A collection of military medals and a compass on a wooden surface. The medals include a red ribbon with a circular emblem, a blue ribbon with a circular emblem, and two silver star-shaped medals with circular centers. A pair of gold-rimmed glasses is also visible. A compass is in the bottom left corner.

# The Effectiveness of Multidisciplinary Treatment Approaches in Improving Quality of Life Compared to Physical Therapy Alone: An Evidence Based Review

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PT 910 Evidence Based Practice

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Spring 2008



# The Problem

- ◆ American Academy of Pain Management reported chronic pain in 57% of Americans (2006)<sup>1</sup>
- ◆ 19% related to spinal pain (neck and back)



# Significance of the Problem

- ◆ Typical CLBP interventions include: 3,4,5,6,7,8,9,10,11,12,13
  - Nerve blocks (stellate ganglion, sympathetic)
  - Botulinum toxin
  - Psychological counseling
  - Chiropractic manipulations
  - Invasive surgery
  - Spinal epidural injections
  - Implantable s.c stimulators
  - Pain medications (opioids)
  - Intrathecal morphine pumps
  - Acupuncture
  - Baclophen pumps
  - Steroid injections
  
- ◆ No long term symptom resolution or functional improvement
  
- ◆ Interventions listed cannot be performed by a PT



# Relevance to PT

- ◆ PT Interventions for CLBP <sup>14,15,16</sup>
  - Exercise regimens
  - Spinal graded passive movements
  - Imagery
  - Core stabilization
  - Cardiopulmonary conditioning
  - Work hardening
  - Sensory retraining to modify pain
  - McKenzie exercises
- ◆ PT interventions do not address psycho-social aspect of pain



# Multidisciplinary Care

- ◆ Chronic LBP is a multi-factorial problem that requires multidisciplinary care
- ◆ Research studies report that multidisciplinary approaches focused on functional restoration are most effective in treating patients with chronic low back pain <sup>17,18,19,20,21,22,23,24,25,26</sup>



# Primary Question

- ◆ In patients with nonmalignant chronic low back pain, are multidisciplinary treatment approaches more effective in improving quality of life compared to physical therapy intervention alone?



# Hypotheses

- ◆ Null: Multidisciplinary interventions will not be more effective than physical therapy interventions for the treatment of patients with nonmalignant chronic low back pain.
- ◆ Alternative: Multidisciplinary treatment approaches are the treatment of choice and the most effective in improving quality of life outcomes in patients with nonmalignant chronic low back pain.



# Expected Findings

- ◆ Multidisciplinary treatment approaches will be more effective than physical therapy treatment alone in terms of:
  - Improving quality of life
  - Decreasing pain
  - Increasing functional mobility
  - Decreasing pain perception
  - Improving return to work rate
  - Decreasing depression
  - Decreasing healthcare utilization

# Theoretical Rationale

- ◆ Chronic pain can interfere w/ recreational activities, self care, work, social interactions, & psychological well being
- ◆ Patients w/ chronic back pain can become recalcitrant to conservative or invasive treatments





# Theoretical Construct

- ◆ Intervention must focus on functional restoration to manage the multi-factorial nature of chronic back pain
  - Physical
  - Psychological
  - Social
  - Quality of life outcome



## Elements of Multidisciplinary Rx

- ◆ Biopsychosocial model of healthcare<sup>6,20</sup>
- ◆ Mind body connection; focus on CBT<sup>25,26</sup>
- ◆ Emphasis on active participation, not passive Rx
- ◆ Typically 3 to 6 weeks<sup>23,28</sup>
- ◆ Cognitive behavioral stress management, relaxation training, workplace interventions<sup>1,8,17,21,22,23,24</sup>



# What Is Usual PT Treatment?

- ◆ Range of definitions in the literature<sup>19,29,30</sup>
- ◆ Medical care from physician referral
- ◆ Outpatient physical therapy
- ◆ Active physical exercise with supervision by a PT once a week
- ◆ Passive modalities i.e. TENS, ice, heat, ultrasound



# Quality of Life Outcomes

- ◆ Physical <sup>1,3,9,15,17</sup>
  - VAS
  - Functional mobility & ADLs
  - Medication use
- ◆ Psychological <sup>18,19,24,26,27,29,30</sup>
  - Pain perception and self efficacy
  - Self perception of disability and work ability
  - Symptoms of depression
  - Psychological status



# Outcomes

- ◆ **Social** 1,3,9,15,17,18,19
  - Work status
  - Days of sick leave
  - Healthcare utilization
  - Compensation claims
- ◆ **Quality of Life Measures** 24,26,27,29,30
  - Actual disability
  - Oswestry Disability Index
  - Global assessment outcomes



# Evidence Based Search

## ◆ Databases:

- MEDLINE / Pubmed
- PEDro

## ◆ Keywords:

- ‘functional restoration’
- ‘multidisciplinary care’
- ‘functional outcomes’
- ‘low back rehabilitation’
- ‘chronic pain programs’
- **‘functional restoration’ AND ‘chronic low back pain’**



# Inclusion Criteria

- ◆ Levels of evidence 1,2, or 3 based on Strauss et al<sup>31</sup>
- ◆ Study published after 1997
- ◆ Minimal number of subjects: 30
- ◆ Presence of control group or minimum of two groups tested
- ◆ Study subjects described as adults with low back pain > 3 mo.
- ◆ Study had any quality of life/outcomes measured
- ◆ Experimental treatment provided in a multidisciplinary program



# Evidence Based Statistics

## Data Analysis

- ◆ Experimental Group E.R.:  $EER = a / (a + b)$
- ◆ Control Group Event Rate:  $CER = c / (c + d)$
- ◆ Absolute Risk Ratio:  $ARR = |(CER - EER)|$
- ◆ Risk Reduction:  $RR = EER / CER$
- ◆ Relative Risk Reduction:  $RRR = (CER - EER) / CER$
- ◆ Odds Ratio:  $OR = (a \times d) / (b \times c)$
- ◆ Number Needed to Treat:  $NNT = 1 / (|(EER - CER)|)$

# Chi Square

	Positive Event (+)	Negative Event (-)	TOTAL
Multi- disciplinary Treatment	a	b	a+b
Individual Therapy / Usual Care	c	d	c+d
	a+c	b+d	a + b + c + d



# Results of Search

- ◆ MEDLINE/Pubmed: 46 studies
  - 1 meta analyses
  - 32 outcomes/broad
  - 0 practice guidelines
  - 9 randomized clinical trials
  - 8 systematic reviews
- ◆ 11 studies met inclusion criteria
- ◆ PEDro: 25 studies
  - 7 systematic reviews
  - 18 clinical trials
  - Duplicates with Pubmed removed (23)
- ◆ 2 studies met inclusion criteria



# Summary of Search Results

- ◆ 22 studies to answer secondary questions
- ◆ 13 studies met inclusion criteria for primary question
- ◆ Independently reviewed by second reviewer
- ◆ 9 studies appropriate for analysis (opinion of 2<sup>nd</sup> reviewer)



# Description of 9 Studies

- ◆ Study type
  - 8 RCTs <sup>17,19,29,30,32,33,34,35</sup>
  - 1 Systematic Review <sup>20</sup>
- ◆ Levels of evidence <sup>TAB 1.0 & 2.0</sup>
  - Grade 1a: 1 study <sup>20</sup>
  - Grade 1b: 7 studies <sup>17,19,30,32,33,34,35</sup>
  - Grade 2b: 1 study <sup>29</sup>



# Studies Included in Analysis

Study	Year
Kaapa EH et al. <sup>17</sup>	2006
Bendix T et al. <sup>30</sup>	2000
Bendix AF et al. <sup>33</sup>	1997
Bendix AF et al. <sup>35</sup>	1998
Lang E et al. <sup>29</sup>	2003
Jousset N et al. <sup>32</sup>	2004
Skouen JS et al. <sup>34</sup>	2002
Roche G et al. <sup>19</sup>	2007
Guzman et al. <sup>20</sup>	2007



## Guzman et al<sup>20</sup>

- ◆ Systematic review of studies comparing multidisciplinary rehabilitation programs versus a control condition between 1989 and 1997
- ◆ Program components of more than 100 hours of intense functional restoration
- ◆ Treatment effect sizes on pain, function, employment status, and sick leave resulted in three distinct levels of evidence



# Guzman et al<sup>20</sup>

## OUTCOMES

- ◆ Strong evidence that intensive functional restoration improves function when compared to inpatient or outpatient non-multidisciplinary programs
- ◆ Moderate evidence that functional restoration reduces pain when compared to outpatient non-multidisciplinary care or usual care
- ◆ Contradictory evidence that functional restoration was effective in terms of work readiness
- ◆ Less intensive programs (defined as less than 100 hours of instruction) did not demonstrate improvement in pain, function, or work readiness



# Kaapa et al <sup>17</sup>

- ◆ FRP
  - ◆ n = 59
  - ◆ Physical training, workplace interventions, back school, relaxation training, cognitive behavioral stress management
  - ◆ 70 hours
- 
- ◆ Individual PT
  - ◆ n = 61
  - ◆ Physical exercise, passive treatment methods for 10 hours
- 
- ◆ **FRP provides improved sense of wellbeing, & incremental benefits compared to individual therapy for females with chronic low back pain**

# Kaapa et al <sup>17</sup>

	Reduction in Days of Sick Leave	No Reduction in Days of Sick Leave	Total
FRP	37	22	59
Individual PT	34	27	61
	71	49	120

-CER =  $34/61 = 0.5574$

-EER =  $37/59 = 0.6271$

-ARR =  $|0.6271 - 0.5574| = 0.0697$

-RR =  $0.6271/0.5574 = 1.125$

-RRR =  $0.697/0.5574 = 0.1250$

-OR =  $(37 \times 27)/(22 \times 34) = 0.1336$

-NNT =  $1/0.0697 = 14.3 = 15$

# Bendix T et al <sup>30</sup>

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>◆ n = 59</li><li>◆ 39 hours per week, 3 weeks</li><li>◆ intensive physical training, ergonomic training, &amp; behavioral support</li></ul> | <ul style="list-style-type: none"><li>◆ n = 68</li><li>◆ 1.5 hours three times per week, 8 weeks</li><li>◆ aerobic &amp; strengthening exercises</li></ul> |
|---|--|

- ◆ **At 1 year follow up, FRP demonstrated improved overall assessment then individual therapy**
- ◆ **No significant differences observed in work capacity, sick leave, healthcare contacts, back pain, leg pain, or self-reported ADLs**

# Bendix T et al <sup>30</sup>

	Reduction in Days of Sick Leave	No Reduction in Days of Sick Leave	Total
FRP	31	28	59
Individual PT	21	47	68
	52	75	127

–CER =  $21/68 = 0.3088$

–EER =  $31/59 = 0.5254$

–ARR =  $|0.5254 - 0.3088| = 0.2166$

–RR =  $0.5254/0.3088 = 1.701$

–RRR =  $0.2166/0.3088 = 0.7014$

–OR =  $(31 \times 47)/(28 \times 21) = 2.478$

–NNT =  $1/0.2166 = 4.6 = 5$

# Bendix AF 33

- ◆ n = 44
  - ◆ 39 hours per week for 3 weeks followed by 3 weeks
  - ◆ all training in groups
  - ◆ aerobics
  - ◆ resistance training & stretching
  - ◆ occupational therapy
  - ◆ psychological pain management
  - ◆ daily relaxation
  - ◆ theoretical class/back school education
  - ◆ recreational activities
  - ◆ rolling admission & graduation
- ◆ n = 79
  - ◆ - 2 hours twice a week for 6 weeks
  - ◆ - aerobics
  - ◆ - resistance training
  - ◆ - psychological pain management

◆ **FRP reported rate of work readiness significantly higher by 65% compared to 36% for control treatments**

◆ **All other measures (contact with healthcare system, days of sick leave, subjective disability, staying physically active, medication ) demonstrated positive findings but not significant**

# Bendix AF 33

	Reduction in Days of Sick Leave	No Reduction in Days of Sick Leave	Total
FRP	37	7	44
Individual PT	41	38	79
	78	45	123

-CER =  $41/79 = 0.5189$

-EER =  $37/44 = 0.8409$

-ARR =  $|0.8409 - 0.5189| = 0.322$

-RR =  $0.8409/0.5189 = 1.6205$

-RRR =  $0.322/0.5189 = 0.6205 = 0.0811$

-OR =  $(37 \times 38)/(7 \times 41) = 4.899$

-NNT =  $1/0.322 = 3.1 = 4$



# Bendix AF<sup>35</sup>

- ◆ n = 38
  - ◆ 8 hours per day, 3 weeks followed by 1 full day once a week for 3 weeks
  - ◆ intensive physical training 5 hours per day
  - ◆ psychological pain management
  - ◆ patient education
- ◆ n = 65
  - ◆ Control group 1: choice of traditional PT, chiropractic care, surgical treatment
  - ◆ Control group 2: intensive physical training 2 times per week, 6 weeks; 6 hours of back school education
  - ◆ Control group 3: physical training & psychological pain management; 2 times per week, 6 weeks

- 
- ◆ **FRP reported significantly less contact with healthcare system, fewer sick leave days, and less disabled lifestyle than controls**
  - ◆ **Pain level and medication use reported no significant difference**

# Bendix AF 35

	Increase in Work Readiness	No Increase in Work Readiness	Total
Intensive FRP	24	14	38
Control	12	53	65
	36	67	103

–CER =  $12/65 = 0.1846$

–EER =  $24/38 = 0.6316$

–ARR =  $|0.6316 - 0.1846| = 0.447$

–RR =  $0.6316/0.1846 = 3.421$

–RRR =  $0.447/0.1846 = 2.421$

–OR =  $(24 \times 53)/(14 \times 12) = 7.57$

–NNT =  $1/0.447 = 2.2 = 3$



# Lang et al <sup>29</sup>

- ◆ n = 51
- ◆ 4 hours per day, 3 days per week, 20 days
- ◆ Restorative exercise therapy
- ◆ Physiotherapy
- ◆ Cognitive behavioral therapy
- ◆ Progressive muscle relaxation therapy

- ◆ n = 157
- ◆ Non-multidisciplinary, nonsurgical treatment by primary care physicians and physiotherapists

- 
- ◆ **FRP improved physical and health domains of SF 36**
  - ◆ **FRP reduced days off work**
  - ◆ **Self appraisal of successful outcomes scores better in FRP**
  - ◆ **NPS, BPI, & depression no significant difference between groups**
  - ◆ **Health related quality of life & functional improvement w/ FRP, no significant changes in pain aspects between FRP & usual care**

# Lang et al<sup>29</sup>

	Reduction in Days Off Work	No Reduction in Days Off Work	Total
FRP	23	28	51
Usual Care	26	131	157
	49	159	208

-CER =  $26/157 = 0.1656$

-EER =  $23/51 = 0.4510$

-ARR =  $|0.1656 - 0.4510| = 0.2854$

-RR =  $0.4510/0.1656 = 2.723$

-RRR =  $0.2854/0.1656 = 1.723$

-OR =  $(23 \times 131)/(28 \times 26) = 4.139$

-NNT =  $1/0.2854 = 3.5 = 4$



# Jousset et al <sup>32</sup>

- ◆ n = 44 (group setting)
  - ◆ 6 hours per day, 5 days per week, 5 weeks
  - ◆ Intensive physical training, occupational therapy, & psychological support
- ◆ n = 42
  - ◆ 1 hour, 3 times per week, 5 weeks
  - ◆ Strengthening, functional training, & pain coping strategies
  - ◆ Documented 50 minutes home exercise program

- 
- ◆ **Number of sick days significantly lower with FRP**
  - ◆ **No significant difference all other measures, but FRP yielded more positive findings compared to individual treatment**

# Jousset et al <sup>32</sup>

	Reduction in # of Sick Days	No Reduction in # of Sick Days	Total
FRP	29	15	44
PT 3 hrs/wk	20	22	42
	49	37	86

-CER =  $20/42 = 0.4762$

-EER =  $29/44 = 0.6591$

-ARR =  $|0.6591 - 0.4762| = 0.1829$

-RR =  $0.6591/0.4762 = 1.384$

-RRR =  $0.1829/0.4762 = 0.3841$

-OR =  $(29 \times 22)/(15 \times 20) = 2.1267$

-NNT =  $1/0.1829 = 5.4 = 6$

# Skouen et al <sup>34</sup>

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"><li>◆ Extensive multidisciplinary treatment<ul style="list-style-type: none"><li>– n = 57</li><li>– 6 hour sessions, 5 days per week, 4 weeks</li></ul></li><li>◆ Two 1 hour sessions on anatomy, exercise, CBT, &amp; body aw. t.g.</li></ul> | <ul style="list-style-type: none"><li>◆ Light multidisciplinary treatment:<ul style="list-style-type: none"><li>– n = 52</li><li>– evaluation by physiotherapist &amp; psychologist</li><li>– 1 hour lecture on exercise, lifestyle, &amp; fear avoidance</li><li>– Three 15 minute follow up sessions</li><li>– Follow up available as needed up to 1 year</li></ul></li></ul> | <ul style="list-style-type: none"><li>◆ Control:<ul style="list-style-type: none"><li>–n = 86</li><li>–Referral back to general practitioner</li><li>–Pain medication</li></ul></li><li>◆ Referral to PT or chiropractor</li></ul> |
|--|---|--|

- ◆ **Light multidisciplinary treatment increased full return to work in men compared to control**
- ◆ **Productivity gains approximately \$924,500**

# Skouen et al <sup>34</sup>

	Increase Return to Work Rate	No Increase in Return to Work	Total
FRP	57	52	109
Usual Care	23	63	86
	80	115	195

-CER =  $23/86 = 0.2674$

-EER =  $57/109 = 0.5229$

-ARR =  $|0.2674 - 0.5229| = 0.2555$


-RR =  $0.5229/0.26744 = 1.9554$

-RRR =  $0.2555/0.9553$

-OR =  $(57 \times 63) / (52 \times 23) = 3.003$

-NNT =  $1/0.2555 = 3.9 = 4$

# Roche et al <sup>19</sup>

- 
- ◆ n = 68
  - ◆ 25 hours per week for 5 weeks
  - ◆ Strengthening, occupational therapy, proprioceptive training, pain management education
  - ◆ Medical clinic
  - ◆ Psychological treatment once a week
  - ◆ Dietary advice
- ◆ n = 64
  - ◆ 3 hours a week for 5 weeks
  - ◆ Strengthening, occupational therapy, proprioceptive training, pain management education
  - ◆ 50 minutes home exercise program, required patient to document

- 
- ◆ **All measures improved with both FRP and AIT**
  - ◆ **Better results observed in FRP compared to AIT**
  - ◆ **Endurance improved with FRP only**

# Roche et al <sup>19</sup>

	Increase Return to Work Rate	No Increase in Return to Work	Total
FRP	59	9	68
Active Ind. PT	54	10	64
	113	19	132

–CER =  $54/64 = 0.8438$

–EER =  $59/68 = 0.8676$

–ARR =  $|0.8438 - 0.8676| = 0.2385$

–RR =  $0.8438/0.8676 = 1.028$

–RRR =  $0.2385/0.8438 = 0.0283$

–OR =  $(59 \times 10)/(9 \times 54) = 1.214$

–NNT =  $1/0.02385 = 41.2 = 42$

# Number Needed to Treat

Roche <sup>42</sup>	42
Kaapa <sup>17</sup>	15
Skouen <sup>34</sup>	4
Jousset <sup>32</sup>	6
Lang <sup>29</sup>	4
Bendix AF <sup>35</sup>	3
Bendix AF <sup>33</sup>	4
Bendix T <sup>30</sup>	5

# Effect Size

Study	Rx	Improved Pain Rating	Improved Functional Activities	Return to Work	Reduced Sick Days
Kaapa (2006)	FRP	0.49	0.46	-	-
	PT	0.36	0.36	-	-
Bendix T (2000)	FRP	0.19	0.63	-	-
	PT	0.10	0.59	-	-
Bendix AF (1997)	FRP	1.4	-	1.9	-
	PT	0.05	-	1.1	-
Lang (2003)	FRP	2.28	2.20	-	-
	PT	2.27	1.30	-	-
Jousset (2004)	FRP	0.81	0.86	0.89	-
	PT	0.24	0.43	0.79	-
Skouen (2002)	FRP	-	-	-	0.99
	PT	-	-	-	0.84
Roche (2007)	FRP	0.90	0.87	-	-
	PT	0.71	0.12	-	-

# Improved Pain Rating

Kaapa (2006)

Bendix T (2000)

Bendix A (1997)

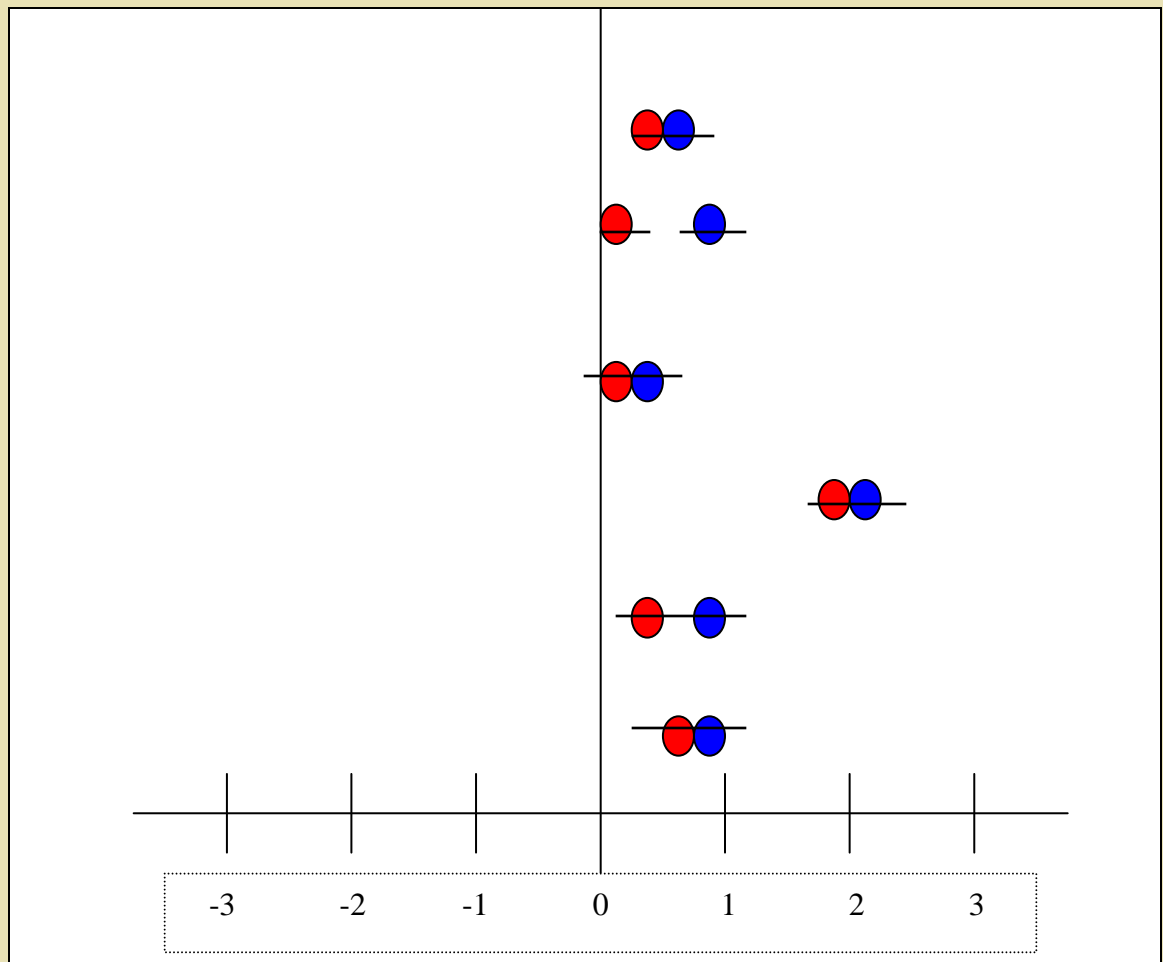
Lang E (2003)

Jousset N (2004)

Roche G (2007)

FRP ●

PT ●



Improved Pain Rating

# Improved Functional Activities

Kaapa (2006)

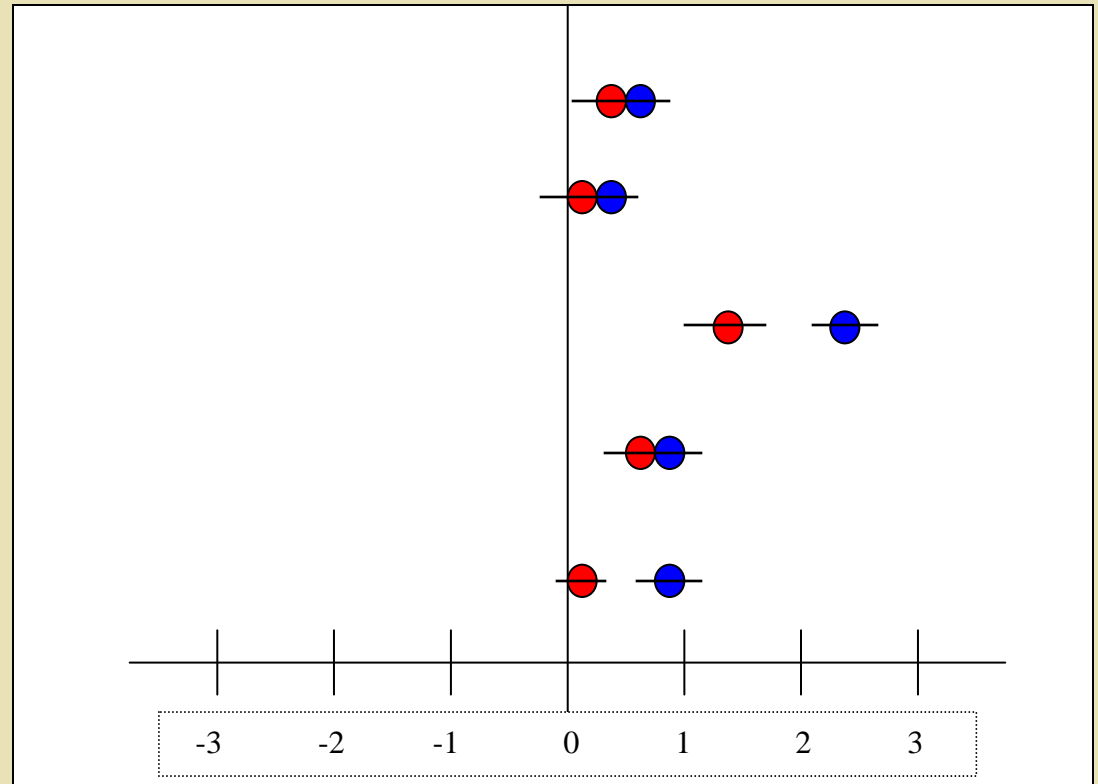
Bendix T (2000)

Lang E (2003)

Jousset N (2004)

Roche G (2007)

FRP      ●  
PT        ●



Improved Functional Activities

# Return to Work & Reduction in Sick Leave

Bendix AF (1997)

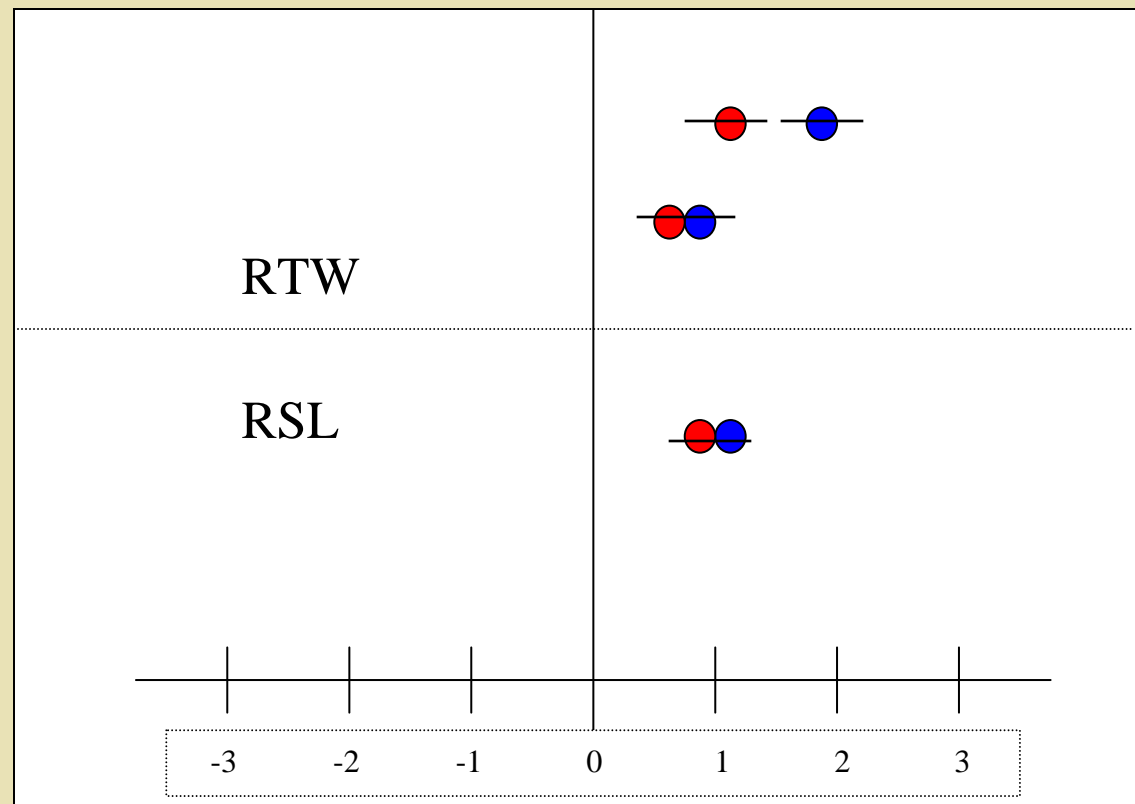
Jousset (2004)

Skouen (2002)

FRP



PT



Return to Work (RTW) &  
Reduction in Sick Leave (RSL)




# Adverse Effects

- ◆ No adverse effects were reported other than one study reporting an attrition rate of 64%



# Incremental Cost Effectiveness Ratio (ICER)

- ◆  $ICER = \frac{R_{X_A} - R_{X_B}}{N_A - N_B}$
- ◆ FRP: \$860/day x 20 days →  
 $R_{X_A} = \$17,200/mo$
- ◆ US/PT: \$200/session x 12 sessions →  
 $R_{X_B} = \$2,400/mo$



## Incremental Cost Effectiveness Ratio (ICER)

- ◆  $Rx_A$  = Functional Restoration Program (FRP)
- ◆  $Rx_B$  = Usual Care/PT (US/PT)
- ◆  $N_A$  = # of patients RTW with FRP Rx (57)
- ◆  $N_B$  = # of patients RTW with US/PT (23)
  
- ◆ ICER = **\$56,923.08**
- ◆ \$17,200 per person/mo to RTW at 52% vs. 26%



# Accept or Reject $H_0$ ?

- ◆ Null: Multidisciplinary interventions will not be more effective than physical therapy interventions for the treatment of patients with nonmalignant chronic low back pain.
- ◆ Reject  $H_0$



# Discussion

- ◆ Although PT interventions provide success in improving quality of life and functional measures, a multidisciplinary approach w/ an emphasis on functional restoration is more effective.
- ◆ Its application is more cost effective over the lifespan of an individual's health cost



## Discussion: Limitations of Search

- ◆ In some studies, PT Rx documented as “usual care” occasionally meant no treatment administered.
- ◆ Only included two databases
- ◆ Only reported on English language studies



# Discussion: Research Gaps

- ◆ Question tailored to the injured worker or a specific age group, gender, or occupation
- ◆ Poor reporting of statistical findings and calculations



# Discussion: Recommendations for Future Research

- ◆ Early intervention programs for prevention of chronic disease process
- ◆ Application of multidisciplinary techniques in PT setting
- ◆ Efficacy of specific disciplines



# Discussion: Practice Implications

- ◆ Practice guidelines for rehabilitation: elements focusing on functional restoration and active symptom management.
- ◆ Psychosocial aspect of patient also addressed with physiological Rx to have expectations of success in terms of functional and quality of life outcomes.
- ◆ Intensity and length of Rx.
- ◆ Standard of care applicable to any setting, in particular the injured worker.
  - Efficient and timely rehabilitation of the injured worker not only improved patient quality of life but also has economical impact for society as a whole



## Discussion: Recommendations for PT Practice

- ◆ PTs should recognize when a patient has moved beyond an acute injury into a chronic stage
- ◆ Make appropriate referral for treatment.
- ◆ Apply “multidisciplinary care” on a smaller scale by referring patient to appropriate services to address needs beyond the scope of physical therapy practice.



# Conclusions

- ◆ Utilizing a multidisciplinary treatment approach with emphasis on functional restoration is more effective than PT alone in improving quality of life in patients with chronic low back pain.
- ◆ More intensive program lasting 3 to 6 weeks is preferable
- ◆ Little to no adverse effects reported
- ◆ Potential cost effectiveness outweigh the initial cost of running a multidisciplinary program.

A collection of military medals and a pair of glasses is displayed on a light-colored, textured surface. On the left, a blue and white checkered box contains several small, round, gold-colored medals. A red ribbon with a circular emblem is attached to a large, ornate silver star-shaped medal. Below it, a blue ribbon with a circular emblem is attached to another large, ornate silver star-shaped medal. A pair of gold-rimmed glasses with thin temples is positioned in the center. In the bottom left corner, a circular compass is visible. The text "QUESTIONS & COMMENTS" is overlaid on the right side of the image in a large, black, serif font.

# QUESTIONS & COMMENTS