Rotatory Crossgraphy (Rotatory Cross Section Radiography) of the Neck

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The apparatus\(^1\)\(^2\)\(^3\)\(^4\) employed for the present study of rotatory crossgraphy was the same as was described in the report published in a preceding number of this Journal. The exposure here continued 9 seconds, under the conditions of 57 kv of the tube terminal, 40 ma in the tube current, with the focus-body rotation table distance of 98 cm. and the body table-film table distance of 50 cm.

Results

23 healthy adults were roentgenographed at nine cross sections of the neck. Each of the sections was selected so that it might be horizontal to the base cross section which included the hyoid bone in the erect position. They are called in the order from top to bottom, the First, the Second—and the Ninth Cross Section. The x-ray image of every cross section consists of three parts different in density respectively caused by the moderate opacity of soft tissue, by the opacity of bone, and by the translucency of the upper air passage.

First, in order to show the topographical features of the upper air passage and the cervical spine, the Second and the Fifth Cross Sections will be detailed below.

The Second Cross Section (The Base one) (Fig. not given). This was radiographed at the height of the hyoid bone.

The contour of the image is a deformed oval with its dull pole directed backwards. The hyoid bone, being convex at the front, is imaged most
anterior in the cross section; and the upper air passage, shaped trapezoid in the cross section, is situated at the back of this bone. Epiglottis, crooked occasionally, and plica pharyngoepiglottica which connects epiglottis and the lateral wall of pharynx, form a border line in pharynx, and divide the trapezoid of pharynx into two parts, namely, vallecula glossoepiglottica at the front and aditus laryngis at the back. The cervical spine is imaged at the center of the cross section. The canal of this spine is bordered anteriorly by a spinal body (C₄), laterally by arcus vertebrae and posteriorly by processus spinalis. At the back of this processus spinalis (C₄) is traversed the lowest part of processus spinalis (C₆), which is imaged as two separate pieces.

The Fifth Cross Section (Fig. 1). This was radiographed at the height of incisura thyreoidea cranialis, which is approximately 15 millimeter lower than the Base. This section is a little larger in size than the Second. The contour forms a deformed hexagon, which is due to the necks bending backwards at the time of roentgenography. Most anterior in the cross section is rima vestibulæ, imaged pyramidal in shape, with the apex directed frontwards; and posterolateral to that and on each side is a pair of recessus piriformis, pyramidal and with its apex directed laterally. Rima vestibulæ and a pair of recessus piriformis form an isosceles triangle, each being situated at one of its vertices. The cervical spine (C₅) is traversed at the back (about 5 mm.) of the upper air passage. A gap between the body and the arch of the spine corresponds to incisura vertebrae. A fleck at the back of processus spinalis (C₅) is the image of the forkshaped termination of processus spinalis (C₄).

The general view of the upper air passage in the cross section will be detailed then.
The Cross Section of Larynx (Fig. 2 and 3.) In the middle of pharynx, 5 mm. higher than the Base Cross Section, epiglottis is imaged with an arch, convex frontwards and dividing pharynx into two areas, that is, the area of the root of the tongue at the front and the opening of aditus
laryngis at the back. Projections from both of the lateral walls of pharynx are the images of plica palatopharyngea.

The x-ray image of the next cross section, namely, the Base one is detailed upper. Epiglottis increases its thickness and curvature, and vallecula formed by epiglottis and the root of the tongue at its front.

In the Third Cross Section radiographed 5 mm lower than the Second, vallecula is missed, and aditus laryngis, of which lateral wall is bordered by plica aryepiglottica, appears with the shape of an ellipse.

In the Fourth Cross Section, 5 mm. lower still, tuberculum corniculatum is imaged as a back border in the contour of this area of larynx. It looks like a butterfly spreading its wings. Vestibulum laryngis, which is bordered by two thin membranes of plica aryepiglottica, is imaged at the front of the wings of this butterfly.

The x-ray image in the next cross section is given in Fig. 1. This was radiographed only under the condition of normal breathing. Rima vestibularis and recessus piriformis are situated at the vertices of an isosceles triangle.

In the Sixth one radiographed 5 mm. lower, recessus piriformis has disappeared. Ventriculus laryngis is imaged indistinctly here. This, however, is imaged clearly, as shown in Fig. 3. VI, only when "A" is pronounced by the subject.

In the Seventh Cross Section, 3 mm. still below, ventriculus laryngis reduces its size, and its contour becomes narrow again on either of the both sides. This is the image of rima glottidis. Rima glottidis is difficult to gain an image in radiography, except when the subject is breathing normally.

In the Eighth Cross Section radiographed 5 mm below, rima glottidis changes in shape and increases its size again. This is the image of cavum laryngis. Cavum laryngis is an ellipse with the longitudinal axis directed frontwards. In the cross section radiographed 15 mm below still appears the x-ray image of trachea with a round contour.

CONCLUSION

The cross section radiography of the neck enables us to know the topographical features in the neck. The complicated structures of larynx and spine, namely, rima ventricularis, ventriculus laryngis, rima glottidis, and incisura vertebrae etc. are imaged there.

References
4) Takahashi, S., and Obara, J., ibid., in press.