



**THE JOINT PROTECTION BEHAVIOUR  
ASSESSMENT  
&  
SHORT- JOINT PROTECTION  
BEHAVIOUR ASSESSMENT  
MANUAL**

**Alison Hammond**

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## THE JOINT PROTECTION BEHAVIOUR ASSESSMENT

Alison Hammond PhD, MSc, BSc, Dip. COT.  
Professor of Rheumatology Rehabilitation  
Centre for Health Sciences Research, Allerton Building, University of Salford  
Frederick Road, Salford M6 6PU, United Kingdom.  
Contact: [a.hammond@salford.ac.uk](mailto:a.hammond@salford.ac.uk)

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**Translation of the JPBA:** please contact the author if you wish to translate and culturally adapt this assessment. The latter will likely require changing some items to be culturally appropriate.

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# Introduction

Joint protection is the traditional term used to describe adapting activities (at home, work, or leisure) to be performed more ergonomically. The approach was first developed by Joy Cordery in the 1960s. At that time, it was common for people with rheumatoid arthritis to develop hand deformities, as very few disease modifying drugs were available, and these were usually prescribed many years into the course of someone's disease. People often did not see a rheumatology consultant or occupational therapists or physiotherapists for many years, as managed by their General Practitioner. The term "joint protection" reflected the focus on avoiding further damaging joints already severely weakened by arthritis.

Whilst hand deformities still do occur, these are less common due to the advent of early aggressive combination therapy and of biologic/ biosimilar drugs. However, joint protection/ **ergonomic methods** are still applicable to help reduce pain, muscle aching and fatigue, as well as the frustration people experience from dropping items or actions being clumsy.

The term Joint Protection has been retained in the title of the assessment and is still widely used in practice and research. However, it can be more appropriate to use "ergonomic methods," particularly with clients/ patients and study participants, as it helps to reduce mistaken understanding that joints should not be used. It is important to teach hand exercises/ exercise alongside ergonomic methods.

## Section 1

Details what the assessment is and how to conduct the assessment procedure.

## Section 2

Outlines the scoring procedure and how to complete the assessment form.

## Section 3

Details scoring the 20 kitchen tasks observed in the assessment procedure i.e., making a hot drink, snack meal and clearing up. Each task describes different methods of performing the tasks, classified as either: Correct, Partially Correct or Incorrect use of joint protection/ ergonomics. Most descriptions are illustrated with a photograph. The coding was based on a validity study with expert rheumatology therapists (Hammond and Lincoln 1999).

## Section 4

The full- and short- JPBA score sheets, plus an example of a completed score sheet.

## What is the Joint Protection Behaviour Assessment (JPBA)?

The JPBA is designed to evaluate whether or not people with rheumatoid arthritis (RA), or other forms of hand arthritis, have altered their working methods and increased use of assistive devices as a result of joint protection/ ergonomic education.

There are two forms:

- The original JPBA: evaluating performance of 20 specified tasks whilst making a hot drink and a snack meal.
- **The short-form JPBA (S-JPBA):** evaluating performance of **10 specified tasks** within the JPBA when making a hot drink. These are asterisked in the Task descriptions and listed on the S-JPBA Score Sheet.

It can be used as a:

- research assessment: pre- and post- joint protection / ergonomic education
- clinical assessment tool: pre-and post-joint protection/ ergonomic education, or post-education only. However, it should be remembered that people can make spontaneous changes in behaviour **prior to** formal joint protection/ ergonomic education. It should not be presumed that a baseline score is 0 before education.

## What does the JPBA analyse?

The JPBA analyses joint protection/ ergonomic methods for the hand and wrist joints.

## Which Joint Protection principles are being assessed?

1. Use of the strongest, largest joint to perform a task.
2. Distributing load over several joints.
3. Use of each joint in its most stable, functional anatomical position.
4. Reducing effort to perform tasks by:
  - use of assistive devices/ ergonomic tools
  - avoiding lifting/carrying
  - employing leverage.
5. Reducing/ avoiding actions with force and/ or prolonged pressure: on the radial side of the fingers, against the backs of fingers, on the tip/ pad of the thumb, in tight grips/grasps, with flexed wrists.

(Guidelines for the Management of Rheumatoid Arthritis: Joint Protection and Energy Conservation, College of Occupational Therapists, 2003)

## Why were the 20 tasks in the JPBA selected?

The 20 tasks included in the assessment were selected because:

- These are commonly targeted in joint protection/ ergonomic education in the UK to demonstrate such methods
- These are common, early activities of daily living (ADL) problems experienced by people with RA.
- They are designed to be sufficiently stressful to joints to require a change in motor behaviour (i.e., adoption of a joint protection / ergonomic method is applicable).

- They require the application of one or more of the five joint protection/ ergonomic principles listed above.

The tasks require the use of:

- Common altered working methods shown to people with RA during joint protection / ergonomic education, such as: the use of two hands to lift a kettle, a milk container, a plate, a pottery mug; avoiding twisting at the metacarpophalangeal joints (MCPJs), e.g., opening a jar, turning a tap, pushing in a wall plug.
- And/ or a number of assistive devices commonly shown to people with RA during joint protection / ergonomic education, e.g., electric can opener; plastic jug to fill a kettle; tap turners, jar openers.

During the development process, tasks were eliminated that people without RA could normally perform using what would be considered a joint protection/ ergonomic method. Thus, all the 20 tasks included require a change from normal behaviour in order to be performed using a correct or partially correct joint protection/ ergonomic behaviour.

Some of the tasks are not performed as they normally would be (e.g., lifting a saucepan out of the shopping bag, keeping sliced bread in a Tupperware box). However, they are designed in this way to either:

- provide the opportunity to observe a variety of different hand actions within this common everyday activity
- or ensure a task must be completed
- or ensure a task is weighty enough/ offers sufficient resistance to require a joint protection/ ergonomic response.

For example, if the shopping bag only contained a few light items, it would not be necessary to lift the bag using a joint protection / ergonomic method, as this would be unnecessary.

### **Why baked beans on toast?**

It is a common snack meal in the UK. If regularly performing the JPBA during home assessments, it is helpful to have a cooking activity that requires mainly dry / canned goods. There is then no difficulty in transporting perishable items between participants' homes if conducting 5 or 6 assessments on a hot day. (The participants' own milk is used in home assessments as this is very likely to be available).

Further details of the development and validation process can be found in Hammond and Lincoln (1999).

### **Teaching students/ therapists**

This manual may also be useful for teaching students or therapists new to rheumatology/ musculoskeletal practice about joint protection/ ergonomic methods.

## **SECTION 1**



## **ASSESSMENT PROCEDURES**



### How do I use the JPBA in clinical or research settings?

The assessment can be used in both department and home settings with equal reliability. The full 20-item assessment should be digitally recorded, as the assessment is too detailed to recall accurately to assess 'in vivo'.

The S-JPBA (10 items: making a hot drink) can be assessed in vivo by skilled assessors. However, it is important to gain assessment experience first by digitally recording and then analysing assessments using this manual. This limits observer "drift" i.e., deciding one's own allocation of scores, differing to the assessment.

Using a portable camcorder is easier and preferable, as it allows the participant/ patient to move more naturally around the kitchen, without being concerned they are blocking your view as your record. (Using a tripod-mounted camcorder requires careful planning to ensure all tasks can be adequately observed).

### How can I ensure I am recording behaviour accurately?

Two difficulties need to be overcome when recording people:

1. The person behaving as they know you want them to behave (i.e., subject reactivity or social desirability). That is, using joint protection/ ergonomic methods during the assessment procedure when normally they have not been doing so.
2. Embarrassment at being recorded.

### How can I overcome these problems?

1. Keep participants/patients unaware, if at all possible, of the real purpose of the assessment. That is, do not inform them you are assessing whether they are using joint protection / ergonomic methods or not.
  - For research purposes, a useful approach is to describe that the recording is to help you develop a hand assessment procedure or because you are interested in how people are using their hands (in whatever way) during normal daily activities. (For research, it should be made clear when seeking ethical approval that you will not be informing patients of the true purpose, and why this is necessary).
  - For clinical and research purposes, use vague terms such as "we want to see how you normally do these tasks, in whatever way you usually prefer to do so".
2. Do not inform participants about which 20 specific tasks you are assessing, or the scoring methods being used. **Do not use the assessment booklet with them as a teaching tool.**
3. Emphasise to participants to use their **everyday** methods of doing tasks, i.e., what is normal for them.
4. Maintain "light" conversation throughout the assessment to put participants/ patients at their ease and to purposefully **distract** them from consciously attending to their hand movements. This is more likely to encourage "automatic" normal hand actions, including joint protection / ergonomic behaviours **if** they have become habitual.
5. Change the topic of conversation if participants begin to discuss how they are using their hands.

6. In research (and preferably for clinical purposes) recording should not be done by the person providing joint protection / ergonomic education. This would increase the likelihood that the person will use joint protection/ ergonomics. In research and for audit an independent assessor is essential.

7. To reduce embarrassment – inform participants you are focusing the camera on their hands not their face. Do not record sound if at all possible and inform participants of this or that the audio recordings will not be listened to.

### **Who is it applicable to use this assessment with?**

The JPBA was originally devised for use with adults with mild to moderate rheumatoid arthritis, who are experiencing regular moderate-severe hand pain, and being provided with joint protection/ ergonomic education. It should be carefully considered whether it is applicable for all patients. Participants with severe, fixed hand deformities are often physically unable to perform some the “correct” behaviours described in the assessment.

The JPBA can be used with people with other forms of hand inflammatory arthritis. It may also be used with hand osteoarthritis.

### **Are there any other versions of the JPBA?**

Yes. There are two versions of the Short-JPBA culturally adapted and validated:

1. The D-S-JPBA: a German version (Niedermann et al, 2007).
2. T-S-JPBA: a Turkish version (Tonga et al, 2016)

See references at end for details.

### **Timing the assessments**

It is recommended the assessment is carried out in late mornings/ afternoons, to reduce the possibility of participants’ / patient’s hand behaviours being affected by morning stiffness.

### Standardising assessment conditions

In the assessment procedure, participants are asked to make a hot drink, snack meal and to wash dishes and clear up. Please see photographs of tasks for examples.

The following equipment should be provided by the assessor and used in both home and clinic assessments:

- A tray
- A saucepan (minimum weight 0.8 kg)
- A jar of instant coffee (100 gram – kept full); a similar type of jar with tea bags (100gm – kept full). Ensure the jar lid has a **vertical** edge and that jar openers can easily be used on it.
- sugar (a full jar of sugar: weight approx. 100 grams)
- A pottery mug (medium weight not light weight)
- A pottery dinner plate
- A Tupperware box (approx. 245 x 160 x 110 mm) – containing sliced bread
- A shopping bag (type illustrated in task 9)
- A 225 gram can of baked beans (or similar)

All these items can easily be stored in the shopping bag for transport between participants' homes if undertaking home assessments. It is important to standardise equipment used between participants/ patients or scores will not be comparable.

#### *In home assessments:*

All other equipment is that normally used by the participant (i.e., that they have available in their own home). **No prompts** should be given regarding use of assistive devices/equipment.

#### *In clinic assessments:*

Commence by asking "Do you normally use."

- a plastic jug or similar to fill your kettle at home?
- a tap turner or adapted taps?
- a jar opener?
- a kettle tipper? (if yes, put kettle on tipper)
- an adapted plug on kettle?
- an electric can opener?

Ensure any relevant assistive devices are placed in clear view on worktops. **Do not prompt** the person to use these during assessment. Request participants use equipment and devices that are most similar to the models they use at home (if available), e.g., a sink with lever or non-lever taps; gas or electric cooker; jug, travel, or 'traditional' style kettle. Give participants time to familiarise themselves with the kitchen layout.

For clinic assessments you should therefore also have:

- an electric jug kettle; an electric traditional-style kettle (i.e., handle on top); a kettle for use on a gas cooker (if you have gas available in your assessment kitchen)
- a plastic jug
- a selection of tap turners fitting the style of taps in your assessment kitchen
- a selection of common jar openers
- kettle tippers: one for jug kettle; one for traditional-style kettle

- an adapted plug/plug pull on an electrical item
- a variety of **normal** can openers (e.g., butterfly wing)
- a selection of common electric can openers (e.g., Kenwood tabletop model; One Touch can opener)

Tasks in home and clinic assessments should be standardised before assessing to ensure they are weighty enough or offer sufficient resistance to require a joint protection/ ergonomic response from participants. This means:

### **Activity 1 – Carry tray**

A wooden or plastic tray with jar of coffee, pottery mug, jar of sugar and plate.

Total weight approx. 1.38 kg.

Participant is asked to “carry the tray across the room”.

Distance – minimum 3 metres.

If necessary, ask them to carry the tray from an adjacent room if it is a small kitchen.

### **Task 2 & 4 – Turn tap on/off**

Prior to assessment, finger tighten the tap to ensure there is resistance offered to the participants’ fingers on turning.

*In clinic:* provide a tap turner if the participant states they would normally use one (if it is needed).

### **Task 3, 5 and 16 – Fill, carry and pour kettle**

The kettle is emptied and unplugged at the start.

Request the participant fills the kettle sufficiently to make two mugs of a hot drink. (The minimum amount required is thus approx. 0.5 litres although people frequently fill with a larger amount, increasing the weight further).

A plastic jug kettle + 0.5 litres water = 1.32 kg approx.

A metal kettle + 0.5 litres water = 1.6 kg approx.

*In clinic:* If a jug (or another similar container) is normally used to avoid carrying a kettle, place the jug next to the kettle before starting. If a kettle tipper is normally used, place this under the kettle.

### **Task 6 – Push in an electric plug**

Assess pushing in the kettle electric plug into the electric wall socket.

Ensure the kettle is unplugged prior to starting.

If the participant normally does not unplug their kettle at home, ask them to push in another plug at the end of the assessment. (The participant may push in a plug during the assessment if they use an electric can opener, thus avoiding the need to request this).

*In clinic:* ensure a kettle lead with an adapted plug is available as an alternative if the participant would normally use this at home. If not available, request the participant to push in an adapted plug into a wall socket at the end of assessment.

### **Task 7 & 8 – Open and Close jar**

Finger-tighten the jar lid prior to starting to ensure sufficient resistance to require a joint protection/ ergonomic method to be used.

Have two jars: one containing coffee and one with teabags. Check that a jar opener can successfully be used to open the type of jars you have.

*In clinic:* place the jar opener the participant identified they normally used in clear view.

**Task 9 – Carry a shopping bag**

Shopping bag (illustrated in section 3) should contain:

- saucepan (see Task 11),
- minimum 4 x 225g cans of baked beans,
- Tupperware box containing bread
- Total weight approx. 2.3-2.8 kg.)
- Minimum carrying distance 3 metres. If the participants' kitchen is too small, then place the bag in a nearby hallway or room.

**Task 10 – Open tin can**

*In clinic:* provide a variety of wing and blade can openers and ask the participant to select the model most like the one they use at home. If they normally use an electric can opener, then have this available in the work area.

**Task 11 – Carry saucepan to cooker**

The saucepan (0.8 kg.) is placed within the shopping bag at the start of the assessment, necessitating lifting the saucepan to the cooker. (An odd place! But it means it has to be lifted).

**Task 12 – Lift box from bag**

Tupperware/ plastic box with sliced bread inside weighs approx. 0.75 kg minimum.

**Task 13 – Lift grill pan**

The weight of this will vary according to the model the participant has in their own home, but usually is approx. 1.3 kg.

Ask the participant to make toast **under the grill, not using their toaster**. (Even if the person does not normally use their grill for toasting, they probably would do so for other cooking tasks such as grilling foods).

Remove the grill pan from its rack at the start of the assessment to ensure the participant is required to lift it into place.

If the participant states they would never normally remove their grill pan, apart from for cleaning purposes, leave it in situ. Some cooker models have grill pans that cannot be removed. For both cases – mark this task as 'not seen' on assessment.

**Task 14 – Emptying contents of saucepan onto plate**

No specific requirements.

**Task 15 – Carry plate**

Use a full-size crockery dinner Plate (0.5-0.7kg). Assess carrying the plate with the snack meal on it. The combined weight should be approx. 0.75 - 1 kg.

**Task 17 – Hold milk**

The weight of the milk container should be at least 0.5 kg (i.e., contain at least a half- litre).

*In home assessments,* ask the person to use the fullest milk container available.

*In clinic:* use 1 litre size milk container (bottle/carton), as full as possible.

**Task18– Carry mug**

Provide a pottery mug, weight approx. 0.5 kg. when full of the hot drink.

### **Task 19 & 20 – Wipe surface and squeeze cloth**

*In home assessments:* whatever the person normally uses.

*In clinic:* provide a range of sponges/cloths and ask participants to select what would normally use at home.

#### **Instructions at the start of the assessment:**

Prior to all assessments (home or clinic) ask the participant:

- “Does someone normally assist you in any stage of making a drink and snack meal? If yes, ask the participant to request the assessor to perform that task during the assessment. (For example, they may normally ask their husband/wife to open a can).

Remind participants that:

- sound is either not being recorded or will not be listened to so that they can talk during assessment
- and that the camcorder is pointed at their hands and **not their face**, so they do not feel embarrassed.

All participants are given the same instructions:

“I would like you to make a cup of coffee or tea (adding milk to this) and baked beans on toast. You can take your time, there is no need to rush, and you can do it in any order you like. I am interested in how you would normally do these, so please do it just as you usually would now every day. Could you start by carrying the tray, with the jars, mug, and plate on and then the bag across the room. There is bread in a Tupperware box, a tin of baked beans and a saucepan ready in the bag for you to use. Would you use the grill rather than the toaster to make the toast.

At the end, could you carry the mug of coffee or tea and the plate of beans on toast back across the room separately, not on the tray, and then wash up and wipe the work surface. If you forget any of this, I am not recording sound so you can check and ask, or I will remind you. If you would wait just a moment, I will label your recording and get ready to record.”

Each recorded assessment is identified by recording a card showing the participants’ trial or record number and the date of assessment.

#### **Duration of assessment**

Setting up the assessment takes 5 minutes maximum.

*Clinic assessments:* allow a little extra time for participants to become familiar with the kitchen layout, storage, cooker controls etc, so they feel more at ease during the assessment.

*Home assessments:* it may occasionally take slightly longer to set up the assessment as, when you are politely requesting the person’s permission/co-operation in setting up the tasks (e.g., asking if you can unplug the kettle, put the tray in another room etc.), they may be engaging in further conversation.

Participants may take between 8 – 20 minutes to complete the task dependent on how talkative they are.

*Total assessment time:*

For the full JPBA: 20 – 30 minutes

For the S- JPBA: 10-15 minutes.

## The S-JPBA

*Home assessments:* You will still need to provide the full jars of coffee/ tea and the pottery mug.

*Clinic assessments:* You will require the full jars of tea/coffee; the pottery mug and the usual range of possible assistive devices (as listed previously) to help with completing the hot drink task.

## SECTION 2



## ASSESSMENT SCORING INSTRUCTIONS



### Scoring instructions

Read through this section to familiarise yourself with the assessment scoring procedure and task descriptions.

### Assessing the recordings:

Write your name, the participant's trial or record number and date of assessment & recording number at the top of the JPBA form.

Assess each task by ticking the appropriate column (C, PC, or I) on the assessment form. For each task, read through the Scoring Instructions and task descriptions to make your decision.

### PLEASE NOTE:

Tasks must be assessed as defined in this assessment and not according to your own opinion if this differs from the JPBA (as this would invalidate the results). The task descriptions are scored as correct, partially correct, or incorrect as a result of a content validity study with a panel of seven Occupational Therapists with between 2 – 18 years experience in Rheumatology (average 8 years).

As discussed, you should preferably record the assessment. You may need to 'pause' and review tasks a number of times to make your decision. You may wish to use the 'fast search' facility to move on more quickly between tasks as you become used to the assessment procedure.

NB. Participants may perform a task several times whilst making the hot drink and snack meal.

- Assess the **FIRST** time you see the task being performed **ONLY**

Ensure you are assessing the task specified on the JPBA form:

e.g., a person may carry the empty mug across the room to the kettle, then carry the full mug back. Assess "carrying a full mug".

If a task is not seen as described, assess its nearest equivalent e.g., carry plate – with meal on it. However, if not seen, assess carrying the empty plate across the room or taking a plate out of a cupboard. Note this on the assessment form.

### "Notes" column

When assessing, please report:

- use of an assistive device: "+ Aid" and note what used, e.g., jar opener)
- if it was performed by someone else during the assessment (" + Help")
- **optionally** you can record which joint protection /ergonomic method was used (e.g. . as Ca, Bc – see task descriptions).
- If a task is **not seen** (e.g., because accidentally omitted during assessment), write '**N/S**' BUT please check through the recording again, as some tasks are performed in quick succession, and you may have missed this.
- If you cannot code a task because there seems no appropriate description, write "**no code**".

## JPBA Scoring definitions

### Correct:-

- Methods reducing stress on hand/wrist joints as described in this assessment.

### Partially Correct

- Any task started incorrectly but then **quickly** altered and completed correctly.
- Two-handed tasks where one hand is performing the correct action and the other hand an incorrect action
- Action performed by another person as participant was unable to do.

### Incorrect:-

- Methods causing stress on the hand/wrist joints as described in this assessment.
- Any task started correctly but then **completed incorrectly**.
- Any task started incorrectly and finally corrected only after **struggling** to perform it incorrectly.

**Summary – if the person alters the method used during task performance:**

Starts:		Changes to:	Score as:
Correct		Partially Correct	Partially Correct
Correct		Incorrect	Incorrect
Partially Correct		Correct	Partially Correct
Partially Correct		Incorrect	Incorrect
Incorrect	<b>Quickly changes to</b>	Correct	Partially Correct
Incorrect	<b>Struggles then changes to</b>	Correct	Incorrect
Incorrect	<b>Quickly or struggles then changes to</b>	Partially Correct	Incorrect

### Scoring the JPBA or S-JPBA

Correct = 2 (5%)

Partially Correct = 1 (2.5%)

Incorrect = 0 (0%)

The maximum score for the 20 tasks observed is 40 (or 100%).

In the sample JPBA score sheet, the total score is 14/40 (or 35%).

### What do I do with missing data?

If any tasks are not performed, put “not seen” in the Notes column.

The total possible score should be reduced accordingly. For example, if one task is “not seen”, the total maximum score would be 38; if two tasks are “not seen” the total maximum score would be 36.

The score is then be converted to percentages to allow comparison across and between participants/patients.

Eg.  $14/38 = 36.8\%$ ,  
 $14/36 = 38.8\%$

### What is a significant score increase?

A test-retest reliability study has established that a significant score increase between assessments is at least 8/40 or 20% (Hammond and Lincoln 1999).

## **SECTION 3**



## **TASK DESCRIPTIONS**

## 1 . CARRY TRAY

**Correct:**



a) Slide tray onto palms/forearms and carry tray on both equally.

**Partially Correct:**



a) One hand gripping tray edge with “plate” grip, i.e., between thumb and side of fingers, other hand supporting tray weight on palm/forearm.

**Incorrect:-**



**a)** Both hands gripping edges of tray between thumb and sides of fingers

## 2. TURN ON TAP \*

Correct:-



a) Use heel/palm of hand – fingers not involved in grip – pressing down on top of tap. (May use piece of Dycem matting to improve purchase).



b) Use both hands gripping tap between palms to turn.



c) Use any tap turner (as appropriate for type of tap)

**Partially Correct:-**



a) Using cylinder grip one-handed – holding side of tap.



b) Using tap turner to slightly loosen tap, completing movement with fingers.

**Incorrect:-**



a) Turning one-handed using fingers.

### 3. FILLING KETTLE (TRADITIONAL OR JUG STYLE) \*

**Correct:-**



a) Using a jug/milk bottle/mug to fill kettle, so avoiding lifting.



b) Kettle sitting in sink or resting on sink edge whilst filling, ie. with weight obviously not being taken on hands.

**Partially Correct**



a) Holding kettle with two hands whilst filling – (one on handle, one underneath).



**Incorrect:-**



a) Holding kettle one-handed under tap whilst filling – whatever grip used (ie. holding over, under or side of handle).



b) Holding kettle with two hands whilst filling (both or handle)

#### 4. TURN OFF TAP \*

Correct:-



a) Use heel/palm of hand – fingers not involved – pressing down on top of tap.



b) Use both hands gripping tap between palms to turn.



c) Use tap turner / lever tap (any design).

Partially Correct:-

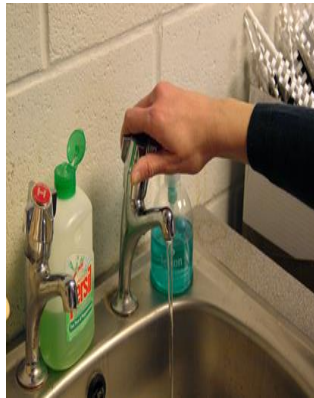


a) Use cylinder grip, holding side of tap.

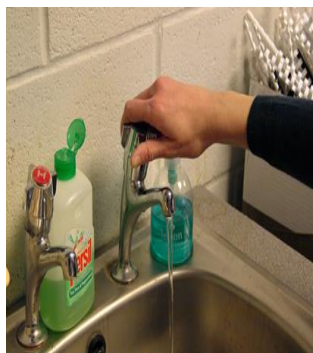
**Incorrect:**



a) Turning one-handed gripping with fingers.



b) Use tap turner to initially turn tap, remove aid and finally tighten with fingers.



c) Use correct grip (ie. heel/palm of hand, both hands gripping between palms) to initially turn tap, completing movement by tightening with fingers.

## 5. CARRY FULL KETTLE \*

### Correct:-



a) Avoid carrying by using jug to fill.



b) Slide kettle along work surface as much as possible.

### Partially Correct:-



a) Use two hands on handle – wrists flexed, on traditional kettle.



b) One hand on handle, wrist in extension, second hand supporting weight from beneath on palm of hand.

**Incorrect:-**



**a)** Holding one-handed – wrist flexed.



**b)** Holding one-handed – wrist extended.



**c)** Using two hands on handle, wrists flexed/deviated.



**d)** One hand holding kettle and other pressed against side of kettle.

## 6. PUSH IN ELECTRIC PLUG INTO WALL SOCKET \*

### Correct:-



a) Use palm/heel of hand, ie. fingers not included to push in (fingertip grip may be used whilst lining up pins with socket)

b) USING A PLUG PULL – not shown

### Partially Correct:-



a) Pushing in with fist.

### Incorrect:-



a) Gripping with fingers/thumb as push in.





b) Pushing in with thumb(s).



c) Pushing in with fingertips.



d) Pushing in with backs of fingers.

## 7. OPEN JAR \*

### Correct:-



a) Use jar opener – any ergonomic design.



b) Hold jar lid still by pressing down with heel/palm of hand, fingers not involved in grip, and turn jar with their hand.

### Partially Correct:-



a) Test tightness of lid with fingers, then use jar aid to loosen.



b) Hold jar lid still by pressing down with heel/palm of hand, fingers not involved in grip, and turn jar with other hand.





c) Gripping side of jar lid with index/middle fingers, palm and thumb in contact.

**Incorrect:-**



a) Twisting off cap using fingers and thumb.



b) Struggle to remove and only then use aid to complete task.

## 8. CLOSE JAR \*

**Correct:**



a) Use jar aid – any ergonomic design



b) Place lid on jar, hold lid still by pressing with heel/palm of hand (fingers not involved in grip) and turn jar with other hand.

**Partially Correct**



a) Use palm of hand, fingers not involved in grip.

**Incorrect:-**



a) Screw on lid with fingers.



b) Use aid but complete task by tightening lid with fingers.



c) Use heel/palm of hand then complete task by tightening lid with fingers.

## 9. CARRY SHOPPING BAG

### Correct:-



a) Carry in arms close to body.

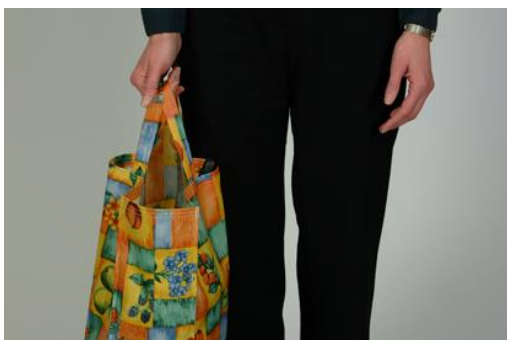


b) Carry over forearm (can pick up with hook grip one-handed initially to put on forearm).

### Partially Correct:-



a) Use "hook" grip two hands, fingers in alignment.

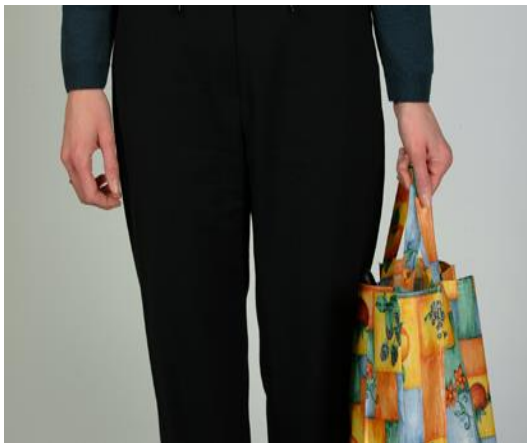


b) Take items out to reduce weight of bag, then carry using "hook" grip one or two handed.

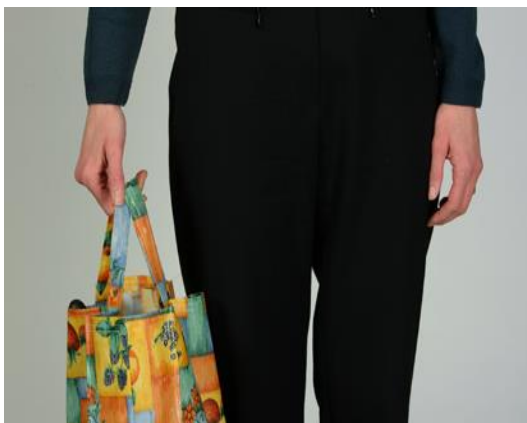


c) Pick up with “hook” grip and change to forearm.

**Incorrect:-**



a) Use “hook” grip one-handed.



b) Lift and carry using fingertips only.

## 10. OPEN TIN

**Correct:-**



a) Use electric can opener – e.g., tabletop model or One Touch can opener (not shown).

**Partially Correct**



a) Use electric can opener – hand held model.



b) Use wall mounted can opener.

**Incorrect:-**



a) Using 'butterfly/wing' style openers, turning with thumb and index/middle fingers.



b) Use tin opener with blade, ie. requiring lid to be stabbed/pierced to initially open.

**11. CARRY SAUCEPAN TO COOKER**  
**(Pan weighs approx. 850g or 1lb.10oz)**

**Correct:-**



a) Using one hand on handle, other supporting base with palm of hand.

**Partially Correct**



a) Using two hands on handle.

**Incorrect:-**



b) Using one hand – wrist extended or flexed.





**b)** Using two hands – one however not taking weight but only guiding (e.g., fingertips of one hand in contact only with side of pan.



**c)** Carrying part way one-handed and completing task two-handed or

alternatively carrying two-handed and completing one-handed.



**12. LIFT OUT LARGE TUPPERWARE BOX FROM BAG  
(Weight approx. 850g)**

**Correct:-**



a) Use two hands, box held between palms.

**Partially Correct**



a) Use two hands, box gripped between thumb and fingers on each hand.

**Incorrect:-**



a) Lifting one-handed, between thumb and fingers.

### 13. LIFT GRILL PAN INTO PLACE

Correct:-



A normal grill pan was not available for the photo shoot. However, the principle is the same for any grill pans or sheets that are placed in ovens. Whilst people rarely use a grill to toast, they may do this action at home to grill bacon, sausages, fish etc.

a) Using two hands – one on handle other obviously supporting weight of grill on palm (using cloth if hot)

Partially Correct:-



a) Using two hands on handle or using two-handled grill.

Incorrect:-



a) Using one hand on handle.



b) Using two hands – one on handle, second only guiding pan into place by gripping grill edge with fingers/thumb (ie. not supporting weight)

## 14. EMPTYING CONTENTS OF SAUCEPAN

**Correct:-**



a) Using two hands – one on handle, other supporting base using oven cloth, allowing contents to pour out.



b) Leave pan sitting or resting tipped on surface (ie. weight not taken on hands) and spooning contents out.

**Partially Correct:-**



a) Using two hands on handle to pick up and hold as contents pour out.

**Incorrect:-**



a) Using one hand to hold pan whilst pouring/.spooning out. Handle held horizontally.



b) Picks up pan one-handed, shakes vigorously, then grips two-handed.

**Or**

b) using two hands first and completing task with one hand).



c) Using one-handed cylinder grip holding pan handle down vertically and slightly tilted whilst pouring out contents.

## 15. CARRY PLATE

**Correct:-**



a) Hold with two hands, weight distributed over palms.

**Incorrect:-**



a) Gripping edge of plate one-handed, with thumb and side of index/middle fingers.



b) Gripping edge of plate two-handed, with thumb and side of index/middle fingers.





c) Hold with two hands, using fingertips only.



d) Gripping plate two-handed, one with fingers and thumb other fingertips only.

## 16. POUR KETTLE \*

**Correct:-**



a) Use two hands – one wrist extended other hand supporting weight of kettle on palm of hand



b) Use kettle tipper (any model)

Picture not shown

c) Tip kettle resting on work surface (ie weight not held) to pour into mug – which may be at lower level if necessary.

**Partially Correct**



a) Firmly gripping handle two-handed, wrists extended.



**Incorrect:-**



a) Holding one-handed.



b) Holding two-handed but one hand obviously not supporting weight. (eg. fingertips only in contact).



c) Holding two-handed – wrists flexed.

## 17. HOLDING FULL MILK BOTTLE/CARTON \*

Correct:-



a) Use two hands – one on base of bottle supporting weight, other wrapped round body of bottle.



b) Use two hands – both on body of bottle.



c) Use light milk jug.

**Partially Correct:-**

Picture not shown

a) Gripping body of bottle one-handed – whole of palm in contact.

**Incorrect:**

Picture not shown

b) Gripping top of bottle with fingertips; or body of bottle with fingertips only.

## 18. CARRY FULL MUG TO TABLE \*

**Correct:-**



a) Two-handed – one on handle, other supporting weight of mug at base on palm of hand.



b) Two-handed one on handle, other firmly wrapped round side of mug with palm and all fingers in contact.

**Partially Correct:-**



a) One-handed, with thumb hooked through handle and palm/fingers wrapped round mug.

**Incorrect:-**



a) Holding mug by handle only one-handed.



b) Using two hands – one on handle, other only guiding e.g., only fingers/fingertips in contact with side or base of mug.



c) Using affected hand only to carry mug.

## 19. WIPE SURFACES

### Correct:-



a) Wiping with cloth/sponge held under flat of hand (thumb in extension at side), using waving, stroking or circular movements.

### Incorrect:-



a) Hold cloth/sponge in fingertips/thumb pressing down onto surface.



b) Cloth/sponge held under hand but with thumb tucked under palm, ie. pressure from fingers and not from palm of hand.

## 20. SQUEEZE OUT CLOTH/SPONGE

**Correct:-**



a) Press out cloth/sponge on sink surface with palm of hand.

**Partially Correct:-**



a) Wrap cloth round taps to squeeze out excess water.

**Incorrect:-**



a) Use two hands in twisting/wringing/squeezing movement.



b) Squeeze out in fist of one hand.

## SECTION 4



### SCORING INSTRUCTIONS JPBA & S-JPBA SCORE SHEETS



### Scoring the JPBA or S-JPBA

Correct = 2 (5%)

Partially Correct = 1 (2.5%)

Incorrect = 0 (0%)

The maximum score for the 20 tasks observed is 40 (or 100%).

In the sample JPBA score sheet, the total score is 14/40 (or 35%).

### What do I do with missing data?

If any tasks are not performed, put “not seen” in the Notes column.

The total possible score should be reduced accordingly. For example, if one task is “not seen”, the total maximum score would be 38; if two tasks are “not seen” the total maximum score would be 36. The score is then be converted to percentages to allow comparison across and between patients/ participants.

Eg.  $14/38 = 36.8\%$ ,  
 $14/36 = 38.8\%$

Up to three missing data are allowed for the full JPBA.

Up to two missing data are allowed for the S-JPBA.

**The following JPBA and S-JPBA score sheets may be freely copied for research and clinical assessment purposes.**

# JOINT PROTECTION BEHAVIOUR ASSESSMENT

Assessor Name:

Participant No.

Recording No:

Task Number	Task	C	PC	I	Notes	Score
1	Carry Tray					
2	Turn on tap					
3	Fill kettle					
4	Turn off tap					
5	Carry full kettle					
6	Push in electric plug to wall socket					
7	Open jar					
8	Close jar					
9	Carry shopping bag					
10	Open tin can					
11	Carry saucepan to cooker					
12	Lift Tupperware box from bag					
13	Lift grill pan					
14	Empty saucepan contents					
15	Carry plate					
16	Pour kettle					
17	Hold milk					
18	Carry mug					
19	Wipe surfaces					
20	Squeeze cloth					
	% Score:				Score/ no. tasks assessed	

Key: C = Correct; PC = Partially Correct; I = Incorrect JP behaviour

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## SHORT- JOINT PROTECTION BEHAVIOUR ASSESSMENT

**Assessor Name:**

**Participant No.**

**Recording No:**

Task Number	Task	C	PC	I	Notes	Score
2	Turn on tap					
3	Fill kettle					
4	Turn off tap					
5	Carry full kettle					
6	Push in electric plug to wall socket					
7	Open jar					
8	Close jar					
16	Pour kettle					
17	Hold milk					
18	Carry mug					
	<b>% Score:</b>				<b>Score/ no. tasks assessed</b>	<b>% score:</b>

**Key: C = Correct; PC = Partially Correct; I = Incorrect JP behaviour**

# JOINT PROTECTION BEHAVIOUR ASSESSMENT: EXAMPLE

## Sample Assessment 1

Assessor Name:

Participant No.

Recording No:

AH

21

Task Number	Task	C	PC	I	Notes	Score
1	Carry Tray		✓		One hand correct, other incorrect = PC	1
2	Turn on tap		✓		Cylinder grip = PC	1
3	Fill kettle			✓	Turn with fingers = I	0
4	Turn off tap	✓			Kettle sitting in sink = C	2
5	Carry full kettle		✓		2 hands, wrists extended = PC	1
6	Push in electric plug to wall socket			✓	Push in with thumbs = I	0
7	Open jar	✓			Press down with palm on lid and turn = C	2
8	Close jar			✓	Screw lid on with fingers =	0
9	Carry shopping bag		✓		Hook grip across room, change to arm = PC	1
10	Open tin can			✓	Wing can opener = I	0
11	Carry saucepan to cooker			✓	1 hand on handle, other guiding only = I	0
12	Lift Tupperware box from bag		✓		2 hands gripping thumb/fingers = PC	1
13	Lift grill pan			✓	1 hand on handle other guiding only = I	0
14	Empty saucepan contents			✓	Vertical cylinder grip = I	0
15	Carry plate		✓		1 hand weight on palm = PC	1
16	Pour kettle			✓	1 on handle, other finger ends only in contact = I	0
17	Hold milk	✓			2 hands on body of bottle = C	2
18	Carry mug		✓		1 hand: thumb hooked handle; fingers round = PC	1
19	Wipe surfaces				NS	NS
20	Squeeze cloth			✓	Squeeze 1 fist; change to 2 fists = I	0
	<b>% score: 34%</b>				<b>Score/ no. tasks assessed</b>	<b>13/38</b>

Key: C = Correct; PC = Partially Correct; I = Incorrect JP behaviour

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## References

Hammond A, Lincoln N (1999). Development of the Joint Protection Behaviour Assessment. *Arthritis Care and Research* 12(3):200-207.

Klompenhouwer P, Lysack C, Dijkers M, Hammond A (2000). The Joint Protection Behaviour Assessment: a reliability study. *American Journal of Occupational Therapy*.54(5):516-524

### **Other versions of the JPBA and S-JPBA:**

#### **German:**

Niedermann K, Forster A, Hammond A, Uebelhart D, de Bie R (2007). Development and Validation of a German version of the Joint Protection Behaviour in people with rheumatoid arthritis. *Arthritis Care and Research* 57 (2): 249-255

#### **Turkish:**

Tonga E, Uysal SA, Karayazgan S, Hayran M, Duyger T. (2016). Development and reliability of a Turkish version of the Short Form-Joint Protection Behavior Assessment (JPBA-S). *Journal of Hand Therapy* 29:275-280.