Research Article

Post Monitor Studies for the Treatment of Speech Hand Synchronization for Adult who Stutter: 3 Months Follow Up

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Abstract

Objective: The aim of the current study was to follow up for 3 months of stuttering therapy procedure in adults who stutters accomplishing spontaneous fluent speech.

Methods: In this pilot study, 30 subjects were selected and divided into (i) speech-hand synchronization (SHS) (ii) Camperdown Programme (CP) and (iii) control group (CG) for the treatment therapy. The post-treatment sessions were carried out for 3 months for 50 minutes a day for 10 weeks and each week was considered as week days (5 days).

Result: The SHS and CP patients could not show the significant association in post-treatment sessions for 3 months' sessions. SSI-4, OASES and LCB were seems to be non-significant. However, SHS and CP was also seeming to be positive effect in assessments measuring well-being and self-perceptions.

Conclusion: The post-treatment results confirm the non-significant association for 3 months programme sessions for SHS and CP. However, SHS and CP was also found to have a positive effect in assessments measuring the quality of life with self-perceptions.

Introduction

Stuttering is a speech fluency and multifactorial disorder, may be associated with biological, psychological, and social aspects are correlated in a complex manner linked to central auditory processing, comprising changes in auditory processing skills and temporal resolution. People with speech and language disorders may exhibit changes in the processing of information received through the sense of hearing. Earlier studies have revealed a correlation between the processing of auditory information, visual pathways, and expressive language difficulty, which can affect speech fluency and be characterized as stuttering [1]. Adults who stutter (AWS) are typically painfully aware of their disfluencies, and often consider stuttering as one of their main defining features. Fluency may be temporarily gained in AWS by manipulating the auditory feedback during speech production, as in delayed auditory feedback or listening to masking noise while speaking [2].

Speech-Hand synchronization (SHS) is recently introduced framework concerned with treating adult and teenagers who want to speak fluently. The uniqueness of this approach lies in synchronization of hand movements (HM) with speech production, thus facilitating the learning of a new and improved fluency of speech. This happened within the framework of prescribed number of SHS sessions. This approach focuses on fluency -but the strategies that help the person achieve fluency also tap (focus on) aspects which are intrinsic to those who stutter. The SHS was originally devised following a review of data

of stuttering-related therapies from many therapeutic programmes. The SHS approach was initially tested with school-age individuals who stuttered but manage to reduce the stuttering overall, from the original 1 year, of therapy time which is required [3]. The SHS approach seeks to combine approaches from various different disciplines. With this in mind, the literature review has incorporated a number of different considerations, namely: speech and language pathology, neurology, psychology and self-improvement strategy, and a number of different therapeutic initiatives are implicated, namely Fluency Shaping (FS) [4], Gesture [5,6], Cognitive and Coping [7-10], Habits [11,12], Self-evaluation and problem-solving [13].

The Camperdown Program (CP) is a speech restructuring treatment developed for adults who stutter. The term speech restructuring refers to any treatment that requires the client to learn the novel speech pattern that is incompatible with stuttering. The prior study by O'Brian et al. [14] was carried the Phase I trial with 10 adults suggested that telehealth, a viable model for delivery of a speech-restructuring treatment known as the Camperdown Program [15].

Program phases: The program consists of four stages:

Stage I: Teaching Treatment Components (Here clients learn the skills needed to undertake the program).

Stage II: Instatement (This occurs within the treatment environment where clients develop consistent control of their stuttering, refine self-evaluation skills and develop problem-solving strategies. The goal was to attain natural-sounding stutter-free speech)

Stage III: Generalisation (Clients develop strategies for controlling their stuttering in everyday speaking situations).

Stage IV: Maintenance (Here clients develop problem-solving skills to prevent relapse).

The current study was the monitor study for the Almudhi et al [2016], a pilot study of 30 participants opted from 3 categories (i) SHS (ii) CP and (iii) control group (CP). The aim of this current study was the follow up study after 3 months in 30 participants with and without subjects and controls to innovate the novel stuttering therapy procedure and to evaluate its efficiency in adults who stutters in accomplishing spontaneous fluent speech.

Materials and Methodology

As we described earlier in the pre as a pilot study designed at Abdul-Aziz Medical City National Guard Hospital, capital city of Saudi Arabia between 30 Saudi nationalize adults. The participants were separated into 3 treatment groups i.e., (i) SHS (ii) CP and (iii) control group CG

and each group were involved with 10 participants. The selection of participants, inclusion and exclusion criteria were described briefly in the prior publication [16].

Results

3-month follow-up with SSI-4 instrument and SHS: CP and CG groups

The results indicate differences between the post-clinic of 3-months follow up for SHS was significant deterioration, the absolute value is very small, particularly when compared with the pre and post results (p=0.06). There is significant difference in SHS group and non-significant results were obtained in CP and CG groups (p=0.07 and p=0.44). The other details have been described in Table 1.

Paired Differences						t	df	Sig
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
SHS post SHS 3m	-1.900	2.02485	.64031	-3.34849	-0.45151	-2.967	9	0.016
CP post CP 3m	-1.300	2.05751	.65064	-2.77185	0.17185	-1.998	9	0.077
CG post CG 3m	-0.400	1.57762	.49889	-1.52856	0.72856	-0.802	9	0.443

Table 1: Paired sample t-test: Descriptive Statistics for post, 3-month of clinic SSI-4 scores for SHS, CP and CG group

(I) Group 1	(J) Group 1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SHS	CP	-3.2000	1.60485	.169	-7.2963	.8963
	CG	-13.9000*	1.60485	.000	-17.9963	-9.8037
CP	SHS	3.2000	1.60485	.169	-.8963	7.2963
	CG	-10.7000*	1.60485	.000	-14.7963	-6.6037
CG	SHS	13.9000*	1.60485	.000	9.8037	17.9963
	CP	10.7000*	1.60485	.000	6.6037	14.7963

Table 2: Multiple Comparisons between SHS, CP and CG at post clinic (Bonferroni test)

Bonferroni adjustment (correction) is used to adjust the p-value when several dependent tests are performed simultaneously on a single dataset. Bonferroni correction aims to reduce the chances of obtaining false-positive results (type I errors) when multiple pairwise tests are performed. Results in Table 2 indicated no significant differences between SHS and CP groups (p=0.169) while significant differences between SHS and CP and the control group (p=0.000).

Descriptive analysis for 3 months follow up for SHS, CP and CG groups with OASES

The results reveal that SHS, CP and CG (p>0.05) were not effective on 3-month follow up and Table 3 consist of statistical analysis with OASES. The results of Bonferroni test in Table 4 demonstrate an equality between SHS and CP groups, p=1, which means that these two treatments are equal in their effectiveness and reduction of stuttering at post clinic level. However, there were significant differences between the SHS and CP and the control group.

Paired Differences						t	df	Sig
				95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper		
Pair 1	SHS post SHS 3 m	-0.92	2.85182	0.90183	-2.96007	1.12007	-1.02	9	0.334
	CP post CP 3 m	1.47	2.22463	0.70349	-3.06141	0.12141	-2.09	9	0.066

	CG post CG 3 m	-0.77	2.05861	0.65099	-2.24264	0.70264	-1.183	9	0.267

Table 3: Paired sample t-test: Descriptive Statistics for post, 3-month and 6-clinic OASES scores for SHS group

(I) Group 1	(J) Group 1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SHS	CP	3.2500	4.22463	1.000	-7.5332	14.0332
	CG	-13.5000*	4.22463	.011	-24.2832	-2.7168
CP	SHS	-3.2500	4.22463	1.000	-14.0332	7.5332
	CG	-16.7500*	4.22463	.001	-27.5332	-5.9668
CG	SHS	13.5000*	4.22463	.011	2.7168	24.2832

	CP	16.7500*	4.22463	.001	5.9668	27.5332

Table 4: Multiple Comparisons between SHS, CP and CG at post clinic (Bonferroni Test). Dependent Variable: Post clinic.

Descriptive analysis for 3 months follow up for SHS, CP and CG groups with LCB

The follow-up results of LCB with SHS, CP and CG groups are shown in Table 5 and could not show the effective results in post follow up for 3 months (p>0.05). The results of Bonferroni test in Table 6 displayed no significant differences between SHS and CP groups while significant differences in relation to the control group at post-clinic treatment.

Paired Differences						t	df	Sig
				95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	SHS post SHS 3 m	-1.30	2.86938	0.90738	-3.35263	0.75263	-1.433	9	0.186
	CP post CP 3 m	-1.90	2.92309	0.92436	-3.99105	0.19105	-2.055	9	0.070
	CG post CG 3 m	-0.0400	1.57762	0.49889	-1.52856	0.72856	-0.802	9	0.443

Table 5: Paired sample t-test: Descriptive Statistics for post, 3-month and 6-clinic LCB scores for SHS group.

(I) Group 1	(J) Group 1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SHS	CP	-.7000	2.38855	1.000	-6.7967	5.3967
	CG	-8.5000*	2.38855	0.004	-14.5967	-2.4033
CP	SHS	.7000	2.38855	1.000	-5.3967	6.7967
	CG	-7.8000*	2.38855	0.009	-13.8967	-1.7033
CG	SHS	8.5000*	2.38855	0.004	2.4033	14.5967
	CP	7.8000*	2.38855	0.009	1.7033	13.8967

Table 6: Multiple Comparisons between SHS, CP and CG at post clinic (Bonferroni test). Dependent variable: Post clinic. The error term is Mean Square (Error) = 28.526, *. The mean difference is significant at the 0.05 level.

Discussion

Overall, the research findings show a significant difference between post-clinic-tests carried out for 3 months in consideration to SHS, with the individuals in this group showing some improvement. Moreover, significant differences were established also between SHS treatment and the CG. Nevertheless, the research findings have highlighted no difference between CP and SHS in specific regard to SSI-4. The findings have also illustrated significant differences between the CG and SHS throughout the tests in terms of OASES. In regard to LCB, the paired sample t-test findings suggest a significant difference between the pre and post-clinic-tests, although the findings have not demonstrated differences in relation to the CP and SHS. Moreover, the t-test provides significant different results in relation to the CG and SHS in the pre and post-clinic-tests when utilizing the SSRS instrument, whilst equality between the SHS and CP (p=1) was found through statistical test.

The decline between post 3 months although statistically significant, is very small in absolute terms; it did not produce clinical improvement in stuttering. For example, in SSI-4, the score for pre-treatment was 34.0 and this improved by 18.8. However, the decline in performance between 3 months and immediately post treatment was only from 18.8 to 20.7. Therefore, from a clinical point of view, the differences between the post-treatment, 3 months although they may be statistically significant, they are not clinically consequential, and have no impact on overall performance. The change between pre and post

step change, while the change between any of the post-treatments are incremental, and are likely to take time before they become important. It can be argued that a certain amount of decline suggests significant improvement over long period of time. This maybe because motivation could wear down purely as a function of time and that the clients may forget the coping mechanisms [17].

There is no reason to assume that this will happen in SHS without testing the programme for a longer time such as five years to make some definite conclusions on sustainability. Clinically significant decline is also likely to be avoided because clients were advised to visit the clinic for a 50-minute therapy every 3 months. This aims to assist with spontaneous fluent speech and conversation, reading and also give the client the opportunity to raise any issues. If the clinician notices anything majorly going wrong, the client is referred back to the clinic for further therapy. The client would also be reminded of the motivational factors, that life is not perfect and that the responsibility is theirs. This is a core element of SHS.

It is very clear from the results that SHS is an effective programme, given the extent of the improvements made between pre and post, and the sustainability shown over the post, 3 months post-clinic periods. SHS is likely to take shorter time compared to CP because while both took 10 weeks in this study, in some studies CP took up to two years.

As set out by Hayes et al. [18], unlike the CP based approach that focuses on changing the content of thought, an acceptance-based therapeutic approach like the SHS focuses on awareness, acceptance and understanding of context. The result of this study therefore gives weight to the theory that acceptance can also reduce the frequency of stuttering and improve the fluency of speech [19]. The importance of this is not just the statistical significant gains at all stages (pre-treatment, post treatment, 3 months (follow up), but clinically meaningful, real and substantive changes that reduced the adverse impact of stuttering and real improvements in OASES.

The results on OASES were particularly important in this study. This is because, as set out by Yaruss et al. [20], despite the compelling evidence that OASES should be included in tests, its use has not been routine. This study has therefore added to the work on the practical application of this tool, which should contribute to the validity of the instrument. This study confirms that this instrument can measure the reduction in the impact of stuttering on general information, reactions to stuttering, communications in daily situations and quality of life. Also, Unlike SSI-4 that is filled in by the clinician, OASES is completed filled by the client, and is considered to be a good measure for the speaker's experience of stuttering.

Conclusion

Using specific tools in this study enabled the researcher to examine effectiveness of the SHS and CP programmes. Post-treatment results confirm non-significant association for 3 months programme sessions for SHS and CP. Consequently, the results were helpful in terms of exploring the effectiveness of the targeted programmes particularly when comparing their results with the CG. The current results indicate to follow up for 3 more months i.e. post study as 6 months follow up.

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