Radiology of the Adult Soft Palate

Russell H. Morgan Department of Radiology and Radiologic Science, and The Johns Hopkins Swallowing Center, The Johns Hopkins Medical Institutions, Baltimore, Maryland, USA

Abstract. Radiographic examination of the adult soft palate has been largely ignored, perhaps because the soft palate is easily inspected on its inferior surface and visualized on its superior surface with a flexible nasopharyngoscope. The major radiologic effort to date has been in the evaluation of cleft palate. A variety of adult neurologic, inflammatory, and neoplastic disorders of the soft palate, however, can benefit from radiologic examination. This article describes useful radiologic techniques, reviews the anatomy of the soft palate, and presents illustrative pathologic states.

Key words: Radiography, velum – Radiography, soft palate.

Technique of Examination

Examination of the soft palate is usually included in radiologic evaluation of the patient with dysphagia. This consists of both an air-contrast spot film examination to elucidate anatomic detail and dynamic recording (videofluoroscopy or cineradiography) for motility.

Dynamic recording of soft palate motion is performed in the lateral position first during phonation and then during swallowing of a bolus of high-density barium. Lateral spot films of the pharynx are then obtained, which are centered at the base of the tongue for optimal exposure. If abnormal soft palate motion or nasopharyngeal regurgitation is observed, the soft palate is then coated with barium. One to 2 cc of high-density barium is instilled into each nostril through a shortened pediatric feeding tube (8 French) while the patient holds the head in a flexed position and sniffs. The superior surface of the soft palate and the walls of the nasopharynx are thus coated.

Although barium does not directly irritate the nasal mucosa (Skolnick 1969), intranasal instillation of barium is uncomfortable and is thus performed only when necessary. Indications for intranasal barium include (1) cleft palate; (2) nasal regurgitation by history or after initial swallow; (3) known or suspected oral or nasopharyngeal tumor; (4) cranial nerve deficit due to cerebrovascular accident, tumor, polio, or the like; (5) prior cranial or neck surgery or radiation; and (6) nasal quality of voice.

The lateral view is by far the most valuable view for evaluation of the soft palate as there is extensive bone and soft tissue overlap on other views. The AP view, however, is useful in evaluation of the lateral pharyngeal walls and uvular deviation. With the head in extension in the AP view, the soft palate is projected above the hard palate (Skolnick 1969). A basal view of the velopharyngeal portal also aids in evaluating the lateral aspect of the nasopharynx, the uvula, and the palatopharyngeal folds.

Lateral spot films are obtained at rest and during prolonged phonation of the vowel sound "Eee..." (as pronounced in "see"). Phonation demonstrates soft palate elevation and expands the tonsillar fossa, enabling the visualization of palatoglossal and palatopharyngeal folds. Vertece-mental spot views provide images of the lateral pharyngeal walls and are indicated when evaluating cleft palate, palatal fusions for cleft palate, nasal quality of the voice, nasal regurgitation, and soft palate asymmetry.

Anatomy of the Normal Soft Palate

Familiarity with the muscular anatomy of the soft palate aids in understanding its radiographic appearances (Fig. 1). The soft palate is formed by an interweaving of muscles contributed from the tongue (palatoglossus), pharynx (palatopharyngeus), skull base (tensor veli palatini, levator veli palatini), and tubal cartilage (salpingopharyngeus). Only the small musculus uvulae is intrinsic to the soft palate. The soft palate is suspended from the skull base by the tensor veli palatini and the levator veli palatini, which course down the nasopharyngeal wall, enter the soft palate laterally, decussate, and fuse in the mid line with their partner from the contralateral side. The tensor is a flat-bellied muscle that mainly arises from the posterior edge of the greater wing of the sphenoid, with a component from the tubal cartilage. Its
fibers converge downward to form a tendon that hooks around the pterygoid hamulus (Fig. 2). The tendon courses horizontally, expands, and merges with its contralateral partner to form part of the fibrous skeleton of the soft palate, the palatine aponeurosis (DuBrul 1980).

The tensor tendon comprises part of the anterior portion of the soft palate and is attached to the posterior border and undersurface of the hard palate. When the tensor contracts the aponeurosis becomes taut from hamulus to hamulus. Radiographically, this is seen as a dip in the anterior