



Physical Therapy vs Glucocorticoid Injection for Osteoarthritis of the Knee

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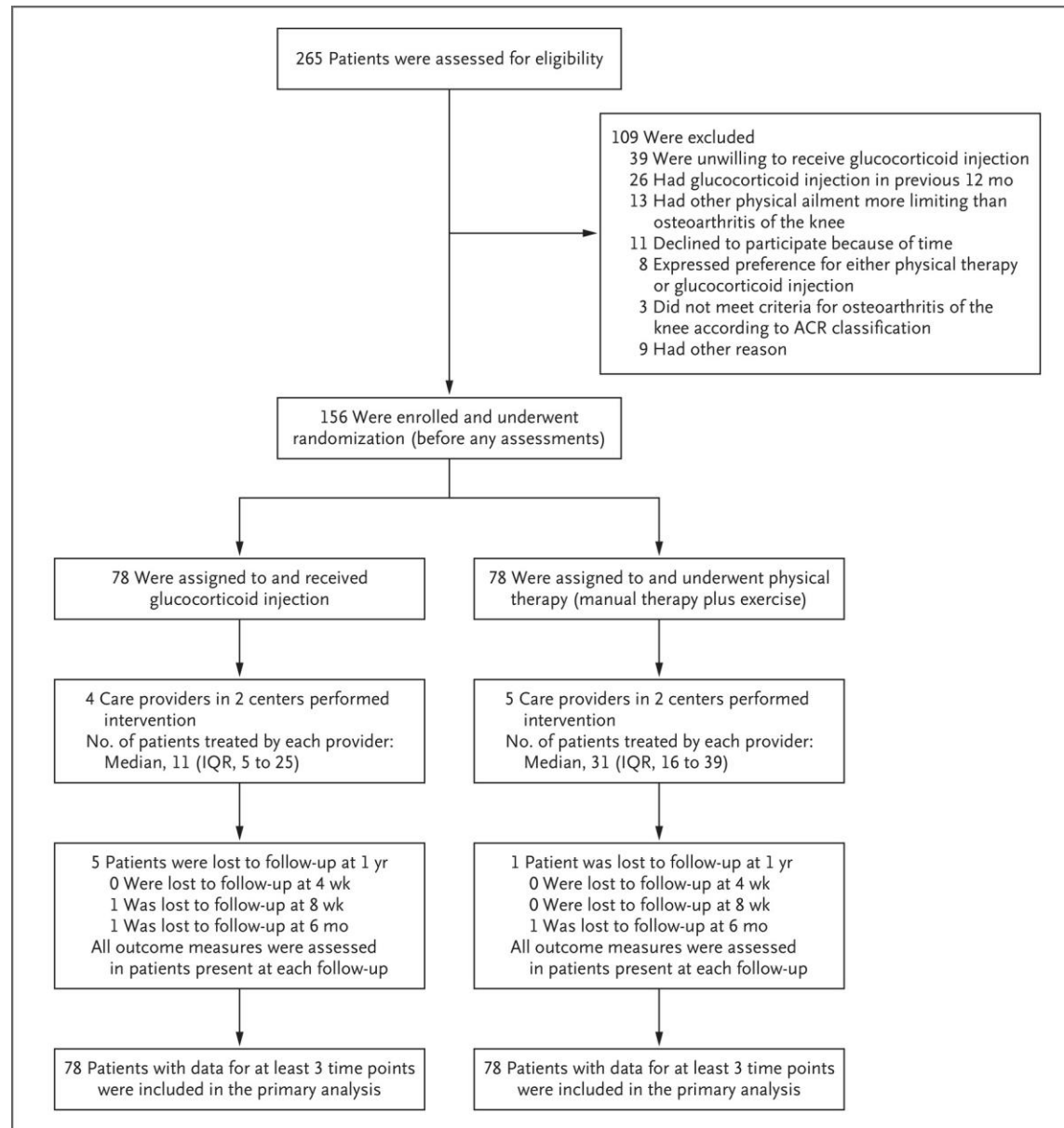
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Background

- ▶ OA of the knee is the leading cause of disability in the world
- ▶ Recent clinical practice guidelines give highest level of endorsement “strongly recommend” for intraarticular glucocorticoid injections
- ▶ In a varying data sets, 38-50% of patients have been reported to receive CSI injection for knee OA
- ▶ Some database claims show that 4x as many patients received CSI injection compared to PT prior to TKA
- ▶ The use of PT for knee OA decreased between 2007-2015
- ▶ No study has compared the efficacy of PT vs CSI injection for knee OA

Methods: Patients

- ▶ Recruited from 2012-2017
- ▶ Beneficiaries of the Military Health System (active duty, retired, or family members)
- ▶ 2 centers - Madigan Army Medical Center in Tacoma, WA and Brooke Army Medical Center in Santa Antonio, TX
- ▶ Had to meet clinical criteria for OA of the knee (defined by ACR) and have radiographic evidence of OA
- ▶ Excluded if they received PT or glucocorticoid injection in prior 12 months



Methods - continued

- ▶ Patients were divided into PT vs CSI groups via random number generator in a 1:1 ratio
- ▶ Providers and patients were not blinded to treatment group (no placebo injection)
- ▶ Research assistants who were not investigators performed the outcome assessments and were blinded to the trial-group assignments

Methods – Glucocorticoid injection

- ▶ 1ml of 40mg triamcinolone acetonide and 7ml of 1% lidocaine
- ▶ Follow-up at 4 months and 9 months by the same provider to discuss continued plan of care, including repeat injections
- ▶ Were eligible to receive up to 3 injections

Methods - PT

- ▶ PT protocol for joint mobilization, exercises, and manual therapy
- ▶ Underwent up to 8 PT sessions over initial 4-6 week period
- ▶ Follow-up at 4 and 9 months as well. Eligible to attend additional 1-3 sessions for refresher course if agreed upon by the PT and patient
- ▶ Eligible to attend total of 14 sessions

Methods – Primary Outcome

- ▶ Primary Outcome – total WOMAC score at 1 year
- ▶ Western Ontario and McMaster Osteoarthritis Index (WOMAC)
 - ▶ 24 questions – 5 pain related questions, 17 functional questions, 2 stiffness questions
 - ▶ Each question scale 0-10 (with higher pains worse pain, stiffness, or function)
 - ▶ Total score 0-240
 - ▶ Minimal clinically importance difference in WOMAC has been reported to be 12-16% change from baseline

Severity, on average, during the last 48 hours, of:

Pain

	None	Slight	Moderate	Severe	Extreme
Pain – Walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain – Stair climbing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain – Nocturnal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain – Rest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain – Weightbearing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stiffness:

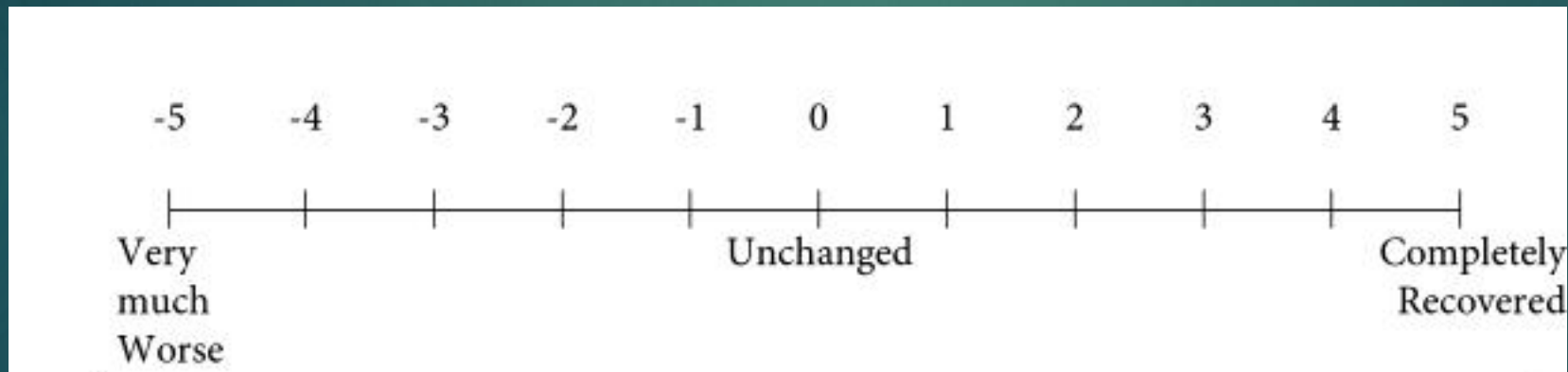
Morning Stiffness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stiffness occurring during the day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Level of difficulty performing the following functions, on average, during the last 48 hours:

	None	Slight	Moderate	Severe	Extreme
Descending stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ascending stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rising from sitting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bending to the floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking on flat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Getting in/out of a car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Going shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Putting on socks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rising from bed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking of socks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lying in bed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Getting in/out of bath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sitting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Getting on/off toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performing heavy domestic duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performing light domestic duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

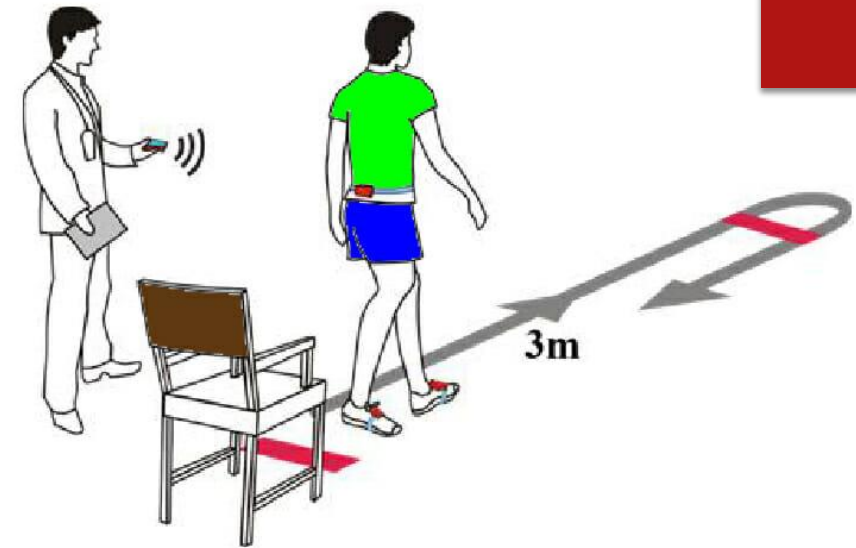
Methods – Secondary Outcomes

- ▶ 15-point Global Rating of Change (-7 to +7)

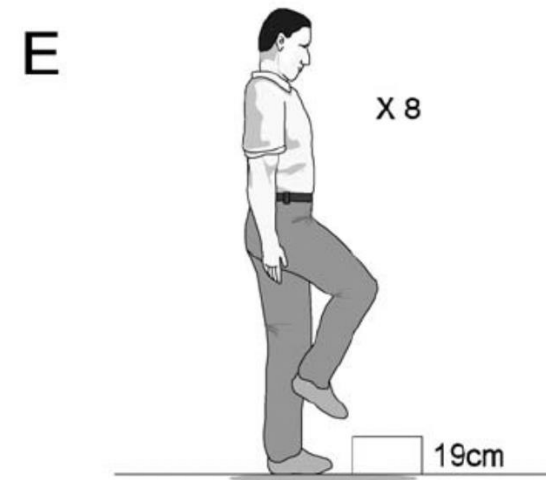


Methods – Secondary Outcomes

- ▶ Timed Up and Go test



- ▶ Alternate Step test



Methods – Secondary Outcomes

- ▶ 1-year cost of knee-related healthcare utilization

Patient characteristics

- ▶ Mean age 56 years old
- ▶ 48% women
- ▶ BMI 31.5
- ▶ Glucocorticoid group received an average of 2.6 injections
- ▶ Patients in PT group received a mean of 11.8 treatment visits

Table 1. Baseline Characteristics of the Patients.*

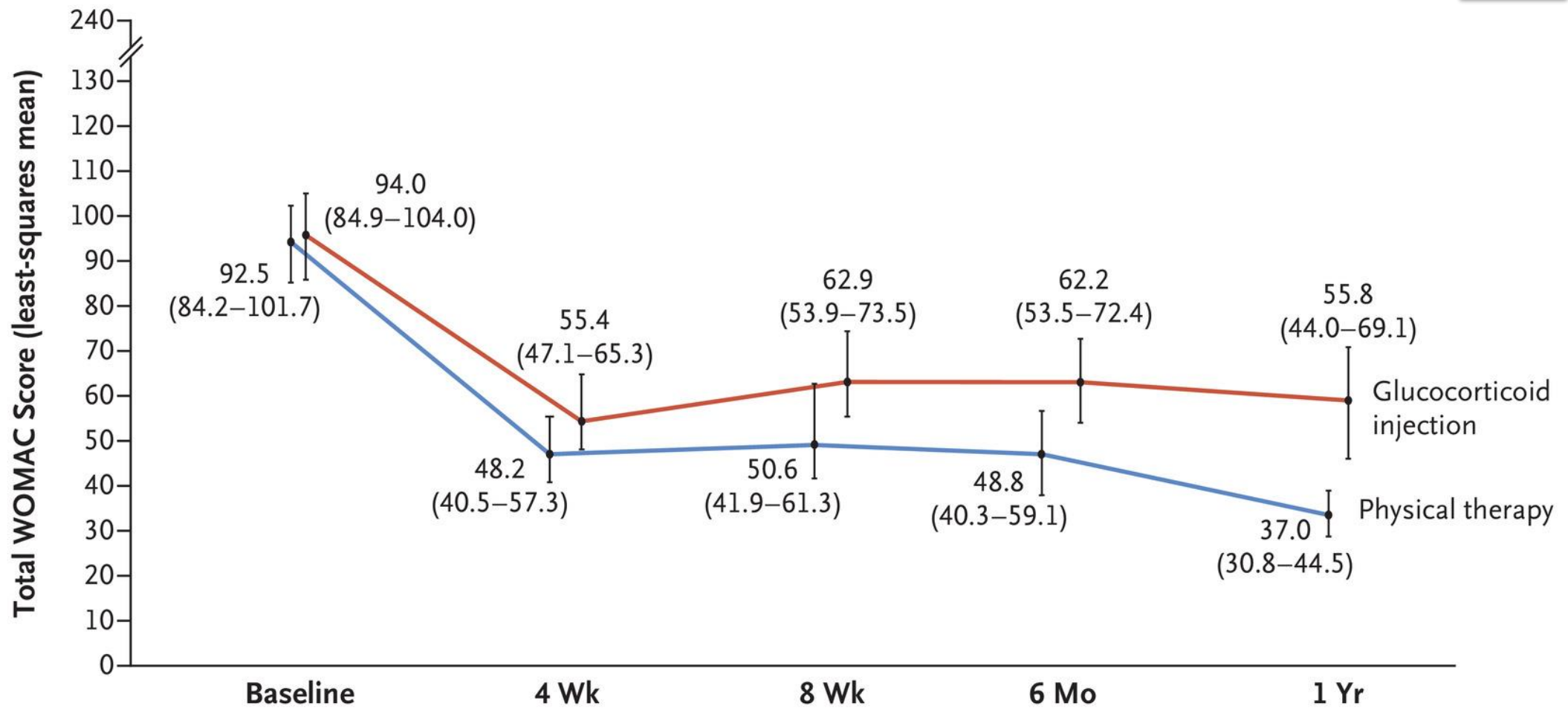
Characteristic	Total Cohort (N=156)	Glucocorticoid Injection (N=78)	Physical Therapy (N=78)
Age — yr	56.1±8.7	56.0±8.2	56.3±9.2
Female sex — no. (%)	75 (48.1)	38 (48.7)	37 (47.4)
Body-mass index	31.5±5.6	31.6±6.1	31.4±5.1
Beneficiary category — no. (%)	26 (16.7)	10 (12.8)	13 (16.7)

Table 1. Baseline Characteristics of the Patients.*

Characteristic	Total Cohort (N=156)	Glucocorticoid Injection (N=78)	Physical Therapy (N=78)
Kellgren–Lawrence grade — no. (%)‡			
1	6 (3.8)	1 (1.3)	5 (6.4)
2	68 (43.6)	42 (53.8)	26 (33.3)
3	59 (37.8)	25 (32.1)	34 (43.6)
4	23 (14.7)	10 (12.8)	13 (16.7)
‡	23 (14.7)	10 (12.8)	13 (16.7)
Knee pain affects sleep — no./total no. (%)			
No	38/155 (24.5)	19/77 (24.7)	19/78 (24.4)
A little, but can sleep through the night	113/155 (72.9)	56/77 (72.7)	57/78 (73.1)
Cannot sleep because of pain	4/155 (2.6)	2/77 (2.6)	2/78 (2.6)
Baseline measures			
WOMAC total score§	108.0±44.7	108.8±47.1	107.1±42.4
Time to complete Alternate Step Test — sec	11.3±2.8	11.7±3.0	10.9±2.5
Time to complete Timed Up and Go test — sec	9.7±2.8	9.9±3.0	9.4±2.5

Results – Primary Outcome

- ▶ WOMAC score at 1 year in glucocorticoid injection group
 - ▶ 55.8 +/- 53.8
- ▶ WOMAC score at 1 year in physical therapy group
 - ▶ 37.0 +/- 30.7
- ▶ 18.8 point difference, 95% CI 5.0 to 32.6, p=0.008



Results – Primary Outcome

- ▶ 20 patients (25.6%) in the glucocorticoid group did not have an improvement of at least 12%
 - ▶ Minimal clinically important difference
- ▶ 8 patients (10.3%) in the physical therapy group did not have an improvement of at least 12%

Table 2. Primary and Secondary Outcomes at 1 Year.*

Outcome	Glucocorticoid Injection	Physical Therapy	Mean Between-Group Difference (95% CI)
Primary outcome: total WOMAC score — least-squares mean (95% CI)	55.8 (45.0–69.1)	37.0 (30.8–44.5)	18.8 (5.0–32.6)†
Secondary outcomes			
Median Global Rating of Change score (IQR)‡	+4 (0.5–6.0)	+5 (3.3–6.0)	
Least-squares mean time to complete Alternate Step Test — sec (95% CI)	9.0 (8.5–9.5)	8.0 (7.6–8.4)	1.0 (0.3–1.6)§
Least-squares mean time to complete Timed Up and Go test — sec (95% CI)	8.1 (7.7–8.6)	7.3 (6.8–7.7)	0.9 (0.3–1.5)¶

* All 156 patients were included in the analyses. The 95% confidence intervals and reported P values were adjusted with the use of Bonferroni correction for multiple comparisons.

† The between-group difference is the difference in points (P=0.008).

‡ Scores on the Global Rating of Change scale range from –7 to +7, with higher positive values indicating more improvement and lower negative values indicating worsening symptoms; a score of +4 indicates “moderately better,” and a score of +5 “quite a bit better.” A total of 50 patients in the glucocorticoid injection group and 67 in the physical therapy group had a score of at least +3.

§ The between-group difference is the difference in seconds (P=0.003).

¶ The between-group difference is the difference in seconds (P=0.005).

Results – Secondary Outcomes

- ▶ Health care cost – similar in 2 groups
 - ▶ \$2,113 in the glucocorticoid injection group
 - ▶ \$2,131 in the physical therapy group

Discussion

- ▶ PT was more effective than glucocorticoid injections in improving WOMAC scores at 1 year
- ▶ PT also had improvement in all secondary measures, functional tasks and patient perception of improvements
- ▶ Data is consistent with previous studies – short term improvement is seen in both PT and CSI injections
 - ▶ However effects of PT persist for 1 year!

Limitations of Trial

- ▶ Non-blinded
- ▶ Non-standardization of repeat CSI injections and refresher PT sessions, left up to provider discretion
- ▶ Trial compared the 2 treatments as independent intervention and cannot be generalized to cases in which both interventions are used concurrently

Questions?

