

GERINOTES

SECTION ON GERIATRICS, AMERICAN PHYSICAL THERAPY ASSOCIATION

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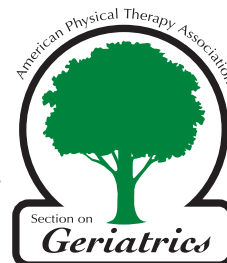
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WANTED: ARTICLES FOR GERINOTES

TOPICS: Anything related to older adults

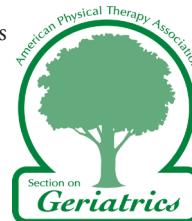
CLINICIANS: Send me an article or an idea

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EDUCATORS: Send me student papers

Everyone loves to publish and it is easy!

Contact Meri Goehring, GeriNotes Editor
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EDITOR'S THANK YOU

Melanie Sponholz, MSPT, GCS, CCEP, CHC



In wrapping up my final issue as the Editor of *GeriNotes*,
I would like to thank the following list of people,
whose support was unwavering in the production of the magazine:

Ken Miller	Ellen Strunk
Jennifer Bottomley	Carole Lewis
Tim Kauffman	Karleen Cordeau
Danille Parker	Bill Staples
John Barr	Marilyn Moffat
Jill Heitzman	Lucy Jones
Karen Curran	Sharon Klinski

Special thanks to Dr. Tim Fox, whose professional support and dedication
to caring for older adults allowed me to take on this editorship.

Thinking of starting a Geriatric Residency? It's never been easier!

The Section's Home Study Courses are a convenient way to get much of the didactic content required in a Geriatric PT Residency Program

The **Section on Geriatrics** is proud to release the new edition of our popular **Focus** course covering physical therapist practice in geriatrics across the practice patterns, written by a talented group of board certified specialists who are leaders in the profession. **Special pricing** for Section members is available for residency programs when you contact the Section directly (*discount not available through the online Learning Center*).

The 6-monograph course includes:

Issue 1: *The Aging Musculoskeletal System* by Karen Kemmis, PT, DPT, GCS, MS, CDE, CPRP, CEEAA

Issue 2: *The Aging Neuromuscular System* by Jason Hardage, PT, DPT, DScPT, GCS, NCS, CEEAA, and Mary Elizabeth Parker, PT, MS, NCS, PCS

Issue 3: *The Aging Cardiovascular System* by Ellen Strunk, PT, MS, GCS, CEEAA

Issue 4: *The Aging Pulmonary System* by John Lowman, PT, PhD, CCS

Issue 5: *The Aging Integumentary System* by Jill Heitzman, PT, DPT, GCS, CWS, CEEAA, FACCWS

Issue 6: *Diabetes Across the Physical Therapy Practice Patterns* by Pamela Scarborough, PT, DPT, MS, CDE, CWS, CEEAA

A preview of all home study modules is available at learningcenter.apta.org/Courses.aspx.
To learn more about developing a Geriatric Residency or Fellowship Program visit
www.apta.org/educators/residencyfellowship/developing/.



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PRESIDENT'S MESSAGE: A NEW VISION

William H. Staples, PT, DHS, DPT, GCS, CEEAA



The 2013 APTA House of Delegates (HOD) adopted a landmark new vision of the profession of physical therapy: **“Transforming society by optimizing movement to improve the human experience.”** This is a great step forward for the APTA. This new vision takes us from a more internal focus of Vision 2020 to add a more external view of the not just the health care environment per se, but the entire human experience! There were rousing discussions at the HOD meeting. Everything from “we need to stay the same” to “the new vision will insult physicians and other health care professionals” to “what an inspiration” or “we need to step outside our current structure.”

This is great timing for the APTA and the Section. We also had stimulating discussions on line with a few people reticent to make a change and a majority of people responding in favor of the change. The Section hopes to make a more external statement as well, with our name change to the Academy of Geriatric Physical Therapy. The name change coincides with our mission and vision statements. This name change will better explain to external stakeholders what we do and coincide with the educational and research goals of the Section. A name is a descriptive or qualifying appellation given to a person or thing, because of the character and actions in which it partakes. I want to reiterate to all Section members that we are NOT leaving the APTA, and that our component status within the

APTA remains the same. The Section will still operate as a Section of the APTA. The APTA bylaws will not be changed to create any new governance for academies. Additionally, the cost to do this name change is minimal, a \$25 filing fee in Virginia where the Section is incorporated.

The Section is classified by the IRS as a 501 3-C charitable organization. This status includes **Educational, Charitable, and Scientific** organizations among others. This is exactly what we are and what we do. We promote education of our members, promote and publish research, and donate funds to the Foundation for Physical Therapy. The Section Governance Work Group of the APTA refined the following working definition from the original wording proposed by the Task Force on Governance Review Subgroup on Sections by removing the word “clinical” from the definition of an academy. While these were not formally adopted as new entities within APTA, here is the working definition used to help frame discussions: **Academies:** An APTA membership group focused on the science, advancement, and practice of physical therapy in a clearly defined practice arena. Academies support the vision of the profession and the mission of the association. An academy can be an institution or society for the advancement of literature, art, or science. Academy is also society of learned persons, scholars, and leaders in a specific field organized to advance art, science, or literature through writing, publishing, and investigating issues related to their topic. An academy usually has a body of established expert opinions established with research and is widely accepted as authoritative and leaders in a particular field.

The Board of Directors of the Section voted unanimously that this definition was a good fit for what we want to accomplish, the advancement in the quality and provision of geriatric physical therapy services. The term “Society” was discussed by the Board and we felt that Academy was the better fit.

The following is the APTA policy for name change:

SECTION NAME, PURPOSE, OR OBJECT CHANGES BOD Y03-97-16-37[Policy]

Changes to a section's name, purpose, or object are bylaw amendments. Therefore, these changes must be reviewed in accordance with the Approval Process for Component Bylaws. In addition to this approval process, proposed changes to a section's name, purpose, or object will be sent to all current section presidents for approval.

The review by current section presidents will occur after the proposed bylaw amendments are received by APTA's Component Services Department, at the same time that the parliamentarian conducts a review, and before the Board Committee to Review Component Documents conducts its review. A unanimous vote of approval by all current section presidents is required. In the event that the proposal is not approved by all section presidents, the section which has proposed a change to its section name, purpose, or object may appeal to the Board Committee to Review Component Documents. The Board Committee will make recommendations to APTA's Board of Directors who shall make a final decision.

Please continue the discussion and I hope to see you at the Member's Meeting in Las Vegas this February!

MOTION 1 AMEND: BYLAWS OF THE SECTION ON GERIATRICS

*Proposed By: Section on Geriatrics Board of Directors
Required for Adoption: Previous Notice, 2/3 Vote in Favor to Adopt*

Motion: that the Bylaws of the Section on Geriatrics, Article 1, Name, be amended by substitution so that it reads: ~~The Section on Geriatrics of the American Physical Therapy Association;~~ **Academy of Geriatric Physical Therapy**, hereinafter referred to as the **Section Academy**, shall be a section of the American Physical Therapy Association, ~~shall hereinafter be referred to as the Association.~~ Proviso: With the passage of this motion, all related Bylaws will be revised to reflect the name change immediately. Section documents, policies, procedures, and external communications will be updated as soon as feasible.

Support Statement:

The Section on Geriatrics formed in response to a need from members of the American Physical Therapy Association (APTA) in 1978. At that time, the founding members were visionary, determining this group should look beyond being devoted to long term care, to recognize the unique needs of older adults across all settings. Over the last 35 years, the Section on Geriatrics has grown exponentially to advance that founding mission, beyond a group of individuals working together to discuss geriatric practice, to become the group that defines best practice physical therapy for the aging adult.

Utilizing the definitions from Merriam Webster Online Dictionary (listed below), we clearly meet the definition of an Academy¹. Our group represents a unique group of a single profession, working together to expand the art and science of physical therapy for older adults. Any of our members can, and should, join other societies that are an organization of people working with older adult (e.g., American Society on Aging, American Geriatrics Society) but none of these is the authoritative voice of geriatric physical therapy “advancing

the art, science, and literature” of the profession. That distinction should belong with the Academy of Geriatric Physical Therapy.

“Academy” is preferred to “Society” because it is a more accurate reflection of the mission, vision, and goals of the organization. A society is best defined as “a social group who has a common interest or profession”.² This organization does not fit that limited definition given that the meaning of “academy” utilizing all that components of a society with the addition of advancement of the field through science, literature and an authoritative body of opinion.¹

Physical therapists and physical therapists assistants who work with the older adult population choose this group for many reasons. The wonders of working with aging adults are too numerous to list, but at the same time we have struggled with an image problem. The physical therapists that are seen on television and other media sources are those on the side-line of sporting events, or depicted in the gym working with athletes or an adorable child. Whereas most who work with older adults are not seen at all or seen as “ambulating” the debilitated older adult. To advance the art and science of geriatric physical therapy, we must demonstrate pride that our work enhances the quality of life and participation of older adults. We should not be afraid, or too humble, to recognize that we are functioning at that level and strive to live up to the societal and visionary expectations of an academy.

The name change represents an evolution of the current Section on Geriatrics. Our mission has evolved and our current strategic plan focuses primarily on advocacy and improving practice for examination of and interventions with older adults. With changes in payment for physical therapy services, defining best practice

and hastening the implementation of research from bench to bedside are the primary areas of our current strategic plan. The term “academy” is also a better descriptor for the organization’s current role as an expert body for healthcare provider issues related to the geriatric patient/client such as healthcare and payment reform (particularly Medicare), and as liaisons to various external groups such as The Joint Commission, the Commission on Accreditation for Rehabilitation Facilities (CARF), the International Association of Physical Therapists working with Older People (IPTOP), a sub-group of the World Confederation for Physical Therapy (WCPT), among many others. This is the role of an Academy, one that will remain tightly ingrained and partnering with our parent organization of the APTA. This name change does not alter our component status as a section, one that will continue to work to promote the profession of physical therapy. Verbal discussions with members of the APTA Board of Directors were supportive of a move in this direction.

To the outside world, our current name is confusing. Having established our identity within physical therapy is not enough, and this name change reflects the expectations and terminology of the medical community to which we partner. While we may be the first section³ within APTA to move in this direction; however, we do not anticipate we will be the last. Many sections have a defined area of specialty practice, represented by developing entry level education criteria, advancing specialty and sub-specialty practice via residency and fellowship education, and who develop and define clinical practice guidelines and evidence-based documents for areas within their specific population. These groups will all meet the definition of an academy and continue to work together with other sections, chapters and future

components to meet the multi-faceted needs of the American Physical Therapy Association.

Applicable Definitions from Merriam Webster Online Dictionary:

1. Academy: a society of learned persons *scholars, and leaders in a specific field* organized to advance art, science, or literature *through writing, publishing, and investigating issues related to their topic*; a body of established opinion

widely accepted as authoritative and leaders in a particular field

2. Society: a voluntary association of individuals for common ends; *especially: an organized group working together or periodically meeting because of common interests, beliefs, or profession*; an enduring and cooperating social group whose members have developed organized patterns of relationships through interaction with one another

3. Section: one of the parts that form something

Financial Implications:

There is a cost to file our name change on the articles of incorporation- \$25. There will be some costs associated with updating the name change on the website and some printed materials, but these will not be overwhelming and will be structured into other updates that regularly occur.

MOTION 2 AMEND: BYLAWS OF THE SECTION ON GERIATRICS

*Proposed By: Section on Geriatrics Board of Directors
Required for Adoption: Previous Notice, 2/3 Vote in Favor to Adopt*

The following motion is put forth by the Section on Geriatrics Board of Directors. Members will have an opportunity to discuss and vote on the motion during the member's meeting from 6PM-6:30PM (local time) on 2/4/14 at CSM in Las Vegas, NV.

Motion: That the Bylaws of the Section on Geriatrics, Article XI (FINANCE) Section 3, Dues, be amended to insert a new Item "D" to read: The Board of Directors may offer reduced rates for Section dues as an incentive to promote membership.

Financial Implications:

The assumption is that these types of incentives will attract new members who will continue to maintain membership once they have reaped the benefits of membership. The overall financial impact will be positive if this attracts new members. Actual amount is unknown.

Support Statement:

SS: The proposed bylaws change allows the Section more flexibility in participating in membership pilots such as the expansion of Career Starter Dues over a 5 year period. Currently, one of the most common requests from the members is a reduction of dues for new professionals, even if temporarily, or to allow for a discount for a specific time period to help

promote future loyalty and continued section membership. One of the biggest challenges in our current financial environment is maintaining membership, especially with new graduates and those who hold multiple section memberships. Innovative pilot programs that involve temporary dues reductions may remove some of the financial barriers to Section membership and encourage continued membership.

Current Bylaw:

ARTICLE XI: FINANCE

Section 1: Fiscal Year

The fiscal year of the Section shall be the same as that of the Association.

Section 2: Limitation on Expenditures

No officer, employee or committee shall expend any money not provided for in the budget as adopted, or spend any money in excess of budget allotment except by order of the Board of Directors. The Board of Directors shall not commit the Section to any financial obligation in excess of its current financial resources.

Section 3: Dues

A. The dues for each membership category shall be:

1. Physical Therapist member: \$45
2. Physical Therapist—Post Professional Student \$15

3. Physical Therapist Assistant member: \$35

4. Life Physical Therapist member: \$15

5. Life Physical Therapist Assistant: \$15

6. Student Physical Therapist: \$15

7. Student Physical Therapist Assistant member: \$15

8. Retired Physical Therapist: \$15

9. Retired Physical Therapist Assistant: \$15

- B. All dues shall be payable for the period specified in the Association's bylaws and shall be payable following the Association's schedule.

C. Dues Changes

All dues changes approved by the Section membership and approved by the Association's Board of Directors before the Association deadline will become effective on the first of the Association's next fiscal year.

Section 4: Financial Statements

The Section shall submit its annual financial statements, tax returns, and audit report to the Association when and as directed by the APTA Headquarters.

REHABILITATION FOR JOINT REPLACEMENT

A Section on Geriatrics Continuing Education Module

OVERVIEW

Physical therapists who work with the aging adult population will encounter many patients whose medical picture includes total joint replacement. These patients may be in rehabilitation to delay or prevent joint replacement, to prepare for scheduled joint replacement, or to recover from joint replacement surgery. As a prevalent procedure for the aging adult population, total joint replacement is also a focus area for insurers, both private and government funded, in the evolving reimbursement landscape. For these reasons, increased knowledge of this subject matter will improve the quality of care and patient education provided by physical therapists and assistants.

MODULE CHAPTERS

- I. Using Movement Retraining to Potentially Improve Long-term Outcomes after Total Knee Replacement
- II. Joint Replacement: Physical Therapy in Acute Care is Challenging and Rewarding
- III. Acupuncture for Knee Osteoarthritis and Chronic Low Back Pain in Older Adults
- IV. Care Redesign: Planning for Rehab in a Bundled Model of Care World
- V. Educational Opportunities for the Rehabilitation Process of a Total Knee Arthroplasty
- VI. Policy Talk: Joint Replacement

AUTHORS

Joseph Zeni, Jr., PT, PhD
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 Goulding, MS/CCC-SLP; Marcia Konyon-Yoo, MS, PT;
 Susan Almon-Matangos, MS/CCC-SLP
 Scott Johnson, PT
 Ellen R. Strunk, PT, MS, GCS, CEEAA

REFERENCE LIST

References can be found at the end of each chapter in the module.

OBJECTIVES

The reader will be able to:

1. Identify treatment paradigms that may improve biomechanical outcomes and prevent long-term disability after total knee replacement.
2. Be aware of clinical and biomechanical impairments that persist after total joint replacement.
3. Provide education to patients receiving joint replacements, throughout the continuum of rehabilitative care.
4. Understand the ways in which a bundled care model impacts rehab care delivery in the post-acute setting.
5. Identify stakeholders in a bundled care reimbursement model.
6. Identify rehabilitation strategies for reducing post-joint replacement re-hospitalizations.
7. Recognize some common medical conditions that need to be considered when working with individuals post-joint replacement in the acute care setting.
8. Understand potential benefits of acupuncture as a pain management alternative for chronic joint pain.
9. Identify the mechanism by which acupuncture relieves pain.
10. Understand the reimbursement issues surrounding joint replacement and rehabilitation of patients following joint replacement.

TARGET AUDIENCE

Physical Therapists and Physical Therapist Assistants

CONTACT HOURS/CONTINUING EDUCATION UNITS

Completion of the CE Module is equivalent to 4 contact hours which converts to .4 Continuing Education Units

CONTINUING EDUCATION CERTIFICATE OF COMPLETION

A Continuing Education certificate will be provided to each participant after successful completion of the course requirements (post-test and module evaluation) and payment of a processing fee. The Section on Geriatrics is a recognized component of the American Physical Therapy Association. The Section on Geriatrics has not applied to any state licensure agency for prior approval of this course. The module has all the components (content, objectives, qualified instructors, reference lists, and post test) that will allow participants to submit the certificate of completion to meet CE requirements in most chapters. Please seek individual approval for this course from the states of Texas, Ohio, Oklahoma, and Nevada.

HOW TO SUBMIT CEUS

To obtain CEUs for this continuing education unit, participants must complete the post-test as well as the evaluation form on page 8 & 9. A processing fee of \$40.00 for SOG members and \$80.00 for nonmembers is required. To apply for CEUs send the post test and the evaluation form to the Section on Geriatrics along with payment. Applications must be postmarked no later than March 31, 2014. Upon submission of materials and a passing score of 80% or higher on the post test the Section will mail you a continuing education certificate for .4 CEUs. Those with incomplete submissions will be notified via e-mail and given the opportunity to re-take the exam.

REHABILITATION FOR JOINT REPLACEMENT

CONTINUING EDUCATION UNIT POST-TEST

Instructions: To obtain CEUs for this continuing education unit, participants must complete the post-test as well as the evaluation form on the back of this page. See specific instructions for submission of the completed post-test on the next page. Please circle the correct answer for each question.

1. Following total joint replacement, which is a common residual deficit or impairment?
 - a. Patients move with asymmetrical movement patterns that overload their replaced joint
 - b. Quadriceps strength does not return to normal values in the operated limb
 - c. Walking speed remains 75% slower compared to age-matched healthy individuals
 - d. More than ½ of individuals report an unsuccessful outcome after surgery
2. In three dimensional gait analysis, a greater external knee flexion moment is thought to be associated with ...?
 - a. A greater need for quadriceps force to overcome the external forces acting to flex the knee
 - b. Reduced joint contact forces at the knee joint
 - c. An larger demand on the hip abductor muscles to control the pelvis in the frontal plane
 - d. "Stiff-legged" gait pattern or "quadriceps-avoidance" gait
3. Weight gain has important musculoskeletal consequences because
 - a. Every pound of weight gain results in a 10 fold increase in joint compression forces
 - b. Patients who gain weight after surgery are most likely to have a better outcome than patients who lose weight
 - c. Have a higher body mass is a risk factor for OA progression and joint pain
 - d. Patients who gain weight are much more likely to demonstrate asymmetrical movement patterns after TKA
4. Which of the following is true of acupuncture?
 - a. It involves inserting needles at defined points, known as "acupoints."
 - b. Acupoints are located along the 12 main channels or meridians of the body.
 - c. A goal of acupuncture is to remove blockages to the flow of energy or "Qi" in the body.
 - d. All of the above
5. Which of the following is NOT an example of a rehabilitation goal in a bundled care post-acute delivery model?
 - a. Reduction in short-term (inpatient) rehab stay at a Skilled Nursing Facility
 - b. Increased consistency of staffing in post-acute care settings
 - c. Shorter stays in the acute care hospital
 - d. Enhanced patient and caregiver education to help prevent avoidable rehospitalizations
6. Acupuncture provides which of the following mechanisms of pain modulation?
 - a. Opiate analgesia
 - b. Gate Control
 - c. Stimulation-produced analgesia
 - d. Neurotransmitter suppression
7. The skills and knowledge of a physical therapist are MOST important when working with individuals with total joint replacements in an acute care setting for which of the following reasons?
 - a. Because the exercises are typically the same regardless of the type of joint replaced.
 - b. Because each individual should learn how to navigate stairs and un-level surfaces.
 - c. Because each patient is complex and may react differently to treatments provided
 - d. Because total knee replacements are more difficult than total hip replacements
8. Of the lists below, which provides some of the MOST important items that should be looked at during a chart review when working with an individual with a joint replacement in the acute care setting:
 - a. height and weight, gender, previous level of function, hemoglobin
 - b. any precautions, weight bearing status, hemoglobin, nursing notes
 - c. availability of rehab aide, height and weight, medications, diet restrictions
 - d. any precautions, hemoglobin, dominant hand/leg, medications
9. What types of activities are MOST LIKELY to be delegated to an unsupervised rehabilitation aide when working with individuals after total joint replacements?
 - a. set up patient room, provide warm blanket and/or emesis basin
 - b. provide a review of routine exercises to be used as a home program
 - c. educate on movement precautions for that particular joint replacement
 - d. provide a height adjustment of the assistive ambulation device
10. Which of the following factors is NOT considered by Medicare when determining the medical necessity of total joint replacement?
 - a. beneficiary signs and symptoms
 - b. functional deficits resulting from advanced arthritis of the involved joint
 - c. pre-operative outpatient treatments
 - d. rationale for joint replacement vs. non-surgical therapies
11. Which of the following elements are included in the author's example of a total joint replacement patient education plan?
 - a. pre-operative motion and strengthening exercises
 - b. post-surgical edema management strategies
 - c. nutritional counseling
 - d. All of the above

REHABILITATION FOR JOINT REPLACEMENT CE UNIT EVALUATION FORM

Please rate the following questions

1= strongly disagree

5= strongly agree

1. The course material met the stated objectives	1	2	3	4	5
2. The information will be useful in my practice	1	2	3	4	5
3. The articles were well written and informative	1	2	3	4	5
4. The authors were knowledgeable for this topic	1	2	3	4	5
5. I am satisfied with this unit as a CE course	1	2	3	4	5
6. I would like future CE courses in <i>GeriNotes</i>	1	2	3	4	5

Please offer any additional comments below: _____

Submission for Continuing Education Credits

To obtain CEUs for these continuing education participants must complete the post test as well as the evaluation form on this page. Return page 8 and 9 with a processing fee of \$40.00 for SOG members and \$80.00 for nonmembers. Submission must be postmarked no later than March 31, 2014. Upon submission of materials and a passing score of 80% or higher the Section will mail you a CEU certificate for .4 units. Those submitting incomplete material will be contacted via e-mail.

Name _____ APTA Number _____

Address _____

City _____ State _____ Zip _____

SOG member yes / no Professional designation PT / PTA _____

E-Mail Address _____

Payment information ☐ \$40.00 for SOG members ☐ \$80.00 for non SOG members

_____ Check Enclosed _____ Credit Card payment ☐ Visa ☐ MasterCard ☐ Discover

number _____ Expiration Date _____ 3 digit # from back of card _____

Signature _____

Mail to: Section on Geriatrics
3510 East Washington Ave.
Madison, WI 53704

USING MOVEMENT RETRAINING TO POTENTIALLY IMPROVE LONG-TERM OUTCOMES AFTER TOTAL KNEE REPLACEMENT

Joseph Zeni, Jr. PT PhD

OBJECTIVES

1. Learn which clinical and biomechanical impairments persist after total joint replacement.
2. Identify treatment paradigms that may improve biomechanical outcomes and prevent long-term disability.

BURDEN OF THE DISEASE

Go into any orthopaedic surgeon's office and you will see a handful of baby-boomers sitting in the waiting room awaiting their consultation for knee or hip pain. With the aging of the population and the epidemic of obesity, the incidence and prevalence of osteoarthritis is dramatically increasing. Unlike many other musculoskeletal conditions, osteoarthritis (OA) is a progressive disease for which the only cure is total joint replacement. Nonsurgical interventions, such as strengthening and body weight management programs are effective at reducing pain and even delaying the need for total joint replacement, but there is limited evidence to suggest that any one intervention can successfully reverse the cartilage damage associated with OA. Currently the only cure for OA is joint replacement and the incidence of this surgery has increased dramatically over the past decade and shows no sign of slowing down.

The most recent estimates suggest that more than 600,000 people per year undergo total knee arthroplasty (TKA).¹ While these numbers are impressive, some researchers believe that the need for future joint replacement will soon outpace the number of orthopaedic surgeons who perform the procedure. By the year 2030, it is expected that more than 3 million people will undergo TKA every year² with a shift towards a much younger patient demographic.³ Given that rehabilitation influences postoperative outcomes, physical therapists and

the physical therapy community must be prepared to manage the ever-increasing burden of this disease.

Most patients have a successful outcome after their joint replacement. Clinical and experimental data show that most patients are satisfied with their outcome after total joint replacement. While this is encouraging, even a small percentage of unsuccessful surgical outcomes could result in a substantial number of people left with postoperative impairments and disability. For example, if the rise of TKA use continues to increase as expected towards 3.5 million by the year 2030, then 175,000 patients per year will have a negative outcome after TKA with an overall success rate of 95%. What is more concerning is that although most patients report reduced pain and improved function after TKA, functional performance, strength, and self-reported functional ability do not return to levels of age-matched subjects without joint pathology. Walking speed remains 17% slower, more patients require a handrail during stair negotiation, and knee extension strength remains 39% weaker when compared to healthy older adults.^{4,5} Functional performance becomes more divergent from normal the further after TKA the patient is evaluated, suggesting that patients who undergo TKA are at greater risk for future functional decline. What is interesting is that this functional decline is not directly attributable to the operated knee. In fact, 2 to 3 years after TKA, the nonoperated knee is more painful than the operated knee and the strength in this knee is more related to functional performance than strength in the operated knee.⁶ Why the expedited decline in the nonoperated limb? Perhaps rapid OA progression in that joint is the source of the progressive weakness and disability at longer-term follow-ups after TKA.

Systematic OA Progression

There is a nonrandom evolution of OA after an initial joint replacement. After one joint replacement surgery, the contralateral cognate joint is most likely to be replaced.⁷ Patients who have one knee replaced are more likely to have their contralateral knee joint replaced in the future. Similarly, patients who had one hip replaced are more likely to have their contralateral hip replaced. However, regardless of which joint is replaced (hip or knee), the joints on the other side are most at risk for OA progression and future joint replacement. This risk comes with substantial socioeconomic burden. Costs associated with total knee replacement average \$37,000 during the perioperative period, and collective medical costs in the year following TKA approach \$87,000.⁸ Given the high incidence of TKA in the United States, the aggregate costs for this procedure exceeded \$11 billion in 2011.⁹ Reducing the need and risk for contralateral TKA will have enormous socioeconomic benefits for the individual, as well as for third-party payers.

Within 5 years of joint replacement, the incidence of contralateral TKA 25%, with younger patients more likely to receive a contralateral TKA.¹⁰ While the amount of OA in the contralateral knee at the time of the initial TKA is a predictor of future contralateral TKA (more contralateral OA at baseline is related to greater risk of contralateral TKA in the future), some patients without pain or OA at baseline require contralateral TKA within 2 to 3 years of index TKA. Figure 1 was taken from a patient who had one knee replaced, but did not have complaints of pain in the contralateral knee, nor did they have evidence of OA in that joint at the time of the first TKA (Figure 1A). However, only 18 months after having their first knee replaced this individual had increased joint pain and

substantial radiographic OA in the contralateral knee (Figure 1B). This person elected to undergo TKA to manage the pain and symptoms in this joint only 2 years after the initial joint replacement. While this expedited OA progression in the contralateral joints is clearly an issue, identifying the individuals who are at greatest risk for OA progression and contralateral TKA is not as obvious.

Factors Related to OA Progression

There have been several epidemiological and biomechanical studies that have evaluated risk factors for OA progression and the need for future TKA. Two of the most common risk factors are both related to abnormal joint loading. First, individuals who gain weight or who are heavier are at greatest risk for OA progression and joint pain.¹¹ The good news is that losing weight greatly reduces chances of OA progression, the bad news is that most patients after TKA gain weight after surgery. In a recent study, we found that two-thirds of people who undergo TKA gain weight within 2 years.¹² What is concerning is the amount of weight gain. In the group that gained weight, patients gained an average of 6.4 pounds. Studies that have examined knee joint contact force have found that for every additional pound of weight gain, there is a 4-fold increase in the compression forces experienced by the knee joint.¹³ A weight gain of 6.4 pounds corresponds to an additional 25.6 pounds of compression force with each step. Multiply 25.6 additional pounds by the number of steps per day and the additional cumulative load is staggering!

The second factor related to OA progression is excessive joint loading in the medial tibiofemoral compartment. Greater adduction moment during walking (which is a correlate of medial knee joint compartment loading) is related to future OA progression in the medial compartment.¹⁴ After TKA, patients move asymmetrically. Although pain is resolved after surgery, patients continue to rely on the “good” leg or the nonoperated leg to complete dynamic tasks. This movement asymmetry increases the joint loading on the nonoperated leg and decreases loading on the operated leg. This asymmetrical movement pattern may contribute to the persistent unilateral disuse atrophy of the operated

leg, as well as contribute to the cartilage deterioration and OA progression in the nonoperated limb.

Most of these studies have evaluated the risk for initial development of OA or the risk for first TKA, not the risk after already having a TKA. However, it is likely that the factors which lead to the initial need for TKA will influence the rate of contralateral OA progression and need for contralateral TKA as well.

Resolving Movement Asymmetry

As a clinician, most patients would tell me that they walk with a limp because it “hurts when I put weight on my affected leg.” This is a common sentiment and agrees with what we would expect in patients with joint disease: increased compression forces are related to increased pain. We see this pattern in patients with hip, knee, and ankle pain, and this asymmetrical movement pattern is characteristic of patients with painful OA. However, patients continue to move with these asymmetrical movement patterns after joint replacement, even though most patients experience a near-complete resolution of pain in the affected joint. This begs the question: Why do patients continue to move asymmetrically after surgery if the pain is resolved?

We think that several factors contribute to these abnormal movement

patterns that reduce load on the operated limb and increase reliance on the nonoperated limb. First, persistent muscle weakness contributes to asymmetrical movement strategies. Patients who have strength asymmetry are most likely to be more asymmetrical in the way that they move. Patients with more pronounced weakness on the operated limb have been shown to rely on the nonoperated limb during walking and sit-to-stand tasks, which are common functional movements repeated many times throughout the day. In a recent randomized controlled trial from our lab, patients after TKA were assigned to one of two groups. One group received a progressive strengthening treatment, while the other was assigned to perform unsupervised home exercises. The group that participated in a supervised progressive strengthening program demonstrated greater improvements in strength and greater improvements in movement symmetry. However, despite improved quadriceps strength, movement asymmetries were not completely resolved and patients still favored their nonoperated limb.

Because strength is related, but does not fully explain the variability in movement symmetry, other factors likely also contribute to abnormal movement patterns after TKA. It is possible that the movement asymmetries we see after sur-

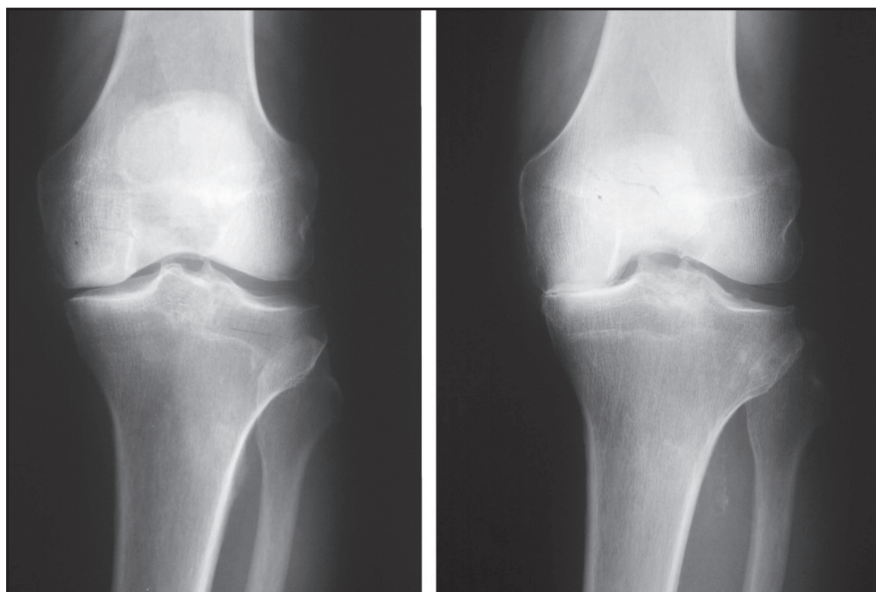


Figure 1. The image on the left (1A) is the PA bent-knee radiograph of the contralateral knee at the time of the index TKA. Eighteen months later (1B) this knee showed substantial narrowing of the medial joint space, which indicates degradation of the cartilage in the medial compartment.

gery are a learned motor pattern that developed in the presence of pain and weakness before surgery. In this case, it is unlikely that the asymmetries will dissipate without specific and targeted retraining. We tested this hypothesis in a recent study that is published in the *Journal of Orthopaedic and Sports Physical Therapy*.¹⁵ In this study, we evaluated biomechanical and functional outcomes after a specialized movement retraining program that included biofeedback during functional and strengthening exercises, progressive lower extremity muscle strengthening and impairment-based interventions to address pain, swelling, and range of motion deficits. This pilot study demonstrated the feasibility and potential effectiveness of this novel rehabilitation paradigm.

Initial Success with Movement Retraining

In the motion analysis laboratory, we are able to precisely measure movement patterns and we can even provide real-time biofeedback of kinematic (joint angles) and kinetic (ground reaction force and joint moments) variables. However, this requires expensive lab equipment including infrared cameras, force plates, and reflective markers (Figure 2). Set-up for these analyses can take more than an hour and requires specialized training, because the accuracy of the data is dependent on the expertise of the investigator. The expense and time associated with this type of measurement preclude their routine use in a physical therapy clinic.

In designing rehabilitation interventions, we put an emphasis on creating clinically-viable rehabilitation strategies that could feasibly be incorporated by a physical therapist in an average physical therapy center. In our recent biofeedback study, the intention was to develop a rehabilitation paradigm that reinforced normal and symmetrical movement during functional tasks and bilateral strengthening exercises. While using forceplates and a motion analysis system would allow us to accurately capture and provide movement feedback, this is not an option in most clinics. Instead we took advantage of relatively cheap commercial technology in the form of a Wii Balance Board (Nintendo Corporation). We were able to acquire the Bluetooth signal from the balance

board and use a custom program that can be run on any laptop computer to calculate the force under each foot while the patient stood on the Balance Board. We then converted the forces under each foot into a ratio and displayed the percentage of weight under each foot for the patient to see. As more weight was placed under the left foot, the cylinder on the left side of the screen would fill. When more weight was placed under the right foot, the cylinder under the right foot would fill. When there was even weight under both feet, each cylinder would fill 50% (Figure 3A).

We were able to adjust the display and set a threshold for “symmetrical force.” For example, when the threshold was set at 10%, the bars would turn red when the weight under each foot was more than 10% different (greater than 55% on one foot and less than 45% under the other foot) (Figure 3B). The bars would turn green when the weight under each foot was less than 10% different. This threshold was lowered as the patient was progressed through the rehabilitation protocol. Progression consisted of a decrease in allowable asymmetry, as well as an increase in the number of repetitions or resistance of the task.

The complete rehabilitation protocol used in this project has been previously reported, but briefly, consisted of progressive strengthening, mobility, and functional retraining activities that were performed with visual feedback of the force under each limb.¹⁶ Patients were challenged at each session and the exercises were progressed when patients met established clinical and performance milestones. Initial exercises consisted of simple weight shifting and symmetrical standing while patients received visual feedback from the Wii Balance Board and laptop computer. As pain resolved and strength improved in the operated limb, the tasks became more challenging and included wall slides and sit-to-stand retraining where the height of the table was progressively lowered and the threshold for allowable asymmetry was decreased. Subjects also performed progressively more challenging knee extension strengthening exercises using the SymSlide, which is a leg press device that also provides feedback of the force under each foot. Future iterations of this study will use feedback from the Balance

Board on a typical leg press device as to make the protocol more generalizable and feasible in the clinic. Symmetrical motion was also encouraged during treadmill walking with visual feedback using a mirror and verbal feedback from the therapist.

Eleven individuals scheduled to undergo TKA were enrolled in the study. Patients participated in functional testing at 4 timepoints: (1) preoperative (2-4 weeks prior to surgery), (2) initial outpatient physical therapy evaluation (2-3 weeks after surgery), (3) discharge from physical therapy (~10 weeks after TKA), and (4) 6 months after TKA. Functional evaluations consisted of a battery of performance-based tests, clinical metrics and self-reported outcomes. Performance tests included the Timed up and Go, Stair Climbing Time and Six Minute Walk. Clinical metrics included strength and range of motion. The Knee Outcome Survey – Activities of Daily Living Scale (KOS-ADLS) was the self-report questionnaire used in this study. Biomechanical symmetry of knee angles and knee moments were evaluated at the preoperative and 6-month time points during walking and sit-to-stand tasks. For the 6-month time point, outcomes were compared to a standard of care group that did not receive biofeedback during exercises.

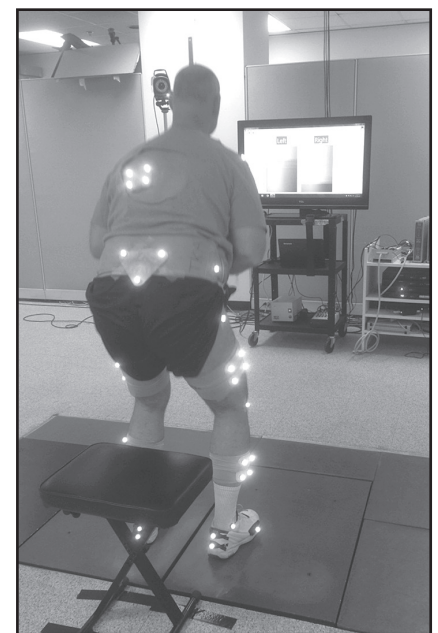


Figure 2. Motion analysis session in which a subject performs a task that requires him to rise out of a chair while the forces under his feet and movement of his segments are recorded.

The initial results from this study are promising. Patients in the symmetry group showed substantial movement asymmetries prior to total joint replacement during both walking and sit-to-stand. The majority of these asymmetries were resolved 6 months after TKA in this group. Subjects in the standard of care group had residual asymmetries during walking that were most apparent during midstance, where they continued to ambulate with greater knee flexion on the operated side. The standard of care group ambulated with greater knee flexion throughout the gait cycle, even though there was no difference in active range of motion between the two groups.

One concerning finding was that both groups had asymmetrical external knee flexion moments during the sit to stand task. The external knee flexion moment is representative of the joint moment created by the external forces acting on the lower extremity. Greater external knee flexion moments indicate a greater use of the quadriceps to generate an internal moment to overcome these external forces. Lower external knee flexion moments are indicative of what is commonly referred to as “stiff-legged” or “quadriceps-avoidance” gait patterns. Although both groups had less external knee flexion moments on the operated side (which suggests less reliance on the knee extensor muscle group), the symmetry group had more symmetrical knee flexion than the standard of care group. Symmetry retraining does appear to improve reliance on the operated knee to a greater extent than

rehabilitation strategies that focus on progressive strengthening, as was the focus of the standard of care group.

This protocol also resulted in functional outcomes that were as good, if not better than, the standard of care group. Almost every subject in the symmetry group had improvements in functional performance that exceeded the minimal detectable change of each measure. Collectively these findings suggest that the symmetry protocol was potentially beneficial and was easily implemented in a physical therapy clinic. The symmetry retraining program only slightly increased the time spent in the clinic, as most of the exercises were the same between groups, except the symmetry group received feedback during those exercises.

DOES FORCE FEEDBACK OF WEIGHT BEARING IMPROVE OVERALL MOVEMENT STRATEGIES?

In designing and implementing this intervention, we had two concerns about the use of the Balance Board as a rehabilitation tool. First, we were uncertain whether the accuracy of the Balance Board was appropriate for the proposed feedback design. Second, we were concerned that increasing the symmetry of weight under each foot may not result in symmetrical knee joint angles, knee joint moments, and other biomechanical variables other than ground reaction forces. It is quite possible that a patient may inappropriately sidebend at the trunk to increase weight under the operated limb, which is a compensation pattern that would produce more symmetrical force

under each limb, but would not improve overall movement symmetry. We are currently conducting several proof of concept studies to ensure the accuracy of the Balance Board and examine how patients respond when provided with feedback of the force under each foot.

In the first proof of concept study, we have subjects complete the sit-to-stand task in two different conditions. Both conditions are completed in the motion analysis laboratory and subjects rise out of an armless piano seat that is taped to the ground to prevent tipping. The height of the chair is set so that the subject's knees are positioned at 90° of flexion. In both conditions, the subjects do not get visual feedback because we want to capture the subject's normal movement asymmetry. In the first condition, subjects have each foot placed on the forceplates in the motion analysis laboratory. Ground reaction force and ground reaction force symmetry are captured for each foot during the rising from a chair, standing, and returning to the chair portions of the task. The subject completes this 3 times and then is allowed to rest for several minutes. After this, the same subject performs the same task while standing on the Balance Board instead of the forceplates. The height of the chair is adjusted so the knee angles remain the same. The subject performs the task 3 more times and the same variables are recorded from the Balance Board. In this comparison between the Balance Board and the forceplates, we have included subjects with hip and knee OA, both before and after joint replacement. The results so far have been promising and

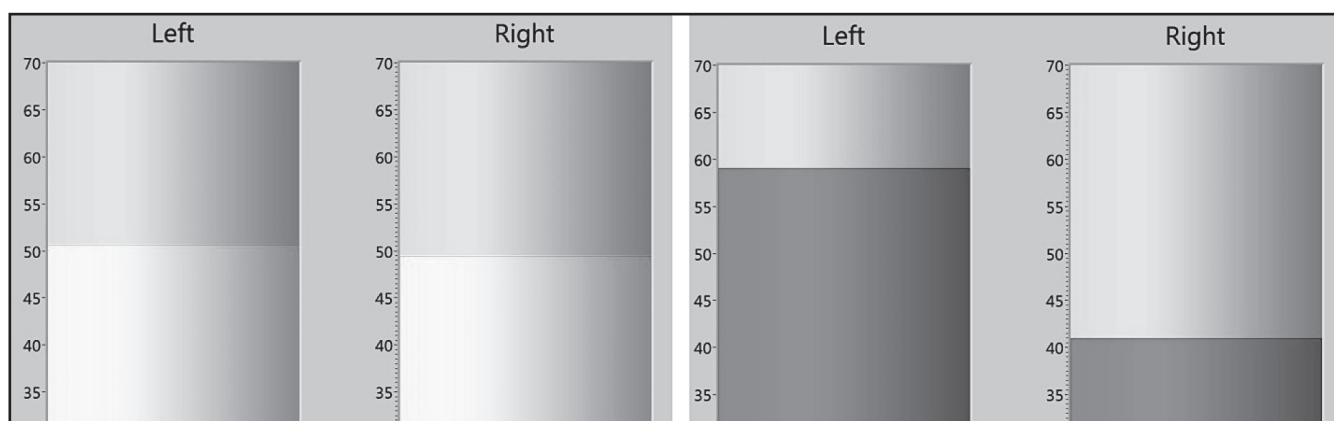


Figure 3. The display on the left (3A) represents someone with symmetrical force through their feet during the dynamic movement. When the force becomes asymmetrical, as is the case on the right (3B), the bars change color to alert the patient that they need to correct the asymmetrical force.

the results we get from the forceplate are very similar to the results we get from the Balance Board. This study is ongoing, but data from a representative subject is presented below.

In the second proof of concept study, we measure how patients respond to visual feedback of the force under each foot in our motion analysis laboratory. Subjects after joint replacement receive the same visual feedback that they would get in the clinic. However, because we are measuring the forces and movement of the body segments, we can actually identify which compensation strategies subjects use to make the force under each limb more symmetrical. The results from this study have been mixed. We have found that some subjects respond appropriately and make joint angles and moments more symmetrical as they make the force under each limb symmetrical. However, other subjects do not respond as anticipated. Instead, these individuals alter their kinetic and kinematic movement strategies so that although their force becomes more symmetrical, more proximal joints and the trunk become more asymmetrical. This is an interesting finding and suggests that the use of the Balance Board in the clinic must only be considered a tool in the retraining process. Clinician feedback and oversight will be essential to correct any noticeable trunk, hip and knee asymmetries when patients are presented with force feedback during the symmetry retraining exercises.

FUTURE DIRECTIONS

Although it appears that the symmetry retraining protocol is feasible and may reduce the persistent movement asymmetries after TKA, much work has yet to be done. We are currently planning a large multi-center clinical trial to test the effectiveness of the symmetry intervention at improving function, normalizing movement patterns and preventing long-term disability through the reduction of contralateral OA progression. This trial would enroll a large number of patients planning to undergo TKA and we would compare two groups, one that underwent progressive strengthening and the other that underwent progressive strengthening with biofeedback.

Although we believe that this rehabilitation approach will help to eliminate

the movement asymmetries after TKA, many other pathologies are characterized by asymmetrical movement patterns in which one lower limb is favored and overloaded. The same technology and biofeedback strategies may also help individuals after lower extremity limb loss or individuals after a cerebrovascular accident or traumatic brain injury in which there is hemiparesis or weakness isolated to one side of the body. The technology could also be modified and adapted so that more challenging tasks could be used for younger patients recovering from musculoskeletal injuries, such as ligamentous tears and repairs.

As our protocol and biofeedback program are updated, we plan to make the computer program and rehabilitation protocol available for use by clinicians. It is possible in the future, that these programs could be used to monitor compliance and progression within home exercise programs. The use of a Balance Board to measure force during exercise is relatively cheap and the programs are user friendly and simple to employ. Low-cost monitoring such as this may play an important role in transitioning patients from supervised clinic-based rehabilitation protocols to home-based exercise training and maintenance programs.

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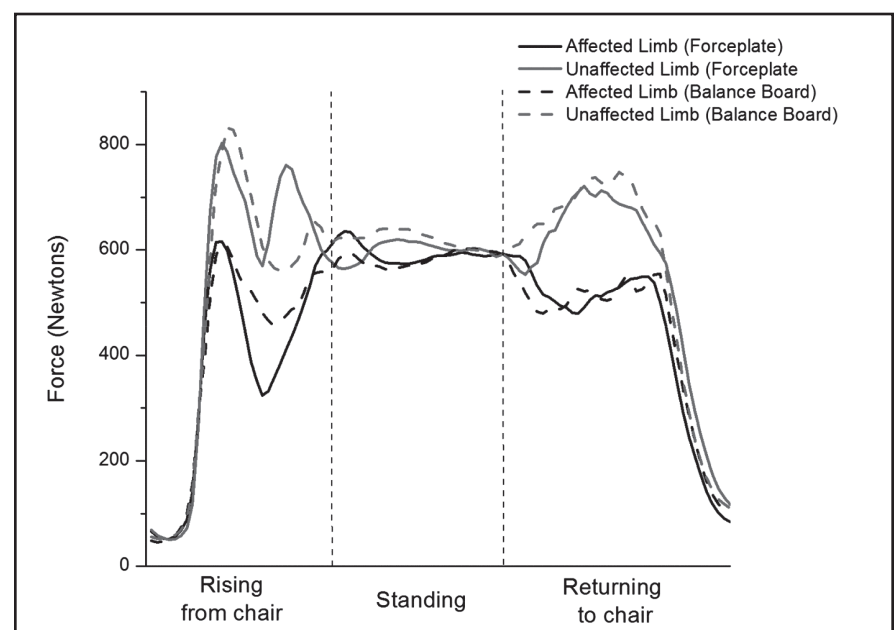


Figure 4. Time-series curve of ground reaction force during a sit-to-stand trial as measured with the Balance Board (dashed lines) and forceplates (solid lines). The force curves from the Balance Board and forceplate are very similar.

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Save the Date

The *GeriNotes*

Editorial Board Meeting

will be held on

Tuesday, February 4, 2014

during the Combined Sections Meeting
in Las Vegas, NV from 12:30 – 1:30 pm.

Location will be announced at a later date.

JOINT REPLACEMENT: PHYSICAL THERAPY IN ACUTE CARE IS CHALLENGING AND REWARDING

Rachael Sallie-Marshall, DPT; Meri Goehring, PT, PhD, GCS

OBJECTIVES

1. Recognize the skill and efficiency needed to provide physical therapy examinations and/or treatments to individuals who have had a joint replacement.
2. Realize the importance of a team approach to total joint rehabilitation with physical therapists and physical therapist assistants as key members of this team.
3. Recognize some common medical conditions that need to be considered when working with individuals after total joint replacements.

I love my job! I am a physical therapist on the orthopedic unit at a very busy hospital. I see elective total joints all day long. I have learned that this is not everyone's cup of tea, but I assure you no two days are ever the same! On our orthopedic floor, we see our total hips and total knees twice daily for physical therapy. Our patients average length of stay is 2 to 3 days depending on the procedure and patient progression. Although the services I provide to each patient are very similar (exercises, transfers and ambulation, and stairs), each patient is different. It is the complexity of each patient and the predictability of recovery that allows me to make skilled and appropriate care decisions and recommendations for discharge that ensure my patient's safety.

Now, I must tell you we run our orthopedic unit like a well-oiled machine! Our patient schedules are not only posted in each individual patient's room, but at the nursing stations as well, to facilitate collaboration between nursing and therapy in regard to pain control, toileting, etc. Nursing indicates on this sheet if each of their patients is appropriate for therapy that day. We also have a list of RN phone numbers based on room assignment that we contact with any patient questions or concerns. Our Occupational Therapy staff shares our office

space, and we are able to organize co-treats easily for patients who require the skills of both disciplines due to limited ability to participate or who do not have the activity tolerance to complete sessions separately. Our Care Management team looks at our PT and OT notes and orders our recommended equipment, so that it is present in the patient's room well in advance of discharge, and we can trial it and fit it appropriately. Our rehab aides go in before us and set up patient rooms, making sure there is an appropriate walker for the patient and chair alarm in the chair if needed, and making any schedule changes that the patient or nursing request. Our rehab aides are available by pager or phone and assist us with transfers as needed and provide patients with fresh drinks, warm blankets, etc. at the end of our sessions.

I start my day as most PTs do, with a tall mug of coffee and a list of patients too long to cover. I have my twice daily ortho patients who are scheduled and not to be missed, and then I have a short list of evaluations and treatments to try to squeeze into my schedule in the event of a cancellation. My patients are rarely missed, but occasionally I'll have someone too painful or too nauseated to participate, or a patient off the floor for an ultrasound or a chest x-ray at their scheduled therapy time. I complete my chart reviews, being sure to note hip precautions and weight bearing status, and check nursing notes for indication of any patients who may be feeling ill or have special concerns. We rarely hold therapy on the orthopedic floor. Hemoglobin is considered critically low at 7.0g/dL; however, we do see patients who are currently being transfused at this level and below. Education can always be provided, exercises and transfer training if the patient is tolerating activity without symptoms, but often we just see these patients at the edge of the bed. Whenever I see low hemoglobin in my chart review I contact the nurse even

if they have already indicated on our therapy sheet that the patient is ok to see. Often we can reschedule the patient for later in the morning to optimize patient success on evaluation. However, it looks like from my chart reviews my patients are doing very well this morning. I page my aide for the day to join me 10 minutes into my session, grab my goniometer, and I'm off!

My first patient of the day is Bob, a 63-year-old male who underwent right total knee arthroplasty (TKA) yesterday. Medical history indicates nothing out of the ordinary—a little hypertension, hypercholesterolemia, GERD, and BPH. No prior orthopedic surgeries. I walk into the room and am greeted by a middle aged man with lightly graying hair, fully dressed in an Under Armour shirt and running shorts. I introduce myself as his PT and am greeted with, "Just the person I was waiting for, the doc says as soon as you give the word I can go home." I just smile and ask Bob if he had a femoral nerve block. I already know the answer, but he smiles and tells me, "Yeah! It's working great, I have no pain!" I ask him to demonstrate lifting his leg, which he is completely unable to do. I ask him to go ahead and get out of bed. Bob looks at me and says, "I'm not going home today am I?" "Probably not Bob," I say, trying not to laugh. I proceed through my evaluation as I normally do, collecting information on home set-up, equipment needs, and available assist for discharge. I initiate education on exercise, however other than ankle pumps, Bob requires pretty much total assist to participate. Up to the chair with assist of my rehab aide at end of the session, his knee wobbles, but Bob is successful at compensating with his upper body strength. I instruct Bob to sit in the chair for 30 minutes as long as he is not feeling dizzy or lightheaded, and to call the nurse to help him back to bed. Bob thanks me for my help and asks if I'll be back to see him this after-

noon. I say yes and motion toward the schedule on his wall. “I look forward to it,” he says.

Mya is a 17-year-old female who underwent left total hip arthroplasty (THA) yesterday. We don't often get the chance to see pediatric patients here at our hospital, but when we get the occasional younger patient our scheduler knows I enjoy taking them on. Mya suffers from Systemic Lupus Erythematosus (SLE) and the accompanying joint pain, but otherwise is a very healthy and normal teenage girl. I walk into the dark room, where her mother and sister are sleeping on the pull-out bed, and am greeted with a huge smile! “Rachael! I wondered if I'd have you again!” We hug, and she catches me up on what's gone on in the past months since having her right hip replaced. She's been home schooled, and her goal is to go back to public school and to be able to walk to her classes for her senior year. She's able to rattle off her posterior hip precautions like a pro, independent with bed mobility on the first attempt, and we know this time to move right to the crutches with the built up grip, since last time around attempts at the walker proved difficult. We make it just outside of her doorway when she starts to slow her walking and her eyes start to look a little vacant. “Mya, how are you feeling,” I ask as I motion to my rehab aide to pull up a chair. “A little dizzy,” she says as I pull up a little harder on the gait belt. We position the hip chair directly behind her and have her sit. My rehab aide has been in this situation with me before more than a dozen times, and she's got the emesis basin in the patient's lap and begins to dampen a cool cloth, as I'm steering the chair back toward the bed. I'm asking Mya to remind me of her sister's names and ages to keep her alert until we get her positioned safely for the transfer. Cool wash cloth on the back of her neck, Mya's eyes open again, and I have her put her hands on my shoulders. I grab her belt and we dance back to the bed, taking small turning steps until she is positioned safely to sit. My aide moves to the other side of the bed to assist her trunk from behind, and we dependently return her to supine. I have Mya start some ankle pumps as we run a blood pressure.

Art is a joint replacement veteran. He's 89 year old and on his third revision

of his right hip. He completed his third revision of his left hip a few months prior. He doesn't remember his hip precautions (likely doesn't follow them anyway), but he moves well. His home is well set up, he has all the equipment he needs, his spouse, although equal in age, is independently ambulatory and confident in being able to assist. I ask Art what side of the bed he gets out of at home and clear the furniture to allow us to exit the bed on the left. Immediately Art goes for the bed controls to raise the head of the bed, I tell him “no cheating” and flatten it back out. He grumbles something about me being a “squirt” and obliges. Once at edge of bed Art is a little short of breath, but he quickly recovers and ambulates into the hall with the standard walker. Once back in the room and up in the chair Art reminds me that he's done this a time or two, brushing off any encouragement that I offer. I smile to his wife and let them know I will return to see them again this afternoon.

Sylvia is a 73-year-old female who underwent a TKA with femoral nerve block yesterday. She tells me “the nerve block didn't take,” and “I'm not sure what I'll be able to do this morning,” as she reports a pain rating of an 8 on a 10-point scale. I learn through our conversation that she lives in a ranch style home, with 3 steps to enter, has a walk-in shower and a walker handed down from a friend who had a similar surgery a few years back. She was independently ambulatory prior to surgery, and hopes to return home with the assist of her husband and her daughter-in-law. I take her through our exercise program and she demonstrates some initial isometric quad contraction, but fatigues quickly and is unable to initiate any knee extension against gravity. Seated at edge of bed Sylvia flexes her knee to 98° without so much as a grimace. While transferring to the chair with a walker and two person assist, her knee wobbles, and I provide tactile cues and instruction to keep the knee straight and pivot on her stronger leg. I know that despite her high pain rating her block has not fully resolved, and there is potential yet for an increase in pain. I explain our therapy schedule, assure her I will be on time, and encourage her to communicate medication needs to her nurse 30 minutes prior to our next session. I

give Sylvia her call light and instruct her to have nursing help her back to bed in a half hour. “That's it? That wasn't bad at all!”

I've been following Ann (68 years old) for a few days. My patients often get shifted to a PTA after evaluation due to our high volume of orthopedic surgeries, but I opted to keep Ann. She's had a rough go of it, severe postoperative pain coupled with nausea and vomiting as she learned she is intolerant of the pain medication prescribed. Attempts to get her pain under control and curb the nausea resulted in her spending the first day groggy, almost sedated. Her spouse, always present at bedside, was able to provide me the baseline info during my poor attempt at her initial evaluation 2 days ago. She couldn't keep her eyes open to complete ankle pumps, despite my constant tactile cues and me feeling like I was shouting instruction at her. It was yesterday morning before I finally was able to get her out of bed, and yesterday afternoon she ambulated into the hallway, getting us back on track for a post-op day 3 discharge. However, this morning our OT paged me minutes before I was headed to her room to let me know that a Doppler ultrasound had been ordered for Ann to rule out DVT. Physical therapy is on hold.

First on my back-up list is Barb, a 60-year-old female who was evaluated yesterday after a quadriceps tendon repair. Per her evaluation, the therapist is recommending home, however she has a full flight of stairs to her second floor apartment that has not been addressed. According to nursing notes, she will discharge today pending PT clearance. I knock on the door of her room, completely dark except for the flicker of the TV. “Barb... it's Rachael from therapy” I call into the room as I slowly open the door. “Is this a good time?” Barb flicks on the light and I see she is fully dressed and ready to go. Her bags are packed as well, even her shoes are on. She's smiling and chatty until I make mention of practicing the stairs. “If I have to” she agrees. Barb is a fairly large woman, so I page my rehab aide to join me, and we head to the short stack of stairs in the therapy gym. We trial both a cane and a crutch, since she only has one rail in her stairwell, but Barb has much difficulty navigating the 2 stairs. I ask Barb how she usually handles stairs, and

she demonstrates sidestepping, which is successful, but now she is out of breath. "Barb we've only done a total of 6 steps, you've got 15. Do you think you can do this?" Barb looks at me and says what I've heard patients say so many times "Once I'm inside I'll just stay in." To which I respond "What if there's a fire?" Barb thinks for a moment and says "I guess I'd just go out my sliding glass door, there's no stairs there." Now I'm looking at the floor trying not to laugh and I ask "So, would you be able to go in your patio door when you get home today?" to which she responds yes and tells me there's a paved path from the patio to the sidewalk. "I think that'd be much easier!" she says.

I finish my morning with my documentation and head to lunch. My afternoons on the unit are generally pretty smooth. I see the same patients as I did in the morning, they all know when I'm coming, and they know what to expect. By this time most of them are free from their foley catheters and IVs, and with the help of our rehab aides I am usually

able to stick to my 30 minute sessions.

This afternoon Bob is able to walk around the foot of the bed to the chair with the walker and a second assist for safety. His knee only wobbles twice, and he's able to check his balance without much assist. "Guess I'll have to delay my next triathlon," he jokes. I educate him that as the nerve block wears off pain will likely increase but that tomorrow I anticipate he'll have more control of the knee and we'll be able to send him home. "I like the sound of that!" he says with a smile.

Mya does much better this afternoon. She walks the 200 or so feet down to our therapy room and demonstrates safety on stairs. She's met my goals so I write a discharge, however she will likely stay another night and leave the hospital in the morning. I leave her in the gym with OT and hurry on to my next appointment.

Sylvia is able to walk into the hallway this afternoon. She needs very specific cues for sequencing the walker, but is otherwise steady. "If you'd have told me

I'd be walking the day after surgery I would have never believed it!"

Art is dressed when I enter, and tells me he's going home today if I give him the "all clear." He recites his hip precautions, peeking at the diagram at the foot of his bed only once. After our walk this afternoon, Art is visibly short of breath and opts to rest in bed rather than sit in the chair. He says he just feels "tired," but that once he's home he'll feel better. I can see that his wife is anxious about being able to take him home today, it's a long car ride and they don't have other assistance as their children are spread out across the state. I remind Art that this is only the first day after surgery, most patients stay in the hospital 2 more days, but that I'd be comfortable with him leaving tomorrow after his morning PT session. I can tell that Art is not happy with my recommendation, but he's too tired to argue. His wife is sitting in the bedside chair, visibly more relaxed. I phone Art's nurse to let her know I'm recommending he stay another night, and that he's more short of breath with activity than what I would anticipate.



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The ultrasound was negative, so I go to see Ann. "This is the best news we've heard all day!" her husband exclaims. There's much family in the room, and they all opt to stay for her therapy session. We get started with bed exercises and Ann's husband is in the background recalling the events of her stay. "And Rachael has been her therapist all along!" Her sister-in-law who has been cheering her on through her exercises starts to grimace and breathe through her teeth as I assist Ann with heel slides. If she hadn't already been sitting down I would have given her my chair. "Ann's ok," I reassure her, "this one's just tough." Ann smiles after her next exhale, and her sister-in-law relaxes a bit. We walk to the therapy gym to try steps, since Ann has 2 platform steps to enter her home. Her knee is a bit stiffer today, because we haven't walked in the hallway since yesterday afternoon. I can tell she's sore, but she's been taking as little pain medication as possible to avoid the nausea. She pushes on, determined to complete our goal of 150 feet, leading her family like a parade down the hall. Once to the gym I have Ann sit for a few minutes, because she's complaining of increasing dizziness and headache. My rehab aide grabs a glass of water, and I place a cool wash cloth on her forehead. After a few minutes she begins to feel better and we practice the step with her walker. This session has taken everything out of her, and we decide together that she'll have another session in the morning before going home. My rehab aide transports her back to her room by chair and we assist her back to bed.

I wrap up my day at my desk. Catching up on the emails I've missed and writing brief notes on my afternoon sessions. And then I go home, and leave my work at work. There's no paperwork to tuck in my bag and finish at home. There are no progress notes or patient discharge files piling up on my desk. There's no reason to sneak in early the next morning, nothing to "catch up" on.

The next morning my day starts like any other. I've got my list, I've got my coffee. Sitting down at my desk to check my email I hear an overhead page.

"CODE 333, 3E. CODE 333, 3E. CODE 333, 3E EDWARD."

My stomach drops. Code 333 is indicative of cardiac or respiratory arrest. 3E is my floor. We don't often hear codes called for our floor. I'm not on the unit, and I can't look anything up from where I am, but I can't shake the feeling that it's one of "mine." I do my chart reviews, since I was given 5 new evaluations today. I sip my coffee, convinced today that I will finish it without it getting cold.

Thirty minutes or so later, as I'm ready to head out to my first patient of the day one of our rehab aides who had been setting up rooms this morning comes into the office. "You know that was your guy, right? 3E45, they took him down to ICU." It was Art. My heart drops into my stomach and the best response I can come up with is, "better it happened here than at home."

As I walk from the office to the unit I push the "*what if I had sent him home?*" thoughts away for another time and enter a room. I'm greeted with a slight

smile by a patient with a wash cloth on her forehead and an emesis basin at her side. "Hello Judy, I'm Rachael from Physical Therapy, how are you feeling this morning?"



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ACUPUNCTURE FOR KNEE OSTEOARTHRITIS AND CHRONIC LOW BACK PAIN IN OLDER ADULTS

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OBJECTIVES

1. To understand the potential benefits of acupuncture as a pain management alternative for chronic joint pain.
2. To understand the mechanism by which acupuncture relieves pain.

Knee osteoarthritis (OA) and low back pain are common in the elderly. Knee OA is defined as a wearing away of the articular cartilage of the knee. Frequently the pain will occur with weight bearing, and patient will have difficulty with gait.¹ Knee OA affects more than one-third of persons older than 65 years old. Exercise, weight loss, physical therapy, intra-articular corticosteroid injections, and the use of nonsteroid anti-inflammatory drugs (NSAIDs) and braces or assist devices decrease pain and improve function. The NSAIDs and acetaminophen are the most commonly used pharmacologic agents for treating knee osteoarthritis. However, according to recent systematic reviews, NSAIDs are only slightly better than placebo and acetaminophen is modestly less effective than NSAIDs.² The only effective non-pharmacologic treatments are exercise and weight loss. Some patients with OA may have difficulty exercising or losing weight. Low back pain is also common in the elderly, with a prevalence of up to 49% of the population.³ It causes morbidity in older patients, including depression, functional disability, and decreased quality of life. Chronic, nonspecific back pain has unknown etiology. Most standard therapies have adverse effects, particularly in older patients. For example, NSAIDs have an increased risk of GI bleeding, which increases with age. Use of narcotic analgesia and muscle relaxing agents can increase the risk of falls in older patients.⁴

Acupuncture, as a nonpharmacologic modality, has been used in pain management for more than 3000 years.⁵ Of all the pain-related conditions, knee osteo-

arthritis and low back pain are the most frequently studied with acupuncture as an intervention.⁶ Acupuncture is an important part of Traditional Chinese Medicine (TCM). The word “acupuncture” is derived from Latin roots, means “to puncture with a needle.” Acupuncture treatment is to insert needles at various well-defined points known as “acupoints.” These points are located all over the body, close to the surface of the skin, and linked together in a complex network of “channels” or “meridians” along which energy known as Qi flows. Qi is the energy in the human body and when it becomes blocked or deficient people become unhealthy. Each acupuncture point has specific effects on individual organs. During acupuncture treatment, the points are carefully chosen to dispense any blockage and to bring the Qi into a better balance. The exact location of each acupuncture point is described in terms of the body part, relative to the bones, muscles or tendons. Most of the body’s acupuncture points lie along each of the 12 main channels and the 2 extraordinary channels. There are a total of 361 points along these channels. The acupuncture points can be imagined as small whirlpools where flow of Qi is disrupted. In addition to the points along the channels, there are so-called “Ah Shi” points which are tender spots and can be used as acupuncture points as well. New points are sometimes discovered and used to treat disease. These points are thought to overlap with trigger points used in Western medical terms.^{7,8}

Although acupuncture has been used for thousands of years to treat various diseases and increasingly is being accepted as an alternate medical therapy in the western world, the mechanism is still not fully understood. In the past several decades, there are extensive studies on the acupuncture’s effects on pain management (acupuncture analgesia), fat metabolism, cardiovascular regulation, modulation on immune and endocrine

systems. So far, mechanistic models have focused on acupuncture’s stimulation on the nervous system, muscles, and connective tissue.⁹

Acupuncture’s analgesic effects are the most studied and documented in the literature, parallel to the scientific understanding of pain perception in recent decades.^{6,9} The physiology of pain perception and modulation is complicated. Pain is frequently associated with tissue damage or potential tissue damage, although pain can be experienced without tissue damage. There are nociceptors in skin, skeletal muscle, tendon and joints responding to mechanical pain, temperature, and chemical substances. When peripheral nociceptors are stimulated, the signals travel up to a variety of brain structures to be processed and regulated. Not all the pain information will be transmitted to the brain. Current knowledge of pain control includes the gate control theory and the antinociceptive system.¹⁰

According to the gate control theory, large A beta fibers that carry mechanoreceptive information is transmitted and the input from the smaller nociceptor fibers is inhibited. Acupuncture analgesia can be explained by the gate control theory. Similar to transcutaneous electrical nerve stimulation (TENS), electrical acupuncture (EA) is often used clinically for better pain control.

Antinociception is suppression of pain in response to stimulation that would normally painful. The endogenous substances (endorphins) that activate antinociception mechanisms include enkephalins, dynorphin and β -endorphin, they bind to opiate receptors and block nociceptive signals.¹⁰ Acupuncture has been shown to increase the levels of endorphins in plasma and brain tissues. Studies show that acupuncture needle stimulation activates A β , A δ and C fibers and causes the secretion of endogenous opioids. There are a few well-identified areas of brain and

spinal cord that are known to be sites of opioid action: the hypothalamus, limbic system, basal ganglia and periaqueductal gray region, nucleus raphe magnus, reticular formation of the brainstem and spinal cord in dorsal horn. The descending inhibitory system travels from the hypothalamus and periaqueductal gray, through the medulla to the dorsal horn of the spinal cord, where inhibition of the afferent nociceptive information occurs. It has been observed that this acupuncture analgesia can be stopped by application of hypophysectomy and beta endorphin antiserum to the third ventricle.^{6,11,12}

The advance of fMRI and PET has provided further evidences for acupuncture point's specificity. For example, one study showed that when vision-related acupoints located in the lateral foot were stimulated, activation of bilateral visual cortex (occipital lobes) was found by fMRI. Stimulation of the eye directly by light caused a similar activation in the occipital lobe. But there was no activation following stimulation of sham points. fMRI studies also confirmed that the "de qi" sensation is related to the activation and de-activation of many brain regions including the PAG, insula, hypothalamus, primary somatosensory-motor cortex, anterior cingulate cortex, amygdala, and the hippocampus.¹²

The analogy of trigger points and acupuncture points is widely discussed. Trigger points have long been used for treatment of musculoskeletal pain in Western medical practice. A trigger point is defined as "a hyperirritable area within a muscle or its fascia, which will evoke a predictable pain pattern and often an autonomic response when compressed" by Janet Travell, et al.¹³ A total of 255 myofascial trigger points and their referred-pain patterns are described in the 1983 publication *Myofascial Pain and Dysfunction: The Trigger Point Manual*. Trigger points are localized spasms of muscle tissues, the result of overactive muscle spindles activated by SNS (adrenaline). There are active and latent trigger points, both can cause pain and muscle weakness. Treatment options include ischemic direct compression, injection, and dry needling. The dry needling method is very similar to acupuncture by using the same type of needles. Interestingly, the referred-pain patterns of myofascial trigger points

accurately follow the meridian distributions of their corresponding acupuncture points in 76% of cases, and have at least some relation in another 14% of cases.⁸ It suggests that trigger points may present a subset of acupuncture points, the Ah Shi points.

Current evidence from several large scale, high-quality RCTs suggests that acupuncture may be an effective treatment for knee OA with improved pain control and joint function for older patients. However, drawing conclusions is complicated depending whether acupuncture is compared with a waiting list, usual care, or sham control. A well designed randomized, controlled trial investigated the efficacy of acupuncture compared to minimal acupuncture and no acupuncture in patients with osteoarthritis of the knee.¹⁴ Minimal acupuncture was defined as superficial needling at non-acupuncture points. Two hundred ninety-four patients with chronic knee OA were randomized to 3 groups: acupuncture, minimal acupuncture, or a waiting list control. Treatment duration was 8 weeks, 12 sessions. Patients were allowed to take oral NSAID as needed. The waiting list control group did not receive treatment for a period of 8 weeks, after which time they received acupuncture. The primary outcome measure was WOMAC index. The secondary outcome measures included the German version SF-36, pain disability index (PDI), a scale for assessing emotional aspects of pain (SES), and the depression scale (ADS). Outcome measures were completed at baseline, 8, 26, and 52 weeks. The results showed that patients who received acupuncture had significantly better results for WOMAC than those in the minimal acupuncture and waiting list groups. The improvements at 8 weeks in the acupuncture and minimal acupuncture groups persisted at weeks 26 and 52, although the differences between the two groups were no longer significant. The patients in the waiting list group who received acupuncture between weeks 9 and 16 showed improvement similar to those in the original acupuncture group. Additionally, the percentage of patients taking analgesics in the acupuncture and minimal acupuncture groups decreased between weeks 1 and 8. In conclusion, patients with knee OA who received acupuncture had significantly less pain

and better function after 8 weeks than did patients who received minimal acupuncture (sham acupuncture) or no acupuncture. After 26 and 52 weeks, exploratory analysis indicated that differences between acupuncture and minimal acupuncture were no longer significant. The long term benefit of acupuncture diminished overtime, it is not surprising because OA as a chronic and degenerative disease may not be cured or reversed. It suggests that maintenance therapy may be beneficial. Because the waiting list patients also received acupuncture after 8 weeks, whether the benefit of acupuncture over no treatment was still clinically significant in the long term was difficult to assess. In this study, only days with intake of analgesics were assessed, not the amount. So it is hard to draw conclusion that acupuncture reduced the use of NSAIDs, more defined studies need to be done.

Another large scale study compared long-term efficacy and safety of standardized traditional Chinese acupuncture (TCA) with sham acupuncture and conservative therapy in patients with chronic pain due to osteoarthritis of the knee.¹⁵ One thousand seven patients who had chronic knee pain for at least 6 months due to OA were randomized to 3 groups. The treatment duration was 6 weeks. The TCA group received 10 sessions of acupuncture, up to 6 physiotherapy sessions. The sham group received 10 sessions of sham acupuncture, which were needling at defined non-acupuncture points with minimal depth. The conservative groups received 10 physician visits. All groups had up to 6 sessions of physical therapy and as-needed anti-inflammatory drugs. The patients knew whether they were in the conservative therapy group but were blinded to TCA versus sham acupuncture. The quality of blinding between the TCA and sham acupuncture groups was assessed in the final interview, it was believed to be successful. The primary outcome measure was WOMAC score at 26 weeks. SF-12 and global patient assessment were conducted at weeks 13 and 26. Success rate was defined by at least 36% improvement in WOMAC scores. The study showed that both TCA and sham acupuncture improve pain and functionality significantly in patients with knee OA more than conservative therapy. No significant differ-

ences were observed between the TCA and sham acupuncture. Apart from hematomas, no obvious adverse effects due to acupuncture were detected. The findings of this study supported the role of acupuncture in the multimodal treatment of patients with pain and functional limitations due to knee OA, even if the mechanism remains unclear. The sham method in this study was chosen to minimize any supposed nonspecific physiologic effects of deep needling and strong stimulation. From the results of the study, it was hard to distinguish the mechanism of true acupuncture and sham acupuncture. But for practical reason, patients seemed to benefit no matter what the mechanism was.

A recent review article attempted to answer whether acupuncture is effective for treating knee OA by conducting a systematic review and meta-analysis the existing evidences.¹⁶ The authors searched the MEDLINE, EMBASE, and Cochrane Center Register of Controlled Trials databases to January 2007 and identify 11 eligible randomized, controlled trials (RCTs). There were a total of 2821 patients involved. Standardized mean differences were calculated by using differences in improvement from baseline between patients assigned to true acupuncture and those assigned to control groups. Compared with patients in waiting list control groups, patient who received true acupuncture reported clinically relevant short-term improvement in pain and function. Patients who received true acupuncture also reported clinically relevant short- and long-term improvements in pain and function compared with patients in usual care control groups. However, compared with a sham control, true acupuncture provided clinically irrelevant short- and long-term improvement in pain and function. The author found that sham-controlled trials had heterogeneous results, probably due to the variability of acupuncture and sham protocol, patient samples, and the settings. They concluded that acupuncture's clinically relevant benefits may be due to placebo effects. No adverse events were associated with acupuncture in this review. Even though the conclusion of this review was that there was no clinically meaningful difference between sham-acupuncture and true acupuncture, it was clear that acupuncture pro-

vided meaningful short-term benefits when compared with waiting list and usual care.

The above meta-analysis review didn't include dry needling or trigger point therapy. Both of the two RCTs mentioned earlier allowed additional trigger points to be used in addition to traditional acupoints. It was known that trigger point needling could be used to treat pain as well, but it was not clear which acupuncture modes were more effective. A recent preliminary RCT investigated the use of trigger point acupuncture for knee OA.¹⁷ This study evaluated the effects of trigger point acupuncture versus standard point acupuncture versus sham acupuncture for knee pain. Thirty patients were recruited and randomized to 3 groups. Six patients dropped out later, so 24 patients were analyzed in the study. There were 5 treatment sessions for 5 weeks. A Visual Analog Scale (VAS) of pain intensity was assessed at baseline, weeks 1, 2, 3, 4, 5, 10, and 20. WOMAC index was assessed at baseline, weeks 5, 10, and 20. Patients were blinded to their treatment. The standard acupuncture group received treatment at traditional acupuncture points for knee pain, which included 6 points. The trigger point acupuncture group received treatment at trigger points in lumbar and lower extremity, the mean number of insertion was 3.3. The sham acupuncture group received needling at the trigger points, but the tips had been cut off to prevent the needle penetrating the skin. The VAS reduction at 5 weeks was significant for trigger point and standard acupuncture groups, but not for sham treatment. This improvement persisted at weeks 10, diminished at weeks 20. The VAS reduction of the trigger point group was the greatest among the three. The WOMAC score followed the same trend. Although the trigger point group scored the lowest among the three, the difference between trigger point and standard acupuncture groups was not statistically significant. The limitation might be due to small sample size. Trigger point release for myofascial pain is used routinely by physical therapists, and recently dry needling has gain popularity as well. Based on the similarities between acupuncture and dry needling, the studies on trigger point needling have clinical implication on the practice

of physical therapists. They may take advantage of the recent research evidence and incorporate this technique in their patient care.

One study looked at knee OA pain and sleep at the same time.¹⁸ There was little evidence to support acupuncture's effect on improving sleep quality even though it was speculated that acupuncture could regulate the melatonin level. Older patients with knee osteoarthritis often have morbidities of chronic pain and sleep disturbance, which significantly affect individual's health-related quality of life (HRQoL). This pilot study was conducted to explore acupuncture's effects on HRQoL reported by older persons with knee OA using acupuncture targeted to knee pain, poor sleep, or both. Twenty-six subjects were recruited in this randomized 4-group sham-controlled clinical trial in outpatient. Inclusion criteria were aged 55 and older with radiographically diagnosed knee OA, sleep disturbance as measured by a global Pittsburgh Sleep Quality Index score (PAQI) of 5+. The 4 groups were: true acupuncture for sleep and sham acupuncture for knee pain, true acupuncture for knee pain and sham acupuncture for sleep, true acupuncture for knee pain and sleep, sham acupuncture for knee pain and sleep. Acupoints selection was based on traditional Chinese medicine theory for treatment of knee pain or sleep imbalance. The treatments were 2 times per week for 4 weeks, followed by one time per week for 4 weeks. The primary outcome measures were WOMAC pain scale, global PSQI, SF-36 at baseline, after intervention, and at a one-month follow up. After adjusting for effects associated with age, sex, race, and Geriatric Depression Scale, receiving true acupuncture for pain, sleep, or both was associated with greater reported improvement in pain and sleep rating than receiving sham acupuncture. True acupuncture for knee pain was associated with better ratings of general health, vitality, and social functioning than sham acupuncture. True acupuncture for poor sleep was associated with better ratings of social functioning than sham acupuncture. This pilot study supported that acupuncture for knee pain, poor health, or both can improve perceived HRQoL. The authors suggested that acupuncture may provide a therapeutic modality that avoids the

potential complications associated with additional multipharmacy in older persons to treat both conditions. But they didn't mention whether patients were taking less medication with acupuncture treatment or not. More well designed studies were needed to answer this question. The clinical application of this study was also limited by small sample size, inadequate data analysis, and lack of external control of patients with other treatment and activity. However, this study laid the ground for future research.

Acupuncture has been shown to be a safe treatment for chronic low back pain in older adults. One study suggested that trigger point acupuncture was more effective than sham acupuncture in reducing pain (VAS score).¹⁹ This study evaluated the effects of trigger point acupuncture on pain and quality of life in chronic LBP patients compared to sham acupuncture. Twenty-six patients were randomized to two groups. Group received trigger point acupuncture and group B received sham acupuncture for 3 weeks, then there was a period of 3 week washout. After that, treatment resumed for 3 weeks with the two groups switching treatments, followed by another 3 week observation period. The primary outcome measures are pain intensity visual analog scale and Roland Morris Questionnaire. At the end of first treatment phase, group A receiving trigger point acupuncture scored significantly lower VAS and Roland Morris Questionnaire than the sham group. There were significant within group reductions in pain in both groups during the trigger point acupuncture phase, no significant change in the sham treatment phase. The between subjects effects in second phase was not statistically significant, with one explanation being that there was a certain carry over effect of trigger point acupuncture and a small sustained effect of the treatment, which could be further explored in future studies. The data suggested that trigger point acupuncture may have greater short-term effects on LBP in elderly patients, but the beneficial effects were not sustained. The authors mentioned trigger point acupuncture may be more effective than traditional acupuncture, but did not discuss it in detail. The sham acupuncture in this study did not penetrate the skin, which might avoid nonspecific acupuncture effects. This

technique would help distinguish the mechanisms of true acupuncture and nonspecific stimulation.

Another RCT attempted to determine if acupuncture was an effective and safe adjunct therapy to standard therapy for chronic, nonspecific low back pain in older patients.⁴ The subjects were randomized to two groups. The control group continued their usual care as directed by their physicians. The acupuncture group received biweekly acupuncture for 5 weeks in addition to usual care. Outcome was measured by modified Roland Disability Questionnaire (RDQ) at weeks 0, 2, 6, and 9. Fifty-five patients were enrolled, with 8 drop-outs. Twenty-four were randomized to acupuncture group and 23 to the control group. Acupuncture subjects had a significant decrease in RDQ score at week 6, compared with the control group. The effect was maintained at week 9. They also found that fewer acupuncture subjects had medication-related side effects compared with the control group. The conclusion was that acupuncture was an effective, safe adjunctive treatment for chronic LBP in older patients. The design of the study was pragmatic, which resembled more closely the clinical setting where acupuncture was actually used. The protocol of this study allowed the acupuncturists to choose more points depending on individual's condition, which made the treatment more effective. But there was no placebo group to control for nonspecific effects of acupuncture.

In summary, current evidence suggests acupuncture may be an effective treatment for older patients with knee OA and patients with chronic low back pain, but not enough data to support its efficacy over sham acupuncture. Acupuncture may also provide additional benefit in conjunction with standard therapy. However, several surveys showed that acupuncture was not well known by older adults as a complementary and alternative medical (CAM) therapy.^{20,21,22} According to one study, the researchers collected information about the back pain patients' experience and knowledge of 5 complementary and alternative medical (CAM) therapies, ie, acupuncture, chiropractic, massage, meditation, and tai chi, and if they were interested in trying these therapies.²¹ They found that except for chiropractic,

knowledge about acupuncture was low, even in Boston and Seattle where use of CAM therapies was generally high. Despite less knowledge of these therapies, substantial fractions of participants were willing to try acupuncture as a treatment if their primary care provider thought it reasonable, even if they had to pay a \$10 co-pay each visit. The study also found that responders showed a clear preference for receiving hand-on treatments as opposed to receiving education on self-care techniques.

According to a 2003 study on CAM use by older adults, the majority reported using CAM for pain relief (80%), or for prevention of disease or debilitation (70%). The study showed that the knowledge of CAM was extremely low across the sample, increased education about CAM was needed for older adults and health professionals.²⁰ A 2010 survey showed that 53% of people 50 and over reported using CAM at some point in their lives. The most use of CAM type is herbal products and diet supplements (37%), acupuncture is only used by less than 5%. The lack of knowledge about acupuncture among older adults and the fear of needling discomfort may contribute the low popularity of acupuncture. The survey also found that only a little over half of CAM users said they have ever discussed CAM with their health care providers. These findings highlight the need for providers to ask about CAM use at every patient visit, and the need for people aged 50 and older to know that CAM use is important to discuss with their conventional medical providers.²²

Acupuncture is a relatively safe treatment in most situations when general precautions are followed. Nevertheless, adverse events may occur such as needle pain, hematoma, local infections, dizziness, fainting, syncope, and injuries to internal organs. One article reported two cases of convulsive syncope during acupuncture treatments.²³ In both cases, the patients had previous acupuncture treatments and tolerated it well. They did not have history of neurological deficits. Both patients in this report had poor sleep the night before. After a few minutes acupuncture session, both patients experienced dizziness and nausea, cold sweating, and lost consciousness suddenly. A 12-lead ECG showed ST-segment depression, indicat-

ing myocardial ischemia. Syncope during acupuncture is a form of vasovagal syncope, which causes a sudden decrease or cessation of cerebral blood flow by inhibition of sympathetic system and activation of parasympathetic system. In most cases, patients recover spontaneously, but some patients may lose consciousness if they are not managed immediately. Convulsion syncope presents with irregular tonic clonic movements, and may be confused with seizure. Convulsive syncope is a rare complication of acupuncture treatment and course is benign. However, clinicians need to be cautious in delivering acupuncture to older and debilitated patients. Most RCTs inclusion criteria excluded those with complex conditions, but in real clinical setting, older adults are more likely to have complex diagnosis. It is advisable to consult professionals before getting acupuncture treatment.

In conclusion, acupuncture is safe and effective for treating knee OA and chronic back pain in older patients. Given the complexity of older adults' diagnosis, it is critical for the clinicians to get a thorough history and educate patients on various CAM therapies. It is too soon to recommend acupuncture as a routine part of care for patients with pain, but we should consider acupuncture as a treatment option in a multidisciplinary approach.

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CARE REDESIGN: PLANNING FOR REHAB IN A BUNDLED MODEL OF CARE WORLD

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OBJECTIVES

1. The reader will understand ways in which a bundled care model impacts rehab care delivery in the postacute setting.
2. The reader will identify the stakeholder providers in a bundled care model.
3. The reader will identify rehabilitation strategies for reducing re-hospitalizations.

THE SHIFT TOWARDS A BUNDLED CARE MODEL

As a physical therapy professional servicing the geriatric client, you are most likely aware of the Centers for Medicare and Medicaid Services' (CMS) role as the overseer of care for these clients; however, are you aware of its vision? In CMS's roadmap for value-driven health care, it states its vision for America as patient-centered, high quality care delivered efficiently, in a concerted effort to improve the Medicare Beneficiary experience of care. This approach conforms to the CMS Innovation Center Three Part Aim of: Better Health, Better Health Care, and Lower Costs. To accomplish this vision, CMS is advocating an approach called Bundled Payment for Care Improvement, Model 3, as one possible solution to improve services and lower cost for patients admitted to Skilled Nursing facilities. For many beneficiaries rehabilitation defines the skilled services required for safe transition through the continuum from acute care to recovery to restoration of independence.

Looking at new ways to pay for the services based on quality outcomes, efficient care, and enhanced communication across multiple continuums yields various "models" of proposed care. One of these models in the post-acute care (PAC) setting is the Bundled Payment for Care Improvement- Model 3, a retrospective bundle payment for PAC

that is triggered by an admission to one of 4 types of post-acute settings within 30 days of a hospital stay. The episodes chosen are based on DRGs that are identified at the acute care hospital and the episode begins upon admission to the participating skilled nursing facility. These post-acute settings in Model 3 include episodes that can be triggered in Long Term Acute Care Hospitals (LTACHs), Inpatient Rehabilitation Facilities (IRFs), Skilled Nursing Facilities (SNFs) and Home Health Agencies (HHAs). This model is based on the belief that quality of care and financial savings will be produced by enhanced care coordination and the elimination of unnecessary and/or duplicated services for a defined clinical condition over a defined time period or episode of care within the traditional Medicare program.

Our parent company, Golden Living, was accepted as "Awardee Convener" for a Model 3 bundling pilot at 5 SNFs across the country. As the rehabilitation provider to the patients of these Golden LivingCenters, Aegis Therapies is collaborating with Golden Living in planning for this bundled model of care. It will include the coordination of post-acute services, related readmissions from a Medicare post-acute provider occurring during the episode of care, and other related Medicare part B services according to the episode definition. The clients are traditional, fee-for-service, Medicare clients (in designated DRG groupings) and the episode is over a 90-day time period, originating with admission to our 5 SNFs within 30 days after hospital discharge. Understanding the full cost of this care across the continuum requires providers to know the needs of their patients both inside the SNF and outside their walls. This article outlines the rehab processes completed to date in one of these facilities preparing for this bundling care model. We will highlight

trends led by a change in our determination of patient care needs, along with the impact on length of stay and the resident's independence at discharge for a designated clinical condition--total hip replacement.

THE CURRENT SETTING AND REHAB OUTCOME MODEL

Post-acute Care Setting

This Golden LivingCenter is nestled in an urban setting near Milwaukee, Wisconsin, with an average daily census of 75 patients. This PAC setting is an SNF where the majority of patients are under care for short-term rehab as noted by an average daily rehab census of 90% of facility census. On any given day, approximately 23 full- and part-time rehab staff for Aegis Therapies represent the disciplines of occupational therapy, physical therapy, and speech-language pathology. Many of the patients admit with discharge plans to return home or to a community assisted-living or independent-living setting. In 2012, 92% of the patients with Medicare Part A in the diagnostic group Ortho-Hip met their goal of returning to the community setting. These patients had an average age of 81 and an average length of stay (LOS) of 29 days.

Rehab Outcome Measure and Estimated Level of Independence

Aegis Therapies uses The Rehabilitation Outcome Measure® (ROM, AccuMed, a division of Omnicare and was developed by South Coast Rehabilitation Services) scale to measure functional outcomes and treatment gain. This scale goes from 0.0 to 3.0 in increments of 0.5. The score 0.0 represents a patient who is totally dependent, while 3.0 represents a patient who is totally independent. However, each 0.5 increment does not represent an equal gain in independence. In other words, for a patient to go from 0.0 to 0.5 is a much larger gain in independence than for a

patient to go from 2.5 to 3.0. This is because to progress from 0.0 to 0.5 is to progress from total dependence (100% assistance) to maximum assistance (75% assistance), while the gain from 2.5 to 3.0 requires progress from modified independence (5%-10% assistance) to independence (0% assistance). In other words, the ROM is not an “equal interval” outcomes measure, as most outcomes measures are not.

In order to express ROM outcomes in more understandable terms, as well as to take into account the differing intervals of independence, Aegis created a crosswalk tool called the Estimated Level of Independence (ELI). The ELI is derived directly from the detailed training guidelines for the ROM tool that are used to certify raters to ensure inter- and intra-rater reliability. Those guidelines describe functional activities related to various ROM ratings in terms of the percent of dependence/independence of the patient. Table 1 demonstrates a compressed ROM- ELI crosswalk.

A SHIFT IN OUR THINKING

In order to embrace the needs of care in a bundled delivery model, the therapy team needed to reframe their concept of safe transitions. Through April 2013, the rehab criteria for discharge centered on the patient's need for independence, or highest functional level, to accomplish “X” task. Whether “X” was transfers, gait, or self-care skills, the recovery plan centered on the patient's maximum independence as the key driver for planning discharge to the next step in the continuum of care. This step often was home health services, and data for this demographic group from January through April 2013 shows 36% of the patients discharged were recommended for home health or outpatient services. What became evident was the need to strengthen the partnership with referring hospitals and home health agencies to identify the optimal sequencing and timing of care in preparation for the January 1, 2014, implementation date for the phase 2, or risk phase, of bundling.

Beginning in May 2013, the rehab team needed to implement and embrace a plan for more timely communication and safe transition through the various PAC environments. This would mean care re-design to support:

- shorter inpatient stays at the acute hospital (which was not in our direct control),
- a reduction in the short-term (inpatient) rehab stay at the SNF,
- enhanced communication with home health and agencies providing outpatient care to ensure safe return to the community,
- additional staff education and acceptance of caregiver continuity (consistent staffing model), schedule changes (workdays), and increased rehab coverage in the facility (days and hours of operation), and
- enhanced patient/caregiver education related to immediate illness (i.e., recent hip replacement) and education related to chronic conditions and comorbidities to prevent avoidable re-hospitalizations.

Steps to Care Redesign

As noted, the LOS in the acute hospital is not within the control per se of the receiving PAC provider. To better equip its referring partners with updated knowledge on its new care design model, the rehab team engaged in educational campaigns with the hospital discharge coordinators to improve communication from the acute setting to the PAC facility. The team identified the need for timelier acknowledgment of transfer sta-

tus for patients ready to leave the acute hospital. The hospital and SNF partners worked towards a consistent process for communication around admissions and, with the use of centralized admissions, found insurance verification and treatment authorization to be more streamlined and effective for order clarification upon arrival at the SNF. Work continues to refine these communications for immediate ability to act on admissions upon arrival. For example, knowing details of the surgical procedure and/or approach and limitations in weight bearing on admission enables staff to evaluate the patient more effectively.

On the flip side of reducing the time in the acute hospital is the need to prevent avoidable re-hospitalizations. In support of this focus, the SNF team established discharge processes that include a confirmed appointment with the patient's primary (community) physician, confirmed home health or outpatient therapy appointments, and phone contact one week post discharge. This reinforces our commitment to the patient for a safe transition from the SNF and support for overall wellness.

Next, the SNF team acknowledged the need to reduce the LOS within its own facility. Rehab assessments needed to begin on day one of admission, thereby providing immediate care to meet

Table 1. Compressed Crosswalk between Rehabilitation Outcome Measures (ROM) and Aegis Therapies' Estimated Level of Independence (ELI) Scale

ROM - Rehabilitation Outcomes Measure

ELI – Estimated Level of Independence

Compressed Crosswalk

ROM	PT/ OT ELI	SLP ELI
3.0	100.0%	100.0%
2.5	95.0%	90.0%
2.0	85.0%	75.0%
1.5	75.0%	50.0%
1.0	50.0%	25.0%
0.5	25.0%	10.0%
0.0	0.0%	0.0%

the needs of the patient in the PAC environment. This required adjustment in scheduling and provision of care across a typical week. Access to skilled therapy expanded in both increased hours per day (available services to the provider) and days per week (available services to the patient).

The SNF team also strengthened the education and training component of care, which extended greater focus to the caregiver or health coach. To address this step in the recovery, the team provided enhanced education through patient training tools and teach-back methodology for consistent demonstration of safety and mobility. The patient gain is greater carryover and support in the next step of the continuum, which is paramount to an earlier discharge.

Supporting discharge planning simultaneously with admission is another shift in clinical planning. The team worked to collaborate with home health agencies used by the referring hospitals, which were often agencies with whom the patients had contact prior to admission to the facility. This provided for another continuous step in the patients' recovery, supporting that we are all working toward one end: the patient's safe return home.

There is potential risk with daily therapy and inclusion of patients and their health coach in the recovery process based on greater demand of their time and commitment toward recovery. The patient in a care re-design model is more engaged and participatory in his or her own recovery and less passive in his or her care. To assess patient satisfaction, the rehab team used a survey process asking the patient to rate the overall rehab experience. Three statements specifically fed into this aggregate score:

1. The therapy resulted in improved quality of life.
2. Overall, the quality of therapy services received was satisfactory.
3. I would use these therapy services again or recommend these services if someone I know needed care.

In the first two quarters of 2013, survey results showed 77% of respondents *strongly agreed* with these statements. In the third quarter with care re-design in place, a consistent response of 77% *strongly agree* was again received; this reinforced that care remained patient-centered and of high quality. They were

proud to see stability in patient satisfaction with their overall care from the Aegis Therapies team while continuing to plan for optimal bundled care delivery.

To highlight the changes in patient independence noted with care redesign, Figure 1 displays one case example of outcomes from care pre- and post-redesign for the same patient. This represents two different episodes of care for the same patient, focused on a similar clinical orthopedic condition, total hip replacement.

Data on the left is from care rendered in the first month of care redesign (May 2013), when the patient was admitted following a left total hip replacement (THR). The PT plan of care (POC) documented a treatment frequency of 5 times per week with the following PT procedures ordered: therapeutic exercise, gait training, therapeutic activities, and electrical stimulation. The resultant facility LOS was 17 days with 13 days of rehab across PT and/or OT, which equated to 76% of the SNF days including skilled therapy services. Specifically, PT administered 12 treatment sessions at an average of 39 minutes per session.

On the right, you see data from care rendered in September 2013, which was 4 months into the new model. The same patient was admitted in September, this time with a right THR. Physical therapy treatment procedures were the same as for the prior POC, however, ordered at a frequency of 6 times per week. Facility LOS was 13 days with 11 days of rehab across PT and/or OT, or 85% of the days including skilled therapy services. Specifically PT administered 10 treatment sessions at an average of 46 minutes per session. Significant to note is the respectable level of overall independence accomplished under the new care model with 24% reduction in LOS and 9% increase in days of skilled therapy.

In both episodes of care, this patient transitioned to home health upon discharge from the SNF. This patient appreciated safe transition to the home environment after care redesign based on therapy services delivered yielding positive patient outcomes, less burden of health care cost (shorter LOS), and expedited assessment of needs at each level. These needs were determined to be greater access to skilled therapy in

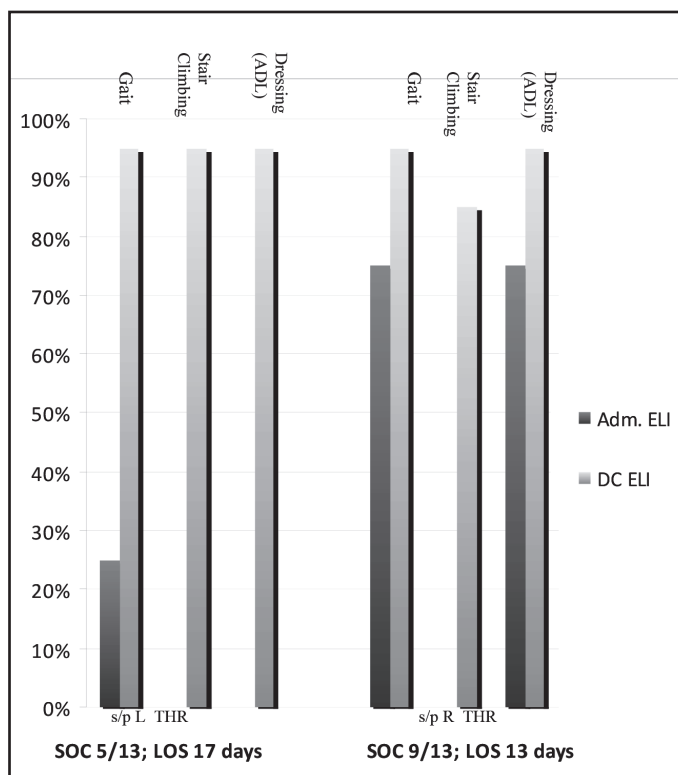


Figure 1. Pre- and Post-care Redesign Outcome Measures for Gait, Stair Climbing and Dressing (OT-ADL tx) - respectively Two Episodes of Care. Same patient. Estimated Level of Independence (ELI) based on Rehab Outcome Measure rating.

terms of both days of stay and minutes per session. One might point out that the discharge ELI for stair climbing during the second stay was 10% less than for the first stay. However, in comparison, consider the functional impact of 85% independence documented by the therapist as requiring stand-by assistance versus 95% independence documented by the therapist as requiring supervision. In the bundled model of care, this must be weighed against the reduction in LOS (ie, cost) to truly consider overall impact from care redesign. The resultant reality is that significant gain was appreciated and safe return home was accomplished through reduced LOS, enhanced access to therapy during the inpatient stay, and

improved communication for staging the next step in the continuum.

If we look at patients in the Ortho-Hip diagnostic category in traditional/original Medicare versus Managed Medicare (Medicare Replacement plans), the outcomes for this SNF reveal similar trends. See Figure 2 for details. In this one setting when comparing the pre-redesign approach from January through April to the care redesign planning/pilot from May through September, positive attainment of independence (discharge ELI) with significantly lower LOS can be seen. Supported by these examples is the stable overall functional gain with reduction in LOS for those patients in the Managed Care group and almost

15% higher gains for the patients in the Medicare Part A group.

SUMMARY

The team readily admits that this planning phase of the bundling pilot is a work in process. They anticipate further reform to steps, procedures, and information flow as this continues to evolve. Best practices learned to date include:

- open communication with referring/referral agencies focusing on the patient's needs for optimal care at the right time in the right setting,
- therapists' acceptance of changes in work hours and/or days to accommodate the needs of the patient for

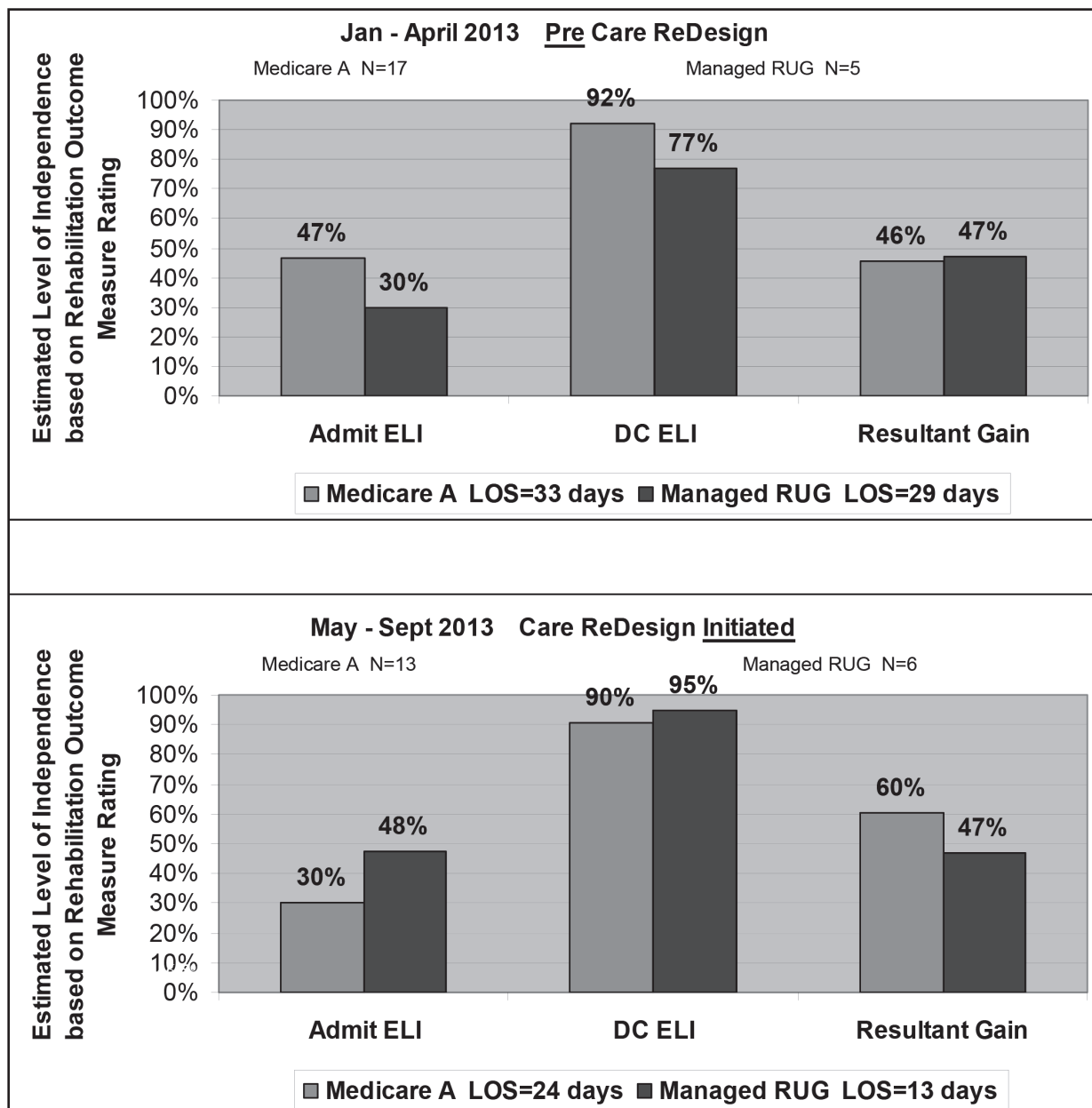


Figure 2.

- efficient delivery of care,
- ongoing and consistent education/training materials for the patient and health coach,
- effective follow-up after discharge from one PAC environment to the next including the earlier engagement of Home Health, and
- commitment to keeping care patient-centered for quality outcomes and patient satisfaction.

RESOURCES

Center for Medicare and Medicaid Services (CMS)- Roadmap for Implementing Value Driven Healthcare in the Traditional Medicare Fee-for Service Program. http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityInitiativesGenInfo/downloads/VBPRoadmap_OEA_1-16_508.pdf. Accessed November 8, 2013.

Center for Medicare and Medicaid Services (CMS) Innovations Center Bundle Payment for Care Improvement-Model 3. <http://innovation.cms.gov/initiatives/BPCI-Model-3/>. Accessed November 8, 2013/



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EDUCATIONAL OPPORTUNITIES FOR THE REHABILITATION PROCESS OF A TOTAL KNEE ARTHROPLASTY

Scott Johnson, PT

LEARNING OBJECTIVES

1. Gain awareness of opportunities to provide education to patients undergoing total joint replacement, from preoperative education, throughout the continuum of rehabilitative care.
2. Review an example of a successful multidisciplinary education program for patients undergoing total joint replacement.

Educational opportunities during the course of a total knee arthroplasty (TKA) are critical to successful outcomes for patients. The options offered across the country vary greatly from no formal preoperative education to comprehensive, multidisciplinary classes. Forty percent to 80% of medical information provided by a health care practitioner is forgotten immediately; furthermore, almost half of the information that is remembered is incorrect.^{1,2} What might seem elementary to a health care provider may be completely foreign to a patient when it comes to the rehabilitation of a TKA. This leads to frustration, dissatisfaction, and quite possibly a less than desired outcome.³ The solution is to provide repetitive educational opportunities to achieve retention of this new information.

In one Canadian study, patients reported the main sources of knowledge of a TKA were family members, friends, acquaintances, and doctors.⁴ It is clear that there is a need for more formalized patient education before a TKA in order to support patients through the surgery and recovery process.⁵ There may even be a financial component that health care organizations need to consider. Better understanding of the rehabilitation of a TKA by the patient will offset preoperative fears and can reduce the hospital stay itself by as much as a full day.⁶

In this author's opinion, offering extensive educational opportunities for patients receiving a TKA is best practice. We have been fortunate to work in an

organization that supports this belief. There is a unique opportunity to offer additional education and support for these patients in an orthopedic surgeon's office both preoperatively and postoperatively.

Once a patient has decided to undergo a TKA, the education process for rehabilitation should start in the surgeon's office. The surgeon provides a diagnosis to the patient and gives the patient options. At that point, education should be handed off to someone who has been educated extensively in rehabilitation. Physical therapists should be the discipline that assumes this role. The American Physical Therapy Association defines a physical therapist as a "highly-educated, licensed health care professional who can help patients improve or restore mobility." Once again, we are fortunate to have an organization and an orthopedic practice that supports this belief.

At this point, this author would like to share the educational journey our patients experience once the decision has been made to undergo a TKA. The patient is introduced to a physical therapist in the orthopedic surgeon's office who initiates preoperative motion and strengthening exercises immediately. There is emphasis on case studies that show that preoperative exercises consisting of flexibility and strengthening are successful in improving pain levels and functional task performance, both before and after a TKA.³ The exercises are taught to the patient, and the patient performs several repetitions of each exercise to ensure the proper technique is being performed. A written home exercise program is given to the patient, and the patient is educated on frequency and repetitions, based on tolerance. In some situations, the patient is extremely debilitated and formal physical therapy is warranted. If the patient is in agreement, the surgeon will prescribe preoperative physical therapy, and the patient

will complete this at an outpatient physical therapy clinic of their choice.

Thankfully our institution requires all patients receiving an elective TKA to attend a preoperative joint class. This free class is offered to all patients and their care providers and is taught by a dietician, a clinical nurse specialist, and a physical therapist. The duration of the class is 2 hours, and the curriculum is broken down to 15 minutes of nutrition, 45 minutes of medical information, and one hour regarding physical therapy and the role of occupational therapy. Outside sources have questioned the duration of our class; however, we believe all of the content is necessary, and attendees report an average satisfaction score of 4.9 out of 5.0.

Evidence is mixed in regards to the benefits of a preoperative education class for patients receiving a total knee replacement. Research has shown that preoperative education can improve patient outcomes and satisfaction with the surgical experience.⁷ However, a Cochrane Review regarding preoperative education for hip or knee replacements indicates little evidence to support the use of preoperative education over and above standard care to improve postoperative outcomes in regards to pain, length of stay, and function.⁸

In response to this Cochrane Review, this author questions the content of the classes that have been studied. Do instructors emphasize the importance of patient and patient-caregiver participation? Do courses emphasize the importance of early knee range of motion, regardless of pain, and the consequences of limited knee range of motion? Do they emphasize expectations regarding hospital length of stay and hospital disposition? Does the educator go over preoperative exercises in detail and encourage patients to attempt to improve knee ROM and strength prior to the operation? Also, one must ask if there is any value in a patient's perception of a

total joint program and the reduction of anxiety that is found with a preoperative program.⁶

This author cannot find any literature correlating the efficiency of the acute care physical therapy evaluation of a TKA with the patient's participation in a preoperative education class. However, this author's experience finds the necessity of a longer evaluation for patients who have not attended the preoperative class, in order to provide adequate information to the patient and the patient's caregivers. Appendix 1 is an outline of the topics covered during the one hour physical therapy section of the class.

The education continues on the day of surgery. Many institutions debate the timing of physical therapy initiation during the patient's hospital stay. This author finds great value for many reasons, but specifically from an education standpoint, in initiating physical therapy the day of surgery. Many family members/caregivers are present in the patient's room on the day of surgery, thus present for the patient's first physical therapy session. This gives the therapist the opportunity to share valuable information to the patient, as well as the family members/caregivers, regarding physical therapy and the continuation of care beyond the patient's hospital stay.

At this point everyone in the room can hear the recommendations and expectations of the patient and family members/caregivers during the recovery process. Valuable information should be shared during this session, including proper use, frequency and duration of cryotherapy, proper positioning in the LRU Pillow, importance of edema control, and how to manage the edema during the hospital stay, as well as beyond the hospital stay. Restrictions and safety concerns are also shared at this time. Exercises are initiated and proper technique, frequency, and repetitions can be conveyed. Of course providing the patient with a written exercise sheet/booklet will allow the patient to review the exercises without the presence of the therapist. Written information leads to better treatment adherence.⁹ If it is appropriate, mobility can be initiated, and the education process continues with proper movement of bed mobility, transfers, and gait.

From a therapy standpoint, it is also important to give an overview to the patient and family members/caregivers of what to expect during the hospital stay, as well as beyond the hospital stay. Through trial and error, our institution has found that 2 weeks of home therapy, followed by outpatient therapy, yields desirable outcomes. Therefore, this information is provided to the patient and family members/caregivers so that the expectations of the near future are understood. Of course patients have choices which we respect, but our professional opinion is shared and recommended. If patients understand why a certain course of care is recommended, they tend to be more compliant with the program. Remember, this is not the first time the patients are hearing this information. It was shared in the preoperative education class as well. Repetition is important. This repetition of information continues each day of the patient's hospital stay. As appropriate, more information/instruction is provided to the patients, such as stair training and car transfers.

Despite the visual, verbal, and written education provided to the patients preoperatively and during their hospitalization, we find that many patients still have questions beyond their hospital stay. This is when the education is assumed by the home physical therapist. We are fortunate to be able to work closely with a home health agency that is a part of our organization. It is cru-

cial that the information provided to the patient is consistent with previously communicated knowledge and beliefs.¹⁰ Formal education has been provided to our home health physical therapists to ensure continuity of information. This is a key to patient satisfaction, and provides further credibility and reinforcement to the information that has been provided to the patients in the hospital.

Regardless of our belief in the educational process of rehabilitating a patient receiving a TKA, it is all for naught if the patient is not satisfied with their outcome. Pain relief and return of function are the main goals following a TKA.¹¹ Adequate range of motion is a necessity for return of function. It is this author's belief that adequate knee range of motion is the foundation of a successful recovery and the window of opportunity to gain adequate range is a quickly closing window of opportunity. Therefore, we objectively track our patient's knee range of motion at hospital discharge and 2 weeks beyond their hospital stay. Figure 1 is a summary of our patient's knee range of motion at hospital discharge in the year 2012. It was mentioned earlier that our institution has found that 2 weeks of home therapy followed by outpatient therapy yields the most successful outcomes. Figure 2 is a summary comparing knee range of motion at 2 weeks postoperatively of patients who had home health physical therapy for 2 weeks and patients

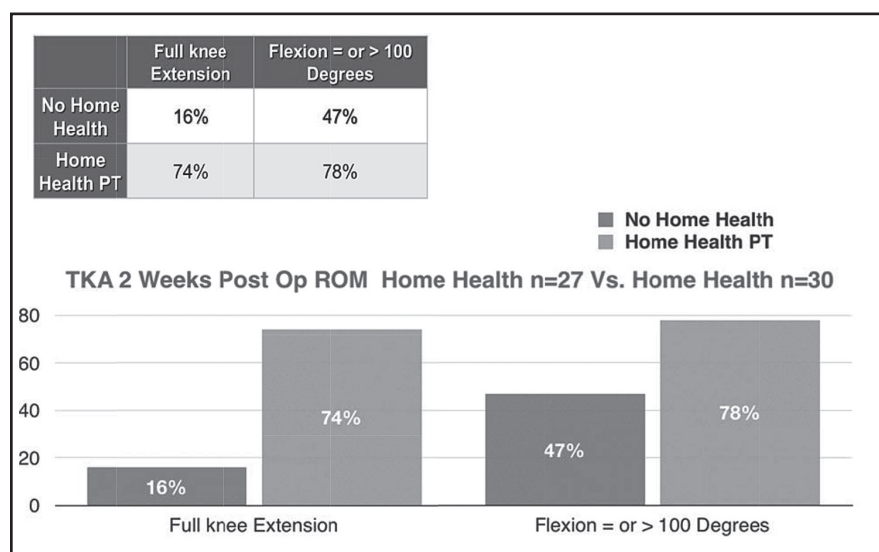


Figure 1. We discovered that continued activity limitations beyond the hospital stay for 2 weeks (with proper PT intervention) yielded much better results. The no home health group was sent to outpatient PT.

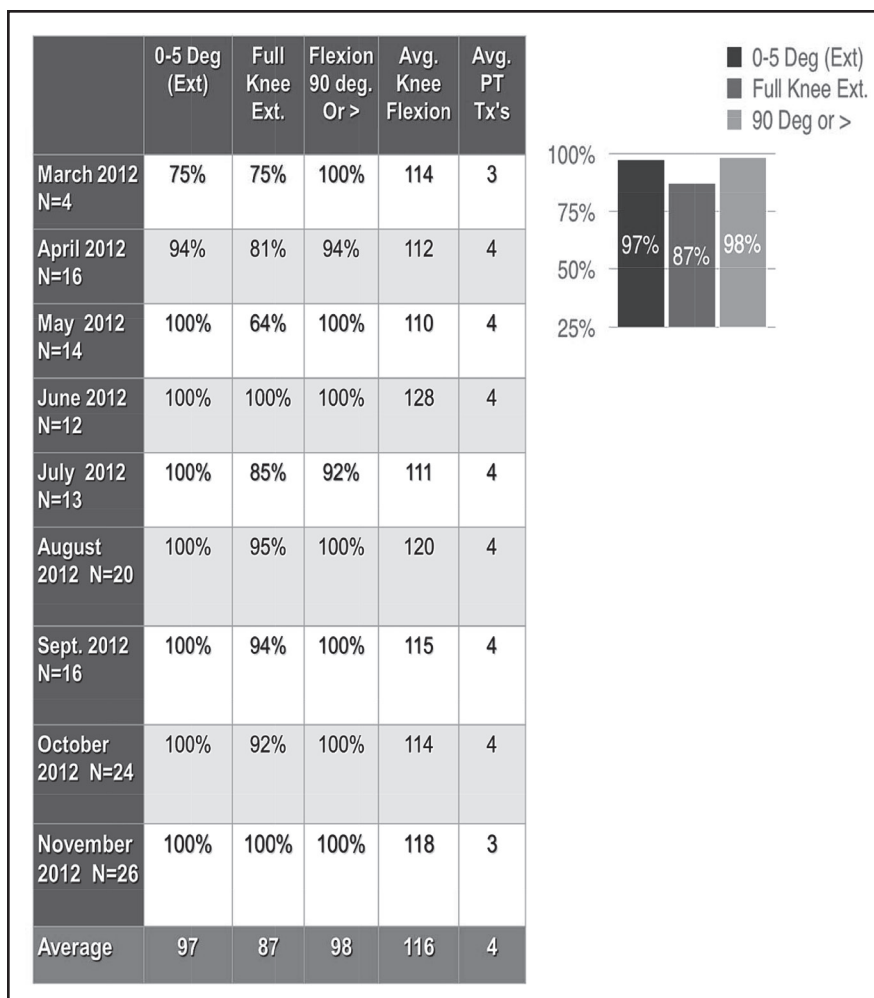


Figure 2. TKA range of motion outcomes at hospital discharge.

who went directly to outpatient physical therapy following their hospital stay.

Most patients at the 2-week mark begin outpatient physical therapy where the educational process continues. There is reinforcement of continued edema control and importance of knee range of motion; however, once these goals are obtained the education shifts to higher level strengthening, higher level balance activities, and further gait training. This education is performed in the outpatient setting via verbal, visual, and written means, followed by patient teach back.

Intentional and extensive education is critical for a successful total joint program. Physical therapy should assume a large role in this educational process through the continuum of preoperative education classes, acute care therapy, home therapy, and finally, outpatient physical therapy. This will lead to satisfied customers (both patient and family members), less frustration, desirable

outcome, satisfied employees, and quite possibly a financial gain to the health care institution.

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For the past 6 years he has been the Acute/Outpatient Orthopedic Service Line Specialist. In this role he facilitates the rehabilitation continuum of care for total joint replacements including teaching preoperative education classes, evaluating and treating postoperative total joints during the acute hospital stay, facilitating home health total joint protocols, and ensuring the transition to outpatient physical therapy.

Appendix 1. Pre-op Education for Total Knee Arthroplasty and Total Hip Arthroplasty

1. Purpose of physical therapy-Gross Mobility

- Bed mobility
- Transfers
- Gait
- Steps
- Exercises (Strength and ROM)
- Education regarding precautions (Discuss that physical therapy will start within 24 hours of their surgery)

2. Equipment-Ambulatory Aid

- Walker (Discuss differences in walkers)
 - 4-wheeled walkers usually do not work well immediately following a TKA or THA. They are too mobile, heavy, difficult to manipulate a single step.
 - FWW are recommended secondary to smoother gait pattern. If you have a bad back, neck, and/or shoulder, picking a standard walker up with every step just irritates these structures.
- Crutches are OK as long as patient is safe. Most patients feel more comfortable with a FWW.
- If patient already has equipment that they believe they will use after the operation, encourage them to have equipment brought to hospital so that physical therapy can assess safety and height.
- Explain that the last facility that the patient is in before returning home will be responsible for required equipment.

3. Clothing

- It is OK to bring in clothes to wear. Recommend loose fitting clothes, preferably with an elastic waistband.
- Incision needs to be easily accessible.
- We prefer to use our gowns with the snaps until the patient no longer has an IV.
- Recommend comfortable shoes with non-skid surface. Shoes without laces are usually easier to don.
- We will supply the patient with a pair of non-skid surface slippers, but once he or she starts walking longer distances, and potentially manipulating steps, they may prefer their shoes.
- Patient's foot and ankle may be swollen after surgery, so tight fitting shoes now may not fit after the surgery.

4. Occupational Therapy

- Patients will be seen by an OT to assess and educate regarding ADLs, such as dressing, bathing, toileting, etc...

5. Hip Precautions (Posterior and Anterior Approach)

6. Home Modifications

- Look at height of chairs, bed, commode. Elevating surfaces for THA is a necessity. Elevating surfaces for TKA will make their function during their recovery easier.
- Recliners are OK for THA patients as long as they do not tilt forward, forcing patient to bend past their 90 degree precaution at the hip.
- Recommend chairs with armrests. This allows for ease of sitting and standing. This also allows THA patients to stand straight up and sit straight down without the need to bend too far forward at the waist.
- Recommend high-density foam to elevate chairs, including car seat. This can be purchased at fabric stores already cut to size of standard chair. Usually recommend 2, 2-inch foam pads stacked on top of each other.
- Recommend "bed lifts" to elevate the bed
- Discuss elevated toilet seats and BSC

7. Pre-op Home Visit

- Performed by a physical therapist from a local home health agency
- Visit not mandatory but recommended
- The therapist applies the information discussed in class to their home. PT will review exercises, answer questions as needed.
- Fidelity will call patient within 24 hours with information regarding insurance coverage of the visit. If the patient requests a visit, the physical therapist will call to schedule a time.

8. TKA protocol

- Limited activity during hospital stay and beyond their hospital stay until follow-up with Surgeon
- Emphasize importance of ROM and controlling swelling
- Discuss the use of the polar ice machine
- Discuss the use of the LRU Pillow
- Our minimal goal for AAROM of surgical knee: 0-100°. (It is not uncommon to achieve much greater flexion outcomes).
- Explain the continuum of care: acute care PT home health PT outpatient PT.

9. Options of therapy beyond hospital stay

- Home with home health followed by outpatient PT
- ECF (additional PT will be discussed by the therapist at ECF or by surgeon)
- Inpatient rehab (additional PT will be discussed by the therapist at inpatient rehab or by surgeon)

Demonstration of preoperative physical therapy exercises

POLICY TALK: JOINT REPLACEMENT

Ellen R. Strunk, PT, MS, GCS, CEEAA

OBJECTIVE

1. The reader will gain awareness of the reimbursement issues surrounding joint replacement surgery and the rehabilitation of patients who undergo joint replacement surgery.

Since this *GeriNotes* issue focuses on the subject of total joint replacements, it is relevant to look at the policy and regulatory environment surrounding the treatment of total joint replacement patients. Since the first knee replacement surgery in 1968, improvements in surgical materials and techniques have greatly increased its effectiveness. According to the Agency for Healthcare Research and Quality, more than 600,000 knee replacements are performed each year in the United States. This article will review recent regulatory news related to joint replacement as well how policy and payment for joint replacement may be modified in the future.

The Department of Health & Human Services (HHS) released a report in May of this year that highlighted the significant variation across the nation in hospital charges for joint replacements. Hospitals can determine what they will “charge” for items and services and even within the same geographic area, hospital charges for similar services can vary significantly. For example, average inpatient hospital charges for hospital services connected with a joint replacement (MS-DRG 470) range from a low of \$5,300 at a hospital in Ada, Oklahoma to a high of \$223,000 at a hospital in Monterey Park, California.¹

Figure 1 illustrates this variation. The national average inpatient charge for certain joint replacements (MS-DRG 470) is \$50,116, while the average inpatient charge in the Hospital Referral Region (HRR) of Minneapolis is \$36,594. The average charge in the HRR of Birmingham is \$53,139. In addition, within each market there is large variation, with charges varying from \$22,788 to \$58,683 in Minneapolis and \$23,640 to \$141,035 in Birmingham.¹

I. Auditing and Medical Review

Because of the amount of money spent on joint replacements and emphasis on controlling costs, it is easy to understand why Joint Replacement surgeries and rehabilitation following joint replacements are a popular subject for medical review.

Medicare covers medically necessary major joint replacements in addition to the inpatient hospital services related to these procedures. The services related to major joint replacements had an improper payment rate of 11.5%, accounting for 2.1% of the overall Medicare FFS improper payment rate. The projected improper payment amount for joint replacements during the 2011 report period was approximately \$686.7 million.²

Medical necessity errors accounted for all of these improper payments, meaning that the records submitted did not support that the major joint replacement was reasonable and necessary. Reviewers look at the totality of the medical documentation to make the determination of whether the total joint replacement was medically necessary. Information considered when making a medical necessity determination includes: (1) beneficiary signs and symptoms, (2) rationale for

joint replacement versus non-surgical therapies, (3) history of joint disease, (4) pre-operative outpatient treatments, (5) joint exam findings, and (6) other supporting pre-, intra-, and postoperative findings. The most common pieces of information missing from the medical record are the preoperative condition of the joint ailment and the history of non-surgical therapies to treat the ailment.

Example: The beneficiary was admitted to the hospital for hip replacement surgery. The only documentation submitted was a preoperative assessment that stated “conservative treatments failed, planned hip replacement.” There was no submitted documentation of the beneficiary’s signs and symptoms, preoperative course of care, physical exam findings, or radiological results. This claim was scored as an improper payment due to a medical necessity error, as the submitted documentation did not support that the hip replacement was reasonable and necessary.

While there are no widespread specific Medicare or private payer payment policies that directly address joint replacements, we are acutely aware of reviewer focus on Therapeutic Exercise (CPT code 97110). Therapeutic Exercise is a common intervention used extensively by physical therapists on patients who have received joint

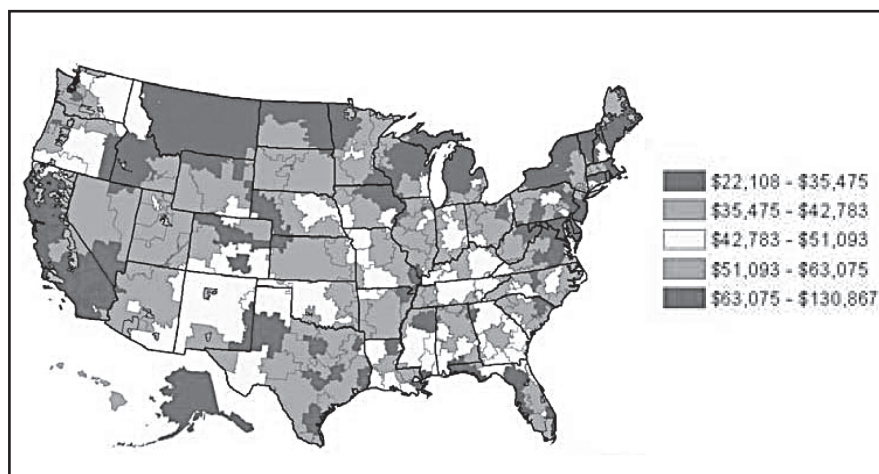


Figure 1.

replacements. It is also an intervention that physical therapists find difficult to document for on an ongoing basis. Too often we rely on number of sets, number of reps, and a listing of exercises to justify medical necessity and intensity of care, rather than explaining why the skills and judgment of a trained therapist were required during the exercise session.

In the last issue of *GeriNotes*, this author shared with readers MedPAC's recommendation to tighten diagnosis coding practices for therapy services by discontinuing the use of V-codes as primary diagnoses on therapy claims. Consider the impact this would have on therapy claims for joint replacement patients! Have you ever stopped to consider how often you utilize these codes for your physical therapy claims (See Table 1)?

In October 2012 after Recovery Audit Contractors (RAs) targeted inpatient hospitals who billed for major joint replacements or re-attachments with major complications or comorbidities (MCC), CMS published a Medlearn Matters article to assist physicians in providing supportive documentation³. This article is also a good educational article for physical therapists who see patients postoperatively. It highlights the need for providing a complete description of historical and clinical findings, such as description of pain, limitation of Activities of Daily Living (ADLs), comorbidities and safety issues. It also stresses the importance of providing objective evidence of physical examination, such as deformities, range of motion, effusion, tenderness and description of gait.

II. Prospective Payment Systems

Physical therapists who work in post-acute care settings, such as long term care hospitals (LTCHs), skilled nursing facilities (SNFs), inpatient rehabilitation facilities (IRFs) and home health agencies (HHAs) are familiar with the prospective payments for their own setting. The intensity of therapy delivered in the SNF, IRF and HHA is directly tied to the payment level of these provider types. Therefore the 'amount' of therapy becomes a hot-button issue for therapists.

The inpatient rehabilitation facility, however, is unique because in order for a facility to maintain its IRF status, 60%

of its patients admitted must fall into one of 13 medical conditions – either as a primary condition or a comorbidity. One of those conditions is severe or advanced osteoarthritis involving two or more weight bearing joints. CMS has added the following patient characteristics for providers to use when determining if an IRF stay would be justified: knee or hip replacement, or both, during the preceding hospital stay and also meets one or more of the following:

- Bilateral knee or bilateral hip joint replacement during the acute care hospital admission immediately preceding the IRF admission;
- Patient is extremely obese (BMI of at least 50); or
- Aged 85 or older at the time of IRF admission

Given the complexity of the requirement itself, it is important for therapists in IRF settings to contribute to the decision making process of whether to accept joint replacement patients. The documentation criteria set forth in the Medicare manuals for "reasonable and necessary" IRF stays⁴ include emphasizing the interdisciplinary approach to care, the need for coordinated care of multiple therapy disciplines which is uniquely provided in IRF, and that the patient can benefit from the intensity of therapy provided in a SNF – a minimum three hours of therapy services.

Therapists in the remaining post-acute care settings – SNF, HH and

outpatient - must also be prepared to document the skilled services provided. It is logical to presume that as the patient gets farther out from surgery, the intensity of therapy should decrease as the patient is transitioned to self-care and independent home programs. If the patient varies from this course, the documentation must support why the skills of a therapist are still required.

III. Value Based Purchasing: Hospital Acquired Conditions / Rehospitalizations and Readmissions

The Hospital Value-Based Purchasing (VBP) Program is a Centers for Medicare & Medicaid Services (CMS) initiative that rewards (or penalizes) acute-care hospitals with incentive payments for the quality of care they provide to people with Medicare. CMS rewards hospitals based on the **quality** of care provided to Medicare patients, how closely best clinical practices are followed, and how well hospitals enhance patients' experiences of care during hospital stays. Hospitals are no longer paid solely based on the **quantity** of services they provide. This concept of payment is moving quickly and will soon be tied to payment in other settings as well.

There are several aspects to VBP for hospitals including: measures processes of care (evidence based practices), patient experience (communication by health care providers, cleanliness), clinical outcomes (mortality rates, infections) and efficiencies (spending per beneficiary). Joint replacements have been and will be integrated in a number of ways.

Table 1. ICD-9 codes include in range V43.60 to V43.7

ICD-9 CODE	ICD-9 CODE DESCRIPTION
V43.60	UNSPECIFIED JOINT REPLACEMENT
V43.61	SHOULDER JOINT REPLACEMENT
V43.62	ELBOW JOINT REPLACEMENT
V43.63	WRIST JOINT REPLACEMENT
V43.64	HIP JOINT REPLACEMENT
V43.65	KNEE JOINT REPLACEMENT
V43.66	ANKLE JOINT REPLACEMENT
V43.69	OTHER JOINT REPLACEMENT
V43.7	LIMB REPLACED BY OTHER MEANS

A. Hospital Acquired Conditions

Section 5001(c) of the Deficit Reduction Act required the Secretary to identify conditions that:

1. Are high cost or high volume or both,
2. Result in the assignment of a case to an MS-DRG that has a higher payment when present as a secondary diagnosis, and
3. Could reasonably have been prevented through the application of evidence-based guidelines.

For discharges occurring on or after October 1, 2008, Inpatient Prospective Payment System (IPPS) hospitals do not receive the higher payment for cases when one of the selected conditions is acquired during hospitalization (ie, was not present on admission). The case is paid as though the secondary diagnosis is not present.

For therapists working with post-op joint replacement patients in hospitals, the Hospital Acquired Conditions (HACs) list includes⁵:

- Foreign object retained after surgery
- Air embolism
- Falls and Trauma
- Surgical site infection following spine, neck, shoulder and elbow orthopedic procedures
- Deep Vein thrombosis and Pulmonary Embolism following total knee replacement and hip replacement surgeries

B. Rehospitalizations and Readmissions

Section 3025 of the Affordable Care Act added section 1886(q) to the Social Security Act establishing the Hospital Readmissions Reduction Program, which requires CMS to reduce payments to inpatient hospitals with excess readmissions, effective for discharges beginning on October 1, 2012. CMS finalized its policies with regard to the readmission measures under the Hospital Readmissions Reduction Program.

A readmission is defined as an admission to a hospital within 30 days of a discharge from the same or another hospital. CMS developed methodology which is used to calculate the excess readmission ratio for each applicable condition; it is then carried over to the readmission payment adjustment. A hospital's excess readmission ratio for a condition is a measure of a hospital's readmission performance compared to

the national average for the hospital's set of patients with that applicable condition.

CMS did establish a risk adjustment methodology, which includes adjustment for factors that are clinically relevant including patient demographic characteristics, comorbidities, and patient frailty.

First CMS establishes 3 years of discharge data and a minimum of 25 cases to calculate a hospital's excess readmission ratio for each applicable condition. For example, for fiscal year 2013, the excess readmission ratios are based on discharges occurring during the 3-year period of July 1, 2008 to June 30, 2011. And for FY 2014, the proposed excess readmission ratios will be based on discharges occurring during the 3-year period of July 1, 2009 to June 30, 2012.

Currently hospital readmission/rehospitalization rates are calculated for three conditions: Acute Myocardial Infarction (AMI), Heart Failure (HF) and Pneumonia (PN). However, beginning in fiscal year 2015, CMS is expanding the condition list to patients admitted for elective total hip arthroplasty (THA) and total knee arthroplasty (TKA).

The 2014 Home Health Proposed Rule⁶ includes a proposal for addition 2 claim based quality measures for home health providers. One of these is rehospitalization during the first 30 days of a HH episode. The measure will apply to any patient who was referred to HH within five days of an inpatient hospitalization and will count for readmissions for any cause during the first 30 days of a HH episode. The second measure is the same, except it will count patients who use emergency department services – without hospital readmission – within the first 30 days of a home health stay.

IV. Bundled Payment Projects

Many physical therapy providers are still struggling to grasp the concept of a “bundled payment”. The easiest way to describe it is to think about how you purchase your cell phone coverage or your cable television coverage. It is in its most simple form defined as: One payment for a group of services. CMS's idea of bundled payment is to negotiate a single predetermined payment amount for all services associated with

either a length of time or a condition. This bundled payment could be paid retrospectively or prospectively. The key is this: which providers are involved or the number of providers does not matter! The centerpiece is an episode of care OR a patient's condition. There are a number of bundling pilot projects going on around the country right now, and this article does not attempt to go into details about them, except to illustrate how joint replacements are a “condition” (as defined above) which providers are comfortable using as a proxy to jump into this ‘new world’ of payment.

In CMS's Bundled Payments for Care Improvement (BPCI) Initiative, providers could choose from 48 episodes to submit proposals for. Four of the 48 categories involved joint replacements:

- Major joint replacement upper extremity
- Major joint replacement of the lower extremity
- Double joint replacement of the lower extremity
- Revision of the hip or knee

This was quite a popular category choice in many states. A search of participating facilities⁷ in four states demonstrated that 5 sites in Alabama are participating in the BPCI bundling project, 23 in California, 22 in Illinois and 21 in New York.

Medicare is also incentivizing patients to make smarter choices that result in savings to the Medicare program. The Medicare Acute Care Episode Demonstration (ACE) is a new demonstration that will test the use of a bundled payment for both hospital and physician services for a select set of inpatient episodes of care for orthopedic and cardiovascular procedures. The orthopedic procedures included in the project are: Hip replacement, Knee replacement and Other lower extremity joint replacement.⁸

Currently, CMS generally pays the hospital a single prospectively-determined amount under the Inpatient Prospective Payment System (IPPS) for all the care it furnishes to the patient during an inpatient stay. The physicians who care for the patient during the inpatient stay are paid separately under the Medicare Physician Fee Schedule

for each service they perform. Under this demonstration, Medicare will pay the hospital a single payment for both hospital (Part A) and physician (Part B) services furnished during an inpatient stay. It is believed that this bundled payment will better align the incentives for both hospitals and physicians to improve quality and greater efficiency in the care that is delivered to Medicare beneficiaries.

What is unique about this program, however, is the demonstration will also test to what extent the provision of price and quality outcome information about the hospital affects the choices made by Medicare beneficiaries in selecting where to have their inpatient procedures. Beneficiaries can continue to choose the hospital and physician that best meets their needs. However, if they choose to receive care from one of the participating demonstration providers (See Table 2), Medicare will share 50 percent of the savings it gains under the demonstration with the Medicare beneficiary (up to a maximum of the annual Part B premium, currently \$1,259).⁹ The exact amount of the shared savings payment will vary by site and procedure. Medicare will send the shared savings payment directly to qualified beneficiaries approximately 90 days after they are discharged from the hospital.

In the most recent GeriNotes issue, this writer described MedPAC's recommendation for a post – acute care bundled payment to incentivize providers to improve care coordination as well as require providers to accept some of the financial and clinical risks for care beyond their own walls. This topic continues to be on the front burner of Congressional hearings and MedPAC monthly meetings. In fact, in its most recent meeting on November 7, 2013 the discussion was focused on rationalizing Medicare's payment for post-acute care (PAC). The over-arching theme among the Commissioners and staff presenters was to find ways through the payment mechanism of promoting care that is coordinated and patient-centered and not – as it is – fragmented and payment “silo-centered. Though it was too early in the MedPAC staff's research to produce recommendations for the Commission to act on, staff could still provide a status report on the options that later could be considered.

Table 2.

Tulsa, OK	Hillcrest Medical Center
San Antonio, TX	The Baptist Health System
Albuquerque, NM	The Lovelace Health System

In its June 2013 report, MedPAC reporting on the 10 medical/surgical conditions that were most frequently admitted to post-acute care. Major joint replacements was the number one condition, representing 29,627 episodes or 27% of all episodes. Eighty two percent (82%) of beneficiaries who have a major joint replacement use some form of post-acute care service. Medicare spending related to these stays is highest in the IRF and lowest in the HH setting, with the SNF coming in at approximately \$4,800 less than IRF, but 1.5 times higher than HH.¹⁰

Joint replacements are receiving significant attention by the Centers for Medicare and Medicaid Services as well as private payers because of the frequency with which they are being done across the country. As the population ages, the incidence and demand for joint replacements will only increase. Physical therapists have an opportunity today to consider how these changes will impact practice and develop models of care to address the concerns of both payers and patients.

RESOURCES

- HHS Releases hospital data on charge variation to promote transparency; May 8, 2013. <http://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-Sheets/2013-Fact-Sheets-Items/2013-05-08.html>
- Medicare Fee-for-Service 2011 Improper Payments Report; Executive Summary. <http://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/CERT/Downloads/MedicareFFS2011CERTReport.pdf>
- MLN Matter® Number SE 1236; <http://www.aaos.org/govern/federal/Medicare/CMSMLNMatters.pdf>
- Medicare Benefit Policy Manual 100-2, Chapter 1, Section 110. <http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/bp102c01.pdf>
- For a complete list of HAC's, visit the HAC and POA web page at: <http://www.cms.gov/HospitalAcqCond>

www.cms.gov/HospitalAcqCond

- At the time this article was written, the HH rule for 2014 had not yet been finalized by CMS
- <http://innovation.cms.gov/initiatives/Bundled-Payments/Participating-Health-Care-Facilities/index.html>
- http://www.cms.gov/Medicare/Demonstration-Projects/DemoProjectsEvalRpts/downloads/ACE_web_page.pdf
- *Medicare beneficiaries who are receiving Medicaid benefits are not eligible to receive shared savings payments*
- MedPAC Report to Congress; June 2013, pgs 69 and 72. <http://www.medpac.gov/>



Ellen Strunk is President and Owner of Rehab Resources & Consulting, Inc., a company providing consulting services and training to providers in

post-acute care settings with a focus on helping customers understand the CMS prospective payment systems. She also lectures nationally on the topics of pharmacology for rehabilitation professionals, exercise & wellness for older adults, and coding/billing/documentation to meet medical necessity guidelines and payer regulations.

CSM PROGRAMMING 2014

Sue Wenker, PT, MS, GCS

We are anticipating another great year of programming at CSM 2014! Review this chart to start your planning!

Date	Time	Session Title
Sunday, Feb 2	8:00AM-5:30PM	Tai Chi Fundamentals® Program Level One A Functional Approach to Neuro Part 1
Monday, Feb 3	8:00AM-5:30PM	Tai Chi Fundamentals® Program Level Two A Functional Approach to Neuro Part 2—Mentoring: Residency & Fellowships
	6:30PM-7:30PM	Balance & Falls SIG Meeting
Tuesday, Feb 4	6:30AM-8:00AM	GCS Breakfast
	8:00AM-10:00AM	Platforms — BOD Meeting 1 HPW SIG: EBPs to Enhance PT Practice: I EDGE & PTNow – Management of Hip fracture BF SIG: EBPs to Enhance PT Practice: II
	11:00AM-1:00PM	Seating and Mobility for Geriatrics— WALKING SPEED IN CLINICAL PRACTICE
	3:00-5:00PM	Members Meeting (First 30 minutes for members only)
	6:30PM-10:00PM	
Wednesday, Feb 5	8:00AM-10:00AM	Platforms — Support Payment: Tests for Aging Adults
	11:00AM-1:00PM	Motivating Apathetic & Depressed Clients Clinicians, Cognition, and Fall Risk
	3:00-5:00PM	Student Forum: The Passion of Geriatrics — Standardized Practice – Optimal Outcomes
	6:30PM-7:30PM	CEEAA Reception — Health & Wellness SIG Meeting
Thursday, Feb 6	6:30AM-8:00AM	BOD Meeting Two — Bone Health Sig: Meeting
	8:00AM-10:00AM	Bone Health SIG: Exercise and Bone: From Jumping to Shaking to Progressive Resistance Risk of falling recommendations: GeriEDGE
	11:00AM-1:00PM	Pilates Functional Outcome Measurement (FMOM)
	3:00-5:00PM	Falls: Identification, Prevention & Treatment Outcome Tools: MDC & MCID — Management of the Complex Patient/Family



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Tai Chi Fundamentals: Program Level One

Sunday, February 2, 2014, 8 am – 5:30 pm

Presenter: Kristi Hallisy, PT, DSc, OCS, CMPT, CTI

Tai Chi Fundamentals: Program Level Two

Monday, February 3, 2014, 8 am – 5:30 pm

Presenter: Kristi Hallisy, PT, DSc, OCS, CMPT, CTI

Mentoring: Residency & Fellowships

Monday, February 3, 2014, 8 am – 5:30 pm

Presenters: Carol Jo Tichenor, PT, MA, FAAOMPT,
Ivan Matsui, PT, BA, FAAOMPT, Gail Jensen, PT, PhD,
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For age is opportunity, no less than youth itself,

*though in another dress, and as the evening twilight fades
away, the sky is filled with stars, invisible by day.*

- Henry Wadsworth Longfellow

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