Promoting Activity and Participation among People with Arthritis: Updates from the Field

Julie J. Keysor, PT, PhD
Kristin Baker, PhD

NARRTC April 25, 2014

Objectives

• Discuss key findings from the NIDRR Arthritis State of the Science meeting April 7th, 2014
  • Impact of arthritis and rheumatological conditions
  • Innovations in rehabilitation
  • Innovations in promoting physical activity adherence
  • Innovations in promoting employment and work functioning
  • Stakeholder reflections
• Explore overlapping themes with other NIDRR areas of emphasis
What is “Arthritis?”

“Arthritis” is a term that refers to more than 100 conditions affecting joints, the surrounding tissues, and connective tissues.

- Also refers to “rheumatological conditions”

- Pain, aching, stiffness, and/or swelling in and around a joint common

Most Common Types

- Osteoarthritis
- Rheumatoid arthritis
- Fibromyalgia
- Gout
- Lupus
Arthritis: Population Impact

- 52 million adults have arthritis (~20% of the population)
- 67 million in 2030

Activity Limitations
Common

- 22 million adults limited in basic daily activities such as walking ¼ mile, climbing stairs, or opening a jar
- 43% of people with arthritis are physically inactive

Centers of Disease Control and Prevention
Participation Restrictions
Common

- 13% adults with arthritis report social participation limitations
- High risk older adult population with knee pain and functional limitations
  ~38% had participation restrictions


Work Disability
Common

- ~30% of working aged adults are unemployed within 10 years of diagnosis
- ~30% of working adults with arthritis report work-related activity limitations
Arthritis Rehabilitation...mid-late 1980s

Joint deformity often substantial

Treatment supported by limited research

Got Arthritis? ....Rest...ahh....
Now: MOVE!

ENGAGED IN COMPLEX ROLES

Major Advances over Past Two Decades

Promoting Activity and Participation Among Persons with Arthritis
Advance #1: Medicine—Inflammatory Conditions

- Early diagnosis & treatment
- Disease modifying medications
- Biological medications

  - RESULT: Less joint and tissue destruction
  - No cure
  - Disability persists

Advance #2: Exercise
**Clinical Practice Guidelines**

**NOW: Knee Osteoarthritis**

- **Strongly recommended:** (ACR 2012 Practice Guidelines; EULAR 2013 Practice Guidelines; OARSI 2014 Practice Guidelines)
  - Aerobic and/or aquatic exercise
  - Resistance exercises

- Moderate aerobic, low impact activity 150 minutes/week
- Resistance training 2 times/week (CDC 2008)

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**Advance #3: Work Disability**

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Arthritis and Work Disability 2000s: Clinical Trials

- Vocational rehabilitation approaches focusing on job accommodations and career counseling
- Ergonomic, occupational therapy, and exercise approaches
  - Positive impact on self-efficacy, fatigue, work performance (Baldwin et al. 2012; Macedo et al., 2009; Verekamp et al. 2011; Nyrop et al. 2011)

Advance #4: Participation—Involvement in Life Situations
Great Advances

...Yet, Gaps Remain

Gaps

- Long-term activity and participation outcomes (rehabilitation)
- Exercise adherence
- Work disability
Session 1: Activity & Participation in the Rehabilitation Setting

Session 2: Activity & Participation: Promoting Physical Activity in the Community

Session 3: Activity & Participation: Employment

Session 1: Activity & Participation in the Rehabilitation Setting

- Knee Pain/Osteoarthritis: Occupational and Physical Therapy Approaches
  - Susan Murphy, PhD, OT & G. Kelley Fitzgerald, PhD, PT
- A Critical Look at Knee Replacement Outcomes
  - Jessica Maxwell, DPT, PhD Candidate
Rehabilitation: How is Knee OA Treated?

“Treatment Gap”
- Tried and exhausted conservative OA management, but still have debilitating pain
- ‘waiting’ for joint replacement

Typically PT referral is late and OT is not consulted unless compensatory strategies

Biomedical Treatment Approach
- joint pain is due to joint damage
- relief of joint pain leads to improved physical function / quality of life

Fix the disease, you will fix the problem
OA ‘Disease’ May Not Be the Problem

Other factors may also impact physical function and quality of life in OA (biopsychosocial treatment approach)

- Lack of physical activity
- Widespread pain
- Fatigue
- Depression
- Psychosocial factors

The above factors may provide important information on which to tailor treatments

Slide: Dr. Susan Murphy, Univ. of Michigan, Arthritis SOS meeting 2014

New Horizons for OA Treatment—Beyond the Biomedical Approach

- Tailored treatments
  - Pain subgroups
  - Pain experience
- Development of evidence-based OT interventions
  - Integration of self-management into clinical care
  - Other important outcomes to clients in addition to pain

Slide: Dr. Susan Murphy, Univ. of Michigan, Arthritis SOS meeting 2014
Physical Therapy and Knee Pain/OA

- Dosing and progression strength training and aerobic conditioning
- Pattern with aerobic conditioning and strength training may be important
- Functional training—greater emphasis on tasks people with OA have difficulty with (rising from chair, getting up from floor)
Knee Joint Replacement

Rates of Knee Total Knee Arthroplasty, Medicare 1991-2010 (Cram et al. JAMA 2012)

- 93,230 procedures in 1991
- 243,802 procedures in 2010 (161.5% increase)

Need: Monitor outcomes and identify who benefits
Knee Replacement PAIN Outcomes

- Majority of patients have meaningful improvement one year\textsuperscript{1,2}

- \textasciitilde 20-30\% of patients have long-term persistent pain\textsuperscript{3}

\textsuperscript{1}Escobar, et al, 2014; \textsuperscript{2}Bachmeier, et al 2011; \textsuperscript{3}Beswick, et al, 2012;
\textsuperscript{4}Singh and Lewellen, 2012

KNEE REPLACEMENT PHYSICAL FUNCTION OUTCOMES

- Majority of people have meaningful improvement in physical function

- 20-30\% of people have persistent functional limitations after joint replacement\textsuperscript{2,3}

\textsuperscript{1}Kane, et al, 2005; \textsuperscript{2}Singh, et al, 2010; \textsuperscript{3}Maxwell, et al, 2013
PARTICIPATION OUTCOMES?

ENACT research study (J. Maxwell, et al)

- MOST Study- large clinical observational study
- Subsample of subjects with knee replacement (n=218)
- Examined participation restrictions among people before and after receiving total joint replacement
Proportions with Participation Restriction

- All Subjects
- Women
- Men
- White
- Non-White
- Age < 65
- Age 65-74
- Age 75+

Pre-KR
∞ 1 yr. post

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Maxwell, et al.
Summary of Knee Replacement Outcomes

Up to 1 MILLION PEOPLE annually

Summary: Rehabilitation Setting

• Strong evidence for physical activity and exercise
• Little to no treatment guidelines for occupational therapy
• Activity and participation in knee OA is likely to NOT be a biomedical problem
• Approximately 1/3 have persistent and significant pain, activity limitations, and participation restriction after joint replacement
Promoting Activity (Physical Activity) and Participation: Community

Kristin Baker, PhD
NARRTC April 25, 2014

Promoting Activity and Participation Among Persons with Arthritis

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Promoting Activity and Participation: Community

- Behavioral strategies to improve adherence
  - Susan Hughes, DSW
- Innovation in technology to improve adherence
  - Kristin Baker, PhD
- Environmental approaches for promoting physical activity adherence in people with chronic conditions and disability.
  - James Rimmer, PhD
**Fit & Strong!**

Slide: Dr. Susan Hughes, Univ. of Illinois at Chicago, Arthritis SOS meeting 2014

- **Multiple component** physical activity / behavior-change program for older adults with lower-extremity pain and stiffness
- 8-weeks
- 3 sessions per week, 90 minutes per session
  - First 60 minutes = physical activity
  - Last 30 minutes = group discussion / problem solving
**Bandura 1989, 2001**

Slide: Dr. Susan Hughes, Univ. of Illinois at Chicago, Arthritis SOS meeting 2014

- Perceived self-efficacy
  - Physical activity logs
- Outcome Expectations
  - Negotiated contract
  - Realistic goal setting
- Fit & Strong!
- Knowledge
  - Education / group discussion
  - Structured 24 session curriculum
- Goal Setting
  - Negotiated contract
  - PA maintenance goals
- Barriers and Facilitators
  - Problem solving
  - Addressing barriers
  - Group discussion
- Normative Influences / Modeling
  - Peer modeling
  - Group discussion

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**Fit & Strong! Completed Research**

- **Efficacy Trial**: Tested safety and efficacy
- **Effectiveness Trial**: Tested effectiveness and maintenance
- **Dissemination Study**: Test implementation and dissemination across heterogeneous group of settings and geographic regions

Slide: Dr. Susan Hughes, Univ. of Illinois at Chicago, Arthritis SOS meeting 2014
Innovation in Technology to Improve Adherence

Promoting Activity and Participation Among Persons with Arthritis

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• **Why** Technology?
  - Capabilities of technology
  - Access to technology
  - Behavioral insights

• **What** Technology?
  - Overview of technologies
  - Specific examples

• **How** Technology?
  - Studies and data
Capabilities

- History of human race can be mapped using its technological innovations

- Extend our capabilities further into the world
- Address limitations of the human condition—both physically, cognitively and emotionally

Access

**Internet adoption over time, seniors vs. all adults**

<table>
<thead>
<tr>
<th>Year</th>
<th>All Adults 18+</th>
<th>65+</th>
<th>Seniors are more likely to own a tablet or e-book reader than smartphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>86</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>73</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>61</td>
<td>48</td>
<td></td>
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<tr>
<td>2008</td>
<td>58</td>
<td>46</td>
<td></td>
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</tbody>
</table>

Pew Research Center's Internet Project tracking surveys.

PEW RESEARCH CENTER
Access - The Quantified Self

- The Monitored Man

- Wearable Devices: Selfies
  For Health Nuts?
  Forbes 3/18/2014

Can Technology Change Behavior?

- Behavior change through a technological lens - YES
However

- The potential of technology to change behavior does not lie in simply digitizing current strategies or creating another communication channel.
- Technology must look through a behavior lens.
  - Technology - Insight led and Human centered
  - Behavior Change - empowering and sustainable
    - Aerobic physical activity through leisure-time activity
      - 45-64 - <50%
      - 65-74 - 37%
      - 75+ - 24%

CDC/NCHS, National Health Interview Survey, 2008–2010

WHAT TECHNOLOGY?
Information Technology

1st Generation

2nd Generation
pre-programmed reasoning

3rd Generation
recognition and inference

Quantified Self or Ecological Momentary Assessment
SenseCam; Trackers (Fit Bit, Jawbone Up, Nike Fuelband); Smart Phone Apps (MapMyFitness)

HOW TECHNOLOGY?
**BOOST** Telephone-Linked Communication (TLC)

Participants

6-week Strength Training Class (2x/week) 8/12 completed

BOOST TLC

Booster Sessions

Control Televox Automate dmessage

- 6 wks baseline
- Post class months
- 1 yr months
- 18 months
- 2 yrs

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**Structure of TLC Conversation**

START

Exercise Days Assessment
Previous 2 weeks
Feedback on recent week

Past 2 weeks > 1

Exercise Pain Script

Goal Setting Negotiation

Exercise Action Counseling

Self-Efficacy
Social Support
Education

Total days = 0

Lapse Scripts

Reasons for Lapse
Motivational Material
Overcoming a Lapse
Community Health Advice by Telephone

- Randomized controlled trial to increase physical activity
- 55 years and older, sedentary, n=218
- Interventions
  - Automated computer advisor by phone
  - Human advisor by phone
  - Health education
- 12 and 18 month follow-up

King AC, et al., Health Psychol. 2007 26:718-727

Exercise advice by humans versus computers:
Maintenance effects at 18 months

King AC, et al., Health Psychol. 2014 Feb;33(2):192-6
Exercise advice by humans versus computers: Maintenance effects at 18 months

King AC, et al., Health Psychol. 2014 Feb;33(2):192-6

Mobile Phones to Promote Daily Physical Activity

King et al., PLoS One, 2013 Apr 25;8(4)
Primary Aim:
To develop a community-based Virtual Exercise Coach for people with Parkinson’s Disease to support long-term self-management of their exercise training to optimize quality of life and participation.

Relational Agent/Exercise Coach in Parkinson’s Disease


Promoting Activity and Participation Among Persons with Arthritis

Environmental Approaches for Promoting Physical Activity Adherence in People with Chronic Conditions and Disability
Barriers to Exercise Reported by People with Chronic Health Conditions and Disability

PAIN

<table>
<thead>
<tr>
<th>Element</th>
<th>% of Participants</th>
</tr>
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<tbody>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Don't Know Where</td>
<td></td>
</tr>
<tr>
<td>Lack of Support</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
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<tr>
<td>Lack of Accessible Facility</td>
<td></td>
</tr>
<tr>
<td>Don't Know How</td>
<td></td>
</tr>
<tr>
<td>Lack of Interest</td>
<td></td>
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<tr>
<td>Not Improving My Health</td>
<td></td>
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<tr>
<td>Worse in My Condition</td>
<td></td>
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<tr>
<td>Too Old</td>
<td></td>
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<tr>
<td>Lack of Care Attendant</td>
<td></td>
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<tr>
<td>Lack of Support Family</td>
<td></td>
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<tr>
<td>Job Responsibility</td>
<td></td>
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<tr>
<td>Transportation</td>
<td></td>
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<td>Lack of Accessible Facility</td>
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Elements of Physical Activity Adherence

Make sure you SELECT the right Physical Activity

The 6 components of the SELECT model are integral in promoting more physical activity in people with disabilities.

Understanding the 6 components of the SELECT model that are part of a physical activity program, thereby promoting and encouraging the practice of physical activity.

Physical Activity, Exercise, Training, Health, Wellness, Recreation

Don't let anyone stop you from being healthy and active.
Lakeshore Foundation Transitional Model from Recovery to Health

Framing the Future in Activity Adherence

- Evidence for behavioral intervention to promote adherence – Fit & Strong!
- Potential for technology
  - Global explosion across all population sectors
  - Platforms are phone and computer, increasingly into tablets and mobile phone, largely 2nd generation moving towards 3rd generation
  - The “Quantified self” increases the objective data utilized by the platforms
- However
  - Technology must look through a behavior lens
  - Problem driven not solution led
  - Interdisciplinary
- Life course approach for people with chronic health conditions and disabilities – SELECT
Promoting Activity and Participation: Employment

Innovations Using Technology to Closing the Gap between Clinic and Workplace
Tele-ergonomics

- Telerehabilitation Computer Ergonomics System (Tele-CES)

- Conducted by ergonomically trained health professionals to remotely assess and intervene on computer workstation

Slide: Jacobs and Baker, Arthritis SOS Meeting, April 7th, 2014

Tele-CES Assessments: Workstation Use

- Multiple photographs of worker in workstation

Slide: Jacobs and Baker, Arthritis SOS Meeting, April 7th, 2014

Baker et al., 2013; Jacobs et al. 2012
Recommendations implemented by category

(Jacobs et al., 2012) Slide: Jacobs and Baker, Arthritis SOS Meeting, April 7th, 2014

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Workplace Interventions to Sustain Employment

Glenn Pransky

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Main risk factors for poor RTW in LBP
(Shaw, Main, PT Practice, 2012)

- Clinical severity (in relatively few cases)
- Comorbidity (more important)
  Pain severity
- Catastrophic view
  Workplace conflict
- Workplace inflexibility
- Fear of injury
- No RTW planning

Workplace accommodations

- Typical 30% disability cost reduction by instituting work accommodations alone
- Informal accommodation more common than formal – and possibly more effective (especially in older workers (Leijten et al)
Community-based Interventions to Sustain Employment

Julie J. Keysor, PhD, PT
Associate Professor
Director, ENACT, the NIDRR Arthritis RRTC


- **Sample:** 242 U.S. employed adults with a rheumatological condition
- **Intervention:** Education & counseling VR session focused on job accommodation, career counseling, and self-advocacy, written job retention materials
- **Control:** Written job retention materials
- **Outcomes:** Employment retention
VR Employment Retention Program for People with Rheumatic Conditions

![Graph showing percent remaining employed over months from randomization.]

OR 0.58 Log rank test P=0.03

WES Demographic, Health and Work History

Section 1. Demographics
1. Age __ 2. Gender _____ 3: Marital/family status: ________
4. Number of years of education ____
Other vocational training, certification, or license: __________
Health
• Primary rheumatic condition: ____________________________
• Number of years with rheumatic condition ________________
• Other health conditions/disabilities: _____________________
• Medications: _________________________________________
• Health Symptoms or issues: check any that are a problem
WES Barrier Checklist Example

Barriers (problems)

Section 2. Getting Ready for Work and Traveling to and from, or for Work

Please check the items that are sometimes, or always, a problem for you.

Getting ready for work

- [ ] Getting out of bed
- [ ] Extra time needed for dressing, preparing breakfast, etc.
- [ ] Doing stairs at home

Traveling to and from, or for work

- [x] Using public transportation (describe)
- [ ] Walking/standing/stairs

VR Job Retention Studies: Systematic Review

- **Studies**: 9 RCTs, chronic conditions (e.g., diabetes, rheumatological conditions, hearing disorders, multiple sclerosis)
- **Intervention**: solving work-related problems (job accommodations) and empowerment
- **Results**: 4/5 studies examining employment status had beneficial effect

(Varekamp et al. Int Arch Occup Environ Health (2006))
On the Horizon: Can Other Health Professionals Deliver Employment Retention Programs

- Physical and occupational therapists
  - Training programs to enhance the ability to intervene using job accommodations and work disability resources
  - Results: positive view of program & approach

(O’Brien et al. 2013; Allaire & Keysor, 2009)

Efficacy of a Modified Vocational Rehabilitation Program to Minimize Work Disability among Persons with Arthritis: “The Work It Study”

Ongoing clinical trial (N=287)

Keysor JJ, Allaire SA, ENACT Research Project #1, Boston University
Summary

- Tele-ergonomics may be an effective way to close the gap between the clinic and the home/work
- Some evidence that approaches targeting job accommodations, career counseling, and empowerment can promote employment retention
- Vocational rehabilitation approaches can decrease symptoms and work limitations and may sustain employment
- Cost-effectiveness of approaches not well established

Panel: Stakeholder Reflections
Next Priorities for the Field

• Establish cost effectiveness of rheumatological rehabilitation interventions
• Close the gap between “science” and “practice” with a focus on academic education
• Foster interdisciplinary rehabilitation and public health efforts to more effectively promote activity and participation
April 21, 2014: Boston Marathon 2013 Survivors

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The National NIDRR Arthritis Rehabilitation Research and Training Center
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