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Peeled and Piled Volume Models of the Kidney that Show Actual Morphology

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Fig. 1. The peeled (-12 mm) model of right kidney reconstructed by computer software (left and right). The level of peeling is indicated with green line on the reference sectioned image (center). The renal column includes the interlobular artery and vein. Head shapes are appended to represent the viewpoints of the volume model and the sectioned image: anterior view (left), horizontal view (center), and posterior view (right).



Fig. 2. The piled (+12 mm) model of right kidney. The followings are found on the anterior surface of the kidney: liver (superolateral), inferior vena cava and renal vein (superomedial), ascending colon (inferolateral), and the duodenum (inferomedial); On the posterior surface, we identify the followings: 12th rib (superior), latissimus dorsi (lateral), erector spinae (medial), quadratus lumborum (inferolateral), psoas major (inferomedial), and external oblique muscle (posterior).

© 2016 The Korean Academy of Medical Sciences. This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. Current learning tools such as photographs, cadavers, and computer models are not sufficient for learning the comprehensive anatomy of the kidney and its surroundings. The objective of this research was to aid medical students by presenting tutorial software that contains peeled and piled volume models of the kidney. The sectioned images of donated female cadaver (age at death, 26 years; cause of death, stomach cancer; kidney pathology, none) were stacked to reconstruct three-dimensional volume model (voxel size, 0.2 mm) (1). Peeling and piling of the model were continuously carried out (intervals, 0.4 mm) to explore the inside and outside of the kidney (2).

For convenient browsing, 61 peeled and piled models (from -12 mm to +12 mm) in anterior, posterior, medial, and lateral views were put into software (Fig. 1 and 2). "Browsing software (Male - Peeled and piled kidney) (118 MB)" can be downloaded from the website (anatomy.co.kr) or directly from the address (http://vkh.ajou.ac.kr/Browsing_software_(kidney)_set-up.exe) without charge or registration.

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