Osteoarthritis Management Needs a Paradigm Shift

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Outline

• What is osteoarthritis?
• Impact of osteoarthritis
• Societal evolution
• Opportunities for prevention
• Management is suboptimal
• Methods of improving care
What is osteoarthritis?

- Normal knee vs. Osteoarthritic knee
- Subchondral bone
- Ligaments
- Cartilage
- Synovium
- Joint fluid
- Capsule
- Meniscus
- Femur
- Tibia
- Fibula
- Muscle atrophy
- Bone remodelling and sclerosis
- Cartilage breaking down
- Meniscal damage
- Synovial hypertrophy
- Osteophytes
- Ligament dysfunction
- Altered fat metabolism

Multiple Locations of Pathology
Common Sites of Involvement and Prevalence >65YO

Hand - 70%
Knee - 30%
Hip - 10%
Spine - 60%
Impact of Osteoarthritis

• Most common joint disease in the world.
• Affects the majority of people over the age of 65.
• Nearly one in five (22.8%) Australians has arthritis most of whom have osteoarthritis (20%).
• In the elderly, accounts for more lower extremity disability than any other disease.
• One in eight days of restricted activity in elderly.
• Total annual cost equal 1.5% GNP in most Western countries and rising.
• Accounts for most total knee and hip replacements
Impact on quality and quantity of life

• Impact on quality of life:
  – 50-84-year-old non-obese person with knee osteoarthritis will lose 1.9 quality-adjusted life years due to osteoarthritis.
  – If obese with knee OA this increases loss to 3.5 quality-adjusted life years.
  – Obese with knee OA the estimated remaining quality-adjusted life expectancy is decreased by 21% to 25%.

• and quantity of life
  – Persons with osteoarthritis are at higher risk of death compared with the general population (standardised mortality ratio 1.55, 95% CI 1.41 to 1.70).
OA Prevalence (%) by Age

- 3.4% in 35-44 years
- 8.8% in 45-54 years
- 20.4% in 55-64 years
- 23.6% in 65-74 years
- 32.0% in 75+ years

Increases dramatically with age however 2/3rds of those affected are <65YO

Ref: National Health Survey 2007-08
OA Prevalence (%) by Gender

Ref: National Health Survey 2007-08

Has a significant female skew

37%

63%
Currently: 1.2 million 55+ already report OA, however.......... this is just the tip of the iceberg
OA and Obesity (number) by Age

Coming: Tsunami of 2.5 million obese ‘Baby Boomers’ + 35-45 year olds to swamp OA health services for years to come.

Ref: National Health Survey 2007-08

Number reporting Osteoarthritis

Number measured to be obese
Impact of OA on societal level

OA Primary Diagnosis for Primary Total KNEE Replacement (%)

- Osteoarthritis: 97%
- Rheumatoid arthritis plus all other: 3%

OA Primary Diagnosis for Primary Total HIP Replacement (%)

- Osteoarthritis: 89%
- Avascular Necrosis: 3%
- Fractured Neck Of Femur: 4%
- All other: 4%

Impact of OA on societal level

Arthroplasties to reduce the impact of arthritis are on the increase in Australia. Over the period 2000–01 to 2007–08, the number of knee arthroplasties for arthritis increased by 67% from 14,866 to 26,712 (Figure 5). The number of hip arthroplasties during the same period increased from 13,524 to 19,279, an overall increase of 40%.

![Graph showing trends in knee and hip replacements for arthritis, 2000–01 to 2007–08]

Source: AIHW National Hospital Morbidity Database.

**Figure 5: Trends in total knee and hip replacements for arthritis, 2000–01 to 2007–08**
Ageing Society

Figure 3. Life expectancy at birth: world and development regions, 1950-2050

Source: UN Department of Economic and Social Affairs
Population Division
Obesity trends – where are we going?

THE GLOBAL OBESITY PROBLEM

An obese adult is classified as having a Body Mass Index equal to or greater than 30

SOURCE: World Health Organization, 2005

World Health Organisation, overweight and obesity fact sheet, 2006
Reducing the burden of OA

Prevention

Disease Progression

Symptomatic Treatment
Prevention: The time is now

• Injury
  – Early surgical treatment of acute ACL injuries provides no benefit over a treatment strategy starting with rehabilitation alone.
  – Lifetime risk of knee OA is 57% among persons with a history of prior knee injury.
    • Arthritis Rheum, 2008;59(9):1207-1213.
  – Neuromuscular conditioning programs have demonstrated effectiveness in reducing the risk of ACL injury by 60%.

• Obesity
  – Promote policies, initiatives and state and national partnerships to help all young people achieve and maintain a healthy weight, thus reducing their risk for developing OA.
  – If all overweight and obese people reduced their weight by 5 kg, or to within the normal body mass index (BMI) range, approximately 25-50% of all knee replacements could be avoided.
Core Elements of Injury Prevention Program

- Proper landing technique
- Proper deceleration & cutting
- Avoiding excessive “caving in” at the knee
Algorithm for OA Management

Non-pharmacological management
- Education, exercise, weight loss, appropriate footwear

Non-pharmacological management
- Physiotherapy, braces, and begin pharmacological treatment with simple analgesics (such as paracetamol)

Pharmacological management
- NSAIDs, opioids (if effusion is present, aspirate and inject)

Surgery
- Osteotomy, total joint replacement

Severity of symptoms
- Mild
- Severe

Treatments for osteoarthritis

- Oral NSAIDs, including cox-2 inhibitors
- Opioids
- Intra-articular corticosteroid injections
- Topical NSAIDs
- Local heat and cold applications
- Assistive devices
- Education, advice, access to information
- Strengthening exercise, aerobic fitness training
- Weight loss if overweight or obese
- Manual therapy (manipulation and stretching)
- Joint arthroplasty
- Transcutaneous electrical nerve stimulation
- Supports and braces
- Shock absorbing shoes or insoles
- Capsaicin

NICE Guidance. BMJ 336 : 502
This is not easy!

• “osteoarthritis is an easy disease to take care of—when the patient walks in the front door, I walk out the back door”

  – Sir William Osler
Current Management of OA is Inadequate

1. Silo based approach of multiple providers.
2. Many concomitant comorbidities which are not addressed or worsened in the presence of OA e.g. obesity, hypertension, diabetes.
3. Suboptimal, non-evidence based care for the majority of patients with OA.
4. Current health care costs for OA are expensive and growing exponentially-this is not sustainable.
Silo based approach of multiple providers

- Current management features multiple health care providers who:
  - do not coordinate their care,
  - provide mixed messages to patients with OA and;
  - don’t measure the outcomes of their service provision.
Concomitant comorbidities

- Persons with OA:
  - 90% are overweight/obese
  - 40% have hypertension
  - 15% have diabetes

- These comorbidities further compound management challenges and are frequently ignored in current silo-based management approaches.

*Archives of Internal Medicine* 2004, **164**: 807.
*American Journal of Managed Care* 2002, **8**: S383-S391.
*Arthritis & Rheumatism* 2005, **52**: 2026-2032.
Relationship between ES for pain relief and quality of RCT

<table>
<thead>
<tr>
<th>Treatment</th>
<th>All trials</th>
<th>ES (95%CI)</th>
<th>High quality trials (Jaded = 5)</th>
<th>ES (95%CI)</th>
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<tbody>
<tr>
<td>Acupuncture</td>
<td>0.35</td>
<td>(0.15, 0.55)</td>
<td>0.22</td>
<td>(0.01, 0.44)</td>
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<tr>
<td>Paracetamol</td>
<td>0.14</td>
<td>(0.05, 0.23)</td>
<td>0.10</td>
<td>(-0.03, 0.23)</td>
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<tr>
<td>NSAIDs</td>
<td>0.29</td>
<td>(0.22, 0.35)</td>
<td>0.39</td>
<td>(0.24, 0.55)</td>
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<tr>
<td>Topical NSAIDs</td>
<td>0.44</td>
<td>(0.27, 0.62)</td>
<td>0.42</td>
<td>(0.19, 0.65)</td>
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<tr>
<td>IA hyaluronic acid</td>
<td>0.60</td>
<td>(0.37, 0.83)</td>
<td>0.22</td>
<td>(-0.11, 0.54)</td>
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<tr>
<td>Glucosamine sulphate</td>
<td>0.58</td>
<td>(0.30, 0.87)</td>
<td>0.29</td>
<td>(0.003, 0.57)</td>
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<tr>
<td>Chondroitin sulphate</td>
<td>0.75</td>
<td>(0.50, 1.01)</td>
<td>0.005</td>
<td>(-0.11, 0.12)</td>
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<tr>
<td>ASU</td>
<td>0.38</td>
<td>(0.01, 0.76)</td>
<td>0.22</td>
<td>(-0.06, 0.51)</td>
</tr>
<tr>
<td>Lavage/debridement</td>
<td>0.21</td>
<td>(-0.12, 0.54)</td>
<td>-0.11</td>
<td>(-0.30, 0.08)</td>
</tr>
</tbody>
</table>

Arthroscopic debridement/ lavage

- Randomized to a placebo arthroscopy group, arthroscopic lavage group, or standard arthroscopic debridement group.
- 180 patients
- No difference
- The incomplete, temporary improvement seen with arthroscopic surgery for knee OA is due to a placebo effect.

Obesity-why intervene?

• For every 1kg of weight carried by the body the contact load across the knee joint experiences 4 times that load.

• A reduction of 5% of body weight leads to a 30% improvement in pain and function.

• A reduction of 10% of body weight leads to a 50% improvement in pain and function.

• Reduce BMI by 1 unit (2.7 kg average weight reduction for a person 1.65 meters tall) would reduce:
  
  – TKRs by 6%.
ADAPT Survivorship 8 years later

Adjusted Survivorship Curve on Weight Loss*

*Adjusted for age, gender, exercise treatment

Need for change

• Less than 8% of Australians reported trying to lose weight as part of their OA treatment (2007 AIHW Report).

• BEACH (Bettering the Evaluation And Care of Health) survey report (April 2004 - March 2009) demonstrates suboptimal use of allied health practitioner interventions to support behaviour interventions for exercise and weight loss.

• Only 3.9% of OA encounters were referred for allied health intervention (81.7% were referrals to physiotherapy, 3.3% hydrotherapy, 0.8% to a dietician).
We are not managing OA well!

• The most widely used therapies in OA are:
  • Paracetamol
  • NSAIDs
  • Intra-articular steroids
  • IA hyaluronans
  • Orthopedics referral-lavage and debridement

• They dwarf effective weight loss, exercises, braces/orthoses by a factor of 3.
  • Rheumatology 2004; 43: 381-384.
  • J Rheumatol 2007; 34:2099-105.
  • J Rheumatol 2007;34:2291-300.
Consequence

• As a result of inadequate care many patients are dissatisfied.
• Many are turning to untested and aggressively marketed dietary supplements with little substantive evidence to support their efficacy.
• Many patients are turning to the internet for healthcare information but how does the consumer know what is a credible source of information?

*Rheumatology* 2002, **41**: 1208-1210.
*BMC Musculoskeletal Disorders* 2006, **7**: 48.
*Orthopaedic Nursing* 2002, **21**: 28-34.
*Arthritis Care & Research* 1999, **12**: 85-95.
*Alternative Therapies in Health & Medicine* 2007, **13**: 22-29.
30-47% of older adults with osteoarthritis use CAM.
Expenditures for CAM therapies averaged $1127 per year per patient, compared with $1148 for traditional therapies.

Costs are rising

• Health expenditure on OA in Australia in 2007 was $2.03 billion

• Total cost of arthritis in Australia, attributable to the burden of disease, productivity costs, and direct health costs, was almost $24 billion.
DOHA

“Osteoarthritis is not high in the public consciousness.”

Here ... Take this ... I have to go back for my wife
Challenges and barriers to better care

• Patient factors
  – Inadequate recognition by public that this can be managed effectively.
  – Adherence to treatment.

• Funders
  – Government-short term perspective does not facilitate long term management.
  – We need to re-engineer the delivery of chronic care rather than simply episodic care.
  – Target prevention.

• Health professionals
  – Education and behaviour
  – Limited communication
  – Division within our own community
Lot of players, little cohesion

- Arthritis Australia
- Arthritis NSW, Vic, SA, WA, Tas, Qld
- BJD
- Industry groups
- RACGP
- Australian Orthopedic Association
- Australian Physiotherapy Association
- Australian Rheumatology Association
- Chiropractors’ Association of Australia
- Department of Health and Ageing
- Sports Medicine Australia
Cost Model for a Population of Patients: Old and New OA Care

$ Cost for population of patients

Chronic Pain Quality of Life Timeline

OA Dysfunction Stages

0. Pre-OA
I. Non-Pharm Mgt
II. Furth Non Pharm. Mgt
III. Pharm. Mgt
IV. Surgery
V. Post Surgery
VI. Severe Pain-Revision
Clinical Governance
- Policies and guidelines
- Risk management
- Quality improvement
- Credentialing and scope of practice
- Performance measurement

Community
- Resources and Policies
  - Self-Management Support

Health Systems
- Organization of Health Care
  - Delivery System Design
  - Decision Support
  - Clinical Information Systems

Informed, Activated Patient

Productive Interactions

Prepared, Proactive Practice Team

Improved Outcomes

http://www.hsmc.bham.ac.uk/news/ReviewIntFrame works-ltc.pdf
Intensities of chronic care management across the disease trajectory

Savage, J. *Models of care for chronic disease.*
Australia: OA care to date

• Federal
  – NSIF-framework for OA care but no implementation/ audit strategy. [link]
  – NAMSCAG (National Arthritis and Musculoskeletal Conditions Advisory Group) - Draft indicators & policy developed but there is no evidence that this has been implemented or audited.
  – RACGP Osteoarthritis Working Group, Guideline for the non-surgical management of hip and knee osteoarthritis, July 2009, Royal Australian College of General Practice (RACGP)

• State
  – Agency of Clinical Innovation (NSW) [link]
  – OA Clinical Pathway Project [link]
  – Orthopaedic Waiting List (OWL) model [link]
  – Orthopaedic Physiotherapy Screening Program (Queensland)
Extended Primary Care-item no.s

Item 721: Preparing a GP Management Plan (GPMP)
Item 723: Coordinating the development of Team Care Arrangements (TCA)
Item 725: Reviewing a GPMP

Little evidence to suggest care of chronic disease has improved.

Diet and exercise not adequately supported for public patients.
Proposed Phases

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<th>Clinical Governance</th>
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<td>Appraise guidelines</td>
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<tr>
<th>Coordinate Chronic Health Care Delivery</th>
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<td>GP Referral to Chronic Care Coordinator</td>
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<tr>
<th>Self Management Support</th>
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<tr>
<td>Internet model for disease education and self management support</td>
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</table>
Multidisciplinary Interventions

Non-Pharmacological
- Disease management education and support
- Land exercise
- Hydrotherapy
- Manual therapy
- Nutritional advice
- Occupational therapy
- Psychosocial support

Pharmacological
- Medication review
- Pain management

Aims and Objectives
- Manage and control symptoms
- Optimise and maintain function
- Optimise and maintain quality of life
- Slow disease progression

Documentation
- Baseline measures using valid tools
- Documented patient-centred management plan and discharge plan
- Regular face to face review and self-management support
- Discharge measures using valid tools
- Discharge destination and long term review plan
OA Disease Awareness

Screening tools

Informed decision making/ Patient decision support aids

Local healthcare resources

Arthritis Australia

The University of Sydney

Bupa

North Sydney Orthopaedic & Sports Medicine Centre
Conclusions

• OA Prevention—we know what needs to be done but at this point there is little action.

• OA Management—dichotomy between guidelines and clinical practice.

• Need to re-engineer health service delivery for chronic disease management.
Acknowledgements
Thank-you for your attention

The Ultimate Question  by  Ellie May

I dunno...you?
Prevalence of Meniscal Lesions in the General Population (Framingham)

Figure 2. Prevalence of Meniscal Tear or Destruction in the Right Knee among Middle-Aged and Elderly Persons, According to Age Group and Sex.

All persons with previous knee surgery were excluded from the prevalence estimates of meniscal destruction. The I bars denote 95% confidence intervals.

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- Randomized to a placebo arthroscopy group, arthroscopic lavage group, or standard arthroscopic debridement group.
- 180 patients
- No difference
- The incomplete, temporary improvement seen with arthroscopic surgery for knee OA is due to a placebo effect.


Placebo Effect

- Placebo ES for pain 0.51 (95% CI 0.46-0.55) untreated control 0.03 (95% CI -0.13 to 0.18).
- Size of placebo effect determined by strength of the active treatment, the baseline disease severity, the route of delivery and the sample size of the study.
- Injections, surgery-greater expectancy, higher placebo effects