From Mirror to Microscope and There After

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Homo sapiens appeared on the surface of the earth about 30,000 years back. Infinitely smaller than a Brontosaurus and infinitely weaker than a tyrannosaurus it has not only ruled the earth but has also changed its face, during this short period. One of the important characteristics of this intelligent man is its adaptability not only with the surroundings but also within itself. An important example is our larynx.

Phylogenetically primitive larynx developed in long fish as a constrictor muscle to protect the lower respiratory tract, but man has used this organ for production of voice and has modified it into speech and language.

The anatomy of this unique organ was first described by Galen (130-200 AD). He described three cartilages and paired muscles. For several centuries Galen's description of larynx was the last word. Subsequently various scientists of the Renaissance age improved the knowledge of anatomy of larynx. Notable among them were Leonardo da Vinci (1452-1519), Vesalius (1514-1564), Fallopio (1523-1563), Fabricius (1537-1619) and many others. Last three were Prof. of Anatomy at the University of Padua. The term vocal cord was coined by Ferrius in 1741 who thought they are like strings of musical instruments.

As the anatomists and physiologists were busy describing the structure of larynx accurately and understanding its function efforts were on to find out ways and means to examine this organ clinically. It was no easy task as the organ lies deep inside the throat. Bozzini (1773-1809) introduced light conductor in which illumination

and reflection by mirror was utilised. Robert Liston of Scotland described a laryngoscope in 1937. But it was left to Manuel Garcia (1805-1906) a Spanish singing teacher residing in London to start a new era of laryngology. In 1854 he had gone for a visit to France. One afternoon while he was walking, he noticed the reflection of sun on the glass window of Royal Palace. Like so many discoveries which has appeared in the mind of the discoverer in a flash, Garcia also got an idea instantly. He purchased a dental mirror and used it to reflect the ray of sun on his own larynx and visualised the open glottis on a hand mirror. He presented his discovery to the Royal Society on March 13, 1855. Three years later his method of examining the larynx was made a permanent part of laryngology by the New Vienna School.

Simultaneous attempts were being made to examine the larynx directly. In 1858 Cutter of Massachusetts devised a laryngoscope with two tubes one for illumination and other for observation. Kirstein of Berlin (1895) successfully examined larynx and trachea without mirror. Gustav Killian of Mainz performed direct bronchoscopy in 1898. He also introduced suspension laryngoscope in 1912, probably a precursor to modern laryngoscope used for microlaryngoscopy.

Direct laryngoscopy so far was being performed using external light source, most common being the headlights worn by the observer. The revolutionary concept of light carrier with a tiny bulb to be used with the laryngoscope was introduced by Jackson in 1915. Since then many

modifications of laryngoscope and lighting system has taken place.

Introduction of microscope in otology by Gunner Holmgren in thirtees gave a big boost to the progress of otology. It took the imagination of Kleinsausser in late 1950 to use microscope for endolaryngeal surgery. Simultaneously Jako in Boston was also experimenting with use of magnification for endo laryngeal surgery. Both Kleinsausser and Jako started with loupe for magnification but the result was not satisfactory. Finally both switched on to Zeiss Microscope. With the development of 400mm lens by Zeiss microlaryngeal surgery reached its culmination.

Light travels in a straight line and its path can be changed by reflection and refraction. Laryngologists many a time face difficult in getting a good view of larynx due to anatomical

abnormalities. This problem was solved with the introduction of optical fibre. These are very thin, flexible glass rods. These very thin fibres can be coherently arranged in bundles and the ends can be ground and polished. If one end of the bundle is placed in contact with or very close to an object the image of that object will appear at the other end. Now a major hurdle has been overcome. Light can be made to travel along an arc and flexible endoscopes are born, which can twist and turn taking the vision to the books and corners.

Progress of science is a continuous process. It has taken the efforts of many a thinker who by the originality of their thoughts has brought laryngology to this stage. But there are many more hurdles to overcome. Our aim is perfection and the key to it lies in the hand of future generation.

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Congratulation !

Dr. A. K. Lahiri, Senior Consultant, Sir Gangaram Hospital, New Delhi has been invited to deliver Dr. R. G. Kar Memorial Lecture on Aug '97 at the R. G. Kar Medical College & Hospital, Calcutta.