NSW Speech Pathology Evidence Based Practice Network

Critically Appraised Paper: TREATMENT (CAP-T)

CLINICAL BOTTOM LINE:

Continuous positive airway pressure (CPAP) can be effective in treating individuals who exhibit moderate to severe hypernasality post- severe TBI. It is best to use both perceptual and instrumental assessment tools in assessment and treatment. This treatment may be less suited to those with multisystem dysarthria's, however it has a low cognitive demand and may therefore be suitable for those with severe memory impairments.

Clinical [PICO] Question *[Patient/problem, Intervention, (Comparison), Outcome]:*

1. WHAT IS THE MOST EFFECTIVE INTERVENTION FOR THE TREATMENT OF MOTOR SPEECH IMPAIRMENTS IN PEOPLE WITH A TBI WHO HAVE SEVERE MEMORY IMPAIRMENT?

2. WHAT IS THE MOST EFFECTIVE INTERVENTION FOR THE TREATMENT OF MOTOR SPEECH IMPAIRMENTS IN PEOPLE WITH ABI WHO HAVE SEVERE MEMORY IMPAIRMENT? (Not applicable)

Citation: Cahill LM, Turner AB, Stabler, PA, Addis PE, Theodoros DG, Murdoch BE (2004) An evaluation of continuous positive airway pressure (CPAP) therapy in the treatment of hypernasality following traumatic brain injury: a report of 3 cases. J Head Trauma Rehabil. May-Jun;19(3):241-53.

Method: Design and Procedure *(e.g., note type of research design, comment on randomization, summarize treatment intensity as appropriate, such as dose (trials) per session, session length, frequency, total treatment duration, summarize general procedure, resources / materials required)*

Design: A-B-A experimental research design (i.e. Baseline assessments (A1), administration of the CPAP treatment program (B) for 4 weeks, and a withdrawal phase (A2)). Participants were also assessed midway through Rx. and immediately post-Rx Treatment involved 4 weeks of CPAP therapy (administered once a day, 4 days a week, predetermined schedule for session length (range of 10–24 minutes) and the CPAP pressure (range of 4–8 cm H2 O) used.).+ 4 weeks without therapy.

Recruitment: The participants were the first 3 individuals with TBI who took part in the CPAP treatment program for people with different types of acquired brain injury.

Measures: Perceptual Ax. included the Frenchay Dysarthria Assessment (FDA), ASSIDS and a perceptual speech sample analysis (Elicitation - Grandfather Passage, Analysis – 7 point rating scale with high reliability reported).
Instrumental Ax – Nasometer Elicitation – The zoo passage.

Description of therapy task: Pt fitted with mask and nasal air pressure was set. Repeating a series of single-word utterances in the form VNCV, where V was any vowel, N was any nasal consonant, and C was any pressure consonant (stop, fricative, or affricate). The participants were instructed to produce the utterances with stress on the second syllable (eg, umpee). The therapy sessions involved the participant reading, or repeating, a list of VNCN combinations, followed by a number of short sentences that contained both nasal and nonnasal sounds. This procedure was repeated until the stipulated session time elapsed.

Analysis: Reliable Change Index formula was used to analyse change in performance on Nasometer. ASSIDS % change calculation.

Method: Participants *(where relevant note number of participants, inclusion/exclusionary criteria, characteristics of participants in experimental group and control group/s):*

Inclusion/Exclusion Criteria: Criteria for inclusion in this study were the following: TBI at least 3 months previously, dysarthria following TBI, and moderate to severe hypernasality. Patients were excluded from the study if they had a coexisting neurological condition, history of speech disturbance, a structurally abnormal velopharyngeal mechanism (eg, cleft palate), or any middle ear pathology that could be exacerbated by the CPAP treatment program.

Characteristics: The participants were 3 adults, 1 female (aged 29) and 2 males (aged 24 and 30) who had all been diagnosed by either a qualified neurologist or a neurosurgeon as having suffered a severe closed head injury (CHI). At the time of initial assessment, all participants were at least 7-months postinjury. The cognitive function of the 3 participants was considered adequate to participate in the CPAP therapy program and in all assessments.

Control group: 20 nonneurologically impaired adults served as controls. 14 females and 6 males, with a mean age of 44 years (SD =11.49 year). Participants in the control group were assessed perceptually using the sentence level of the ASSIDS + instrumentally with Nasometer.

Critically Appraised Paper: TREATMENT (CAP-T) *continued....*

Results: *(Briefly summarize the results – you could note whether the outcome was evaluated with/without blinding; note how many (if any) of the participants 'dropped out' of the study; note if **effect size** was reported, and what it was – see manual for more information about effect sizes.)*

Summary: Between assessment periods, varying degrees of improvement in hypernasality and sentence intelligibility were noted. At the 1-month post-CPAP assessment, all 3 participants demonstrated reduced nasalance values, and 2 exhibited increased sentence intelligibility.

Subject 1: Minimal reductions in hypernasality immediately following the CPAP treatment program with unintelligible speech. However, at 1 month post Rx. slight improvement in palatal movement (FDA) and nasalance.

Subject 2: During and immediately post Rx improvements were noted across most measures.

Subject 3: Clinically significant improvement in sentence intelligibility, slight improvements in perceptual speech ratings

Discussion Points: CPAP can be effective in treating individuals who exhibit moderate to severe hypernasality post-TBI.
Difficulty rating hypernasality in the presence of other deviant speech characteristics associated with dysarthria.
Flow on effect to improved swallowing observed for Subject 1.

Level of Evidence (NHMRC, 2009) *Circle one* **I** **II** **III-1** **(III-2)** **III-3** **IV**

Quality of Evidence: ❒Rated ☑ Not Rated

(i) rating system (e.g., PEDRo, SCED Scale from SpeechBITE) _____

***(ii)* score** _____ *If the paper has not been rated, just check 'not rated'.*

Nature of Evidence: ❒ feasibility ☑ efficacy study ❒effectiveness study

Additional comments about level, quality and/or nature of the evidence: *(e.g., limitations of the study, need for further research addressing a specific issue; assessors weren't blind, insufficient baseline or baseline not stable, effect size not reported)*

Limitations: Small sample size, no long-term maintenance measures, sensitivity of measures e.g. sentence vs word level intelligibility measures,

Other: It is unclear if the person administering was a SLP and level of support that was provided, no comments on cognitive status of subjects, would be useful to investigate whether non-sense words used in therapy could be replaced by real and/or functional/contextual words.

Relevance to practice *(e.g., In this section just note down the clinical groups thoughts about the relevant of the research findings fro clinical practice. Consider some of the following questions - were the participants and/or treatment context similar/different to everyday clinical practice? Is replication possible in clinical practice? What barriers might prevent the results from be applied to everyday clinical practice? What could be done to address barriers? If barriers can't be modified, how could the procedure be modified to accommodation limitations in clinical practice?)*

Comment on answering clinical question: The treatment program, from the description, appears to place low demands on cognitive functions such as memory. In this study there were no comments regarding impact of memory on treatment program.

Potential Barriers/Ways to overcome: Administering direct therapy 4 x per week may not suit all settings. Potentially use TA's who have been trained. Use apps as reminder for practise for those with memory disorders. Not all settings have access to Nasometer equipment and/or sufficient training in their use. Barrieres may be overcome by investigating funding for equipment or sharing equipment. May be useful to practise use of the equipment as a PD activity.

Appraised By: Adult TBI group (Elise Elbourn & Melissa Brunner)

Date: 09/03/16