

Tai Chi for Chronic Musculoskeletal Pain and Well-being[©]

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Tufts Medical Center, Boston, USA

**Symptomatic OA: 27 million in US, 8.5 million in UK;
>300 million worldwide**

Knee osteoarthritis has doubled in prevalence since the mid-20th century

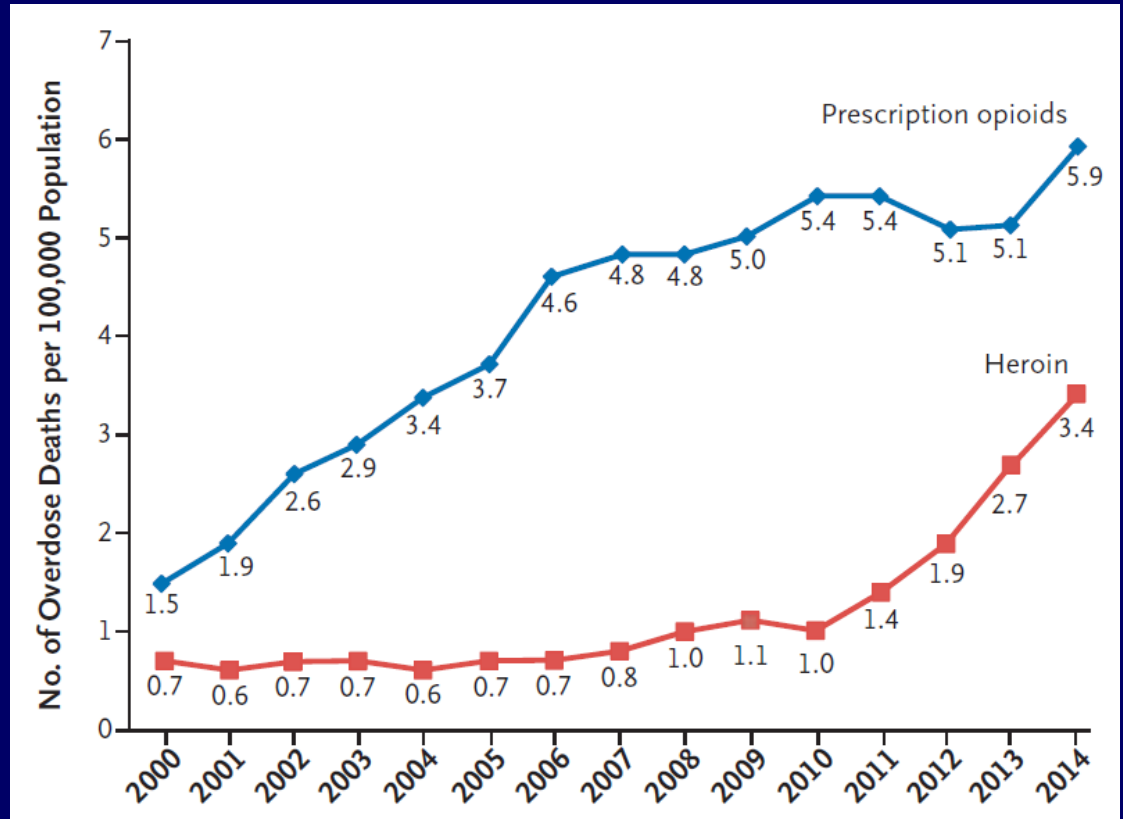
prevalence was found to be 16% among the postindustrial sample but only 6% and 8% among the early industrial and prehistoric samples, respectively. After controlling for age, BMI, and other variables, knee OA prevalence was 2.1-fold higher (95% confidence interval, 1.5–3.1) in the postindustrial sample than in the early industrial sample. Our results indicate that increases in longevity and BMI are insufficient to explain the approximate doubling of knee OA prevalence that has occurred in the United States since the mid-20th century. Knee OA is thus more preventable than is commonly assumed, but prevention will require research on additional independent risk factors that either arose or have become amplified in the postindustrial era.

Chronic Pain and Opioid Crisis

- WHO estimates **20%** of the world population has chronic pain.
- **126 million US** people have chronic pain which costs **\$785 billion** a year in medical bills.
- **100 million** Americans used prescription opioids in 2015, primarily from pain management.

Rates of Death Related to Prescription Opioids Drug Poisoning in US, 2000-2014

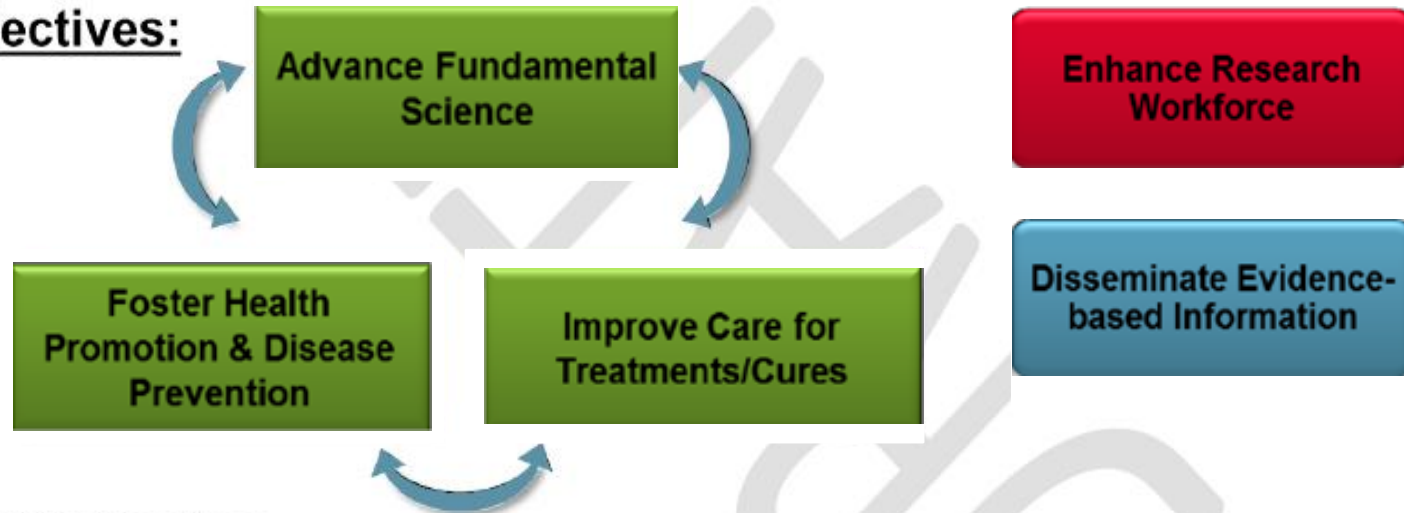
- Between 2000 and 2014, the rates of death from prescription-opioid overdose nearly **quadrupled**



NCCIH Strategic Framework (2016-2020)



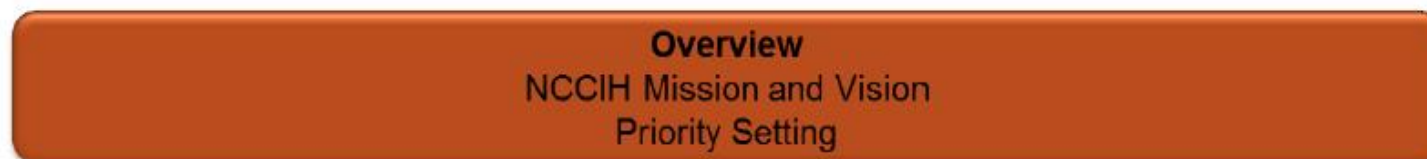
Objectives:



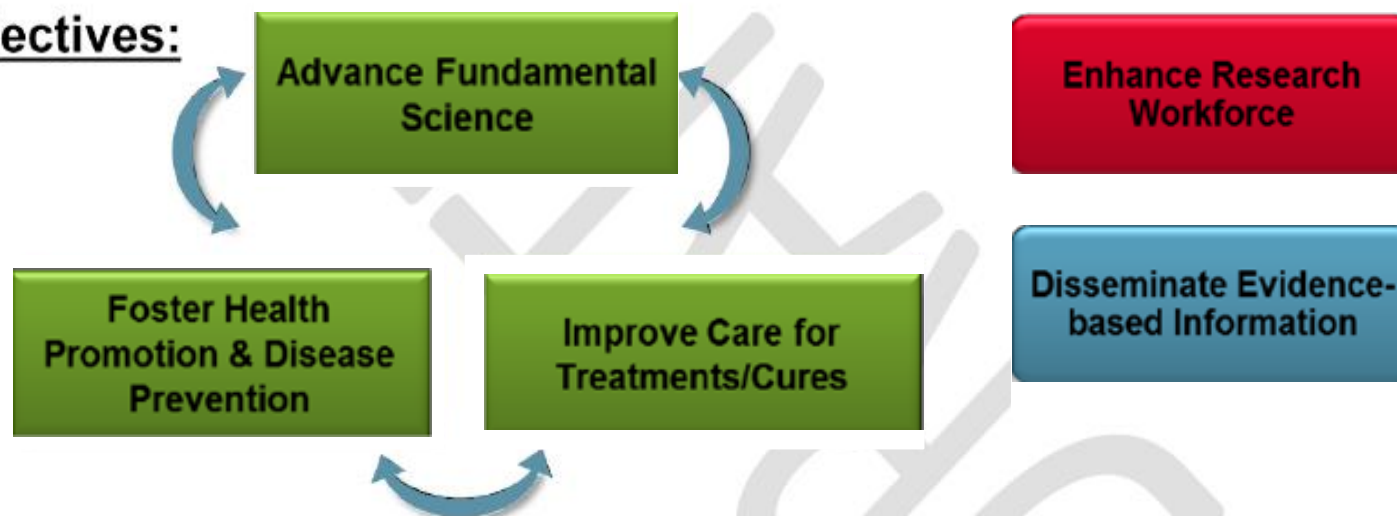
Priority Topics:



NCCIH Strategic Framework (2016-2020)



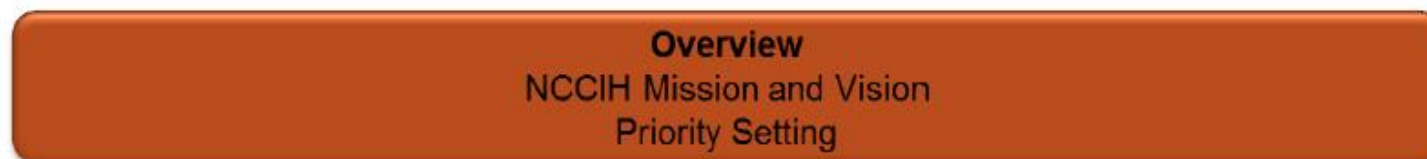
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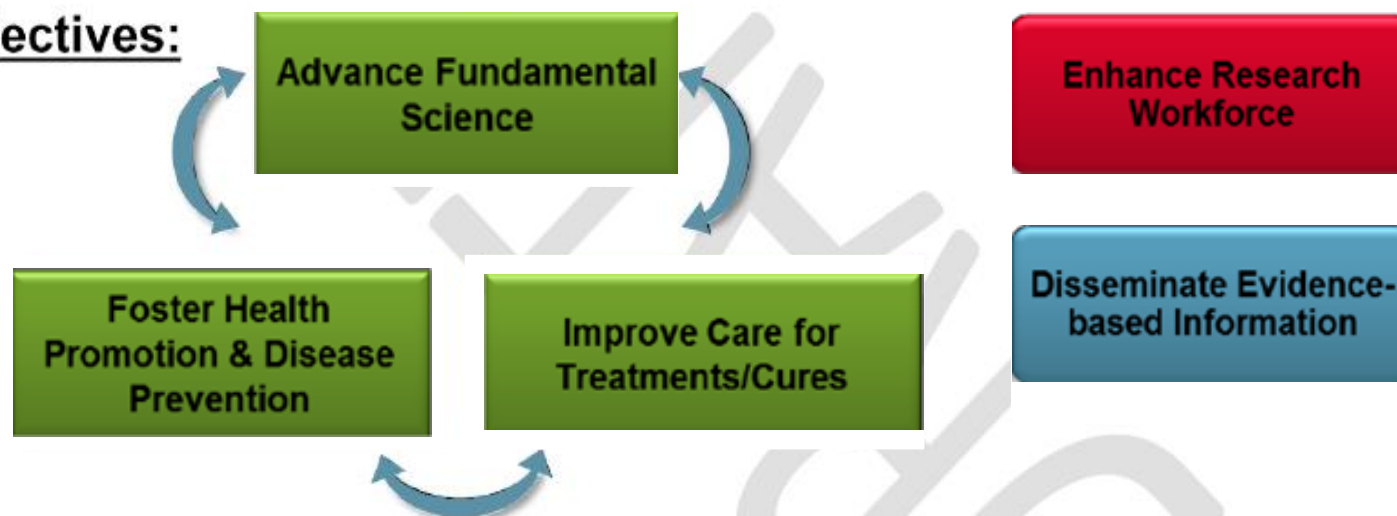
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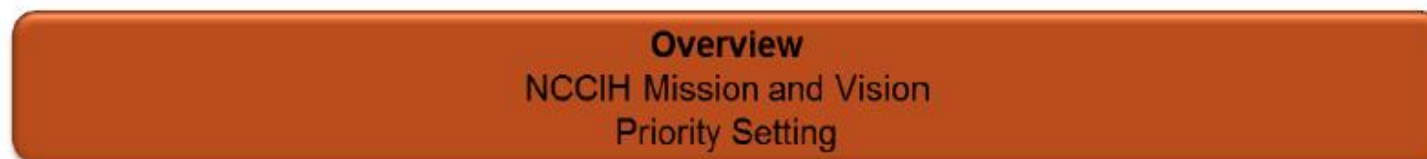
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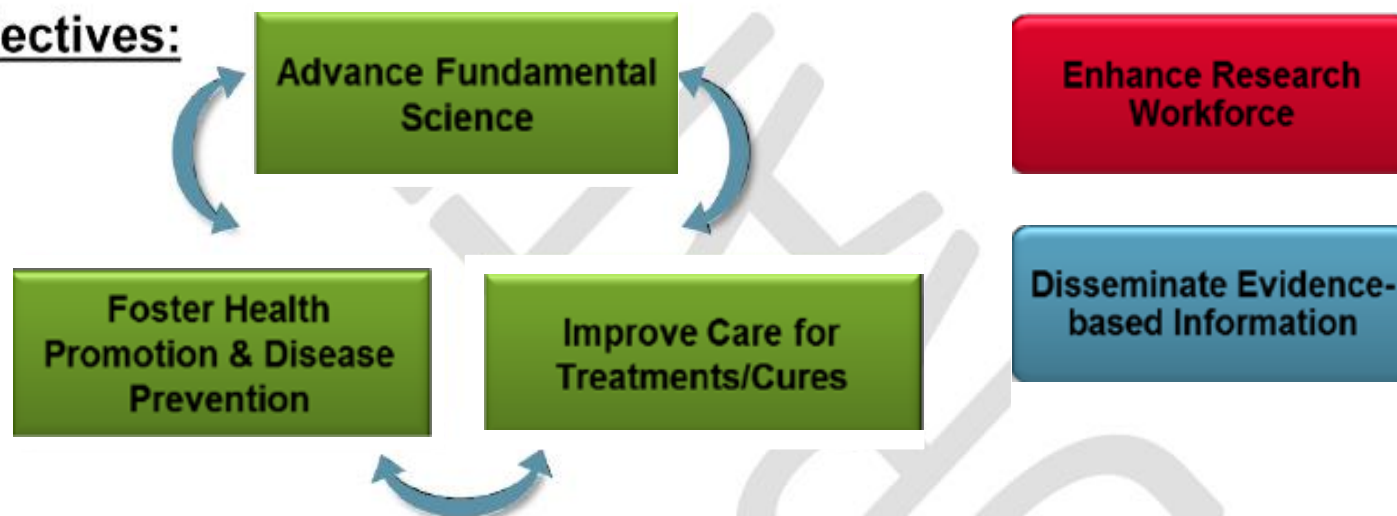
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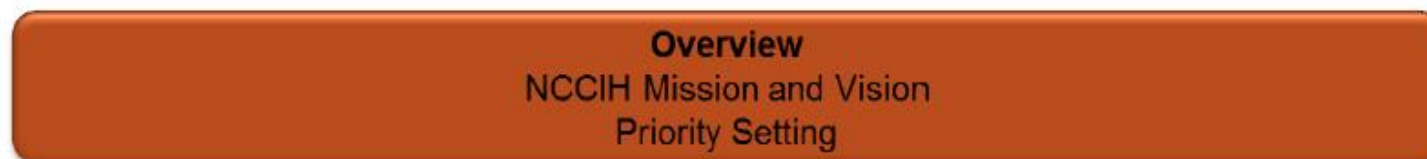
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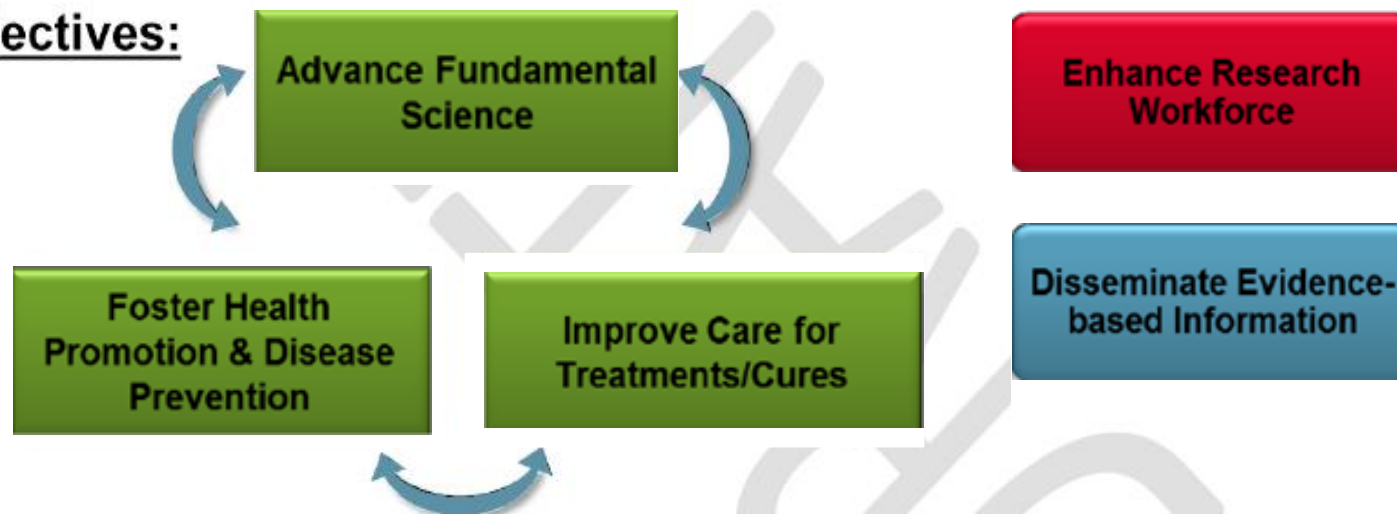
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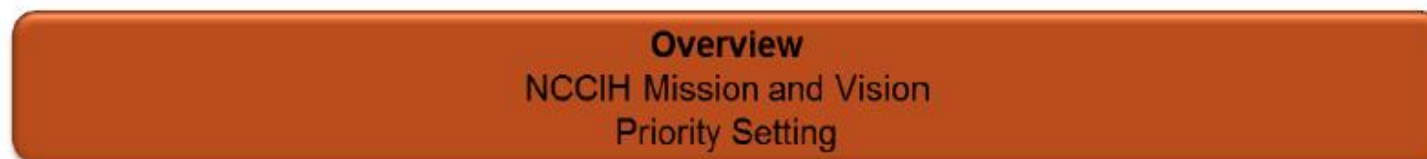
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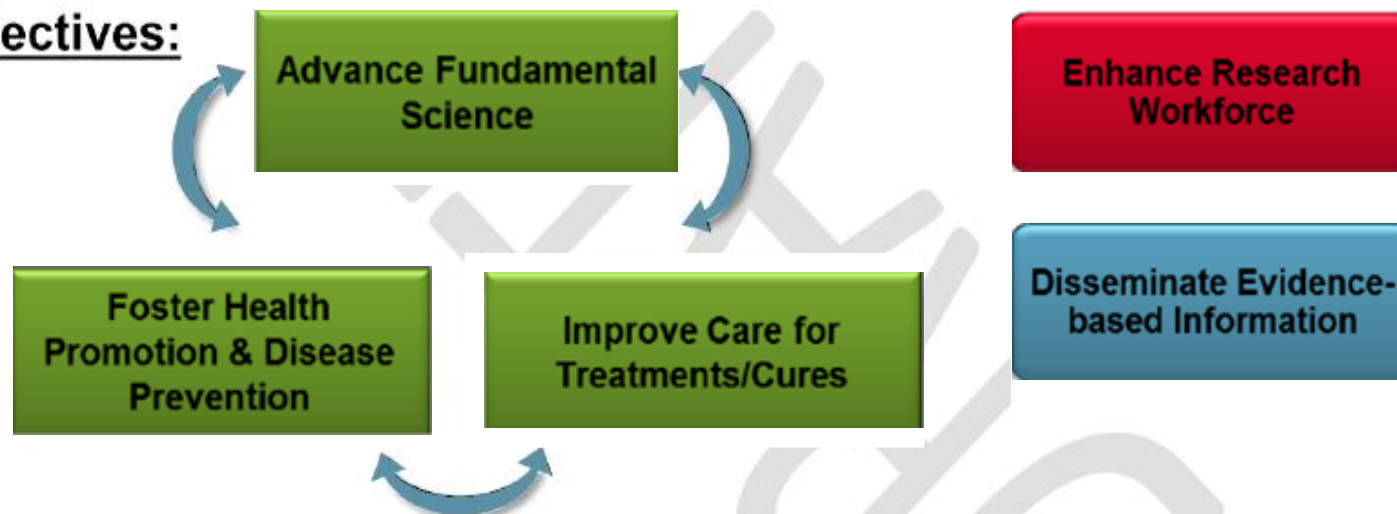
Priority Topics:



NCCIH Strategic Framework (2016-2020)



Objectives:



Priority Topics:



Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States

Richard L. Nahin, PhD, MPH; Robin Boineau, MD, MA; Partap S. Khalsa, DC, PhD;
Barbara J. Stussman, BA; and Wendy J. Weber, ND, PhD, MPH

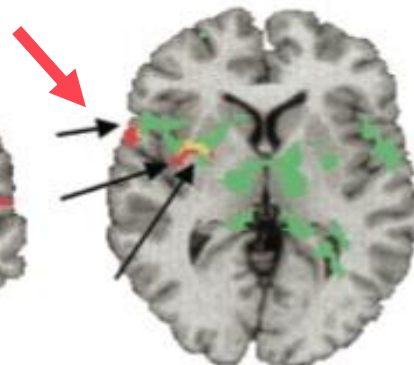
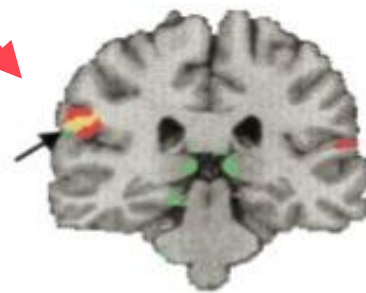
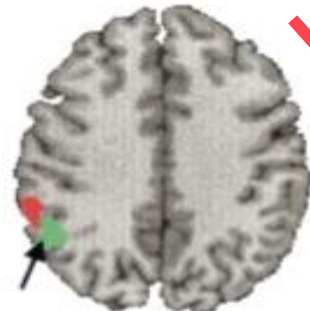
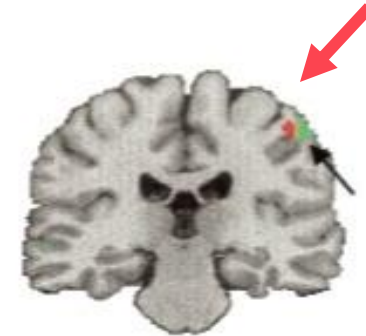
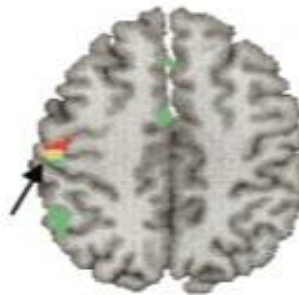
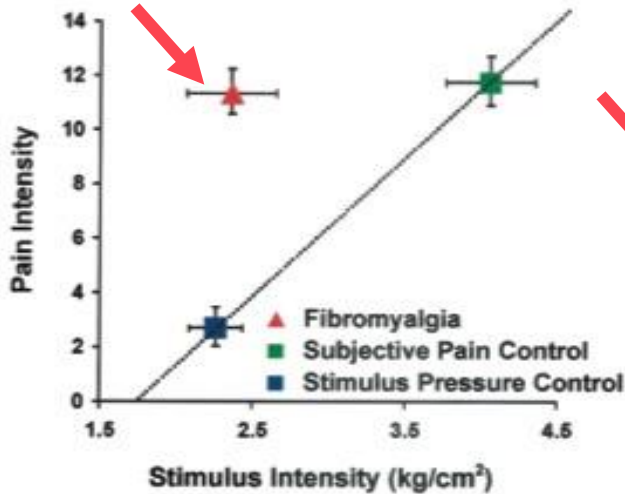
Strong Evidence

- **Tai Chi and acupuncture for Knee Osteoarthritis**
- Acupuncture and yoga for back pain
- Massage therapy for neck pain
- Relaxation techniques for severe headaches and migraine

Weaker evidence

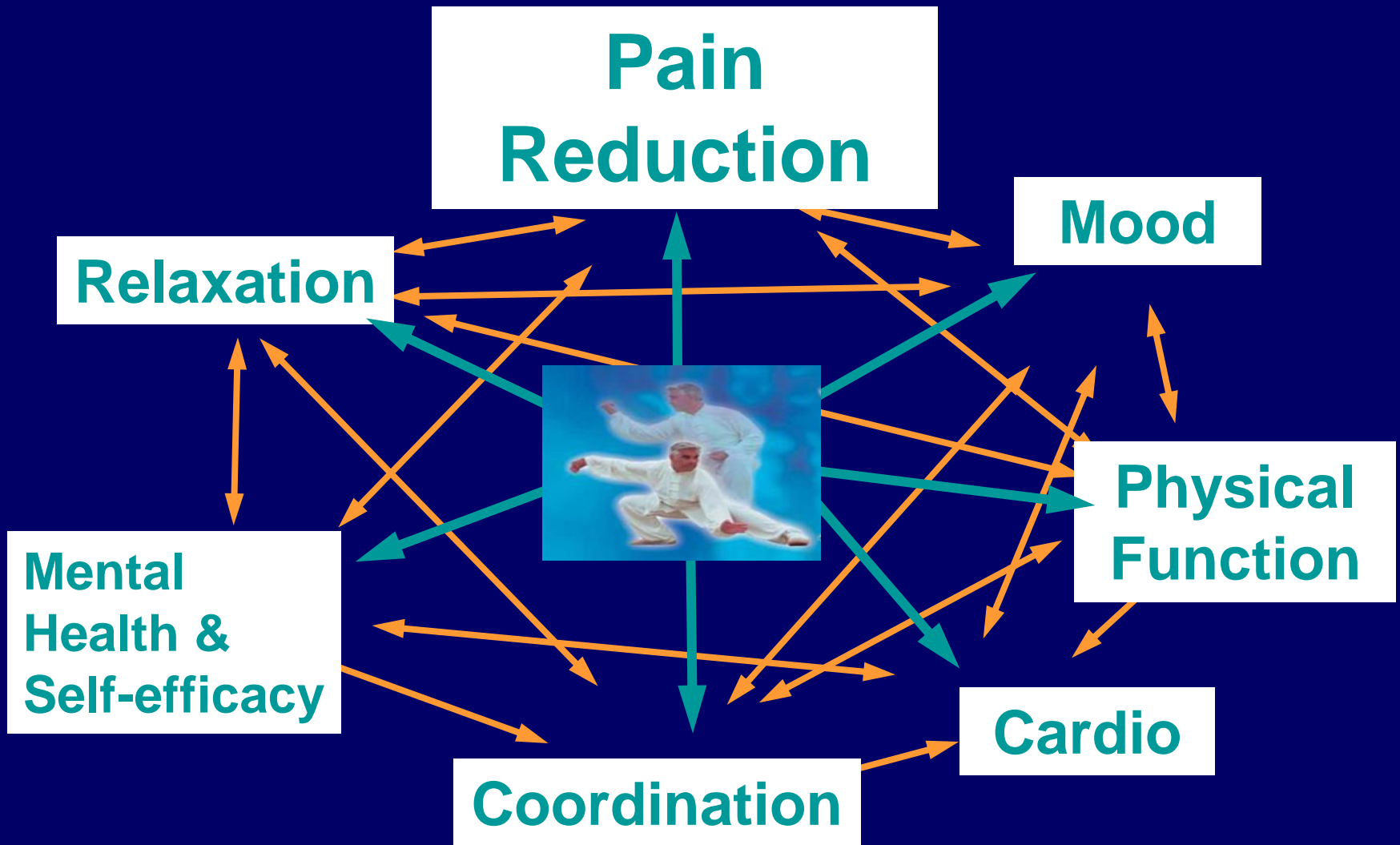
- **Tai Chi may assist those with Fibromyalgia**
- Massage therapy, spinal manipulation and relaxation approaches may benefit back pain

Brain Regional Blood Flow Response to Pain in Fibromyalgia vs Controls



Gracely et al, Arthritis & Rheumatism 2002; 46: 1333-1334

Tai Chi Mind-body Benefits for Chronic Pain



The Effect of Tai Chi on Health Outcomes in Patients With Chronic Conditions

A Systematic Review

Chenchen Wang, MD, MSc; Jean Paul Collet, MD, PhD; Joseph Lau, MD

(REPRINTED) ARCH INTERN MED/VOL 164, MAR 8, 2004
493

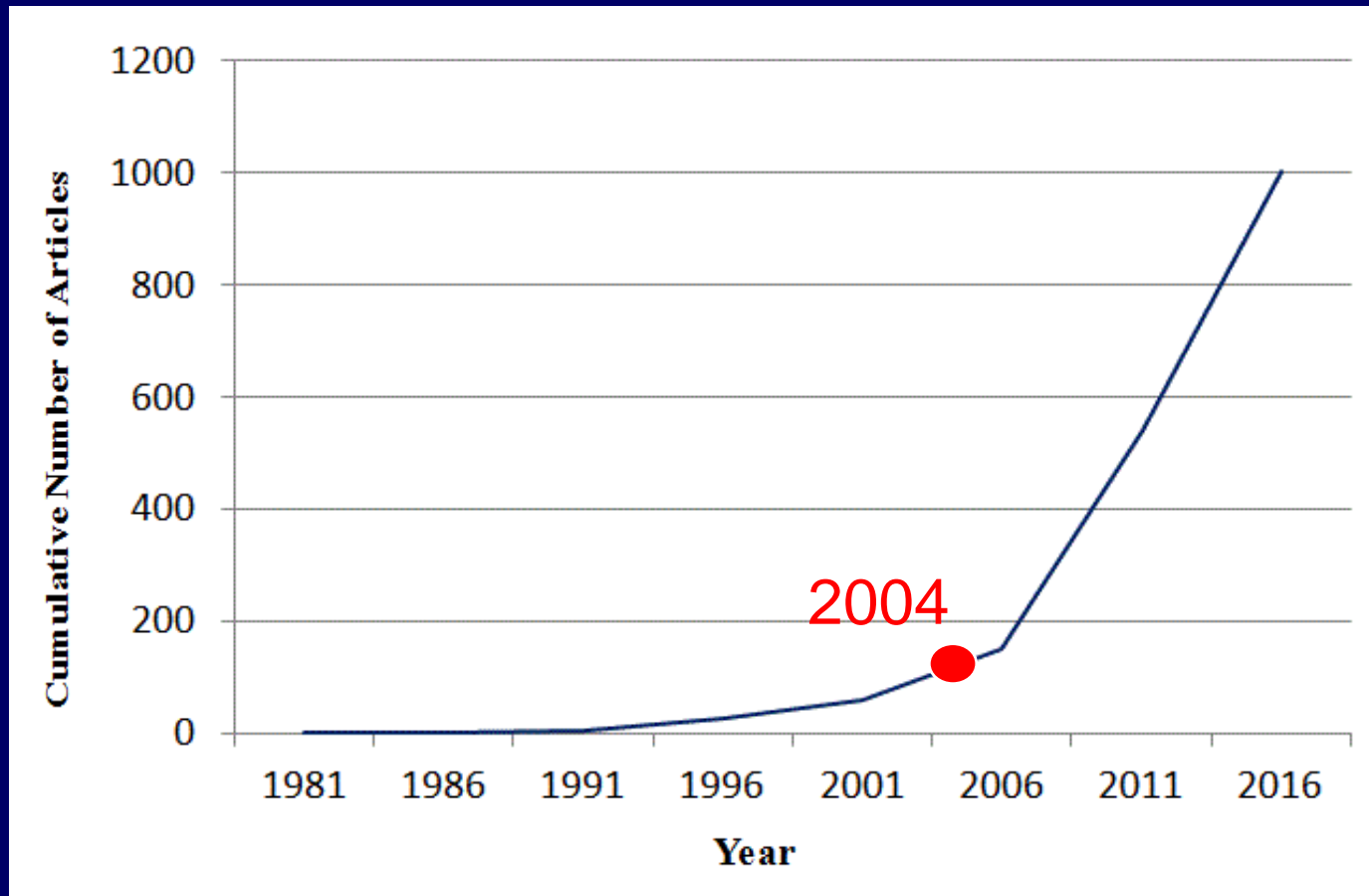
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47 studies published in English or Chinese.

Wang C et al. *JAMA Internal Medicine*. 2004;164: 493-501

Growth of Tai Chi Literature



Currently, there are 28000 studies (6000 RCTs)

Tai Chi and Osteoarthritis

Arthritis & Rheumatism (Arthritis Care & Research)
Vol. 61, No. 11, November 15, 2009, pp 1545–1553
DOI 10.1002/art.24832
© 2009, American College of Rheumatology

ORIGINAL ARTICLE

Tai Chi Is Effective in Treating Knee Osteoarthritis: A Randomized Controlled Trial

CHENCHEN WANG,¹ CHRISTOPHER H. SCHMID,¹ PATRICIA L. HIBBERD,² ROBERT KALISH,¹
RONENN ROUBENOFF,³ RAMEL RONES,⁴ AND TIMOTHY McALINDON¹

Tai Chi - Intervention

Classical Yang style

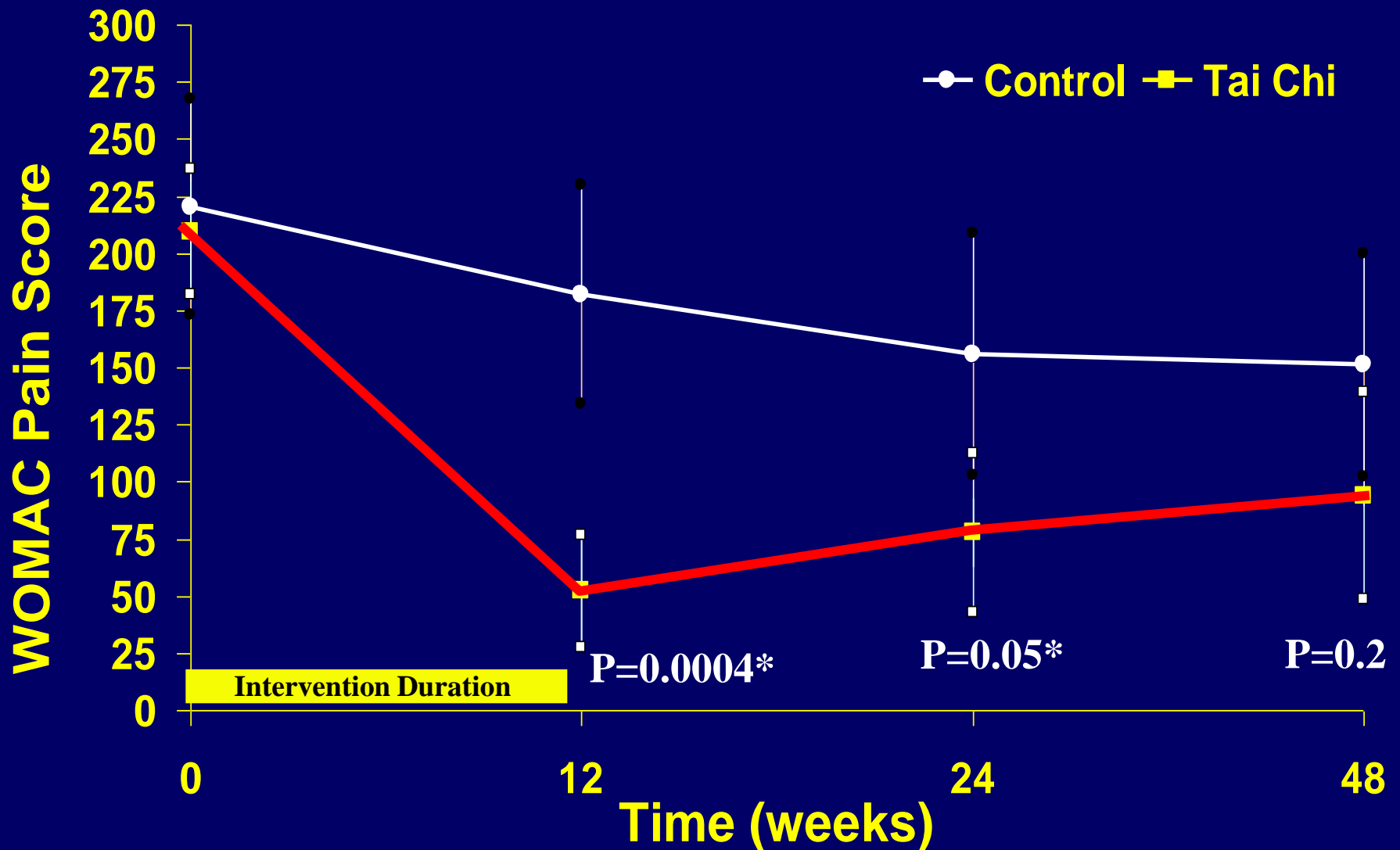
1 hour, 2x/week, 12 weeks

Every session:

- 1) Warm up and review Tai Chi principles**
- 2) Meditation with Tai Chi movement**
- 3) Breathing technique**
- 4) Relaxation**

Wang et al. *BMC Complement Altern Med.* 2014 8;14: doi: 10.1186/1472-6882-14-333.

Mean WOMAC Pain Scores (Osteoarthritis)



Comparative Effectiveness of Tai Chi Versus Physical Therapy for Knee Osteoarthritis

A Randomized Trial

Chenchen Wang, MD, MSc; Christopher H. Schmid, PhD; Maura D. Iversen, SD, DPT, MPH; William F. Harvey, MD, MSc; Roger A. Fielding, PhD; Jeffrey B. Driban, PhD; Lori Lyn Price, MAS; John B. Wong, MD; Kieran F. Reid, PhD, MPH; Ramel Rones; and Timothy McAlindon, MD, MPH

- Randomized, 52-week, comparative effectiveness trial.
- 204 participants with symptomatic knee OA (mean age 60 years).
- Tai Chi (2 times per week for 12 weeks) or standard physical therapy.

Physical Therapy

Consistent with recommended guidelines

- 30-minute outpatients sessions
2 x /week (6 weeks)
- 6 weeks of rigorously monitored
home exercise
(30-minutes, 4 x /week)

Mean WOMAC Pain Scores

WOMAC Pain

■ Tai Chi ···▲··· Physical Therapy

Intervention Duration

Baseline

12 week

24 week

52 week

$p=0.16$

$p=0.06$

$p=0.38$

Guidelines for the Management of Osteoarthritis 2019



AMERICAN COLLEGE
of RHEUMATOLOGY
Empowering Rheumatology Professionals

American college of rheumatology



OARSI OSTEOARTHRITIS
RESEARCH SOCIETY
INTERNATIONAL

Osteoarthritis research society international



RACGP

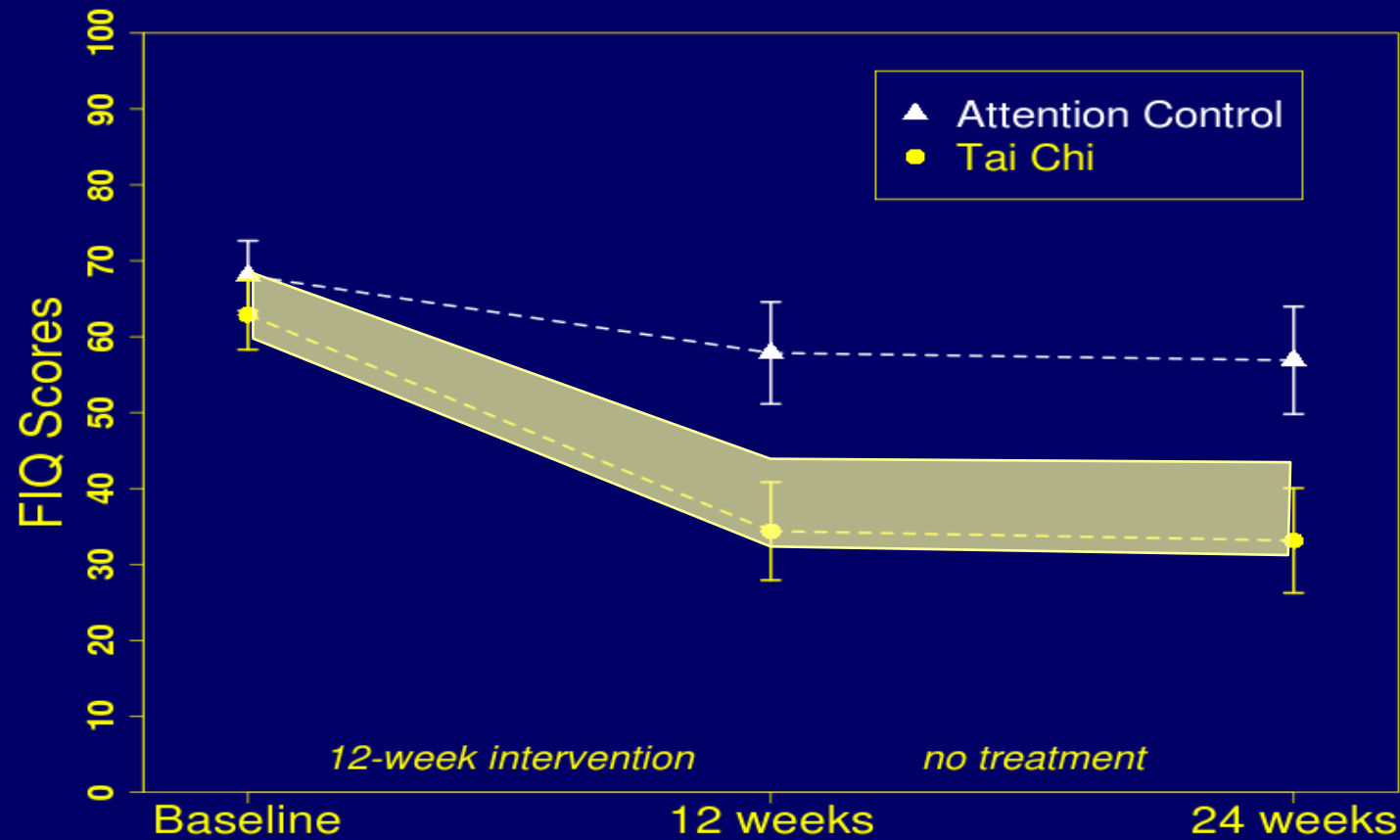
**Royal Australian College of General
Practitioners (RACGP)**

Tai Chi and Fibromyalgia

ORIGINAL ARTICLE

A Randomized Trial of Tai Chi for Fibromyalgia

Chenchen Wang, M.D., M.P.H., Christopher H. Schmid, Ph.D., Ramel Rones, B.S., Robert Kalish, M.D., Janeth Vinh, M.D., Don L. Goldenberg, M.D., Yoojin Lee, M.S., and Timothy McAlindon, M.D., M.P.H.



ORIGINAL ARTICLE

A randomized controlled trial of 8-form Tai chi improves symptoms and functional mobility in fibromyalgia patients

Kim D. Jones • Christy A. Sherman • Scott D. Mist •
James W. Carson • Robert M. Bennett • Fuzhong Li

Study Aims

To further investigate of effects of Tai Chi on symptoms, and functional mobility for patients with fibromyalgia.

Tai chi: benefits for fibromyalgia patients



Effect of tai chi versus aerobic exercise for fibromyalgia: comparative effectiveness randomised controlled trial



Primary outcome

FIQR score (0–100, low scores better)

Clinical significance

8.1 points

226

Individuals with fibromyalgia

Mean age 52

92% female

61% white race

151

Tai chi

12 or 24 weeks of yang-style supervised tai chi, once or twice a week (4 groups with different schedules)

75

Aerobic exercise

24 weeks of supervised aerobic exercise, twice a week

All tai chi groups

-14.7

5.5 points lower

-9.2

2x24 weeks tai chi

-25.4

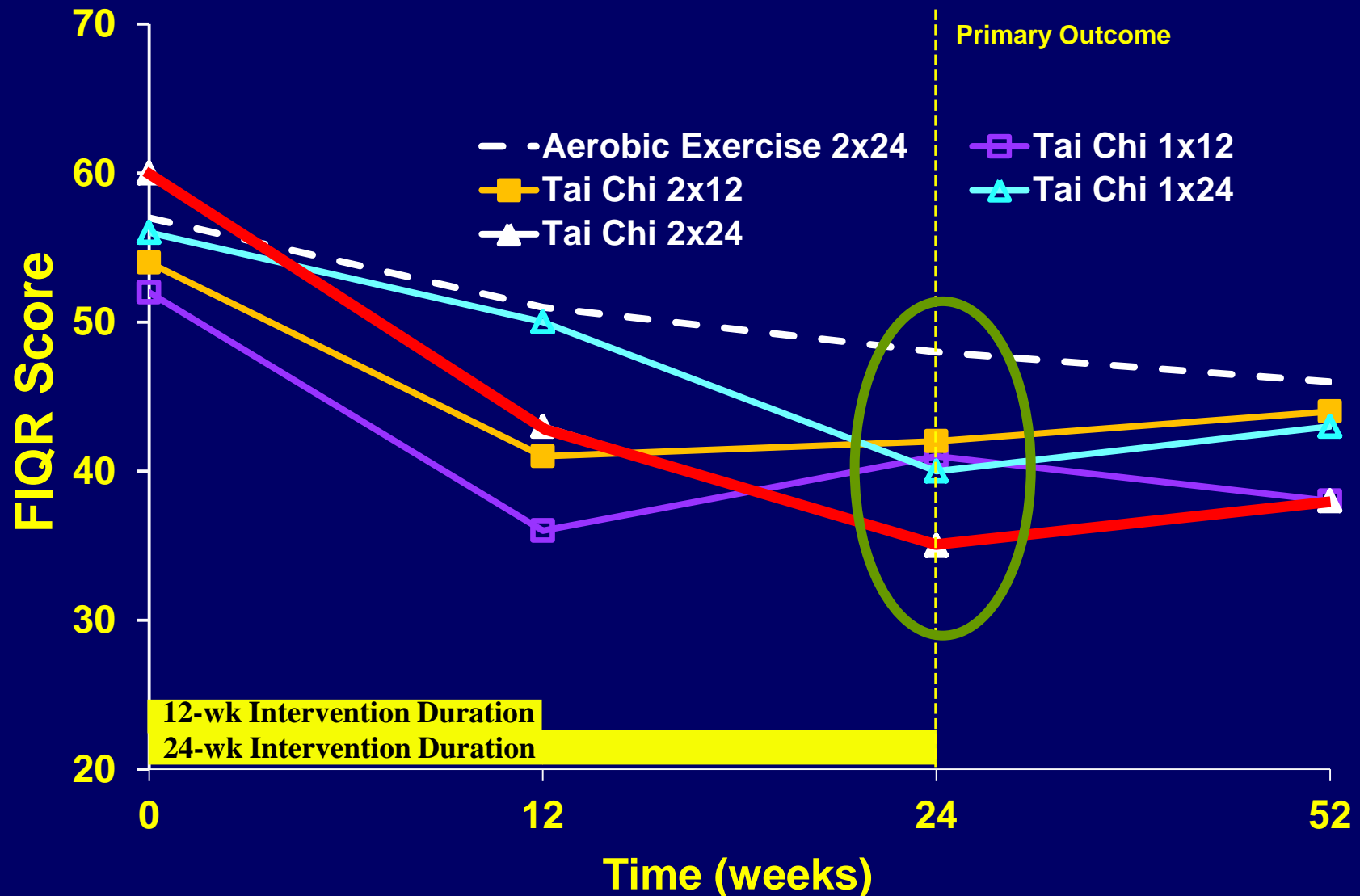
16.2 points lower

-9.2

Improvement in symptom scores was greater for people in each of the tai chi groups than for those receiving aerobic exercise. A clinically significant difference was only observed when comparing the highest intensity tai chi programme (twice a week for 24 weeks) with aerobic exercise.

1. Wang C, et al. *BMJ*. 2018;360:k851.
2. *JAMA* May 2018 ;319, 20 2069
3. *Annals of Internal Medicine*, 2018 doi:10.7326

Mean Revised Fibromyalgia Impact Scores By Treatment Group



Main Findings

- Tai Chi has similar symptom improvement compared with the current most commonly prescribed non-pharmacological treatment for

Chenchen Wang: Time to rethink exercise for fibromyalgia care

March 21, 2018

It's time to explore new approaches to provide the best care for patients with chronic pain conditions

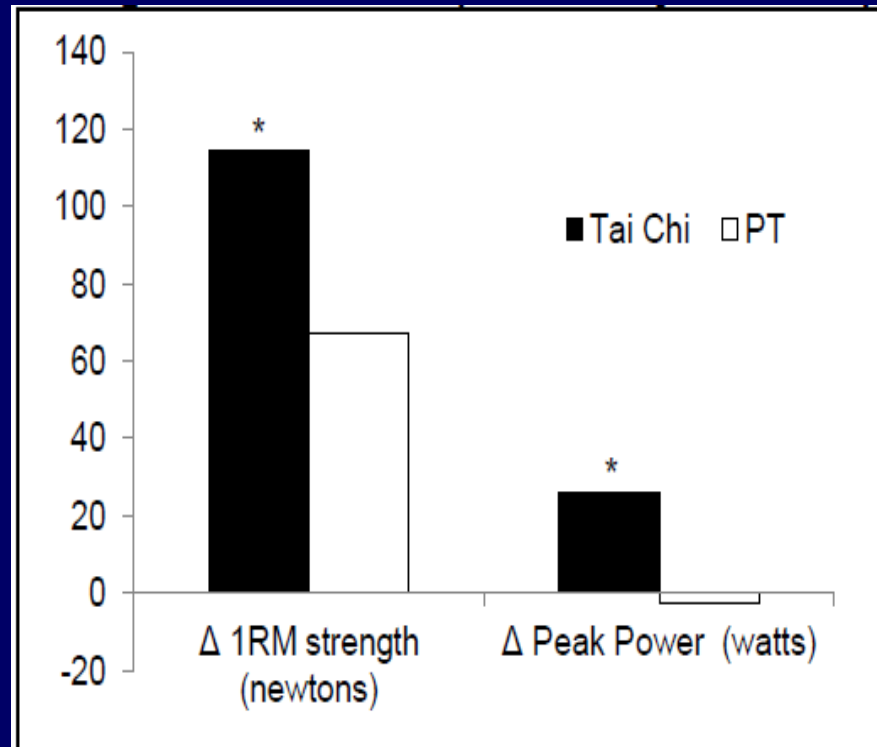
thebmj

- Therapeutic benefits were consistent among multiple instructors in a large sample of diverse fibromyalgia patients.

Why mind-body approaches work? (Mechanisms)

Muscle Power Is an Independent Determinant of Pain and Quality of Life in Knee Osteoarthritis

Kieran F. Reid,¹ Lori Lyn Price,² William F. Harvey,² Jeffrey B. Driban,² Cynthia Hau,¹ ARTHRITIS & RHEUMATOLOGY
Roger A. Fielding,¹ and Chencheng Wang² Vol. 67, No. 12, December 2015, pp 3166-3173



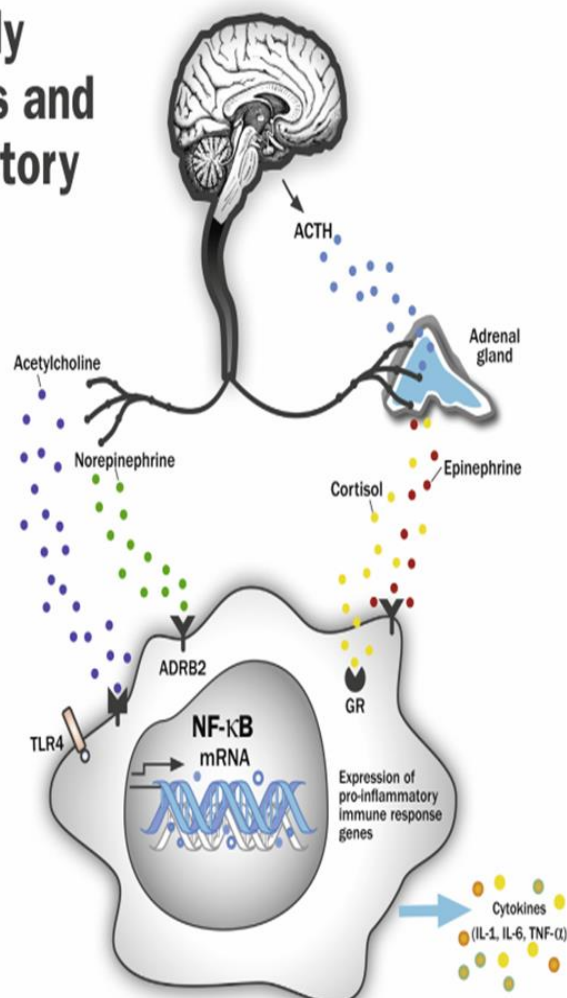
Tai Chi Significantly Improves Lower Extremity Strength and Power Compared to Physical Therapy

The Effects of Mind-Body Therapies on the Immune System: Meta-Analysis

Nani Morgan¹, Michael R. Irwin², Mei Chung³, Chenchen Wang^{1*}

Mind-Body Therapies and Inflammatory Biology

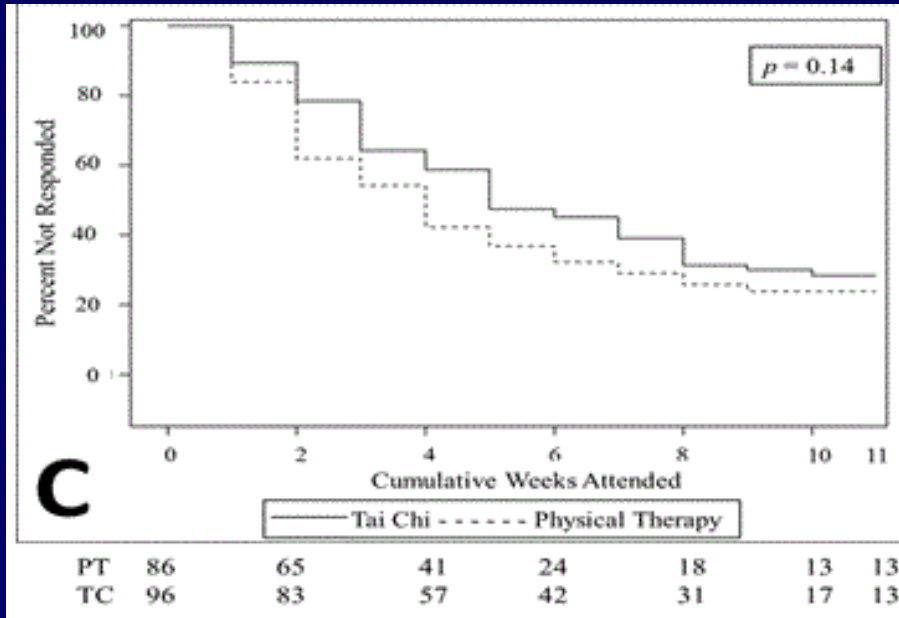
MEDITATION | QIGONG
TAI CHI | YOGA



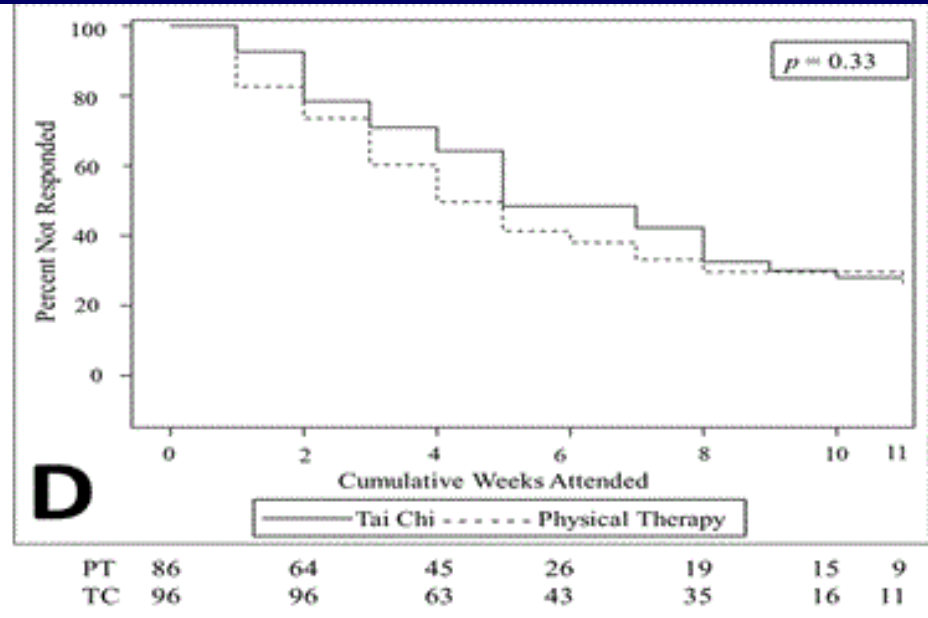
- 32 RCTs of Tai Chi, Qi Gong, Meditation, and Yoga
- C-reactive protein decreased after 7 to 16 weeks of mind-body interventions.
- Mind-body therapies appear to reduce markers of inflammation and influence virus-specific immune responses to vaccinations.

Dose-Response Effects of Tai Chi and Physical Therapy for Knee OA

Pain



Function



Estimated minimum effective doses of Tai Chi and Physical Therapy were **4-5 weeks for $\geq 50\%$ improvement** in pain and function

Acknowledgment



National Center for
Complementary and
Integrative Health



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