Evidence Table
Efficacy of Treatments for Sacroiliac Joint Dysfunction

Clinical Question: In non-pregnant adults, aged 20-65 y.o., with sacroiliac joint dysfunction, does standard exercise treatment combined with spinal manipulation produced decreased low back pain in a shorter rehabilitation course than spinal manipulation alone?

Journal (Year) Authors & Title	Purpose of Study & Study Design	Recruited From & Inclusion Criteria	Outcome Measures Assessed & Intervals of Assessment	Intervention	Statistically Significant Results	Conclusions	Clinical Significance / PICO Conclusion
Spine (2006) Goldby, L.; Moore, A.; Doust, J.; Trewy, M. *A RCT Investigating the Efficiency of MSK PT on Chronic LBP Disorder*	To determine the efficacy of 2 components of MSK PT – spinal stabilization program and manual therapy intervention – on chronic LBP. RCT	Referred from GP to PT dept. Inclusion: chronic LBP (current episode ≥ 12 wks); 18-65 yo.; able to read/write English	All outcomes assessed @ Baseline, 3 months, 6 months, 12 months, & 24 months - Pain: NPRS for back & leg pn intensity; pn diagram; & presence of back pn in last 2/7 days -Disability: Modified ODI -Handicap: Low back outcome score -Impairment: Lumbar ✔ ROM; pt.-reported med intake (# of days/wk); Timed walking test -NHP (QOL)	**Spinal Stab Program**: 10-wk course of EXRS class to retrain TA, MTF, pelvic floor, & diaphragm mm; video shown @ beginning & end of each session; 2 PTs per ≤ 12 pt.'s; 10 1-hr sessions max **Manual Therapy:** manual tx @ the discretion of treating PT, ≤ 10 sessions; Allowed NO stab EXRS or modalities. **Education:** booklet "Back In Action" explained by PT **All Groups:** Back School: 1 group specific 3-hr q&a re: anatomy/phys; lifting; advice	Between entry & 3-months, highest reduction in pn in manual therapy group. Improvement in spinal stab group at 6 months for pain and QOL; and at 12 months for meds, QOL, & disability.	10-week spinal stabilization program is more effective than manual therapy or education alone at reducing pn, disability, med intake, & improving QOL in pts with chronic LBP. In pt.'s who recorded ≥ 50 NPRS for LBP @ entry, manual tx was most effective for pn relief.	Inclusion of a component of spinal stabilization emphasizing the TA, MTF, pelvic floor, & diaphragm leads to better long-term pt. outcomes than manual therapy or education alone. PICO: Considering spinal stabilization & SMT alone, they are both effective for pn reduction, but spinal stabilization program is more effective in the long term.
Journal of Bodywork & Movement Therapies (2012) Kamali, F. & Shokri, E. *The Effect of Two Manipulative Therapy Techniques and Their Outcome in Patients with Sacroiliac Joint Syndrome*	To investigate the effectiveness of applying SIJ SMT in combination with lumbar SMT versus applying only SIJ SMT to treat SIJD Randomized Clinical Study	Recruited 32 females attending PT for LBP. Inclusion: female; acute UL or BL SIJD in last 6 wks. (indicated by + on ≥ 3/6 SI provocation tests: Yeoman's, Gaenslen's, FABERs, compression, resisted hip abd, & thigh thrust); pn in last 24 hrs. ≥ 30mm (on 100 mm VAS); no SMT in last month	Assessed @ baseline, immediately p tx (pain only), 48 hours p tx, & 1 month p tx -Pain: 100 mm VAS -Functional Disability: Oswestry LBP Disability Questionnaire	Each group received 1 tx of SMT **SIJ Only Group:** Sacroiliac Regional Manipulation **Combo Tx Group:** Lumbar Rotational Manipulation (Neutral "Gapping" Manipulation)	Improvement in VAS scores in both groups immediately, @ 48 hrs, & 1 month p tx. Improvements in ODI scores in both groups @ 48 hrs & 1 month p tx. No differences b/ween 2 tx groups in VAS or ODI	Lumbar and SIJ SMT offers no additional benefit in relation to pn and disability, as compared to SIJ SMT alone, in pts with SIJD. 1 tx session with SMT resulted in similar improvements in pn and disability as multiple tx's (+ finding for pts. re: cost of clinic visits)	Consider use of a generalized lumbar or SIJ SMT as an acceptable tx option to reduce pn and disability in pts. with SIJD in the acute phase (≤ 1 month). Presence of SIJD indicated by a (+) on ≥ 3/6 of tests indicated in the inclusions column. PICO: SMT is effective in the acute phase as a stand-alone treatment option
Spine (2009) Cleland, J.; Fritz, J.; Kulig, K.; Davenport, T.; Eberhart, S.; Magel, J.; & Childs, J *Comparison of the Effectiveness of Three Manual Physical Therapy Techniques in a Subgroup of Patients with Low Back Pain Who Satisfy a CPR*	Examine the generalizability of the SMT CPR to different thrust & non-thrust SMT techniques by comparing the outcomes of 3 different SMT techniques in pts. with LBP who fit the CPR. Multicenter RCT	Recruited over 28-mnth period while attending PT in OP setting in 1 of 4 clinics. Inclusion: Modified ODI score of ≥ 25%; 20-60 y.o.; (+) for SMT CPR (presence of ≥ 4/5 criteria: duration of sxs < 16 days, no sxs distal to knee, FABQW subscale score of < 19 pts, ≥ 1 hypomobile segment in LS, & ≥ 1 hip with > 35° IR ROM)	Self-report questionnaires were completed at baseline. Follow-up assessments (ODQ & NPRS) were performed p 1 week (3rd visit), 4 weeks (5th visit), and 6 months -Impairment: NPRS for pn intensity -Disability: Modified ODI -Fear: FABQ	**Treatments 1 (w/in 3 days p eval) & 2 (w/in 1 wk p eval):** pts. received SMT technique to which they were randomized: supine thrust SMT (SI regional manipulation), S/L thrust SMT (neutral "gapping"), or non-thrust (central LS PA @ L4/5) & a spinal ROM EXRS (PPT) x 10 p SMT (+ as HEP 10x 3-4x/day) **Treatments 3-5 (over a 4-wk period):** all instructed in spinal stabilization prgm targeting TA, MTF, ES, & obliques.	No differences between supine thrust group and side-lying thrust group at any follow up period for ODI & NPRS. Sig. differences in ODI & NPRS at each follow-up b/ween the trust groups and the non thrust group.	Both the supine thrust & side-lying thrust produced successful pt outcomes in comparison to the non-thrust group. The spinal manipulation CPR is generalizable to an additional technique (side-lying thrust), but not generalizable to non-thrust techniques.	In pt.'s with LBP and whom satisfy the spinal manipulation CPR, use of either the supine or side-lying thrust technique can be used as an adjunct to spinal stabilization programs in tx in therapy sessions. In this group of pt.'s, SMT was effective to reduce pn & disability scores acutely, but the combination of the two tx's produced positive outcomes up to 6 months of follow-up. (PICO)

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Spine (2005) Lewis, J.; Hewitt, J.; Billington, L.; Cole, S.; Byng, J.; & Karayiannis, S. *A Randomized Clinical Trial Comparing Two Physiotherapy Interventions for Chronic Low Back Pain*	To compare the outcome of a group exercise intervention versus an individualized exercise intervention for patients with nonspecific chronic LBP RCT	Pt.'s w/ LBP referred from family physician to PT Inclusion: 18-65 y.o.; fluency in English; & mechanical LBP (pn that increases with mvmt) for > 3 months of a non-radicular nature	Before group allocation, immediately p tx, 6 months p tx, & 12 months p tx -Quebec Back Pain Disability Questionnaire -Pt. perceived Physical Fitness Rating (5-pt scale) -Medication use for LBP -Lumbar ROM (flex, ext, SB, & SLR)	**Exercise Class:** 8, 1-hr sessions over 2 months. 10 pts. @ a time, led by 3 PTs. 10 min warm-up, 40 min circuit, & 10 min cool-down. Stations included: treadmill, bike, sit-to-stand reps, spinal stabilization EXRS (supine, prone, quadruped), sitting physioball EXRS, leg press, bridging, step ups, arm circling/raising, high-stepping, gym ball lifts to ceiling in supine, & manual therapy station. **Individualized Treatments:** 8, 30-minute therapy tx's, included: spinal stabilization EXRS, manual therapy, **Both Groups:** received a copy of "The Back Book"	Reduction in Quebec scores for both groups. At 12 months, significant increases noted for ROM all movements in both groups, as well as decreases in VAS reported with those movements Exercise group was 40% more cost-effective than the individual treatments	There was no consensus found regarding one form of treatment over the other. Both forms of interventions were associated with significant improvements in Quebec scores & Lumbar ROM w/ associated pain levels	The plausibility of incorporating group fitness programs utilizing spinal stabilization for pt.'s presenting with non-specific chronic LBP is apparent, and is 40% more cost effective than individual treatment. This could be a treatment option for the future, where therapist demands are likely to increase, in a commonly seen pt. population for PT PICO: incorporating spinal stabilization (in group or individual tx format) contributes to (+) pt outcomes
Pain (2007) Ferreira, M.; Ferreira, P.; Katimer, J.; Herbert, R.; Hodges, P.; Jennings, M.; Maher, C.; Refshauge, K. *Comparison of General Exercise, Motor Control Exercise, and Spinal Manipulation Therapy for Chronic Low Back Pain: A Randomized Trial*	To compare the effects of general exercise, SMT, and motor control exercise for chronic low back pain RCT	Pt.'s receiving PT from 3 teaching hospitals in Sydney, Australia Inclusion: non-specific low back pain for ≥ 3 months, 18-80 y.o.; given written informed consent	Baseline measurement prior to randomization, during follow-up appointments at 8 wks., 6 months, and 12 months -Patient-Specific Functional Scale -Global Perceived Effect -Pain (VAS) -Roland-Morris Disability Questionnaire	Up to 12 tx sessions over 8 wk period **General Exercise:** class of up to 8 pt.'s for 1 hr consisting of strengthening/stretching for main mm groups and exercise for CV fitness **Motor Control:** exercises aimed at improving fxn of specific trunk mm's (TA, MTF, diaphragm, pelvic floor). **Spinal Manipulation:** joint mobs or manipulation techniques. NO exercises or HEP. Advised to avoid pain-aggravating activities.	Outcomes of all 3 groups improved over 12 months following randomization. In the short-term, the motor control exercises and SMT groups had greater improvement than the general exercise group	Motor control exercise and SMT produced slightly better short-term function and perceptions of effect than general exercise, but not better medium to long-term effects, in patients with chronic non-specific back pain.	Inclusion of spinal manipulative therapy and motor control exercises for patients with significant pain or disability has the potential to improve the outcomes in the short term for patients with greater than 3 months history of low back pain. Including motor control (spinal stabilization) exercises as opposed to general exercises in your arsenal of conservative tx options will have a more positive effect on treatment outcomes.
Spine (2011) Bronfort, D.; Maiers, M.; Evans, R.; Schulz, C.; Bracha, Y., Svendsen, K., Grimm, R.; Owens, E.; Garvey, T.; & Transfeldt, E. *Supervised Exercise, Spinal Manipulation, and*	Assess relative efficacy of supervised EXRS, SMT, and home EXRS (a less time-consuming and less-costly intervention) for the tx of chronic LBP RCT	Recruited through newspaper advertisement, community posters, & postcard mailings. Inclusion: 18-65 y.o.; 1° complaint of mechanical LBP of ≥ 6 week duration w/ or w/out radiating pain to the lower extremity	Baseline and at 4, 12, 26, and 52 weeks p randomization. -Patient-rated NPRM -Modified Roland Questionnaire -SF-36 -Frequency of pain med use for LBP in last week -Lumbar dynamic ROM (rotation, SB, Flex, Ext) -Isometric trunk flexion & extension strength -Muscle endurance of trunk	Pts. received 12 wks. of tx & had to attend 80% of txs to be analyzed **Supervised EXRS Therapy:** 1:1 tx, 20 1-hr sessions (~2x/wk); light aerobic warm-up followed by core strengthening exrs focused on dynamic trunk strengthening (trunk & leg extensions) of high reps & progressive increase in loading of mm's; 6 static stretches before & p	All 3 tx groups were associated with mean changes of 40%-50% in pain and disability in 12 wks and 12 months p tx Those receiving individualized spinal stabilization tx were most satisfied and experienced greatest gains in trunk muscle endurance & strength but did not significantly	For chronic low back pain, supervised exercise was significantly better than SMT and home exercise in terms of satisfaction with tx and trunk muscle endurance & strength.	Incorporation of individualized spinal stabilization exercise programs, in addition to patient education, and even SMT, are options when providing physical therapy treatment to those patients presenting with chronic low back pain. There are many options to choose from, and given the lack of clear superiority of one treatment over another for

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Home Exercise for Chronic Low Back Pain: A Randomized Controlled Trial			flexors and extensors	strengthening. **SMT:** 1-2x/wk, 15-30 mins; short-lever, low amplitude, high-velocity thrust to low back and sacroiliac regions; adjunct modalities (ice, heat, STM to facilitate SMT **Home Exercise & Advice:** 2, 1-hr appt's w/ f/u 1-2 wks. later. Individualized sessions re: self-care, ergonomics, lifting techniques, stretching/stabilization exercise instruction	differ from those receiving SMT in terms of pain and other pt-related outcomes in the short or long term.		CLBP, individual treatment decisions will best be made by choosing from a variety of effective treatment options and considering the individual patient characteristics that may lead to them responding to one treatment approach over another.
Clinical Rehabilitation (2010) Cecchi, F.; Molino-Lova, R.; Chiti, M.; Pasquini, G.; Paperini, A.; Conti, A.; & Macchi, C. *Spinal Manipulation Compared with Back School and with Indvidually Delivered Physiotherapy for the Treatment of Chronic Low Back Pain: A Randomized Trial with One-Year Follow-Up*	To compare spinal manipulation, back school, and individual physiotherapy in the tx of low back pain. RCT	Recruited from the author's clinic environment Inclusion: non-specific low back pain, reported 'often' to 'always' at least for the past 6 months	Baseline, on discharge, and at 3, 6, and 12 weeks after discharge -Roland-Morris Disability Score -Pain Rating Scale	**Back School:** 15 1-hr sessions, 5 days/wk. First 5 devoted to information and group discussions on back physiology/pathology & focus on benign character of common back pn. Next 10 included relaxation techniques, postural, & respiratory group exercises **Individualized Therapy:** 15 sessions lasting 1 hr, 5x/wk for 3 consecutive weeks of passive & assisted mobs, active EXRS, STM, PNF, & pt. education **SMT:** 4-6 weekly sessions of 20 minutes each for total of 4-6 weeks. Specific manipulation technique performed not stated.	At discharge, all 3 groups reported sig. improvement in disability score and in pain rating scale when compared to baseline data, with SMT group reporting highest reduction. 1 yr later, all 3 groups maintained sig. improvement in Roland Morris Disability Score and in pain rating scale compared to baseline, with SMT group maintaining most reduction.	Spinal manipulation was associated with best results both in terms of pain and function, but long-term results required further follow-up. Thus, SMT is less effective than other conservative forms of PT in promoting self-treatment and long term results without further consultation.	Back school, individualized therapy treatments, and spinal manipulation all produce significant improvement in function and pain disability in patients with chronic back pain in the short and long term. Spinal manipulation appears to result in the greatest short term effects (which was proven in many other studies I analyzed) but requires continued maintenance treatments to remain effective in the long term.
Journal of Orthopedic and Sports Physical Therapy (2006) Cleland, J.; Fritz, J; Whitman, J.; Childs, J.; and Palmer, J. *The Use of a Lumbar Spine Manipulation Technique by Physical Therapists in Patients who Satisfy a Clinical Predication Rule: A Case Series*	To describe the outcomes of patients presenting to PT with LBP who met the SMT CPR and were treated with an alternative manipulation technique (versus the one used in validation of the CPR)	Referred from PCP to a PT at author's clinic Inclusion: presence of LBP, Oswestry Disability Index Score ≥ 30%, and (+) on ≥ 4/5 criteria on SMT CPR (see above reference); read/write English in order to understand and complete the questionnaires Case series	Baseline and on the 3rd visit -ODI (with a 50% reduction in the ODI serving as the reference standard to determine whether a successful outcome was achieved)	Pts treated on both the 1st and 2nd visit with the neutral "gapping" S/L technique, in addition to completing a PPT in supine immediately after manipulation tx. Pt. then instructed to complete the exercise in a pain-free ROM 10 repetitions, 3-4x/day at home.	Mean reduction in disability on ODI was 57% (+/- 9%), with only 1 patient not exceeding the 50% reduction in ODI required for successful outcome.	Results suggest that the recently developed SMT CPR might not be isolated to the specific manipulation technique that was used to derive and validate the rule.	IF the results of this case series can be replicated in studies with a control group, then identification of patients likely to respond to the manipulation technique by using the CPR can then lead to clinicians such as myself choosing the manipulative technique used which is the most comfortable for the patient and the therapist, and not be restricted to using one technique. Only to be applied as an adjunct to a comprehensive tx to enhance therapeutic effect.

List of Abbreviations:

MSK= musculoskeletal; RCT= randomized controlled trial; PT= physical therapy/physiotherapy; pt.= patient; LBP: low back pain; GP= general practitioner; NPRS= numerical pain rating scale; ODI= Oswestry Disability Index; ROM= range of motion; ✔= Flexion; NHP= Nottingham Health Profile; QOL= quality of life; TA= transverse abdominis; MTF= multifidus; ES= erector spinae; EXRS: exercise; mm= muscles; pn= pain; SMT= spinal manipulation treatment; SIJD= sacroiliac joint dysfunction; UL= unilateral; BL= bilateral; VAS= visual analog scale; p= after; CPR= clinical prediction rule; sxs= symptoms; OP= outpatient; FABQW: Fear-Avoidance Beliefs Questionnaire Work Subscale; LS= lumbar spine; IR ROM= internal rotation range of motion; PPT= posterior pelvic tilt; S/L= side-lying; STM= soft tissue massage