Research – Neuro-feedback therapy for ADHD

Brief	Is neuro feedback effective for treating people (13yo, pubescence age range) with ASD (level 2)? (update to 2019 research) Is neuro feedback effective for treating people (13yo, pubescence age range) with ASD (level 2) and ADHD? Is neuro feedback effective for treating people (13yo, pubescence age range) with ADHD? Is it suitable for prolonged/ongoing treatment and in conjunction with other allied health treatments? What are some side effects of neuro feedback treatment? i.e. increase in tics Is there evidence in the published literature that neuro feedback therapy can effectively treat "paroxysmal activity on executive functioning, reduce anxiety, improve emotional self-regulation and language processing issues."
Date	09/04/2021
Requester(s)	Julie s47F - personal priv - Senior Technical Advisor (TAB)
Researcher	Jane s47F - personal priv (Research Team Leader - TAB)
Cleared	N/A

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1 Contents

2 Summary

1) Neurofeedback therapy for the treatment of ASD is not considered an evidence based practice. The few randomised controlled trials that do exist are of poor quality. Further large scale, high quality studies that include best practice treatments as a comparison group are required.
2) Most commonly, studies include “high functioning” children with ASD and do not provide severity level. Therefore, results can only be generalised to that population group.
3) Comorbid ADHD is not reliably assessed in current studies, possibly owing to the current exclusion criteria in the classification system that rule out coexisting ASD and ADHD. Few neurofeedback studies have focused on ADHD in individuals with ASD.
4) Multiple meta-analyses have investigated the effectiveness of neurofeedback therapy for ADHD. They have found that neurofeedback is superior to ‘non-active’ control groups for reducing inattention and hyperactivity/impulsivity symptoms when parents provide self-reported assessments. When less biased examiners (teachers) perform assessments the results are more commonly non-significant
    a. Further high quality studies (better blinding, use of objective measures) comparing to current best practice treatment for ADHD are required
    b. Some authors have suggested that neurofeedback be used as a complimentary/combined treatment with stimulants
    c. Neurofeedback does not appear in any ADHD clinical practice guidelines or treatment recommendations
5) No studies could be located which used neurofeedback therapy in conjunction with other allied health treatments
6) Given that neurofeedback therapy is a non-invasive treatment, adverse events are unlikely. One study did look investigate this and reported no significant adverse effects or sleep problems after neurofeedback therapy [1].
    a. No evidence of an increase in tics following neurofeedback therapy
7) No consensus on protocol, intensity or duration of treatment
8) There is no evidence that neurofeedback therapy can effectively treat “paroxysmal activity on executive functioning, reduce anxiety, improve emotional self-regulation and language processing issues.”
    a. There is only weak evidence of its effectiveness in reducing inattention and hyperactivity/impulsivity symptoms in those with ADHD

3 What is neurofeedback therapy?

Neurofeedback is a kind of biofeedback, which utilises operant conditioning to teach self-control of brain functions to subjects by measuring brain waves through electroencephalography (EEG) or functional magnetic resonance imaging (fMRI) and providing a feedback signal [2, 3]. Positive or negative feedback is produced for desirable or undesirable brain activities, respectively. Various EEG components are extracted and fed to subjects using online feedback loop in the form of audio, video or their combination. Accordingly, electrophysiological components are separately demonstrated [2]. As an illustration, the power of a signal in a frequency band can be shown by a varying bar graph. During this procedure, the subject becomes aware of the changes occurring during training and will be able to assess his/her progress in order to achieve optimum performance. Neurofeedback treatment protocols mainly focus on the alpha, beta, delta, theta, and gamma treatment or a combination of them such as alpha/theta ratio, beta/theta ratio, etc. [2]. Table 1 below provides an overview of common brainwaves, frequencies and characteristics.

Table 2. Specific brainwaves with their characteristics

Common brainwave frequency	Frequency range (Hz)	General characteristics
Delta	1–4	Sleep, repair, complex problem solving, unawareness, deep-unconsciousness
Theta	4–8	Creativity, insight, deep states, unconsciousness, optimal meditative state, depression, anxiety, distractibility
Alpha	8–13	Alertness and peacefulness, readiness, meditation, deeply-relaxed
Lower alpha	8–10	Recalling

Table 2. Specific brainwaves with their characteristics

Common brainwave frequency	Frequency range (Hz)	General characteristics
Upper alpha	10–13	Optimize cognitive performance
SMR (sensorimotor rhythm)	13–15	Mental alertness, physical relaxation
Beta	15–20	Thinking, focusing, sustained attention, tension, alertness, excitement
High beta	20–32	Intensity, hyper alertness, anxiety
Gamma	32–100 or 40	Learning, cognitive processing, problem solving tasks, mental sharpness, brain activity, organize the brain

4 Neurofeedback in the treatment of autism spectrum disorder

There are very few high quality studies that investigate the use of neurofeedback therapy for children and adolescents with ASD (Table 2). A recent systematic review found that 19/20 studies which investigated neurofeedback therapy obtained positive results [3]. However, they provided not critical analysis of the included studies.

The limitations of the studies include:

1) Small sample sizes (ranging from n = 10 to 28) meaning results should be interpreted with caution
2) Lack of criterion standard diagnostic instruments
3) No clear guidance as to how many sessions of neurofeedback are needed for optimal results (ranged from 5 to 69 sessions)

4) No firm agreement on optimal treatment protocols
5) Studies restricted to individuals with ASD with an IQ above 70 ('high-functioning ASD'); this selection bias does not allow for the generalization of current findings
6) Insufficient control interventions - no studies compared to best practice treatments

A further systematic review concluded that existing evidence does not support neurofeedback as a treatment that can be recommended for ASD core symptoms [4]. They also suggest that studies with outcomes in favour of neurofeedback might be showing an improvement in comorbid ADHD symptoms rather than a true improvement in core ASD symptoms.

Table 2. Literature Review - ASD				
Author	**Aim/Objective**	**Methods**	**Results**	**Level & Quality of evidence**
van Hoogdalem, Feijs [3]	Is neurofeedback (NF) an effective alternative treatment in children with ASD?	**Systematic Review** Methods designed in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement <u>Eligibility criteria</u> • NF as a treatment for ASD in children (<18 years) • Diagnosis for autism had to be diagnosed by DSM-III-R, DSM-IV, or DSM-5 guidelines • Peer reviewed • Experimental in design with a control group <u>Excluded</u> • Adults	20 studies (n = 443) met the inclusion criteria (3 RCT, 13 non-randomised & 4 experimental). Selected studies were heterogeneous in their design and methodology. The NF therapy protocol as well as the duration, frequency, and number of sessions varied between studies. Results qualitatively presented. 19/20 studies found some form of positive result. Various studies also reported that specific functions improved while other functions did not, or even became worse. Socialisation appears to improve most consistently. <u>Long term effects</u>	**MODERATE** Lacked quality assessment of included studies. The authors take positive findings at face value and don't criticise further. 3/4 of the included RCTs are not blinded and all have small samples. Sample sizes of all included studies were quite small (ranging from n = 10 to n = 28) meaning results should be interpreted with caution. Lack of qualitatively good studies, which makes it hard to draw strong conclusions

Table 2. Literature Review - ASD				
Author	**Aim/Objective**	**Methods**	**Results**	**Level & Quality of evidence**
		• Other disorders such as ADHD, learning disorders, intellectual disability • Case studies and book chapters No quality assessment of included studies.	2 RCTs looked at longitudinal effects. One found significant maintenance in social behaviour and executive function at 12 months. The other study showed that NF did not significantly reduced ASD symptoms. Non-invasive, no side effects	No clear guidance as to how many sessions of NF are needed for optimal results (ranged from 5 to 69 sessions). No firm agreement on optimal treatment protocols.
Holtmann, Steiner [4]	To review current studies on the effectiveness of neurofeedback as a method of treatment of the core symptoms of ASD.	**Literature review** Other than listing the databases searched there are no descriptions on the eligibility criteria, data collection or quality assessment methods used. Authors state that 'all available data on neurofeedback in ASD and in comorbid ASD / ADHD are reviewed'. This cannot be determined without a search strategy or methods.	Qualitative interpretation of individual studies provided along with corresponding percentage changes/descriptive statistics. Studies with outcomes in favour of neurofeedback might be showing an improvement in comorbid ADHD symptoms rather than a true improvement in core ASD symptoms. Lack of blinding in controlled studies, therefore effects might be biased by rater expectations (i.e. parents). Authors find that existing evidence does not support neurofeedback as a	**LOW** • Studies don't use criterion standard diagnostic instruments • Neurofeedback should be compared with best practice ASD interventions in order to determine its efficacy and effectiveness • Unknown whether neurofeedback adds therapeutic value to existing methods • Studies restricted to individuals with ASD with

Table 2. Literature Review - ASD				
Author	**Aim/Objective**	**Methods**	**Results**	**Level & Quality of evidence**
			treatment that can be recommended for ASD core symptoms.	an IQ above 70 ('high-functioning ASD'); this selection bias does not allow for the generalization of current findings

5 Neurofeedback in the treatment of attention deficit hyperactivity disorder

The delivery of neurofeedback therapy for children and adolescents with ADHD has been researched extensively over the past two decades (Table 3). Evidence from meta-analyses of RCTs show that most studies compare neurofeedback to a 'non-active' control group (described as control group conditions without enough proven efficacy to reduce ADHD symptoms – such as sham neurofeedback, wait list, electromyographic biofeedback, and physical activity) and not to current best practice such as stimulants/medication.

- The majority of meta-analyses (in the <18 year old cohort) find that neurofeedback is superior to 'non-active' control groups for reducing inattention and hyperactivity/impulsivity symptoms [5-7].

However, the above finding needs to be interpreted in relation to the below limitations

1) Pre-post-test comparisons are calculated using measures performed by proximal evaluators (often parents). When 'possibly blind' evaluations are used (usually teachers) the magnitude of positive effect is often much smaller or non-significant. There is less bias when using a teachers subjective assessment rather than parent report
2) This substantial variation in results depending on who provides the evaluation means conclusions about the effectiveness of neurofeedback therapy are fragile/weak
3) The magnitude of effect sizes that support the efficacy of neurofeedback at present are small (<0.5)

Neurofeedback compared to stimulants shows that stimulants are more effective, even when parents are used to make the evaluations [7, 8].

Although current evidence on neurofeedback for ADHD is considered weak positive, it is suggested that neurofeedback be used as a complimentary/combined treatment with stimulants.

At this stage, neurofeedback does not appear in any ADHD clinical practice guidelines or treatment recommendations in the USA, Canada, UK or Spain (Aus guidelines currently being developed).

Table 3. Literature Review - ADHD

Author	Aim/Objective	Methods	Results	Level & Quality of evidence
Riesco-Matías, Yela-Bernabé [7]	Summarise and review the results of previous meta-analyses and present the results of a new meta-analysis of randomized controlled ADHD neurofeedback trials.	**Meta-analysis** Inclusion criteria • Meta-analytic methodology used to summarize the effect of studies • RCTs published in peer-reviewed journals • Sample: primary ADHD diagnosis (DSM or ICD) • Mean age < 18 years old • standard EEG-NF theta/beta ratio training, standard SCP or SMR, and theta training; • Validated scale pre–post treatment measurements of at least one of the core ADHD symptoms (inattention, hyperactivity, impulsivity, hyperactivity-impulsivity)	7 meta-analyses were reviewed and 17 studies were incorporated into the new meta-analysis. All meta-analyses that calculated the effects of neurofeedback applied to inattention symptoms and/or hyperactivity-impulsivity symptoms versus the effect of non-active control condition groups and used most-proximal evaluator data (often parents) obtained significant effect sizes in favour of neurofeedback. No meta-analysis has found effective neurofeedback treatment for hyperactivity-impulsivity symptoms when possibly blind ratings (often teacher ratings) have been used. Only one meta- analysis was in favour of	**HIGH** There is less bias when using a teacher's subjective assessment rather than parent report. Therefore, this substantial variation in results depending on who provides the evaluation means conclusions are 'fragile'. Current evidence on neurofeedback for ADHD is considered weak positive. New RCTs that establish links between ADHD symptom measurements,

Table 3. Literature Review - ADHD

Author	Aim/Objective	Methods	Results	Level & Quality of evidence
		Exclusion criteria • <5 participants per group • Language other than English or Spanish • Sample was shared with another study included in the current meta-analysis • Insufficient data to calculate target effect sizes • No inclusion criteria	neurofeedback for inattention symptoms Results of the updated meta-analysis are in support of previous findings, i.e. results are only effective when parents are providing ratings of change/effectiveness, and these effects are small (<0.5) 1) NF v control group for inattention using most proximal evaluator: ES -0.33, 95% CI -0.56, -0.10 2) NF v control group inattention using probably blind evaluator: ES -0.25, 95% CI -0.45, -0.04 3) NF v control for hyperactivity/impulsivity symptoms using most proximal evaluator: ES -0.17, 95% CI -0.33, -0.02	subjects' learning after neurofeedback, and neurophysiological measures could improve the quality of the current conclusions.

Table 3. Literature Review - ADHD

Author	Aim/Objective	Methods	Results	Level & Quality of evidence
			4) NF v control for hyperactivity/impulsivity symptoms using probably blind evaluator: ES -0.16, 95% CI -0.32, 0.01 5) NF v stimulant control group using most proximal evaluator: ES 0.26, 95% CI 0.02, 0.51	
Bussalb, Congedo [5]	To update the meta-analysis performed by Cortese, Ferrin [6] and evaluate the efficacy of neurofeedback treatment for ADHD in children and adolescents.	**Meta-Analysis** <u>Inclusion criteria</u> • studies have to assess NFB efficacy • subjects must have received a diagnosis of ADHD based on DSM, ICD-10 (67) criteria, or by a qualified psychiatrist • be written in English, German, Spanish, or French • include at least eight subjects in each group	16 included RCTs (n = 706) • ES in favour of NF efficacy as being significant when clinical scales of ADHD are rated by parents (non-blind, p-value = 0.0014), but not when they are rated by teachers (probably blind, p-value = 0.27). • The ES is significant according to both raters for the subset of studies meeting the definition of "standard NF protocols (parents'	**HIGH** Although results are in favour of NF when parents are rating/self-reporting effectiveness there is still the need for studies with placebo-controlled intervention as well as carefully reported neuro-marker changes in relation to clinical response to be performed.

Table 3. Literature Review - ADHD

Author	Aim/Objective	Methods	Results	Level & Quality of evidence
		• Aged below 25 years Severity of ADHD symptoms assessed by parents (most proximal) or teachers (probably blinded). Measured using clinical scales such as the ADHD-RS which is a self-reported questionnaire. Extensive explanation of meta-analysis methods provided. Sensitivity analysis and regression models conducted.	p-value = 0.0054; teachers' p-value = 0.043, k = 4) • 3 main factors identified that have an impact on NF efficacy: 1) more intensive treatment, but not treatment duration 2) teachers report a lower improvement compared to parents 3) Using high-quality EEG equipment improves the effectiveness of treatment.	
Yan, Wang [8]	To perform a systematic review and meta-analysis of head-to-head RCTs comparing the effects of methylphenidate (MPH - Ritalin) and NF in terms of efficacy on ADHD core symptoms (combined,	**Systematic review and meta-analysis** PRISMA guidelines followed. <u>Eligibility</u> • children/adolescents <18 years) and/or adults ≥18 years • RCTs only	18 RCTs included (778 individuals with ADHD in the NF arm and 757 in the MPH group) At the study first endpoint, MPH was significantly more efficacious than NF on ADHD core symptoms (ADHD symptoms combined: SMD=−0.578,	**MODERATE** Differences in the dose of drugs, the number of feedbacks, which may introduce some bias in the statistical analyses.

Table 3. Literature Review - ADHD

Author	Aim/Objective	Methods	Results	Level & Quality of evidence
	inattention and hyperactivity/impulsivity)	• diagnosis of ADHD according to the DSM or ICD-10 • ADHD defined based on scores above cut-off point on any validated ADHD measure, as in previous meta-analyses <u>Interventions</u> Trials comparing head to head NF and MPH. Both fixed dose and flexible dose designs. Multimodal treatments were excluded to avoid confounding factors. Only validated ADHD rating scales were included to determine treatment effectiveness.	95% CI (–1.063 to –0.092)) and on two neuropsychological parameters (inattention:–0.959 (-1.711 to –0.208); inhibition:–0.469 (-0.872 to –0.066)). Dropouts were significantly lower in NF versus MPH (OR=0.412, 0.186 to 0.913). At the study follow-up, MPH was superior to NF in some outcomes, but results were inconsistent across raters (parents and teachers). High risk of bias across studies due to concerns of allocation concealment. This may have contributed to placebo effects, which may affect the results.	Inclusion of different rating scales to assess the core symptoms of ADHD. In future studies, risk of bias should be reduced, in particular, blinding of outcome assessments. At this stage there is still some uncertainty around results due to study quality. Results should be interpreted with caution.

Revision History

Revision	Revised by	Cleared by	Date	Research Register No.	HPE No.	Summary of Revision
Complete update of literature and inclusion of treatment for ASD and ADHD	Jane s22(1)(a)(ii) - Irrelevant	Jane s22(1)(a)(ii) - Irrelevant	09/04/2021	2021/180 and 2019/0038	NED19/195669	This document has been completely revised. The initial document did not conduct a comprehensive review of the literature or critically analyse any of the included papers. Most information was not peer reviewed and taken from website sources. This version now includes literature on the effectiveness of neurofeedback therapy for ASD and ADHD in children and adolescents.

6 References

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Research – Osteoarthritis (OA): Evidence Based Treatments

Brief	Evidence based treatments for ***Osteoarthritis (OA).***
Date	January 18, 2021
Requester(s)	Alicia s47F - personal privacy (Senior Technical Advisor (TAB/AAT))
Researcher	Craig s47F - persona (Tactical Research Advisor (TAB?AAT)
Cleared	Jane s47F - personal priv (Research Team Leader (TAB)

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1 Contents

2 Summary

- This document makes substantial use of the following comprehensive research paper: Arthritis Australia. Evidence to support the national strategic action plan for arthritis, 2019.
- A range of evidence-based national and international guidelines and standards of care have been developed to support the timely and effective management of OA
- Evidence based first line treatment strategies for OA involve weight loss, exercise, patient education and self-management support, where a multidisciplinary management approach is taken.
- A variety of medications are used to support OA to increase bone mineral density, manage symptoms such as pain and inflammation, and reduce the risk of fractures.
- Complementary medicines are often used in conjunction with pharmaceuticals or as an alternative to traditional medicines
- Joint replacement surgery is used for severe, symptomatic OA, when first line treatment options fail.
- Although devices such as braces, walking sticks, and shoe insoles, are often utilized in OA treatment, there appears to be little evidence of their effectiveness.

3 What is Osteoarthritis (OA)?

Osteoarthritis (OA) is a chronic condition characterised by the breakdown of the cartilage that overlies the ends of bones in joints. This results in the bones rubbing together, causing pain, swelling and loss of motion. OA usually gets worse over time and commonly affects the hands, spine and joints such as hips, knees and ankles [1].

OA has no specific cause, however several factors contribute to the onset and progression [2], including:

- being female
- genetic factors
- excess weight
- joint misalignment
- joint injury or trauma (such as dislocation or fracture)
- repetitive joint-loading tasks (for example, kneeling, squatting and heavy lifting).

OA is the most common form of arthritis in Australia. An estimated 2.2 million (9.3%) Australians have this condition, according to the Australian Bureau of Statistics (ABS) 2017–18 National Health Survey. OA represented over half (62%) of all arthritic conditions in 2017–18 [1, 3].

Although OA affects people of all ages, the prevalence increases sharply from the age of 45 years. 1 in 5 Australians (22%) over the age of 45 have OA. It is most common in adults aged 75 and over, with just over one-third (36%) of people in this age group experiencing the condition [1, 3].

OA is also more common among females than males, affecting 10% of females compared with 6.1% of males (after adjusting for age) [1, 3].

At present, there is no cure for OA and the disease is long-term and progressive. Treatment for OA aims to manage symptoms, increase mobility and maximise quality of life. Treatment options for OA include [4]:

- physical activity
- weight management
- medication
- joint replacement surgery

4 Management and Treatment of OA

4.1 Evidence based Guidelines and Standards of Care

A range of evidence-based national and international guidelines and standards of care have been developed to support the timely and effective management of OA, and particularly, hip and knee OA. These guidelines consistently emphasise that core management of OA should comprise a combination of non-pharmacological and pharmacological interventions, with referral for consideration of surgery only if symptoms are no longer responsive to conservative management [5-13]. The core recommendations for OA management across these guidelines can be broadly summarised as:

- Diagnosis should be based on clinical assessment alone.
- An individualised self-management plan should be developed based on a comprehensive assessment of symptoms, other health conditions and a psychosocial evaluation.
- Conservative (non-surgical) management involving weight loss, exercise, disease-relevant patient education and self-management support are **first-line treatment strategies** and are also recommended at all stages of the disease.
- If required, pharmacological therapies should be added to the core treatments.
- Patients should be included in shared decision-making for the development of a personalized pain management program involving treatment options such as exercise, orthotics, psychological and social interventions, sleep interventions, weight management and pharmacological treatments [8]
- Referral for consideration of surgery should be made only when conservative management no longer provides adequate pain relief or maintenance of function.

4.2 Evidence based Models of Care

Models of care are evidence- and consultation-based frameworks that describe what and how health services and other resources should be delivered to people with specific health conditions. Models of care aim to guide the provision of 'the right care, delivered at the right time, by the right team in the right place, with the right resources.' They provide an effective way to embed evidence into health policy and practice and achieve system efficiencies [11, 14].

A number of arthritis-related models of care already exist in some jurisdictions in Australia and are at various stages of implementation. These models have been developed by state-based musculoskeletal clinical networks, which have been identified as an important enabler for the development and implementation of models of care [15]. These models include:

- NSW ACI Osteoarthritis Chronic Care Program (OACCP) Model of Care
- NSW ACI Local Musculoskeletal Service (LMS)
- Osteoarthritis of the Hip and Knee Service (Victoria)
- Victorian Model of Care for Osteoarthritis of the Knee and Hip
- WA Inflammatory Arthritis Model of Care
- WA Service Model for Community-Based Musculoskeletal Health • WA Elective Joint Replacement Service Model of Care
- Model of Care for NSW Paediatric Rheumatology Network
- Orthopaedic Physiotherapy Screening Clinic and Multidisciplinary Service (Queensland)
- Comprehensive Osteoarthritis Pathway and Musculoskeletal Triage and Assessment Service (Tasmania).

4.3 Treatment and Interventions

4.3.1 Overview

Treatments for OA include:

- Weight Loss
- Exercise
- Pain Management using medication
- Devices such as braces, walking sticks, and shoe insoles
- Surgery, if symptoms are no longer controlled with other therapies

Weight loss, exercise, and a multidisciplinary approach to both, are viewed as conservative treatments and interventions. Surgery is regarded as non-conservative [11].

4.3.2 Weight Loss

- For **obese people with established OA**, weight loss of between 5-10% of their body weight can result in significant pain relief, and this may in turn manifest in improvements in

mobility, physical function and quality of life [16]. Weight loss greater than 10% achieves even larger improvements in symptoms [17].

- Strategies to support weight loss in people with OA may include informal advice, referral to a dietician for appropriate counselling and structured weight loss programs incorporating dietary changes and/or exercise [18].

4.3.3 *Exercise*

- There is a large body of evidence in support of exercise for OA, with exercise achieving improvements in knee pain and physical function comparable to those reported from non-steroidal anti-inflammatory drugs [19]. Improvements in pain and function following exercise programs for hip OA have also been shown [20].

- **Therapeutic water-based exercise** has also been shown to have benefits for patients with lower limb (hip or knee) OA [21].

- **Supported self-management** and exercise programmes, delivered by health professionals, are feasible in clinical practice and can positively impact symptoms, function and medication use [22-24].

- **Information, clear advice about benefits and reassurance** from health professionals can encourage greater exercise participation by patients with OA [25].

- Studies of innovative service delivery models for the provision of physiotherapist-supervised exercise management for people with knee OA have found that the use of **Skype and telephone coaching** is feasible and beneficial [26, 27].

- Use of **booster sessions with a physiotherapist** can also help improve exercise adherence for older adults with OA and/or back pain [28].

- Specific **neuromuscular exercise programs** delivered by trained physiotherapists have demonstrated both short and long term improvements in pain, function and quality of life [23].

4.3.4 *Multidisciplinary Approach*

- Multidisciplinary conservative care programs for OA have been shown to reduce willingness for joint replacement surgery. Most recently, a randomised controlled trial to investigate the effectiveness of total knee replacement plus non-surgical treatments in comparison to nonsurgical interventions alone, found that both groups reported significant improvements in pain, health related quality of life and functional outcomes. Although improvements were greater in the group undergoing joint replacement, two out of three patients eligible for

total knee replacement who received non-surgical treatment, had still not proceeded to surgery at the two-year follow up [29].

4.3.5 Medication

- Pharmaceutical medicines are normally used in the management of osteoporosis to increase bone mineral density, manage symptoms such as pain and inflammation, and reduce the risk of fractures. The most common pharmaceuticals used for this condition are **bisphosphonates, analgesics and synthetic hormones**. [30]

- Medicines used to manage arthritis and osteoporosis can be administered in many different shapes and forms. There are topical treatments and ointments used to alleviate inflammation and mild pain, tablets (often the most common) either to modify the symptoms (for example, analgesics) or the disease (for example, bisphosphonates), and injections which are administered directly into the affected joints to lubricate them or to slow disease progression. Types of medications used for arthritis and osteoporosis [30]:

    - Non-steroidal anti-inflammatory drugs, or NSAIDs, are used to relieve symptoms of pain, stiffness and inflammation in the muscles, joints and bones. NSAIDs can be selective or non-selective and are commonly used to manage arthritis. Medications within this group include celecoxib, meloxicam, ibuprofen, diclofenac and naproxen.

    - Anti-resorptives are a type of medication commonly used in osteoporosis. This group of medicines binds to bone to stop the removal of calcium, assisting in restoring bone density. Common medicines from this group include bisphosphonates such as alendronate, risedronate and other medications like strontium ranelate.

    - Analgesics are medications that relieve pain. These types of medications are used to relieve the symptoms of mild, moderate and severe pain. Common medications used to manage arthritis and osteoporosis include paracetamol, tramadol and paracetamol combinations.

- Typically, treatment is limited to the use of analgesic and/or anti-inflammatory medications to manage symptoms until the condition worsens, at which point the patient is referred for a joint replacement [11].

- There is evidence to support a variety of pharmacological treatment options for pain management. Opioids are generally considered of limited use for managing arthritis pain because the clinical benefits appear to be limited, but the risk of adverse events is high [31, 32].

4.3.6 Devices such as braces, walking sticks, and shoe insoles

Although literature on treatments for OA advise devices such as braces, walking sticks, and shoe insoles, these are not given evidence-based recommendations by national and international guidelines and standards of care.

In 2018 the Royal Australian College of General Practitioners (RCGP) produced the "Guideline for the management of knee and hip osteoarthritis", with the objective to present the best available, current scientific evidence for OA interventions, covering all interventions other than joint replacement for the hip and knee [13].

With regard to devices such as braces, walking sticks, and shoe insoles, the RCGP either do not recommend their use or are unable to recommend either for or against their use. This is based on low or very low quality of evidence in their research.

4.3.7 Surgery

- Joint replacement surgery is a highly effective and cost-effective intervention for OA when conservative therapies are no longer effective. Hip and knee replacements provide substantial and sustained improvements in pain, physical function and quality of life [33].

- Despite the demonstrated effectiveness of joint replacement surgery, not all patients experience optimal outcomes and, as with all surgical procedures there is a risk of complications. A substantial proportion of patients is unsatisfied or continues to experience persistent pain after total hip replacement (6-27%) and total knee replacement (15-44%) [34, 35].

- As joint replacement prostheses have a limited lifespan, future revision surgery may also be required. In view of these considerations, national and international clinical guidelines recommend that joint replacement surgery should only be offered for severe, symptomatic OA after conservative management strategies have been trialled [36, 37].

5 Complementary and Alternative Treatment

- Complementary medicines are often used in conjunction with pharmaceuticals or as an alternative to traditional medicines. In recent years, evidence-based research regarding the use of complementary medicines has gained more momentum [30].

- Clinical trials for glucosamine and omega 3 for OA have indicated that these medications may be effective in reducing pain, inflammation and stiffness [38, 39]. However there are contradictions between research findings and methodologies that call into question whether these medications are truly effective in controlling the symptoms of OA [39].

- Statistically, the ABS, National Health Survey: Summary of Results, 2004-05, indicates that complementary medicines were the most common type of medication to be reported for OA. Females were more likely to be report usage than males overall (48% compared to 36%), with the most common complementary medicines used to manage OA being glucosamine (25%) and fish oils/omega 3 (16%) [40].

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Research – Therapy Best Practice

Brief	In order to develop business rules for the funding of CB supports as part of the Participant Budget Model, we need the following information: • For the following disability groups: Parkinson's Disease, multiple sclerosis, muscular dystrophy, dementia, Huntington's Disease, arthritis, chronic fatigue, chronic pain, amputation. • What is considered best practice in terms of: a) The allied health team members of a multidisciplinary team, i.e. who should be involved in managing the disability? b) The frequency of intervention i.e. approximate dosage – how many hours per year is required for each professional? c) Evidence based practice for widely accepted therapy approaches. Not too much detail required, mainly eg "For MS, X therapy approach is often recommended, which involves intensive blocks of 20 sessions every X months". Looking for information again regarding number of hours that would be considered best practice.
Date	28/06/21
Requester(s)	Jane s47F - personal - Assistant Director (TAB) Jean s47F - personal priv - Senior Technical Advisor (TAB)
Researcher	Jane s47F - personal priv - Research Team Leader (TAB)
Cleared	N/A

Please note:

The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision-making.

Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.

The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters.

The contents of this document are OFFICIAL

1 Contents

2 Summary

- Information provided has been obtain from a rapid review of the literature. This includes best practice guidelines, systematic reviews from the Cochrane Collaboration and other high quality meta-analyses and reviews.
- The personal circumstances, goals of each individual, and severity of the disease impacts the level of intervention required. Therefore, it is often not possible to provide an exact number of hours required for each intervention. This is reflected in the literature as studies investigating the same intervention often deliver it at a different frequency, leading to a lack of agreement around gold standard levels.
- If the agency requires precise numbers around how many hours of intervention are useful per clinician they will need to commission systematic reviews of each type of intervention delivered, across various disease severities. This is a substantial tasks. Current literature

focuses on the effectiveness rather than the intensity of intervention. The level of intervention is often decided by the allied health professional looking after the patient.

3 Parkinson's disease

3.1 Clinician involved in management

A systematic review and meta-analysis of integrated care in Parkinson's disease provides a list of core team members to be included in interventions [1].

- Movement disorders specialist
- General neurologist
- PD specialist nurse
- Physiotherapist
- Occupational therapist
- Speech therapist
- Clinical psychologist
- Neuropsychologist
- Community mental health team
- Social worker
- Dietician

Models of care varied significantly, ranging from 4-8 weeks, 1-4 sessions a day (30 minutes to 2 hr per session) ranging from 1-7 days a week. No indication of what hours were allocated to each profession.

3.2 Best practice treatment and frequency of intervention

Recommendations for treatment are taken from the NICE UK guidelines [2].

1) First-line treatment
    a. Offer levodopa to people in the early stages of Parkinson's disease whose motor symptoms impact on their quality of life.
    b. Consider a choice of dopamine agonists, levodopa or monoamine oxidase B (MAO-B) inhibitors for people in the early stages of Parkinson's disease whose motor symptoms do not impact on their quality of life.

2) Non-pharmacological management
    a. Nurse specialist interventions
        i. Clinical monitoring and medicines adjustment.
        ii. A continuing point of contact for support, including home visits when appropriate.

iii. A reliable source of information about clinical and social matters of concern to people with Parkinson's disease and their family members and their carers (as appropriate).

b. Physiotherapy and physical activity [3]
   i. General physiotherapy: 4 weeks to 12 months. Only 2 studies reported duration of sessions which included 12 hrs over 4 weeks and 18 hrs over 6 weeks.
   ii. Exercise: Treatment sessions lasted from 30 minutes to two hours, and took place over a period of three to 24 weeks.
   iii. Treadmill: Treatment sessions lasted from 30 to 60 minutes, and took place over a period of four to eight weeks.
   iv. Cueing: Treatment sessions lasted from four to 30 minutes and took place over a period of a single session to 13 weeks.
   v. Dance: Dance classes lasted one hour over 12 to 13 weeks, with a trained instructor teaching participants the tango, waltz, or foxtrot.
   vi. Martial arts: Treatment lasted one hour and took place over a period of 12 to 24 weeks

c. Speech and language therapy [4]
   i. Median duration of therapy for those treated was four weeks with 68% attending a single weekly session, a further 22%, who were predominantly receiving Lee Silverman Voice Therapy (LSVT), had four or more therapy sessions per week. Most sessions (80%) lasted between 30-60 minutes.

d. Occupational therapy [5]
   i. A Cochrane Review from 2007 only found 2 studies that met inclusion criteria. These studies delivered intervention of 12 hours across 4 weeks, and 20 hours over 5 weeks.

e. Nutrition [6]
   i. Monitoring every four to six weeks if there have been any changes to medications or treatment plan, with particular focus on the swallowing recommendations.
   ii. Every three months if the patient's condition is stable.
   iii. For oral nutrition support, regular review of ONS prescriptions every three months is advisable, to ensure the appropriateness of the intervention.
   iv. Some centres offer one-day holistic reviews to re-assess mobility, swallow, speech and nutritional status.

* Dysphagia management should be conducted by speech and language therapists in conjunction with nurses and dietitians. No information provided on level/duration of intervention [7].

3) Deep brain stimulation
   a. Surgery is performed to implant a device that sends electrical signals to brain areas responsible for body movement. Electrodes are placed deep in the brain and are connected to a stimulator device.

4 Multiple sclerosis

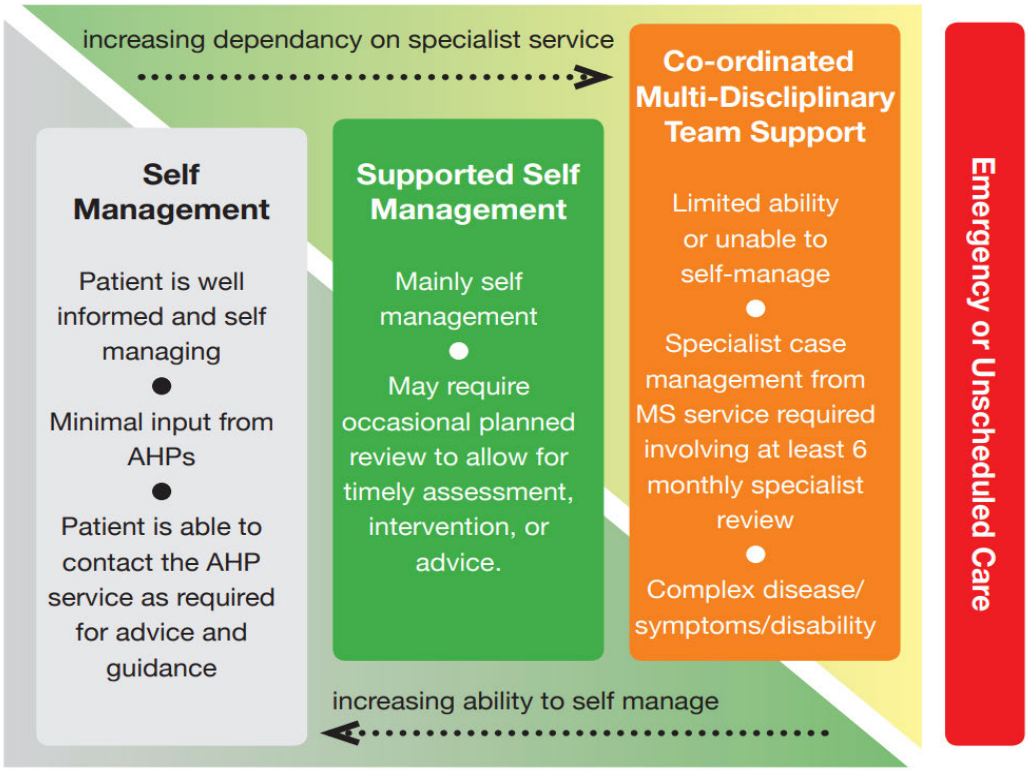
4.1 Clinician involved in management

There is variation in the make-up of MS multidisciplinary teams. The NICE MS Clinical Guideline states that: "As a minimum, the specialist neurological rehabilitation service should have as integral members of its team, specialist [8, 9]:

- Doctors (GPs, Neurologist)
- Nurses
- Physiotherapists
- Occupational therapists
- Speech and language therapists
- Dieticians
- Continence specialists
- Clinical psychologists
- Ophthalmologist/orthoptist
- Social workers.

General rehabilitation – patients must be seen for 6-8 sessions or for a 6-8 week period, however, appointments should be booked according to the needs of the patient [8]. The figure below describes the level of dependency on specialist services for varying levels of disease severity.

Figure 2[3]: Self Management/Specialist Service Dependency Model for People with MS



Patients are able to move fluidly in both directions between the different aspects of care illustrated, and such moves can be triggered either by the patient or their carer, or by the service professionals.

4.2 Best practice treatment and frequency of intervention

Determine how often the person with MS will need to be seen based on [9]:

- Their needs, and those of their family and carers
- The frequency of visits needed for different types of treatment (such as review of disease-modifying therapies, rehabilitation and symptom management).
    - *"Review information, support and social care needs regularly"*

The below interventions are listed in the NICE UK guidelines for the management of MS [9]

1) Exercise programs
2) Mindfulness-based training
3) Cognitive behavioural therapy
4) Fatigue management
5) Mobility rehabilitation
6) Spasticity management

7) Occupational therapy – memory or cognitive problems
8) Diet
9) Ocular rehab

A Cochrane Review of Multidisciplinary Rehabilitation (MD) for the treatment of MS has been conducted to determine its effectiveness [10]. The concept of MD comprises elements of physical therapy, occupational therapy, speech pathology, psychology and or neuropsychology, cognitive therapy and or behaviour management, social work, nutrition, orthotics, counselling input, recreation and vocational therapy.

Intensity of MD rehabilitation programme was subdivided into 'high' or 'low' intensity

- High intensity therapy involved input from at least two disciplines, a minimum of thirty minutes per session and total duration of at least 2-3 hours of interrupted therapy per day for at least 4 days per week. This is usually provided in inpatient settings and some outpatient programmes.
- Low intensity programmes varied, the intensity and duration of therapy was lesser than that provided in inpatient rehabilitation settings and was dependent upon the type of rehabilitation setting and available resources

From this review, it has not been possible to suggest best 'dose' of therapy, further studies are needed to suggest optimum number, duration and intensity of treatment sessions.

Neuropsychological rehabilitation

A Cochrane Review of neuropsychological rehabilitation (delivered by psychologists) for MS was conducted in 2014 [11]. It found that the number of intervention sessions varied from eight to 36, the duration of the rehabilitation intervention from four weeks to six months, and the frequency from two times per month to five times per week. When analysing the results with regard to the number of sessions, duration and frequency, no definite conclusions can be drawn about the effect of these factors on rehabilitation outcomes.

Exercise

Ranging from 6 to 24 weeks in duration, ranging from once to 5 times weekly frequency [12].

5 Muscular dystrophy

5.1 Clinician involved in management

Muscular dystrophy (MD) is a group of diseases that cause progressive weakness and loss of muscle mass. The most common form of MD is Duchenne's MD which most commonly occurs in young boys. The below will be presented for Duchenne's MD.

The care team should include a [13]:

- Neurologist with expertise in neuromuscular diseases
- Physical medicine and rehabilitation specialist

- Physiotherapist
- Occupational therapists.
- Speech-language pathologists
- Orthotist
- Psychologist
- Dietician.

Some people might also need a lung specialist (pulmonologist), a heart specialist (cardiologist, a sleep specialist, a specialist in the endocrine system (endocrinologist), an orthopedic surgeon and other specialists.

5.2 Best practice treatment and frequency of intervention

Several types of therapy and assistive devices can improve the quality and sometimes the length of life in people who have muscular dystrophy. Examples include [13]:

- **Range-of-motion and stretching exercises.** Muscular dystrophy can restrict the flexibility and mobility of joints. Limbs often draw inward and become fixed in that position. Range-of-motion exercises can help to keep joints as flexible as possible.
- **Exercise.** Low-impact aerobic exercise, such as walking and swimming, can help maintain strength, mobility and general health. Some types of strengthening exercises also might be helpful.
    - Optimal exercise modality and intensity of exercise for people with a muscle disease is still unclear. Large variation in frequency, duration and intensity exists within the literature [14-16].
- **Braces.** Braces can help keep muscles and tendons stretched and flexible, slowing the progression of contractures. Braces can also aid mobility and function by providing support for weakened muscles.
- **Mobility aids.** Canes, walkers and wheelchairs can help maintain mobility and independence.
- **Psychosocial intervention**
- **Gastrointestinal and nutritional management**

Guidelines published for the diagnosis and management of Duchenne's MD essentially states that patients should be assessed/reviewed every 6 months by allied health professionals involved in their multidisciplinary care [17].

There is no specific guidance on how many hours/visits are required for each rehabilitation intervention or clinician.

"Provide direct treatment by physical and occupational therapists, and speech-language pathologists, based on assessments and individualised to the patient."

The above also goes for psychological assessment and intervention. The number of visits will depend on the patient's current needs and ability to cope with their diagnosis.

6 Dementia

6.1 Clinician involved in management

The needs of people with dementia vary widely and tailoring care to each person's circumstances can be complex. A multidisciplinary approach in which different health professionals work together is important [18].

A medical specialist is required to make a dementia diagnosis. These include:

- General physicians
- General practitioners
- Geriatricians
- Neurologists
- Psychiatrists
- Rehabilitation physicians

A number of different allied health professionals may be required at different points in time, including but not limited to [19]:

- Audiologists
- Dentists
- Dietitians
- Occupational therapists
- Orthoptists
- Physiotherapists
- Podiatrists
- Psychologists
- Social workers
- Speech pathologists

Nurses and aged care workers are also involved in the care of patients with dementia.

6.2 Best practice treatment and frequency of intervention

Best practice care has been taken from the UK NICE guidelines on dementia [20]:

1) Person centred care
    a. Involving people in decision making
    b. Providing information
    c. Advance care planning
2) Care coordination
    a. Provide people living with dementia with a single named health or social care professional who is responsible for coordinating their care.
3) Interventions to promote cognition, independence and wellbeing

a. "Offer a range of activities to promote wellbeing that are tailored to the person's preferences" – i.e. previous hobbies/interests
b. Cognitive Stimulation for mild to moderate dementia
    i. Cochrane Review found that intervention ranged from 4 weeks to 24 months [21]. Median session length across the studies was 45 minutes, and the median frequency was three times a week, ranging from one to five times a week. The total possible exposure to the intervention varied dramatically, from 10 to 12 hours to 375 hours in the two-year study. Across the 15 studies, the median exposure time was 30 hours.
c. Group reminiscence therapy for mild to moderate dementia
    i. Cochrane Review concluded that duration and frequency of the sessions could differed. Sessions ranged from 2-8 times at either 1-2 hours (face to face or telephone) and were delivered by occupational therapists, trained recreation therapists [22].
d. Cognitive rehabilitation or occupational therapy for mild to moderate dementia
    i. A Cochrane Review found that intervention duration ranged from 2 to 104 weeks. Sessions ranged from 1-12 per week. More intense was classified as more than 3 formal sessions per week. Duration was 30 to 240 minutes. Those in day care facilities were often longer [23].

NOTE: The Cochrane Collaboration have undertaken various reviews of non-pharmacological interventions for dementia and found that many lack convincing evidence or well described treatment protocols. These include homeopathy, acupuncture, aromatherapy, snoezelen, validation therapy or dance movement therapy.

There is promising evidence that exercise programs may improve the ability to perform ADLs in people with dementia, although some caution is advised in interpreting these findings. Included studies were highly heterogeneous in terms of subtype and severity of participants' dementia, and type, duration, and frequency of exercise [24].

4) Pharmacological interventions
    a. acetylcholinesterase (AChE) inhibitors donepezil, galantamine and rivastigmine as monotherapies are recommended as options for managing mild to moderate disease
5) Caregiver education and skills training
    a. A meta-analysis of 23 randomized clinical trials provides strong confirmation of the benefits of caregiver education and skills training interventions for reducing behavioural symptoms [19]. Collectively, these trials involved 3,279 community-dwelling caregivers and patients. Effective interventions were wide-ranging and included caregiver education, skills training (problem solving, communication strategies), social support (linking caregivers to others), and/or environmental modifications (assistive device use, creating a quiet uncluttered space). Interventions varied in dose, intensity, and delivery mode (telephone, mail, face-to-face, groups, computer technologies.
    b. Successful interventions identified included approximately **nine to 12 sessions** tailored to the needs of the person with dementia and the caregiver and were

delivered individually in the home using multiple components **over 3–6 months** with periodic follow-up [19].

While pharmacological intervention can be conveniently packaged and standardised, with a measured dose, non-pharmacological interventions can be more difficult to evaluate [25]. The same intervention may be used in different studies, but it may comprise quite different components [25]. Non-pharmacological interventions have rarely used a standardised treatment manual; mainly due to the range of individual differences between people with dementia [25].

Although some interventions can be offered for a discrete period of time, such as half an hour per day, many others involve intervention at the level of the care setting or in the general approach or interactive style of those providing care (i.e. depends on disease severity, level or care and care providers) [25].

Frequency of intervention is briefly mentioned in the Australian Clinical Practice Guidelines and Principles of Care for People with Dementia [18]. Statements include:

- *Health system planners should ensure that people with dementia have access to a care coordinator who can work with them and their carer's and families from the time of diagnosis. If more than one service is involved in the person's care, services should agree on one provider as the person's main contact, who is responsible for coordinating care across services at* ***whatever intensity is required****.*
- A care plan developed in partnership with the person and his or her carer(s) and family that ***takes into account the changing needs of the person.***
- ***Formal reviews of the care plan at a frequency agreed between professionals involved*** *and the person with dementia and/or their carer(s) and family.*

7 Huntington's disease

7.1 Clinician involved in management

The multidisciplinary team assesses the stage of the disease and formulates, coordinates and implements the individual care and treatment plan and consists of [26]:

- Physician
- Psychologist
- Speech and language therapist
- Social worker
- Occupational therapist
- Case manager
- Psychologist
- Dentist/oral health specialist

7.2 Best practice treatment and frequency of intervention

Only non-pharmacological recommendations will be presented [27].

Motor Disorders

- Chorea
  - Mouth guards splints.
  - Physiotherapy, OT, speech intervention to assess protective measures.
- Dystonia
  - Active and passive rehabilitation with a physiotherapist to maintain range of movement.
- Rigidity
  - Physiotherapy is recommended to improve or maintain mobility and prevent the development of contractures and joint deformity.
- Swallowing disorders
  - Motor skills training with speech therapist.
  - Psychology for mood, behaviour, emotional status and cognition
  - Provision of information and advice by a dietician, on food textures and consistency and food modifications, bolus size and placement, safe swallowing procedures, elimination of distractions and on focusing attention on just one task at a time can help to avoid aspirations and leads to improvement of swallowing disorders.
- Gait and balance disorders
  - Rehabilitative methods (e.g. physiotherapy and occupational therapy) may improve walking and balance disorders and prevent from their main complications (falls, fractures, loss of autonomy). Interventions for gait and balance should start as early as possible and be continued and adapted throughout the progression of the disease.
  - Supervised low impact exercise.
- Manual dexterity
  - Management with physiotherapy and occupational therapy may be useful to reduce the functional impact of fine motor skill deterioration.
  - OT may suggest adaptive aids to compensate for the deterioration of manual dexterity (adapted cutlery, computer keyboard, adapted telephone, etc.)
- Global motor capacities
  - Referral to a physiotherapist is recommended in order to facilitate the development of a therapeutic relationship, promote sustainable exercise behaviours and ensure long-term functional independence. Exercise programs should be personalized (considering abilities and exercise capacity), goal directed and task specific.
- Cognition
  - Multiple rehabilitation strategies (speech therapy, occupational therapy, cognitive and psychomotricity) might improve or stabilise transitorily cognitive functions (executive functions, memory, language...) at some point of time in the course of the disease.
  - Cognitive stimulation
- Language and communication disorders
  - Communication disorders in HD are variable, requires comprehensive assessment of language and of other factors such as mood, motivation and behaviour.

- Multi-disciplinary input such as Speech & Language Therapy and Physiotherapy help to retain communication and social interaction
- The changing communication needs of the person with HD will be monitored and reassessed throughout the course of the disease to plan effective management strategies at all stages.

- Psychiatric disorders
  - Based on data from other neurodegenerative conditions, mindfulness-based cognitive therapy and Acceptance and Commitment Therapy may be useful.
  - Underlying triggers causing changes in mood or behaviour should be addressed.
  - The duration of treatment is generally for over 6 months and can be for several years

*Unable to find precise data on frequency or duration of interventions for each professional.

8 Arthritis

The main treatment for arthritis is Methotrexate.

The NICE UK guidelines provides the below recommendations [28].

Non-pharmacological management

- Physiotherapy
  - Adults with RA should have access to specialist physiotherapy, with periodic review
  - Improve general fitness and encourage regular exercise
    - 3 to 6 face to face sessions over 3-6 month period [29].
  - Learn exercises for enhancing joint flexibility, muscle strength and managing other functional impairments
  - Learn about the short-term pain relief provided by methods such as transcutaneous electrical nerve stimulators (TENS) and wax baths.
- Occupational therapy
  - Adults with RA should have access to specialist occupational therapy, with periodic review if they have:
    - Difficulties with any of their everyday activities, or
    - Problems with hand function.
- Hand exercise programmes
  - Consider a tailored strengthening and stretching hand exercise programme for adults with RA with pain and dysfunction of the hands or wrists if:
    - They are not on a drug regimen for RA, or
    - They have been on a stable drug regimen for RA for at least 3 months.

The tailored hand exercise programme for adults with RA should be delivered by a practitioner with training and skills in this area.

- Podiatry
  - All adults with RA and foot problems should have access to a podiatrist for assessment and periodic review of their foot health needs.

- Functional insoles and therapeutic footwear should be available for all adults with RA if indicated.

- Psychological interventions
  - Offer psychological interventions (for example, relaxation, stress management and cognitive coping skills [such as managing negative thinking]) to help adults with RA adjust to living with their condition.
  - Meta-analysis of psychological interventions for arthritis pain found that interventions tested were most commonly delivered in a total of nine sessions of 85 min duration, offered on a weekly or biweekly basis [30].
- Diet and complementary therapies
  - Inform adults with RA who wish to experiment with their diet that there is no strong evidence that their arthritis will benefit. However, they could be encouraged to follow the principles of a Mediterranean diet (more bread, fruit, vegetables and fish; less meat; and replace butter and cheese with products based on vegetable and plant oils).
  - Inform adults with RA who wish to try complementary therapies that although some may provide short-term symptomatic benefit, there is little or no evidence for their long-term efficacy.
  - If an adult with RA decides to try complementary therapies, advise them: these approaches should not replace conventional treatment.

Monitoring

Ensure that all adults with RA have:

- Rapid access to specialist care for flares
- Information about when and how to access specialist care, and
- Ongoing drug monitoring.

Consider a review appointment to take place **6 months** after achieving treatment target (remission or low disease activity) to ensure that the target has been maintained.

Offer all adults with RA, including those who have achieved the treatment target, an annual review to:

- Assess disease activity and damage, and
- Measure functional ability (using, for example, the Health Assessment Questionnaire [HAQ]).
- Check for the development of comorbidities, such as hypertension, ischaemic heart disease, osteoporosis and depression.
- Assess symptoms that suggest complications, such as vasculitis and disease of the cervical spine, lung or eyes.
- Organise appropriate cross referral within the multidisciplinary team.

9 Chronic fatigue syndrome

9.1 Clinician involved in management

In most cases, a GP should be able to diagnose chronic fatigue syndrome (CFS). However, if, after a careful history, examination and screening investigations, the diagnosis remains uncertain, the opinion of a specialist physician, adolescent physician or paediatrician should be sought [31].

Other non-medical professionals include:

- Physiotherapists
- Occupational therapists
- Psychologists
- Social workers
- Dieticians

9.2 Best practice treatment and frequency of intervention

Care should be provided to people with CFS using a coordinated multidisciplinary approach. Based on the person's needs, include health and social care professionals with expertise in the following [31, 32]:

- self-management strategies, including energy management
- symptom management
- managing flares and relapse
- activities of daily living
- emotional wellbeing, including family and sexual relationships
- diet and nutrition
- mobility, avoiding falls and problems from loss of dexterity, including access to aids and rehabilitation services
- social care and support
- support to engage in work, education, social activities and hobbies

No detailed information could be sourced around how many hours are required per clinician for each of these approaches. It is clearly stated that service providers should be "adapting the timing, length and frequency of all appointments to the person's needs" [32].

There is still little evidence to support any particular management or intervention for CFS in primary care that can provide an effective early intervention [33]. The only two evidence based therapies recommended by NICE are:

- Cognitive Behavioural Therapy
    - Five to 16 sessions. Sessions ranged from 30 minutes to 150 minutes [34]
    - People with CFS should not undertake a physical activity or exercise programme unless it is delivered or overseen by a physiotherapist or occupational therapist who has training and expertise in CFS [32].
    -

- Exercise Therapy
    - Duration of the exercise therapy regimen varied from 12 weeks to 26 weeks
    - three and five times per week, with a target duration of 5 to 15 minutes per session using different means of incrementation, often exercise at home [35]

10 Chronic pain

This is a very broad area. Treatments depend on location of pain. Musculoskeletal pain, particularly related to joints and the back, is the most common single type of chronic pain.

Information provided in the section on arthritis directly relates to the management of chronic pain.

A substantial systematic review by Skelly, Chou [36] investigated non-pharmacological interventions for chronic pain. Interventions that improved function and/or pain for ≥1 month included:

- Low back pain:
    - Exercise
    - Psychological therapy
    - Spinal manipulation
    - Low-level laser therapy
    - Massage
    - Mindfulness-based stress reduction
    - Yoga
    - Acupuncture
    - Multidisciplinary rehabilitation
- Neck pain
    - Exercise
    - Low-level laser
    - Mind-body practices
    - Massage
    - Acupuncture
- Knee osteoarthritis
    - Exercise
    - CBT
- Hip osteoarthritis
    - Exercise
    - Manual therapies
- Fibromyalgia
    - Exercise
    - CBT
    - Myofascial release massage
    - Mindfulness practices
    - Acupuncture

Substantial variability in the numbers of sessions, length of sessions, duration of treatment, methods of delivering the interventions and the experience and training of those providing the interventions present a challenge to assessing applicability [36].

The range and duration of sessions of interventions are provided below.

- Psychological therapy sessions ranged from six to eight, and the duration of therapy ranged from 6 to 8 weeks
- Exercise therapy ranged from 6 weeks to 12 months, and the number of supervised exercise sessions ranged from 3 to 52.
- Ultrasound therapy was 4 and 8 weeks and the number of sessions was 6 and 10.
- Laser therapy ranged from 2 to 6 weeks and the number of sessions ranged from 10 to 12.
- Manipulation therapy sessions ranged from 4 to 24 and the duration of therapy ranged from 4 to 12 weeks.
- Massage therapy ranged from 2 to 10 weeks and the number of massage sessions ranged from 4 to 24
- Mindfulness based stress reduction 1.5 to 2 hour weekly group sessions for 8 weeks.
- Yoga therapy ranged from 4 to 24 weeks and the number of sessions ranged from 4 to 48.
- Acupuncture therapy ranged from 6 to 12 weeks and the number of acupuncture sessions ranged from 6 to 15.
- Relaxation training and muscle performance exercise therapy were done in 30-minute sessions three times per week for 12 weeks,

11 Amputation

11.1 Clinician involved in management

The Limbs 4 Life is the peak body for amputees in Australia. They provide a list of professionals who assist with rehabilitation of amputees [37].

- Rehabilitation Consultant (doctor)
    - Oversees and coordinates medical care.
- Occupational Therapist
    - Helps adjust to day to day activities like: personal care, domestic tasks such as: meal preparation, accessing your place of residence, driving, education or work readiness. If you are an upper limb amputee the occupational therapist will assist you to set goals, teach you how to perform tasks, explore modifications required to achieve goals (e.g. changes within the home or workplace), explore equipment to assist with completing tasks and assist you with the functional training of your prosthesis.
- Physiotherapist
    - Design a tailored exercise program tailored. They will assist with balance, flexibility, strength and stamina. They will help with mobility aids such as: wheelchairs, walking frames, crutches and other assistive devices.
- Prosthetist

- Will look after the design, manufacture, supply and fit of the prosthesis. Together, you will discuss and decide on the prosthetic components to suit your needs and lifestyle.

- Psychologist
  - Supports individuals and fosters positive mental health outcomes and personal growth.
- Nursing team
  - Assists with your medications, personal hygiene, bathing and dressing and any wound care and diabetic management that is required.
- Dietitian
- Podiatrist

11.2 Best practice treatment and frequency of intervention

Physiotherapy
The physiotherapist progresses the patient through a programme based on continuous assessment and evaluation [38]. Through regular assessment, the physiotherapist should identify when the individual has achieved optimum function with a prosthesis, facilitating discharge to a maintenance programme.

The consensus opinion is that the physiotherapist should contribute to the management of wounds, scars, residual limb pain and phantom pain and sensation together with other members of the multidisciplinary team [38].

During prosthetic rehabilitation *patients should receive physiotherapy as often as their needs and circumstances dictate* [38].

Occupational therapy

The occupational therapy practitioner provides critical interventions, such as [39]"

- identifying the client's functional goals, which can include self-care, home management, work tasks, driving, child care, and leisure activities, and offering modifications to complete these goals if required
- analysing tasks and providing modifications to achieve functional goals
- providing education on compensatory techniques and equipment to accomplish tasks and activities
- providing prosthetic training
- identifying and addressing psychosocial issues

Occupational therapy intervention will vary according to individual needs, and phases of intervention may overlap, depending on the person's progress [39].

The administration of interventions for phantom limb have been shown to range between one day and 12 weeks, with one to five sessions per week [40] .

Psychology

Counselling and psychological support is available to the person and their valued others preoperatively and continues as part of lifelong management [41].

Experienced clinical counselling and psychological support should be available to assist with issues such as adjustment and pain management from the acute phase, and throughout lifelong management [41].

Psychosocial issues are evaluated and addressed as part of the overall treatment plan and reviewed regularly throughout the care journey [41].

No information could be sourced about how many sessions are required.

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DOCUMENT 4

Research – Treatment of Advanced Osteoarthritis, Spinal Stenosis and Functional Neurological Disorder

Brief	**AAT Matter – Access** Applicant (s47F - personal privacy) is seeking Access and has diagnoses of: • Advanced Osteoarthritis (Left Hip) • Spinal Stenosis • Functional Neurological Disorder What are the known available and strokappropriate evidence based clinical, medical or other treatments/interventions for each impairment listed above?
Date	September 16, 2020
Requester	Naomi s47F - personal priv (Senior Technical Advisor – TAB/AAT)
Researcher	Craig s47F - persona (Tactical Research Advisor – TAB/AAT)

Please note:

The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision-making.

Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.

The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters.

Contents

Related TAB Research

NED19/326570: RES HWB Functional Neurological Disorder & CRPS 2019/0060 ADO283 (Research to assist Assessors from NAWM with their decisions for access requests relating to these specific conditions).

Summary

Research indicates that all three conditions are best treated by a multi-disciplinary approach.

Treatment for Advanced Osteoarthritis (Left Hip)

Multi-disciplinary approach is taken with treatment which includes physical activity, weight management, medication, and nondrug pain relief techniques to control pain and complementary and alternative therapies. Australian GPs generally demonstrate a conservative approach, where non-pharmacological interventions were not given the importance suggested by clinical practice guidelines.

Treatment for Spinal Stenosis

Multi-disciplinary approach to treatment which may include medication, physiotherapy, steroids injections, and laminectomy surgery as a last resort (where clinical treatment fails or neurological symptoms worsen).

Treatment for Functional Neurological Disorder

Comprehensive multi-disciplinary team approach involving neurology, neuro-psychiatry, physical therapy, occupational therapy, and Neuro-psychology.

Definitions

Advanced Osteoarthritis (Left Hip)

Osteoarthritis (AO) is the most common form of arthritis. It occurs when the protective cartilage that cushions the ends of your bones wears down over time. Although osteoarthritis can damage any joint, the disorder most commonly affects joints in hands, knees, hips and spine. [1] Advanced and terminal stage hip OA causes severe restriction of hip range of motion and hip pain. [2]

Spinal Stenosis

Spinal stenosis, or spinal canal stenosis, is a narrowing of the canal in which the spinal cord sits. The narrowing can put pressure on the nerves in the back, which can cause pain and weakness in the arms or legs.

Spinal stenosis is usually caused by arthritis. Some people are born with a narrowed spinal canal, which puts them at greater risk. Spinal stenosis can happen after a disc prolapse (a 'slipped disc', or a problem with the spongy discs between the bones of the spine).

Spinal stenosis can also be caused when a thickened ligament bulges into the spinal cord, by a tumour, or by an injury to the back.

The most common form of spinal stenosis is in the lower back (called a lumbar stenosis). It can also happen at the top of the spine (called a cervical stenosis). [3]

Functional Neurological Disorder

Functional neurologic disorders is a newer and broader term that includes what some people call conversion disorder. It feature nervous system (neurological) symptoms that can't be explained by a neurological disease or other medical condition. However, the symptoms are real and cause significant distress or problems functioning.

Signs and symptoms vary, depending on the type of functional neurologic disorder, and may include specific patterns. Typically these disorders affect movement of the senses, such as the ability to walk, swallow, see or hear. Symptoms can vary in severity and may come and go or be persistent. However, the patient can't intentionally produce or control the symptoms.

The cause of functional neurologic disorders is unknown. The condition may be triggered by a neurological disorder or by a reaction to stress or psychological or physical trauma, but that's not always the case. Functional neurologic disorders are related to how the brain functions, rather than damage to the brain's structure (such as from a stroke, multiple sclerosis, infection or injury). [4]

Treatment

Advanced Osteoarthritis (Left Hip)

It appears a multi-disciplinary approach is taken with treatment. The Australian Institute of Health and Welfare (AIHW) suggests that at present, there is no cure for osteoarthritis (OA) and the disease is long-term and progressive. [5] The Institute suggests treatment for OA aims to manage symptoms, increase mobility and maximise quality of life. General practitioners (GPs) are usually the first point of contact with the health care system for people with OA and are ideally placed to play the role of care coordinator to ensure treatment continuity. GP management of OA may include assessment and diagnosis, referral to other health services, prescribing medication and providing education about the condition.

Treatment options [5] for OA include:

- physical activity
- weight management
- medication
- joint replacement surgery

Other sources [6] also suggest the following inclusions in treatment plans:

- Rest and joint care
- Use of a Crutches, Canes, and Walkers to take weight off the affected hip
- Nondrug pain relief techniques to control pain
- Complementary and alternative therapies

It would appear that the severity of the OA would determine the likely treatment protocol. A 2016 study [7] looked at International evidence-based guidelines for the management of patients with hip and knee OA which recommend to start with a combination of non-surgical treatments, and using surgical intervention only if a patient does not respond sufficiently to non-surgical treatment options. Despite the recommendations, there are strong indications that nonsurgical treatments are not optimally used in orthopaedic practice.

In Australia, a 2015 survey study set out to examine opinions about the management of OA by Australian GPs following the release of the Royal Australian College of General Practitioners Guideline for the non-surgical management of hip and knee. The study concluded that Australian GPs generally demonstrated a conservative approach to the treatment of OA, and non-pharmacological interventions were not given the importance that is suggested by clinical practice guidelines. [8]

The Royal Australian College of General Practitioners Guideline for the non-surgical management of hip and knee best practice [9], for long term and advanced stage management are:

Long term management of OA

Best practice management of chronic conditions:

- optimal use of medicines
- non-pharmacological management

- care and referral pathways
- patient self-management education
- patient psychosocial support requirements

Treatment and management in advanced stages of OA

Best practice management to optimise quality of life:

- optimal use of medicines
- non-pharmacological management
- care and referral pathways
- patient self-management education
- patient psychosocial support requirements
- Carer support and information

Physical Activity/Exercise

Exercise is an important and effective component in both management and prevention of OA. Exercise helps improve symptoms (especially pain and joint stiffness) and quality of life by increasing range of motion (the ability to move joints through their full motion), strengthening muscles around affected joints, assists in weight control and reduces risk of other chronic diseases (e.g. diabetes and cardiovascular disease). Exercise is also beneficial for other comorbidities and overall health. A GP or Exercise Physiologist should be consulted before undertaking an exercise program. [5]

Weight Management

Being overweight increases the risk of developing OA, due to the increased load on weight bearing joints and increased stress on cartilage. Weight management is strongly recommended for people with knee and/or hip OA who are overweight or obese. For people with existing OA and who are overweight or obese, weight loss can help reduce symptoms. Weight loss should be combined with exercise for the greatest benefits. A GP or Dietitian can be consulted to discuss weight loss/management strategies. [5]

Medications

Treatment of OA with medication aims to relieve pain, reduce inflammation and improve functioning and quality of life. Analgesics, or pain medications, are commonly used to manage the pain of OA. Analgesics include paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs) and opioid analgesics. For those with hip and/or knee OA requiring pain relief, it may be reasonable to trial the use of paracetamol or NSAIDs for a short period and then discontinue use if it is not effective. Corticosteroid injections may also be recommended for short term pain relief for hip and/or knee OA if appropriate. Opioids are not recommended for the treatment of hip and/or knee OA. [5]

Spinal Stenosis

Research indicates a multi-disciplinary approach to treatment which may include:

- Medication (for pain management)
- Physiotherapy (build strength, flexibility and balance)
- Steroids injections (reduce pain and inflammation)
- Laminectomy surgery (where other treatments don't work) [10]

Medication

In a 2016 literature review [11], suggest that drug treatment does not offer many possibilities. The indiscriminate and frequent use of anti-inflammatory medications for chronic lumbar pain does not have a proven satisfactory response and may be associated with gastrointestinal and renal complications. Its use should be very restricted and avoided in elderly patients with narrow lumbar spinal canal syndrome.

Simple painkillers, muscle relaxants, and opioids may be of value. They are indicated for treating and controlling the pain but have no effect on the treatment of neurogenic claudication. [11] Gabapentin has been shown to be a safe medication; it may be taken orally and has a positive effect on patients with neurogenic claudication and the sensory alterations, which are very common in this cohort of patients [11]. Corticosteroids are also used indiscriminately. The idea is that there is an inflammatory process associated with the mechanical compression that could benefit from the medication, but this theory was not proven. [11]

Physiotherapy

Physiotherapy, or more broadly rehabilitation is a non-surgical approach. Manual therapy, stretching, and muscular strengthening play an important role, in addition to the exercises. Patients who suffer from canal stenosis have, in addition to pain, a significant muscle loss, which severely limits their activities and progressively worsens their clinical condition, which leads to further impairments. [12] [13]

The recommended activities include manual therapy, strengthening, and walking training, as well as exercises that improves proprioception. In addition, weight loss is important, because obese patients have been described to have a worse prognosis. [14]. Cycling is a very much recommended activity, not only because patients tolerate it well, but it also allows them to improve their conditioning and does not impact other joints that may also be degenerated, such as the hip and the knee. [15]

Steroid Injections

Peridural corticosteroids (Steroid injections) are another type of non-surgical treatment for narrow lumbar spinal canal syndrome, as opposed to oral corticosteroids, which were shown to be ineffective for this condition. [14]

Peridural corticosteroids have some advantages. There are several possibilities for their administration, with or without radioscopy, as well as several techniques: interlaminar, caudal, and transforaminal. Despite their limited benefits, their use may have lasting efficacy in many patients. [15]

Laminectomy Surgery

Surgical treatment is considered the last resort for patients with treating lumbar canal stenosis. Because surgery is performed in patients over 65 years of age, there is significant morbidity and mortality, which increase with associated diseases and patient age, making it mandatory to assess the risks and benefit of the surgery.

Surgical treatment is indicated when clinical treatment fails or neurological symptoms worsen. There are several different surgical techniques.

- The classical technique is laminectomy, performed by an incision along the midline followed by decompression, removing up to 50% of facets.

- Interspinous spacers have been recently included in the surgical arsenal for canal stenosis, but studies are still under way, and there are no studies yet evaluating for an adequate follow-up period.

For this reason, the actual benefit of this kind of surgery is not yet well established. However, it is known that it does offer some advantages, such as short hospitalization periods and limited bleeding. [16]

Functional Neurological Disorder (FND)

Research indicates that FND is best treated within a comprehensive multi-disciplinary team involving [17] [18]:

- Neurology
- Neuro-psychiatry
- Physical therapy
- Occupational therapy and,
- Neuro-psychology
- Speech pathology
- Physiotherapists

Patients with physical symptoms (gait disturbance, weakness, paralysis, dystonia, etc.) will often need physical treatment. Allied health professionals including: speech pathologist, occupational therapists and physiotherapists then becomes integral to the patient's recovery process. [18]

Patients who have early access to an FND specialised multi-disciplinary treatment program with specialist FND knowledge, have the best chance of improved outcomes and potential for recovery. When patients were able to access specialised treatment there were noticeable positive benefits. [19]

Neuro-psychiatry & Neuro-psychology

Around one third of patients with FND have a comorbid psychiatric condition [18]. Some patients experience depression and anxiety as a result of having their functional symptoms. For others, a history of trauma or adverse childhood experiences can make them vulnerable to developing FND. Psychologists and psychiatrists can assist in the management of comorbid mental health conditions and in the treatment of FND. Cognitive behavioural therapy (CBT) is an evidenced based psychological approach for treating FND. This can include exploring the symptoms and identifying behaviours and cognitions (thoughts) that maintain or exacerbate the symptoms to increase the patient's awareness of their symptoms. A range of CBT strategies can be taught to the patient to assist them manage their FND and mood symptoms to maximise their everyday function. [18]

Physical therapy

Neuro-physiotherapists can offer education, movement retraining and self-management strategies. Recent research has demonstrated marked improvements in functional motor symptoms in patients who work closely with physiotherapists. [18]

Occupational therapy

Occupational therapists are able to build good rapport with patients and help them with self explorations to understand what they can/can't do, as well as, determining and addressing the specific blockages for their normal everyday functioning. This is done through a wide range of activities and relaxation techniques. [18]

Medications

Generally, pharmacological therapy for FND is avoided when possible. In the clinical practice, their use may not be welcomed by many patients due to psychiatric stigma, perception of addictive and harmful properties, and side effects. Antidepressants have demonstrated benefits even in those who do not have comorbid mental disorders. Tricyclics are helpful in those with insomnia and pain. Serotonin reuptake inhibitors are good for hypersomnia but not so good in pain management. Neuropathic analgesia such as gabapentin or pregabalin are used in chronic pain. Patients are often explained to that they can get better without the tablets but they are worth trying for those who are looking to explore every therapeutic avenue. [18]

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