

INNOVATIVE SPEECH RECONSTRUCTIVE SURGERY

Hashem Shemshadi ., MD., FACS., FICS

**Research Department of Speech and Language Sciences
University of Social Welfare and Rehabilitation Sciences , Tehran , IRAN**

Abstract :

Proper speech functioning in human being , depends on the precise coordination and timing balances in a series of complex neuromuscular movements and actions .Starting from the prime organ of energy source of expelled air from respiratory system; deliver such air to trigger vocal cords; swift changes of this phonatory episode to a comprehensible sound in RESONANCE and final coordination of all head and neck structures to elicit final speech in Articulators, are needed to function elegantly together.

Any defects in this pathway with any etiology, creates speech difficulties. Reconstructive procedures to correct these defects as much as possible , is the basis of Speech Reconstructive Surgery.

Embellishing a team work , consisting of different specialties with a major role for speech and language pathologists is the golden opportunity to gain a successive information which helps the surgeon in pre,intra.and postoperative period . Mutual exchanges of information among these different specialties related to speech pathology , will initiate a great success for everyone in the team, especially the patient.

Key Words : Speech Reconstructive Surgery / Speech Pathology / Speech and Language.

HISTORICAL PERSPECTIVE

Generally speaking, the reconstructive head and neck surgery and specifically speech reconstructive surgery has undergone revolutionary changes over the past twenty five years . Prior to this evolution , the prolonged speech reconstructive surgeries of the head and neck , performing in multiple stages , were considered routine . Today many stages have been narrowed down to a single stage in speech reconstruction surgery . The new look also has been influenced by other innovative happenings in other clinical specialties. Sophisticated radiological assays , improvements in anesthetic agents progress in training in plastic and reconstructive surgery and inventing harmless paraclinical means such as tridimensional computerized tomography , computer magnetic resonance imaging and appliances of computer softwares and hardwares made the clinicians to stay at ease for a better anatomical deranged speech pathology diagnosis.

Traditionally , not many patients with speech difficulties knew surgical intervention may correct their problems and not too many serious clinical and paraclinical lab works were felt by therapists , to be needed in diagnosis of speech pathology . Presently , many surgeries performed toward restoration of function by changing the anatomical contours . The new concepts circle around the improvement of the quality of life . This means obtaining a better

communication process , speech problems should be assigned as if there is some anatomical defect which could be altered surgically . The present generation of speech reconstructive surgery and its modern technology incorporating the use of meticulous methods for tissue transfer has allowed speech reconstructive surgeons to be more willing to operate , with less morbidity and mortality , resulting an improved functions of articulator organs of speech . From a practical standpoint , the speech reconstructive surgeries should be performed and approached with proper speech functioning in mind . One method of assessing the impact of patient's speech problem versus reconstructions of respected deranged anatomy , is to ensure the functional improvements towards an increase in patient's quality of life . Although it is difficult to precisely define quality of life , one can conceptualize as an appraisal of the patient's overall wellbeing in the state of creation of a better communication bridge with others by evoking an intelligent speech .

SPEECH AND LANGUAGE

In recent years , to be able to communicate better with others has been considered as a golden power of success. Those who can communicate better , can easily convey their experiences, knowledge , ideas and feelings to others . Communication has two scientific stages ; language and speech. Language , is considered as a structured symbolic system for interpersonal communication composing of sounds arranged in ordered sequences to form words . Linguistic rules are used to express thoughts , intentions , experiences and feelings . They consist of phonological , morphological , syntactical ,

semantic and pragmatic components .

Speech employs the above mentioned language codes into the obvious motor acts of verbal expressions. Such motor acts are closely related to proper functioning of respiratory , phonatory , resonance and articulation system . The therapist should make sure , that the respiratory function works well for the prime energy source of speech act; that is holding a good expiratory source of air for an efficient energy needs . Physiological processing of such energy by passing of air through larynx and vocal tract and subsequent change into acoustic energy .

This process creates vibration in the vocal cords . Such produced vibrations are further forced into the existing anatomical cavities below , back , front and above the larynx and pharynx to diminish and or potentiate their quality into a more comprehensible energy sound . This episode is named " resonance " , which involves effectively the major parts of " hypopharynx " , " oropharynx " (mouth) and the nasopharynx (nose) .

Energy sounds are accurately placed in further organs of speech production for the harmonized movements of different anatomical section in providing a "voice" which has the optimal value in a communication act , is called "articulation " process .

Speech reconstructive surgeon as a member of speech and language pathology team , is responsible for the surgical repairing of those anatomical defects .

PREOPERATIVE SPEECH EVALUATIONS

Although there are numerous reports regarding speech reconstructive surgery , there are relatively few reports that the sur-

geon has assessed speech values preoperatively . The initial evaluation of the patient's speech and hearing , relating to the proper functioning of articulators is important . Various evaluative techniques are needed to be performed after a complete history and physical examination , which enables the team work to assess the speech functional properties in the preoperative period . A number of speech functional evaluation tools may be those of imaging and non - imaging procedures to evaluate the respiratory , phonatory , resonance and articulators physiology . One may evaluate oropharynx and the velopharyngeal sphincter motion by videofluoroscopic study .It allows visualization of activity of tempromandibular joints during speech production , the occurrence of the harmonized movements of soft palate in episodes of coupling and uncoupling . Movements of tongue , tongue- base , pharyngeal wall, cricopharyngeal , hyoid and the larynx are evaluated during swallow - reflex and speech production . Fiberoptic endoscopic tool along with recent application of computer softwares and hardwares , also evaluate the articulatory movements in speech. These movements are assessed directly and / or indirectly , converted to graphs and diagrams, to whom the non - harmonized, out - of - shaped ,space - occupied lesions and other defected chambers of speech organs . X - ray studies such as skull X - ray and cephalometric analysis may also be needed for oromaxillofacial correlations related to any speech difficulties .

SURGICALLY CORRECTABLE SPEECH PROBLEMS

After precise evaluation of the patient's general health and close cooperation within the team work, operative plans are settled .

Preoperative speech and hearing measures are considered simultaneously different with the team specialists . Neurolinguistic components are assayed and evaluated. Clinical and paraclinical tests are performed and exact speech problems are tabulated with existing anatomical derangements .Most of the speech reconstructive surgery , are related to congenital anomalies such as cranio-maxillo- facial , cleft lip along with or without cleft palate, dental anomalies,maxillary protrusion-retrusion, tempromandibular joint defects pro / retrognathism , macroglossia,ankyloglossia,velopharyngeal insufficiency , oronasal fistula , nasal septal deviations , nasal malformations and laryngeal stenosis are some of the examples which create speech problems and most of which can be corrected surgically. By performing specific surgical procedure for any specific anatomical defect , we can alleviate respected speech problems . Some of the most commonly occurred speech problems, which may be corrected surgically are as follows :

HYPERNASALITY , due to any abnormal fistulas and/ or malfunctioning of coupling and uncoupling phenomenon. **HYPONASALITY** , due to any airway physical obstructions such as adenoids , polyps ,nasal septal deviations and a non - successful pharyngeal flap procedures . **NASAL EMISSIONS** , due to palatal clefts , usually produced when the patient initiates production of voiceless plosives and fricatives . **NASAL RUSTLE** , due to severe palatal cleft , which its typical sound is generated from pharynx while the patient is trying to produce a voiceless sound . **LISP** , due to any odontofacial anomalies and / or improper tongue placement due to its small size - microglossia and / or its large size - macroglossia . **ARTICULATION** errors which may be obligatory or compensatory , are usually due to the anatomical defects in lips, upper and

lower jaws, velum , tongue , pharynx , cheeks , fauces , hyoid bone, larynx , uvula , alveolar ridge , nose , teeth and sinuses . Compensatory errors usually occur as SUBSTITUTIONS which are errors in learning caused by wrong placing and/ or other manner of articulation . They may be corrected by speech therapy procedures .

VOICE DISORDERS , due to any possible anatomical defects through the larynx and pharynx , such as polyps , adenoids , benign and malignant lesions may also be corrected surgically . The prime sign of any of the above mentioned correctable pathology , is HOARSNESS which can be produced by anything that interferes with optimum vocal fold adduction ; pitch level is usually low and the range is restricted .

CONCLUSIONS AND RECOMMENDATIONS

Communication, through language , leaves a very important role in human life . Once the vocabularies and lexicons exist , processed , refined and get available in any given "language " the organs of "speech " are considered as equally important in coding these language signs . Such organs must stay in good health and remain in proper anatomical contours and function in order to produce an intelligent speech.

Innovative reconstructive surgeries aiming at alleviation and / or elimination of any speech pathology is highly respective . Exact clinical and paraclinical evaluations for the precise nature of speech problem is mandatory.

Cooperation of different specialties , somehow related to speech pathology and their unifications as a teamwork is highly recom-

mended . Conjoined and interchanging different specialist views by neurolinguists, speech pathologists, oromaxillofacial and otolaryngeal surgeons , radiologist , clinical nurses , anesthetics and other related fields are so important in better judgements of team work in subjective , objective , assessments and plans in any speech , language and hearing problems .

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