Effectiveness of week-long speech therapy by trained nurses in correcting articulatory errors in children after palatoplasty

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ABSTRACT

INTRODUCTION: Most of the children in Nepal undergo palate repair at a later age than ideal and develop articulatory errors. Very few speech pathologists are available in the periphery where great majority of cleft children reside. ReSurge International Surgical Outreach Program-Nepal provides week-long speech therapy camps in peripheral sites for post cleft palatoplasty children by trained nurses. This study examined the effectiveness of these speech therapy camps in correcting articulatory errors.

METHODS: This is a retrospective study of post palatoplasty patients with articulatory errors. Records of speech assessment performed before and after the week-long speech camp were retrieved and analyzed to compare the number and types of articulatory errors at different sound levels.

RESULT: Sixty patient records were analyzed. There were 36 males and 24 females. Average age was 7.7 years with a range of 3 to 22 years. Pre-therapy speech assessment revealed a total of 2294 articulatory errors with a range of 3 to 87 and a mean of 38.2. Highest number of errors were seen in retroflex (N=603, 26.3%) sounds followed by dental (N=568, 24.7%) sounds. After therapy a total of 502 articulatory errors (22%) were corrected. Five of the patients had correction of all the articulatory errors. The average number of articulatory errors also decreased to 30.8.

CONCLUSION: Speech therapy provided by trained nurses in a camp set up help in correcting compensatory articulatory errors in post palatoplasty children. This could be a model for countries where access to speech professionals is limited.

INTRODUCTION

Facial cleft deformities are one of the common congenital deformities. The cleft palate repair is aimed at normal or near normal speech development. Due to many reasons, not all the children who undergo cleft palate repair will have normal speech. Many of these children will develop compensatory articulatory disorders (CAD) especially if the surgery is performed after the child had already developed speech. CAD means the child will produce the sound defectively because the articulators (glottis, pharynx, velum, hard palate, alveolus, tongue, and lips) will be misplaced or the manner of sound production with proper air flow will be defective or because of both. The upper limit of the ideal age for cleft palate repair recommended by American Cleft Palate Craniofacial Association (ACPA) is 18 years.[1] The average age of patients at the time of cleft palate repair in Nepal is much higher than recommended by ACPA.[2]

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CAD can be corrected with speech therapy provided by professional speech pathologists. These professionals are very few in Nepal. Majority of our cleft children reside in the periphery. It is not practical for most of the children to be brought to Kathmandu for speech therapy which is usually a protracted procedure over several weeks and months. Considering these facts, ReSurge International Surgical Outreach Program of Department of Plastic Surgery at Public Health Concern Trust-Nepal designed a program where the families of cleft palate children are invited to a town near their home villages for a week-long speech therapy camp. Free food and lodging is provided for the child and the family. Since there are usually 50-70 children attending these camps at a time, one or two speech pathologists are not adequate. Thus there was need for training nurses in providing the speech therapy to cleft children. Over the years, these nurses, ten in number at present, are well trained following a curriculum and are capable of diagnosing the speech problems, formulating a speech therapy plan customized to the need of an individual child and executing the plan by themselves working under the supervision of a professional speech pathologist.

There are more than one modalities of correcting CAD.3 One modality is articulatory, also known as phonetic method. This study examines the effectiveness of the speech therapy by articulatory (phonetic) method provided by these trained nurses in a week-long camps.

METHOD:

This is a retrospective, cross sectional study of children who had under gone palate repair in the past and was found to have CAD at the week-long speech camps where they received articulatory therapy by trained nurses under the supervision of a professional speech pathologist. The records were collected from six different speech camps conducted from July to December, 2014. The records of the speech assessments before and after the week-long speech therapy were also analyzed by professional speech pathologists. Number of articulatory errors in different sounds were noted in the pre therapy records and compared with the records after week-long speech therapy at different sound levels. Patients with severe learning disabilities, hearing problems, obvious velopharyngeal incompetence, palatal fistula were excluded from the study. Microsoft Excel 2003 Worksheet was used for data analysis.

RESULTS:

There were a total of 60 patients. There were 36 males and 24 females. Age distribution is shown in Table-1. Average age was 7.7 years with a range of 3 years to 22 years as shown in Table-1.

Table-1. Distribution of males and females in different age groups.

Age of Patients	Male	Female	Total
3-5	12	11	23
5-10	17	7	24
>10	7	6	13
TOTAL	36	24	60

Eleven patients attended the speech camp for the first time. The highest number of speech camps attended was 12. Table-2 shows the distribution of the number of camps attended.

Table-2. Distribution of number of camps attended by patients

Number of camps	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Number of patients	11	9	14	8	5	3	2	4	0	1	1	1

During pre-therapy speech assessment in the beginning of the week, a total of 2294 compensated articulatory errors were identified in 60 patients. The range of errors was 3 to 87 with a mean of 38.2. Highest number of errors were seen in retroflex (N=603, 26.3%) sounds followed by dental (N=568, 24.7%) sounds. Articulatory errors seen in the highest number of patients (54) was dental sounds followed by retroflex sounds which were seen in 53 patients as shown in Table-3.

Table-3. Distribution of types of errors pre-speech therapy

Number of Patients	Sound with Errors	Total	Average number of erros in individual patient
23	Bilabial	189	8.2
54	Dental	568	10.5
53	Retroflex	603	11.3
47	Iveolar	551	11.7
12	Palatal	32	2.6
35	Velar	321	9.1
10	Glottal	30	3

After a week-long speech therapy by the trained nurses, the total number of articulatory errors reduced to 1792 from 2294. Thus a total of 502 articulatory errors (22%) were corrected in a week. Five of the patients had full correction of their articulatory errors. The average number of articulatory errors also decreased to 30.8 from 38.2 as shown in Table-4.

The highest number of sounds corrected was in Dental sounds (N=153) followed by Aveolar sounds (N=105), Retroflex sounds (N=104), Velar sounds (N= 78) and Bilabial sound (N= 42) as shown in Table-6.

Table-5. Distribution of types of errors post speech therapy

Number of Patients	Sound with Error	Number of Errors	Average Number of Errors in an individual Patient
19	Bilabial	147	7.7
40	Dental	415	10.3
47	Retroflex	499	10.4
38	Alveolar	446	11.7
8	Palatal	31	5.8
29	Velar	243	8.3
5	Glottal	11	2.2

Table-6. Distribution of corrected sounds types and numbers

Pre Speech Patients	Post Speech Patients	Sound s With Errors	Pre Speech Errors	Post Speech Errors	Total Number of Errors corrected
23	19	Bilabial	189	147	43
54	40	Dental	568	415	153
53	47	Retroflex	603	499	104
47	38	Alveolar	551	446	105
12	8	Palatal	32	31	1
35	29	Velar	321	243	78
10	5	Glottal	30	11	19

DISCUSSION:

The need to develop community- based speech therapy model was realized by many in the past.4, 5 It has been found to be cost effective as well.6 It is usually the developed countries that enjoy the luxury of adequate number of speech therapy professionals. Developing countries like Nepal will not have adequate speech professionals for a long time to come. Only one Bachelor Level training program in the whole country with limited number of trainees per year will not be able to supply the required number of professionals. This has led to the need of training paraprofessionals in speech therapy especially for remote areas in the developing countries.7

The need to provide the service of speech therapy for the cleft children at peripheral sites closer to the homes of cleft palate children was realized in the cleft program of Nepal during its early stage in the year 2000 which is reported elsewhere.8 Later, the increased number of cleft palate children post palatoplasty demanded the need to train the nurses so that larger number of children could receive the therapy at the same time.

The provision of speech therapy camp not only provides the much needed speech therapy but it also gives a lot of opportunities for the children to develop their social skills by interacting, playing with other similar children and their families. Their interaction with the therapists, nurses, plastic surgeons, maxillofacial surgeons, orthodontists, general dentists and a team of coordinators also gives them ample opportunity to see, learn and experience new things. The children also undergo basic dental care, oral hygiene activities including awareness and practices.

The present study though preliminary one, showed the therapy to be effective in reducing the articulatory errors. If the children have problems with multiple sounds, therapists make plans to address only some errors of certain sound suitable to be corrected for their age and stage of their language development. All errors cannot be addressed at the same time in the same child. This also limits the number of errors correctable in a week. A longitudinal study will be much better to show the progress in individual child.

Patients' families cannot be out of home for a long time since they also have many other needs to attend such as another child , animals and farms. Many may have to depend upon their daily earning. One week, though long for patients' families, is not adequate for

majority of the patients who need intensive therapy for their large number of errors in many sound levels. More frequent speech therapy camps are needed to be organized than once a month at present. Another option would be to train more nurses so that they can spend more time with individual patients every day during the week.

A larger study with blinding of the speech assessment by external speech pathologists could be a logical next step since real double blind controlled trial is not practical and may not be ethical either. Articulatory errors which were not addressed for correction during the week may be used as control for that week. A longitudinal study of following the same patients over many camps could also give a better understanding of the effectiveness of the therapy. Continuous training of nurses on speech assessment is needed so that there will be more uniformity and consistency to improve the reliability and validity.

CONCLUSION:

Speech therapy provided by trained nurses in a camp set up help in correcting compensatory articulatory errors in post palatoplasty children. This could be a model for many developing countries where the access to speech therapy by professionals is limited.

ACKNOWLEDGEMENT:

We want to thank ReSurge International for providing the fund for free cleft surgeries as well as for conducting speech therapies for cleft children. We also want to thank Ms Rosie Sleater for her untiring effort to train the nurses in cleft speech therapy for more than a decade. Our thanks also goes to the coordinators who organized the speech camps.

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