

### Testimony from expert witness for review question: B.1a What physical rehabilitation interventions are effective and acceptable for adults with complex rehabilitation needs after traumatic injury?

<b>Name:</b>	Col Rhodri Phillip
<b>Role:</b>	Clinical Director & CT lead Consultant, Defence Medical Rehabilitation Centre
<b>Institution/Organisation (where applicable):</b>	Defence Medical Rehabilitation Centre Stanford Hall, Stanford on Soar, Loughborough, LE12 5BL
<b>Contact information:</b>	████████████████████
<b>Guideline title:</b>	Rehabilitation after traumatic injury
<b>Guideline Committee:</b>	Guideline committee meeting 17 (January 2021)
<b>Subject of expert testimony:</b>	Intensity of rehabilitation packages
<b>Evidence gaps or uncertainties:</b>	<i>What is the effectiveness of intensive rehabilitation packages on clinical outcomes for people with complex rehabilitation needs after traumatic injury?</i>
<p>One of the key areas of interest that was identified during scoping for this guideline was the success the military has seen with providing intensive rehabilitation for soldiers suffering complex trauma during conflict. Currently, civilians are not offered this same intensity of rehabilitation and show poorer outcomes, both for individuals and the state. This was subsequently reinforced by the Committee as an important area to make recommendations on, exploring what can be extended to patients receiving treatment in the NHS. Additionally, the Committee were interested identifying how physical and psychological rehabilitation interventions can be combined into holistic packages for rehabilitation after complex trauma. Review questions covering physical, psychological and cognitive rehabilitation therapy packages, and specific rehabilitation programmes for limb reconstruction, amputation, nerve injury and spinal cord injury, were designed to include comparisons of intensity.</p> <p>Following a systematic search of published literature and screening against our agreed protocol, we have identified evidence for rehabilitation packages for people after traumatic injury, covering physical, cognitive, psychological and social participation programmes. As well as these interventions, we also located evidence for specific limb, nerve, spinal, and chest injury rehabilitation packages. These provided evidence for how these programmes can affect patient outcomes of patient satisfaction, return to work or education, activities of daily living, quality of life and changes in mood (among others).</p> <p>However, the results of this review also highlighted certain gaps in the evidence, namely intensity of rehabilitation. In order to keep the strength of evidence as high as possible, any non-RCT with less than 100 participants per arm were excluded. While military studies were located, they tended to be reporting on small non-randomised comparative studies. Civilian trials that investigate the effectiveness of intensive rehabilitation either did not meet this criterion for study design or did not fit our definition of complex trauma. The majority of comparators of studies that did meet our inclusion criteria were either usual care or another intervention. There was only 1 study identified that compared different intensities of rehabilitation packages that was judged to be suitable for exploratory economic analysis. This was a RCT to compare a balancing exercise programme with standard physiotherapy in patients with hip fractures. However, due to the lack of other data, the specific needs of the hip fracture population, the elderly age of the included participants and the poor quality of</p>	

evidence (as measured using GRADE), this evidence was not considered sufficient to make recommendations on rehabilitation intensity.

Due to these gaps in the evidence and the focus placed on intensity in the guideline protocols and economic analysis, the Committee agreed to supplement the data by inviting an expert witness. This witness will provide testimony on intensive rehabilitation for complex trauma, ideally on the following areas:

- The definition, key components, and setting (i.e., inpatient vs. outpatient) of intensive rehabilitation
- Type of injury and any sub-groups intensive rehabilitation should be aimed at, or is particularly effective in
- Timing of intensive rehabilitation along an individual's rehabilitation journey (at what time along the pathway, possibility of more than one burst)
- Expected duration of intensive rehabilitation and standard care rehabilitation
- Location of intensive rehabilitation (i.e., potentially delivered by a tertiary service provided by one provider for the region such as major trauma centre for their trauma network) and issues around accommodation and travel
- Delivery and coordination of follow-up care after intensive rehabilitation periods, including between healthcare settings
- The benefits and harms of intensive rehabilitation
- Any factors that may contribute to effectiveness of intensive rehabilitation
- Resource implications of providing intensive rehabilitation and the potential capacity within the NHS to provide such rehabilitation
- Ideally, the witness will also provide expert opinion on exploratory economic analysis that is being undertaken for this guideline to assess the potential cost effectiveness of intensive rehabilitation including:
  - The generalisability and applicability of identified intensive rehabilitation packages (musculoskeletal rehabilitation packages, and police outpatient rehabilitation package) to NHS practice
  - Applicability of identified quality of life scores
  - Potential relative effectiveness of intensive rehabilitation relative to standard care rehabilitation
  - Impact on other health and care costs

### Summary testimony

I'd like to start with a caveat to my testimony. I work for the Ministry of Defence and as such am employed in an occupational healthcare system. The aim of this service is to either ensure individuals can return to full fitness, can return to a work role of benefit to the organisation or are rehabilitated to their maximum potential in order to minimise the impact of any issues on their future life and career outside of the military. Hence, we are resourced with those intents in mind. Our patient population could be from wherever the military is based and as such once a week or occasional inputs are unrealistic. An intensive model of care delivery is essential at Defence Medical Rehabilitation Centre (DMRC). I would also add that typically patients come to us either after NHS input, during NHS input or in the absence of local specialist NHS input.

DMRC is the tertiary facility in the mil rehab programme, supported by 13 regional rehab units and over 100 local physio units globally. Our patients are still being paid and their attendance is seen as duty, though they can decline input if they prefer. At DMRC we operate two streams – residential care and inpatient care. The former comprises of lower limbs, spines and upper quadrant, spec (cardiac to post viral), the latter neurorehabilitation and complex trauma. At present we also have COVID-19 rehab elements operating. All look after what the NHS would term trauma patients, save for some of the Spec patients. Clinical teams consist of Rehab and subject-matter experts (SME) consultants, physiotherapists, occupational therapists, exercise rehab instructors and social workers. Additional support comes from nursing, our own pain and mental health practitioners, prosthetics, orthotics and podiatry, radiology, mild traumatic brain injury (mTBI) and the clinical research team. We're a Royal College of General Practitioners and Royal College of Physicians recognised training site for

Speciality Registrars programmes.

The residential programme will often see patients who have failed to recover despite local or regional rehabilitation unit support. We have best practice guidelines that aim to identify when to refer to DMRC. Initial input is outpatients followed by a one-week remote education element and a two-week residential element. This can be repeated if required but rarely goes beyond two admissions.

The neurorehabilitation element runs along NHS lines and the majority attend for six weeks, with some cases requiring longer input. The flexibility to offer care to maximise recovery, rather than be time limited, has led to some very impressive return to work results that I've referenced below.

Complex trauma has increased and reduced capacity in response to the recent conflicts. At its height we had up to 80 inpatients at any one time. Normal times would see around 34 and COVID-19 has reduced that further due to competing priorities. The standard model is 4-6 week admissions with periods back home to allow for tissue adaptation and recovery. The gap periods also allow us to get other patients and allow for 'real world' experiences to help identify rehab goals going forward. A rehab unit can be quite an artificial environment. Rehab is goal focused and that helps define input duration. Input towards the end of their time with us often sees significant gaps between interventions and may also incorporate graduated return to work programmes back at their unit.

As part of our care delivery, we work closely with tertiary level surgeons and specialists in order to address complex issues. This includes specialist orthopaedic surgeons with regional special interests, nerve and complex tissue loss plastic surgeons, gastrointestinal surgeons, urologists, fertility SMEs, cardiac and respiratory physicians, musculoskeletal and neuro radiology. This allows for complex case discussions and coordinated intervention planning. The DMRC consultants often act as coordinators of the multiple inputs and this role is quite key to the success of the patient pathway.

My question back to the panel would be what do you define as intensive? Depending on the paper that could be daily to fortnightly or less. Does it imply effort on the part of the patient or just frequency of inputs? For rehab to be effective it should comply to the same rules of drug prescription. Right input at the right time, at the right frequency and at the right 'dose' for the right duration. I don't think there is any group that cannot benefit from an intensive approach, save for the chronic pain or post-viral patient (>6 months) who may require a less intense approach. That can still be delivered though in a residential programme.

Our focus is on patients who have either already failed the local, intermittent approach or the regional three-week course model, or the more complex cases that come to us directly from NHS trauma centres. The fact that the former still generates positive results is good evidence of effect. But we are fortunate in that patients remain paid throughout their rehab journey and their employer actively encourages participation. It is hard to imagine a similar scenario in the civilian world. We also have a younger population with less comorbidities and who generally thrive on a group rehab delivery approach.

Keys to success –

- Coordinated tertiary level care delivery with all relevant specialists
- Care model delivery matched to patient population circumstances
- Timing and nature of input matched to tissue pathology
- Holistic approach to rehab to maximise success – not just exercise based or single disease specific input
- Real world goal identification through periodic inputs
- Coordinated with occupational health elements to maximise return to work success

Not aware of any reason – other than in the chronic cases mentioned above – where intensive rehab potentially offers harm. Our current COVID-19 rehab 2-week programme is showing positive results, with some patients presenting 9 months post initial infection. Intensive doesn't mean level of effort on the patient's part but can mean intensity of input and support.

My biggest concerns for the applicability to the NHS is having the access to rehab expertise to allow for delivery and coordination, concentrated resources to allow for true holistic input, a patient population willing to commit to a period of intensive input, the latitude to define the end point by outcome rather than resource utility and the funding stream to recognise the level of input and compensate it effectively. As I understand it whether a fractured femur patient goes

back to a highly physical demanding job or remains off work for life with reduced mobility makes no difference to the trauma centre as to the tariff received. Interestingly in my time at DMRC the ministry most interested in our model was the Department of Work and Pensions as they pay for sick pay and disability benefits.

**References**

None

**Disclosure**

Nil