The Sensitivity and Specificity of the GALS (Gait, Arms, Legs, Spine) Examination when used by Physiotherapists to Detect Rheumatoid Arthritis

K.A. Beattie PhD[1,2], N. MacIntyre PT, PhD[2], J. Coombs MSc (PT)[2], D. Horobetz MSc (PT)[2], A. Petric MSc (PT)[2], M. Pimm MSc (PT)[2], W. Kean MD[1], M. Larché MD, PhD[1], A. Cividino MD[1]

[1]Department of Medicine, [2]School of Rehabilitation Sciences, McMaster University, Hamilton, ON, Canada

Abstract

Objective: To evaluate the sensitivity and specificity of the GALS musculoskeletal screening examination for detecting rheumatoid arthritis (RA) when used by physiotherapy students and physiotherapists working in direct access settings.

Methods: Participating healthcare professionals (HCP), including 2 rheumatologists, 2 physiotherapy students (PTS) and 2 physiotherapists (PT), were trained to perform the GALS examination and record their findings by viewing an instructional DVD and attending a hands-on training workshop. Three weeks following training, HCP performed the GALS examination on 48 study participants. Twenty-five participants were recruited through a local rheumatology practice and had previously been diagnosed with RA; Twenty-three participants without diagnoses of arthritis were recruited from a primary care family health centre. Each participant was assessed by a rheumatologist, PTS and PT using the GALS exam. HCP recorded any gait abnormalities and abnormalities of the movement or appearance of the arms, legs and spine. If an abnormality was observed, HCP recorded the location and description of the abnormality (i.e. left hand, Heberden's nodes) and whether a diagnosis of Inflammatory Arthritis or RA was suspected. HCP were told that the primary objective of the study was to investigate their level of agreement regarding findings on the GALS examination and were unaware that half of the study population had previously been diagnosed with RA. HCP were blinded to the medical history of the participants. Sensitivity and specificity were calculated to determine the ability of the GALS examination to detect RA when performed by PTS and PT.

Results: Compared to the recruitment source (diagnosis of RA versus no arthritis), sensitivity and specificity varied from 50 to 77% and 75 to 100%, respectively. Compared to the findings of the rheumatologists on the study day, sensitivity and specificity varied from 67 to 86% and 71 to 92%, respectively.

Conclusions: These results suggest that the GALS examination may be a useful tool for PT to rule out the diagnosis of inflammatory/rheumatoid arthritis in a direct access setting. Differences in level and type of clinical experience may contribute to the variation in sensitivity observed. Lower sensitivity in relation to the actual diagnosis likely reflects the clinical status of participants with RA whose disease was controlled with medication. The merits of introducing the GALS examination into primary care physiotherapy curricula and physiotherapy practice should be explored.

Background

- Rheumatoid arthritis (RA) is an autoimmune disease which can cause significant disability if disease activity is not controlled by appropriate therapy (1-4). Early referral to a rheumatologist is recommended when potential cases are suspected (5).

- In Canada, most physiotherapists work in private clinics or community practice where caseloads are comprised of musculoskeletal (MSK) problems (6). Since physiotherapy services are accessed directly by the public, it is important that physiotherapists screen for conditions requiring medical assessment and follow-up.

- The GALS (Gait, Arms, Legs, Spine) examination was designed to provide a quick screening assessment of the MSK system. Medical students are currently trained to perform this examination but it is not typically used in primary care. The GALS examination may be useful as a quick method of screening for patients who would benefit from rapid referral to a rheumatologist.

- The **purpose of this study was twofold:** 1) to evaluate the sensitivity and specificity of the GALS examination for detecting RA; and 2) to evaluate the agreement between GALS examination findings recorded by rheumatologists and physiotherapy students (PTS) and physiotherapists (PT).

Methods

- Volunteers ≥50 years of age with no previous diagnosis of arthritis (n=23) were recruited from a family practice clinic via the electronic medical record database. Patients with RA (n=25) were recruited from the caseload of a rheumatologist who was not an assessor in the study.

- Assessors were two rheumatologists experienced using the GALS, two PTS and two PT with no previous exposure to the GALS.

- PTS and PT learned to perform the GALS independently using an instructional DVD prior to attending a hands-on instructional workshop led by the rheumatologists.

- Testing occurred at the family health clinic three weeks after the training workshop.

- HCP were told the objective of the study was to calculate agreement in the assessment of each GALS feature; the HCP did not know that half of the volunteers had a diagnosis of RA.

- Each volunteer, rheumatologist, PTS and PT was assigned to one of two circuits on the study day. Each assessor completed the GALS (Table 1) on each volunteer assigned to their circuit. Features (appearance and movement as noted in Table 1) were recorded as normal or abnormal and HCP documented suspected cases of RA and OA.

- Sensitivity (the proportion of people previously diagnosed with RA who have positive findings) and specificity (the proportion of people with no previous diagnosis of RA who have negative findings) were calculated.

- Overall agreement of findings on the GALS recorded by the HCP was corrected for chance using the kappa statistic.

Table 1: Individual features of the GALS exam which are examined

QUESTIONS	Do you have any pain or stiffness in your muscles, joints or back? Yes/No	
	Do you have difficulty going up or down stairs? Yes/No	
	Do you have any difficulty washing or dressing yourself? Yes/No	
GAIT	• Symmetry & smoothness of movement • Ability to turn normally & quickly	
ARMS	Hands	• Wrist/finger swelling/deformity • Squeeze across 2nd-5th metacarpals for tenderness (synovitis)
	Grip Strength	• Power & precision of grip
	Elbows	• Full extension
	Shoulders	• Abduction & external rotation
LEGS	Feet	• Squeeze across metatarsals for tenderness (synovitis)
	Knees	• Knee swelling/deformity, effusion • Quadriceps muscle bulk
	Hips	• Internal rotation of hips
SPINE	Inspection from behind	• Shoulders and iliac crest height/symmetry • Scoliosis
	Inspection from front	• Lateral cervical spine flexion – ears against shoulders • Joints and rotator cuff muscles – hands behind head, elbows back
	Inspection from side	• Normal thoracic and lumbar lordosis • Normal cervical kyphosis
	Trigger point	• Supraspinatus muscle tenderness (exaggerated response)

Results

Table 2: Sensitivity and specificity of GALS to detect RA based on recruitment source in Circuit 1

	Sensitivity (%)	Specificity (%)
Rheumatologist	84.6	90.9
PTS	77.0	81.8
PT	61.5	100

Table 3: Sensitivity and specificity of GALS to detect RA based on recruitment source in Circuit 2

	Sensitivity (%)	Specificity (%)
Rheumatologist	58.3	100
PTS	50.0	75.0
PT	66.6	75.0

Table 4: Sensitivity and specificity of GALS to detect RA based on rheumatologist's findings in Circuit 1

	Sensitivity (%)	Specificity (%)
PTS	83.3	83.3
PT	66.7	91.7

Table 5: Sensitivity and specificity of GALS to detect RA based on rheumatologist's findings in Circuit 2

	Sensitivity (%)	Specificity (%)
PTS	85.7	70.6
PT	71.4	76.5

Table 6: Agreement between PTS/PT findings on GALS and the rheumatologist's findings on GALS

	Kappa (95% CI) Circuit 1		Kappa (95% CI) Circuit 2	
	PTS	**PT**	**PTS**	**PT**
Gait	0.42 (0.08, 0.77)	0.28 (0, 0.63)	0.57 (0.25, 0.89)	0.50 (0.17, 0.83)
Arms	Left: 0.33 (0, 0.71) Right: 0.81 (0.56, 1)	Left: 0.24 (0, 0.63) Right: 0.51 (0.13, 0.88)	Left: 0.41 (0.04, 0.77) Right: 0.42 (0.08, 0.77)	Left: 0.44 (0.12, 0.76) Right: 0.51 (0.19, 0.83)
Legs	Left: 0.14 (0, 0.54) Right: 0.23 (0, 0.61)	Left: 0.25 (0, 0.76) Right: 0.47 (0, 1)	Left: 0.44 (0.12, 0.76) Right: 0.29 (0.03, 0.55)	Left: 0.73 (0.46, 1) Right: 0.44 (0.15, 0.73)
Spine	0.37 (0.05, 0.69)	0.30 (0, 0.61)	0.33 (0.08, 0.59)	0.02 (0, 0.23)

Discussion

- In Circuit 1, sensitivity and specificity were similar when compared to recruitment source versus the rheumatologist's findings on the study day (Tables 2 & 4).

- In Circuit 2, sensitivity was improved when PTS and PT assessments were compared with the rheumatologist's findings on the study day (Tables 3 & 5).

- It appears that participants with a previous diagnosis of RA examined in Circuit 2 may have had less active disease making it more difficult to detect RA. The fact that the rheumatologist picked up just more than half of those individual who had previously been diagnosed with RA supports this possibility.

- In general, PTS and PT agreement with the rheumatologist's findings on the study day for all traits was highest when the trait was perceived as abnormal (Table 6).

- Study limitations include a) limited training of PTS and PT in performance of the GALS exam, b) only 2 PTS and 2 PT participated in the study, c) the length of time that past between training and testing days and d) basing the gold standard for diagnosis of RA on recruitment source rather than assessment of disease status on the study day.

Conclusions

- We believe this to be the first study to investigate the sensitivity and specificity of the GALS examination when performed by physiotherapy students and physiotherapists.

- Level of disease activity plays a significant role in being able to detect RA, as less severe symptoms may be mistaken for another MSK condition.

- Results suggest that the GALS examination may be useful as a screening tool in physiotherapy practice for ruling out those who do not require early referral to rheumatology.

- Improved training of physiotherapy students and physiotherapists through interaction with rheumatologists and hands-on experiences may improve their ability to identify potential cases of RA who do require rapid referral.

- These findings should be confirmed in a larger sample of rehabilitation therapists and other primary care practitioners such as family physicians, nurses and nurse practitioners who examine a group of volunteers which includes people with early stage RA and people without arthritis.
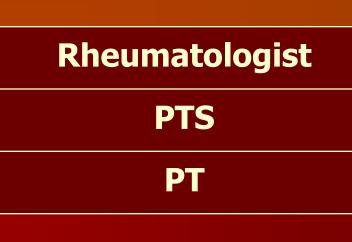
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