-222, 2005.

H. Epps, L. Ginnelly, M. Utley, T. Southwood, S. Gallivan, M. Sculpher, and P. Woo. Is hydrotherapy cost-effective? A randomised controlled trial of combined hydrotherapy programmes compared with physiotherapy land techniques in children with juvenile idiopathic arthritis. *Health Technol.Assess.* 9 (39):iii-x, 1, 2005.

L. Eversden, F. Maggs, P. Nightingale, and P. Jobanputra. A pragmatic randomised controlled trial of hydrotherapy and land exercises on overall well being and quality of life in rheumatoid arthritis. *BMC.Musculoskelet.Disord.* 8:23, 2007.

D. Falla, G. Jull, P. Hodges, and B. Vicenzino. An endurance-strength training regime is effective in reducing myoelectric manifestations of cervical flexor muscle fatigue in females with chronic neck pain. *Clin.Neurophysiol.* 117 (4):828-837, 2006.

C. Fernandez-de-Las-Penas, C. Alonso-Blanco, M. Morales-Cabezas, and J. C. Miangolarra-Page. Two exercise interventions for the management of patients with ankylosing spondylitis: a randomized controlled trial. *Am.J.Phys.Med.Rehabil.* 84 (6):407-419, 2005.

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W. R. Ferrell, N. Tennant, R. D. Sturrock, L. Ashton, G. Creed, G. Brydson, and D. Rafferty. Amelioration of symptoms by enhancement of proprioception in patients with joint hypermobility syndrome. *Arthritis Rheum.* 50 (10):3323-3328, 2004.

G. K. Fitzgerald, M. J. Axe, and L. Snyder-Mackler. The efficacy of perturbation training in nonoperative anterior cruciate ligament rehabilitation programs for physical active individuals. *Phys.Ther.* 80 (2):128-140, 2000.

N. E. Foster, E. Thomas, P. Barlas, J. C. Hill, J. Young, E. Mason, and E. M. Hay. Acupuncture as an adjunct to exercise based physiotherapy for osteoarthritis of the knee: randomised controlled trial. *BMJ* 335 (7617):436, 2007.

K. Y. Fulcher and P. D. White. Randomised controlled trial of graded exercise in patients with the chronic fatigue syndrome. *BMJ* 314 (7095):1647-1652, 1997.

L. J. Goldby, A. P. Moore, J. Doust, and M. E. Trew. A randomized controlled trial investigating the efficiency of musculoskeletal physiotherapy on chronic low back disorder. *Spine* 31 (10):1083-1093, 2006.

F. Guler-Uysal and E. Kozanoglu. Comparison of the early response to two methods of rehabilitation in adhesive capsulitis. *Swiss.Med.Wkly.* 134 (23-24):353-358, 2004.

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M. A. Hirsch, T. Toole, C. G. Maitland, and R. A. Rider. The effects of balance training and high-intensity resistance training on persons with idiopathic Parkinson's disease. *Arch.Phys.Med.Rehabil.* 84 (8):1109-1117, 2003.

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A. Jordan, T. Bendix, H. Nielsen, F. R. Hansen, D. Host, and A. Winkel. Intensive training, physiotherapy, or manipulation for patients with chronic neck pain. A prospective, single-blinded, randomized clinical trial. *Spine* 23 (3):311-318, 1998.

G. Jull, P. Trott, H. Potter, G. Zito, K. Niere, D. Shirley, J. Emberson, I. Marschner, and C. Richardson. A randomized controlled trial of exercise and manipulative therapy for cervicogenic headache. *Spine* 27 (17):1835-1843, 2002.

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M. Kankaanpaa, S. Taimela, O. Airaksinen, and O. Hanninen. The efficacy of active rehabilitation in chronic low back pain. Effect on pain intensity, self-experienced disability, and lumbar fatigability. *Spine* 24 (10):1034-1042, 1999.

D. J. Kidgell, D. M. Horvath, B. M. Jackson, and P. J. Seymour. Effect of six weeks of dura disc and mini-trampoline balance training on postural sway in athletes with functional ankle instability. *J.Strength.Cond.Res.* 21 (2):466-469, 2007.

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J. S. Lewis, J. S. Hewitt, L. Billington, S. Cole, J. Byng, and S. Karayiannis. A randomized clinical trial comparing two physiotherapy interventions for chronic low back pain. *Spine* 30 (7):711-721, 2005.

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B. Malmros, L. Mortensen, M. B. Jensen, and P. Charles. Positive effects of physiotherapy on chronic pain and performance in osteoporosis. *Osteoporos.Int.* 8 (3):215-221, 1998.

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M. Mulet, K. L. Decker, J. O. Look, P. A. Lenton, and E. L. Schiffman. A randomized clinical trial assessing the efficacy of adding 6 x 6 exercises to self-care for the treatment of masticatory myofascial pain. *J.Orofac.Pain* 21 (4):318-328, 2007.

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Level 2-4: (0 references)

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TENS:

Positive:

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Negative:

Level 1-3: (0 References)

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Extension Traction:

Negative:

Level 1-4: (0 References)

Scoliosis Specific Exercises

Positive:

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