

left/right?

The left/right judgement task in people with & without shoulder pain

Summary

- Subjects with shoulder pain are both slower and less accurate than control participants at the shoulder LRJT.

Background

- Pain has been linked to functional changes in the cortex of the brain,¹⁻³ referred to as maladaptive neuroplastic changes.⁴ Alterations to the working body schema⁵ (the representation of the body in the brain) are a commonly observed neuroplastic change.
- The left/right judgement task (LRJT) measures the ability to recognise left from right body images and requires an intact working body schema.^{6,7} Poor performance implies an alteration to the working body schema.
- In chronic pain conditions of the upper

limb and back alterations in response time and accuracy of the LRJT have been reported.^{7,8}

- No research investigating LRJT in patients with chronic painful shoulder dysfunction has been published.
- Investigation of the shoulder LRJT in a shoulder pain population is warranted.

Purpose

- The aim of this pilot project was to compare the accuracy and response times for the shoulder LRJT in asymptomatic controls and patients with current shoulder pain.

Design and setting

- Experimental, cross-sectional design.

Participants

- Thirty participants with current shoulder pain were recruited consecutively through a physiotherapy private practice (20 females, 10 males, mean age 54 years).
- A convenience sample of thirty control participants with no history of shoulder pain were also recruited (20 females, 10 males, mean age 35 years).

Methods

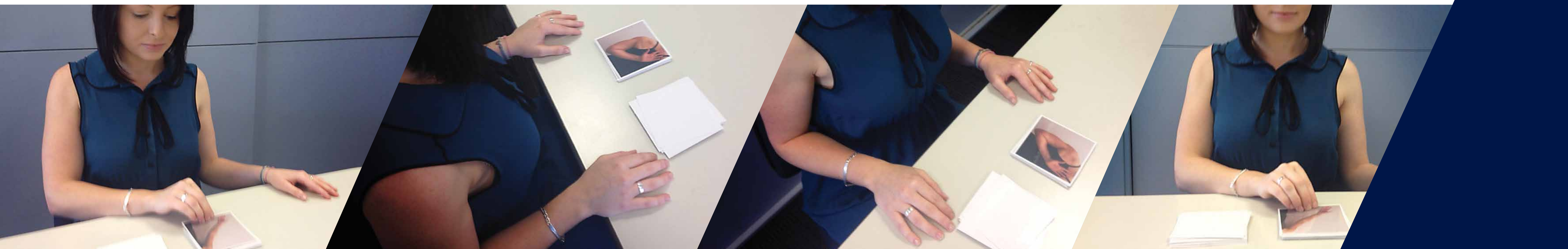
- Participants sat comfortably at a desk.
- A set of 32 cards were placed face down in front of the participant – 16 right sided images and 16 identical left sided images.
- Each card consisted of a photographic image of an upper limb which included the shoulder.

- The upper limb images included simple neutral postures to near end ranges of shoulder rotation and elevation, as well as hand behind back and neck.
- The cards were thoroughly shuffled so that the images were viewed in random order. Subjects were instructed to view the top card, determine if it was a left or right image and place it on a left or

- right pile. Then repeat for all cards.
- Subjects were instructed to perform the test as quickly and accurately as possible.
- One-way analysis of variance was used to compare both total mean response time and accuracy for the task, between symptomatic and asymptomatic participants.
- Total response time for the task was

divided by the number of images viewed to give the mean response time per image.

- Mean accuracy of the task for images of the painful limb – in participants with shoulder pain, was compared to mean accuracy all limbs for controls.



Results

- Mean response time for participants with shoulder pain was 4.3 seconds per image (95%CI, 3.8 - 4.9 seconds).
- Compared to 2.7 seconds per image for control participants (95%CI, 2.5 - 2.9 seconds). ($F_{1,58} = 38.13, P < 0.001$).

- Mean accuracy of participants with shoulder pain was 78% (95%CI, 72 - 83%).
- Compared to 95% accuracy for control participants (95%CI, 92 - 97%). ($F_{1,58} = 31.38, < 0.001$).

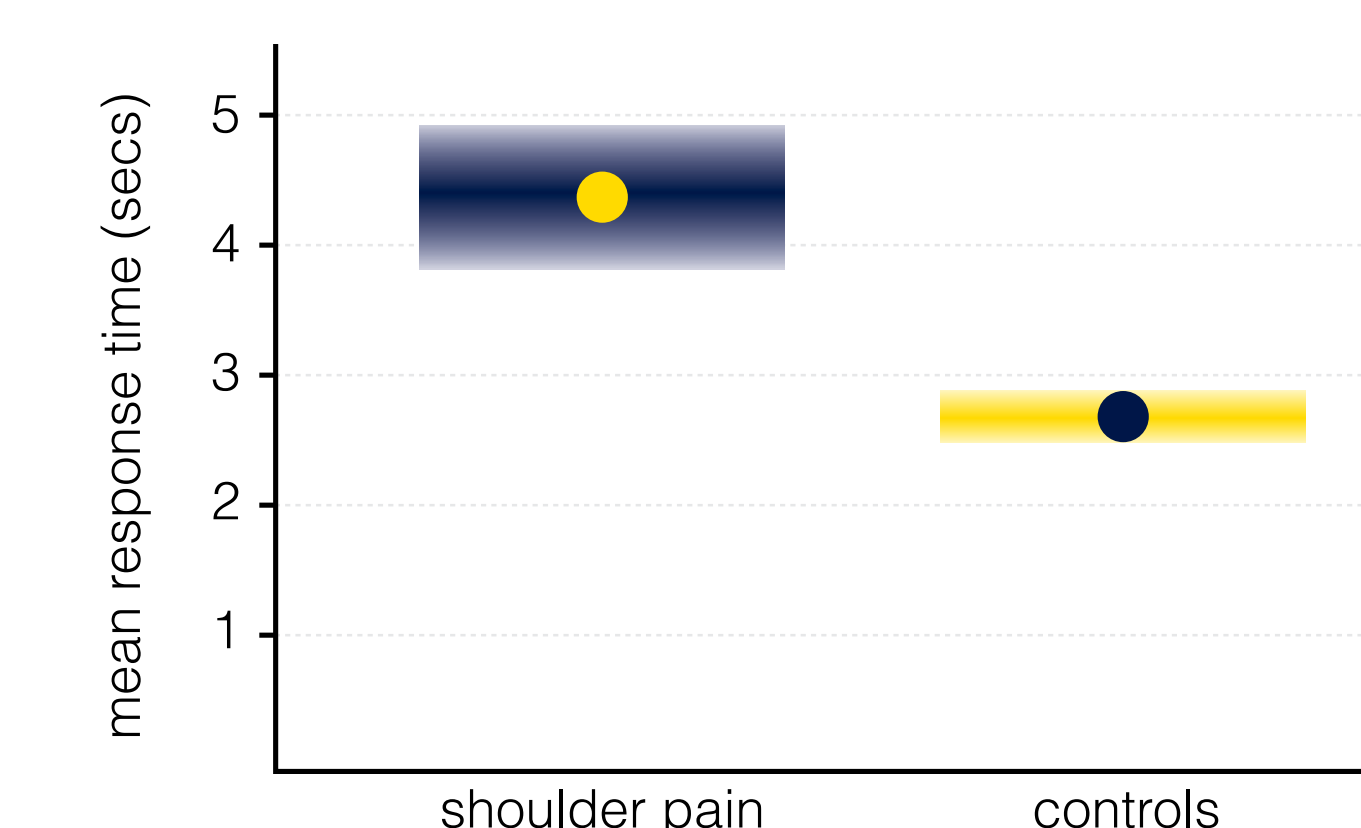


Figure 1
Response time for the LRJT

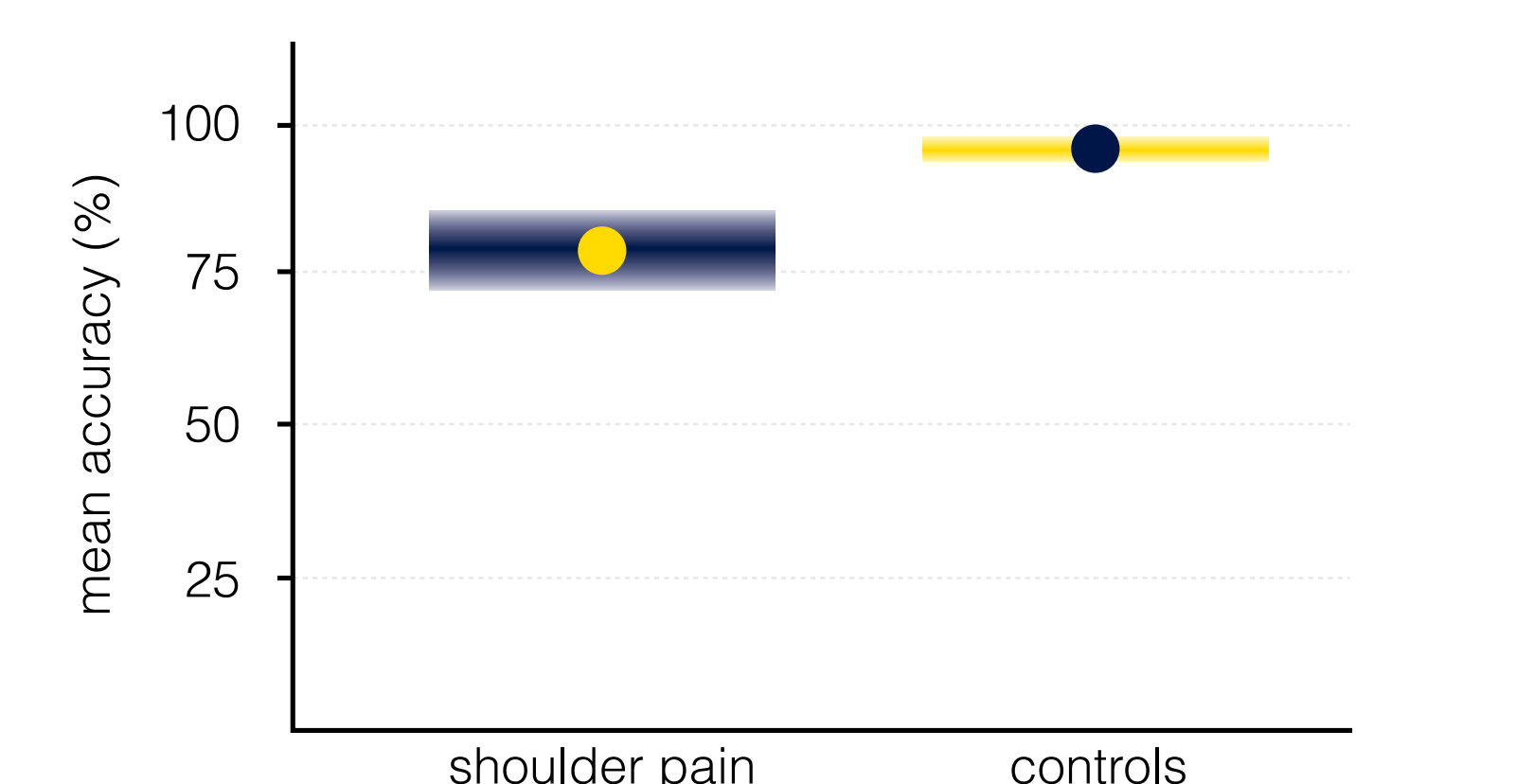


Figure 2
Accuracy for the LRJT

Discussion

- In this pilot study we demonstrated that subjects with shoulder pain are both slower and less accurate than normal healthy participants without shoulder pain at the shoulder LRJT.
- We demonstrated that upper limb images, when used for the LRJT, were able to detect a difference

- in participants with shoulder pain.
- Together these results imply maladaptive cortical changes associated with shoulder pain.
- We also demonstrated that the method of testing the LRJT was acceptable to participants with shoulder pain and controls.
- This data provides good evidence for

- further exploring the shoulder LRJT in a larger, more robust study.
- This was a small pilot study using a convenience sample based in the clinic. In doing so the mean age of shoulder pain participants was greater than the control group and this may have affected the outcome. A larger study matching shoulder pain and pain-free subjects for age is

- needed to control for this variable.
- There was no control task. It may be that people with shoulder pain are generally worse at left/right judgements. A further study should include images of other body parts as a control task.
- This data provides some evidence for the use of the shoulder LRJT in people with shoulder pain.

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